Micrel
Shortform Catalog

MICREL

Innovation Through Technology®

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Corporate Profile

Micrel Inc., is a leading global manufacturer of IC solutions for the worldwide Analog, Ethernet and High Bandwidth markets. The Company's products include advanced mixed-signal, analog and power semiconductors; high performance communication, clock management, Ethernet switch and physical layer transceiver ICs. Company customers include leading manufacturers of enterprise, consumer, industrial, mobile, telecommunications, automotive, and computer products. Corporation headquarters and state-of-the-art wafer fabrication facilities are located in San Jose, CA with regional sales and support offices and advanced technology design centers situated throughout the Americas, Europe and Asia. In addition, the Company maintains an extensive network of distributors and reps worldwide. Web: http://www.micrel.com.

Founded in 1978, Micrel maintains a portfolio of world class wafer fabrication processes that enable the Company to produce new products faster than the competition. The Company uses, singularly or in combination, CMOS, Bipolar and DMOS technologies in its analog products. With the acquisition of Synergy Semiconductor in 1998, Micrel has high-speed bipolar capability in the form of ASSET™ (All Spacer Separated Element Transistor) process. This proprietary, patented bipolar technology employs a narrow deep-trench isolation technique allowing for electrical isolation between adjacent circuit elements. This means the Company can place multiple analog and digital functions on the same IC without the various functions causing interference typically found when alternate techniques are utilized.

Ethernet ICs

Micrel is a leader in Ethernet technology. The Company's Ethernet products are consistently used in Wireless, VoIP, IP-STB, Industrial, Embedded and Media Converter Ethernet applications, to name but a few. There are a wide range of field-proven, multi-port products in a variety of packages, including Physical Layer Transceivers (Phys), Embedded Controllers, Unmanaged and Managed Switches and System-on-Chip (SoC) ICs with an integrated ARM processor and fully managed 5-port switch. Micrel's comprehensive portfolio of Ethernet products operate over commercial and industrial temperature ranges, and are available in a series of environmentally friendly, lead-free packaging options.

High-Bandwidth and Communication Semiconductor Solutions

Micrel's High-Bandwidth and Communication products include PMD (Physical Media Device) ICs such as multi-rate (up to 4.25Gbps) Laser drivers, post amplifiers and optical module management controllers for all types of fiber optical module applications. It also includes physical layer ICs such as 155Mbps and multi-rate (up to 2.7Gbps) CDRs (Clock and Data Recovery), and MUX/DeMUX ICs for Access and Telecommunications applications. This growing family of devices leads the industry in design innovation and flexibility. The ICs often exceed stringent industry requirements.

Precision Edge® Products

Micrel's Precision Edge® product family includes precision frequency synthesizers, clock distribution and translation, multiplexers, crosspoint switches, and high-speed gates—all aimed at meeting the most rigorous, timing-critical applications. All Precision Edge® products are designed to provide the lowest skew and jitter IC solutions available.

Low-Dropout Voltage Regulators

Micrel has gained a reputation as a leading supplier of LDO regulators and is a major global supplier to the mobile phone and computing industries. The Company maintains a very broad portfolio of LDO regulators ranging from 80mA devices in Teeny™ SC-70-5 packages to 7.5A power devices and LDO controllers for even higher current applications.

Radio Frequency Products

Micrel's RF offering consists of two product groups: QwikRadio® receivers and transmitters for actuation devices such as remote controls and remote keyless entry; and RadioWire® transceivers for connectivity applications such as wire replacement in industrial control and security systems.

Universal Serial Bus and PCMCIA

As a recognized leader of USB and PC Card power distribution solutions, Micrel's extensive selection of ICs are consistently used by many of the leading PC and peripheral OEMs.

Hot Swap Controllers

Micrel's hot swap power controllers support the industry requirement for high availability (24/7/365) operation in servers, telecom and datacom equipment, and enterprise storage networks. These products allow customers to upgrade or replace system boards without having to power down the entire system. Offering products for primary- and secondary-side applications, Micrel's family of hot swap power controllers offers customers a wide range of product choices uniquely suited to these applications. This product portfolio includes the award-winning MIC2590B, the industry's most integrated dual-slot hot swap power controller for PCI and CompactPCI applications. Leveraging Micrel's expertise in power control and distribution, the MIC2590B was designed to support Intel's Itanium® 64-bit server platforms. To address the next generation, dual-slot power controllers are in development. For primary-side applications, the Company continues to add innovative products to the high-voltage hot swap product portfolio, addressing power control applications for the telecommunications, data communications, and data storage equipment markets.

MOSFET Drivers

Micrel offers a broad range of MOSFET drivers, ranging from IttyBitty® devices in SOT-23 packaging to 12A high-power devices. "New" device families offer thermally enhanced exposed pad SOIC, MSOP and space saving efficient MLF® 2mm x 2mm, 3mm x 3mm and 4mm x 4mm package options.

Switch-Mode Power Supply Products

Micrel has a rapidly expanding portfolio of switching regulator products serving the mobile device, portable computer, telecommunications and industrial markets. All products combine Micrel's advanced processes with the Company's strong design expertise to produce best-in-class products. These products address step-up, step-down and multi-output systems, all offering designers speed and efficiency advantages.

System/Thermal Management Products

Thermal management is an increasingly critical function in today's portable and high performance systems. Micrel's proprietary technology enables more functionality in smaller packages and superior, real-world accuracy in temperature measurement via embedded thermal diodes. Thermal diodes are increasingly used to monitor the die temperature of high-performance integrated circuits such as Intel® and AMD® microprocessors, Xilinx Virtex®, FPGAs, and ASICs. Micrel's family of products include the world's first and only IttyBitty® SOT-23 thermal diode supervisor IC and the smallest three-zone thermal supervisor. All together, Micrel offers a complete family of one, two, and three-zone thermal supervisor ICs as well as both analog and digital fan controllers.

Operational Amplifiers and Comparators

The Company has a broad range of high and low voltage op amps and comparators. These ICs range from general purpose to high speed devices. Of particular note is the MIC86x family of ICs which are, by far, the lowest power consumption op amps of their type on the market. The advanced features of these products make them ideally suited for all forms of battery-powered equipment.

Other Product Lines

- Charge pumps
- Voltage references
- Voltage/processor supervisors
- Miniature MOSFETs
- Serial and parallel-input latched drivers
- Display drivers
- Latch drivers
- Custom and semi-custom products

Big Technology, Small Package Innovation

In response to increasing demands for smaller and smaller footprint solutions, Micrel leads the industry in packaging innovation with IC packaging options, including MLF® technology, down to 1.2mm x 1.6mm and smaller.

Quality Assurance

Micrel first achieved ISO 9001 registration on March 31, 1997 and on December of 2004, the Company's wafer fabrication facility was certified to ISO14001:1996, the International Environmental Management System Standard. The goal of the environmental management system is to ensure regulatory compliance and to reduce environmental impact through waste reduction and recycling. Micrel is committed to delivering products and services that meet or exceed our customers' expectations—error free, on-schedule, and at a competitive price. Micrel maintains a culture of continuous improvement that runs through all disciplines in the company and includes the activities of its suppliers.

Commitment to Customer Satisfaction

Micrel remains committed to contributing to its customers' success. Internal processes have been developed with flexibility in mind, so the Company can quickly react to changing requirements. Micrel's outstanding sales, customer service and technical support organizations are set up to address customer needs and requirements.

LDO Regulator Selection Guide

Micrel Advantange

- Industry's broadest LDO porfolio
- Lowest input voltages
- Best transient performance

- Lowest quiescent current and dropout
- High PSRR, Low noise
- Small and efficient packaging

Single Outputs

Device		I_{OUT}	V_{IN}	V_{OUT}	I_{GND} (Typ.)	$V_{DROPOUT}$ (Typ.)	Package	Comments	µCaP
MIC5231		10mA	3.5V to 12V	2.75, 3.0, 3.3, 5.0	650nA	150mV	SOT-23		Yes
MIC5232		10mA	2.7V to 7.0V	1.2, 2.8, 3.3	1.8µA	100mV	TSOT-23-5, MLF® (2x2mm)	Ultra Low I_Q µCap 10mA LDO with Reverse Current Protection	Yes
MAQ5280	New!	25mA	4.5V to 120V	Adj.	31µA	1.1V	eSOIC-8	Wide Input Voltage Range	
MIC5203		80mA	2.5V to 16V	2.6, 2.8, 3.0, 3.3, 3.6, 3.8, 4.0, 4.5, 5.0	180µA	300mV	SOT-23		Yes
MIC5213		80mA	2.5V to 16V	2.5, 2.6, 2.7, 2.8, 3.0, 3.3, 3.6, 5.0	180µA	300mV	SC70		Yes
LP2950		100mA	2V to 30V	5.0, 5.0 (0.5%)	100µA	380mV		2nd Source to Natl.	
LP2951		100mA	2V to 30V	5.0 (0.5%), 5.0 (1%), Adj.	100µA	380mV	SOIC, PDIP	2nd Source to Natl.	
MIC5200		100mA	2.5V to 26V	3.0, 3.3, 4.8, 5.0	130µA	230mV	MSOP, SOIC, SOT-223	Load Dump Protection.	
MIC5233		100mA	2.3V to 36V	1.8, 2.5, 3.0, 3.3, 5.0, Adj.	18µA	270mV	SOT-23	Reverse Battery Protection.	Yes
MIC5253		100mA	2.7V to 6V	1.5, 1.8, 1.85, 2.5, 2.6, 2.7, 2.8, 2.85, 2.9, 3.0, 3.1, 3.2, 3.3	100µA	165mV	SC70		Yes
MIC5270		100mA	–2V to –16V	–3.0, –4.1, –5.0, Adj.	35µA	480mV	SOT-23	Negative µCap LDO.	Yes
MIC5271		100mA	–3.3V to –16V	–3.0, –5.0, Adj.	35µA	480mV	SOT-23	Negative µCap LDO.	Yes
MIC2950		150mA	2V to 30V	5.0, 5.0 (0.5%)	120µA	300mV		High V_{IN}, Load Dump Protection.	
MIC2951		150mA	2V to 30V	3.3, 4.85, 5.0 (0.5%), 5.0 (1%) Adj	120µA	300mV	MSOP, SOIC, PDIP	High V_{IN}, Load Dump Protection.	
MIC5205		150mA	2.5V to 16V	2.5, 2.7, 2.8, 2.85, 2.9, 3.0, 3.1, 3.2, 3.3, 3.6, 3.8, 4.0, 5.0, Adj.	80µA	165mV	SOT-23	Low Noise LDO.	
MIC5206		150mA	2.5V to 16V	2.5, 2.7, 3.0, 3.2, 3.3, 3.6, 3.8, 4.0, 5.0, Adj	80µA	165mV	MSOP, SOT-23	Low Noise LDO w/Error Flag.	
MIC5235		150mA	2.3V to 24V	1.5, 1.8, 2.5, 2.7, 3.0, 3.3, 5.0, Adj.	18µA	310mV	SOT-23	Zero Shutdown Current, Reverse Battery Protection.	Yes
MIC5236		150mA	2.3V to 30V	2.5, 3.0, 3.3, 5.0, Adj.	20µA	350mV	P-MSOP, P-SOIC	Load Dump Protected µCap LDO.	Yes
MIC5238		150mA	1.5V to 6V	1.0, 1.1, 1.2, 1.3	23µA	310mV	T/SOT	Low Voltage, Dual Supply µCap.	Yes
MIC5247		150mA	2.7V to 6V	1.5, 1.6, 1.8, 1.85, 2.0, 2.4	85µA	150mV	MLF® (2x2mm), T/SOT		Yes
MIC5248		150mA	2.7V to 6V	1.2	85µA	n/a	SOT-23	1.2V LDO with Power Good.	Yes
MIC5252		150mA	2.7V to 6V	1.8, 2.5, 2.8, 2.85, 3.0, 4.75	90µA	135mV	MLF® (2x2mm), SOT-23	Low Noise LDO.	Yes
MIC5254		150mA	2.7V to 6V	3.3/2.5	117µA	135mV	MSOP	w/Error Flags.	Yes
MIC5255		150mA	2.7V to 6V	2.5, 2.6, 2.7, 2.75, 2.8, 2.85, 2.9, 3.0, 3.1, 3.2, 3.3, 3.5	90µA	135mV	MLF® (2x2mm), TSOT	Low Noise LDO.	Yes
MIC5256		150mA	2.7V to 6V	2.5, 2.6, 2.7, 2.9, 2.8, 2.85, 3.0, 3.1, 3.3	90µA	135mV	T/SOT	Low Noise with Error Flag.	Yes
MIC5258		150mA	2.7V to 6V	1.2	85µA	n/a	SOT-23	1.2V LDO with Power Good.	Yes
MIC5265		150mA	2.7V to 5.5V	1.5, 1.8, 1.85, 2.5, 2.6, 2.7, 2.8, 2.85, 2.9, 3.0, 3.1, 3.2, 3.3	75µA	210mV	TSOT	General Purpose LDO.	Yes
MIC5268		150mA	2.7V to 6V	1.2	85µA	n/a	SOT-23		Yes
MIC5301		150mA	2.3V to 5.5V	1.3, 1.5, 1.8, 2.1, 2.5, 2.85, 2.8, 2.9, 3.0, 3.3, 4.6, Adj.	85µA	40mV	Thin MLF®, TSOT23-5 MLF® (1.6x1.6mm)		Yes
MIC5302		150mA	2.3V to 5.5V	1.3, 1.5, 1.8, 2.1, 2.5, 2.85, 2.8, 2.9, 3.0, 3.3, 4.6, Adj.	85µA	50mV	Thin MLF®, (1.2x1.6mm)	Ultra-small	Yes
MIC5304	New!	150mA		3.15/1.85	24µA	85mV	Thin MLF®, (1.6x1.6mm)	Single 150mA Micro Power ULDO™ with Voltage Select Pin	Yes
MIC5305		150mA	2.25V to 5.5V	1.5, 1.8, 2.5, 2.6, 2.7, 2.8, 2.85, 2.9, 3.0, 3.3, 4.75, Adj.	90µA	60mV	MLF® (2x2mm), TSOT, Thin MLF®	High PSRR Low Noise ULDO™.	Yes
MIC5306		150mA	2.25V to 5.5V	1.5, 1.8, 2.7, 2.8, 3.0, 3.1, 3.3	16µA	120mV	TSOT, MLF® (2x2mm)	Low I_Q, 150mA ULDO™.	Yes
MIC5308		150mA	1.6V to 5.5V	1.0, 1.2, 1.3, 1.5, Adj.	23µA	50mV	TSOT-23-6, MLF® (1.6x1.6mm)	Low V_{IN}/V_{OUT} with Ultra-low I_Q.	Yes
MIC5365	New!	150mA		1.0, 1.2, 1.3, 1.5, 1.8, 2.0, 2.4, 2.5, 2.6, 2.8, 3.0, 3.3	32µA	180mV	Thin MLF® (1x1mm), SC-70	Ultra-small Single 150mA ULDO™	Yes
MIC5366	New!	150mA		1.0, 1.2, 1.3, 1.5, 1.8, 2.0, 2.4, 2.5, 2.6, 2.8, 3.0, 3.3	32µA	180mV	Thin MLF® (1x1mm), SC-70	Ultra-small Single 150mA ULDO™ with Auto Dischage	Yes

LDO Regulator Selection Guide

Single Outputs (continued)

Device	I$_{OUT}$	V$_{IN}$	V$_{OUT}$	I$_{GND}$ (Typ.)	V$_{DROPOUT}$ (Typ.)	Package	Comments	μCaP
MIC5207	180mA	2.5V to 16V	1.8, 2.5, 2.8, 2.9, 3.0, 3.1, 3.2, 3.3, 3.6, 3.8, 4.0, 5.0, Adj.	80μA	165mV	T/SOT	Low Noise LDO.	
MIC5201	200mA	2.5V to 26V	3.0, 3.3, 4.8, 5.0, Adj	130μA	270mV	SOIC, SOT-223	Load Dump Protection.	
MIC5309	300mA	1.7V to 5.5V	1.0, 1.2, 1.3, 1.5, Adj.	23μA	100mV	TSOT-23-6, MLF® (1.6x1.6mm)	Low V$_{IN}$/V$_{OUT}$ with Ultra-low I$_Q$.	
MIC2954	250mA	2V to 30V	5.0, 5.0 (0.5%) Adj.	140μA	375mV	SOIC, SOT-223, TO-220	Load Dump Protection.	
MIC5303	300mA	2.3V to 5.5V	1.3, 1.5, 1.8, 2.1, 2.5, 2.85, 2.8, 2.9, 3.0, 3.3, 4.6, Adj.	85μA	100mV	Thin MLF® (1.2x1.6mm)	High I$_{OUT}$, ultra-small.	Yes
MIC5307	300mA	2.4V to 5.5V	2.8, 3.0. Adj.	20μA	120mV	MLF® (1.6x1.6mm) TSOT-23	Ultra-low I$_Q$, 300mA ULDO™.	Yes
MIC5318	300mA	2.3V to 6.0V	2.8, 2.85, Adj.	85μA	100mV	Thin MLF® (1.6x1.6mm) TSOT-23	High V$_{IN}$.	Yes
MIC5249	300mA	2.7V to 6V	1.8, 2.5, 2.6, 2.8, 2.85, 3.0, 3.3	90μA	400mV	MSOP	LDO w/POR.	Yes
MIC5259	300mA	2.7V to 6V	1.5, 1.8, 2.5, 2.8, 2.85, 3.0, 3.3	90μA	300mV	MLF® (2x2mm), TSOT	High PSRR Low Noise LDO.	Yes
MIC29201	400mA	4.3V to 26V	3.3, 4.85, 5.0, 12	140μA	450mV	SOIC, TO-220, TO-263	Load Dump Protection.	
MIC29202	400mA	4.3V to 26V	Adj.	140μA	450mV	TO-220, TO-263	Load Dump Protection.	
MIC29204	400mA	4.3V to 26V	5.0, Adj.	140μA	450mV	SOIC, PDIP	Load Dump Protection.	
MIC2920A	400mA	4.3V to 26V	3.3, 4.8, 5.0, 12	140μA	450mV	SOT-223, TO-220	Load Dump Protection.	
MIC5325	400mA	1.7V to 5.5V	1.2, 1.5, 1.8, Adj.	35μA	110mV	Thin MLF® (2x2mm)	Single 400mA ULDO™. Pin Compatible to LTC3025.	Yes
MIC5209	500mA	2.5V to 16V	1.8, 2.5, 3.0, 3.3, 3.6, 4.2, 5.0, Adj.	80μA	300mV	P-SOIC, SOT-223, TO-263	Low Noise LDO.	
MIC5216	500mA	2.5V to 12V	2.5, 3.3, 3.6, 5.0	80μA	300mV	SOT-23, P-MSOP	Low Noise LDO w/Error Flag.	
MIC5219	500mA	2.5V to 12V	2.5, 2.6, 2.7, 2.8, 2.85, 2.9, 3.0, 3.1, 3.3, 3.6, 5.0, Adj.	80μA	300mV	SOT-23, P-MSOP, MLF® (2x2mm)	Low Noise LDO.	
MIC5237	500mA	2.5V to 16V	2.5, 3.3, 5.0	80μA	300mV	TO-220 TO-263	>3% O/P Voltage Accuracy.	
MIC5239	500mA	2.3V to 30V	1.5, 1.8, 2.5, 3.0, 3.3, 5.0, Adj.	23μA	350mV	P-MSOP, P-SOIC, SOT-223	Reverse Battert Protection.	Yes
MIC5319	500mA	2.5V to 5.5V	1.375, 1.8, 1.85, 2.5, 2.6, 2.7, 2.8, 2.85, 2.9, 3.0, 3.3, 5.0, Adj.	90μA	200mV	MLF® (2x2mm), TSOT	ULDO™ High PSRR.	Yes
MIC29371	750mA	4.3V to 26V	3.3, 5.0, 12	160μA	370mV	TO-220, TO-263	Load Dump Protection.	
MIC29372	750mA	4.3V to 26V	Adj.	160μA	370mV	TO-220, TO-263	Load Dump Protection.	
MIC2937A	750mA	4.3V to 26V	3.3, 5.0, 12	160μA	370mV	TO-220, TO-263	Load Dump Protection.	
MIC3775	750mA	2.25V to 6V	1.5, 1.65, 1.8, 2.5, 3.0, 3.3, Adj.	400μA	300mV	P-MSOP	Wide V$_{IN}$ Range.	Yes
MIC3975	750mA	2.25V to 16V	1.8, 2.5, 3.0, 3.3, 5.0, Adj.	400μA	300mV	P-MSOP	Wide V$_{IN}$ Range.	Yes
MIC37100	1A	2.25V to 6V	1.5, 1.65, 1.8, 2.5, 3.3	400uA	280mV	SOT-223		Yes
MIC37101	1A	2.25V to 6V	1.5, 1.65, 1.8, 2.1, 2.5, 3.3	400μA	280mV	P-SOIC	w/EN and Error Flag.	Yes
MIC37102	1A	2.25V to 6V	Adj.	400μA	280mV	P-SOIC, SPAK		Yes
MIC39100	1A	2.25V to 16V	1.8, 2.5, 3.3, 5.0	400μA	410mV	SOT-223, TO-220, TO-263	Ultra-Low Dropout.	
MIC39101	1A	2.25V to 16V	1.8, 2.5, 3.3, 5.0	400μA	410mV	P-SOIC	Ultra-Low Dropout.	
MIC39102	1A	2.25V to 16V	Adj.	400μA	410mV	P-SOIC	Ultra-Low Dropout.	
MIC47100	1A	1.0V to 3.6V	0.8, 1.0, 1.2, Adj.	350μA	80mV	MLF® (2x2mm), eMSOP-8		
MIC69101 *New!*	1A	1.65V to 5.5V	1.8	12mA	500mV	MLF® (3x3mm), P-MSOP-8	Ultra-small 1A LDO. Single Supply Operation.	
MIC69103 *New!*	1A	1.65V to 5.5V	Adj.	12mA	500mV	MLF® (3x3mm), P-MSOP-8	Ultra-small 1A LDO. Single Supply Operation.	
MIC2940A	1.25A	4.3V to 26V	3.3, 5.0, 12	240μA	400mV	TO-220, TO-263	Load Dump Protection.	
MIC2941A	1.25A	4.3V to 26V	Adj.	240μA	400mV	TO-220, TO-263	Load Dump Protection.	
MIC2915x	1.5A	2.25V to 26V	3.3, 5.0, 12, Adj.	225μA	350mV	TO-220, TO-263	Load Dump Protection.	
MIC37139	1.5A	2.25V to 6V	1.8	17mA	350mV	SOT-223		Yes
MIC37150	1.5A	2.25 to 6V	1.5, 1.65, 1.8, 2.5, 3.3	17mA	325mV	SPAK	Fixed Voltage in 3-pin Package.	Yes
MIC37151	1.5A	2.25V to 6V	1.5, 1.65, 1.8, 2.5, 3.3	17mA	325mV	SPAK, eSOIC	w/EN and Error Flag.	Yes
MIC37152	1.5A	2.25V to 6V	Adj	17mA	325mV	SPAK		Yes
MIC37153	1.5A	2.25V to 6V	Adj	17mA	325mV	eSOIC	w/EN and Error Flag.	Yes
MIC39150	1.5A	2.25V to 16V	1.65, 1.8, 2.5	300μA	375mV	TO-220, TO-263	Ultra-Low Dropout.	
MIC39151	1.5A	2.25V to 16V	1.65, 1.8, 2.5	300μA	375mV	TO-220, TO-263	Ultra-Low Dropout w/EN.	

LDO Regulator Selection Guide

Single Outputs (continued)

Device	I_OUT	V_IN	V_OUT	I_GND (Typ.)	V_DROPOUT (Typ.)	Package	Comments	µCaP
MIC49150	1.5A	1.4V to 6V	0.9, 1.2, 1.5, 1.8, Adj.	15mA	280mV	P-MSOP, S-PAK	Dual Supply µCap LDO.	Yes
MIC59150 *New!*	1.5A	1.0V to 3.3V	Adj.			eSOIC-8	Dual Supply, Low V_IN LDO.	Yes
MIC69151 *New!*	1.5A	1.65V to 5.5V	1.8	22mA	500mV	MLF® (3mm x 3mm), eSOIC-8	Single Supply Operation.	
MIC69153 *New!*	1.5A	1.65V to 5.5V	Adj.	22mA	500mV	MLF® (3mm x 3mm), eSOIC-8	Single Supply Operation.	
MIC49200	2A	1.4V to 6V	1.0, 1.8, Adj	15mA	400mV	SPAK, TO-263	Dual Supply µCap LDO.	Yes
MIC68200	2A	1.65V to 5.5V	1.2, 1.5, 1.8, 2.5, 3.3, Adj.	7mA	140mV	MLF® (3mm x 3mm)	Tracking & Ramp Control.	Yes
MIC37252	2.5A	3.0V to 6V	Adj.	40mA	550mV	SPAK, TO-263	Low Voltage µCap LDO.	
MIC37253	2.5A	3.0V to 6V	Adj.	40mA	600mV	eSOIC	w/EN and Error Flag.	
MIC2930x	3A	2.25V to 26V	3.3, 5.0, 12, Adj.	225µA	370mV	TO-220, TO-263	Load Dump Protection.	
MIC29310/2	3A	2.3V to 16V	3.3, 5.0, Adj.	400µA	600mV	TO-220, TO-263		
MIC29311	3A	2.3V to 16V	5.1	400µA	600mV	TO-220	USB LDO.	
MIC37301	3A	2.25V to 6V	1.5, 1.65, 1.8, 2.5, 3.3	27mA	300mV	SPAK		Yes
MIC37302	3A	2.25V to 6V	Adj.	27mA	300mV	SPAK, TO-263		Yes
MIC37303	3A	2.25V to 6V	Adj.	27mA	325mV	eSOIC	w/EN and Error Flag.	Yes
MIC39300	3A	2.25V to 16V	1.8, 2.5	5mA	300mV	TO-220, TO-263	Ultra-Low Dropout.	
MIC39301	3A	2.25V to 16V	1.8, 2.5	5mA	350mV	TO-220, TO-263	Ultra-Low Dropout w/EN.	
MIC49300	3A	1.4V to 6V	0.9, 1.2, 1.5, 1.8, Adj.	25mA	280mV	SPAK	Dual Supply µCap LDO.	Yes
MIC59300 *New!*	3A	1.0V to 3.8V	Adj., 1.2V	0.1µA	205mV	TO-263-5, eSOIC-8	Dual Supply, Low V_IN LDO.	Yes
MIC69301	3A	1.65V to 5.5V	1.0, 1.2, 1.8	40mA	275mV	SPAK, eSOIC	Low Voltage Single Input Supply.	Yes
MIC69302	3A	1.65V to 5.5V	Adj.	40mA	275mV	SPAK, eSOIC	Low Voltage Single Input Supply.	Yes
MIC68400	4A	1.65V to 5.5V	0.8, 1.0, 1.2, 1.5, 1.8, 2.5, Adj.	18mA	300mV	TSSOP, MLF® (4mm x 4mm)	Tracking and Ramp Control.	Yes
MIC2950x	5A	2.25V to 26V	3.3, 5.0, Adj.	225µA	370mV	TO-220, TO-263	Load Dump Protection.	
MIC29510/2	5A	2.3V to 16V	3.3, 5.0, Adj.	500µA	700mV	TO-220		
MIC37501	5A	2.3V to 6V	1.5, 1.65, 1.8, 2.5, 3.3	57mA	330mV	SPAK		Yes
MIC37502	5A	2.3V to 6V	Adj	57mA	330mV	SPAK, TO-263		Yes
MIC39500	5A	2.25V to 16V	1.8, 2.5	70mA	350mV	TO-220, TO-263	Ultra-Low Dropout.	
MIC39501	5A	2.25V to 16V	1.8, 2.5	70mA	350mV	TO-220, TO-263	Ultra-Low Dropout w/EN.	
MIC49500	5A	1.4V to 6V	.0.9, 1.2, Adj	55mA	290mV	SPAK, TO-263	Dual Supply µCap LDO.	Yes
MIC69502	5A	1.65 to 5.5V	Adj.	54mA	250mV	SPAK	Low Voltage Single Input Supply.	Yes
MIC2971x	7.5A	2.3V to 16V	3.3, 5.0, Adj.	1mA	700mV	TO-220		
MIC29750	7.5A	2.5V to 26V	3.3, 5.0	35mA	425mV	TO-247	Load Dump Protection.	
MIC29751	7.5A	2.5V to 26V	3.3, 5.0	35mA	425mV	TO-247	Load Dump Protection.	
MIC29752	7.5A	2.5V to 26V	Adj.	35mA	425mV	TO-247	Load Dump Protection.	

