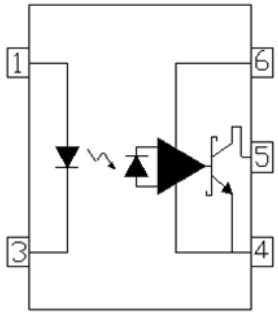
ICPLM600, ICPLM601, ICPLM611

DESCRIPTION

The ICPLM600, ICPLM601 and ICPLM611 devices each consists of an infrared emitting diode optically coupled to a high speed integrated photo detector logic gate with a strobable output.

These devices belong to Isocom Compact Range of optocouplers.



1. Anode
3. Cathode
4. GND
5. Vout
6. Vcc

VCC must be bypassed by a A 0.1µF capacitor.

FEATURES

- High speed 10Mbit/s
- Half Pitch 1.27mm
- Common Mode Transient Immunity 20kV/µs min. (ICPLM611)
- High AC Isolation Voltage 3750V_{RMS}
- Guaranteed Performance from -40°C to 85°C
- Pb Free and RoHS Compliant
- Safety Approvals Pending

APPLICATIONS

- Line Receivers, Data Communication
- LSTTL to TTL, LSTTL or 5V CMOS
- Data Multiplexing
- Pulse Transformer Replacement
- Switch Mode Power Supplies
- Ground Loop Elimination
- Computer Peripheral Interface

ORDER INFORMATION

- Available in Tape and Reel with 3000pcs per reel.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Input Diode

Forward Current	50mA
Reverse Voltage	5V
Power dissipation	100mW

Output

Output Current	50mA
Output Voltage	7V
Supply Voltage	7V
Power Dissipation	85mW

Total Package

Isolation Voltage	3750V_{RMS}
Total Power Dissipation	85mW
Operating Temperature	-40 to 85 °C
Storage Temperature	-55 to 125 °C
Lead Soldering Temperature (10s)	260°C

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Truth Table (Positive Logic)

Input	Output
H	L
L	H

ELECTRICAL CHARACTERISTICS (T_A = -40°C to 85°C unless otherwise specified)

INPUT

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
Forward Voltage	V_F	I_F = 10mA		1.45	1.8	V
Reverse Voltage	V_R	I_R = 10µA, T_A = 25°C	5.0			V
Temperature Coefficient of V_F	$\Delta V_F/\Delta T_A$	I_F = 10mA		-1.9		mV/°C
Input Capacitance	C_{IN}	V_F = 0V, f = 1MHz		70		pF

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
High Level Supply Current	I_{CCH}	I_F = 0mA, V_{CC} = 5.5V		6.0	9	mA
Low Level Supply Current	I_{CCL}	I_F = 10mA, V_{CC} = 5.5V		7.5	10	mA

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
High Level Output Current	I_{OH}	V_{CC} = 5.5V, V_O = 5.5V I_F = 250µA		2.1	30	µA
Low Level Output Voltage	V_{OL}	V_{CC} = 5.5V, I_F = 5mA, I_{OL} = 13mA		0.4	0.6	V
Input Threshold Current	I_{FT}	V_{CC} = 5.5V, V_O = 0.6V, I_{OL} = 13mA		2.4	5	mA

* Typical values at T_A = 25°C

ELECTRICAL CHARACTERISTICS (T_A = -40°C to 85°C unless otherwise specified)

Switching Characteristics (T_A = -40°C to 85°C, I_F = 7.5mA, V_{CC} = 5V unless otherwise specified)

