

TOSHIBA Bipolar Digital Integrated Circuit Silicon Monolithic

TD62006PG,TD62006FG

6ch Darlington Sink Driver

The TD62006PG/TD62006FG 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 TD62006PG and TD62006FG are suitable for interfaces from minus and plus dual supply voltage system to plus single supply voltage system.

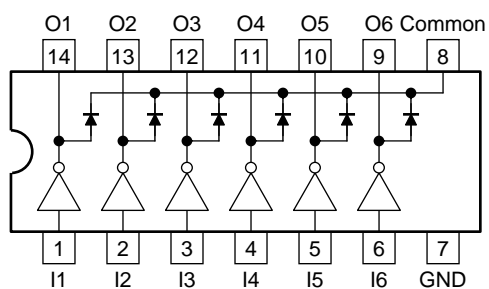
Applications include relay, hammer, lamp and display (LED) drivers.

Please observe the thermal condition for using.

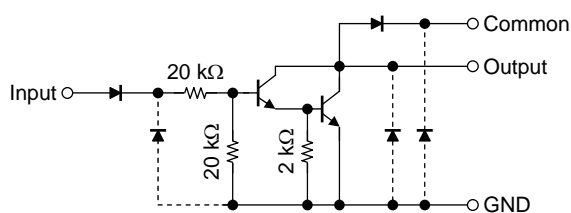
Features

- Output current (single output): 150 mA (max)
- High sustaining voltage output: 22 V (min)
- Output clamp diodes
- Protective diodes against a negative input voltage
- Inputs base resistor: $R_{IN} = 20\text{ k}\Omega$
- Inputs compatible with 9 to 15 V PMOS, CMOS.
- Package type-PG: DIP-14 pin
- Package type-FG: SOP-14 pin

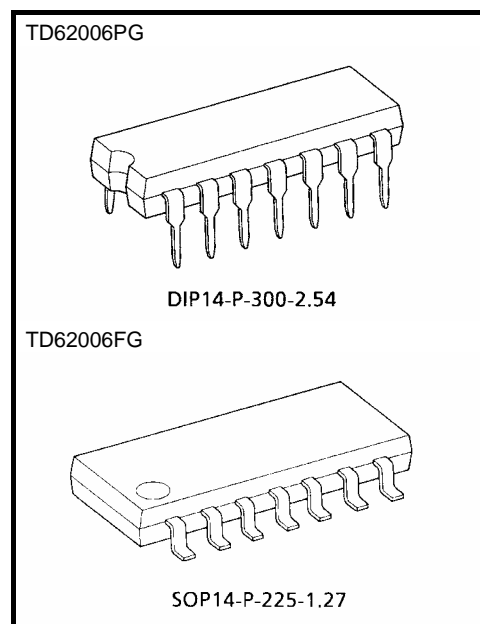
Pin Connection (top view)



Schematics (each driver)



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



Weight
DIP14-P-300-2.54 : 1.11 g (typ.)
SOP14-P-225-1.27: 0.16 g (typ.)

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Output sustaining voltage		V _{CE (SUS)}	−0.5 to 22	V
Output current		I _{OUT}	150	mA/ch
Input voltage		V _{IN}	−37 to 22	V
Clamp diode reverse voltage		V _R	22	V
Clamp diode forward current		I _F	150	mA
Power dissipation	PG	P _D	1.0	W
	FG		0.625 (Note)	
Operating temperature	PG	T _{opr}	−30 to 75	°C
	FG		−40 to 85	
Storage temperature		T _{stg}	−50 to 150	°C

Note: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 30%)

Recommended Operating Conditions (Ta = −40 to 85°C and Ta = −30 to 75°C for Type-PG)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Output sustaining voltage		V _{CE (SUS)}	—	0	—	20	V
Output current		I _{OUT}	DC 1 Circuit	0	—	120	mA/ch
			Tpw = 25 ms, Duty = 10%, 6 Circuits	0	—	100	
Input voltage		V _{IN}	—	−35	—	20	V
Clamp diode reverse voltage		V _R	—	—	—	20	V
Clamp diode forward current		I _F	—	—	—	120	mA
Power dissipation	PG	P _D	—	—	—	0.44	W
	FG		Ta = 85°C (Note)	—	—	0.325	