Multiple Outputs, DUAL

Device	I_OUT	V_IN	V_OUT	I_GND (Typ.)	V_DROPOUT (Typ.)	Package	Comments	µCaP
MIC5208	50/50mA	2.5V to 16V	3.3, 3.8, 4.0	180µA	250mV	MSOP	±3%	Yes
MIC5211	50/50mA	2.5V to 16V	1.8, 1.8/2.5, 1.8/3.3, 2.5, 2.5/3.3, 2.7, 2.8, 3.0, 3.3, 3.3/5.0, 3.6, 5.0,					
MIC5202	100/100mA	2.5V to 26V	3.0, 3.3, 4.8, 5.0	170µA	225mV	SOIC	±1%	
MIC5210	150/150mA	2.5V to 16V	2.7, 2.8, 3.0, 3.3, 3.6, 4.0, 5.0	80µA	165mV	MSOP	Low Noise LDO.	
MIC5310	150/150mA	2.3V to 5.5V	1.8/1.5, 1.8/1.8, 1.8/1.6, 2.5/1.8, 2.5/2.5, 2.6/1.85, 2.6/1.8 2.7/2.7, 2.8/1.5, 2.8/1.8, 2.8/2.6, 2.8/2.8, 2.85/1.85, 2.85/2.6, 2.85/2.85, 2.9/1.5, 2.9/1.8, 2.9/2.9, 3.0/1.8, 3.0/2.5 3.0/2.6, 3.0/2.8, 3.0/2.85, 3.0/3.0, 3.3/1.5, 3.3/1.8, 3.3/2.5 3.3/2.6, 3.3/2.8, 3.3/2.85, 3.3/2.9, 3.3/3.0, 3.3/3.2, 3.3/3.3,	75µA	35mV	MLF® (2mm x 2mm)	Tiny ULDO™ • Dual Enable • High PSRR	Yes
MIC5320	150/150mA	2.3V to 5.5V	1.8/1.5, 1.8/1.8, 1.8/1.6, 2.4/1.5, 2.5/1.8, 2.5/2.5, 2.6/1.85, 2.6/1.8, 2.7/2.7, 2.8/1.5, 2.8/1.8, 2.8/2.6, 2.8/2.8, 2.85/1.85, 2.85/2.6, 2.85/2.85, 2.9/1.5, 2.9/1.8, 2.9/2.9, 3.0/1.8, 3.0/2.5, 3.0/2.6, 3.0/2.8, 3.0/2.85, 3.0/3.0, 3.3/1.5, 3.3/1.8, 3.3/2.5, 3.3/2.6, 3.3/2.8, 3.3/2.85, 3.3/2.9, 3.3/3.0, 3.3/3.2, 3.3/3.3, 4.6/2.8,	75µA	35mV	MLF® (1.6mm x 1.6mm) TSOT-06	Tiny ULDO™ • Dual Enable	Yes

LDO Regulator Selection Guide

Multiple Outputs, DUAL (continued)

Device	I$_{OUT}$	V$_{IN}$	V$_{OUT}$	I$_{GND}$ (Typ.)	V$_{DROPOUT}$ (Typ.)	Package	Comments	µCaP
MIC5321	150/150mA	2.3V to 5.5V	1.8/1.5, 1.8/1.8, 1.8/1.6, 2.4/1.5, 2.5/1.8, 2.5/2.5, 2.6/1.85, 2.6/1.8, 2.7/2.7, 2.8/1.5, 2.8/1.8, 2.8/2.6, 2.8/2.8, 2.85/1.85, 2.85/2.6, 2.85/2.85, 2.9/1.5, 2.9/1.8, 2.9/2.9, 3.0/1.8, 3.0/2.5, 3.0/2.6, 3.0/2.8, 3.0/2.85, 3.0/3.0, 3.3/1.5, 3.3/1.8, 3.3/2.5, 3.3/2.6, 3.3/2.8, 3.3/2.85, 3.3/2.9, 3.3/3.0, 3.3/3.2, 3.3/3.3, 4.6/2.8,	75µA	35mV	MLF® (1.6mm x 1.6mm) TSOT-6	Tiny ULDO™ • High PSRR • Common Enable • Bypass Pin	Yes
MIC5322	150/150mA	2.5V to 5.5V	2.8/1.5, 2.8/1.8, 2.85/2.85, 3.0/2.8, 3.0/2.85, 3.0/3.0	150µA	35mV	Thin MLF® (1.6mm x 1.6mm)	Tiny ULDO™ • High PSRR • Common Active Low Enable • Bypass	Yes
MIC5370 *New!*	150/150mA		1.8/1.5, 1.8/1.8, 1.8/1.6, 2.4/1.5, 2.5/1.8, 2.5/2.5, 2.6/1.85, 2.85/1.85, 2.85/2.6, 2.85/2.85, 2.9/1.5, 2.9/1.8, 2.9/2.9, 3.0/1.8, 3.0/2.5, 3.0/2.6, 3.0/2.8, 3.0/2.85, 3.0/3.0, 3.3/1.5, 3.3/1.8, 3.3/2.5, 3.3/2.6, 3.3/2.8, 3.3/2.85, 3.3/2.9, 3.3/3.0, 3.3/3.2, 3.3/3.3, 4.6/2.8,	49µA	190mV	Thin MLF® (1.6mm x 1.6mm)	General Pupose Dual 150mA LDO.	Yes
MIC5371 *New!*	150/150mA		1.8/1.5, 1.8/1.8, 1.8/1.6, 2.4/1.5, 2.5/1.8, 2.5/2.5, 2.6/1.85, 2.85/1.85, 2.85/2.6, 2.85/2.85, 2.9/1.5, 2.9/1.8, 2.9/2.9, 3.0/1.8, 3.0/2.5, 3.0/2.6, 3.0/2.8, 3.0/2.85, 3.0/3.0, 3.3/1.5, 3.3/1.8, 3.3/2.5, 3.3/2.6, 3.3/2.8, 3.3/2.85, 3.3/2.9, 3.3/3.0, 3.3/3.2, 3.3/3.3, 4.6/2.8,	49µA	190mV	Thin MLF® (1.6mm x 1.6mm)	General Pupose Dual 150mA LDO with Auto Discharge.	Yes
MIC5264	150/150mA	2.7V to 5.5V	2.5/1.8, 2.6/1.8, 2.6/2.6, 2.8/1.5, 2.8/1.8, 2.8/2.5, 2.8/2.6, 2.8/2.8, 2.85/1.52.85/1.8, 2.85/2.85, 2.9/2.6, 3.0/1.8, 3.0/2.5, 3.0/2.8, 3.0/3.0, 3.3/3.3	75µA	210mV	MLF® (2.5mm x 2.5mm)	µCap LDO Regulator.	Yes
MIC2210	150/300mA	2.25V to 5.5V	1.5/2.8, 1.8/3.3, 2.8/1.6, 2.8/3.0, 3.0/3.3, 3.3/3.3	48µA	120mV	MLF® (3mm x 3mm)	LDO w/Driver & Error Flag.	
MIC2211	150/300mA	2.25V to 5.5V	Adj/Adj, 1.5/1.8, 1.5/2.8, 1.5/2.85, 1.5/2.9, 1.5/3.1, 1.6/2.8, 1.6/2.9, 1.6/3.3, 1.8/2.5, 1.8/2.6, 1.8/2.8, 1.8/2.9, 1.8/3.0, 1.8/3.3, 1.9/2.8, 2.0/3.0, 2.5/1.8, 2.5/1.9, 2.5/2.8, 2.5/3.0, 2.5/3.3, 2.6/1.8, 2.6/2.85, 2.6/3.0, 2.7/1.8, 2.7/3.0, 2.8/1.5, 2.8/1.6, 2.8/1.8, 2.8/2.5, 2.8/2.8, 2.8/3.0, 2.8/3.3, 2.85/2.85, 2.85/3.3, 2.9/1.5, 2.9/2.9, 3.0/1.6, 3.0/2.7, 3.0/2.8, 3.0/3.0, 3.0/3.3, 3.3/1.8, 3.3/2.8, 3.3/3.3, 3.6/3.6	48µA	120mV	MLF® (3mm x 3mm)	LDO.	Yes
MIC2212	150/300mA	2.25V to 5.5V	1.6/2.8, 1.6/3.3, 1.8/2.6, 1.8/2.7, 1.8/2.8, 1.8/3.0, 1.8/3.3, 1.85/2.85, 1.85/2.9, 2.5/3.3, 2.6/2.8, 2.6/2.85, 2.7/2.8, 2.7/2.9, 2.7/3.0, 2.8/2.6, 2.8/2.8, 2.8/3.0, 2.85/2.85, 3.0/2.8, 3.0/2.85, 3.0/3.0, 3.0/3.3, 3.3/1.8, 3.3/2.5, 3.3/2.8	48µA	120mV	MLF® (3mm x 3mm)	LDO w/POR.	Yes
MIC2213	150/300mA	2.25V to 5.5V	1.8/2.85, 1.8/3.3, 2.5/3.3, Adj/Adj.	48µA	120mV	MLF® (3mm x 3mm)	Sequenced w/POR & Driver.	Yes
MIC2214	150/300mA	2.25V to 5.5V	1.5/2.8, 1.6/2.8, 1.6/3.0, 1.6/3.3, 1.8/2.6, 1.8/2.7, 1.8/2.8, 1.8/2.9, 1.8/3.0, 1.8/3.3, 1.85/2.6, 1.85/2.65, 1.85/2.7, 1.85/2.85, 1.85/2.9, 2.5/1.8, 2.5/2.8, 2.5/3.0, 2.5/3.1, 2.6/2.6, 2.6/2.8, 2.6/2.85, 2.6/3.0, 2.7/2.8, 2.7/3.0, 2.8/2.8, 2.8/3.0, 2.85/2.85, 3.0/2.8, 3.0/2.85, 3.0/3.3, 3.0/1.6, 3.3/1.8, 3.3/2.8, 3.3/1.6, Adj/Adj.	48µA	120mV	MLF® (3mm x 3mm)	LDO w/POR & LED Driver.	Yes
MIC2219	150/300mA	2.25V to 5.5V	3.0/3.3	48µA	120mV	MLF® (3mm x 3mm)	Dynamically Adjustable µCap.	Yes
MIC5311	300/300mA	2.5V to 5.5V	1.8/2.8, 1.85/2.6, 2.85/2.7	28µA	120mV	MLF® (3mm x 3mm)	LowQ® Mode (7µA).	Yes
MIC5312	300/300mA	2.5V to 5.5V	1.8/2.8, 1.8/3.0, 1.85/2.6, 2.8/2.8, 2.85/2.85	28µA	120mV	MLF® (3mm x 3mm)	LowQ® Mode & POR (7µA).	Yes
MIC5313	300/300mA	1.7V to 5.5V	1.5/1.0,1.5/1.1,1.5/1.2,1.5/1.3,1.5/1.4,1.5/1.5, 1.8/1.2,1.8/1.8	37µA	85mV	Thin MLF® (2mm x 2mm)	Dual 300mA Low V$_{IN}$/Low V$_{OUT}$ LDO.	Yes
MIC5314	300/300mA	1.7V to 5.5V	1.5/1.0,1.5/1.1,1.5/1.2,1.5/1.3,1.5/1.4,1.5/1.5, 1.8/1.2,1.8/1.8	37µA	85mV	Thin MLF® (2.5mm x 2.5mm)	Dual 300mA Low V$_{IN}$/Low V$_{OUT}$ LDO with POR and CSET.	Yes
MIC5315	300/300mA	1.7V to 5.5V	1.5/1.0,1.5/1.1,1.5/1.2,1.5/1.3,1.5/1.4,1.5/1.5, 1.8/1.2,1.8/1.8	37µA	85mV	Thin MLF® (2mm x 2mm)	Dual 300mA Low V$_{IN}$/Low V$_{OUT}$ LDO with Voltage Scaling.	Yes
MIC5316	300/300mA	1.7V to 5.5V	1.5/1.0,1.5/1.1,1.5/1.2,1.5/1.3,1.5/1.4,1.5/1.5, 1.8/1.2,1.8/1.8	37µA	85mV	Thin MLF® (2.5mm x 2.5mm)	Dual 300mA Low V$_{IN}$/Low V$_{OUT}$ LDO with POR, CSET and Voltage Scaling.	Yes
MIC5330	300/300mA	2.3V to 5.5V	1.8/1.5, 1.8/1.5, 1.8/1.6, 2.5/1.8, 2.5/2.5, 2.6/1.85 2.6/1.8, 2.7/2.7, 2.8/1.5, 2.8/1.8, 2.8/2.6, 2.8/2.8, 2.85/1.85, 2.85/2.6, 2.85/2.85, 2.9/1.5, 2.9/1.8, 2.9/2.9 3.0/1.8, 3.0/2.5, 3.0/2.6, 3.0/2.8, 3.0/2.85, 3.0/3.0, 3.3/1.5, 3.3/1.8, 3.3/2.5, 3.3/2.6, 3.3/2.8, 3.3/2.85, 3.3/2.9, 3.3/3.0, 3.3/3.2, 3.3/3.3	75µA	75mV	MLF® (2mm x 2mm)	Tiny ULDO™ • Dual Enable • High PSRR	Yes

LDO Regulator Selection Guide

Multiple Outputs, DUAL (continued)

Device		I_{OUT}	V_{IN}	V_{OUT}	I_{GND} (Typ.)	$V_{DROPOUT}$ (Typ.)	Package	Comments	µCaP
MIC5331	*New!*	300/300mA		2.5/1.2, 2.8/2.8, 2.8/2.85, 2.85/2.85, 3.0/2.85,3.0/3.0	40µA	120mV	Thin MLF® (2x2mm)	Dual Micro Power 300mA ULDO™	Yes
MIC5332	*New!*	300/300mA		2.5/1.2, 2.8/2.8, 2.8/2.85, 2.85/2.85, 3.0/2.85,3.0/3.0	40µA	120mV	Thin MLF® (2mm x 2mm)	Dual Micro Power 300mA ULDO™ with POR and CSET	Yes
MIC5333	*New!*	300/300mA		2.5/1.2, 2.8/2.8, 2.8/2.85, 2.85/2.85, 3.0/2.85,3.0/3.0	40µA	120mV	Thin MLF® (2.5 x 2.5mm)	Dual Micro Power 300mA ULDO™ with Two PORs and CSETs	Yes
MIC5335		300/300mA	2.3V to 5.5V	1.8/1.5, 1.8/1.8, 1.8/1.6, 2.5/1.8, 2.5/2.5, 2.6/1.85, 2.6/1.8, 2.7/2.7, 2.8/1.5, 2.8/1.8, 2.8/2.6, 2.8/2.8, 2.85/1.85, 2.85/2.6, 2.85/2.85, 2.9/1.5, 2.9/1.8, 2.9/2.9, 3.0/1.8, 3.0/2.5, 3.0/2.6, 3.0/2.8, 3.0/2.85, 3.0/3.0, 3.3/1.5, 3.3/1.8, 3.3/2.5 3.3/2.6, 3.3/2.7, 3.3/2.8, 3.3/2.85, 3.3/2.9, 3.3/3.0, 3.3/3.2, 3.3/3.3,	75µA	75mV	Thin MLF® (1.6mm x 1.6mm)	High I_{OUT}, Ultra-small.	Yes
MIC5212		500/500mA	4.0V to 16V	3.3/2.5	1.5mA	350mV	SOIC	Small, High-Current Dual.	
MIC68220		2A/2A	1.65V to 5.5V	Adj./Adj.	15mA	300mV	MLF® (4mm x 5mm)	Trading and Ramp Control.	Yes

Multiple Outputs, TRIPLE

Device	I_{OUT}	V_{IN}	V_{OUT}	I_{GND} (Typ.)	$V_{DROPOUT}$ (Typ.)	Package	Comments	µCaP
MIC2215	250/250/250mA	2.25V to 5.5V	2.8/2.8/2.8, 3.0/2.8/2.8, 3.0/3.0/2.8, 3.0/3.0/1.8, 3.0/3.0/3.0, Adj/Adj/Adj	110µA/LDO	170mV	MLF® (4mm x 4mm)	Triple High PSRR µCap LDO.	Yes

LDO Controllers (N- and P-Channel), and DDR Terminators

Device	I_{OUT}	V_{IN}	V_{OUT}	I_{GND} (Typ.)	$V_{DROPOUT}$ (Typ.)	Package	Comments	µCaP
MIC5156	—	3.0V to 36V	3.3, 5.0, Adj.	—	—	SOIC	Drives External N-Ch MOSFET.	
MIC5157	—	3.0V to 36V	Selectable 3.3, 5.0, 12	—	—	PDIP, SOIC	Drives External N-Ch MOSFET.	
MIC5158	—	3.0V to 36V	5.0, Adj.	—	—	PDIP, SOIC	Drives External N-Ch MOSFET.	
MIC5159	—	1.65V to 5.5V	1.8, 3.0, Adj.	—	—	SOT-23	Low Input Voltage P-Ch MOSFET.	
MIC5162	—	1.35V to 6V	—	—	—	MSOP	DDR Memory Termination.	
MIC5190	—	0.9V to 5.5V	Adj. down to 0.5V	17mA	—	MSOP, MLF® (3mm x 3mm)	N-Ch Controller HBW>500kHz.	
MIC5191	—	1.0V to 5.5V	Adj. down to 1.0V	17mA	—	MSOP, MLF® (3mm x 3mm)	N-Ch Controller HBW>500kHz.	

Specific voltage/package options offered as noted on posted data sheets at: www.mcirel.com.

T/SOT = Thin SOT-23 & SOT-23

ULDO™ = Ultra Low Dropout

HELDO™ (High Efficiency LDO)

Device	I_{OUT}	V_{IN}	V_{OUT}	Output Noise	Package	Comment
MIC38300	2.2A	3.0V to 5.5V	Adj. to 1V	5mV	MLF® (4mm x 6mm x 0.9mm)	Integrated switcher, LDO, inductor, ultra-low noise. Fast transient response. Ease-of-use.

Automotive (AEC-Q100 Qualified)

Device		I_{OUT}	V_{IN}	V_{OUT}	I_{GND} (Typ.)	$V_{DROPOUT}$	Package	Comment
MAQ5280	*New!*	25mA	4.5V to 120V	Adj.	31µA	1.1V	eSOIC-8	AEC-Q100 qualified, wide V_{IN} range.

Power Management Selection Guide

Device	I_{OUT}	V_{IN}	V_{OUT}[1]	I_{GND} (Typ.)	$V_{DROPOUT}$ (Typ.)	Package	Comments
MIC2225	600/300mA	2.7V to 5.5V	1.2/2.6, 1.2/2.8, 1.2/2.9, 1.2/3.3, 1.8/1.2, 1.8/1.5, 1.8/2.5, 1.8/2.8		210mV	MLF-10 (2mm x 2mm)	Digital Power Management IC, 2MHz DC/DC converter with LDO.
MIC2800	600/300/300mA	2.7V to 5.5V	Adj./1.2/3.3, 1.87/1.2/2.8, 1.87/1.5/2.8, 1.8/1.2/2.5, 1.8/1.2/2.6, 1.8/1.2/3.3, 1.8/1.58/3.3, 1.8/1.52/2.8, 1.8/1.2/2.8	30µA	142mV	MLF-16 (3mm x 3mm)	Digital Power Management IC, 2MHz DC/DC converter with two Linear Regulators. LDO1 is directly connected to the output of the DC/DC converter. POR/Power Good pin.
MIC2807	600/200/30mA	2.7V to 5.5V	2.8/2.8, 2.85/2.85			MLF-17 (2.5mm x 2.8mm)	RF Power Management IC, 600mA DC/DC converter with DAC controlled output to power amplifier. 200mA RF LDO output current (provides bias voltage supply for PA), 30mA PA LDO (provides highly accurate PA reference voltage).
MIC2810	600/300/300mA	2.7V to 5.5V 1.65V to 5.5V	1.2/1.2/2.8, 1.2/1.8/2.6, 1.2/1.8/2.8, 1.2/1.8/3.0, 1.2/1.8/3.3, 1.2/2.7/3.3, 1.2/2.8/3.3, 1.0/1.8/2.5	38µA	142mV	MLF-16 (3mm x 3mm)	Digital Power Mangement IC, 2MHz with two Linear Regulators. LDO1 has a separate V_{IN} pin and can either post-regulate the DC/DC converter or be connected directly to the main input supply. POR/Power Good pin.
MIC2811	600/300/300/300mA	2.7V to 5.5V 1.65V to 5.5V 1.65V to 5.5V	1.2/1.8/2.5/2.7, 1.2/1.8/2.8/3.3		142mV	MLF-16 (3mm x 3mm)	2MHz DC/DC converter with 3 LDOs. Bypass cap for improved noise performance on LDO1 and 2. LDO1 and 2 have separate V_{IN} pins.
MIC2821	600/300/300/300mA	2.7V to 5.5V 1.65V to 5.5V 1.65V to 5.5V	1.2/1.8/2.5/2.7, 1.2/1.8/2.8/3.3		142mV	MLF-16 (3mm x 3mm)	2MHz DC/DC converter with 3 LDOs LDO1 and 2 have separate V_{IN} pins. Independent enable for all four regulators.

1. Contact factory for additional output voltage options.

Battery Charger Selection Guide

Linear Battery Chargers

Device	Charge Cell Type	Charge Voltage	Voltage Accuracy	V_{IN}	I_{GND} (Typ.)	I_{GND} Shutdown (Typ.)	$V_{DROPOUT}$ +25°C (Typ.)	$V_{DROPOUT}$ Temp. Max.	Package
MIC79050	Li-Ion, 1 cell	4.2V	±0.75%	2.5V to 16V	85µA	3µA	380mV	600mV	MSOP, Power SOIC, SOT-223
MIC79110	Li-Ion	4.2V, Adj.	±0.75%	2.5V to 16V	2mA	0.1µA	375mV	550mV	MLF® (3mm x 3mm)

High-Side Load Switches Selection Guide

Micrel Advantange

- Lowest R_{DSON}
- Highest Power Handling
- Highest Current Drive Capability
- Soft-Start

Device	Type	Operating Voltage Min.	Max.	Max. Switch Current	R_{DS} ON @5V	Load Discharge	Soft-Start	Enable Logic	Input Pull-Up Resistor	Reverse Current Blocking	Package
MIC94030	Single	2.7V	13.5V	1.0A	750mΩ			Low True		Yes	SOT-143
MIC94031	Single	2.7V	13.5V	1.0A	750mΩ			Low True	Yes	Yes	SOT-143
MIC94040	Single	1.7V	5.5V	3.0A	28mΩ			High True		No	MLF-4 (1.2mm x 1.2mm)
MIC94041	Single	1.7V	5.5V	3.0A	28mΩ	250Ω		High True		No	MLF-4 (1.2mm x 1.2mm)
MIC94042	Single	1.7V	5.5V	3.0A	28mΩ		100µs	High True		No	MLF-4 (1.2mm x 1.2mm)
MIC94043	Single	1.7V	5.5V	3.0A	28mΩ	250Ω	100µs	High True		No	MLF-4 (1.2mm x 1.2mm)
MIC94050	Single	1.8V	5.5V	1.8A	125mΩ			Low True		Yes	SOT-143
MIC94051	Single	1.8V	5.5V	1.8A	125mΩ			Low True	Yes	Yes	SOT-143
MIC94052	Single	1.8V	5.5V	2.0A	70mΩ			Low True		No	SC-70-6
MIC94053	Single	1.8V	5.5V	2.0A	70mΩ			Low True	Yes	No	SC-70-6
MIC94060	Single	1.7V	5.5V	2.0A	77mΩ			High True		No	SC-70-6, TMLF-4 (1.2mm x1.6mm)
MIC94061	Single	1.7V	5.5V	2.0A	77mΩ	200Ω		High True		No	SC-70-6, TMLF-4 (1.2mm x 1.6mm)
MIC94062	Single	1.7V	5.5V	2.0A	77mΩ		800µs	High True		No	SC-70-6, TMLF-4 (1.2mm x 1.6mm)
MIC94063	Single	1.7V	5.5V	2.0A	77mΩ	200Ω	800µs	High True		No	SC-70-6, TMLF-4 (1.2mm x 1.6mm)
MIC94064	Single	1.7V	5.5V	2.0A	77mΩ		115µs	High True		No	SC-70-6, TMLF-4 (1.2mm x 1.6mm)
MIC94065	Single	1.7V	5.5V	2.0A	77mΩ	200Ω	115µs	High True		No	SC-70-6, TMLF-4 (1.2mm x 1.6mm)
MIC94066	Dual	1.7V	5.5V	2.0A	85mΩ			High True		No	MLF-8 (2mm x 2mm)
MIC94067	Dual	1.7V	5.5V	2.0A	85mΩ	200Ω		High True		No	MLF-8 (2mm x 2mm)
MIC94068	Dual	1.7V	5.5V	2.0A	85mΩ		800µs	High True		No	MLF-8 (2mm x 2mm)
MIC94069	Dual	1.7V	5.5V	2.0A	85mΩ	200Ω	800µs	High True		No	MLF-8 (2mm x 2mm)
MIC94070	Single	1.7V	5.5V	1.2A	120mΩ			High True		No	SC-70-6, TMLF-4 (1.2mm x 1.6mm)
MIC94071	Single	1.7V	5.5V	1.2A	120mΩ	200Ω		High True		No	SC-70-6, TMLF-4 (1.2mm x 1.6mm)
MIC94072	Single	1.7V	5.5V	1.2A	120mΩ		800µs	High True		No	SC-70-6, TMLF-4 (1.2mm x 1.6mm)
MIC94073	Single	1.7V	5.5V	1.2A	120mΩ	200Ω	800µs	High True		No	SC-70-6, TMLF-4 (1.2mm x 1.6mm)
MIC94080 *New!*	Single	1.7V	5.5V	2A	67mΩ			High True		No	TMLF-4 (0.85mm x 0.85mm)
MIC94081 *New!*	Single	1.7V	5.5V	2A	67mΩ	250Ω		High True		No	TMLF-4 (0.85mm x 0.85mm)
MIC94082 *New!*	Single	1.7V	5.5V	2A	67mΩ		850µs	High True		No	TMLF-4 (0.85mm x 0.85mm)
MIC94083 *New!*	Single	1.7V	5.5V	2A	67mΩ	250Ω	850µs	High True		No	TMLF-4 (0.85mm x 0.85mm)
MIC94084 *New!*	Single	1.7V	5.5V	2A	67mΩ		120µs	High True		No	TMLF-4 (0.85mm x 0.85mm)
MIC94085 *New!*	Single	1.7V	5.5V	2A	67mΩ	250Ω	120µs	High True		No	TMLF-4 (0.85mm x 0.85mm)

Switch-Mode Voltage Regulator Selection Guide

Micrel Advantange

- Best efficiency
- Highest speed
- Smallest solution size

Buck Regulators (Internal Switches)

Device	V_IN Range	V_OUT	I_SW[1] (Avg)(Max)	Frequency	Package(s)	Comments
MIC4721	2.7V to 5.5V	Adj. to 1V	1.5A	2MHz	MSOP-10	Ultra-Fast Response Internal Compensation.
MIC4722	2.7V to 5.5V	Adj. to 1V	3A	2.7MHz	MLF-12 (3mm x 3mm)	Ultra-Fast, Ultra-Small.
MIC4723	2.7V to 5.5V	Adj. to 1V	3A	2MHz	MLF-12 (3mm x 3mm), eMSOP-10	Ultra-Fast, Ultra-Small.
MIC4724	6V	Adj. to 1V	3A	2MHz	eMSOP-10	Ultra-Fast, Ultra-Small.
MIC4742 *New!*	2.9V to 5.5V	Adj. to 0.6V	2A Dual Output	2MHz	MLF-16 (3mm x 3mm), eTSSOP-16	Integrated dual 2A switcher.
MIC4744 *New!*	2.9V to 5.5V	Adj. to 0.6V	2A Dual Output	4MHz	MLF-16 (3mm x 3mm), eTSSOP-16	High-efficiency, Integrated dual 2A switcher.
MIC2207	2.7V to 5.5V	Adj. to 1V	3A	2MHz	MLF-12 (3mm x 3mm)	Ultra-Fast, Ultra-Small.
MIC2208	2.7V to 5.5V	Adj. to 1V	3A	1MHz	MLF-12 (3mm x 3mm)	External Compensation.
MIC4720	2.7V to 5.5V	Adj. to 1V	2A	2MHz	MLF-12 (3mm x 3mm), eMSOP-10	Ultra-Fast, Ultra-Small.
MIC4680	4V to 34V	3.3V, 5V, Adj.	1.3A	200kHz	SOIC-8	
MIC4681	4V to 30V	Adj.	2A Peak	200kHz	SOIC-8	
MIC4682	4V to 34V	Adj.	2A	200kHz	SOIC-8	10% Precision Adjustable Current Limit.
MIC4684	4V to 30V	Adj.	2A	200kHz	SOIC-8	
MIC4685	4V to 30V	Adj.	3A	200kHz	SPAK-7	33% Smaller Than TO-263 (D2PAK).
MIC4690	4V to 30V	Adj.	1.3A	500kHz	SOIC-8	500kHz: Small Inductor.
MIC4574	4V to 24V	3.3V, 5V, Adj.	0.5A	200kHz	PDIP-8, SOIC-14	
MIC4575	4V to 24V	3.3V, 5V, Adj.	1A	200kHz	TO220-5, TO263-5	
MIC4576	4V to 36V	3.3V, 5V, Adj.	3A	200kHz	TO220-5, TO263-5	
LM2574	4V to 40V	3.3V, 5V, 12V, Adj.	0.5A	52kHz	PDIP-8	
LM2575	4V to 40V	3.3V, 5V, 12V, Adj.	1A	52kHz	TO220-5, TO263-5, PDIP-16, SOIC-24	
LM2576	4V to 40V	3.3V, 5V, 12V, Adj.	3A	52kHz	TO220-5, TO263-5	

1. I_{SW} (Avg) refers to the average current flowing through the switch.

Synchronous Buck Regulators (Internal Switches)

Device	V_IN Range	V_OUT	I_SW[1] (Avg)(Max)	Frequency	Package(s)	Comments
MIC2177	4.5V to 16.5V	3.3V, 5V, Adj.	2.5A	200kHz	WSOIC-20	Auto-Skip Mode.
MIC2178	4.5V to 16.5V	3.3V, 5V, Adj.	2.5A	200kHz	WSOIC-20	Manual-Select Skip Mode.
MIC2179	4.5V to 16.5V	3.3V, 5V, Adj.	1.5A	200kHz	SSOP-20	
MIC2202	2.3V to 5.5V	Adj. to 0.5V	0.6A	2MHz	MSOP-10, MLF-10 (3mm x 3mm)	1µF Ceramic Stable.
MIC2203	2.3V to 5.5V	Adj. to 0.5V	0.3A	1MHz	MSOP-10, MLF-10 (3mm x 3mm)	1µF Ceramic Stable.
MIC2204	2.3V to 5.5V	Adj. to 1V	0.6A	2MHz	MSOP-10, MLF-10 (3mm x 3mm)	Synchronizable to External Clock.
MIC2205	2.7V to 5.5V	Adj.	0.6A	2MHz	MLF-10 (3mm x 3mm)	LowQ® LDO Mode. No Noise at Light Load.
MIC2245	2.7V to 5.5V	Adj.	0.5A	4MHz	MLF-10 (3mm x 3mm)	LowQ® LDO Mode. No Noise at Light Load.
MIC2285A	2.7V to 5.5V	Adj.	0.6A	8MHz	MLF-10 (2mm x 2mm)	LowQ® LDO Mode. No Noise at Light Load.
MIC2206	2.7V to 5.5V	1.8V(1.0V), 1.2V(1.0V)	0.6A	2MHz	MLF-10 (3mm x 3mm)	Voltage Scaling in LowQ® Mode.
MIC2224	2.7V to 5.5V	Adj. to 0.3V	0.6A	2MHz	MLF-10 (3mm x 3mm)	DAC Controlled V_OUT with Bypass Switch.
MIC22200 *New!*	2.6V to 5.5V	Adj. to 0.7V	2A	800kHz to 6MHz	MLF-12 (3mm x 3mm)	Sequencing/Tracking Easy Compensation.
MIC22400	2.6V to 5.5V	Adj. to 0.7V	4A	800kHz to 4MHz	MLF-20 (3mm x 4mm), eTSSOP-20	Sequencing/Tracking Easy Compensation.
MIC22600	2.6V to 5.5V	Adj. to 0.7V	6A	1MHz	MLF-24	Sequencing/Tracking Easy Compensation.
MIC23031	2.7V to 5.5V	1.0V, 1.2V, 1.5V, 1.8V, Adj.	0.4A	4MHz	MLF® (1.6mm x 1.6mm)	PWM Buck Regulator with HyperLight Load™.
MIC23030	2.7V to 5.5V	1.0V, 1.2V, 1.5V, 1.8V, Adj.	0.4A	8MHz	MLF® (1.6mm x 1.6mm)	PWM Buck Regulator with HyperLight Load™.
MIC23050	2.7V to 5.5V	1.2V, 1.8V, 3.3V	0.6A	4MHz	MLF® (2mm x 2mm)	PWM Buck Regulator with HyperLight Load™.
MIC23051	2.7V to 5.5V	1.2V (1.0V), 1.25V (0.95V), 1.4V (1.15V), 1.8V (1.0V),	0.6A	4MHz	MLF® (2mm x 2mm)	PWM Buck Regulator with HyperLight Load™ and Voltage Scaling.
MIC23150 *New!*	2.7V to 5.5V	1.0V, 1.2V, 1.8V, 3.3V	1.5A	4MHz	MLF® (2mm x 2mm)	PWM Buck Regulator with HyperLight Load™.