Parameter	Symbol	Test Condition	Min	Typ.*	Max	Unit
Propagation Delay Time to Logic Low	T_{PHL}	R_L = 350Ω, C_L = 15pF, T_A = 25°C		41	100	ns
Propagation Delay Time to Logic High	T_{PLH}	R_L = 350Ω, C_L = 15pF, T_A = 25°C		50	100	ns
Pulse Width Distortion	$\|t_{PHL}-t_{PLH}\|$	R_L = 350Ω, C_L = 15pF		9	35	ns
Propagation Delay Skew	t_{PSK}	R_L = 350Ω, C_L = 15pF			40	ns
Output Rise Time	t_r	R_L = 350Ω, C_L = 15pF		40		ns
Output Fall Time	t_f	R_L = 350Ω, C_L = 15pF		10		ns
Common Mode Transient Immunity at Logic High	CM_H	ICPLM600 I_F = 0mA, V_{OH} = 2.0V, R_L = 350Ω, V_{CM} = 10Vp-p, T_A = 25°C		1000		V/µs
		ICPLM601 I_F = 0mA, V_{OH} = 2.0V, R_L = 350Ω, V_{CM} = 50Vp-p, T_A = 25°C	5000			
		ICPLM611 I_F = 0mA, V_{OH} = 2.0V, R_L = 350Ω, V_{CM} = 1kVp-p, T_A = 25°C	20000			
Common Mode Transient Immunity at Logic Low	CM_L	ICPLM600 I_F = 7.5mA, V_{OL} = 0.8V, R_L = 350Ω, V_{CM} = 10Vp-p, T_A = 25°C		1000		V/µs
		ICPLM601 I_F = 7.5mA, V_{OL} = 0.8V, R_L = 350Ω, V_{CM} = 50Vp-p, T_A = 25°C	5000			
		ICPLM611 I_F = 7.5mA, V_{OL} = 0.8V, R_L = 350Ω, V_{CM} = 1kVp-p, T_A = 25°C	20000			

* Typical values at T_A = 25°C

ELECTRICAL CHARACTERISTICS

Notes :

1. The V_{CC} supply must be bypassed by a 0.1µF capacitor or larger with good high frequency characteristic and should be connected as close as possible to the package V_{CC} and GND pins.

2. t_{PLH} – Propagation delay is measured from the 3.75mA level on the HIGH to LOW transition of the input current pulse to the 1.5 V level on the LOW to HIGH transition of the output voltage pulse.

3. t_{PHL} – Propagation delay is measured from the 3.75mA level on the LOW to HIGH transition of the input current pulse to the 1.5 V level on the HIGH to LOW transition of the output voltage pulse.

4. t_{PSK} – The magnitude of the worst case difference in t_{PHL} and/or t_{PLH} that will be seen between devices at any given temperature within the worst case operating condition range.

4 t_r – Rise time is measured from the 10% to the 90% levels on the LOW to HIGH transition of the output pulse.

5. t_f – Fall time is measured from the 90% to the 10% levels on the HIGH to LOW transition of the output pulse.

