

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

# TD62308AP, TD62308F, TD62308AF

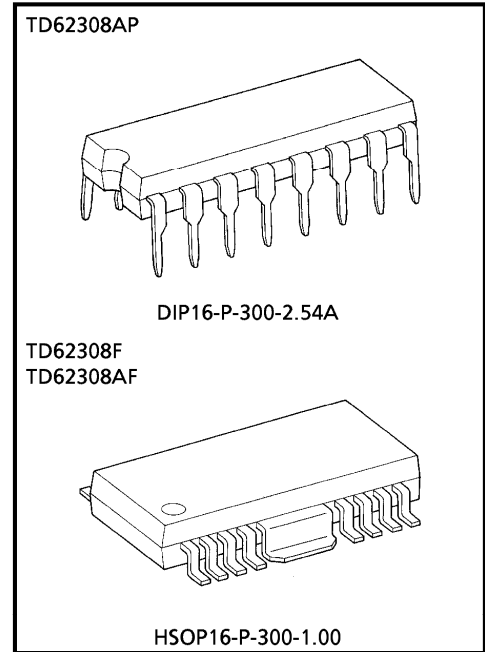
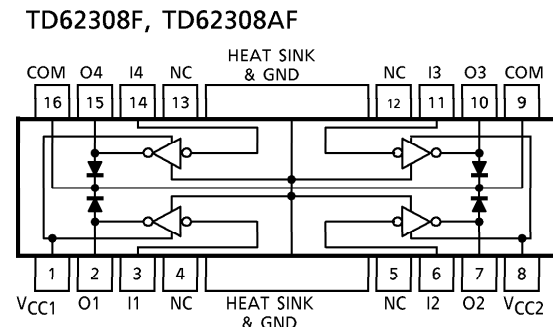
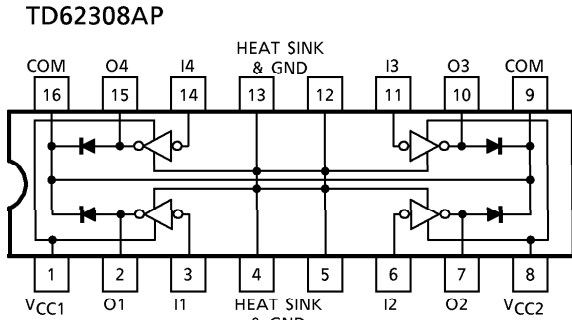
## 4CH LOW INPUT ACTIVE HIGH-CURRENT DARLINGTON SINK DRIVER

The TD62308AP/F/AF are non-inverting transistor array which are comprised of four NPN darlington output stages and PNP input stages. These devices are low level input active driver and are suitable for operation with TTL, 5V CMOS and 5V Microprocessor which have sink current output drivers. Applications include relay, hammer, lamp and stepping moter drivers.

**FEATURES**

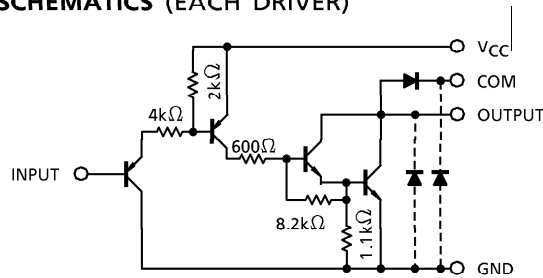
- Output current (single output) 1.5A (Max.)
- High sustaining voltage output 35V (Min.) (TD62308F)  
50V (Min.) (TD62308AP, TD62308AF)
- Output clamp diodes
- Input compatible with TTL and 5V CMOS
- Low level active inputs
- Standard supply voltage
- Two V<sub>CC</sub> terminals V<sub>CC1</sub>, V<sub>CC2</sub> (separated)
- GND and SUB terminal = heat sink
- Package type-AP : DIP-16pin
- Package type-F, AF : PFP-16pin

**PIN CONNECTION (TOP VIEW)**



Weight  
 DIP16-P-300-2.54A : 1.11g (Typ.)  
 HSOP16-P-300-1.00 : 0.50g (Typ.)

