

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

# TD62008AP, TD62008F, TD62008AF

## 7CH DARLINGTON SINK DRIVER

The TD62008AP/F/AF are high-voltage, high-current darlington drivers comprised of seven NPN darlington pairs.

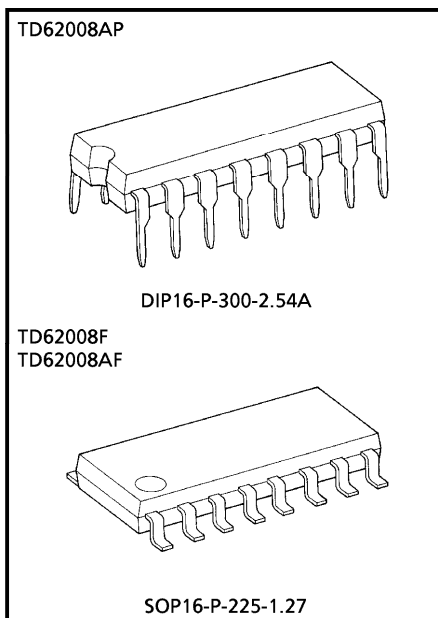
All units feature integral clamp diodes for switching inductive loads and protective diodes against a negative input voltage.

The TD62008AP/F/AF are suitable for interfaces from minus and plus dual supply voltage system to plus single supply voltage system.

Applications include relay, hammer, lamp and display (LED) drivers.

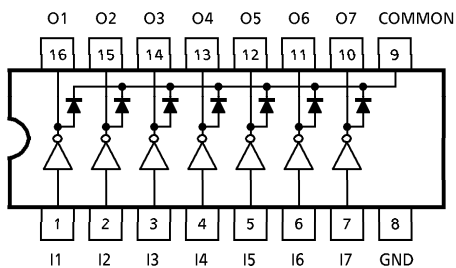
### FEATURES

- Output current (single output) 400mA (Max.)
- High sustaining voltage output 50V (Min.)
- Output clamp diodes
- Protective diodes against a negative input voltage
- Inputs base resistor  $R_{IN} = 20k\Omega$
- Inputs compatible with 9~15V PMOS, CMOS.
- Package type-AP : DIP-16pin
- Package type-F, AF : SOP-16pin

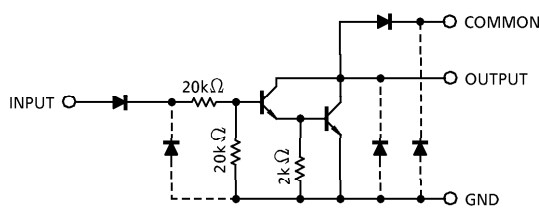


Weight  
 DIP16-P-300-2.54A : 1.11g (Typ.)  
 SOP16-P-225-1.27 : 0.16g (Typ.)

### PIN CONNECTION (TOP VIEW)



### SCHEMATICS (EACH DRIVER)



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

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● The information contained herein is subject to change without notice.

## MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Output Sustaining Voltage	AP / AF	V <sub>CE (SUS)</sub>	- 0.5 ~ 50	V
	F		- 0.5 ~ 35	
Output Current		I <sub>OUT</sub>	400	mA/ch
Input Voltage		V <sub>IN</sub>	- 40 ~ 40	V
Clamp Diode Reverse Voltage	AP / AF	V <sub>R</sub>	50	V
	F		35	
Clamp Diode Forward Current		I <sub>F</sub>	400	mA
Power Dissipation	AP	P <sub>D</sub>	1.47	W
	F / AF		0.625 (Note)	
Operating Temperature		T <sub>opr</sub>	- 40 ~ 85	°C
Storage Temperature		T <sub>stg</sub>	- 55 ~ 150	°C

(Note) On Glass Epoxy PCB  
(30 × 30 × 1.6mm Cu 50%)