6. CM_H – The maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the HIGH state (i.e., $V_{OUT} > 2.0V$).

7. CM_L – The maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the LOW output state (i.e., $V_{OUT} < 0.8V$).

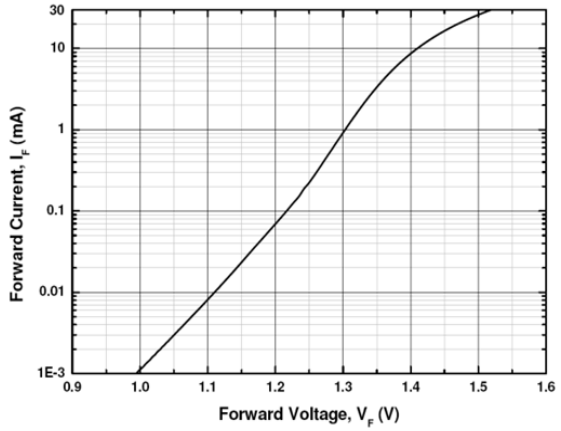


Fig 1 Forward Current vs Forward Voltage

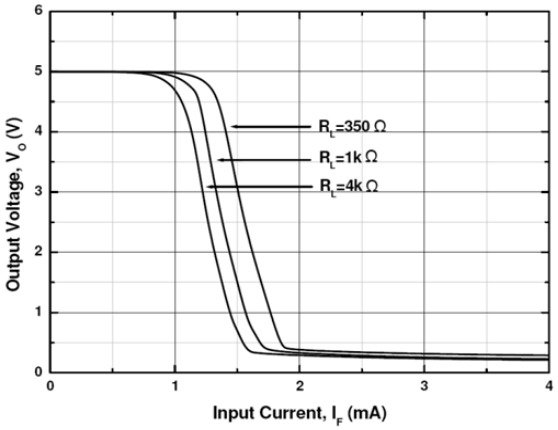


Fig 2 Output Voltage vs Forward Current

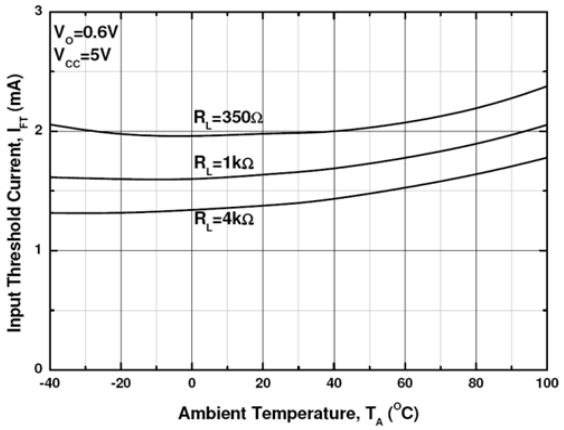


Fig 3 Input Threshold Current vs T_A