**SCHEMATICS (EACH DRIVER)**



(Note) The input and output parasitic diodes cannot be used as clamp diodes.

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**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V <sub>CC</sub>	-0.5~10	V
Output Sustaining Voltage	F	V <sub>CE (SUS)</sub>	-0.5~35	V
	AP, AF		-0.5~50	
Output Current		I <sub>OUT</sub>	1.5	A / ch
Input Current		I <sub>IN</sub>	-10	mA
Input Voltage		V <sub>IN</sub>	-0.5~30	V
Clamp Diode Reverse Voltage	F	V <sub>R</sub>	35	V
	AP, AF		50	
Clamp Diode Forward Current		I <sub>F</sub>	1.5	A
Power Dissipation	AP	P <sub>D</sub>	1.47 / 2.7 (Note 1)	W
	F, AF		0.9 / 1.4 (Note 2)	
Operating Temperature		T <sub>opr</sub>	-40~85	°C
Storage Temperature		T <sub>stg</sub>	-55~150	°C

(Note 1) On Glass Epoxy (50 × 50 × 1.6mm Cu 50%)

(Note 2) On Glass Epoxy (60 × 30 × 1.6mm Cu 30%)

**RECOMMENDED OPERATING CONDITIONS (Ta = -40~85°C)**

CHARACTERISTIC		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage		V <sub>CC</sub>	—	4.5	—	5.5	V
Output Sustaining Voltage	F	V <sub>CE (SUS)</sub>	—	0	—	35	V
	AP, AF		—	0	—	50	
Output Current	AP	I <sub>OUT</sub>	DC 1 circuit, Ta = 25°C	0	—	1250	mA / ch
			T <sub>pw</sub> = 25ms	Duty = 10%	0	—	
	4 circuits		Duty = 50%	0	—	700	
			Ta = 85°C	Duty = 10%	0	—	
F, AF	T <sub>j</sub> = 120°C	Duty = 50%	0	—	390		
	Input Voltage		V <sub>IN</sub>	—	0	—	25
Input Voltage	Output On	V <sub>IN (ON)</sub>	—	0	—	V <sub>CC</sub> - 3.6	V
	Output Off	V <sub>IN (OFF)</sub>	—	V <sub>CC</sub> - 1.0	—	V <sub>CC</sub>	
Clamp Diode Reverse Voltage	F	V <sub>R</sub>	—	—	—	35	V
	AP, AF		—	—	—	50	
Clamp Diode Forward Current		I <sub>F</sub>	—	—	—	1.25	A
Power Dissipation	AP	P <sub>D</sub>	Ta = 85°C (Note 1)	—	—	1.4	W
	F, AF		Ta = 85°C (Note 2)	—	—	0.7	

(Note 1) On Glass Epoxy (50 × 50 × 1.6mm Cu 50%)

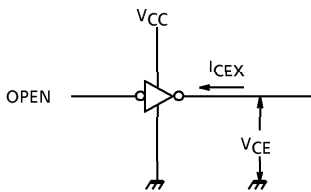
(Note 2) On Glass Epoxy (60 × 30 × 1.6mm Cu 30%)

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

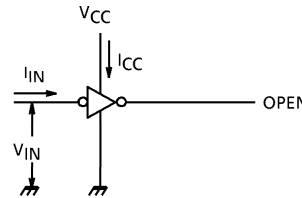
CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current	AP, AF	ICEX	1	VCE = 50V, Ta = 25°C	—	—	50	μA
				VCE = 50V, Ta = 85°C	—	—	100	
	F			VCE = 35V, Ta = 25°C	—	—	50	
				VCE = 35V, Ta = 85°C	—	—	100	
Output Saturation Voltage		VCE (sat)	3	IOUT = 1.25A	—	—	1.8	V
				IOUT = 0.7A	—	—	1.3	
Input Voltage	"H" Level	VIH	—	—	VCC - 1.6	—	25	V
	"L" Level	VIL	—	—	—	—	VCC - 3.6	
Input Current	"H" Level	IiH	—	—	—	—	10	μA
	"L" Level	IiL			—	-0.05	-0.36	mA
Clamp Diode Reverse Current	AP, AF	IR	4	VR = 50V, Ta = 25°C	—	—	50	μA
	F			VR = 35V, Ta = 25°C	—	—	50	
Clamp Diode Forward Voltage		VF	5	IF = 1.25A	—	1.5	2.0	V
Supply Current	Output On	ICC (ON)	2	VCC = 5.5V, VIN = 0V	—	8.5	12.5	mA / ch
	Output Off	ICC (OFF)		VCC = 5.5V, VIN = VCC	—	—	1.0	
Turn-On Delay	F	tON	6	CL = 15pF	VOUT = 35V RL = 28Ω	—	0.2	—
	AP, AF							
Turn-Off Delay	F	tOFF	6	CL = 15pF	VOUT = 35V RL = 28Ω	—	5.0	—
	AP, AF							