Synchronous Buck Regulators (Internal Switches + Internal Inductor)

Device	V_IN Range	V_OUT	I_SW[1] (Avg)(Max)	Frequency	Package(s)	Comments
MIC33050	2.7V to 5.5V	1.2V, 1.8V, 3.3V	0.6A	4MHz	MLF-12 (3mm x 3mm)	4MHz Operation with Internal Chip Inductor.
MIC3385	2.7V to 5.5V	1.5V, Adj.	0.6A	8MHz	MLF-14 (3mm x 3.5mm)	8MHz Operation with Internal Chip Inductor, HyperLight Load™.

Switch-Mode Voltage Regulator Selection Guide

Dual Synchronous Buck Regulators (Internal Switches)

Device	V$_{IN}$ Range	V$_{OUT}$	I$_{SW}$[1] (Avg)(Max)	Frequency	Package(s)	Comments
MIC2238	2.5V to 5.5V	1.2/1.8V, 1.2/1.5V, 1.2/2.5V, 1.2/3.3V, 1.0/1.5V, 1.0/1.8V, 1.0/2.5V, Adj./Adj.	800/800mA	2.5MHz	MLF-12 (3mm x 3mm)	POR/PG Pin. Trickle Mode™ at Light Load. Independent Enables.
MIC23250	2.7V to 5.5V	1.2/1.8V, 1.0/1.2V, 0.9/1.1V, 1.2/1.6V, 1.2/2.5V, 1.2/3.3V, 2.6/3.3V, Adj./Adj.	400/400mA	4MHz	MLF-10 (2mm x 2mm)	PWM Buck Regulators with HyperLight Load™. Independent Enables.

Buck Controllers (External Switches)

Device	V$_{IN}$ Range	V$_{OUT}$	I$_{SW}$[1] (Avg)(Max)	Efficiency (Typ)	I$_Q$ (Typ)	Shutdown I$_Q$ (Typ)	Frequency	Package(s)	Comments
MIC2184	2.9V to 16V	Adj.	External P-FET, 1A to 10A	90%	600µA	0.5µA	200/400kHz	SOIC-16 QSOP-16	Can also be configured as Buck-Boost Buck-Boost
MIC2194	2.9V to 14V	Adj.	External P-FET, 1A to 10A	90%	1mA	0.5µA	400kHz	SOIC-8	

Synchronous Buck Controllers (External Switches)

Device	V$_{IN}$ Range	V$_{OUT}$	I$_{SW}$[1] (Avg)(Max)	Efficiency (Typ)	I$_Q$ (Typ)	Shutdown I$_Q$ (Typ)	Frequency	Package(s)	Comments
MIC2130	8V to 40V	Adj. to 0.7V	External FETs, 15A				150/400kHz	MLF-16, eTSSOP-16	
MIC2131	8V to 40V	Adj. to 0.7V	External FETs, 15A				150/400kHz	MLF-16, eTSSOP-16	Low EMI Frequency Dithering.
MIC2168	3V to 14.5V	Adj. to 0.8V	External N-FETs, 10A	95%	1mA	50µA	1MHz	MSOP-10	Small and Fast.
MIC2168A	3V to 14.5V	Adj. to 0.8V	External N-FETs, 10A	95%	1mA	50µA	1MHz	MSOP-10	Small and Fast, Enable Function.
MIC2169	3V to 14.5V	Adj. to 0.8V	External N-FETs, 15A	95%	1mA	50µA	500kHz	MSOP-10	Small and Super Efficient.
MIC2169A	3V to 14.5V	Adj. to 0.8V	External N-FETs, 15A				500kHz	MSOP-10	Small and Super Efficient; Enable Function.
MIC2159	3V to 14.5V	Adj. to 0.8V	External N-FETs, 20A				400kHz	EPAD-MSOP-10	Higher Current, Enable Function.
MIC2182	4.5V to 32V	3.3V, 5V, Adj.	External N-FETs, 2.5A to 20A	90%+	600µA	2µA	300kHz	SOIC-16, TSSOP-16	
MIC2183	2.9V to 14V	Adj. to 1.25V	External N- and P-FET, 1A to 10A	95%+	600µA	0.5µA	400/200kHz	MSOP-16, QSOP-16	100% Max. Duty Cycle.
MIC2193	2.9V to 14V	Adj.	External N- and P-FET, 1A to 10A	93%+	1mA	–	400kHz	SOIC-8	100% Max. Duty Cycle.
MIC2198	4.5V to 32V	Adj. To 0.8V	External N-FETs, 1A to 20A	95%+	3.5mA	0.1µA	500kHz	MLF-12 (4mm x 4mm)	
MIC2199	4.5V to 32V	Adj. To 0.8V	External N-FETs, 1A to 20A	95%+	1.6mA	0.1µA	300kHz	MLF-12 (4mm x 4mm)	

1. I$_{SW}$ (Avg) refers to the average current flowing through the switch.

Boost Regulators (Internal Switches)

Device	V$_{IN}$ Range	V$_{OUT}$	I$_{SW}$ (Typ)	Frequency	Package(s)	Comments
MIC2141	2.5V to 14V	Adj. to 22V	0.1A	330kHz	SOT-23-5	Dynamically Adjustable V$_{OUT}$ for LCD Bias.
MIC2142	2.2V to 16V	Adj. to 22V	0.1A	330kHz	SOT-23-5	
MIC2145	2.4V to 16V	Adj. to 16V	1A	450kHz	MSOP-8, MLF-10 (3mm x 3mm)	
MIC2171	3V to 40V	Adj. to 60V	4A	100kHz	TO-220-5, TO-263-5	High-Current, High-Voltage.
MIC2172	3V to 40V	Adj. to 60V	2.5A	100kHz	SOIC-8, DIP-8	Sync Pin., High-Current, High-Voltage.
MIC2288	2.5V to 10V	Adj. to 34V	1.2A	1.2MHz	TSOT-23-5, MLF-8 (2mm x 2mm)	OLED Driver, High Accuracy, OVP.
MIC2289	2.5V to 10V	Adj. to 34V	0.75A	1.2MHz	MLF-8 (2mm x 2mm)	Internal Schottky White LED Driver, OVP.
MIC2570	1.3V to 15V	2.85V, 3.3V, 5V, Adj. to 33V	1.1A	20kHz	SOIC-8	Low Input Voltage.
MIC2571	0.9V to 15V	2.85V, 3.3V, 5V, Adj. to 33V	1.1A	20kHz	SOIC-8	Low Input Voltage.
MIC2250 *New!*	2.5V to 5.5V	Adj. to 32V	2.0A	Up to 2.5MHz	MLF-8 (2mm x 2mm)	High Light Load Efficiency Boost Regulator with low EMI.
MIC2290	2.5V to 10V	Adj. to 34V	0.75A	1.2MHz	MLF-8 (2mm x 2mm)	Internal Schottky, OVP.
MIC2295	2.5V to 10V	Adj. to 34V	1.2A	1.2MHz	TSOT-23-5, MLF-8 (2mm x 2mm)	High-Current, High-Efficiency, OVP.
MIC2296	2.5V to 10V	Adj. to 34V	1.7A	0.6MHz	TSOT-23-5, MLF-8 (2mm x 2mm)	High-Current, High-Efficiency, OVP.
MIC2297	2.5V to 10V	Adj. to 40V	1.2A	0.6MHz	MLF-10 (2mm x 2mm)	High Voltage White LED Driver, OVP.
MIC2298	2.5V to 10V	Adj. to 15V	4.75A	1.0MHz	MLF-12 (3mm x 3mm)	High Power Photo Flash LED Driver with Torch Mode, OVP.
MIC2299	2.5V to 10V	Adj. to 30V	4.75A	2.0MHz	MLF-12 (3mm x 3mm)	High Power Photo Flash LED Driver with Torch Mode, OVP.
MIC2601/2	4.5V to 20V	Adj. to 40V	1.2A	1.2/2MHz	MLF-8 (2mm x 2mm)	Enable Pin/SS/ Low Shutdown Current.
MIC2605/6	4.5V to 20V	Adj. to 40V	0.5A	1.2/2MHz	MLF-8 (2mm x 2mm)	Enable Pin/SS/ Low Shutdown Current. Integrated Schottky.
MIC3172	3V to 40V	Adj. to 34V	2.25A	100kHz	SOIC-8, PDIP-8	Enable Pin.

Switch-Mode Voltage Regulator Selection Guide

Boost Controllers (External Switches)

Device	V_{IN} Range	V_{OUT}	Output Current	Efficiency (Typ)	I_Q (Typ)	Shutdown I_Q (Typ)	Frequency	Package(s)	Comments
MIC2186	2.9V to 14V	Adj.	External N-FET, 1A to 10A	90%	600µA	0.5µA	100/200/400kHz	SOIC-16, QSOP-16	
MIC2196	2.9V to 14V	Adj.	External N-FET, 1A to 10A	90%	1mA	0.5µA	400kHz	SOIC-8	Boost, SEPIC, Cuk Configurations.

Synchronous Boost Controllers (External Switches)

Device	V_{IN} Range	V_{OUT}	Output Current	Efficiency (Typ)	I_Q (Typ)	Shutdown I_Q (Typ)	Frequency	Package(s)	Comments
MIC2185	2.9V to 14V	Adj.	External N-FET/P-FET, 1A to 10A	95%	600µA	0.5µA	400kHz	SOIC-8	High Efficiency.

Flyback/Forward Converter/Push-Pull Controllers for Isolated Applications (External Switches)

Device	V_{IN} Range	Gate Drive	V_{START}	V_{STOP}	Start-Up Current (Max)	Duty Cycle (Max)	Topology	Frequency	Package(s)	Comments
MIC9130	9V to 180V	1A	9V	–	–	50%	Forward/Flyback	Adj. to 1.5MHz	SOIC-16, QSOP-16	Fast. Built-in 180V Start-up Circuitry.
MIC9131	9V to 180V	1A	9V	–	–	75%	Forward/Flyback	Adj. to 1MHz	SOIC-16, QSOP-16	Fast. Built-in 180V Start-up Circuitry.
MIC3808	8.3V to 15V	0.5A	12.5V	8.3V	130µA	50%	Push-Pull	Adj. to 1MHz	SOIC-8, MSOP-8	High-Output Current.
MIC3809	4.1V to 15V	0.5A	4.3V	4.1V	130µA	50%	Push-Pull	Adj. to 1MHz	SOIC-8, MSOP-8	High-Output Current.
MIC3838	8.3V to 15V	0.5A	12.5V	8.3V	130µA	50%	Push-Pull	Adj. to 1MHz	MSOP-10	Can Implement Volt-Second Clamp.
MIC3839	4.1V to 15V	0.5A	4.3V	4.1V	130µA	50%	Push-Pull	Adj. to 1MHz	MSOP-10	Can Implement Volt-Second Clamp.
MIC38C42	15.5V to 20V	0.5A	14.5V	9.0V	200µA	96%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, MSOP-8 SOIC-8, -14	
MIC38C43	9V to 20V	0.5A	8.4V	7.6V	200µA	96%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, MSOP-8 SOIC-8, -14	
MIC38C44	15.5V to 20V	0.5A	14.5V	9.0V	200µA	50%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, MSOP-8 SOIC-8, -14	
MIC38C45	9V to 20V	0.5A	8.4V	7.6V	200µA	50%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, MSOP-8 SOIC-8, -14	
MIC38HC42	15.5V to 20V	1A	14.5V	9.0V	200µA	96%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14	
MIC38HC43	9V to 20V	1A	8.4V	7.6V	200µA	96%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14	
MIC38HC44	15.5V to 20V	1A	14.5V	9.0V	200µA	50%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14	
MIC38HC45	9V to 20V	1A	8.4V	7.6V	200µA	50%	Forward/Flyback	Adj. to 500kHz	PDIP-8, -14, SOIC-8, -14	
MIC38C42A[1]	15.5V to 20V	0.5A	14.5V	9.0V	200µA	96%	Forward/Flyback	Adj. to 500kHz	SOIC-8, -14	
MIC38C43A[1]	9V to 20V	0.5A	14.5V	9.0V	200µA	96%	Forward/Flyback	Adj. to 500kHz	SOIC-8, -14	
MIC38C44A[1]	15.5V to 20V	0.5A	14.5V	9.0V	200µA	50%	Forward/Flyback	Adj. to 500kHz	SOIC-8, -14	
MIC38C45A[1]	9V to 20V	0.5A	14.5V	9.0V	200µA	50%	Forward/Flyback	Adj. to 500kHz	SOIC-8, -14	

1. Recommended for new designs.

WLED Driver Selection Guide

Boost LED Drivers

Device	V_IN Range	V_OUT	I_SW (Typ)	Frequency	Package(s)	Comments
MIC2287	2.5V to 10V	Adj. to 34V	0.75A	1.2MHz	TSOT-23-5, MLF-8 (2mm x 2mm)	White LED Driver.
MIC2287C	2.5V to 10V	Adj. to 34V	0.75A	1.2MHz	TSOT-23-5, MLF-8 (2mm x 2mm)	White LED Driver. 10% ILED accuracy
MIC2289	2.5V to 10V	Adj. to 34V	0.75A	1.2MHz	MLF-8 (2mm x 2mm)	Internal Schottky White LED Driver, OVP.
MIC2291	2.5V to 10V	Adj. to 34V	1.2A	1.2MHz	TSOT23-5, MLF-8 (2mm x 2mm)	Photo Flash LED Driver, OVP.
MIC2292	2.5V to 10V	Adj. to 34V	0.5A	1.6MHz	MLF-8 (2mm x 2mm)	High-Frequency White LED Driver with Internal Schottky Diode, OVP.
MIC2293	2.5V to 10V	Adj. to 34V	0.5A	2MHz	MLF-8 (2mm x 2mm)	High-Frequency White LED Driver with Internal Schottky Diode, OVP.
MIC2293C	2.5V to 10V	Adj. to 34V	0.5A	2MHz	MLF-8 (2mm x 2mm)	High-Frequency White LED Driver with Internal Schottky Diode, OVP. 10% ILED accuracy
MIC2297	2.5V to 10V	Adj. to 40V	1.2A	0.6MHz	MLF-10 (2mm x 2mm)	High Voltage White LED Driver, OVP.
MIC2298	2.5V to 10V	Adj. to 15V	4.75A	1.0MHz	MLF-12 (3mm x 3mm)	High Power Photo Flash LED Driver with Torch Mode, OVP.
MIC2299	2.5V to 10V	Adj. to 30V	4.75A	2.0MHz	MLF-12 (3mm x 3mm)	High Power Photo Flash LED Driver with Torch Mode.
MIC3287	2.8V to 5.5V	Adj. to 24V	0.35A	1.2MHz	TSOT-23-5, TSOT-23-6, MLF-8 (2mm x 2mm)	White LED Driver.
MIC3289	2.5V to 6.5V	Adj. to 24V	0.5A	1.2MHz	TSOT-23-6, MLF-8 (2mm x 2mm)	Single Wire Digital Brightness Control with Internal Schottky Diode.

Linear LED Drivers

Device	V_IN Range	Output	Dimming	I_LED Matching	LDOs	Package(s)	Comments
MIC2841A *New!*	3.0V to 5.5V	4 x 20mA	PWM to 500kHz	1.5%	–	Thin MLF-10 (2mm x 2mm)	Linear WLED Driver.
MIC2842A *New!*	3.0V to 5.5V	4 x 20mA	32-Step Digital	1.5%	–	Thin MLF-10 (2mm x 2mm)	Linear WLED Driver.
MIC2843A *New!*	3.0V to 5.5V	6 x 20mA	PWM to 500kHz	1.5%	–	Thin MLF-10 (2mm x 2mm)	Linear WLED Driver.
MIC2844A *New!*	3.0V to 5.5V	6 x 20mA	32-Step Digital	1.5%	–	Thin MLF-10 (2mm x 2mm)	Linear WLED Driver.
MIC2845A *New!*	3.0V to 5.5V	6 x 20mA	PWM to 500kHz	1.5%	2	Thin MLF-14 (2.5mm x 2.5mm)	Linear WLED Driver with 2 LDOs.
MIC2846A *New!*	3.0V to 5.5V	6 x 20mA	32-Step Digital	1.5%	2	Thin MLF-14 (2.5mm x 2.5mm)	Linear WLED Driver with 2 LDOs.

High Power LED Drivers

Device	V_IN Range	I_LED	Dimming	Switching Frequency	I_LED Accuracy	Feedback Looping	Package(s)	Comments
MIC3230 *New!*	6V to 45V	Controller (external FET)	PWM	100 to 1MHz	3%	250mV	eTSSOP-16, MLF-12 (3mm x 3mm)	Boost Controller High Power LED Driver.
MIC3231 *New!*	6V to 45V	Controller (external FET)	PWM	to 1MHz	3%	250mV	eTSSOP-16 MLF-12 (3mm x 3mm)	Boost Controller High Power LED Driver with filtering.
MIC3232 *New!*	6V to 45V	Controller (external FET)	PWM	400kHz	3%	250mV	MSOP-10	Fixed Frequency Boost Controller High Power LED Driver
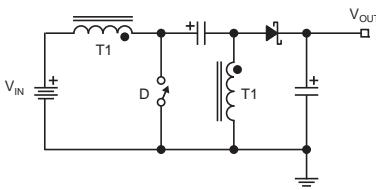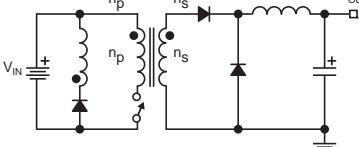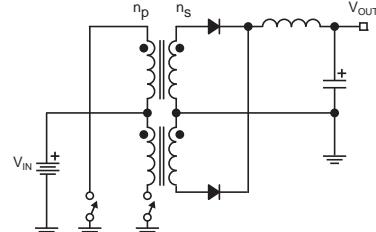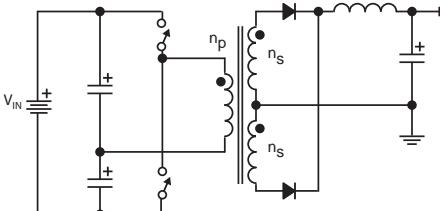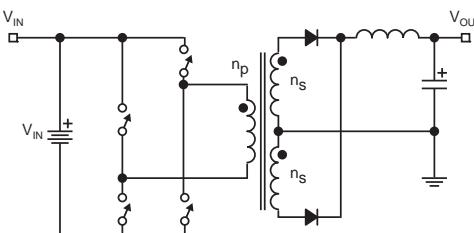
Switch-Mode Voltage Regulator DC-to-DC Topologies

Device		Typical Applications	Pros	Cons

MIC5203
MIC5205
MIC5219
MIC5245
MIC2940A
	MIC39100
	MIC39150
	MIC47100*
	MIC69103*
	MIC69153*
	MIC69302*
			Linear Regulator
			Only Steps Down ($V_{OUT} < V_{IN}$)
			– Inexpensive
			– Very Small
			– Low Noise/EMI
			– Ideal for:
			  – 3.3V to 2.5V
			  – 2.5V to 1.8V
			  – 1.8V to 1.2V
				Inefficient at high input to output voltage differential
				$Eff = V_{OUT}/V_{IN}$
				
				Note:
				If a linear regulator gets too hot, then use a buck switching regulator instead or the new HELDO™ MIC38300.

LM257x MIC457x MIC2207 MIC2208 MIC4680* MIC4681* MIC4682* MIC4684*	MIC4685* MIC4690* MIC4720* MIC4721* MIC4722* MIC4723* MIC4724*		**Buck Regulator (Internal Switch)** Only Steps Down ($V_{OUT} < V_{IN}$) – Lowest Peak Current – Only One Switch Voltage Drop – Low-Ripple Current In – Output-Filter Capacitor – Simple Inductor – Low Switch-Stress Voltage Eff = +85%	High-Side Switch I_{SW} (Avg) $\approx I_{OUT}$ $DC \approx \dfrac{V_{OUT}}{V_{IN} \times Eff}$
MIC2177* MIC2178* MIC2179* MIC2202* MIC2203* MIC2204* MIC2205*	MIC2206* MIC2224* MIC2245* MIC2285* MIC22400* MIC22600* MIC23xxx		**Synchronous Buck Regulator (Internal Switch)** High Efficiency Step Down – Highest Efficiency (+90%) – Pros are same as Buck – High Output Current (Up to 20A)	Two Switches I_{SW} (Avg) $\approx I_{OUT}$ $DC \approx \dfrac{V_{OUT}}{V_{IN} \times Eff}$
MIC2130/1* MIC2159* MIC2168A* MIC2169A* MIC2182*	MIC2183 MIC2193* MIC2198* MIC2199*		**Synchronous Buck Regulator (External Switch)** High Efficiency Step Down – Highest Efficiency (+90%) – Pros are same as Buck – High Output Current (Up to 20A)	Two Switches I_{SW} (Avg) $\approx I_{OUT}$ $DC \approx \dfrac{V_{OUT}}{V_{IN} \times Eff}$
MIC2142* MIC2145* MIC2186* MIC2288 MIC2290 MIC2570*	MIC2601/2 MIC2605/6 MIC3172* MIC2171* MIC3289*		**Boost** Only Steps Up ($V_{OUT} > V_{IN}$) – Low Peak Current – Low-Side Switch – Simple Inductor – Low Switch-Stress Voltage Eff $\approx$ 85%	Output can't be completely turned off. No short-circuit protection. I_{SW} (Avg) $\approx \dfrac{V_{OUT} \times I_{OUT}}{V_{IN} \times Eff.}$ $DC \approx \dfrac{V_{OUT} - (V_{IN} \times Eff.)}{V_{OUT}}$
MIC2196* LM257x MIC457x	MIC4680 MIC4681 MIC4690		**Inverter/Buck Boost** Negative Output Only – Simple Inductor Eff $\approx$ 80%	High-Side Switch High Peak Currents I_{SW} (Avg) $\approx \dfrac{V_{OUT} \times I_{OUT} + I_{OUT}}{V_{OUT} \times Eff.}$ $DC \approx \dfrac{V_{OUT}}{V_{OUT} + (V_{IN} \times Eff.)}$
MIC38HC4x MIC38C4x			**Forward** Step Up and Down – Isolated Outputs – Low Side Switch – Low Input/Output Ripple Eff $\approx$ 90%	I_{SW} (Avg) $\approx \dfrac{n_s}{n_p} \times I_{OUT}$ $DC \approx \dfrac{V_{OUT}}{(Eff \times V_{IN})} \times \dfrac{n_p}{n_s}$

Note:

* = evaluation board is available.

Switch-Mode Voltage Regulator DC-to-DC Topologies

Device	Typical Applications	Pros	Cons
MIC2171 MIC38HC4x MIC2186* MIC9130** (POE) MIC2196* MIC9131* MIC38C4x		**Flyback Applications (External Switches)** Step Up and Down Isolated Output Multiple Outputs Negative Output High Output Voltage – Low-Side Switch Eff ≈ 80%	Transformer instead of Inductor High Peak Current High Switch-Stress Voltage $I_{SW}(Avg) \approx \dfrac{2 \times V_{OUT} \times I_{OUT}}{V_{IN} \times Eff.}$ DC ≈ Duty Cycle DC ≈ Assume 50%
MIC2142* MIC2196* MIC2145* MIC2288* MIC2171* MIC2295* MIC2172* MIC2570* MIC2186* MIC3172*		**SEPIC** Step Up and Down – Low-Side Switch Eff ≈ 80%	High Peak Currents 2 inductors or coupled inductor. High Switch-Stress Voltage $I_{SW}(Avg) \approx \dfrac{V_{OUT} \times I_{OUT} + I_{OUT}}{V_{OUT} \times Eff.}$ $DC \approx \dfrac{V_{OUT}}{V_{OUT} + \left(V_{IN} \times Eff.\right)}$
MIC3808/9 MIC3838/9		**Push-Pull** Step Up and Down – Isolated Outputs – Low Side Switches – Low Input/Output Ripple Eff ≈ 94%	$I_{SW}(Avg) \approx \dfrac{n_s}{n_p} \times I_{OUT}$ $DC \approx \dfrac{V_{OUT}}{2(Eff \times V_{IN})} \times \dfrac{n_p}{n_s}$
MIC3808 MIC3809* MIC3838/9		**Half-Bridge** Step Up and Down – Isolated Outputs – Low FET Stress – Low Transformer Leakage Eff ≈ 95%	$I_{SW}(Avg) \approx \dfrac{n_s}{n_p} \times I_{OUT}$ $DC \approx \dfrac{V_{OUT}}{2(Eff \times V_{IN})} \times \dfrac{n_p}{n_s}$
MIC3808 MIC3809* MIC3838/9		**Full-Bridge** Step Up and Down – Isolated Outputs – High Power – Low FET Stress Eff ≈ 95%	$I_{SW}(Avg) \approx \dfrac{n_s}{n_p} \times I_{OUT}$ $DC \approx \dfrac{V_{OUT}}{2(Eff \times V_{IN})} \times \dfrac{n_p}{n_s}$

Note:

* = evaluation board is available.