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

CHARACTERISTIC		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Sustaining Voltage	AP / AF	V <sub>CE (SUS)</sub>		0	—	50	V
	F			0	—	35	
Output Current	I <sub>OUT</sub>		DC 1 Circuit, T <sub>pw</sub> = 25%, Duty = 40%	0	—	400	mA
			T <sub>pw</sub> = 25ms, Duty = 10%, 7 Circuits	0	—	200	
Input Voltage		V <sub>IN</sub>		- 35	—	35	V
Clamp Diode Reverse Voltage	AP / AF	V <sub>R</sub>		—	—	50	V
	F			—	—	35	
Clamp Diode Forward Current		I <sub>F</sub>		—	—	400	mA
Power Dissipation	AP	P <sub>D</sub>		—	—	0.52	W
	F / AF		(Note)	—	—	0.325	

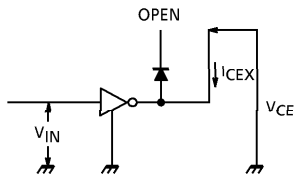
(Note) On Glass Epoxy PCB (30 × 30 × 1.6mm Cu 50%)

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

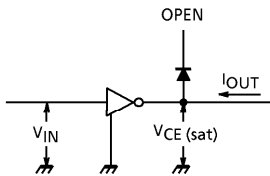
CHARACTERISTIC		SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Output Leakage Current	AP / AF	I <sub>CEX</sub>	1	V <sub>OUT</sub> = 50V	—	—	100	μA	
	F			V <sub>OUT</sub> = 35V	—	—	100		
Collector-Emitter Saturation Voltage		V <sub>CE (sat)</sub>	2	I <sub>OUT</sub> = 400mA	—	1.3	2.4	V	
				I <sub>OUT</sub> = 200mA	—	1.0	1.6		
Input Current	"H" Level	I <sub>IN (ON)</sub>	4	V <sub>IN</sub> = 18V	—	0.85	1.8	mA	
	"L" Level	I <sub>IN (OFF)</sub>		V <sub>IN</sub> = 35V	—	—	3.8		
			4	V <sub>IN</sub> = - 35V	—	—	- 20	μA	
DC Current Transfer Ratio		h <sub>FE</sub>	3	V <sub>CE</sub> = 4V, I <sub>OUT</sub> = 350mA	1000	3000	—		
Clamp Diode Reverse Current		I <sub>R</sub>	5	V <sub>R</sub> = 50V, V <sub>R</sub> = 35V (Type-F)	—	—	100	μA	
Clamp Diode Forward Voltage		V <sub>F</sub>	6	I <sub>F</sub> = 400mA	—	1.5	2.4	V	
Turn-On Delay	AP / AF	t <sub>ON</sub>	7	C <sub>L</sub> = 15pF		—	0.1	—	μs
	F								
Turn-Off Delay	AP / AF	t <sub>OFF</sub>	7	C <sub>L</sub> = 15pF		—	0.2	—	μs
	F								

