

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

# TD62006P, TD62006F

## 6CH DARLINGTON SINK DRIVER

The TD62006P, TD62006F Series are high-voltage, high-current darlington drivers comprised of six NPN darlington pairs.

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

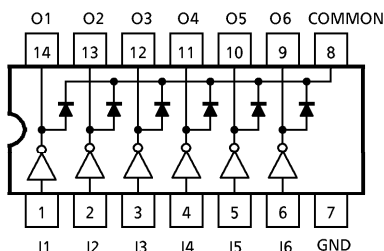
The TD62006P, TD62006F are suitable for interfaces from minus and plus dual supply voltage system to plus single supply voltage system.

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

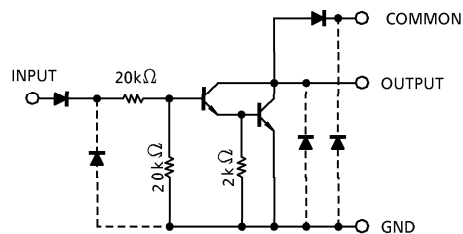
### FEATURES

- Output current (single output) : 150mA (Max.)
- High sustaining voltage output : 22V (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-P : DIP-14pin
- Package type-F : SOP-14pin

### PIN CONNECTION (TOP VIEW)



### 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
Output Sustaining Voltage	V <sub>CE (SUS)</sub>	− 0.5~22	V
Output Current	I <sub>OUT</sub>	150	mA / ch
Input Voltage	V <sub>IN</sub>	− 37~22	V
Clamp Diode Reverse Voltage	V <sub>R</sub>	22	V
Clamp Diode Forward Current	I <sub>F</sub>	150	mA
Power Dissipation	P	P <sub>D</sub>	W
	F		
Operating Temperature	P	T <sub>opr</sub>	°C
	F		
Storage Temperature	T <sub>stg</sub>	− 50~150	°C

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

**RECOMMENDED OPERATING CONDITIONS** (Ta = − 40~85°C and Ta = − 30~75°C for Type-P)

CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Sustaining Voltage	V <sub>CE (SUS)</sub>		0	—	20	V
Output Current	I <sub>OUT</sub>	1 Circuit	0	—	120	mA / ch
		T <sub>pw</sub> = 25ms, Duty = 10%, 6 Circuits	0	—	100	
Input Voltage	V <sub>IN</sub>		− 35	—	20	V
Clamp Diode Reverse Voltage	V <sub>R</sub>		—	—	20	V
Clamp Diode Forward Current	I <sub>F</sub>		—	—	120	mA
Power Dissipation	P	P <sub>D</sub>	—	—	0.44	W
	F				(Note) 0.325	

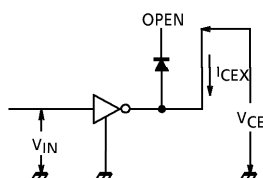
(Note) On Glass Epoxy PCB (50×50×1.6mm Cu 30%)

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

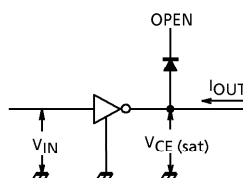
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current	P	I <sub>CEX</sub>	1	—	—	100	μA
	F						
Collector-Emitter Saturation Voltage	V <sub>CE (sat)</sub>	2	V <sub>IN</sub> = 7.5V, I <sub>OUT</sub> = 120mA	—	—	1.6	V
DC Current Transfer Ratio	h <sub>FE</sub>	3	V <sub>CE</sub> = 2.0V, I <sub>OUT</sub> = 120mA	800	—	—	mA
Input Current	"H" Level	I <sub>IN (ON)</sub>	4	—	—	0.7	—
	"L" Level						
Input Voltage	"H" Level	V <sub>IN (ON)</sub>	5	—	—	7.5	V
	"L" Level						
Clamp Diode Reverse Current	I <sub>R</sub>	6	V <sub>R</sub> = 20V	—	—	30	μA
Clamp Diode Forward Voltage	V <sub>F</sub>	7	I <sub>F</sub> = 120mA	—	—	1.6	V
Turn-On Delay	t <sub>ON</sub>	8	V <sub>OUT</sub> = 20V, R <sub>L</sub> = 167Ω C <sub>L</sub> = 15pF	—	0.1	—	μs
Turn-Off Delay	t <sub>OFF</sub>			—	0.4	—	