General Purpose Power Distribution Switch Selection Guide

Micrel Advantange

- Highest Efficiency
- Highest Current Density

- Low R_{DS} ON
- Best CLS Performance

Device	Type	Switch Element	Internal Charge Pump	Operating Voltage	Current Limit Fixed (Min.)	Current Limit Adj. (Max.)	Output Resistance	Body Diode Blocking	Enable Logic	Under Voltage Lockout	Current Limit	Thermal Shutdown	Fault Flag	Flag Transient Filter	Package
MIC2003/13	Single	P-Channel	n/a	2.5V to 5.5V	500mA 800mA 1.2A		100mΩ@5V	No	Noninverting	Yes	Yes	Yes	No	Yes	SOT-23-6, MLF® (2mm x 2mm)
MIC2004/14	Single	P-Channel	n/a	2.5V to 5.5V	500mA 800mA 1.2A		100mΩ@5V	No	Noninverting	Yes	Yes	Yes	No	Yes	SOT-23-6, MLF® (2mm x 2mm)
MIC2005/15	Single	P-Channel	n/a	2.5V to 5.5V	500mA 800mA 1.2A		10mΩ@5V	No	Noninverting	Yes	Yes	Yes	Yes	Yes	SOT-23-6, MLF® (2mm x 2mm)
MIC2005A *New!*	Single	P-Channel	n/a	2.5V to 5.5V	500mA		170mΩ@5V	No	Noninverting	Yes	Yes	Yes	Yes	Yes	SOT-23-5, SOT-23-6
MIC2005L *New!*	Single	P-Channel	n/a	2.5V to 5.5V	500mA 800mA 1.2A		100mΩ@5V	No	Noninverting	Yes	Yes	Yes	Yes	Yes	SOT-23-5
MIC2006/16	Single	P-Channel	n/a	2.5V to 5.5V	500mA 800mA 1.2A		100mΩ@5V	No	Noninverting	Yes	Yes	Yes	No	Yes	SOT-23-6, MLF® (2mm x 2mm)
MIC2007/17	Single	P-Channel	n/a	2.5V to 5.5V	200mA	2.0A	100mΩ@5V	No	Noninverting	Yes	Yes	Yes	No	Yes	SOT-23-6, MLF® (2mm x 2mm)
MIC2008/18	Single	P-Channel	n/a	2.5V to 5.5V	200mA	2.0A	100mΩ@5V	No	Noninverting	Yes	Yes	Yes	No	Yes	SOT-23-6, MLF® (2mm x 2mm)
MIC2009/19	Single	P-Channel	n/a	2.5V to 5.5V	200mA	2.0A	100mΩ@5V	No	Noninverting	Yes	Yes	Yes	Yes	Yes	SOT-23-6, MLF® (2mm x 2mm)
MIC2025-1	Single	N-Channel	Yes	2.7V to 5.5V	500mA		140mΩ@5V	Yes	Noninverting	Yes	Yes	Yes	Yes	Yes	SOIC-8, MSOP-8
MIC2025-2	Single	N-Channel	Yes	2.7V to 5.5V	500mA		140mΩ@5V	Yes	Inverting	Yes	Yes	Yes	Yes	Yes	SOIC-8, MSOP-8
MIC2026-1	Dual	N-Channel	Yes	2.7V to 5.5V	500mA		140mΩ@5V	Yes	Noninverting	Yes	Yes	Yes	Yes	Yes	SOIC-8, DIP-8
MIC2026-2	Dual	N-Channel	Yes	2.7V to 5.5V	500mA		140mΩ@5V	Yes	Inverting	Yes	Yes	Yes	Yes	Yes	SOIC-8, DIP-8
MIC2027-1	Quad	N-Channel	Yes	2.7V to 5.5V	500mA		150mΩ@5V	Yes	Noninverting	Yes	Yes	Yes	Yes	Yes	SOIC-16
MIC2027-2	Quad	N-Channel	Yes	2.7V to 5.5V	500mA		150mΩ@5V	Yes	Inverting	Yes	Yes	Yes	Yes	Yes	SOIC-16
MIC2040-1	Single	N-Channel	Yes	0.8V to 5.5V	250mA	1.5A	80mΩ@5V	Yes	Noninverting	Yes	Yes	Yes	Yes	Yes	MSOP-10
MIC2040-2	Single	N-Channel	Yes	0.8V to 5.5V	250mA	1.5A	80mΩ@5V	Yes	Inverting	Yes	Yes	Yes	Yes	Yes	MSOP-10
MIC2041-1	Single	N-Channel	Yes	0.8V to 5.5V	250mA	1.5A	80mΩ@5V	Yes	Noninverting	Yes	Latched	Yes	Yes	Yes	MSOP-10
MIC2041-2	Single	N-Channel	Yes	0.8V to 5.5V	250mA	1.5A	80mΩ@5V	Yes	Inverting	Yes	Latched	Yes	Yes	Yes	MSOP-10
MIC2042-1	Single	N-Channel	Yes	0.8V to 5.5V	500mA	3.0A	40mΩ@5V	Yes	Noninverting	Yes	Yes	Yes	Yes	Yes	SOIC-8, TSSOP-14
MIC2042-2	Single	N-Channel	Yes	0.8V to 5.5V	500mA	3.0A	40mΩ@5V	Yes	Inverting	Yes	Yes	Yes	Yes	Yes	SOIC-8, TSSOP-14
MIC2043-1	Single	N-Channel	Yes	0.8V to 5.5V	500mA	3.0A	40mΩ@5V	Yes	Noninverting	Yes	Latched	Yes	Yes	Yes	SOIC-8, TSSOP-14
MIC2043-2	Single	N-Channel	Yes	0.8V to 5.5V	500mA	3.0A	40mΩ@5V	Yes	Inverting	Yes	Latched	Yes	Yes	Yes	SOIC-8, TSSOP-14
MIC2044-1	Single	N-Channel	Yes	0.8V to 5.5V	1.0A	6.0A	20mΩ@5V	Yes	Noninverting	Yes	Yes	Yes	Yes	Yes	TSSOP-16
MIC2044-2	Single	N-Channel	Yes	0.8V to 5.5V	1.0A	6.0A	20mΩ@5V	Yes	Inverting	Yes	Yes	Yes	Yes	Yes	TSSOP-16
MIC2045-1	Single	N-Channel	Yes	0.8V to 5.5V	1.0A	6.0A	20mΩ@5V	Yes	Noninverting	Yes	Latched	Yes	Yes	Yes	TSSOP-16
MIC2045-2	Single	N-Channel	Yes	0.8V to 5.5V	1.0A	6.0A	20mΩ@5V	Yes	Inverting	Yes	Latched	Yes	Yes	Yes	TSSOP-16
MIC2075-1	Single	N-Channel	Yes	2.7V to 5.5V	500mA		140mΩ@5V	Yes	Noninverting	Yes	Yes	Latched	Yes	Yes	SOIC-8, MSOP-8
MIC2075-2	Single	N-Channel	Yes	2.7V to 5.5V	500mA		140mΩ@5V	Yes	Inverting	Yes	Yes	Latched	Yes	Yes	SOIC-8, MSOP-8
MIC2076-1	Dual	N-Channel	Yes	2.7V to 5.5V	500mA		140mΩ@5V	Yes	Noninverting	Yes	Yes	Latched	Yes	Yes	SOIC-8, DIP-8
MIC2076-2	Dual	N-Channel	Yes	2.7V to 5.5V	500mA		140mΩ@5V	Yes	Inverting	Yes	Yes	Latched	Yes	Yes	SOIC-8, DIP-8
MIC2077-1	Quad	N-Channel	Yes	2.7V to 5.5V	500mA		150mΩ@5V	Yes	Noninverting	Yes	Yes	Latched	Yes	Yes	SOIC-16
MIC2077-2	Quad	N-Channel	Yes	2.7V to 5.5V	500mA		150mΩ@5V	Yes	Inverting	Yes	Yes	Latched	Yes	Yes	SOIC-16
MIC2505	Single	N-Channel	Yes	2.7V to 7.5V	2.0A		50mΩ@5V	Yes	Noninverting		Yes	Yes	Yes	Yes	SOIC-8
MIC2505-1	Single	N-Channel	Yes	2.7V to 7.5V	2.0A		50mΩ@5V	Yes	Noninverting		Yes	Yes	Yes	Yes	SOIC-8
MIC2505-2	Single	N-Channel	Yes	2.7V to 7.5V	2.0A		50mΩ@5V	Yes	Inverting		Yes	Yes	Yes	Yes	SOIC-8
MIC2506	Dual	N-Channel	Yes	2.7V to 7.5V	1.0A		125mΩ@5V	Yes	Noninverting		Yes	Yes	Yes	Yes	SOIC-8
MIC2514	Single	P-Channel	Yes	3V to 13.5V	400mA		2.4Ω@5V		Noninverting		Yes	Yes			SOT-23-5
MIC2536-1	Dual	N-Channel	Yes	2.7V to 5.5V	100mA		700mΩ@5V	Yes	Noninverting		Yes	Yes	Yes	Yes	SOIC-8, MSOP-8
MIC2536-2	Dual	N-Channel	Yes	2.7V to 5.5V	100mA		700mΩ@5V	Yes	Inverting		Yes	Yes	Yes	Yes	SOIC-8, MSOP-8

General Purpose Power Distribution Switch Selection Guide

Device	Type	Switch Element	Internal Charge Pump	Operating Voltage	Current Limit Fixed (Min.)	Current Limit Adj. (Max.)	Output Resistance	Body Diode Blocking	Enable Logic	Under Voltage Lockout	Current Limit	Thermal Shutdown	Fault Flag	Flag Transient Filter	Package
MIC2537-1	Quad	N-Channel	Yes	2.7V to 5.5V	100mA		700mΩ@5V	Yes	Noninverting		Yes	Yes	Yes		SOIC-16
MIC2537-2	Quad	N-Channel	Yes	2.7V to 5.5V	100mA		700mΩ@5V	Yes	Inverting		Yes	Yes	Yes		SOIC-16
MIC2544-1	Single	N-Channel	Yes	2.7V to 5.5V	100mA	1.5A	120mΩ@5V	Yes	Noninverting		Yes	Yes	Yes		SOIC-8, MSOP-8
MIC2544-2	Single	N-Channel	Yes	2.7V to 5.5V	100mA	1.5A	120mΩ@5V	Yes	Inverting		Yes	Yes	Yes		SOIC-8, MSOP-8
MIC2545A-1	Single	N-Channel	Yes	2.7V to 5.5V	500mA	3.0A	50mΩ@5V	Yes	Noninverting		Yes	Yes	Yes		SOIC-8, PDIP-8, TSSOP-14
MIC2545A-2	Single	N-Channel	Yes	2.7V to 5.5V	500mA	3.0A	50mΩ@5V	Yes	Inverting		Yes	Yes	Yes		SOIC-8, PDIP-8, TSSOP-14
MIC2546-1	Dual	N-Channel	Yes	2.7V to 5.5V	100mA	1.5A	120mΩ@5V	Yes	Noninverting		Yes	Yes	Yes		SOIC-16, TSSOP-16
MIC2546-2	Dual	N-Channel	Yes	2.7V to 5.5V	100mA	1.5A	120mΩ@5V	Yes	Inverting		Yes	Yes	Yes		SOIC-16, TSSOP-16
MIC2546-1	Dual	N-Channel	Yes	2.7V to 5.5V	100mA	1.5A	120mΩ@5V	Yes	Noninverting		Yes	Yes	Yes		SOIC-16, TSSOP-16
MIC2546-2	Dual	N-Channel	Yes	2.7V to 5.5V	100mA	1.5A	120mΩ@5V	Yes	Inverting		Yes	Yes	Yes		SOIC-16, TSSOP-16
MIC2547-1	Dual	N-Channel	Yes	2.7V to 5.5V	100mA	1.5A	120mΩ@5V	Yes	Noninverting		Yes	Latched	Yes		SOIC-16, TSSOP-16
MIC2547-2	Dual	N-Channel	Yes	2.7V to 5.5V	100mA	1.5A	120mΩ@5V	Yes	Inverting		Yes	Latched	Yes		SOIC-16, TSSOP-16
MIC2548-1	Single	N-Channel	Yes	2.7V to 5.5V	100mA	1.5A	120mΩ@5V	Yes	Noninverting		Yes	Latched	Yes		SOIC-8, MSOP-8
MIC2548-2	Single	N-Channel	Yes	2.7V to 5.5V	100mA	1.5A	120mΩ@5V	Yes	Inverting		Yes	Latched	Yes		SOIC-8, MSOP-8
MIC2549A-1	Single	N-Channel	Yes	2.7V to 5.5V	500mA	3.0A	50mΩ@5V	Yes	Noninverting		Yes	Latched	Yes		SOIC-8, PDIP-8, TSSOP-14
MIC2549A-2	Single	N-Channel	Yes	2.7V to 5.5V	500mA	2.5A	50mΩ@5V	Yes	Inverting		Yes	Latched	Yes		SOIC-8, PDIP-8, TSSOP-14

USB Switches and USB Switches Supporting ACPI S0/S3 State Transitions[1]

Device	Type	Switch Element	Internal Charge Pump	Operating Voltage	Current Limit Fixed (Min.)	Current Limit Adj. (Max.)	Output Resistance	Body Diode Blocking	Enable Logic	Under Voltage Lockout	Current Limit	Thermal Shutdown	Fault Flag	Flag Transient Filter	Package
MIC2010-1	Dual	N-Channel	Yes	4.5V to 5.5V	500mA	300mA[2]	140mΩ@5V	Yes	Noninverting	Yes	Yes	Yes	Yes	Yes	QSOP-16
MIC2010-2	Dual	N-Channel	Yes	4.5V to 5.5V	500mA	300mA[2]	140mΩ@5V	Yes	Inverting	Yes	Yes	Yes	Yes	Yes	QSOP-16
MIC2012-1	Dual	N-Channel	Yes	4.5V to 5.5V	500mA		140mΩ@5V	Yes	Noninverting	Yes	Yes	Yes	Yes	Yes	QSOP-16
MIC2012-2	Dual	N-Channel	Yes	4.5V to 5.5V	500mA		140mΩ@5V	Yes	Inverting	Yes	Yes	Yes	Yes	Yes	QSOP-16
MIC2012	Dual	N-Channel	Yes	4.5V to 5.5V	500mA		140mΩ@5V	Yes	—	Yes	Yes	Yes	Yes	Yes	SOIC-8
MIC2070-1	Dual	N-Channel	Yes	4.5V to 5.5V	500mA	300mA[2]	140mΩ@5V	Yes	Noninverting	Yes	Yes	Latched	Yes	Yes	QSOP-16
MIC2070-2	Dual	N-Channel	Yes	4.5V to 5.5V	500mA	300mA[2]	140mΩ@5V	Yes	Inverting	Yes	Yes	Latched	Yes	Yes	QSOP-16
MIC2072-1	Dual	N-Channel	Yes	4.5V to 5.5V	500mA		140mΩ@5V	Yes	Noninverting	Yes	Yes	Latched	Yes	Yes	QSOP-16
MIC2072-2	Dual	N-Channel	Yes	4.5V to 5.5V	500mA		140mΩ@5V	Yes	Inverting	Yes	Yes	Latched	Yes	Yes	QSOP-16
MIC2072	Dual	N-Channel	Yes	4.5V to 5.5V	500mA		140mΩ@5V	Yes	—	Yes	Yes	Latched	Yes	Yes	SOIC-8
MIC2073 *New!*	Dual	N-Channel	Yes	2.7V to 5.5V	500mA		210mΩ@5V	Yes	Noninverting	Yes	Yes	Yes	Yes	Yes	SOIC-8
MIC2074 *New!*	Dual	N-Channel	Yes	2.7V to 5.5V	500mA		210mΩ@5V	Yes	Inverting	Yes	Yes	Yes	Yes	Yes	SOIC-8

1. Contact factory for availabilty of specific options. Specifications are given for "MAIN" mode operation.
2. S3 State.

USB Transceiver Selection Guide

Device	Description	Supported Speeds	Package
MIC2550A	Universal Serial Bus Transceiver	1.5Mbps (low) and 12Mbps (full)	TSSOP-14, MLF-16
MIC2551A	Universal Serial Bus Transceiver	1.5Mbps (low) and 12Mbps (full)	TSSOP-14, MLF-16
MIC2551A-2.5	Universal Serial Bus Transceiver	1.5Mbps (low) and 12Mbps (full)	MLF-14 (2.5mm x 2.5mm)
MIC2555	Universal Serial Bus On-The-Go (OTG) Transceiver	1.5Mbps (low) and 12Mbps (full)	MLF-24 (4mm x 4mm)

PC Card/PCMCIA/CardBus Power Distribution Switch Selection Guide

Micrel Advantange

- Single Chip Smallest Footprint Solution

- First Company with PCMCIA Solution

Device	Slots Supported	V_{CC3} On-Resistance	V_{CC5} On-Resistance	V_{PP} On-Resistance	Current Limit	Thermal Shutdown	Charge Pump[1]	Package
MIC2560	Single	40mΩ	70mΩ	550mΩ	Yes	Yes		WSOIC-16
MIC2561	Single	110mΩ	210mΩ	550mΩ	Yes	Yes		SOIC-14
MIC2562A	Single	100mΩ	70mΩ	600mΩ	Yes	Yes	Yes	SOIC-14
MIC2563A	Dual	100mΩ	70mΩ	600mΩ	Yes	Yes	Yes	SSOP-28
MIC2564A	Dual	120mΩ	85mΩ	1300mΩ	Yes	Yes	Yes	SSOP-24, TSSOP-24
MIC2566	Single	120mΩ	85mΩ	—	Yes	Yes	Yes	SOIC-14, TSSOP-14
MIC2568	Dual	120mΩ	85mΩ	—	Yes	Yes	Yes	SSOP-28, TSSOP-28
MIC2569		90mΩ	—	275mΩ	Yes	Yes	Yes	QSOP-16

1. 12V is not required for switching when equipped with a charge pump.

Operational Amplifier Selection Guide

Micrel Advantange

- Low Power
- Low Current
- Can Drive Large Capacitance Loads
- Best Performance

Device	Description	GBW	Slew Rate	Supply Current (per Op Amp)	Input Offset Voltage (max.)	Input Bias Current	Supply Range	Rail-to-Rail I/O	# of Op Amps Per Package	Package	Comments
MIC6211	High-Voltage Op Amp	2.5MHz	6V/µs	1.2mA	7mV	50nA	4V–32V		1	SOT-23-5	High-Voltage General Purpose.
LMC7101	General Purpose Op Amp	500kHz	0.5V/µs	500µA	6mV	1pA	2.7V–10V	Input/Output	1	SOT-23-5	Rail-to-Rail Input and Output.
MIC7111	Micropower 1.8V Op Amp	25kHz	20mV/µs	15µA	7mV	1pA	1.8V–11V	Input/Output	1	SOT-23-5	Rail-to-Rail Input and Output.
MIC7122	Rail-to-Rail Dual Op Amp	750kHz	0.7V/µs	350µA	9mV	1pA	2.2V–15V	Input/Output	2	MSOP-8	Rail-to-Rail Input and Output.
MIC7300	High Output Drive Op Amp	500kHz	0.5V/µs	700µA	9mV	0.5pA	2.2V–10V	Input/Output	1	SOT-23-5 MSOP-8	Rail-to-Rail Input and Output.
MIC860	4MHz/30µA Op Amp	4MHz	3V/µs	30µA	15mV	20pA	2.43V–5.25V	Output	1	SC-70-5	Very Low Power.
MIC861	400kHz/4.6µA Op Amp	400kHz	0.12V/µs	4.6µA	10mV	20pA	2.43V–5.25V	Output	1	SC-70-5	Very Low Power.
MIC862	Dual 3MHz/31µA Op Amp	3MHz	4V/µs	31µA	6mV	10pA	2V–5.25V	Output	2	SOT-23-8	Very Low Power.
MIC863	Dual 450KHz/4.2µA Op Amp	450KHz	0.35V/µs	4.2µA	6mV	10pA	2V–5.25V	Output	2	SOT-23-8	Very Low Power.
MIC910	135MHz Op Amp	135MHz	270V/µs	2.4mA	15mV	3.5µA	5V–18V		1	SOT-23-5	Low Power/High Speed.
MIC911	105MHz Op Amp	105MHz	120V/µs	1.25mA	10mV	1.5µA	5V–18V		1	SOT-23-5	Low Power/High Speed.
MIC912	200MHz Op Amp	200MHz	360V/µs	2.4mA	15mV	3.5µA	5V–18V		1	SOT-23-5	Low Power/High Speed.
MIC913	350MHz Op Amp	350MHz	500V/µs	4.2mA	16mV	5.5µA	5V–18V		1	SOT-23-5	Low Power/High Speed.
MIC914	160MHz Op Amp	160MHz	160V/µs	1.25mA	10mV	1.5µA	5V–18V		1	SOT-23-5	Low Power/High Speed.
MIC915	Dual MIC910	135MHz	270V/µs	2.4mA	15mV	3.5µA	5V–18V		2	MSOP-10	Low Power/High Speed.
MIC916	Triple MIC910	135MHz	270V/µs	2.4mA	15mV	3.5µA	5V–18V		3	QSOP-8	Low Power/High Speed.
MIC918	1500V/µs Op Amp	51MHz	1500V/µs	550µA	5mV	0.26µA	5V–18V		1	SC-70-5	Low Power/High Speed.
MIC919	1500V/µs Op Amp	27MHz	1500V/µs	360µA	5mV	0.13µA	5V–18V		1	SC-70-5	Low Power/High Speed.
MIC920	3000V/µs Op Amp	80MHz	3000V/µs	500µA	5mV	0.26µA	5V–18V		1	SC-70-5	Low Power/High Speed.
MIC921	3000V/µs Op Amp	45MHz	3000V/µs	300µA	5mV	0.13µA	5V–18V		1	SC-70-5	Low Power/High Speed.
MIC922	230MHz Op Amp	230MHz	1500V/µs	2.5mA	5mV	1.7µA	5V–18V		1	SC-70-5	Low Power/High Speed.
MIC923	410MHz/2200V/µs Op Amp	410MHz	2200V/µs	2.5mA	5mV	1.7µA	5V–18V		1	SC-70-5	Low Power/High Speed.

Comparator Selection Guide

Device	Description	Response Time	Supply Current	Input Offset Voltage (max.)	Input Bias Current	Supply Range	Package	Comments
MIC6270	High-Voltage Comparator	600ns	0.3mA	5mV	25nA	2V–36V	5-Pin SOT-23	
MIC7211	Rail-to-Rail Input Comparator	4µs	5µA	10mV	5pA	2.2V–10V	5-Pin SOT-23	Push-Pull Output.
MIC7221	Rail-to-Rail Input Comparator	4µs	5µA	10mV	5pA	2.2V–10V	5-Pin SOT-23	Open-Drain Output.
MIC833	Comparator and Reference w/Adjustable Hysteresis	5µs	1µA	n/a	5pA	1.5V–5.5V	5-Pin SOT-23	Internal 1% Reference.
MIC834	Comparator and Reference	5µs	1.5µA	n/a	5pA	1.5V–5.5V	5-Pin SOT-23	Internal 1% Reference.
MIC841	Comparator and Reference w/Adjustable Hysteresis	12µs	1.5µA	n/a	5pA	1.5V–5.5V	5-Pin SC-70	Internal 1.25% Reference.
MIC842	Comparator and Reference	12µs	1.5µA	n/a	5pA	1.5V–5.5V	5-Pin SC-70	Internal 1.25% Reference.
MIC845	Micro-Power Comparator Battery Monitor	12µs	1.0µA	n/a	5pA	2.75V–5.5V	5-Pin SC-70	Internal 2% Reference, 2.55V Reference.

MOSFET Driver Selection Guide

Device	Function	Type	Logic	Sink/Source Peak Output	Sink/Source Output Impedance	t_r/t_f	t_{pd} (input rise/fall)	Supply Voltage	Package	Comments
Half-Bridge Drivers										
MIC4100	Half-Bridge MOSFET Driver	Dual	Non-Inverting (CMOS)	2A/2A	2.5Ω/2.5Ω	10ns into 1000pF	27ns into 1,000pF	up to 100V	SOIC-8, MLF-8 (3mm x 3mm)[1]	Hysteresis on input pins for noisy or slow signals.
MIC4101	Half-Bridge MOSFET Driver	Dual	Non-Inverting (TTL)	2A/2A	2.5Ω/2.5Ω	10ns into 1000pF	27ns into 1,000pF	up to 100V	SOIC-8, MLF-8 (3mm x 3mm)[1]	Level shift between V_{IN} signal and V_{DD} supply voltage.
MIC4102	High-Voltage Sync. Buck Driver	Dual	Non-Inverting (TTL)	3A/2A	1.5Ω/2.5Ω	10ns/6ns into 1000pF	27ns into 1,000pF	up to 100V	SOIC-8, MLF-8 (3mm x 3mm)[1]	Embedded Anti-Shoot through Protection.
MIC4103	Half-Bridge MOSFET Driver	Dual	Non-Inverting (CMOS)	3A/2A	1.25Ω/2.5Ω	10ns/6ns into 1000pF	27ns into 1,000pF	up to 100V	SOIC-8, MLF-8 (3mm x 3mm)[1]	
MIC4104	Half-Bridge MOSFET Driver	Dual	Non-Inverting (TTL)	3A/2A	1.25Ω/2.5Ω	10ns/6ns into 1000pF	27ns into 1,000pF	up to 100V	SOIC-8, MLF-8 (3mm x 3mm)[1]	
Low-Side Drivers										
MIC4120[2]	Low-Side Driver	Single	Non-Inverting	6A	1.5Ω	12ns/13ns into 2500pF	45ns/50ns into 2,500pF	4.5V to 20V	eSOIC-8, MLF-8 (3mm x 3mm)	MIC4420 upgrade; Advanced packaging; Higher input voltage; Input pulse down to 50ns.
MIC4123[2]	Low-Side Driver	Dual	Inverting	3A	2.2Ω	23ns/25ns into 1800pF	44ns/59ns into 1,800pF	4.5V to 20V	eSOIC-8, MLF-8 (4mm x 4mm)	MIC4423 upgrade; Advanced packaging; Higher input voltage; Input pulse down to 50ns.
MIC4124[2]	Low-Side Driver	Dual	Non-Inverting	3A	2.2Ω	23ns/25ns into 1800pF	44ns/59ns into 1,800pF	4.5V to 20V	eSOIC-8, MLF-8 (4mm x 4mm)	MIC4424 upgrade; Advanced packaging; Higher input voltage; Input pulse down to 50ns.
MIC4125[2]	Low-Side Driver	Dual	Inverting + Non-Inverting	3A	2.2Ω	23ns/25ns into 1800pF	44ns/59ns into 1,800pF	4.5V to 20V	eSOIC-8, MLF-8 (4mm x 4mm)	MIC4425 upgrade; Advanced packaging; Higher input voltage; Input pulse down to 50ns.
MIC4126[2]	Low-Side Driver	Dual	Inverting	1.5A	6Ω	13ns/15ns into 1000pF	37ns/40ns into 1000pF	4.5V to 20V	eSOIC-8, eMSOP-8, MLF-8 (3mm x 3mm)	MIC4426 upgrade; Advanced packaging; Higher input voltage; Input pulse down to 50ns.
MIC4127[2]	Low-Side Driver	Dual	Non-Inverting	1.5A	6Ω	13ns/15ns into 1000pF	37ns/40ns into 1000pF	4.5V to 20V	eSOIC-8, eMSOP-8, MLF-8 (3mm x 3mm)	MIC4427 upgrade; Advanced packaging; Higher input voltage; Input pulse down to 50ns.
MIC4128[2]	Low-Side Driver	Dual	Inverting + Non-Inverting	1.5A	6Ω	13ns/15ns into 1000pF	37ns/40ns into 1000pF	4.5V to 20V	eSOIC-8, eMSOP-8, MLF-8 (3mm x 3mm)	MIC4428 upgrade; Advanced packaging; Higher input voltage; Input pulsedown to 50ns.
MIC4129[2]	Low-Side Driver	Single	Inverting	6A	1.5Ω	12ns/13ns into 2500pF	45ns/50ns into 2,500pF	4.5V to 20V	eSOIC-8, MLF-8 (3mm x 3mm)	MIC4429 upgrade; Advanced packaging; Higher input voltage; Input pulse down to 50ns.
MIC4416	Low-Side Driver	Single	Non-Inverting	1.2A	7.6Ω/7.8Ω	24ns/28ns into 1000pF	42ns into 1,000pF	4.5V to 18V	SOT-143	IttyBitty® Device.
MIC4417	Low-Side Driver	Single	Inverting	1.2A	7.6Ω/7.8Ω	24ns/28ns into 1000pF	37ns into 1,000pF	4.5V to 18V	SOT-143	IttyBitty® Device.
MIC44F18	N-Channel MOSFET Driver	Single	Non-Inverting (TTL)	6A	2Ω	10ns/10ns into 1000pF	15ns/13ns into 1000pF	4.5V to 13.2V	MLF-8 (2mm x 2mm), eMSOP-8,	High Speed; small, thermally efficient package.
MIC44F19	P-Channel MOSFET Driver	Single	Inverting (TTL)	6A	2Ω	10ns/10ns into 1000pF	15ns/13ns into 1000pF	4.5V to 13.2V	MLF-8 (2mm x 2mm), eMSOP-8,	High Speed; small, thermally efficient package.
MIC44F20	N-Channel MOSFET Driver	Single	Inverting (TTL)	6A	2Ω	10ns/10ns into 1000pF	15ns/13ns into 1000pF	4.5V to 13.2V	MLF-8 (2mm x 2mm), eMSOP-8	High Speed; small, thermally efficient package.
MIC4420	Low-Side Driver	Single	Non-Inverting	6A	1.7Ω/1.5Ω	12ns/13ns into 2500pF	18ns/48ns into 2500pF	4.5V to 18V	SOIC-8, MSOP-8, PDIP-8, TO-220-5, CerDIP-8[3]	Drives Hex 6–Hex 7 Size. MOSFET: 1,500pF to 16,000pF; Latch-Up Protected; Input to –5V.
MIC4429	Low-Side Driver	Single	Inverting	6A	1.7Ω/1.5Ω	12ns/13ns into 2500pF	18ns/48ns into 2500pF	4.5V to 18V	SOIC-8, MSOP-8, PDIP-8, TO-220-5,	Drives a Hex 6–Hex 7 Size. MOSFET: 1,500pF to 16,000pF; Latch-Up Protected; Input to –5V.
MIC4421 MIC4421A[2]	Low-Side Driver	Single	Inverting	9A	0.8Ω/0.6Ω	20ns/24ns into 10nF	15ns/35ns into 10nF	4.5V to 18V	PDIP-8, SOIC-8, TO-220-5	Drives 1,500pF to 47,000pF; Latch-Up Protected; Input to –5V.
MIC4422 MIC4422A[2]	Low-Side Driver	Single	Non-inverting	9A	0.8Ω/0.6Ω	20ns/24ns into 10nF	15ns/35ns into 10nF	4.5V to 18V	PDIP-8, SOIC-8, TO-220-5	Drives 1,500pF to 47,000pF; Latch-Up Protected; Input to –5V.

1. Contact factory for MLF® availability.
2. Recommended for new designs.
3. SMD (military) 5962-8877003PA.

MOSFET Driver Selection Guide

Device	Function	Type	Logic	Sink/Source Peak Output	Sink/Source Output Impedance	t_r/t_f	t_{pd} (input rise/fall)	Supply Voltage	Package	Comments
MIC4423	Low-Side Driver	Dual	Inverting	3A	3.8Ω/3.5Ω	23ns/25ns into 1800pF	33ns/38ns into 1800pF	4.5V to 18V	SOIC-8, WSOIC-16, PDIP-8	Drives Hex 4–Hex 5 Size. MOSFET: 6,000pF to 12,000pF; Latch-Up Protected; Input to –5V.
MIC4424	Low-Side Driver	Dual	Non-inverting	3A	3.8Ω/3.5Ω	23ns/25ns into 1800pF	33ns/38ns into 1800pF	4.5V to 18V	SOIC-8, WSOIC-16, PDIP-8, CerDIP-8[5]	Drives a Hex 4–Hex 5 Size. MOSFET: 6,000pF to 12,000pF; Latch-up Protected; Input to –5V.
MIC4425	Low-Side Driver	Dual	Inverting + Non-Inverting	3A	3.8Ω/3.5Ω	23ns/25ns into 1800pF	33ns/38ns into 1800pF	4.5V to 18V	SOIC-8, -16 PDIP-8	Drives a Hex 4–Hex 5 Size. MOSFET: 6,000pF to 12,000pF; Latch-up Protected; Input to –5V.
MIC4426	Low-Side Driver	Dual	Inverting	1.5A	6Ω	18ns/15ns into 1000pF	17ns/23ns into 1000pF	4.5V to 18V	SOIC-8, MSOP-8, PDIP-8 CerDIP-8[6]	Drives a Hex 0–Hex 3 Size. MOSFET: 400pF to 3,000pF; Latch-up Protected; Input to –5V.
MIC4427	Low-Side Driver	Dual	Non-inverting	1.5A	6Ω	18ns/15ns into 1000pF	17ns/23ns into 1000pF	4.5V to 18V	SOIC-8, MSOP-8, PDIP-8V CerDIP-8[7]	Drives a Hex 0–Hex 3 Size. MOSFET: 400pF to 3,000pF; Latch-up Protected; Input to –5V.
MIC4428	Low-Side Driver	Dual	Inverting + Non-Inverting	1.5A	6Ω	18ns/15ns into 1000pF	17ns/23ns into 1000pF	4.5V to 18V	SOIC-8, MSOP-8, PDIP-8 CerDIP-8[8]	Drives a Hex 0–Hex 3 Size. MOSFET: 400pF to 3,000pF; Latch-up Protected; Input to –5V.
MIC4451 MIC4451A[4]	Low-Side Driver	Single	Inverting	12A	0.8Ω/0.6Ω	20ns/24ns into 15nF	15ns/35ns into 15nF	4.5V to 18V	SOIC-8, PDIP-8, TO-220-5	Drives 1,500pF to 62,000pF; Latch-up Protected; Input to –5V.
MIC4452 MIC4452A[4]	Low-Side Driver	Single	Non-inverting	12A	0.8Ω/0.6Ω	20ns/24ns into 15nF	15ns/35ns into 15nF	4.5V to 18V	SOIC-8, PDIP-8, TO-220-5	Drives 1,500pF to 62,000pF; Latch-up Protected; Input to –5V.
MIC4467	Low-Side Driver	Quad	Non-inverting NAND Inputs	1.2A	5Ω	14ns/13ns into 470pF	30ns/45ns into 470pF	4.5V to 18V	WSOIC-16, PDIP-14	Drives a Hex 0–Hex 3 Size. MOSFET: 400pF to 3,000pF; Latch-up Protected; Input to –5V.
MIC4468	Low-Side Driver	Quad	Non-inverting AND Inputs	1.2A	5Ω	14ns/13ns into 470pF	30ns/45ns into 470pF	4.5V to 18V	WSOIC-16, PDIP-14	Drives a Hex 0–Hex 3 Size. MOSFET: 400pF to 3,000pF; Latch-up Protected; Input to –5V.
MIC4469	Low-Side Driver	Quad	Inverting + Non-inverting AND Inputs	1.2A	5Ω	14ns/13ns into 470pF	30ns/45ns into 470pF	4.5V to 18V	WSOIC-16, PDIP-14 CerDIP-14[9]	Drives a Hex 0–Hex 3 Size. MOSFET: 400pF to 3,000pF; Latch-up Protected; Input to –5V.
MIC5011	High- or Low-Side Driver	Single	Non-inverting	–	–	60μs into 1,000pF		4.75V to 32V	SOIC-8, PDIP-8	External Charge Pump. Capacitors (opt.).
MIC5013	High- or Low-Side Driver	Single	Non-inverting	–	–	60μs into 1,000pF		7V to 32V	SOIC-8, PDIP-8	Current Sense, Fault.
MIC5014	High- or Low-Side Driver	Single	Non-inverting	–	–	90μs into 1,000pF		2.75V to 30V	SOIC-8, PDIP-8	
MIC5015	High- or Low-Side Driver	Single	Inverting	–	–	90μs into 1,000pF		2.75V to 30V	SOIC-8, PDIP-8	
MIC5016[10]	High- or Low-Side Driver	Dual	Non-inverting	–	–	90μs into 1,000pF		2.75V to 30V	WSOIC-16, PDIP-14	
MIC5017[10]	High- or Low-Side Driver	Dual	Inverting	–	–	90μs into 1,000pF		2.75V to 30V	WSOIC-16, PDIP-14	
MIC5018	High- or Low-Side Driver	Single	Non-inverting	–	–	2.1ms into 3,000pF		2.7V to 9V	SOT-143	IttyBitty® Device.
MIC5020	Complementary Low-Side Driver	Single	Non-inverting	–	–	1.1μs into 1,500pF		11V to 50V	SOIC-8	Complement to MIC5021 (Similar Performance), Current Sense (50mV nominal).
MIC5021	High-Speed High-Side Driver	Single	Non-inverting	–	–	0.9μs into 1,500pF		12V to 36V	SOIC-8, PDIP-8	Current Sense (50mV nominal).