**TEST CIRCUIT**

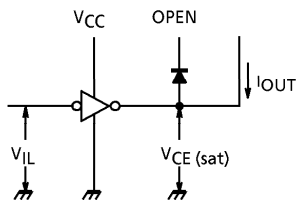
1. ICEX



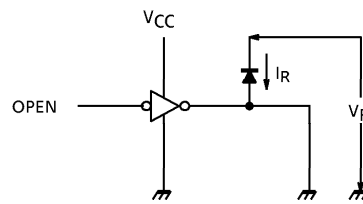
2. ICC



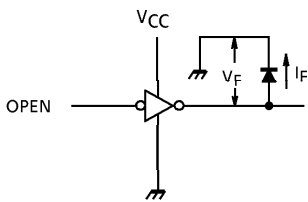
3.  $V_{CE(sat)}$



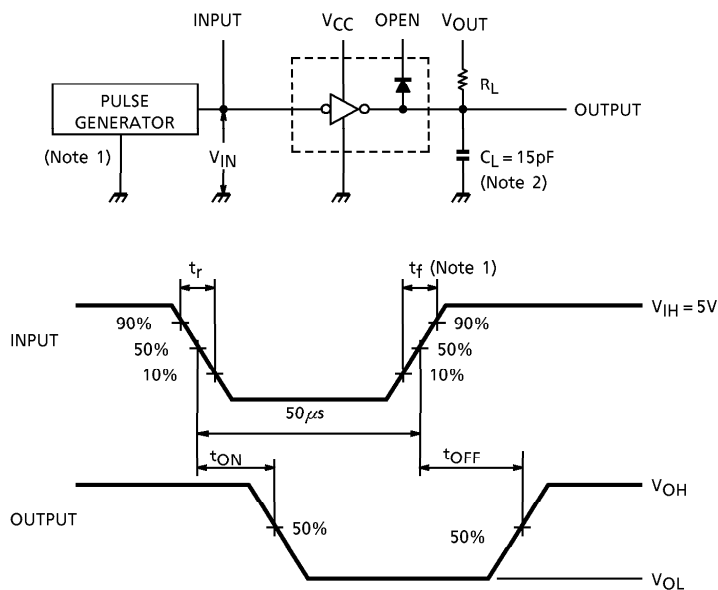
4.  $I_R$



5.  $V_F$