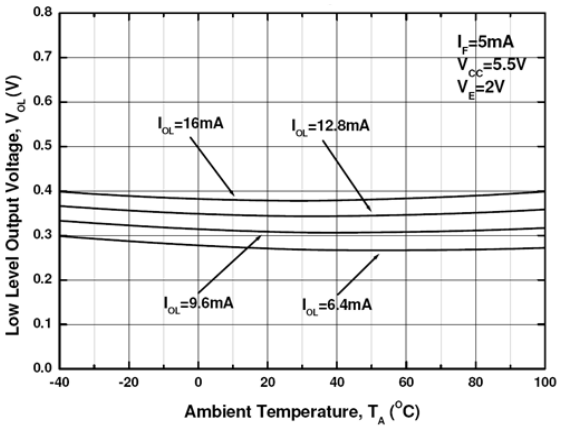


Fig 4 Low Level Output Voltage vs T_A

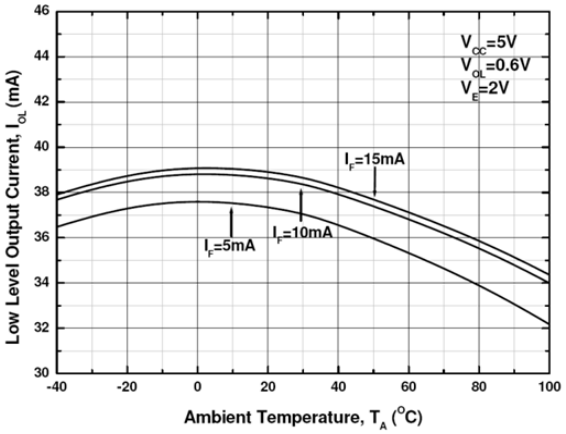


Fig 5 Low Level Output Current vs T_A

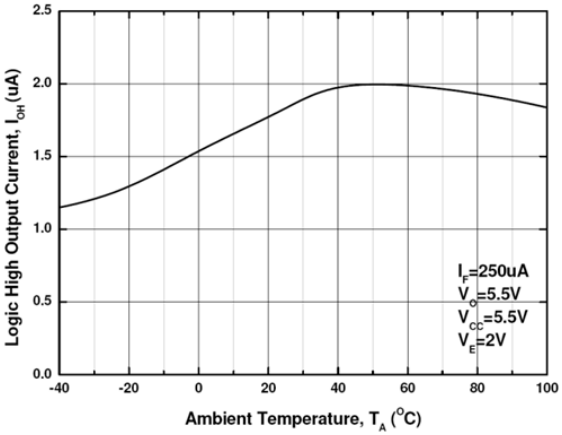


Fig 6 High Level Output Current vs T_A

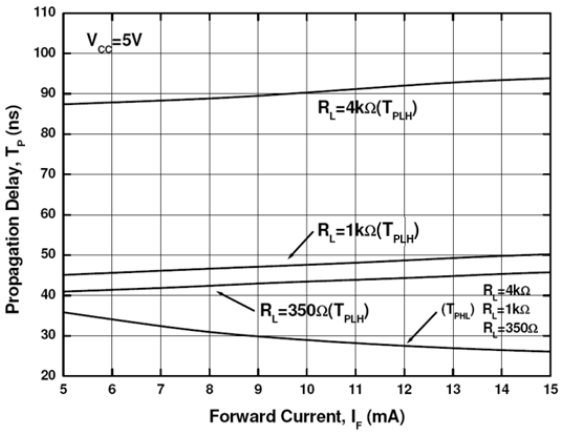


Fig 7 Propagation Delay vs Forward Current

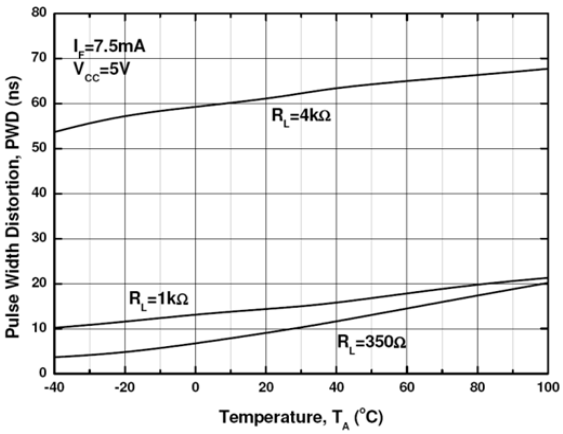


Fig 8 Pulse Width Distortion vs T_A

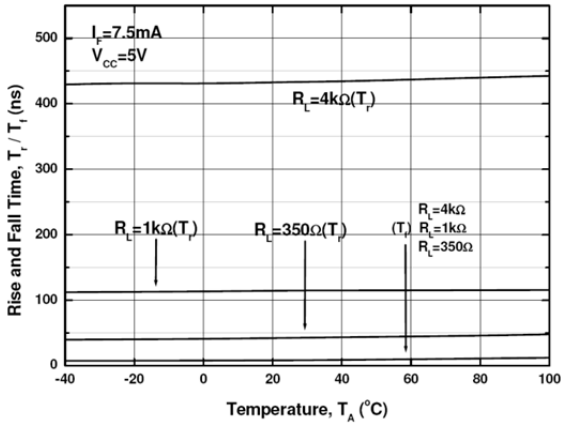