## TEST CIRCUIT

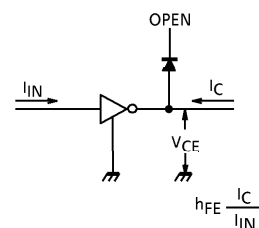
### 1. $I_{CEX}$



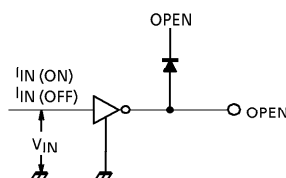
### 2. $V_{CE(sat)}$



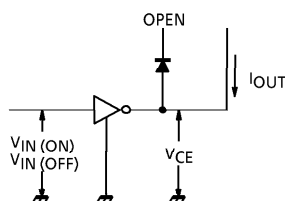
### 3. $h_{FE}$



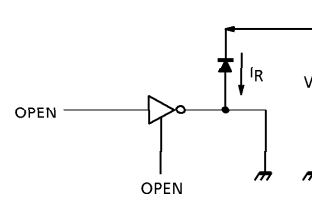
### 4. $I_{IN(ON)}, I_{IN(OFF)}$



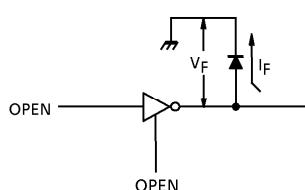
### 5. $V_{IN(ON)}, V_{IN(OFF)}$



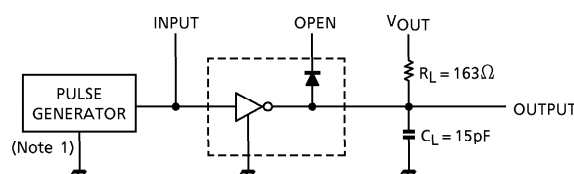
### 6. $I_R$



### 7. $V_F$

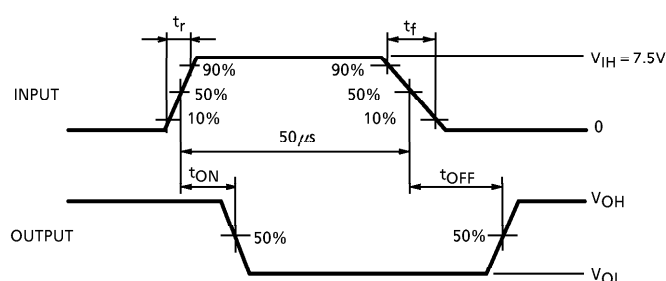