4. Recommended for new designs.
5. SMD (military) 5962-8850305PA.
6. SMD (military) 5962-8850307PA.
7. SMD (military) 5962-8850308PA.
8. SMD (military) 5962-8850309PA.
9. SMD (military) 5962-9459403MCA.
10. Product familiy discontinuance announced effective June 3, 2005. Recommended Micrel alternatives; two each MIC5014 and two each MIC5015.

Voltage Monitors and Voltage/Processor Supervisors Selection Guide

Micrel Advantange

- Industry Standards
- Cross to Maxim
- Very Low IQ
- Very Low Supply Voltage
- Adjustable Hysterisis

Standard Voltage Supervisors

Device	Manual Reset Input	Reset Output Polarity	Reset Threshold Voltage	t_{RESET} (ms)	I_{SUPPLY} (µA)	Package
MIC1810-15/-10/-5	No	Low	4.12V, 4.37V, 4,62V	100	9.0	SOT-23-3
MIC1815-20/-10	No	Low	2.55V, 2.88V	100	9.0	SOT-23-3
MIC809R/S/T/J/M/L	No	Low	2.63V, 2.93V, 3.08V, 4.00V, 4.38V, 4.63V	140	9.0	SOT-23-3, SC-70-5
MIC810R/S/T/J/M/L	No	High	2.63V, 2.93V, 3.08V, 4.00V, 4.38V, 4.63V	140	9.0	SOT-23-3, SC-70-5
MIC811R/S/T/J/M/L	Yes	Low	2.63V, 2.93V, 3.08V, 4.00V, 4.38V, 4.63V	140	9.0	SOT-143
MIC812R/S/T/J/M/L	Yes	High	2.63V, 2.93V, 3.08V, 4.00V, 4.38V, 4.63V	140	9.0	SOT-143
MIC6315-xxD2	Yes	Low	2.5–5.0V in 100mV increments	20	9.0	SOT-143
MIC6315-xxD3	Yes	Low	2.5–5.0V in 100mV increments	140	9.0	SOT-143
MIC6315-xxD4	Yes	Low	2.5–5.0V in 100mV increments	1100	9.0	SOT-143
MIC707	Yes	Both	4.65V	140	60	SOIC-8, PDIP-8
MIC708	Yes	Both	4.40V	140	60	SOIC-8, PDIP-8
MIC708R/S/T	Yes	Both	2.63V, 2.93V, 3.08V	140	30	SOIC-8, PDIP-8

Microprocessor Supervisors with Watchdog Timers

Device	Manual Reset Input	Reset Output(s) Polarity	Reset Threshold Voltage	Watchdog Timeout	Power Fail Detect	t_{RESET} (ms)	I_{SUPPLY} (µA)	Package
MIC705	Yes	Low	4.65V	1.6s	Yes	140	60	SOIC-8, PDIP-8
MIC706	Yes	Low	4.40V	1.6s	Yes	140	60	SOIC-8, PDIP-8
MIC706P	Yes	High	2.63V	1.6s	Yes	140	30	SOIC-8, PDIP-8
MIC706R/S/T	Yes	Low	2.63V, 2.93V, 3.08V	1.6s	Yes	140	30	SOIC-8, PDIP-8
MIC1232	Yes	Both	4.62V or 4.37V	150ms/600ms/1.2s	Yes	250	30	SOIC-8, PDIP-8
MIC1832	Yes	Both	2.88V or 2.55V	150ms/600ms/1.2s	Yes	250	30	8-Pin SOIC, 8-Pin PDIP

Standard Voltage Supervisors for AMD Elan™ Microprocessors

Device	Manual Reset Input	Reset Output Polarity	Reset Threshold Voltage	t_{RESET} (ms)	I_{SUPPLY} (µA)	Package
MIC8114T (SC400/410)	Yes	Low	3.08V	790	9.0	SOT-143
MIC8115T (SC500)	Yes	Low	3.08V	1100	9.0	SOT-143

Single and Dual Ultra-Low Voltage Supervisors

Device	Single/ Dual	Manual Reset Input	Reset Output(s) Polarity	Reset Threshold Voltage	t_{RESET} (ms)	I_{SUPPLY} (µA)	Package
MIC2772-xxxxYM5	Dual	Yes	Low	2.93V, 3.08V, 4.38V, 4.63V	140	10	MLF-8
MIC2774H-xxYM5 MIC2774N-xxYM5 MIC2774L-xxYM5	Dual	Yes	High Open-Drain Low	Fixed: 1.69V, 2.25V, 2.34V, 2.53V, 2.67V, 2.81V, 2.93V, 3.09V, 4.43V, 4.68V; Adjustable from 0.300V min.	140	3.5	SOT-23-5
MIC2775-xxYM5	Single	Yes	Both	1.69V, 2.25V, 2.34V, 2.53V, 2.67V, 2.81V, 2.93V, 3.09V, 4.43V, 4.68V	140	3.5	SOT-23-5V
MIC2776N-YM5	Single	Yes	Open-Drain	Adjustable from 0.300V min.	140	3.5	SOT-23-5
MIC2776L-YM5	Single	Yes	Low	Adjustable from 0.300V min.	140	3.5	SOT-23-5
MIC2776H-YM5	Single	Yes	High	Adjustable from 0.300V min.	140	3.5	SOT-23-5
MIC2777-xxYM5	Dual	Yes[1]	Both	Fixed: 1.69V, 2.25V, 2.34V, 2.53V, 2.67V, 2.81V, 2.93V, 3.09V, 4.43V, 4.68V; Adjustable from 0.300V min.	140	3.5	SOT-23-5

1. Manual reset switch connects to adjustable input.

Voltage Monitors and Voltage/Processor Supervisors Selection Guide

Voltage Monitors and Supervisors Optimized for Battery Monitoring

Device	Manual Reset Input	Reset Output(s) Polarity	V_{RESET}	Adjustable Hysteresis	t_{RESET} (ms)	I_{SUPPLY} (μA)	Package
MIC833	No	High	Adjustable ≥ 1.25V	Y	n/a	1.0	SOT-23-5
MIC834	No	High	Adjustable ≥ 1.25V	N	n/a	1.5	SOT-23-5
MIC841	No	High or Low	Adjustable ≥ 1.25V	Y	n/a	1.5	SC-70-5
MIC842	No	High or Low	Adjustable ≥ 1.25V	N	n/a	1.5	SC-70-5
MIC845	n/a	High or Low	2.55V or adjustable >2.55V	N	n/a	1.0	SC-70-5
MIC2755	Yes	Open-Drain	Adjustable ≥ 1.25V	Y	700	2.0	MSOP-8
MIC2778-1/-2[1]	No	Low	Adjustable ≥ 1.25V	Y	140	1.0	SOT-23-5
MIC2779L-1/-2[1]	No	Low	Adjustable ≥ 1.25V	Y	140	1.0	SOT-23-5
MIC2779H-1/-2[1]	No	High	Adjustable ≥ 1.25VY	Y	140	1.0	SOT-23-5

1. −1 is 1% and −2 is 2% 1.25V reference tolerance.

Thermal/System Management, Transistors and Arrays, Timers, References, and SCSI Terminators Selection Guides

Micrel Advantange

- General Purpose Flexible Design

2-Wire Serial Thermal Supervisors

Device	Description	Remote Zone	Internal Zone	Data Width	CRIT Output	Device Bus	Resolution (Bits)	Accuracy	Package
MIC184	Local/Remote Thermal Supervisor	1[1]	Yes	9	—	8[2]	9	3%	SOIC-8, MSOP-8
MIC280	Precision IttyBitty® Thermal Supervisor	1	Yes	12	Yes	8	12	1%	SOT-23-6
MIC281	Low-Cost IttyBitty® Thermal Sensor	1	—	8	—	8	8	3%	SOT-23-6
MIC284	2-Zone Thermal Supervisor w/CRIT Output	1	Yes	8	Yes	8	8	3%	SOIC-8, MSOP-8
MIC384	3-Zone Thermal Supervisor	2	Yes	8	—	8	8	3%	SOIC-8, MSOP-8

1. MIC184 has limit registers for monitoring one zone at a time; either the internal or external zone may be monitored at any given time.

2. In LM75 mode; 4 when using T1 function.

Fan Management ICs

Device	Description	Package
MIC502	Fan Management IC	PDIP-8, SOIC-8
MIC74	2-Wire Serial I/O Expander and Fan Controller	QSOP-16

I/O Expanders

Device	Description	Package
MIC74	2-Wire Serial I/O Expander and Fan Controller	QSOP-16

Transistors/Switches

Device	Description	Voltage Range	On-Resistance	Substrate Pin	Gate Pull-Up Resistor	Package
MIC94030	Single P-Channel MOSFET	2.7V to 13.5V	0.75Ω @ V_{GS} = 4.5V	Yes	—	SOT-143-4
MIC94031	Single P-Channel MOSFET	2.7V to 13.5V	0.75Ω @ V_{GS} = 4.5V	Yes	Yes	SOT-143-4
MIC94050	Single P-Channel MOSFET	1.8V to 5.5V	0.125Ω @ V_{GS} = 4.5V	Yes	—	SOT-143
MIC94051	Single P-Channel MOSFET	1.8V to 5.5V	0.125Ω @ V_{GS} = 4.5V	Yes	Yes	SOT-143
MIC94052	Single P-Channel MOSFET	1.8V to 5.5V	0.07Ω @ V_{GS} = 4.5V	—	—	SC-70-6
MIC94053	Single P-Channel MOSFET	1.8V to 5.5V	0.07Ω @ V_{GS} = 4.5V	—	Yes	SC-70-6

Array

Device	Description	Voltage	Input Signal	Package
MIC2981/82	Octal Source-Driver Array	50V	5V-TTL or 5V-to-15V CMOS or PMOS	PDIP-18, WSOIC-18

Timers

Device	Description	Package
MIC1555	IttyBitty® RC Timer/Oscillator	SOT-23-5
MIC1557	IttyBitty® RC Oscillator	SOT-23-5

References

| Device	Description	Package
LM4040/4041	Precision Micropower Shunt Voltage Reference	SOT-23-3

Hot Swap Power Controller Selection Guide
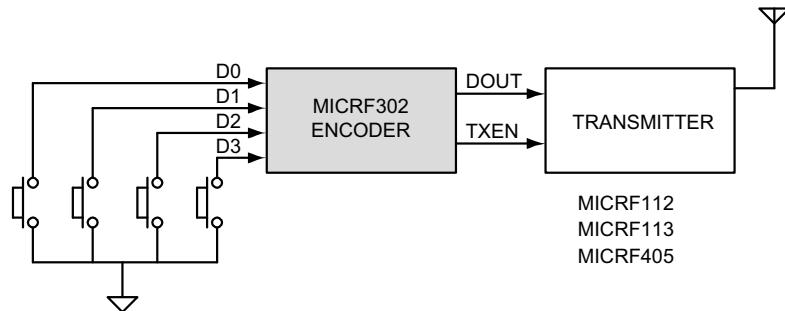
Micrel Advantange

- Robustness
- High voltage capability
- Superior parametric performance
- Smallest solution size

Device	Outputs	Input Voltage Range	Latch Off	Auto Retry	/FAULT	/POR	PWRGD or RST	OV SCR	Foldback Current Limit	Packages	Comments
MIC2085	1	+2.3V to +16.5V	Yes		Yes	Yes		Yes	Yes	QSOP-16	Pin-for-pin equivalent to LTC1642; Uncommitted comparator and crowbar output.
MIC2086	1	+2.3V to +16.5V	Yes		Yes	Yes	/PWRGD	Yes	Yes	QSOP-20	Uncommitted comparator, crowbar output, and C_L discharge capability.
MIC2580A	4	±12V , +3.3V, +5V	Yes		Yes	Yes	/PWRGD		Yes	TSSOP-24	Single-slot controller for CompactPCI applications.
MIC2582	1	+2.3V to +13.2V	Yes			Yes				SOIC-8	Pin-for-pin functional equivalent to LTC1422; Dual-level fault detection.
MIC2583	1	+2.3V to +13.2V	Yes		Yes	Yes	PWRGD			QSOP-16	Dual-level fault detection; C_L discharge capability.
MIC2583R	1	+2.3V to +13.2V	Yes	Yes	Yes	Yes	PWRGD			QSOP-16	Dual-level fault detection; C_L discharge capability.
MIC2310-1 MIC2310-2	1	+10.8V to +13.2V	Yes	Yes	HW_FLT, I_FLT HW_FLT, /I_FLT		PWRGD /PWRGD			TSSOP-24	Single FET, constant power-limit, Hot plug controller for general purpose power-limiting applications and UL60950 systems (240-VA).
MIC2584	2	CH1: +2.3V to +13.2V CH2: +1V to +13.2V	Yes		Yes	Yes				TSSOP-16	Output voltage tracking with dual-level fault detection.
MIC2585-1 MIC2585-2	2 2	CH1: +2.3V to +13.2V CH2: +1V to +13.2V	Yes		Yes	Yes	PWRGD			TSSOP-24	V_{OUT} sequencing/tracking with dual-level detection and C_L discharge capability: −1: V_{OUT2} follows V_{OUT1}; −2: V_{OUT1} follows V_{OUT2}.
MIC2590B	10	±12V, +5V, +3.3V, and +3.3V_{AUX}	Yes		Yes					TQFP-48	Dual-slot controller for PCI v2.x and PCI-X 1.0b. Compliant applications with IPMI v1.0 support.
MIC2593	10	±12V, +5V, +3.3V, and +3.3V_{AUX}	Yes		Yes					TQFP-48	Dual-slot controller for PCI v2.x and PCI-X 1.0b. Compliant applications without IPMI v1.0 support.
MIC2341 MIC2341R	6	+12V, +3.3V, and +3.3V_{AUX}	Yes	Yes	Yes		/PWRGD /DLY_PWRGD			TQFP-48	Dual-slot controller for PCI-Express systems without the SMBus interface (hardware mode only); MAIN & AUX outputs are independent.
MIC2342 MIC2342R	6	+12V, +3.3V, and +3.3V_{AUX}	Yes	Yes	Yes		/PWRGD /DLY_PWRGD			TQFP-48	Dual-slot controller for PCI-Express systems without the SMBus interface (hardware mode only); MAIN & AUX outputs are inter-dependent upon AUX overcurrent event.
MIC2591B	6	+12V, +3.3V, and +3.3V_{AUX}	Yes		Yes		/PWRGD			TQFP-48	Dual-slot controller for PCI-Express systems with IPMI v1.0 support.
MIC2592B	6	+12V, +3.3V, and +3.3V_{AUX}	Yes		Yes		/PWRGD			TQFP-48	Dual-slot controller for PCI-Express systems where IPMI v1.0 support not needed.
MIC2586-1 MIC2586-2	1	+10V to +80V	Yes				PWRGD /PWRGD		Yes	SOIC-14	Multiple PWRGD outputs for sequencing, user-programmable delay.
MIC2586R-1 MIC2586R-2	1	+10V to +80V		Yes			PWRGD /PWRGD		Yes	SOIC-14	Multiple PWRGD outputs for sequencing, user-programmable delay.
MIC2587-1 MIC2587-2	1	+10V to +80V	Yes				PWRGD /PWRGD		Yes	SOIC-8	1st Generation +48V controller. Pin-for-pin equivalent to LT1641–1.
MIC2587R-1 MIC2587R-2	1	+10V to +80V		Yes			PWRGD /PWRGD		Yes	SOIC-8	1st Generation +48V controller. Fault condition: Auto-retry. Pin-for-pin equivalent to LT1641–2.
MIC2588-1 MIC2588-2	1	−19V to −80V	Yes				PWRGD /PWRGD			SOIC-8	1st Generation −48V controller; pin-for-pin equivalent to LT1640/LT/LT1640A/LT4250.
MIC2594-1 MIC2594-2	1	−19V to −80V	Yes				PWRGD /PWRGD			SOIC-8	MIC2588 with Programmable input ON/OFF control.
MIC2589-1 MIC2589-2	1	−19V to −80V	Yes				PWRGD /PWRGD			SOIC-14	Programmable UVLO and OV protection and three PWRGD outputs for sequencing.
MIC2589R-1 MIC2589R-2	1	−19V to −80V		Yes			PWRGD /PWRGD			SOIC-14	Programmable UVLO and OV protection and three PWRGD outputs for sequencing.
MIC2595-1 MIC2595-2	1	−19V to −80V	Yes				PWRGD /PWRGD			SOIC-14	Programmable input ON/OFF control and three PWRGD outputs for sequencing.
MIC2595R-1 MIC2595R-2	1	−19V to −80V		Yes			PWRGD /PWRGD			SOIC-14	Programmable input ON/OFF control and three PWRGD outputs for sequencing.

RF Remote Packet Generator

MICRF302 Block Diagram

The MICRF302 RF remote packet generator translates push-button closures into Manchester encoded packets greatly simplifying design and reducing the need for a costly microcontroller in cost-sensitive one-way transmitter applications such as RKE, Garage Door Openers and Remote Controls. The MICRF302 is designed to easily connect to Micrel's family of low-power, low-cost, 300MHz to 1GHz, ASK or FSK RF transmitters, such as the MICRF112, MICRF113 or MICRF405. Each MICRF302 contains a 20-bit Poly-Fuse Programmable Read-Only Memory (PPROM) which is programmed at the factory and offers over 1 Million unique addresses. A pair of logic-level inputs allows the device to be set to support data rates of 0.6, 1.0, 3.0 or 4.8kbps. The internal clock requires no external components and maintains an accuracy of ±10%. Four logic-level input pins support 1 to 15 external switches. Upon any switch closure, the device is immediately awoken from Standby Mode, a TX enable signal is sent to awake the accompanying transmitter, and a Manchester encoded packet is generated. Each packet includes a pre-amble, sync, address, data and an 8-bit Cyclic Redundancy Check (CRC) which allows the decoder to check for errors in the packet. Each packet is transmitted four times to improve the probability of a received signal. After transmission the device is immediately placed in low-power standby mode. The MICRF302 consumes 0.3uA in standby mode and 130uA during operation from a 1.8V to 3.6V power supply.

Features

- Factory programmed 20-bit address with >1M unique addresses
- 4 push-button switch inputs supports 1 to 15 switches
- Manchester Encoded Packets
- 8-bit Cyclic Redundancy Check (CRC)
- Selectable data rates of 0.6, 1.0, 3.0 and 4.8kbps
- Internal clock generation requires no external components
- 0.3uA supply current in Standby Mode
- 130uA supply current during operation
- 1.8V to 3.6V Supply Voltage Range

Applications

- Remote Keyless Entry (RKE)
- Remote Car Starters
- Garage Door Openers (GDO)
- Remote Controls
- Remote Light Switches
- Remote Fan Controls
- Remote Thermostats
- Lawn Watering Sensors

RadioWire® and QwikRadio® RF Selection Guide

Micrel Advantange

- Highest Performance Transceivers
- Lowest Power
- High Sensitivity

- Micrel Net
- Low Component Count
- Easy to Design
- Modules Available

RF Remote Packet Generator

Device	Data Rate	Internal Address	Address Combos	CRC	Supply Current	Supply Voltage	Temp. Range	Package
MICRF302 *New!**	<4.8kbps	20-bit	>1M	8-bit	130µA	1.8V to 3.6V	-40°C to +85°C	MLF-10 (2.5mm x 2.5mm)

*See Product Highlight on previous page.

RF Transmitter (QwikRadio® and RadioWire®)

Device	Frequency Range	Modulation	Data Rate/ Modulation	Output Power	Supply Current	Supply Voltage	Temp. Range	Package
MICRF405 *New!*	290MHz–980MHz	ASK FSK	<200kbps FSK <50kbps ASK	+10dBm	18mA	2.2V to 3.6V	-40°C to +125°C	MLF-24 (4mm x 4mm)
MICRF113	300 to 450MHz	ASK OOK	<10kbps	+10dBm	12.3mA	1.8V to 3.6V	-40°C to +85°C	SOT-23-6 (2.8mm x 2.9mm)
MICRF112	300 to 450MHz	ASK FSK	<50kbps ASK <10kbps FSK	+10dBm	8.5mA 12.5mA	1.8V to 3.6V	-40°C to +125°C	MSOP-10 (3.0mm x 4.9mm)
MICRF103	800 to 1000MHz	ASK/OOK	115kbps	-3dBm	16mA	5V	-40°C to +85°C	SOIC-8 (4.9mm x 6.0mm)
MICRF102	300 to 470MHz	ASK/OOK	20kbps	-4dBm	4mA	5V	-40°C to +85°C	SOIC-8 (4.9mm x 6.0mm)

RF Receivers (QwikRadio®)

Device	Frequency Range	Modulation	Maximum Data Rate	Sensitivity	Supply Current	Supply Voltage	Temp. Range	Package
MICRF221 *New!*	850 to 950MHz	ASK/OOK	<10kbps	-109dBm @1kbps	9.0mA	3.0V to 3.6V	-40°C to +105°C	QSOP-16 (4.9mm x 6.0mm)
MICRF219 *New!*	300 to 450MHz	ASK/OOK	<10kbps	-110dBm @ 1kbps	4.0mA	3.0V to 3.6V	-40°C to +105°C	QSOP-16 (4.9mm x 6.0mm)
MICRF218	300 to 450MHz	ASK/OOK	<10kbps	-110dBm @ 1kbps	5.5mA	3.0V to 3.6V	-40°C to +85°C	QSOP-16 (4.9mm x 6.0mm)
MICRF213	300 to 350MHz	ASK/OOK	<7.2kbps	-110dBm @ 1kbps	3.9mA	3.0V to 3.6V	-40°C to +105°C	QSOP-16 (4.9mm x 6.0mm)
MICRF211	380 to 450MHz	ASK/OOK	<10kbps	-110dBm @ 1kbps	6.0mA	3.0V to 3.6V	-40°C to +105°C	QSOP-16 (4.9mm x 6.0mm)
MICRF010	300 to 440MHz	ASK/OOK	<2kbps	-105dBm @ 1kbps	2.9mA	5V	-40°C to +85°C	SOIC-8 (4.9mm x 6.0mm
MICRF009	300 to 440MHz	ASK/OOK	<2kbps	-104dBm @ 1kbps	2.9mA	5V	-40°C to +85°C	SOIC-8 (4.9mm x 6.0mm)
MICRF007	300 to 440MHz	ASK/OOK	<3.2kbps	-99dBm @ 1kbps	2.3mA	5V	-40°C to +85°C	SOIC-8 (4.9mm x 6.0mm)

RF Transceivers (RadioWire®)

Device	Frequency Range	Modulation	Maximum Data Rate	Sensitivity	Output Power	Supply Current	Supply Voltage	Temp. Range	Package
MICRF505	850 to 950MHz	FSK	<200kbps	-111dBm @ 2.4kbps	+10dBm	13.5mA Rx 28mA Tx	2.0V to 2.5V	-40°C to +85°C	MLF-32 (5mm x 5mm)
MICRF506	410 to 450MHz	FSK	<200kbps	-113dBm @ 2.4kbps	+11dBm	12.0mA 21.5mA Tx	2.0V to 2.5V	-40°C to +85°C	MLF-32 (5mm x 5mm)

RF Transceiver Modules

Device	Frequency Range	Modulation	Maximum Data Rate	Sensitivity	Output Power	Supply Current	Supply Voltage	Temp. Range	Package
MICRF600	902 to 928MHz	FSK	<20kbps	-111dBm @ 2.4kbps	9dBm	13.2mA Rx 28mA Tx	2.0V to 2.5V	-20°C to +75°C	11.5 x 14.1
MICRF610	868 to 870MHz	FSK	<15kbps	-111dBm @ 2.4kbps	8.5dBm	13.6mA Rx 26mA Tx	2.0V to 2.5V	-20°C to +75°C	11.5 x 14.1
MICRF620	430 to 440MHz	FSK	<20kbps	-110dBm @ 2.4kbps	10dBm	12mA Rx 23mA Tx	2.0V to 2.5V	-20°C to +75°C	11.5 x 14.1

Electroluminescent Drivers Selection Guide

Micrel Advantange

- Low Noise
- Low Power
- Bright Light

Device	Description	Package
MIC4826	Low Input Voltage, 160V$_{PP}$ Output Voltage EL Driver	MSOP-8
MIC4827	Low Input Voltage, 180V$_{PP}$ Output Voltage EL Driver	MSOP-8
MIC4830	Low Input Voltage, Low Noise, 180V$_{PP}$ Output Voltage EL Driver	MLF-10 (3mm x 3mm), MSOP-8
MIC4832	Low Input Voltage, Low Noise, 220V$_{PP}$ Output Voltage EL Driver	MLF-10 (3mm x 3mm), MSOP-8
MIC4833	Low Input Voltage, Low Noise, 220V$_{PP}$ Output Voltage EL Driver	MLF-12 (3mm x 3mm)
MIC4834	Low Input Voltage, Low Noise, 220V$_{PP}$ Output Voltage EL Driver with Slew Rate Control	MLF-10 (3mm x 3mm), MSOP-10

Display Driver Selection Guide

Micrel Advantange

- High Current
- High Voltage
- Video Image Speeds
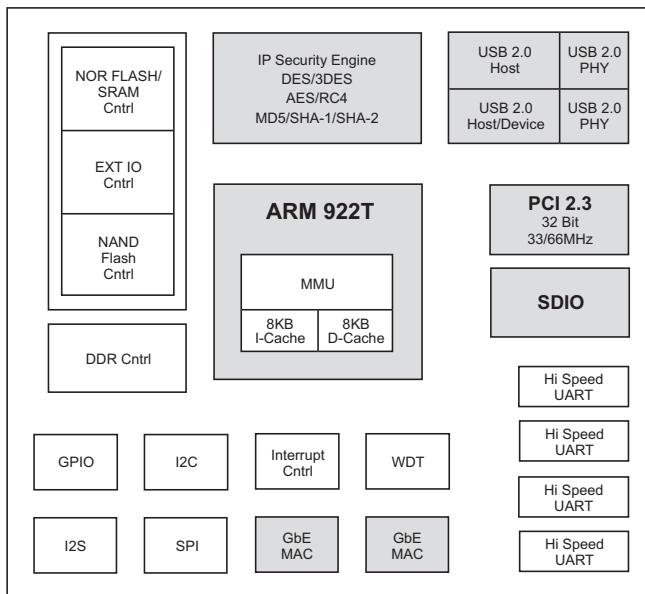
Device	Description	Segments	LEDs	Package
MIC5400	LED Video Display Driver		16	SOIC-28
MM5450	LED Display Driver	34		PDIP-40, PLCC-44
MM5451	LED Display Driver	35		PDIP-40, PLCC-44

Latched Driver Selection Guide

Device	Input	Number Output Channels	Nominal Sink Current	Nominal Source Current	Maximum Output Voltage	Thermal, UVLO, Overcurrent Protection	Packages			
							SOIC	PLCC	PDIP	CerDIP
MIC5800	Parallel	4	400mA	—	50V	—	14-pin	—	14-pin	—
MIC5801	Parallel	8	400mA	—	50V	—	24-pin	28-pin	22-pin	22-pin[1]
MIC58P01	Parallel	8	400mA	—	80V	Yes	24-pin wide	28-pin	22-pin	—
MIC5821	Serial	8	400mA	—	50V / 35V	—	—	—	16-pin	—
MIC5822	Serial	8	400mA	—	80V / 50V	—	—	—	16-pin	—
MIC5841	Serial	8	400mA	—	50V / 35V	—	18-pin wide	20-pin	18-pin	—
MIC5842	Serial	8	400mA	—	80V / 50V	—	18-pin wide	20-pin	18-pin	—
MIC58P42	Serial	8	400mA	—	80V / 50V	Yes	18-pin wide	20-pin	18-pin	—
MIC5891	Serial	8	—	400mA	50V	—	16-pin wide	—	16-pin	—
MIC59P50	Parallel	8	400mA	—	80V	Yes	24-pin wide	28-pin	24-pin	—
MIC59P60	Serial	8	400mA	—	80V / 50V	Yes	20-pin wide	20-pin	20-pin	—

1. SMD (military) 5962-8764001WA.

Ethernet Product Highlight — KSZ8692/9692

KSZ8692/9692

The KSZ9692PB is a highly integrated Gigbit Ethernet System-on-Chip (SoC) containing an ARM 922T 32-bit processor and a rich set of peripherals to address the cost-sensitive, high-performance needs of a wide variety of high bandwidth networking and communications applications.