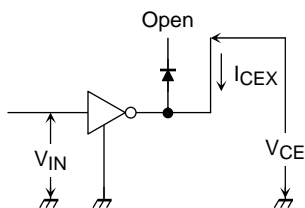
Note: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 30%)

Electrical Characteristics (Ta = 25°C)

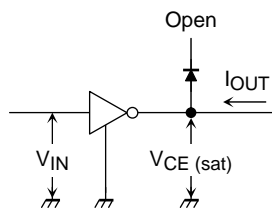
Characteristics		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output leakage current	PG	I _{CEX}	1	V _{OUT} = 20 V V _{IN} = 1.0 V	—	—	100	μA
	FG							
Collector-emitter saturation voltage		V _{CE (sat)}	2	V _{IN} = 7.5 V, I _{OUT} = 120 mA	—	—	1.6	V
DC current transfer ratio		h _{FE}	3	V _{CE} = 2.0 V, I _{OUT} = 120 mA	800	—	—	—
Input current	High level	I _{IN (ON)}	4	V _{IN} = 7.5 V	—	—	0.7	mA
	Low level	I _{IN (OFF)}		V _{IN} = −35 V	—	—	−10	μA
Input voltage	High level	V _{IN (ON)}	5	I _{OUT} = 120 mA	—	—	7.5	V
	Low level	V _{IN (OFF)}		—	1	—	—	
Clamp diode reverse current		I _R	6	V _R = 20 V	—	—	30	μA
Clamp diode forward voltage		V _F	7	I _F = 120 mA	—	—	1.6	V
Turn-on delay		t _{ON}	8	V _{OUT} = 20 V, R _L = 167 Ω C _L = 15 pF	—	0.1	—	μs
Turn-off delay		t _{OFF}	8		—	0.4	—	μs