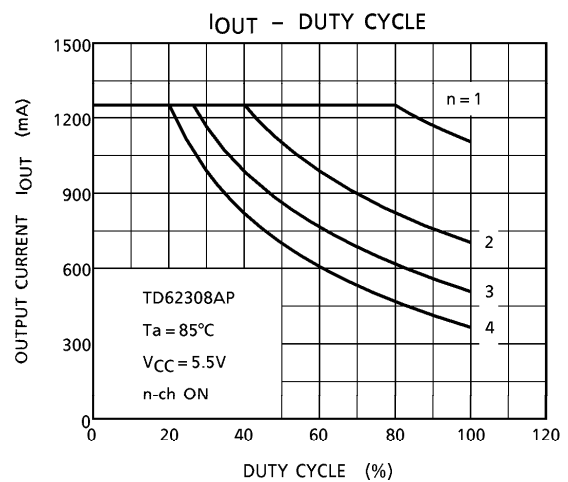
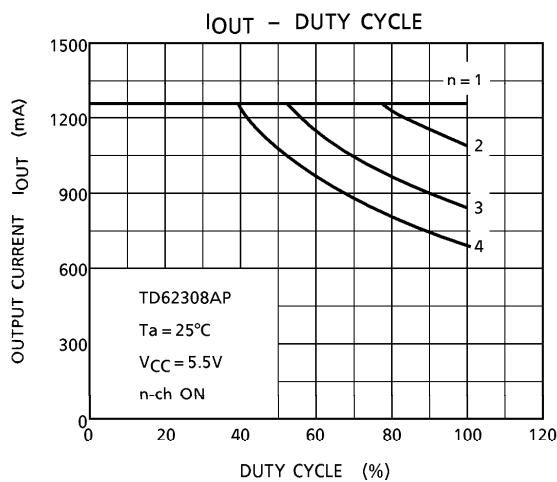
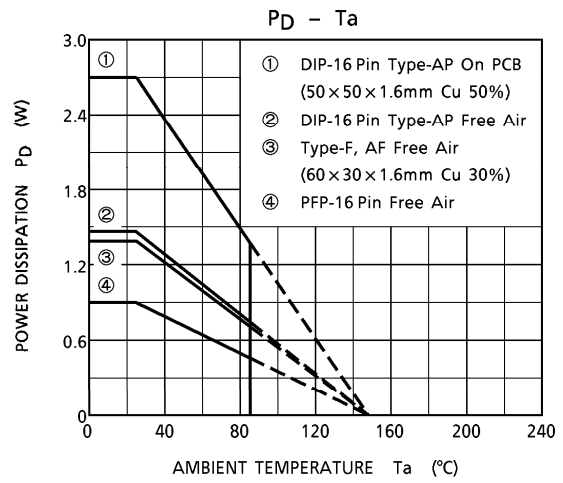
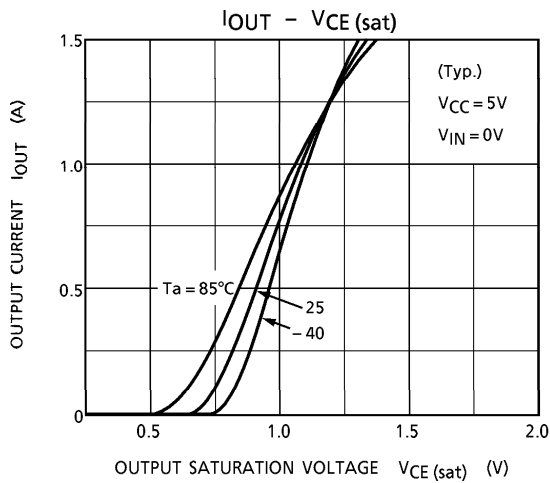
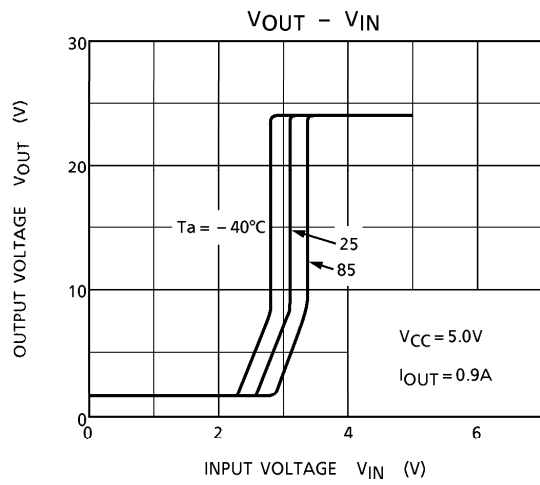
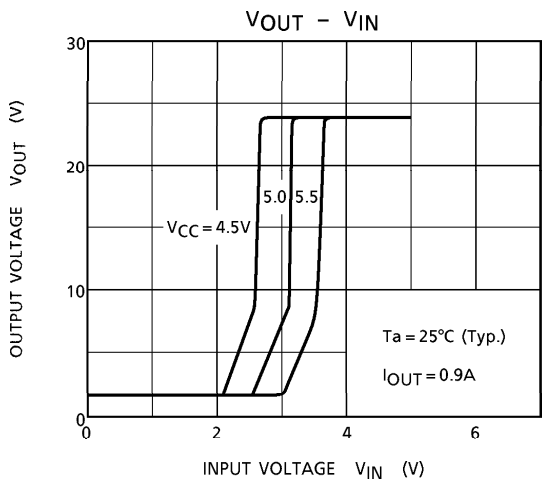
6.  $t_{ON}$ ,  $t_{OFF}$