Features

ARM 922T High-Performance Processor Core

- 250MHz ARM 922T RISC processor core
- 8KB I-cache and 8KB D-cache
- Configurable Memory Management Unit (MMU) for Linux and WinCE

Memory Controller

- 8/16-bit external bus interface for FLASH, ROM, SRAM, and external I/O
- NAND FLASH controller with boot option
- 200MHz 32-bit DDR controller
- Four JEDEC Specification JESD82-1 compliant differential clock drivers for a glueless DDR interface solution

Ethernet Interfaces

- Two GbE (10/100/1000 Mbps) MACs
- MII or RGMII interface
- Fully compliant with IEEE 802.3 Ethernet standards

IP Security Engine

- Hardware IPSec Engine guarantees 100Mbps VPN
- Secure Socket Layer Support
- DES/3DES/AES/RC4 Cyphers
- MD-5, SHA-1, SHA-256 Hashing Algorithms
- HMAC
- SSLMAC

PCI Interface

- Version PCI 2.3
- 32-bit 33/66MHz
- Integrated PCI Arbiter supports three external masters

- Configurable as Host bridge or Guest device
- Glueless Support for mini-PCI or CardBus devices

Dual High-Speed USB 2.0 Interfaces

- Two USB2.0 ports with integrated PHY
- Can be configured as 2-port host, or host + device

SDIO/SD Host Controller

- Meets SD Host Controller Standard Specification Version 1.0
- Meets SDIO card specification Version 1.0

DMA Controllers

- Dedicated DMA channels for PCI, USB, IPSec, SDIO and Ethernet ports

Peripherals

- Four high-speed UART ports up to 5Mbps
- Two programmable 32-bit timers with watchdog timer capability
- Interrupt Controller
- Twenty GPIO ports
- One shared SPI/I2C interface
- One I2S port

Debugging

- ARM9 JTAG debug interface
- JTAG Boundary Scan Support

Power Management

- CPU and system clock speed step-down options
- Ethernet port Wake-on-LAN
- DDR and PCI power down

Operating Voltage

- 1.2V power for core
- 3.3V power for I/O
- 2.5V power for DDR memory interface

Ethernet Selection Guide[1,3]

Micrel Advantange

- Best-in-class patented mixed signal technology resulting in the lowest power dissipation in the industry for FE products
- Best-in-class feature sets for targeted applications (e.g. VoIP, ATA, IP-STB)
- Largest family of cost effective Embedded Controllers in the industry

Physical Layer Products

Part Number		Description	Package	Comments
KS8001L		Single 3.3V Supply, LinkMD® Cable Diagnostics, 10/100BASE-T/TX/FX MII and SMII, Digital Interface Physical Layer Transceiver with HP Auto-MDIX	LQFP-48	
KSZ8001L		Same as KS8001L (lead free version)	LQFP-48	
KSZ8001LI[2]		Same as KSZ8001L (lead free version, Industrial version)	LQFP-48	
KS8001S		1.8V/3.3V Tolerant I/O, 10/100BASE-TX/FX MII Physical Layer Transceiver with Auto Crossover	SSOP-48	
KSZ8001S		Same as KS8001S (lead free version)	SSOP-48	
KSZ8001SI[2]		Same as KSZ8001S (lead free, Industrial version)	SSOP-48	
KSZ8041NL		3.3V, 10BASE-T/100BASE-TX Physical Layer Transceiver	MLF-32	
KSZ8041NLI[2]		Same as 3.3V, KSZ8041NL (lead free, Industrial version)	MLF-32	
KSZ8041TL		3.3V, 10BASE-T/100BASE-TX Physical Layer Transceiver (lead free version)	TQFP-48	
KSZ8041FTL		3.3V, 10BASE-T/100BASE-TX/FX Physical Layer Transceiver (lead free version)	TQFP-48	
KS8721B		2.5V/3.3V Tolerant I/O, 10/100BASE-TX/FX MII Physical Layer Transceiver with Auto Crossover	SSOP-48 and TQFP-48	
KSZ8721B		Same as KS8721 (lead free version)	SSOP-48 and TQFP-48	
KSZ8721BI[2]		Same as KS8721 (lead free, Industrial version)	SSOP-48 and TQFP-48	
KS8721BL		3.3V 10/100BASE TX/FX MII Physicial Layer Transceiver	LQFP-48	
KSZ8721BL		Same as KS8721BL (lead free version)	LQFP-48	
KS8721BLI[2]		3.3V 10/100BASE TX/FX MII Physicial Layer Transceiver (Industrial version)	LQFP-48	
KSZ8721BLI[2]		Same as KS8721BLI (lead free, Industrial version)	LQFP-48	
KS8721BT		2.5V 10/100BASE-TX/FX MII Physical Layer Transceiver with Auto Crossover	TQFP-48	
KSZ8721BT		Same as KS8721BT (lead free version)	TQFP-48	
KS8721CL		Single 3.3V Supply, 10/100BASE-TX/FX MII Physical Layer Transceiver with Auto Crossover	LQFP-48	
KSZ8721CL		Same as KS8721CL (lead free version)	LQFP-48	
KS8721SL		3.3V 10/100BASE TX/FX MII Physicial Layer Transceiver	SSOP-48	
KSZ8721SL		Same as KS8721SL (lead free version)	SSOP-48	
KSZ8721SLI[2]		Same as KS8721SL (lead free, Industrial version)	SSOP-48	
KSZ9021GQ	*New!*	Single Gigabit Ethernet Transceiver with GMII/MII	QFP-128	
KSZ9021GQ	*New!*	Same as KSZ9021GQ (Industrial version)	QFP-128	
KSZ9021RL	*New!*	Single Gigabit Ethernet Transceiver with RGMII	eLQFP-64	
KSZ9021RL	*New!*	Same as KSZ9021RL (Industrial version)	eLQFP-64	

Layer 2 Switch Products - Unmanaged

Part Number	Description	Package	Comments
KS8993	3-Port 10/100 Integrated Switch	PQFP-128	
KS8993I[2]	Industrial Temperature grade, 3-Port 10/100 Integrated Switch	PQFP-128	
KSZ8993	Same as KS8993 (lead free version)	PQFP-128	
KS8995XA	5-Port 10/100 Integrated Switch (Unmanaged)	PQFP-128	
KSZ8995XA	Same as KS8995XA (lead free version)	PQFP-128	
KS8995X	5-Port 10/100 Integrated Switch (Unmanaged)	PQFP-128	
KSZ8995X	Same as KS8995X (lead free version)	PQFP-128	
KS8997	8-Port 10/100 Integrated Switch	PQFP-128	
KSZ8997	Same as KS8997 (lead free version)	PQFP-128	
KS8999	9-Port 10/100 Integrated Switch	PQFP-208	
KSZ8999	Same as KS8999 (lead free version)	PQFP-208	
KS8999I[2]	9-Port 10/100 Integrated Switch (Industrial version)	PQFP-208	
KSZ8999I[2]	Same as KS8999I (lead free, Industrial version)	PQFP-208	

1. "KSZ" is the lead-free RoHS-compliant version of the KS part.

2. If the part number has an "I" at the end of it (e.g.: KSZ8721BI), this indicates it is industrial temperature tested.

3. With the exception of the KS8997, all of Micrel Ethernet Products may be used in Media Converter applications.

Embedded Controllers

Part Number	Description	Package	Comments
KSZ8841-16MQL	Single Port Ethernet MAC Controller with 8- or 16-Bit Generic Bus Interface (lead free version)	PQFP-128	
KSZ8841-16MVL	Single Port Ethernet MAC Controller with 8- or 16-Bit Generic Bus Interface (lead free version)	LQFP-128	
KSZ8841-16MVLI[2]	Single Port Ethernet MAC Controller with 8- or 16-Bit Generic Bus Interface (Industrial version)	LQFP-128	
KSZ8841-32MQL	Single Port Ethernet MAC Controller with 32b Generic Bus Interface (lead free version)	PQFP-128	
KSZ8841-32MVL	Single Port Ethernet MAC Controller with 32b Generic Bus Interface (lead free version)	LQFP-128	
KSZ8841-PMQL	Single Port Ethernet MAC Controller with 32b/33MHz PCI Interface (lead free version)	PQFP-128	
KSZ8841-PMQLI[2]	Single Port Ethernet MAC Controller with 32b/33MHz PCI Interface (Industrial version)	PQFP-128	
KSZ8842-16MQL	2-Port Ethernet Switch Plus 8-, 16-Bit Generic Bus Interface (lead free version)	PQFP-128	
KSZ8842-16MVL	2-Port Ethernet Switch Plus 8-, 16-Bit Generic Bus Interface (lead free version)	LQFP-128	
KSZ8842-16MVLI[2]	2-Port Ethernet Switch Plus 8-, 16-Bit Generic Bus Interface (Industrial version)	LQFP-128	
KSZ8842-32MQL	2-Port Ethernet Switch Plus 32-Bit Generic Bus Interface (lead free version)	PQFP-128	
KSZ8842-32MVL	2-Port Ethernet Switch Plus 32-Bit Generic Bus Interface (lead free version)	LQFP-128	
KSZ8842-PMQL	2-Port Ethernet Switch Plus 32b/33MHz PCI Interface (lead free version)	PQFP-128	
KSZ8842-PMQLI[2]	2-Port Ethernet Switch Plus 32b/33MHz PCI Interface (Industrial version)	PQFP-128	
KSZ8851-16MLL *New!*	Single-Port Ethernet MAC Controller with 8-Bit or 16-Bit Non-PCI Interface	LQFP-48	
KSZ8851-16MQL *New!*	Single-Port Ethernet MAC Controller with 8/16-Bit or 32-Bit Non-PCI Interface	PQFP-128	
KSZ8851SNL *New!*	Single-Port Ethernet Controller with SPI Interface	MLF-32	

Layer 2 Switch Products - Managed

Part Number	Description	Package	Comments
KSZ8842-16MQL	2-Port Ethernet Switch Plus 8-, 16-Bit Generic Bus Interface (lead free version)	PQFP-128	
KSZ8842-16MVL	2-Port Ethernet Switch Plus 8-, 16-Bit Generic Bus Interface (lead free version)	LQFP-128	
KSZ8842-16MVLI[2]	2-Port Ethernet Switch Plus 8-, 16-Bit Generic Bus Interface (Industrial version)	LQFP-128	
KSZ8842-32MQL	2-Port Ethernet Switch Plus 32-Bit Generic Bus Interface (lead free version)	PQFP-128	
KSZ8842-32MVL	2-Port Ethernet Switch Plus 32-Bit Generic Bus Interface (lead free version)	LQFP-128	
KSZ8842-PMQL	2-Port Ethernet Switch Plus 32b/33MHz PCI Interface (lead free version)	PQFP-128	
KSZ8842-PMQLI[2]	2-Port Ethernet Switch Plus 32b/33MHz PCI Interface (Industrial version)	PQFP-128	
KSZ8893MQL	3-Port Ethernet Switch (lead free version)	PQFP-128	
KSZ8893MQLI[2]	3-Port Ethernet Switch (Industrial version)	PQFP-128	
KS8993M	3-Port 10/100 Integrated Switch	PQFP-128	
KSZ8993M	Same as KS8993M (lead free version)	PQFP-128	
KS8993MI[2]	3-Port 10/100 Integrated Switch (Industrial version)	PQFP-128	
KSZ8993MI[2]	Same as KS8993MI (lead free version)	PQFP-128	
KS8993ML	Single 3.3V, 3-Port 10/100 Integrated Switch	PQFP-128	
KSZ8993ML	Same as KS8993ML (lead free version)	PQFP-128	
KS8995M	5-Port 10/100 Integrated Managed Switch	PQFP-128	
KSZ8995M	Same as KS8995M (lead free version)	PQFP-128	
KS8995MI[2]	5-Port 10/100 Integrated Managed Switch, (Industrial version)	PQFP-128	
KSZ8995MI[2]	Same as KS8995MI (lead free, Industrial version)	PQFP-128	
KS8995MA	5-Port 10/100 Integrated Managed Switch	PQFP-128	
KSZ8995MA	Same as KS8995MA (lead free version, FX on port 4, 5)	PQFP-128	
KS8995MAI[2]	5-Port 10/100 Integrated Managed Switch (Industrial version)	PQFP-128	
KSZ8995MAI[2]	Same as KS8995MAI (lead free, Industrial version)	PQFP-128	
KSZ8995FQ	Same as KS8995MA (lead free version, FX on port 3, 4)	PQFP-128	

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System-On-a-Chip
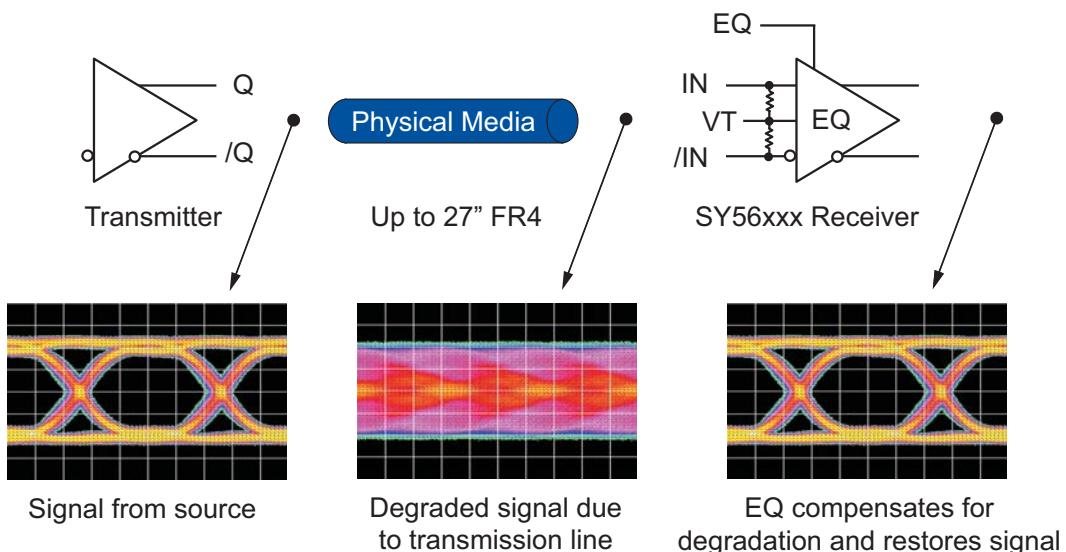
Part Number		Description	Package	Comments
KSZ8692PB	*New!*	Integrated 10/100Mbps Ethernet and Communication Controller with IPSec	PBGA-400	
KSZ8692PBI	*New!*	Same as KSZ8692PB (Industrial version)	PBGA-400	
KSZ8692XPB	*New!*	Integrated 10/100Mbps Ethernet and USB Controller	PBGA-400	
KS8695X		5-Port 10/100 Managed Switch and PHY	PQFP-208	
KSZ8695X		Same as KS8695X (lead free version)	PQFP-208	
KS8695P		5-Port 10/100 Integrated Managed Switch and PHY with 3 PCI Master Support	PBGA-289	
KSZ8695P		Same as KS8695P (lead free version)	PBGA-289	
KS8695PI[2]		Industrial version of KS8695P	PBGA-289	
KSZ8695PI[2]		Industrial version of KSZ8695P	PBGA-289	
KS8695PX		5-Port 10/100 Integrated Managed Switch and PHY with 1 PCI Master Support	PBGA-289	
KSZ8695PX		Same as KS8695PX (lead free version)	PBGA-289	
KSZ9692PB	*New!*	Integrated Gigabit Ethernet and Communication Controller with IPSec	PBGA-400	
KSZ9692PBI	*New!*	Same as KSZ9692PB (Industrial version)	PBGA-400	
KSZ9692XPB	*New!*	Integrated Gigabit Ethernet and USB Controller	PBGA-400	

Media Converters

Part Number	Description	Package	Comments
KSZ8862-16MQL	2-Port Ethernet Switch with Integrated 10B-FL/100B-SX LED Driver and Post Amplifier Plus 8- or 16-bit Generic Bus Interface	PQFP-128	
KSZ8862-16MQL-FX	2-Port Ethernet Switch with 100B-FX TTC TS-1000 V2-Compliant OAM Sublayer Plus 8- or 16-bit Generic Bus Interface	PQFP-128	
KSZ8862-32MQL	2-Port Ethernet Switch with Integrated 10B-FL/100B-SX LED Driver and Post Amplifier plus 32-bit Generic Bus interface	PQFP-128	
KSZ8862-32MQL-FX	2-Port Ethernet Switch with 100B-FX TTC TS-1000 V2-Compliant OAM Sublayer Plus 32-bit Generic Bus Interface	PQFP-128	
KSZ8893FQL	3-Port Ethernet Switch with Integrated 10B-FL/100B-SX LED Driver and Post Amplifier	PQFP-128	
KSZ8893FQL-FX	3-Port Ethernet Switch with 100B-FX TTC TS-1000 V2-Compliant OAM Sublayer	PQFP-128	
KS8993F	Single Chip Fast Ethernet Media Converter with TTC TS-1000-Compliant OAM Sublayer	PQFP-128	
KSZ8993F	Same as KS8993F (lead free version)	PQFP-128	
KS8993FL	Single Chip Fast Ethernet Media Converter with TTC TS-1000-Compliant OAM Sublayer	PQFP-128	
KSZ8993FL	Same as KS8993FL (lead free version)	PQFP-128	

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| Transmitter	Physical Media	SY56xxx Receiver
	Up to 27" FR4	

| Signal from source | Degraded signal due to transmission line | EQ compensates for degradation and restores signal |

SY56xxx, 6.4Gbps Low Voltage CML Family with Equalization

The products in the SY56xxx family are fully differential and operate up to 5GHz or 6.4Gbps. The input structures of these products have an Equalization (EQ) circuit that compensates for signal degradation caused by the transmission medium. The EQ circuit can compensate for up to 27" of FR4 signal attenuation.

The differential input includes Micrel's unique, 3-pin input termination architecture that interfaces to ANY differential signal, without any level-shifting or termination resistor networks in the signal path. The differential input can accept AC-coupled CML, LVPECL, and LVDS signals.

The SY56xxx family operates from a 2.5V ±5% core supply and a 1.2V, 1.8V or 2.5V ±5% output supply and is guaranteed to operate over the full industrial temperature range, from –40°C to +85°C.

Features

- 1.2V/1.8V/2.5V CML Differential Line Driver/Receiver with Equalization
- Equalizes 9, 18, 27 inches of FR4
- Guaranteed AC performance over temperature and voltage:
  - DC-to >6.4Gbps Data throughput
  - DC-to >5.0GHz Clock throughput
  - <250ps propagation delay (IN-to-Q)
  - <80ps rise/fall times
- Ultra-low jitter design

  - <1psRMS random jitter
- High-speed CML outputs
- 2.5V ±5% V_{CC}, 1.2V/1.8V/2.5V ±5% V_{CCO} power supply operation
- Industrial temperature range: –40°C to +85°C
- Available in MLF® packages

Applications

- Data Distribution
- SONET/SDH
- Fibre Channel
- Gigabit Ethernet
- SMPTE

Markets

- Telecom/Datacom
- Storage
- Test and measurement
- Video
- High-end servers

Part Number	Function	Package
SY56011R	1:2 Fanout Buffer with Equalization	16-Pin 3mm x 3mm MLF®
SY56017R	2:1 Multiplexer with Equalization	16-Pin 3mm x 3mm MLF®
SY56023R	2x2 Crosspoint Switch with Equalization	16-Pin 3mm x 3mm MLF®
SY56020R *New!*	1:4 Fanout Buffer with Equalization	16-Pin 3mm x 3mm MLF®
SY56216R *New!*	Dual Channel Buffer with Equalization	16-Pin 3mm x 3mm MLF®
SY56034AR *New!*	2x2 Crosspoint Switch with Six Outputs	32-Pin 5mm x 5mm MLF®
SY56040AR *New!*	4x4 Crosspoint Switch without Equalization	44-Pin 7mm x 7mm MLF®
SY56016R *New!*	Low Voltage CML Buffer with Equalization	10-Pin 2mm x 2mm MLF®

Precision Edge® Selection Guide

Micrel Advantange

- Highest precision, lowest Jitter
  - Internal Termination — Stubless Design
  - MUX Isolation — 70% Crosstalk Noise Improvement
  - Fail-Safe Input — Prevents Metastable Condition
  - Runt Pulse Elimination

- Highest Speed
  - CML
  - LVPECL
  - LVDS

- Smallest Footprint
  - MLF® Package
  - Integration

Clock Distribution

Part Number	Fanout	Input	Output	Voltage	Max. Freq. (GHz)	Package	Description
SY54011R	1:2	ANY	CML	1.2/1.8V	3.2	MLF-16	Low Voltage CML Fanout Buffer/Translator.
SY56011R	1:2	ANY	CML	1.2/1.8/2.5V	4.5	MLF-16	Low Voltage EQ Fanout Buffer.
SY56020R *New!*	1:4	ANY	CML	1.2/1.8/2.5V	4.5	MLF-16	Low Voltage EQ Fanout Buffer.
SY58011U	1:2	ANY	CML	2.5/3.3V	7	MLF-16	Fanout Buffer/Translator.
SY58012U	1:2	ANY	LVPECL	2.5/3.3V	5	MLF-16	Fanout Buffer/Translator.
SY58013U	1:2	ANY	RS-LVPECL	2.5/3.3V	6	MLF-16	Fanout Buffer/Translator with 400mV Output Swing.
SY58020U	1:4	ANY	CML	2.5/3.3V	6	MLF-16	Fanout Buffer/Translator.
SY58021U	1:4	ANY	LVPECL	2.5/3.3V	4	MLF-16	Fanout Buffer/Translator.
SY58022U	1:4	ANY	RS-LVPECL	2.5/3.3V	5.5	MLF-16	Fanout Buffer/Translator with 400mV Output Swing.
SY58031U	1:8	ANY	CML	2.5/3.3V	5	MLF-32	Fanout Buffer.
SY58032U	1:8	ANY	LVPECL	2.5/3.3V	4	MLF-32	Fanout Buffer.
SY58033U	1:8	ANY	RS-LVPECL	2.5/3.3V	5.5	MLF-32	Fanout Buffer with 400mV Output Swing.
SY58034U	2:6	ANY	CML	2.5/3.3V	6	MLF-32	Fanout Buffer w/2:1 MUX Input.
SY58035U	2:6	ANY	LVPECL	2.5/3.3V	4.5	MLF-32	Fanout Buffer w/2:1 MUX Input.
SY58036U	2:6	ANY	RS-LVPECL	2.5/3.3V	6	MLF-32	Fanout Buffer w/2:1 MUX Input and 400mV Output Swing.
SY58606U	1:2	ANY	CML	2.5/3.3V	2.5	MLF-16	Fanout Buffer with Fail-Safe Input.
SY58607U	1:2	ANY	LVPECL	2.5/3.3V	2.5	MLF-16	Fanout Buffer with Fail-Safe Input.
SY58608U	1:2	ANY	LVDS	2.5V	2	MLF-16	Fanout Buffer with Fail-Safe Input.
SY89112U	2:12	ANY	LVPECL	2.5/3.3V	3	MLF-44	Improved EP111 Replacement.
SY89113U	2:12	ANY	LVDS	2.5V	1	MLF-44	Fanout Buffer.
SY89200U	1:8	ANY	LVDS	2.5V	1.5	MLF-32	3 Banks (÷1, ÷2, ÷4).
SY89202U	1:8	ANY	LVPECL	2.5/3.3V	1.5	MLF-32	3 Banks (÷1, ÷2, ÷4).
SY89311U	1:2	ECL/PECL/LVPECL/LVECL	ECL/PECL/LVPECL/LVECL	2.5/3.3/5V	3	MLF-8	Differential Fanout Buffer.
SY89467U	2:20	ANY	LVPECL	2.5/3.3V	1.5	TQFP-64	Fanout Buffer with Fail-Safe Input.
SY89468U	2:20	ANY	LVDS	2.5V	1.5	TQFP-64	Fanout Buffer with Fail-Safe Input.
SY89645L	1:4	LVCMOS/LVTTL	LVDS	3.3V	0.65	TSSOP-16	LVCMOS/LVTTL-to-LVDS Fanout Buffer.
SY89808L	1:9	LVPECL/HSTL	HSTL	3.3V	0.5	TQFP-32	Fanout Buffer.
SY89809L	1:9	LVPECL/HSTL	HSTL	3.3V	0.5	TQFP-32	Bus Clock Driver.
SY89823L	1:22	LVPECL/HSTL	HSTL	3.3V	0.5	TQFP-64	Fanout Buffer/Translator.
SY89824L	1:22	LVPECL/HSTL	HSTL	3.3V	0.5	TQFP-64	Bus Clock Driver.
SY89825U	1:22	LVPECL/LVDS	LVPECL	2.5/3.3V	1	TQFP-64	Bus Clock Driver/Translator.
SY89826L	1:22	LVPECL/LVDS	LVDS	3.3V	1	TQFP-64	Fanout Buffer/Translator.
SY89827L	Dual 1:10	LVPECL/HSTL	HSTL	3.3V	0.5	TQFP-64	Fanout Buffer/Translator.
SY89828L	Dual 1:10	LVPECL/LVDS	LVDS	3.3V	1	TQFP-64	Fanout Buffer/Translator.
SY89829U	Dual 1:10	LVPECL/LVDS	LVPECL	2.5/3.3V	2	TQFP-64	Clock Driver.
SY89830U	2:4	ECL/PECL/LVPECL/LVECL	ECL/PECL/LVPECL/LVECL	2.5/3.3/5V	2.5	TSSOP-16	Clock Driver with 2:1 MUX Input.
SY89831U	1:4	ANY	LVPECL	2.5/3.3V	2.0	MLF-16	Fanout Buffer/Translator.
SY89832U	1:4	ANY	LVDS	2.5V	2.0	MLF-16	Fanout Buffer/Translator.
SY89833L	1:4	ANY	LVDS	3.3V	2	MLF-16	Fanout Buffer/Translator.
SY89834U	2:4	LVTTL	LVPECL	2.5/3.3V	1	MLF-16	Fanout Buffer with 2:1 MUX Input.
SY89837U	2:8 RPE	ANY	LVPECL	2.5/3.3V	1.5	MLF-32	RPE, FSI Fanout with 2:1 MUX Input.

Clock Distribution (continued)

Part Number	Fanout	Input	Output	Voltage	Max. Freq. (GHz)	Package	Description
SY89838U	2:8 RPE	ANY	LVDS	2.5V	1.5	MLF-32	RPE, FSI Fanout with 2:1 MUX Input.
SY89843U	2:2 RPE	ANY	LVPECL	2.5/3.3V	1.5	MLF-24	RPE, FSI Fanout with 2:1 MUX Input.
SY89844U	2:2 RPE	ANY	LVDS	2.5V	1.5	MLF-24	RPE, FSI Fanout with 2:1 MUX Input.
SY89464U	2:10 RPE	ANY	LVPECL	2.5/3.3V	2	MLF-44	RPE, FSI Input MUX with 2:1 MUX Input.
SY89465U	2:10 RPE	ANY	LVDS	2.5V	2	MLF-44	RPE, FSI Input MUX with 2:1 MUX Input.
SY89473U	2:2	ANY	LVPECL	2.5/3.3V	3	MLF-24	Fanout Buffer/Translator.
SY89474U	2:2	ANY	LVDS	2.5V	2.5	MLF-24	Fanout Buffer/Translator.
SY89846U	2:5	ANY	LVPECL	2.5/3.3V	1.5	MLF-32	Fanout Buffer with Fail-Safe Input.
SY89847U	2:5	ANY	LVDS	2.5V	1.5	MLF-32	Fanout Buffer with Fail-Safe Input.
SY89850U	1:1	ANY	LVPECL	2.5/3.3V	4	MLF-8	LVPECL Line Driver/Receiver.
SY89851U	1:2	ANY	LVPECL	2.5/3.3V	3	MLF-16	Low Power Fanout Buffer/Trans.
SY89854U	1:4	ANY	LVPECL	2.5/3.3V	3.5	MLF-16	Low Power Fanout Buffer/Trans.
SY89856U	2:6	ANY	LVPECL	2.5/3.3V	3	MLF-32	Low Power Fanout Buffer with 2:1 MUX Input.
SY89858U	1:8	ANY	LVPECL	2.5/3.3V	3	MLF-32	Low Power Fanout Buffer.

Clock Dividers/Generators

Part Number	Fanout Buffer	Input	Output	Voltage	Max. Freq. (GHz)	Package	Description
SY89200U	Y	ANY	LVDS	2.5V	1.5	MLF-32	3 Banks (÷1, ÷2, ÷4) 8 Total.
SY89202U	Y	ANY	LVPECL	2.5/3.3V	1.5	MLF-32	3 Banks (÷1, ÷2, ÷4) 8 Total.
SY89218U	Y	ANY	LVDS	2.5V	1.5	TQFP-64	4 Banks (÷1, ÷2, ÷4) 15 Total FSI Input.
SY89221U	Y	ANY	LVPECL	2.5/3.3V	1.5	TQFP-64	4 Banks (÷1, ÷2, ÷4) 15 Total FSI Input.
SY89228U	N	ANY	LVPECL	2.5/3.3V	1	MLF-16	÷3, ÷5 FSI Input.
SY89229U	N	ANY	LVDS	2.5V	1	MLF-16	÷3, ÷5 FSI Input.
SY89230U	N	ANY	LVPECL	2.5/3.3V	3.2	MLF-16	÷3, ÷5.
SY89231U	N	ANY	LVDS	2.5V	3.2	MLF-16	÷3, ÷5.
SY89312V	N	ECL/PECL	ECL/PECL	3.3/5V	4	MLF-8	÷2.
SY89313V	N	ECL/PECL	ECL/PECL	3.3/5V	4	MLF-8	÷4.
SY89871U	Y	ANY	LVPECL	2.5/3.3V	2.5	MLF-16	2 Banks (÷1, ÷2, ÷4, ÷8, ÷16).
SY89872U	Y	ANY	LVDS	2.5V	2	MLF-16	2 Banks (÷1, ÷2, ÷4, ÷8, ÷16).
SY89873L	Y	ANY	LVDS	3.3V	2	MLF-16	2 Banks (÷1, ÷2, ÷4, ÷8, ÷16).
SY89874U	Y	ANY	LVPECL	2.5/3.3V	2.5	MLF-16	÷1, ÷2, ÷4, ÷8, ÷16.
SY89875U	Y	ANY	LVDS	2.5V	2	MLF-16	÷1, ÷2, ÷4, ÷8, ÷16.
SY89876L	Y	ANY	LVDS	3.3V	2	MLF-16	÷1, ÷2, ÷4, ÷8, ÷16.
SY100S834L	N	ECL/PECL/LVPECL	ECL/PECL	3.3/5V	—	SOIC-16	(÷1, 2, 4) or (÷2, 4, 8).
SY100S838L	N	ECL/PECL/LVPECL	ECL/PECL	3.3/5V	—	SOIC-20	(÷1, 2/3) or (÷2, 4/6).
SY100S839V	N	ECL/PECL/LVPECL	ECL/PECL	3.3/5V	—	SOIC-20	(÷2/4) or (÷4/5/6).