Test Circuit

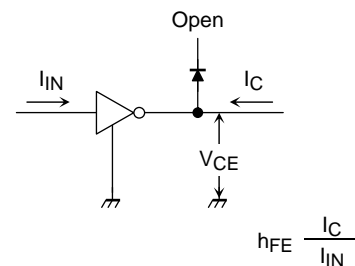
1. I_{CEX}



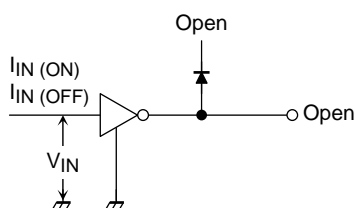
2. $V_{CE(sat)}$



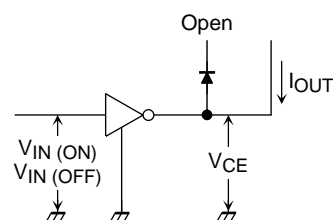
3. h_{FE}



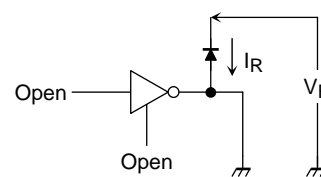
4. $I_{IN(ON)}, I_{IN(OFF)}$



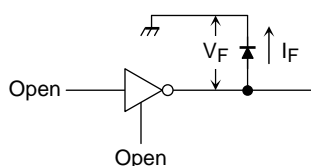
5. $V_{IN(ON)}, V_{IN(OFF)}$



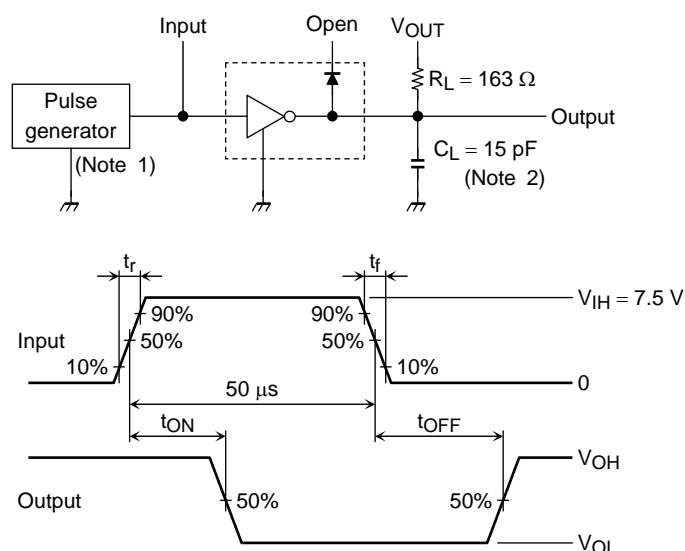
6. I_R



7. V_F



8. t_{ON}, t_{OFF}



Note 1: Pulse width 50 μ s, duty cycle 10%
output impedance 50 Ω , $t_r \leq 5$ ns, $t_f \leq 10$ ns

Note 2: C_L includes probe and jig capacitance.

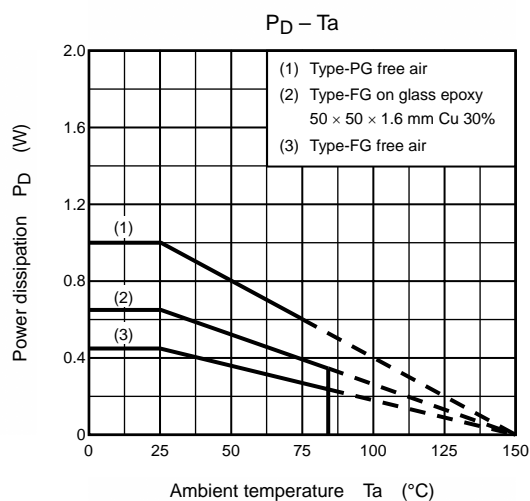
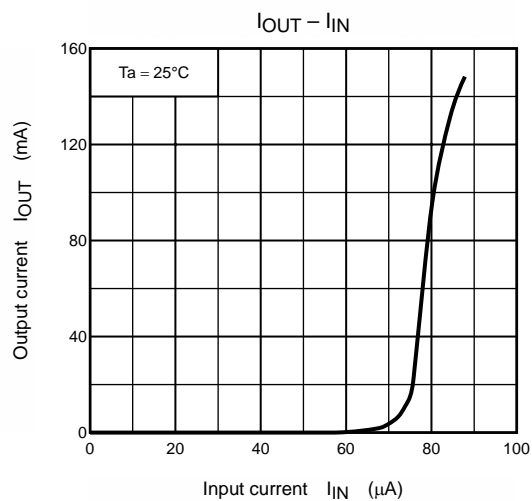
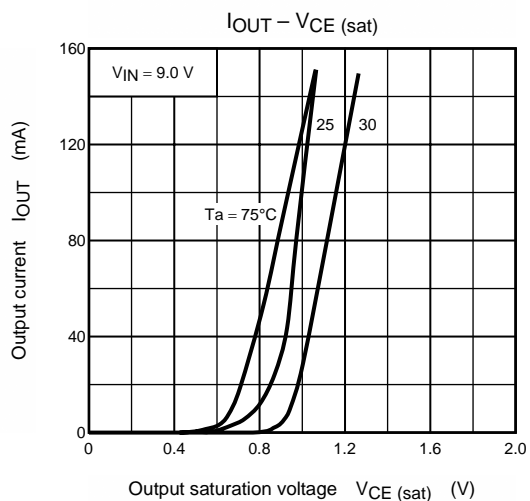
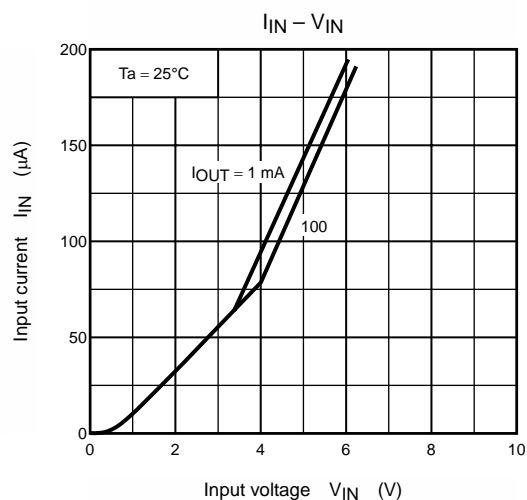
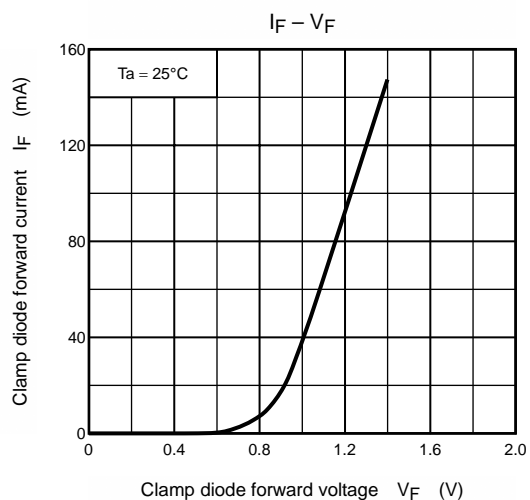
Precautions for Using