TEST CIRCUIT

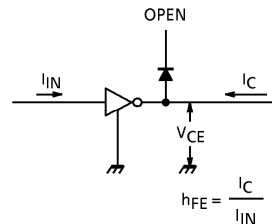
1.  $I_{CEX}$



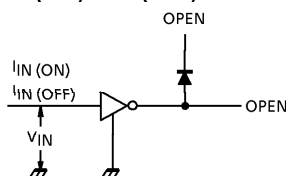
2.  $V_{CE(sat)}$



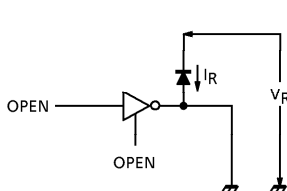
3.  $h_{FE}$



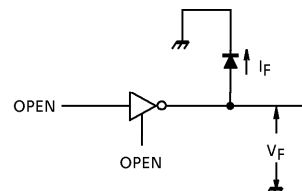
4.  $I_{IN(ON)}, I_{IN(OFF)}$



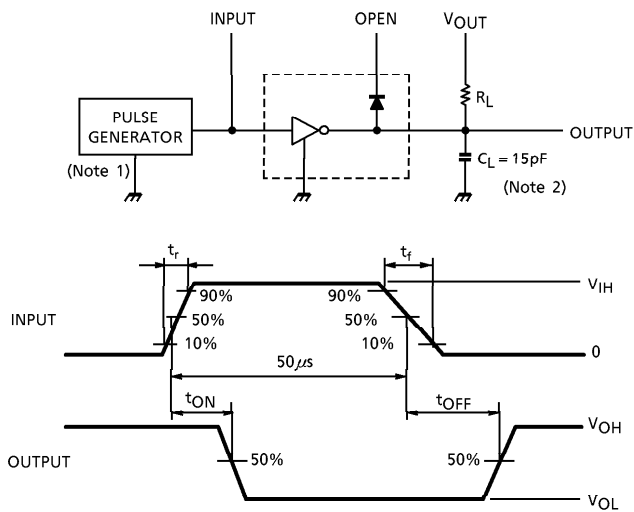
5.  $I_R$



6.  $V_F$