### 8. $t_{ON}, t_{OFF}$



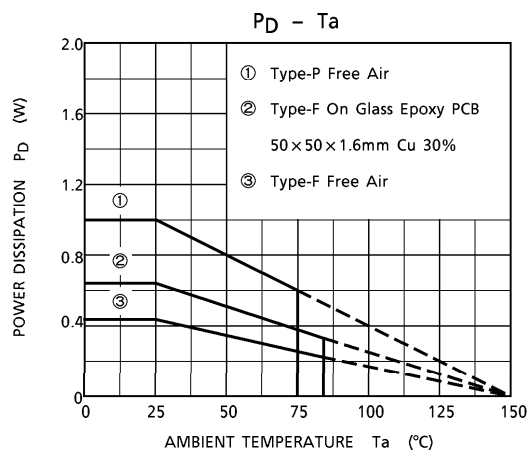
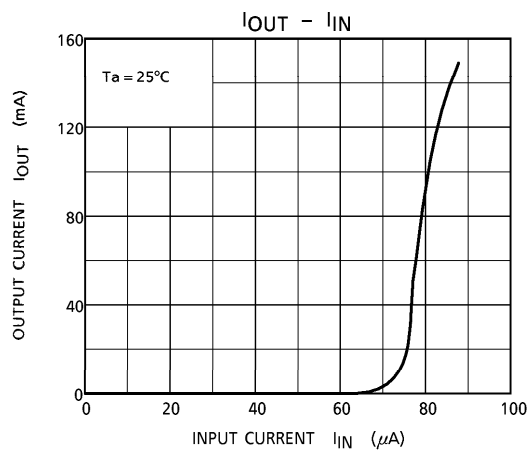
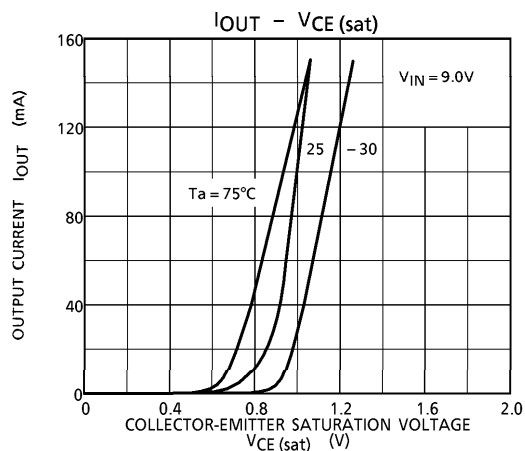
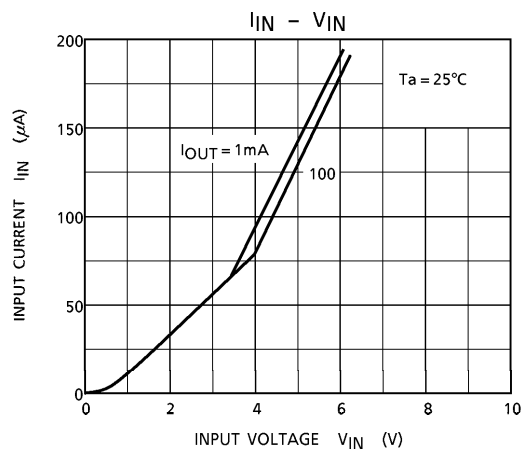
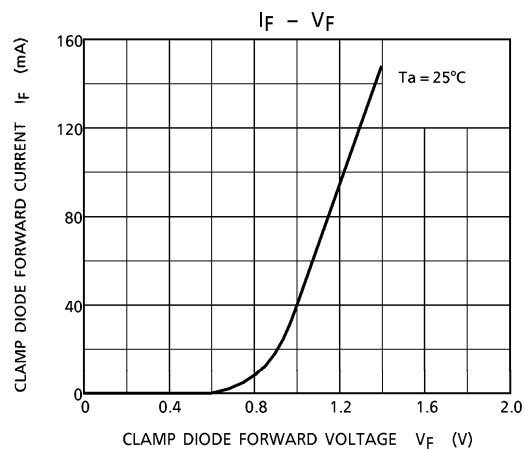
## PRECAUTIONS for USING

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.



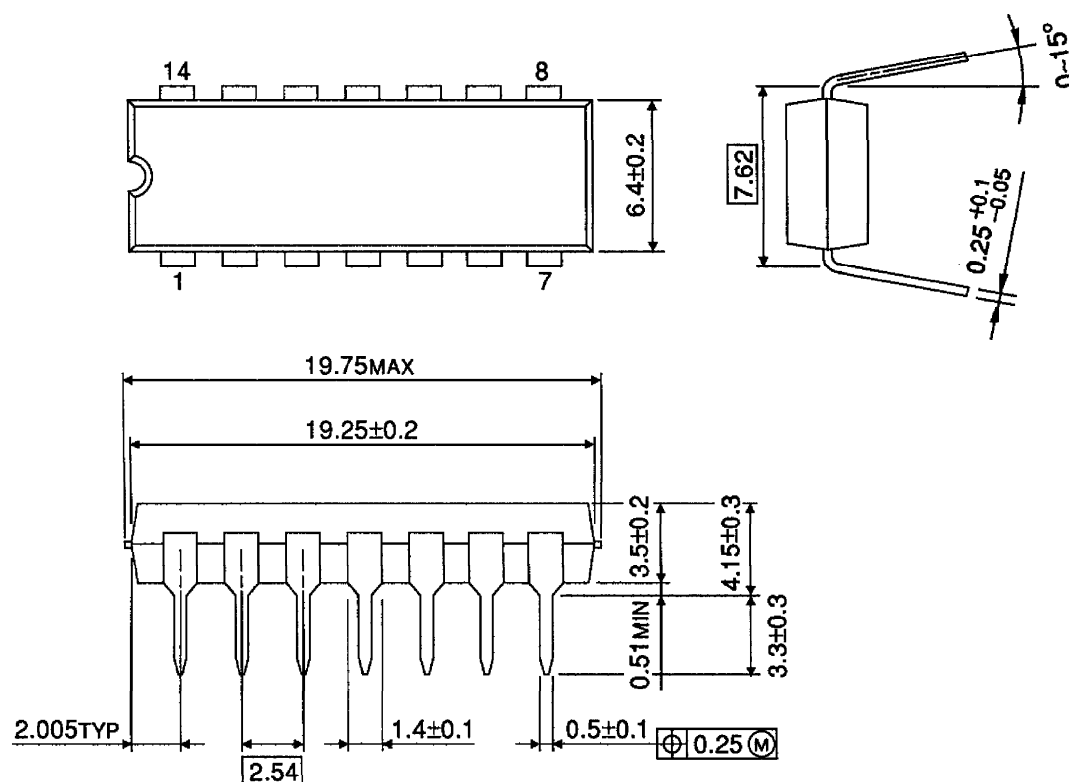
(Note 1) Pulse Width  $50\mu s$ , Duty Cycle 10%  
Output Impedance  $50\Omega$ ,  $t_r \leq 5ns$ ,  
 $t_f \leq 10ns$