Crosspoint Switches

Part Number	Input	Output	Voltage	Max. Data Rate (Gbps)	Package	Description
SY54023R	ANY	CML	1.2/1.8V	3.2	MLF-16	2x2 with Fail-Safe Inputs.
SY56023R	ANY	CML	1.2/1.8/2.5V	6.4	MLF-16	2x2 with Equalization.
SY56034AR *New!*	ANY	CML	1.2/1.8/2.5V	6.4	MLF-32	2x2 Crosspoint Switch with Six Outputs.
SY56040AR *New!*	ANY	CML	1.2/1.8/2.5V	6.4	MLF-44	4x4 Crosspoint Switch.
SY58023U	ANY	CML	2.5/3.3V	10.7	MLF-16	2x2.
SY58024U	ANY	CML	2.5/3.3V	10.7	MLF-32	Dual 2x2.
SY58040U	ANY	CML	2.5/3.3V	5	MLF-44	4x4.
SY89540U	ANY	LVDS	2.5V	3.2	MLF-44	4x4.
SY55854U	ANY	CML	2.5/3.3/5V	2.5	QSOP-16	2x2.
SY55858U	CML/PECL/LVPECL	CML	2.5/3.3V	3	TQFP-32	Dual 2x2.
SY55859L	CML	CML	3.3V	2.7	MLF-32	Dual 2x2.

Clock Synthesis

Part Number	Input	Output	Voltage	Min Freq. (MHz)	Max Freq. (MHz)	Package	Description
SY87729L	XTAL	PECL	3.3V	10	365	TQFP-32	AnyClock® Fractional-N Synthesizer.
SY87739L	XTAL	PECL	3.3V	10	730	TQFP-32	AnyClock® Fractional-N Synthesizer.
SY89426	TTL	PECL	5V	33	622	PLCC-28	SONET OC-12/OC -3.
SY89529L	XTAL	LVPECL	3.3V	—	200	TQFP-32, SOIC-28	Spectrum Clock Synthesizer.
SY89531L	XTAL	HSTL/LVPECL	3.3V	33	500	TQFP-64	XTAL Input Synthersizer.
SY89532L	XTAL	LVPECL	3.3V	33	500	TQFP-64	XTAL Input Synthesizer.
SY89533L	XTAL	LVDS/LVPECL	3.3V	33	500	TQFP-64	XTAL Input Synthesizer.
SY89534L	ANYX	LVPECL	3.3V	33	500	TQFP-64	Reference Input Synthesizer.
SY89535L	ANYX	LVDS/LVPECL	3.3V	33	500	TQFP-64	Reference Input Synthesizer.
SY89536L	ANYX	HSTL/LVPECL	3.3V	33	500	TQFP-64	Reference Input Synthesizer.
SY89537L	ANYX	LVDS/LVPECL	3.3V	73	750	MLF-44	Reference and XTAL Prog. Frequency.
SY89538L	ANYX	LVDS/LVPECL	3.3V	73	750	TQFP-64	Reference Input, Multiple Banks, Zero Delay.
SY89610L	ANY	CML	3.3V	19	694	MLF-32	Clock Synthesizer with Ultra Low Jitter.

Receivers/Buffers/Drivers

Part Number	Input	Output	Voltage	Max. Data Rate (Gbps)	Max. Freq. (GHz)	Package	Description
SY54016R	ANY	CML	1.2/1.8V	3.2	2.5	MLF-8 (2mm x 2mm)	Low Voltage CML Translator with Fail-Safe Input.
SY54016AR	ANY	CML	1.2/1.8V	3.2	3.2	MLF-8 (2mm x 2mm)	Low Voltage CML Translator.
SY56016R *New!*	ANY	CML	1.2/1.8/2.5V	6.4	5	MLF-10 (2mm x 2mm)	Differential Line Driver with EQ.
SY56216R *New!*	ANY	CML	1.2/1.8/2.5V	6.4	5	MLF-16 (3mm x 3mm)	Dual Channel EQ Buffer.
SY58016L	CML/PECL	CML	3.3V	10.7	7	MLF-16 (3mm x 3mm)	Differential CML Line Driver/Receiver.
SY58600U	ANY	CML	2.5/3.3V	10.7	7	MLF-8 (2mm x 2mm)	Line/Driver Receiver.
SY58601U	ANY	LVPECL	2.5/3.3V	5	5	MLF-8 (2mm x 2mm)	Line/Driver Receiver.
SY58602U	ANY	RS-LVPECL	2.5/3.3V	10.7	7	MLF-8 (2mm x 2mm)	Line/Driver Receiver with 400mV Output Swing.
SY58603U	ANY	CML	2.5/3.3V	4.25	2.5	MLF-8 (2mm x 2mm)	Line/Driver Receiver with Fail-Safe Input.
SY58604U	ANY	LVPECL	2.5/3.3V	3.2	2.5	MLF-8 (2mm x 2mm)	Line/Driver Receiver with Fail-Safe Input.
SY58605U	ANY	LVDS	2.5V	3.2	2	MLF-8 (2mm x 2mm)	Line/Driver Receiver with Fail-Safe Input.
SY58620L	ANY	CML	3.3V	4.25	2.5	MLF-24 (4mm x 4mm)	Backplane Transceiver.
SY89206V	ECL/PECL	ECL/PECL	3.3/5V	—	1	MLF-8 (2mm x 2mm)	Receiver/Buffer-100k Comp.
SY89207L	LVECL/LVPECL	PECL	3.3V	—	0.8	MSOP-10	Amp. w/Low-Gain Feedback.
SY89216V	ECL/PECL	ECL/PECL	3.3/5V	—	1	MLF-8 (2mm x 2mm)	Receiver/Buffer-10k Comp.
SY89250V	ECL/PECL	ECL/PECL	3.3/5V	—	—	MLF-8 (2mm x 2mm)	Enhanced Differential Receiver.
SY89306V	ECL/PECL	ECL/PECL	3.3/5V	—	2.5	MLF-8 (2mm x 2mm)	Receiver/Buffer-100k Comp.
SY89307V	ECL/PECL	ECL/PECL	3.3/5V	2.5	—	MLF-8 (2mm x 2mm)	Variable Output Swing Differential Receiver.
SY89316V	ECL/PECL	ECL/PECL	3.3/5V	—	2.5	MLF-8 (2mm x 2mm)	Differential Receiver/Buffer-10k Comp.
SY89835U	LVDS	LVDS	2.5V	3.2	2	MLF-8 (2mm x 2mm)	Buffer with Fail-Safe Input.
SY89850U	CML/PECL/LVDS	LVPECL	2.5/3.3V	3.2	4	MLF-8 (2mm x 2mm)	Low Power.

Gates and Flip-Flops

Part Number	Input	Output	Voltage	Max. Freq. (GHz)	Package	Description
SY58051U	ANY	CML	2.5/3.3V	7	ANY-16	CML AnyGate®.
SY58052U	ANY	CML	2.5/3.3V	10.7	MLF-16	Data/Clock Synchronizer.
SY55851/A	CML/PECL/LVPECL	CML	2.5/3.3V	3	MSOP-10	CML AnyGate®.
SY55852U	CML/PECL/LVPECL	CML	2.5/3.3/5V	2.5	MSOP-10	D Flip Flop.
SY55853U	CML/PECL/LVPECL	CML	2.5/3.3/5V	2.5	MSOP-10	D Latch.

Multiplexers

Part Number	Fanout	Input	Output	Voltage	Frequency (Gbps)	Max. Freq. (GHz)	Package	Description
SY54017R	2:1	ANY	CML	1.2/1.8V	3.2	2.5	MLF-16	Low Voltage CML with Fail-Safe Input.
SY54017AR	2:1	ANY	CML	1.2/1.8V	3.2	2.5	MLF-16	Low Voltage CML MUX.
SY56017R	2:1	ANY	CML	1.2/1.8/2.5V	6.4	3.2	MLF-16	Low Voltage EQ MUX.
SY58017U	2:1	ANY	CML	2.5/3.3V	10.7	7	MLF-16	Internal Termination.
SY58018U	2:1	ANY	LVPECL	2.5/3.3V	5	4	MLF-16	Internal Termination and 800mV Output Swing.
SY58019U	2:1	ANY	RS-LVPECL	2.5/3.3V	10.7	7	MLF-16	Internal Termination and 400mV Output Swing.
SY58025U	Dual 2:1	ANY	CML	2.5/3.3V	10.7	7	MLF-32	Internal Termination.
SY58026U	Dual 2:1	ANY	LVPECL	2.5/3.3V	5	6	MLF-32	Internal Termination and 800mV Output Swing.
SY58027U	Dual 2:1	ANY	RS-LVPECL	2.5/3.3V	10.7	6	MLF-32	Internal Termination and 400mV Output Swing.
SY58028U	4:2	ANY	CML	2.5/3.3V	10.7	7	MLF-32	Internal Termination.
SY58029U	4:2	ANY	LVPECL	2.5/3.3V	5	4	MLF-32	Internal Termination and 800mV Output Swing.
SY58030U	4:2	ANY	RS-LVPECL	2.5/3.3V	10.7	7	MLF-32	Internal Termination and 400mV Output Swing.
SY58037U	8:2	ANY	CML	2.5/3.3V	5	4	MLF-44	Internal Termination.
SY58038U	8:2	ANY	LVPECL	2.5/3.3V	4.5	5	MLF-44	Internal Termination and 800mV Output Swing.
SY58039U	8:2	ANY	RS-LVPECL	2.5/3.3V	5	5.5	MLF-44	Internal Termination and 400mV Output Swing.
SY58609U	2:1	ANY	CML	2.5/3.3V	4.25	2.5	MLF-16	Fail-Safe Input and Internal Termination.
SY58610U	2:1	ANY	LVPECL	2.5/3.3V	3.2	2.5	MLF-16	Fail-Safe Input and Internal Termination.
SY58611U	2:1	ANY	LVDS	2.5V	3.2	2.5	MLF-16	Fail-Safe Input and Internal Termination.
SY89208V	2:1	ECL/PECL	ECL/PECL	3.3/5V	—	3	MLF-8	Internal Termination and 800mV Output Swing.
SY89464U	2:10	ANY	LVPECL	2.5/3.3V	—	2	MLF-44	Internal Termination and 800mV Output Swing.
SY89465U	2:10	ANY	LVDS	2.5V	—	2	MLF-44	Fast Edge Rates and Internal Termination.
SY89473U	2:2	ANY	LVPECL	2.5/3.3V	3.2	3	MLF-24	Internal Termination and 800mV Output Swing.
SY89474U	2:2	ANY	LVDS	2.5V	3.2	4	MLF-24	Fast Edge Rates and Internal Termination.
SY89542U	Dual 2:1	ANY	LVDS	2.5V	3.2	4	MLF-32	Fast Edge Rates and Internal Termination.
SY89543L	Dual 2:1	ANY	LVDS	3.3V	3.2	3	MLF-32	Fast Edge Rates and Internal Termination.
SY89544U	4:1	ANY	LVDS	2.5V	3.2	4	MLF-32	Fast Edge Rates and Internal Termination.
SY89545L	4:1	ANY	LVDS	3.3V	3.2	3	MLF-32	Fast Edge Rates and Internal Termination.
SY89546U	4:2	ANY	LVDS	2.5V	3.2	4	MLF-32	Fast Edge Rates and Internal Termination.
SY89547L	4:2	ANY	LVDS	3.3V	3.2	4	MLF-32	Fast Edge Rates and Internal Termination.
SY89840U	2:1	ANY	LVPECL	2.5/3.3V	—	2	MLF-16	Internal Termination and 800mV Output Swing.
SY89841U	2:1	ANY	LVDS	2.5V	—	1.5	MLF-16	Fast Edge Rates and Internal Termination.
SY89842U	2:1	ANY	CML	2.5/3.3V	—	2	MLF-16	Internal Termination.
SY89843U	2:2	ANY	LVPECL	2.5/3.3V	—	2	MLF-24	Internal Termination and 800mV Output Swing.
SY89844U	2:2	ANY	LVDS	2.5V	—	2	MLF-24	Fast Edge Rates and Internal Termination.
SY89845U	2:2	ANY	CML	2.5/3.3V	—	2	MLF-24	Internal Termination.
SY89852U	2:1	ANY	LVPECL	2.5/3.3V	3.2	3.5	MLF-16	Internal Termination and 800mV Output Swing.
SY89853U	Dual 2:1	ANY	LVPECL	2.5/3.3V	2.5	2.5	MLF-32	Internal Termination and 800mV Output Swing.
SY89855U	4:2	ANY	LVPECL	2.5/3.3V	2.5	2.5	MLF-32	Internal Termination and 800mV Output Swing.
SY89859U	8:2	ANY	LVPECL	2.5/3.3V	2.5	3.5	MLF-44	Internal Termination and 800mV Output Swing.

Backplane and Cable Management Solutions

Part Number	Input	Output	Voltage	Max. Data Rate (Gbps)	Package	Description
SY58620L	ANY	CML	3.3V	4.25	MLF-24	Backplane Transceiver with Integrated Loopback.
SY58621L	ANY	LVPECL/CML	3.3V	3.2	MLF-24	Backplane Transceiver with Integrated Loopback.
SY58626L	ANY	CML	3.3V	6.4	MLF-32	Pre-Emphasis Driver with Integrated Loopback.
SY58627L	ANY	CML	3.3V	6.4	MLF-32	Equalization Receiver with Integrated Loopback.

Phase-Locked Loop

Part Number	Input	Output	Voltage	Max. Data Rate (Gbps)	Package	Description
SY89420V	Ref.	PECL	3.3/5V	10MHz to 666MHz	PLCC-28	Dual Phase-Locked Loop w/Freq. Doubler Mode.
SY89421V	Ref.	PECL	3.3/5V	10MHz to 666MHz	SOIC-20	High-Performance Phase-Locked Loop.

Skew Management

Part Number	Input	Output	Voltage	Max. Freq. (GHz)	Package	Description
SY89295U	LVPECL/LVTTL	LVPECL	2.5/3.3V	1.5	TQFP/MLF-32	Programmable Delay.
SY89296U	LVPECL/LVTTL	LVPECL	2.5/3.3V	1.5	TQFP/MLF-32	Programmable Delay with Fine Tune Control.
SY89297U	ANY	CML	2.5V	1.6/3.2(Gbps)	MLF-24	5ps /Step Programmable Delay, Dual Channel.
SY55856U	CML	CML	2.5/3.3V	2.5	TQFP-32	Two Channel Delay Line.

Translators

Part Number	Input	Output	Voltage	Max. Freq. (GHz)	Package	Single/Dual
SY55851/A	PECL/LVPECL/CML	CML	2.5/3.3V	3	10-Pin MSOP	Single
SY55855V	ANY	LVDS	3.3/5V	0.75	10-Pin MSOP	Dual
SY55857L	ANY	LVPECL	3.3V	2.5	10-Pin MSOP	Dual
SY89222L	TTL	PECL	3.3V	0.4	MLF-8 (2mm x 2mm)	Dual
SY89223L	LVPECL	LVTTL	3.3V	0.16	MLF-8 (2mm x 2mm)	Dual
SY89321L	LVPECL	LVTTL	3.3V	0.275	MLF-8 (2mm x 2mm)	Single
SY89322V	LVTTL	LVPECL	3.3/5V	0.8	MLF-8 (2mm x 2mm)	Dual
SY89323L	LVPECL	LVTTL	3.3V	0.275	MLF-8 (2mm x 2mm)	Dual
SY89325V	ANY	LVDS	3.3V	0.750	MLF-8 (2mm x 2mm)	Single
SY89327L	ANY	LVPECL	3.3V	2.5	MLF-8 (2mm x 2mm)	Single
SY89328L	LVPECL/LVTTL	LVTTL/LVPECL	3.3V	0.275	MLF-8 (2mm x 2mm)	Single
SY89329V	LVTTL	LVPECL	3.3/5V	0.8	MLF-8 (2mm x 2mm)	Single
SY89464U	ANY	LVPECL	2.5/3.3V	2.0	MLF-44	Single
SY89465U	ANY	LVDS	2.5V	2.0	MLF-44	Single
SY89645L	LVCMOS/LVTTL	LVDS	3.3V	0.65	TSSOP-16	Single
SY89825U	LVDS/LVPECL	LVPECL	2.5/3.3V	1.0	TQFP-64	Single
SY89826L	LVDS/LVPECL	LVDS	3.3V	1.0	TQFP-64	Single
SY89827L	HSTL/LVPECL	HSTL	3.3V	0.5	TQFP-64	Dual
SY89828L	LVDS/LVPECL	LVDS	3.3V	1.0	TQFP-64	Dual
SY89829U	LVDS/LVPECL	LVPECL	2.5/3.3V	1.0	TQFP-64	Dual
SY89831U	LVPECL/HSTL/CML	LVPECL	2.5/3.3V	2.5	MLF-16 (3mm x 3mm)	Single
SY89832U	LVPECL/HSTL/LVDS/CML	LVDS	2.5V	2.5	MLF-16 (3mm x 3mm)	Single
SY89833L	LVPECL/HSTL/LVDS/CML	LVDS	3.3V	2.0	MLF-16 (3mm x 3mm)	Single
SY89834U	LVTTL/CMOS	LVPECL	2.5/3.3V	1.0	MLF-16 (3mm x 3mm)	Single
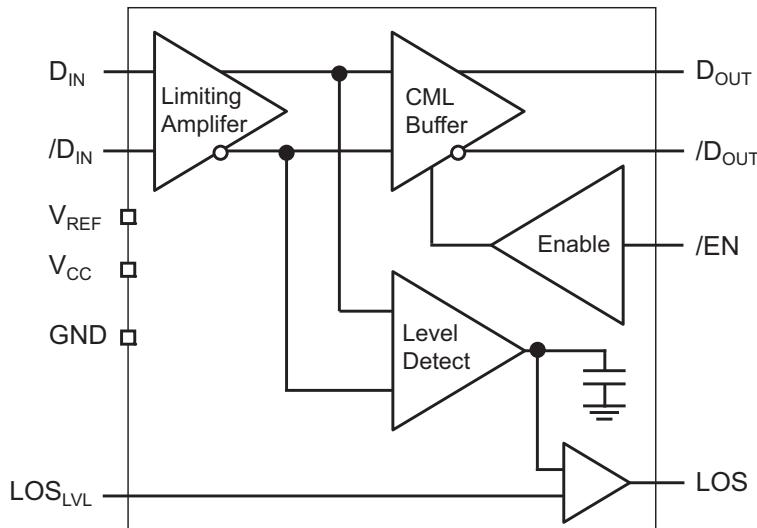
MLF-8 (2mm x 2mm) Solutions

Part Number	Equivalent	Input	Output	Voltage	Max. Freq. (GHz)	Description
SY58600U	—	ANY	CML	2.5V/3.3V	7	7GHz/10.7Gbps Differential Translator.
SY58601U	—	ANY	LVPECL	2.5V/3.3V	5	5GHz/5Gbps Differential Translator.
SY58602U	—	ANY	LVPECL	2.5V/3.3V	7	7GHz/10.7Gbps Differential Translator.
SY58603U	—	ANY	CML	2.5V/3.3V	2.5	Fail-Safe Input Buffers.
SY58604U	—	ANY	LVPECL	2.5V/3.3V	2.5	Fail-Safe Input Buffers.
SY58605U	—	ANY	LVDS	2.5V	2	Fail-Safe Input Buffers.
SY89206V	100EL16V	PECL	PECL	3.3/5V	1	Differential Receiver/Buffer.
SY89208V	100EP58V	PECL	PECL	3.3/5V	3	2:1 Multiplexer.
SY89216V	10EL16V	PECL	PECL	3.3/5V	1	Differential Receiver/Buffer.
SY89222L	100ELT22L	TTL	PECL	3.3V	0.40	Dual Differential Translator.
SY89223L	100ELT23L	LVPECL	LVTTL	3.3V	0.16	Dual Differential Translator.
SY89250V	100EL16VC	PECL	PECL	3.3/5V	1	Enhanced Differential Receiver.
SY89306V	100EP16V	PECL	PECL	3.3/5V	2.5	Differential Receiver/Buffer.
SY89307V	100EP16VS	PECL	PECL	3.3/5V	2.5	Variable-out Differential Receiver.
SY89311U	100EP11U	PECL	PECL	2.5/3.3/5V	3	Differential 1:2 FOB.
SY89312V	100EP32V	PECL	PECL	3.3/5V	4	÷2 Clock Generator.
SY89313V	100EP33V	PECL	PECL	3.3/5V	4	÷4 Clock Generator.
SY89316V	10EP16V	PECL	PECL	3.3/5V	2.5	Differential Receiver/Buffer.
SY89321L	100EPT21L	LVPECL	LVTTL	3.3V	0.275	Differential Translator.
SY89322V	100EPT22V	LVTTL	LVPECL	3.3/5V	0.800	Dual Differential Translator.
SY89323L	100EPT23L	LVPECL	LVTTL	3.3V	0.275	Dual Differential Translator.
SY89325V	55855V	ANYX	LVDS	3.3/5V	0.750	Differential Translator.
SY89327L	55857L	ANYX	LVPECL	3.3V	2.5	Differential Translator.
SY89328L	100EPT28L	LVTTL/LVPECL	LVTTL/LVPECL	3.3V	0.275	Dual Differential Translator.
SY89329V	100EPT20V	LVTTL	LVPECL	3.3/5V	0.800	Differential Translator.

Micrel Advantange

- Pin-to-pin compatible with other Micrel post amplifers
- Consistent hysteresis performance
- Ideal drop-in replacement for SY88993V/AV

SY88993AL

The SY88993AL limiting post amplifier, with its wide bandwidth, is ideal for use as a post amplifier in fiber-optic receivers with data rates up to 3.2Gbps. Signals as small as 4mVPP can be amplified to drive devices with CML inputs or AC-coupled PECL inputs. The SY88993AL generates a chatter-free Loss-of-Signal (LOS) open collector TTL output using an external resistor.

The SY88993AL incorporates a programmable level detect function to identify when the input signal has been lost. This information can be fed back to the /EN input of the device to maintain stability under loss of signal conditions. Using LOSLVL pin the sensitivity of the level detect can be adjusted. The LOSLVL voltage can be set by connecting a resistor divider between VCC and VREF.

Features

- Up to 3.2Gbps operation
- Low noise CML data outputs
- Chatter-Free LOS generation
- Open Collector TTL LOS output
- TTL /EN Input
- Differential PECL inputs for data
- Single 3.3V power supply
- Available in a tiny 10-pin (3mm x 3mm) MSOP

Applications

- PON
- SFP/SFF/GBIC optical transceivers
- Gigabit Ethernet
- 1X and 2X Fibre Channel
- SONET/SDH: OC 3/12/24/48 – STM 1/4/8/16
- Line driver and line receiver

Markets

- FTTX
- Datacom/Telecom

CDRs with Integrated Clock Synthesis

Part Number	Description	Function	Data Rate (Mbps)	Data Output Type	V_CC	Package	Eval. Board
SY69753AL[1]	Clock and Data Recovery	CDR	125-155	PECL	3.3V	EPAD-TQFP-32	Yes
SY69754AL	Clock and Data Recovery	CDR	622	PECL	3.3V	EPAD-TQFP-32	Yes
SY87700AL[1]	AnyRate® Clock and Data Recovery	CDR	32–208	PECL	3.3V	EPAD-TQFP-32, SOIC-28[2]	Yes
SY87701AL[1]	AnyRate® Clock and Data Recovery	CDR	28-1300	PECL	3.3V	EPAD-TQFP-32, SOIC-28[2]	Yes
SY87813L	AnyRate® Clock and Data Recovery with Differential Clock	CDR	28-1300	PECL	3.3V	EPAD-TQFP-32	Yes
SY87700V	AnyRate® Clock and Data Recovery	CDR	32–175	PECL	3.3/5V	EPAD-TQFP-32, SOIC-28[2]	Yes
SY87700L	AnyRate® Clock and Data Recovery	CDR	32–175	PECL	3.3V	EPAD-TQFP-32, SOIC-28[2]	Yes
SY87701V	AnyRate® Clock and Data Recovery	CDR	32–1250	PECL	3.3/5V	EPAD-TQFP-32, SOIC-28[2]	Yes
SY87701L	AnyRate® Clock and Data Recovery	CDR	32–1250	PECL	3.3V	EPAD-TQFP-32, SOIC-28[2]	Yes
SY87721L	AnyRate® Clock and Data Recovery	CDR	28–2700	CML/PECL	3.3V	EPAD-TQFP-64	Yes
SY69753L	Clock and Data Recovery	CDR	125-155	PECL	3.3V	EPAD-TQFP-64	Yes
SY69952	Clock Recovering Transceiver	Transceiver	51.84–155	PECL	5V	SOIC-28[2]	n/a

1. Run on 30% less I_{CC} than the SY69753L, SY87700V/L or SY87701V/L and are recommended for new designs.
2. 28-Pin SOIC is available, but not recommended for new designs.