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



(Note 1) Pulse Width 50µs  
Duty Cycle 10%

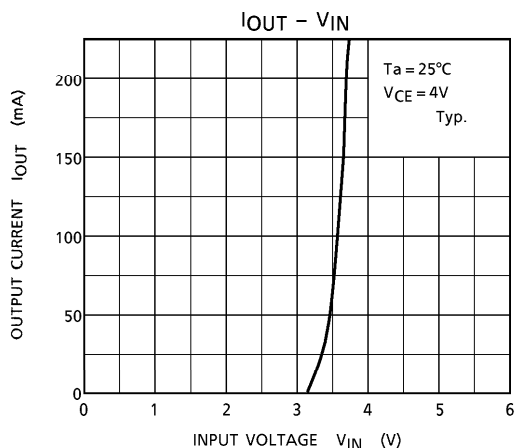
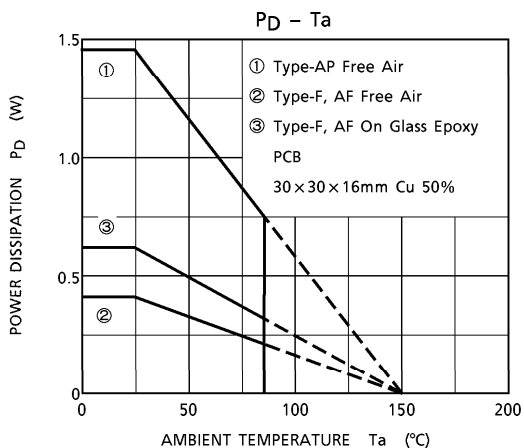
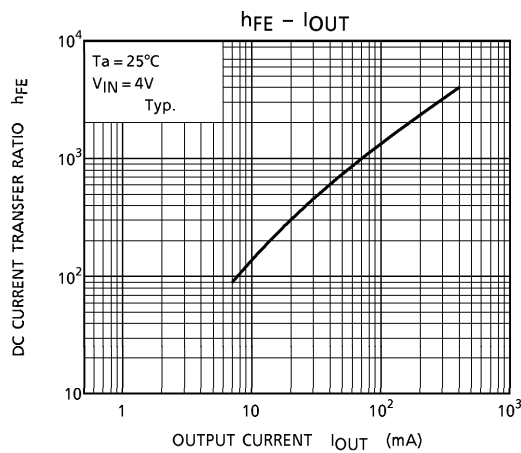
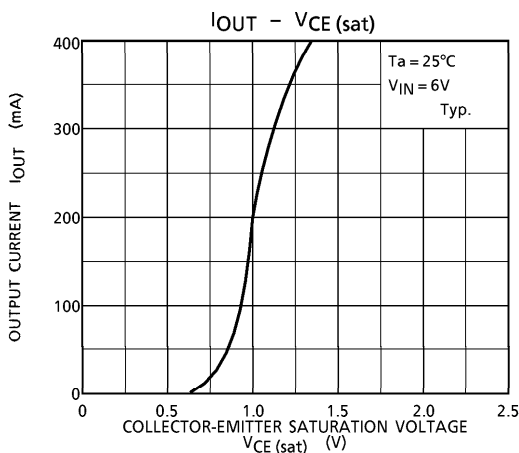
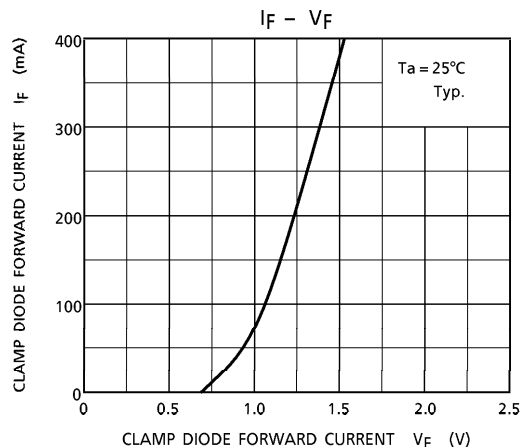
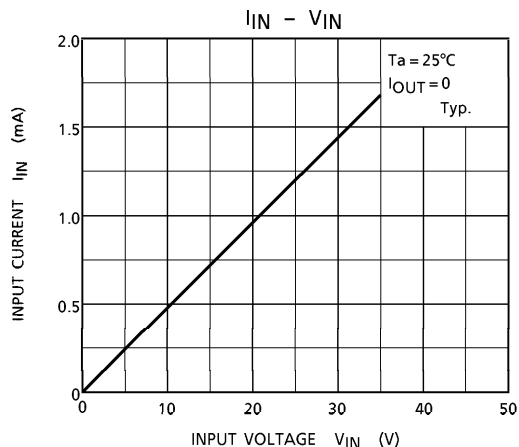
Output Impedance 50Ω