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



OUTLINE DRAWING  
DIP14-P-300-2.54

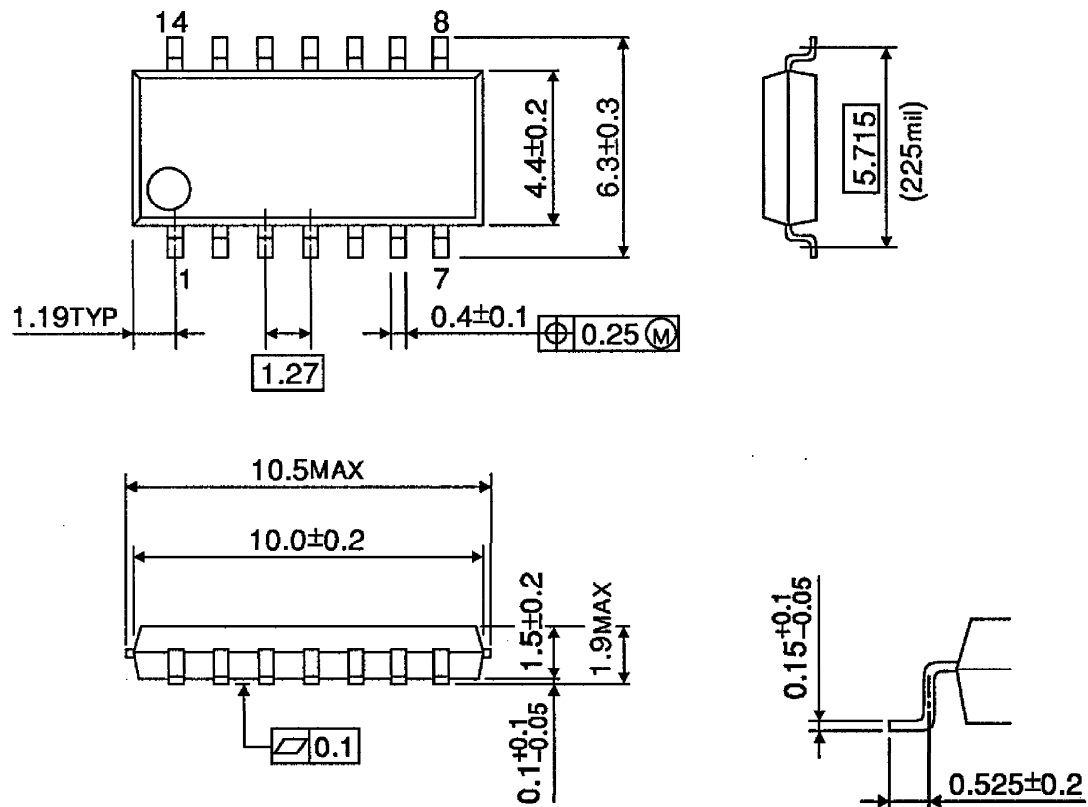
Unit : mm



Weight : 1.11g (Typ.)

OUTLINE DRAWING  
SOP14-P-225-1.27

Unit : mm



Weight : 0.16g (Typ.)