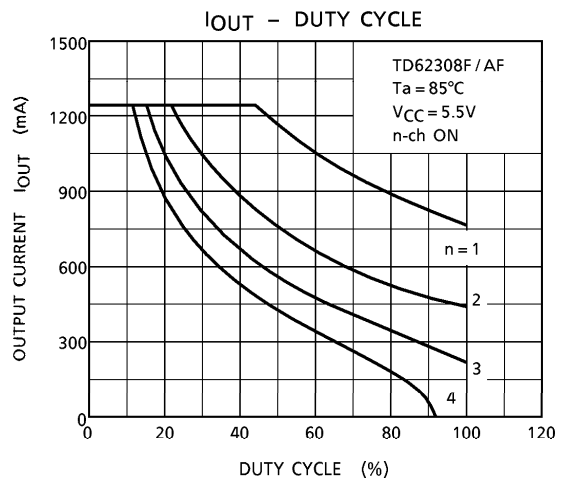
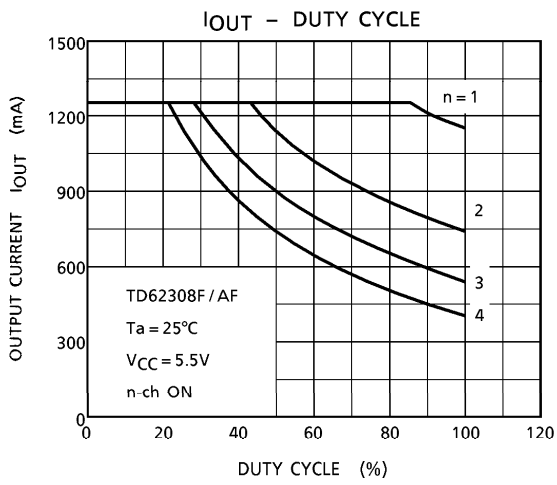


- (Note 1) Pulse width  $50\mu s$ , duty cycle 10%  
Output impedance  $50\Omega$   $t_r \leq 5ns$ ,  $t_f \leq 10ns$
- (Note 2)  $C_L$  includes probe and jig capacitance.