$t_r \leq 5ns, t_f \leq 10ns$

(Note 2)  $C_L$  includes probe and jig capacitance

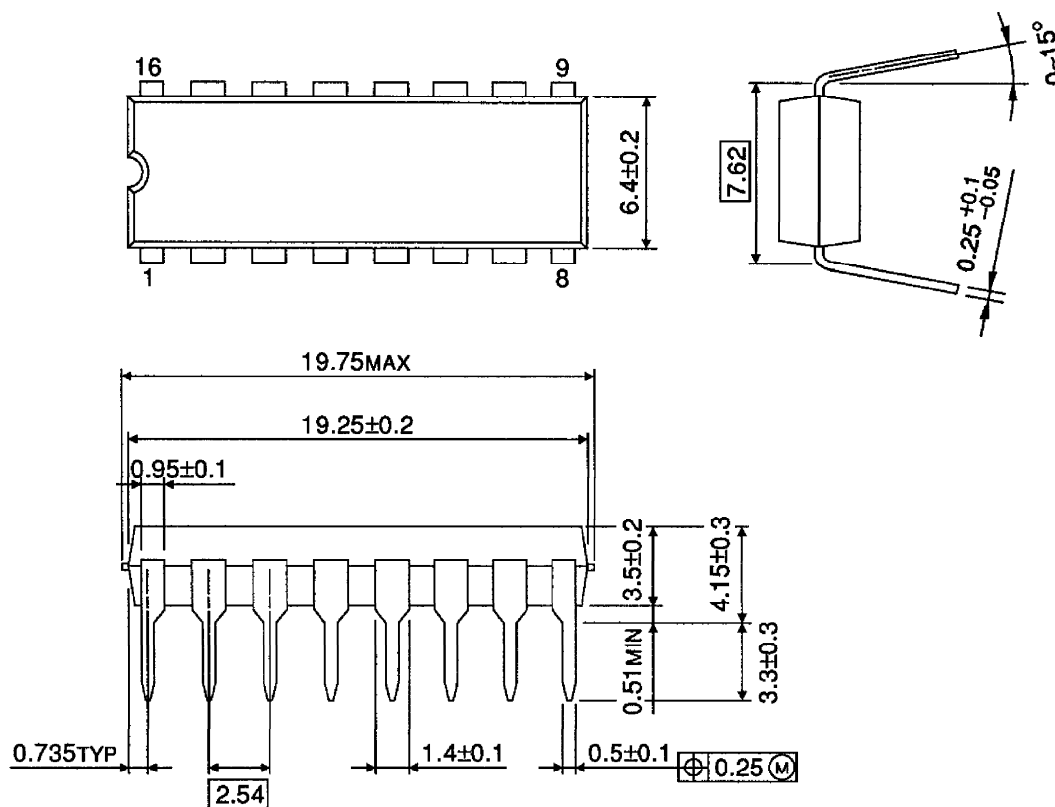
PRECAUTIONS for USING

Utmost care is necessary in the design of the output line, 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

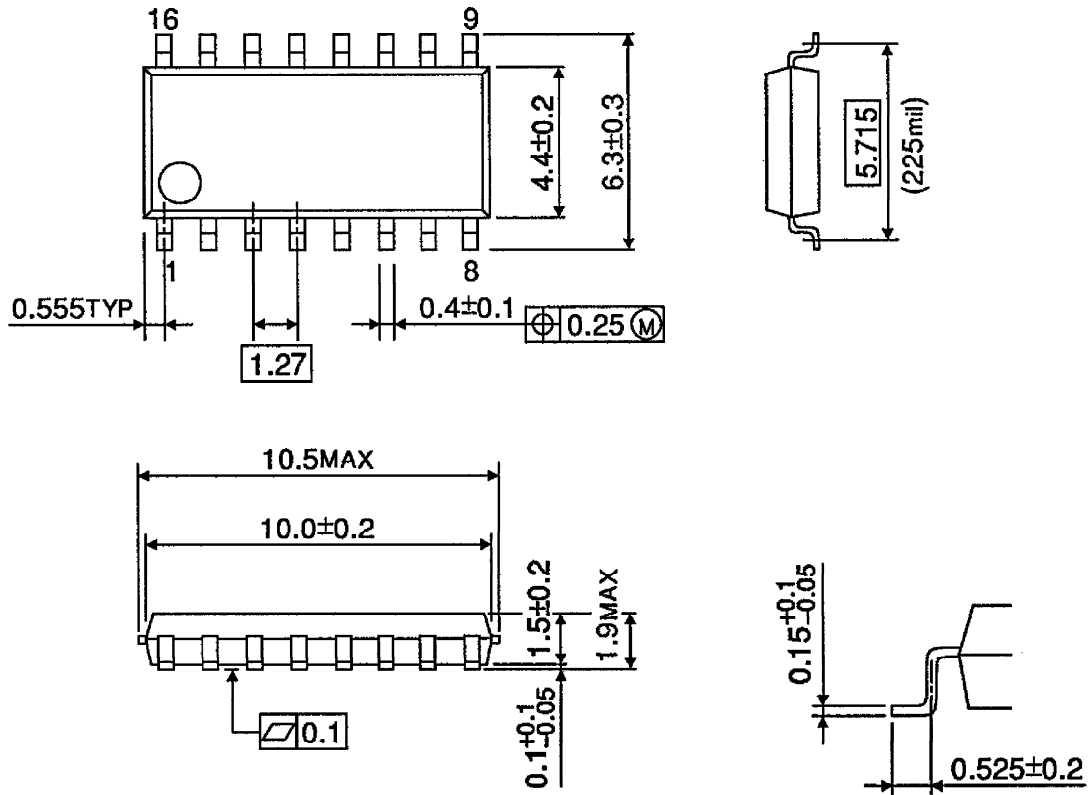
Unit : mm



Weight : 1.11g (Typ.)

**OUTLINE DRAWING**  
SOP16-P-225-1.27

Unit : mm



Weight : 0.16g (Typ.)