Fig 9 Rise and Fall Time vs T_A

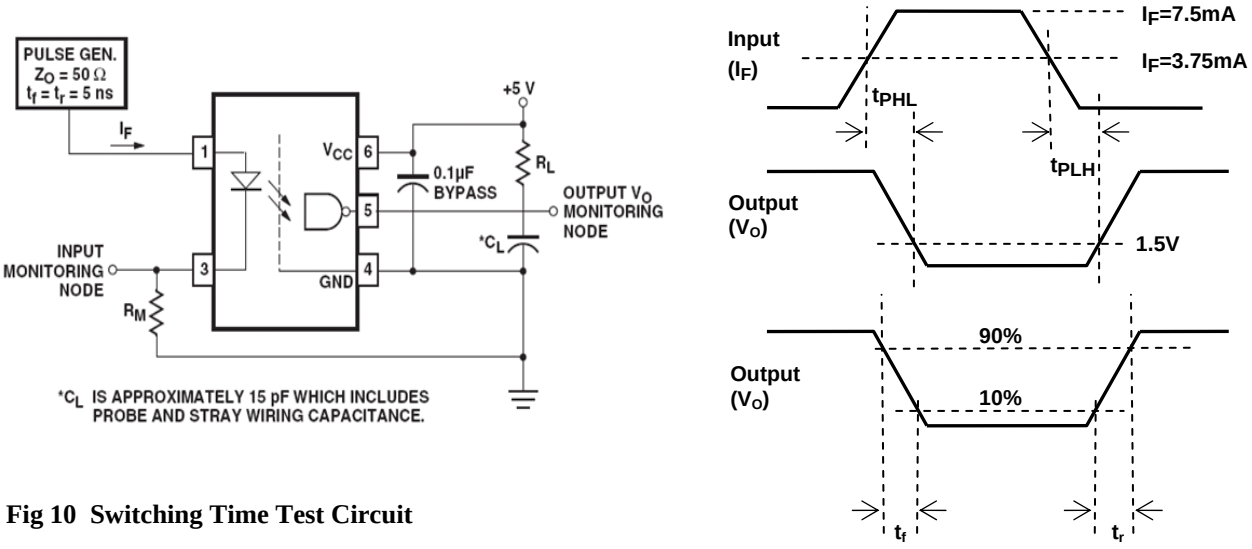


Fig 10 Switching Time Test Circuit

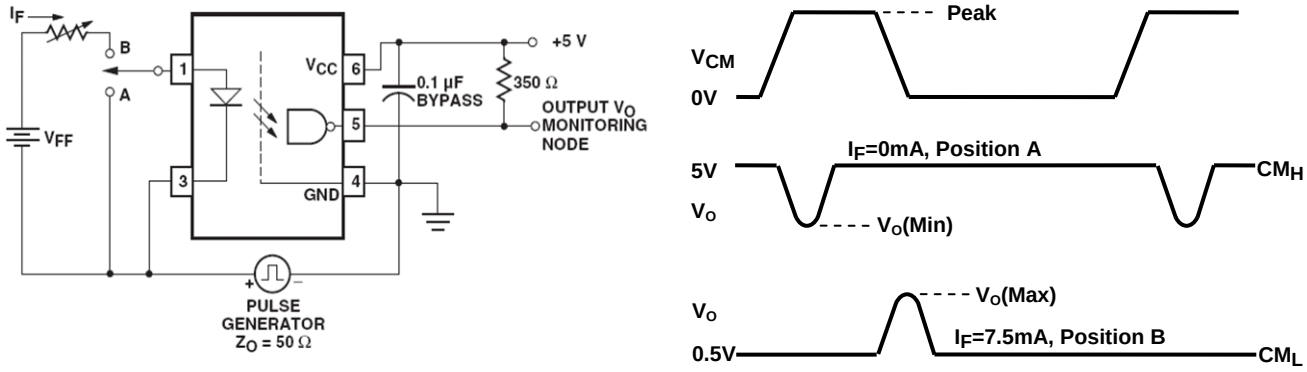


Fig 11 Common Mode Transient Immunity Test Circuit

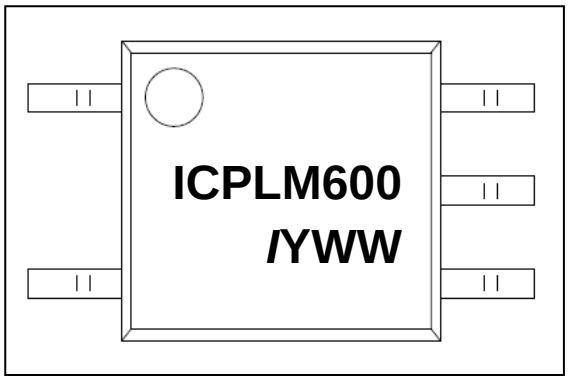
Common mode transient immunity in logic high level is the maximum tolerable (positive) dV_{CM}/dt on the leading edge of the common mode pulse signal V_{CM}, to assure that the output will remain in a logic high state (i.e., $V_O > 2.0V$).