This IC does not include built-in protection circuits for excess current or overvoltage.

If this IC is subjected to excess current or overvoltage, it may be destroyed.

Hence, the utmost care must be taken when systems which incorporate this IC are designed.

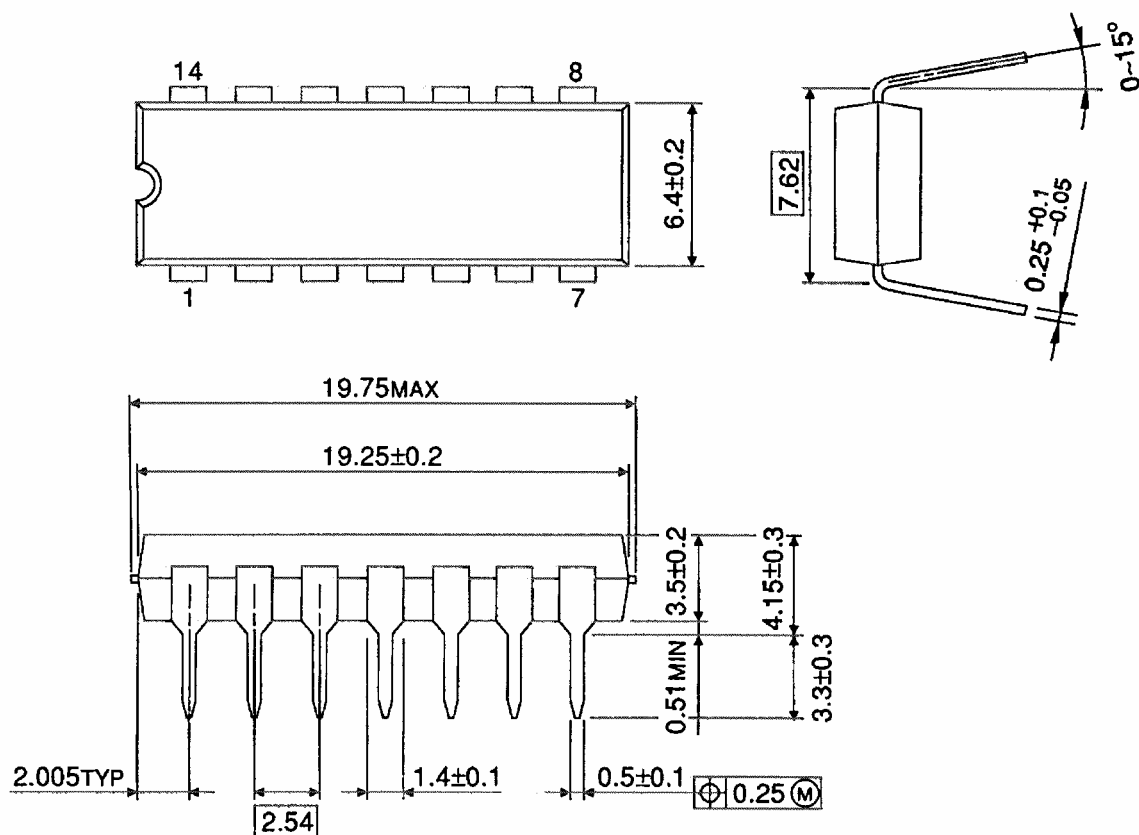
Utmost care is necessary in the design of the output line, COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.