Fiber Optic Transceiver ICs

Laser Drivers

Part Number	Description	Data Rate (Gbps)	Drive Current (mA)	V_CC	Package	Eval. Board
SY88212L	Laser Driver with APC and Power Monitoring	2.5	85	3.3V	MLF-24 (4mm x 4mm)	Yes
SY88216L	Burst Mode Laser Driver	2.5	85	3.3V	MLF-24 (4mm x 4mm)	Yes
SY88422L[4]	Laser Driver with Integrated Bias	4.25	90	3.3V	MLF-16 (3mm x 3mm)	Yes
SY88722V	Laser Driver with Output Enable	0.622	30	3.3/5V	MSOP-10	Yes
SY88782L[4]	High-Current, Low Power FP/DFB Laser Driver	1.25	90	3.3V	MLF-16 (3mm x 3mm)	n/a
SY88822V	Laser Driver with Output Enable	0.155	25	3.3/5V	MSOP-10	Yes
SY88902V	VCSEL Laser Driver with Output Enable	1.25	25	5V	MSOP-10	n/a
SY88912L	SONET/SDH Laser Driver	3.2	60	3.3V	MLF-16 (3mm x 3mm)	n/a
SY88922	SONET/SDH VCSEL Laser Driver	2.5	25	5V	MSOP-10 (3mm x 3mm)	n/a
SY88922V	SONET/SDH VCSEL Laser Driver	2.5	25	3.3/5V	MSOP-10 (3mm x 3mm)	n/a
SY88932L[4]	VCSEL/FP/DFB Laser Driver	4.25	60	3.3V	MLF-16 (3mm x 3mm)	Yes
SY88982L[4]	High-Current, Low Power FP/DFB Laser Driver	2.7	90	3.3V	MLF-16 (3mm x 3mm)	Yes
SY88992L[4]	VCSEL Driver	4.25	25	3.3	MLF-16 (3mm x 3mm)	Yes
SY89307V[4]	Output Swing Differential Receiver—VCSEL Driver	2.125	25	3.3V/5V	MLF-8 (2mm x 2mm)	Yes
SY100EL1003	Laser Driver with Output Enable	1.25	75	5V	SOIC-16	n/a
SY100EL16VS	Variable Output Swing Differential Receiver	1.25	25	3.3V/5V	MSOP-8 (3mm x 3mm), SOIC-8	n/a
SY100EP16VS	Variable Output Swing Differential Receiver	2.5	25	3.3V/5V	MSOP-8 (3mm x 3mm), SOIC-8	n/a

4. To be interfaced with MIC3001/2 controllers.

Controllers

Part Number	Description	Package
MIC3001	FOM Management IC with Internal Calibration	MLF-24 (4mm x 4mm)
MIC3002	FOM Management IC with Internal/External Calibration	MLF-24 (4mm x 4mm)

Post Amplifiers

Part Number	Data Rate (Gbps)	V$_{CC}$	LOS/SD	Input	Output	LOS/SD Gain	RC Time Constant	Hysteresis Typ. (dB)	Package
SY88993AL *New!*	1.25	3.3V	LOS (TTL)	PECL	PECL	1X	1X	5.6	MSOP-10
SY88147DL	1.25	3.3V	LOS (TTL)	PECL	PECL	4X	20X	3.5	MSOP-10
SY88149CL	1.25	3.3V	SD (TTL)	PECL	PECL	4X	1X	3.5	MSOP-10
SY88289AL[1]	3.2	3.3V	LOS (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	1X	20X	3.5	MLF-16
SY88289CL[1]	3.2	3.3V	LOS (TTL)	PECL	CML	4X	20X	3.5	MLF-16
SY88289HL	3.2	3.3V	LOS (TTL)	PECL	CML	4X	20X	3.5	MLF-16
SY88303BL	3.2	3.3V	LOS (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	0.5X	20X	3.5	EPAD-MSOP-10, MLF-16
SY88305BL	3.2	3.3V	SD (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	0.5X	20X	3.5	EPAD-MSOP-10, MLF-16
SY88307BL	3.2	3.3V	LOS (TTL)	PECL with internal 50Ω to V$_{REF}$	PECL	0.5X	20X	3.5	EPAD-MSOP-10, MLF-16
SY88309BL	3.2	3.3V	SD (TTL)	PECL with internal 50Ω to V$_{REF}$	PECL	0.5X	20X	3.5	EPAD-MSOP-10, MLF-16
SY88313BL	3.2	3.3V	LOS (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	1X	20X	3.5	EPAD-MSOP-10, MLF-16
SY88315BL	3.2	3.3V	SD (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	1X	20X	3.5	EPAD-MSOP-10, MLF-16
SY88343BL	3.2	3.3V	LOS (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	4X	20X	3.5	EPAD-MSOP-10, MLF-16
SY88343DL	3.2	3.3V	LOS (TTL)	PECL	CML	4X	20X	3.5	MLF-16
SY88343HL	3.2	3.3V	LOS (TTL)	PECL	CML	4X	20X	3.5	MLF-16
SY88345BL	3.2	3.3V	SD (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	4X	20X	3.5	EPAD-MSOP-10, MLF-16
SY88347DL	3.2	3.3V	LOS (TTL)	PECL	PECL	4X	20X	3.5	MSOP-10
SY88353BL[2]	3.2	3.3V	LOS (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	1X	20X	3.5	MLF-16
SY88403BL	4.25	3.3V	LOS (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	1X	20X	3.5	EPAD-MSOP-10, MLF-16
SY88713V	0.622	3.3V/5V	SD (PECL)	PECL	PECL	1X	1X	4.6	MSOP-10
SY88773V	3.2	3.3V/5V	LOS (TTL)	PECL	CML	1X	1X	4.6	EPAD-MSOP-10, MLF-16
SY88803V	0.155	3.3V/5V	LOS (TTL)	PECL	PECL	1X	1X	4.6	MSOP-10
SY88813V	0.155	3.3V/5V	SD (PECL)	PECL	PECL	1X	1X	4.6	MSOP-10
SY88843V	3.2	3.3V/5V	SD (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	1X	1X	4.6	EPAD-MSOP-10 , MLF-16
SY88903AL	1.25	3.3V	LOS (TTL)	PECL	PECL	4X	1X	3.5	MSOP-10
SY88903V	1.25	3.3V/5V	LOS (TTL)	PECL	PECL	1X	1X	4.6	MSOP-10
SY88913V	1.25	3.3V/5V	LOS (PECL)	PECL	PECL	1X	1X	4.6	MSOP-10
SY88923AV	3.2	3.3V/5V	LOS (TTL)	PECL	PECL	1X	1X	4.6	EPAD-MSOP-10, MSOP-10
SY88923V	2.5	3.3V/5V	LOS (TTL)	PECL	PECL	1X	1X	4.6	MSOP-10
SY88933AL	1.25	3.3V	SD (TTL)	PECL	PECL	4X	20X	3.5	MSOP-10
SY88933V	1.25	3.3V/5V	SD (TTL)	PECL	PECL	1X	1X	4.6	MSOP-10
SY88943V	2.5	3.3V/5V	SD (TTL)	PECL	PECL	1X	1X	4.6	MSOP-10
SY88953L[2]	10.7	3.3V	SD & LOS (TTL)	CML	CML	1X	1X	4.6	MLF-16
SY88973V	3.2	3.3V/5V	LOS (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	1X	1X	4.6	EPAD-MSOP-10 , MLF-16
SY88973BL[3]	3.2	3.3V	LOS (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	1X	1X	4.6	MLF-16
SY88983V	3.2	3.3V/5V	SD (TTL)	PECL with internal 50Ω to V$_{REF}$	CML	1X	1X	4.6	EPAD-MSOP-10 , MLF-16
SY88993AV	3.2	3.3V/5V	LOS (TTL)	PECL	CML	1X	1X	4.6	MSOP-10
SY88993V	3.2	3.3V/5V	LOS (TTL)	PECL	CML	1X	1X	5.6	MSOP-10

1. I/O compatible with ADN2891.

2. With Decision Threshold Adjustment: to correct input DC offset and optimize BER performance.

3. The pull-up resistor between LOS output and VCC is external.

Fractional N Synthesizers
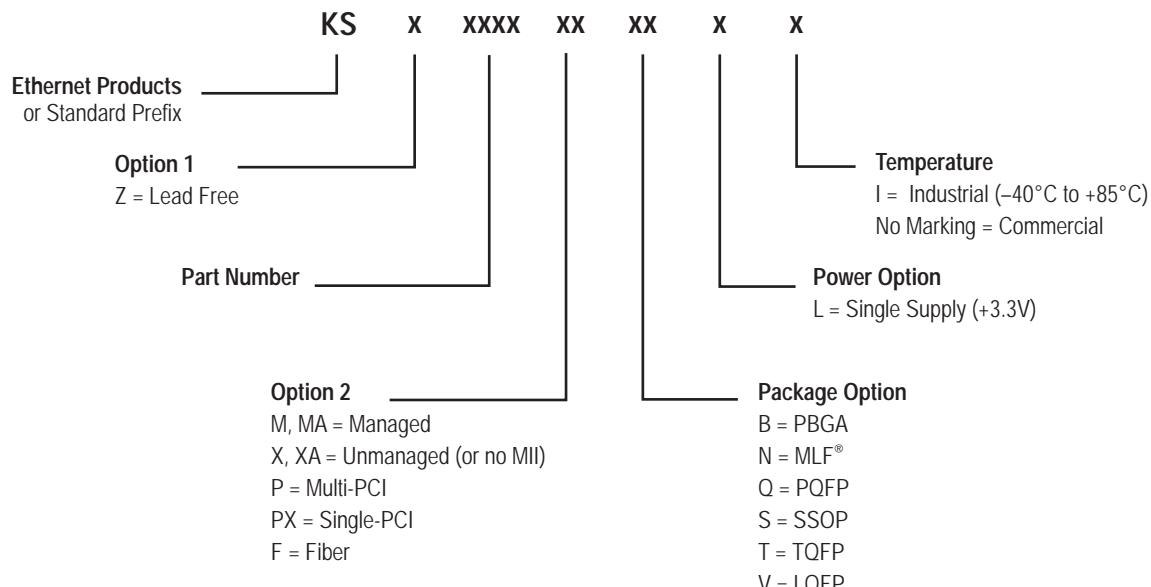
Part Number	Description	Output Range	Input Ref. Osc.	Temperature	Package	Eval. Software
SY87729L	3.3V, AnyClock® 10MHz to 365MHz Fractional N Synthesizer	10MHz to 365MHz	27MHz	Industrial	TQFP-32	Yes
SY87739L	3.3V, Protocol Transparent 10MHz to 729MHz Factional N Synthersizer	10MHz to 729MHz	27MHz	Industrial	TQFP-32	Yes

Multiplexer/Demultiplexer

Part Number	Function	Data Rate	Data Output	V$_{CC}$	Temperature	Conversion	Package
SY87724L	MUX and DeMUX	2.7Gbps	PECL	3.3V	Industrial	1:, 1:5, 1:8, 1:10, 4:1, 5:1, 8:1, 10:1	TQFP-80
SY87725L	SERDES	2.5Gbps	CML	3.3V	Industrial	1:4, 4:1	EPAD-TQFP-64
SY10/100E445	DeMUX	2.5Gbps	PECL	5V	Commercial	1:4	LPCC-28
SY10/100E446	MUX	1.6Gbps	PECL	5V	Commercial	4:1	LPCC-28
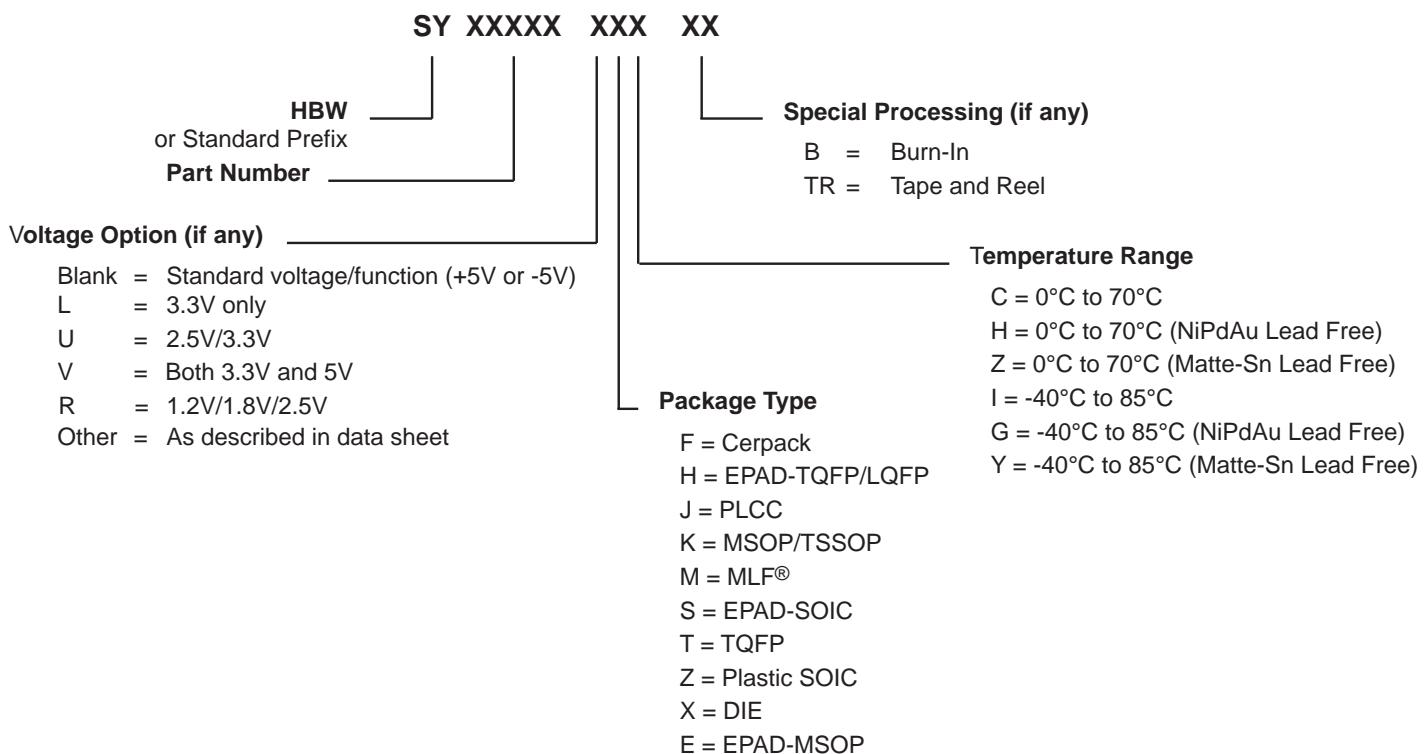
Ethernet Part Identification

KS   x   xxxx   xx   xx   x   x

Ethernet Products
or Standard Prefix

Option 1
Z = Lead Free

Part Number

Option 2
M, MA = Managed
X, XA = Unmanaged (or no MII)
P = Multi-PCI
PX = Single-PCI
F = Fiber

Package Option
B = PBGA
N = MLF®
Q = PQFP
S = SSOP
T = TQFP
V = LQFP

Power Option
L = Single Supply (+3.3V)

Temperature
I = Industrial (–40°C to +85°C)
No Marking = Commercial
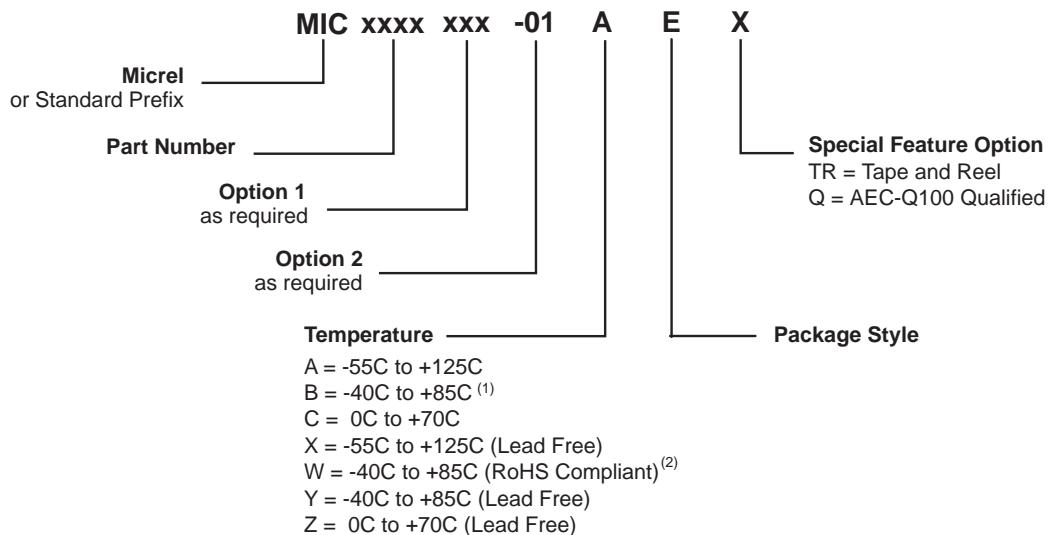
High Bandwidth Part Identification

SY   XXXXX   XXX   XX

HBW
or Standard Prefix
Part Number

Voltage Option (if any)
Blank = Standard voltage/function (+5V or -5V)
L = 3.3V only
U = 2.5V/3.3V
V = Both 3.3V and 5V
R = 1.2V/1.8V/2.5V
Other = As described in data sheet

Package Type
F = Cerpack
H = EPAD-TQFP/LQFP
J = PLCC
K = MSOP/TSSOP
M = MLF®
S = EPAD-SOIC
T = TQFP
Z = Plastic SOIC
X = DIE
E = EPAD-MSOP

Special Processing (if any)
B = Burn-In
TR = Tape and Reel

Temperature Range
C = 0°C to 70°C
H = 0°C to 70°C (NiPdAu Lead Free)
Z = 0°C to 70°C (Matte-Sn Lead Free)
I = -40°C to 85°C
G = -40°C to 85°C (NiPdAu Lead Free)
Y = -40°C to 85°C (Matte-Sn Lead Free)

Analog Part Identification

Micrel Analog Standard

MIC **xxxx** **xxx** **-01** **A** **E** **X**

- **Micrel** — or Standard Prefix
- **Part Number**
- **Option 1** — as required
- **Option 2** — as required
- **Temperature**
  - A = -55C to +125C
  - B = -40C to +85C [1]
  - C = 0C to +70C
  - X = -55C to +125C (Lead Free)
  - W = -40C to +85C (RoHS Compliant) [2]
  - Y = -40C to +85C (Lead Free)
  - Z = 0C to +70C (Lead Free)
- **Package Style**
- **Special Feature Option**
  - TR = Tape and Reel
  - Q = AEC-Q100 Qualified
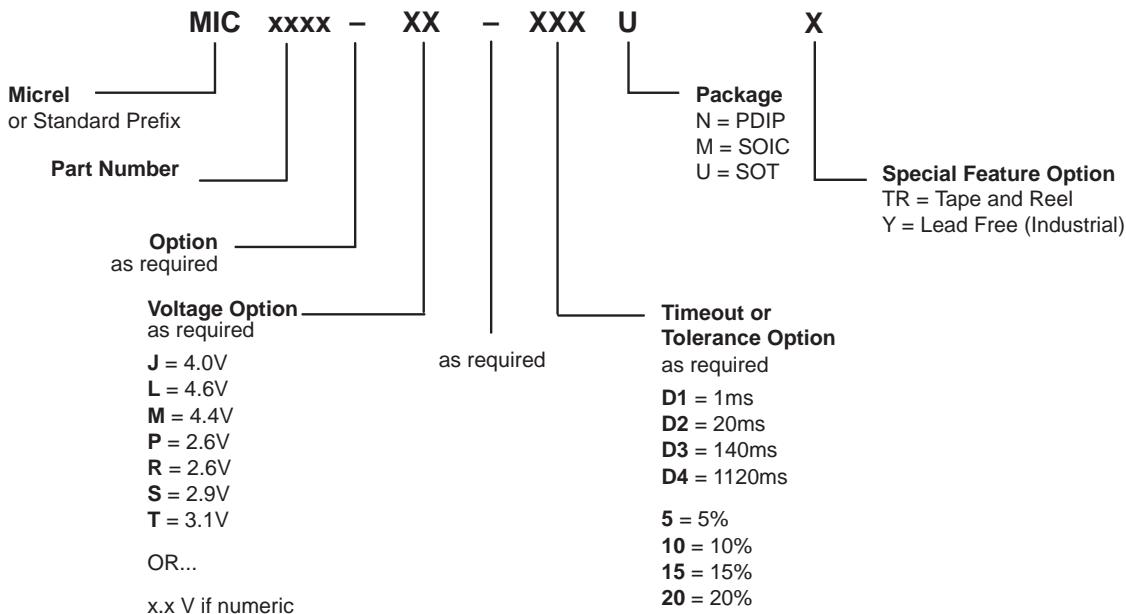
Notes:

1. Typically, industrial grade power products rate the junction temperature up to +125C. Refer to the datasheet.
2. Applicable to TO-220, TO-247, TO-263, SOT-223, SPAK packages using 85% lead plus lead alloy die attach material. Refer to the datasheet.

C3 = SC70-3	**M** = 150 mil SOIC	**M6** = SOT-23-6	**TS** = TSSOP
C4 = SC70-4	**ME** = 150 mil EPAD-SOIC	**M8** = SOT-23-8	**TSE** = EPAD-TSSOP
C5 = SC70-5	**ML** = MLF®	**N** = Plastic DIP	**TQ** = TQFP
C6 = SC70-6	**MM** = MSOP	**QS** = QSOP	**TQE** = EPAD-TQFP
D5 = Thin SOT	**MME** = EPAD-MSOP	**QSE** = EPAD-QSOP	**U** = TO-263
FL = MLF®	**MT** = Thin MLF®	**R** = SPAK	**V** = PLCC
HL = Hybrid MLF®	**M3** = SOT-23-3	**S** = SOT-223	**WM** = 300 mil Wide SOIC
J = Ceramic DIP	**M4** = SOT-143	**SM** = SSOP	**WME** = 300 mil Wide EPAD-SOIC
LQ = LQFP (Low Profile QFP)	**M5** = SOT-23-5	**T** = TO-220	**WT** = TO-247

Industry Standard Voltage Supervisors

MIC **xxxx** – **XX** – **XXX** **U** **X**

- **Micrel** — or Standard Prefix
- **Part Number**
- **Option** — as required
- **Voltage Option** — as required
  - J = 4.0V
  - L = 4.6V
  - M = 4.4V
  - P = 2.6V
  - R = 2.6V
  - S = 2.9V
  - T = 3.1V

  OR...

  x.x V if numeric
- as required
- **Timeout or Tolerance Option** — as required
  - **D1** = 1ms
  - **D2** = 20ms
  - **D3** = 140ms
  - **D4** = 1120ms

  - **5** = 5%
  - **10** = 10%
  - **15** = 15%
  - **20** = 20%
- **Package**
  - N = PDIP
  - M = SOIC
  - U = SOT
- **Special Feature Option**
  - TR = Tape and Reel
  - Y = Lead Free (Industrial)

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Worldwide Sales Offices

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Dist.	Future Electronics	Tel: 852-2484-2484	www.futureelectronics.com

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Dist.	Arrow Electronics Inc.	Tel: (403) 259-6817	www.arrow.com
Dist.	Future Electronics	Tel: (403) 291-3443	www.futureelectronics.com

Canada–BC

Rep.	GMA	Tel: (603) 303-0044	www.gmarep.com
Dist.	Arrow Electronics Inc.	Tel: (604) 421-2333	www.arrow.com
Dist.	Future Electronics	Tel: (604) 294-1166	www.futureelectronics.com

Canada-East

Die Dist.	ES Components, Inc.	Tel: (403) 291-3443	www.escomponents.com

Canada–MB

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Dist.	Future Electronics	Tel: (204) 944-1446	www.futureelectronics.com

Canada–MP

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Canada–ON

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Dist.	Nu Horizons Electronics	Tel: (905) 761-1911	www.nuhorizons.com

Canada–QC

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Dist.	Arrow Asia PAC Ltd.	Tel: 852-2484-2484	www.arrowasia.com
Dist.	Comtech Group, Inc.	Tel: + 86 (755) 2674-3210	www.comp-techgroup.com
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Dist.	Synnex Pacific, Ltd.–Shanghai	Tel: + 86 (21) 62216298	www.synnex.com
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Rep.	Galaxy Far East Corp.–Shenzhen	Tel: + 86 (755) 8399-8903	www.gfec.com.tw
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Rep.	Lestina International Ltd.–Shenzhen	Tel: + 86 (755) 8343-8383	www.lestina.com
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Czeck Republic

Dist.	SASCO Holz–Prague	Tel: + 420 271 001 470	www.sascoholz.com

Denmark

Dist.	Arrow Denmark	Tel: + 45 70 10 22 11	www.arrow.com
Dist.	Arrow Nordic Components AB	Tel: + 44 1279 441144	www.arrowne.com
Dist.	Future Electronics	Tel: + 45 76 40 87 64	www.futureelectronics.com

Estonia

Dist.	Arrow Nordic Components AB	Tel: + 44 1279 441144	www.arrowne.com
Dist.	Arrow Estonia	Tel: + 372 677 42 50	www.arrow.com
Dist.	Future Electronics	Tel: + 372 614 3201	www.futureelectronics.com
Die Dist.	Chip Supply, Inc.	Tel: + 44 (1616) 336627	www.chipsupply.com

Europe

Die Dist.	Die Technology, Ltd.	Tel: + 44 (0) 1603 788 967	www.dietechnology.com
Dist.	Arrow Finland	Tel: + 358 (9) 47 66 60	www.arrowne.com
Dist.	Arrow Nordic Components AB	Tel: + 44 1279 441144	www.arrowne.com

Finland

Dist.	Future Electronics	Tel: + 358 (9) 525 9950	www.futureelectronics.com

France

Dist.	Arrow France–Rungis	Tel: + 33 (1) 56.30.24.25	www.arrow.com
Dist.	Arrow France–Lyon	Tel: + 33 (4) 72.78.14.80	www.arrow.com
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Dist.	Tekelec Europe–Rungis	Tel: + 33 (1) 56.30.24.25	www.tekelec.com

Germany

Rep.	Activerep Electronic GmbH	Tel: + 49 7252-537-101	www.activerep.com
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Dist.	Future Electronics Deut.–Ismaning	Tel: + 49 (89) 95 72 70	www.futureelectronics.com
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Dist.	SASCO Holz– Stuttgart South	Tel: + 49 (0) 70 21/9 83 90	www.sascoholz.com

Hong Kong

Rep.	Lestina International Ltd.	Tel: + (852) 2735-1736	www.lestina.com
DRep.	RTI Holdings Ltd.	Tel: + (852) 2795-7421	www.rti.com.hk
Dist.	Arrow Asia PAC Ltd.	Tel: + (852) 2484 2484	www.arrowasia.com
Dist.	Future Electronics	Tel: + (852) 2420-6238	www.futureelectronics.com

Hungary

Dist.	SASCO Holz– Budapest	Tel: + 36 (0) 1/28 87 30-0	www.sascoholz.com
Dist.	Future Electronics	Tel: + 36 (1) 224 0510	www.futureelectronics.com

India

Rep.	Syratron Marketing Private, Ltd.	Tel: + 91-80-25591031	www.syratron
Dist.	Arrow Asia PAC Ltd.	Tel: + (852) 2484-2484	www.arrowasia.com
Dist.	Arrow Electronics India– Bangalore	Tel: + 91 (80) 51353800	www.arrowasia.com.hk
Dist.	Arrow Electronics India– New Delhi	Tel: + 91 (11) 25784629	www.arrowasia.com.hk
Dist.	Arrow Electronics India– Bombay	Tel: + 91 (22) 56925196	www.arrowasia.com.hk
Dist.	Arrow Electronics India– Hyderabad	Tel: + 91 (40) 55774146	www.arrowasia.com.hk
Dist.	Future Electronics– Bangalore	Tel: + 91 (80) 558-7885	www.futureelectronics.com
Dist.	Future Electronics– Bombay	Tel: + 91 (22) 570-2745	www.futureelectronics.com
Dist.	Future Electronics– New Delhi	Tel: + 91 (11) 646-1414	www.futureelectronics.com

Indonesia

Dist.	Arrow Asia PAC Ltd.	Tel: + (852) 2484-2484	www.arrowasia.com
Dist.	Weikeng Technology Pte. Ltd.	Tel: + 886-2-2659-0202	www.weikeng.com

Ireland

Dist.	Arrow Nordic Components AB	Tel: + 44 1279 441144	www.arrowne.com
Dist.	Future Electronics Ltd.	Tel: + 353 (65) 41 330	www.futureelectronics.com

Israel

Rep.	2BePresent Ltd.	Tel: + 972 (77) 7505017	www.2bepresent.com
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Dist.	Gitronics Ltd.	Tel: + 972 (3) 927-4738	www.gitronics.co.il

Italy

Rep.	Aertronica S.r.l.	Tel: + 39 (039) 230 2240	www.aertronica.it
Dist.	Claitron	Tel: + 39 (02) 661431	www.claitron-lasi.it
Dist.	Future Electronics Srl– Milan	Tel: + 39 (02) 660 941	www.futureelectronics.com
Dist.	Future Electronics Srl– Bologna	Tel: + 39 (51) 613 6711	www.futureelectronics.com
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Japan

Rep.	Hakuto Co. Ltd.– Aichi	Tel: + 81 (52) 204-8910	www.hakuto.co.jp
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Dist.	Uni-Electronics, Inc.	Tel: + 81 (3) 3347-8878	www.uni-elec.co.jp

Korea

Rep.	Brainworld Co. Ltd.	Tel: + 82 (2) 974-2647	www.brainworld.co.kr
Rep.	GenCore Technology Co., Ltd.	Tel: + 82 (2) 3463-0040	www.bec.co.kr
DRep.	Progate Technology Ltd.	Tel: + 82 (31) 707-3274	www.progate.co.kr

Latvia

Dist.	Arrow Latvia	Tel: + 371 7311490	www.arrownordic.com
Dist.	Arrow Nordic Components AB	Tel: + 44 1279 441144	www.arrownordic.com

Lithuania

Dist.	Arrow Lithuania	Tel: + 370-37-759015	www.arrownordic.com
Dist.	Future Electronics	Tel: + 370-37-408482	www.futureelectronics.com

Malaysia

Dist.	Arrow Asia PAC Ltd.	Tel: + (852) 2484 2484	www.arrowasia.com
Dist.	Future Electronics-Kuala Lumpur	Tel: + 60 (3) 703-7133	www.futureelectronics.com
Dist.	Future Electronics-Penang	Tel: + 60 (4) 227-7213	www.futureelectronics.com
Dist.	JAG Components Sdn Bhd	Tel: + 60 (4) 6469488	www.jagcomponents.com
Dist.	Weikeng Technology Pte. Ltd.	Tel: + 886-2-2659-0202	www.weikeng.com

Mexico

Rep.	BP Electronica S.A. DEC V	Tel: + (972) 234-8438	www.bpsales.com
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Netherlands

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New Zealand

Dist.	Arrow Asia PAC Ltd.	Tel: + (852) 2484 2484	www.arrowasia.com
Dist.	Braemac Pty. Ltd.	Tel: + 61 (2) 9550-6600	www.braemac.com
Dist.	Future Electronics	Tel: + 64 (3) 9823256	www.futureelectronics.com

North America

Die Dist.	Chip Supply, Inc.	Tel: + 1 407-298-7100	www.chipsupply.com

Norway

Dist.	Arrow Norway	Tel: + 47 52763000	www.arrowne.com
Dist.	Arrow Nordic Components AB	Tel: + 44 1279 441144	www.arrowne.com
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Philippines

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Dist.	Weikeng Technology Pte. Ltd.	Tel: + 886-2-2659-0202	www.weikeng.com

Poland

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Puerto Rico

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Singapore

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Dist.	JAG Components Pte. Ltd.	Tel: + (65) 6749 5663	www.jagcomponents.com
Dist.	Future Electronics Ltd.	Tel: + (65) 6479 1300	www.futureelectronics.com
Dist.	Weikeng Technology Pte. Ltd.	Tel: + 886-2-2659-0202	www.weikeng.com

South Africa

Rep.	MB Silicon Systems Ltd.	Tel: + 27 (11) 728 4757	www.mbsiliconsystems.co.za/

South America

Rep.	BP & M Ltd.		
	689 West Renner Rd., Suite 101		
	Richardson, TX 75070, USA	Tel: + 1 972-234-8438	

South Korea

Dist.	Arrow Asia PAC Ltd.	Tel: + (852) 2484 2484	www.arrowasia.com

Spain

Dist.	Arrow-Iberia	Tel: + 34 (91) 304 3040	www.arrowiberia.com
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Sweden

Dist.	Arrow Nordic Components–Kista	Tel: + 46 8 562 655 00	www.arrownordic.com
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Switzerland

Dist.	SASCO Holz–Yverdon	Tel: + 41 (0) 24/4 47 01 41	www.sascoholz.com
Dist.	SASCO Holz–Zurich	Tel: + 41 (0) 44/81 76 28-0	www.sascoholz.com

Taiwan, R.O.C.

Dist.	Arrow Asia PAC Ltd.	Tel: + (852) 2484 2484	www.arrowasia.com
Dist.	Future Electronics–Hsin Chu	Tel: + 886 (3) 574-4646	www.futureelectronics.com
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Dist.	Galaxy Far East Corp.–Taipei	Tel: + 886 (2) 8913-2200	www.gfec.com.tw
Dist.	Techmosa International Corp.	Tel: + 886 (2) 8226-7698	www.techmosa.com.tw
Dist.	Weikeng Technology Pte. Ltd.	Tel: + 886 (2) 2659-0202	www.weikeng.com

Thailand

Dist.	Arrow Asia PAC Ltd.	Tel: + (852) 2484 2484	www.arrowasia.com
Dist.	Future Electronics-Thailand	Tel: + 662-361-8400	www.futureelectronics.com
Dist.	JAG Components Thailand Co. Ltd.	Tel: + 662-720-4302	www.jagcomponents.com
Dist.	Weikeng Technology Pte. Ltd.	Tel: + 886 (2) 2659-0202	www.weikeng.com

Turkey

Rep.	2BePresent Ltd.	Tel: + 972 (77) 7505017	www.2bepresent.com
Dist.	Future Electronics	Tel: + 90 (216) 445 8700	www.futureelectronics.com

UK

Dist.	Arrow UK	Tel: + 44 1279 441144	www.arrrowuk.com
Dist.	Future Electronics Ltd.	Tel: + 44 (1753) 763000	www.futureelectronics.com

Ukraine

Dist.	SASCO Holz Kiev	Tel: + 38 06 72 31 09 50	www.sascoholz.com

Vietnam

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