**PRECAUTIONS for USING**

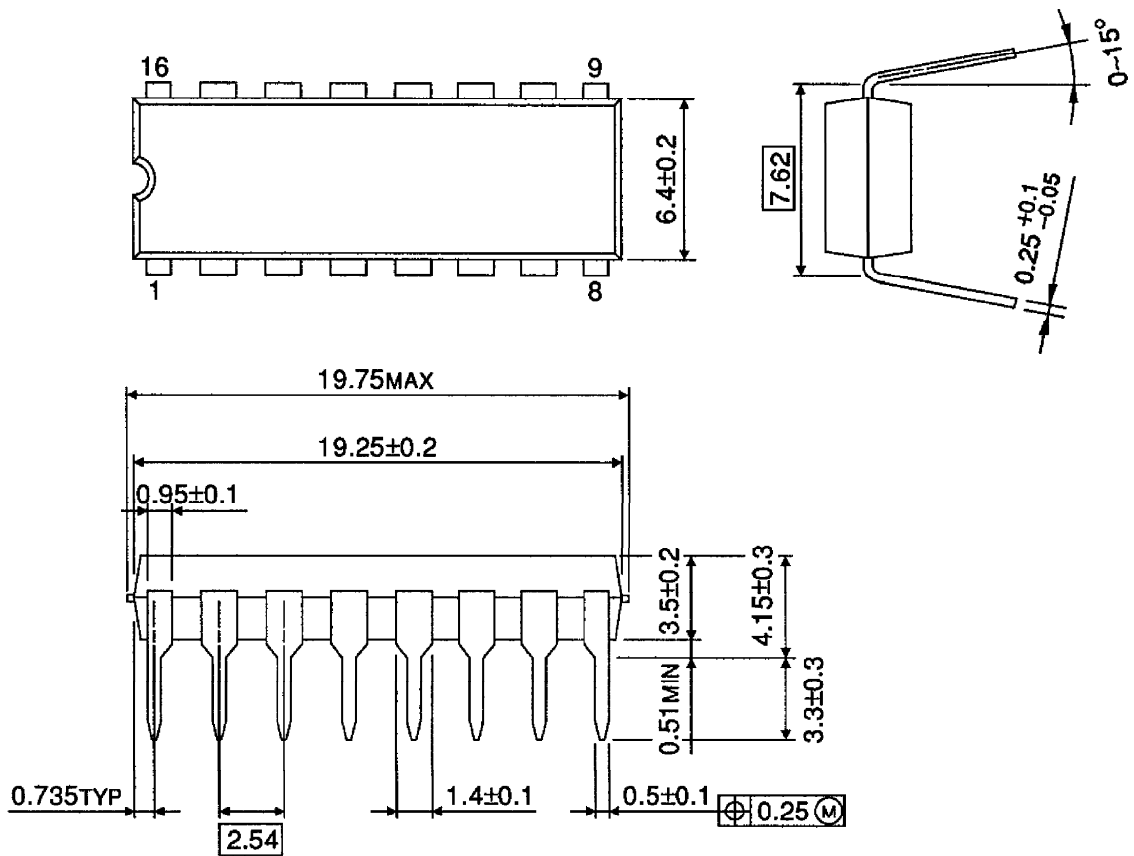
Utmost care is necessary in the design of the output line,  $V_{CC}$ , COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.





**OUTLINE DRAWING**  
DIP16-P-300-2.54A

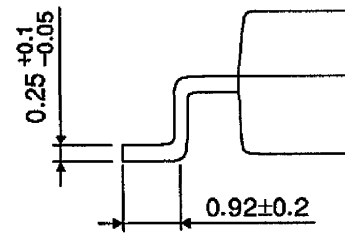
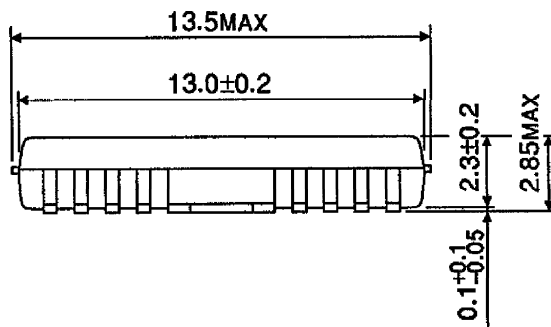
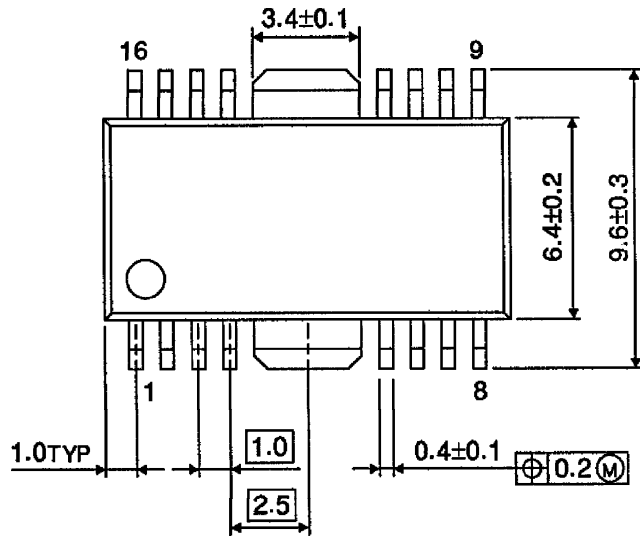
Unit : mm



Weight : 1.11g (Typ.)

**OUTLINE DRAWING**  
HSOP16-P-300-1.00

Unit : mm



Weight : 0.50g (Typ.)