Common mode transient immunity in logic low level is the maximum tolerable (negative) dV_{CM}/dt on the trailing edge of the common mode pulse signal, V_{CM}, to assure that the output will remain in a logic low state (i.e., $V_O < 0.8V$).

ORDER INFORMATION

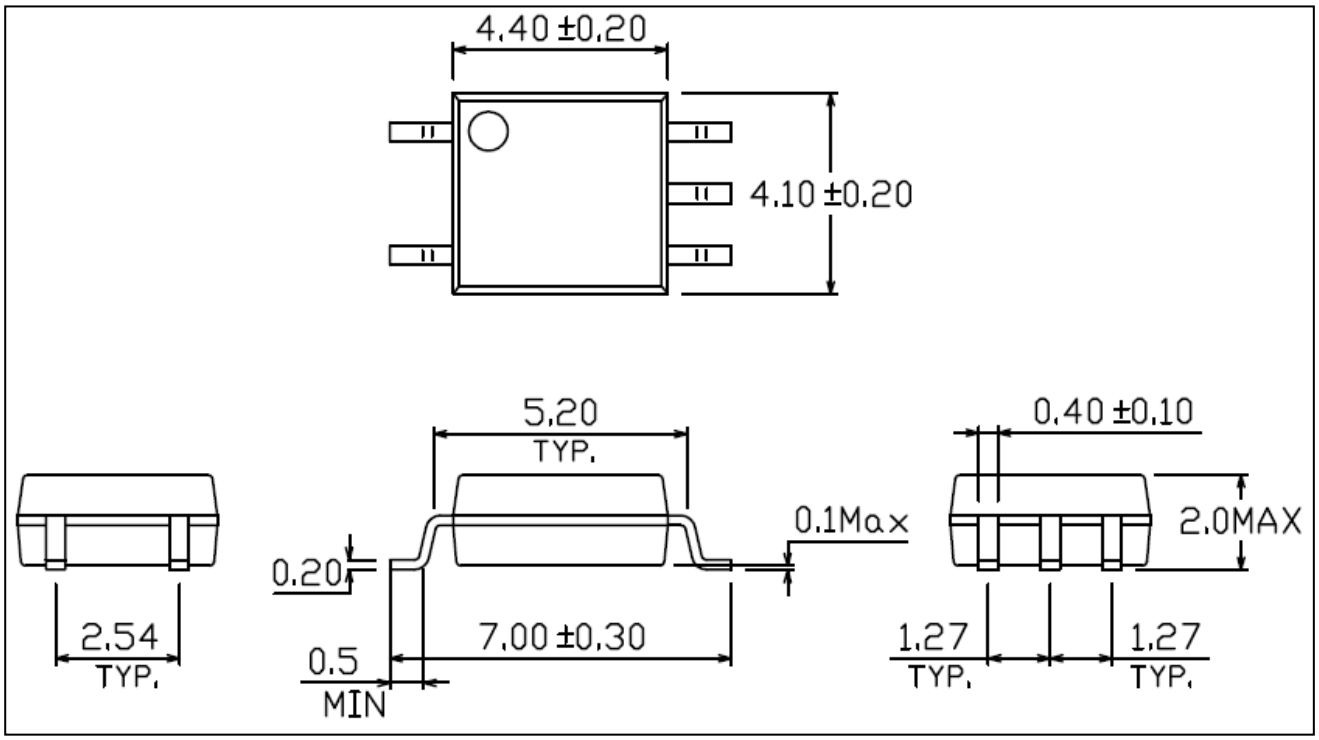
ICPLM600, ICPLM601, ICPLM611			
After PN	**PN**	**Description**	**Packing quantity**
None	ICPLM600, ICPLM601, ICPLM611	Surface Mount Tape & Reel	3000 pcs per reel