Package Dimensions

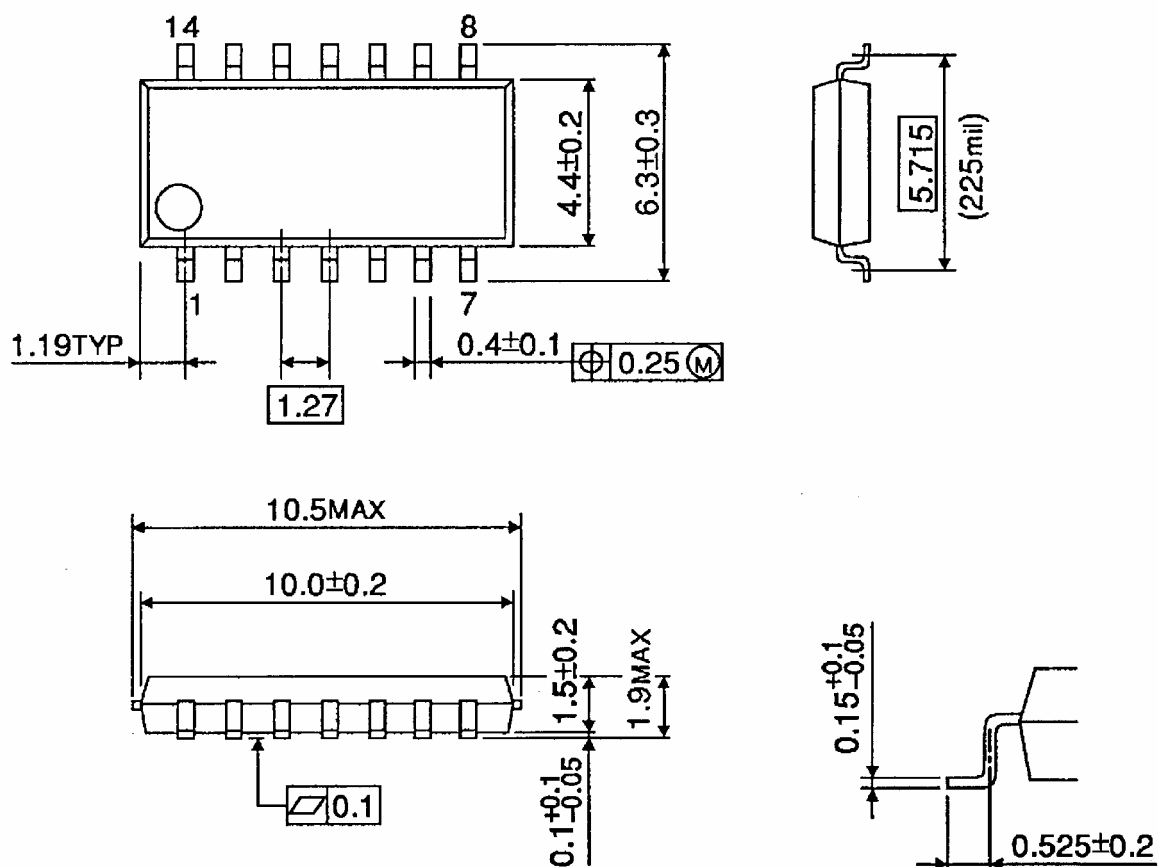
DIP14-P-300-2.54

Unit : mm



Weight: 1.11 g (typ.)

Unit : mm



Weight: 0.16 g (typ.)

About solderability, following conditions were confirmed

- Solderability

- (1) Use of Sn-63Pb solder Bath

- solder bath temperature = 230°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux

- (2) Use of Sn-3.0Ag-0.5Cu solder Bath

- solder bath temperature = 245°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux

RESTRICTIONS ON PRODUCT USE

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