DEVICE MARKING

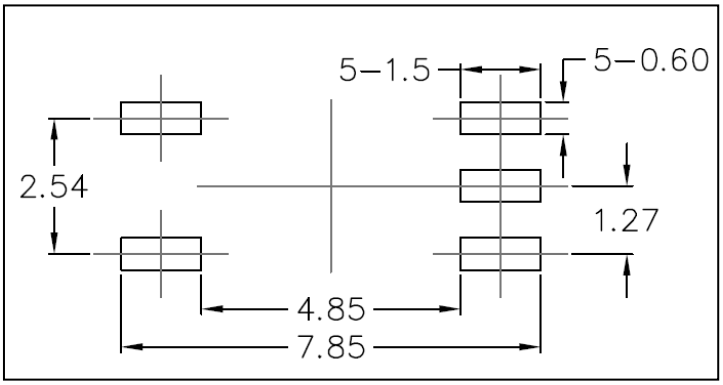


ICPLM600	denotes Device Part Number (ICPLM600 is used as example)
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
/	denotes Isocom

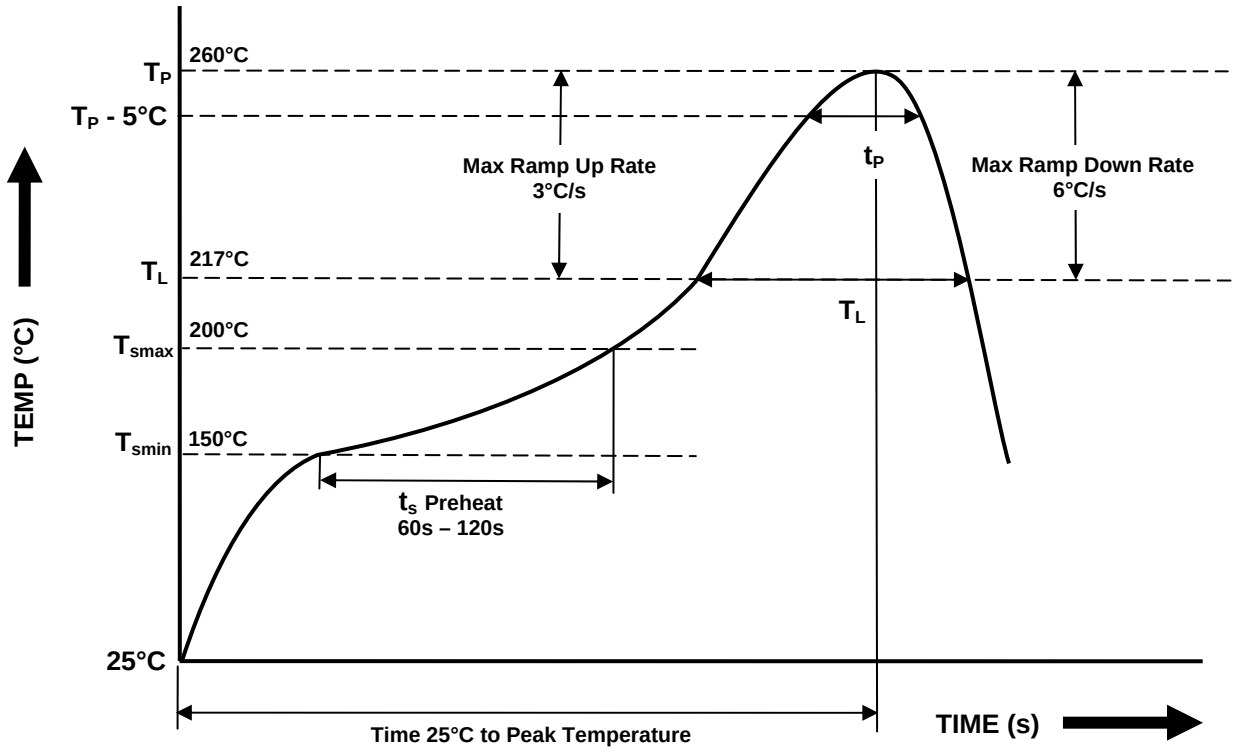
PACKAGE DIMENSIONS (mm)



RECOMMENDED PAD LAYOUT (mm)

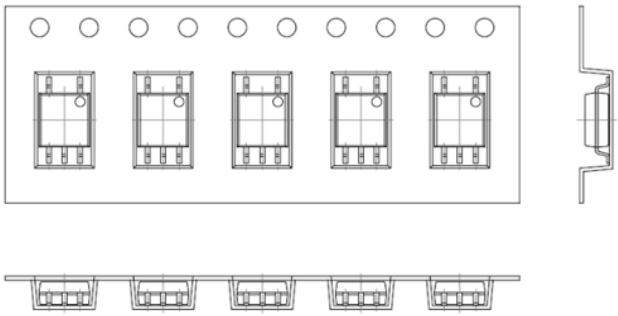


IR REFLOW SOLDERING TEMPERATURE PROFILE
(One Time Reflow Soldering is Recommended)

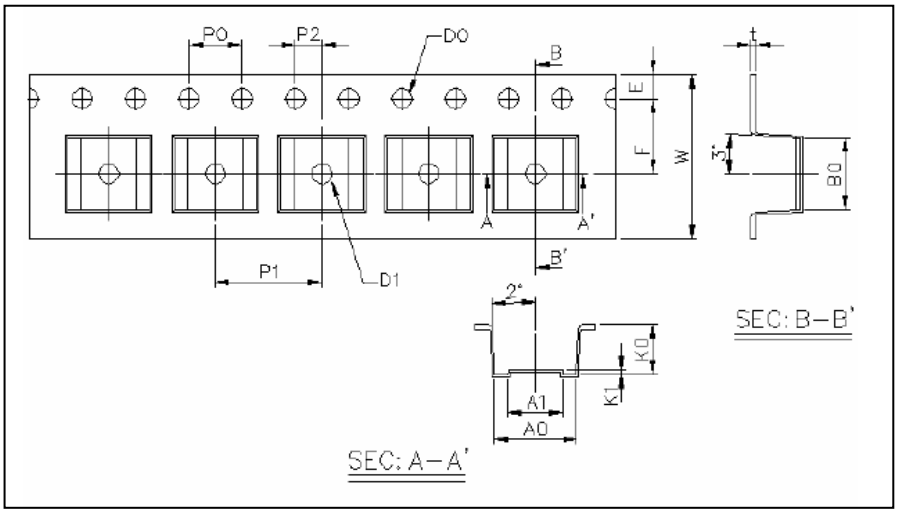


Profile Details	Conditions
Preheat - Min Temperature (T_{SMIN}) - Max Temperature (T_{SMAX}) - Time T_{SMIN} to T_{SMAX} (t_s)	 150°C 200°C 60s - 120s
Soldering Zone - Peak Temperature (T_P) - Liquidous Temperature (T_L) - Time within 5°C of Actual Peak Temperature (T_P – 5°C) - Time maintained above T_L (t_L) - Ramp Up Rate (T_L to T_P) - Ramp Down Rate (T_P to T_L)	 260°C 217°C 30s 60s - 100s 3°C/s max 6°C/s max
Average Ramp Up Rate (T_{smax} to T_P)	3°C/s max
Time 25°C to Peak Temperature	8 minutes max

TAPE AND REEL PACKAGING



Direction of feed from reel



Dimension No.	**A0**	**B0**	**D0**	**D1**	**E**	**F**
Dimension (mm)	4.4±0.1	7.4±0.1	1.5±0.1	1.5±0.3	1.75±0.1	7.5±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**K0**
Dimension (mm)	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0 +0.3/-0.1	2.4±0.1

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- When requiring a device for any ”specific” application, please contact our sales for advice.

- The contents described herein are subject to change without prior notice.

- Do not immerse device body in solder paste.

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COMPONENTS

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