

TOSHIBA Bipolar Digital Integrated Circuit Silicon Monolithic

**TD62501PG,TD62501FG,TD62502PG,TD62502FG,TD62503PG,TD62503FG,TD62504PG
TD62504FG,TD62505PG,TD62505FG,TD62506PG,TD62506FG,TD62507PG,TD62507FG**

7ch Single Driver

TD62501PG/FG, TD62502PG/FG, TD62503PG/FG, TD62504PG/FG	Common emitter
TD62505PG/FG, TD62506PG/FG	Common collector
TD62507PG/FG	Isolated

The TD62501PG/FG Series are comprised of seven or five NPN transistor arrays.

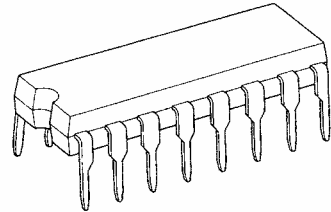
For proper operation, the substrate (SUB) must be connected to the most negative voltage.

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

Features

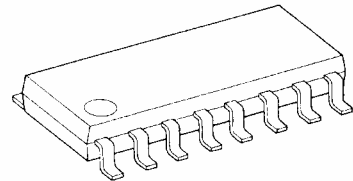
- Output current (single output) 200 mA (max)
- High sustaining voltage output 35 V (min)
- Inputs compatible with various types of logic.
- TD62501PG/FG, TD62505PG/FG and TD62507PG/FG
: Using external resistor... General Purpose
- TD62502PG/FG
: $R_{IN} = 10.5 \text{ k}\Omega + 7 \text{ V Zener Diode}$... 14 to 25 V P-MOS
- TD62503PG/FG, TD62506PG/FG
: $R_{IN} = 2.7 \text{ k}\Omega$... TTL, 5 V C-MOS
- TD62504PG/FG: $R_{IN} = 10.5 \text{ k}\Omega$... 6 to 15 V P-MOS, C-MOS
- Package Type-PG: DIP-16 pin
- Package Type-FG: SOP-16 pin

TD62501PG, TD62502PG, TD62503PG,
TD62504PG, TD62505PG, TD62506PG,
TD62507PG



DIP16-P-300-2.54A

TD62501FG, TD62502FG, TD62503FG,
TD62504FG, TD62505FG, TD62506FG,
TD62507FG



SOP16-P-225-1.27

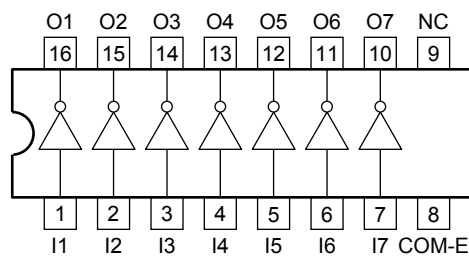
Weight

DIP16-P-300-2.54A : 1.11g (typ.)

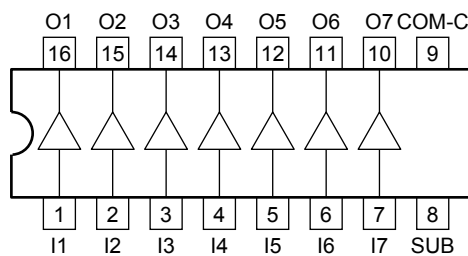
SOP16-P-225-1.27 : 0.16g (typ.)

Pin Assignment (top view)

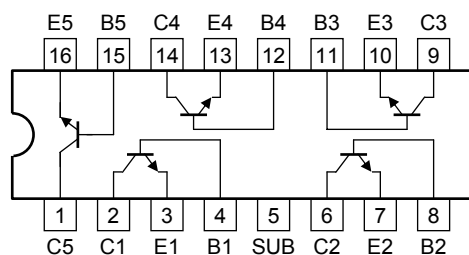
TD62501PG/FG, TD62502PG/FG
TD62503PG/FG, TD62504PG/FG



TD62505PG/FG, TD62506PG/FG



TD62507PG/FG

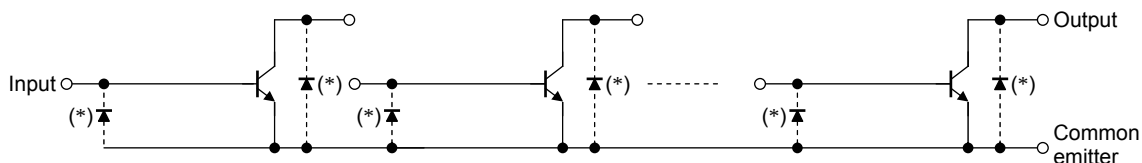


*: NC pin assignment

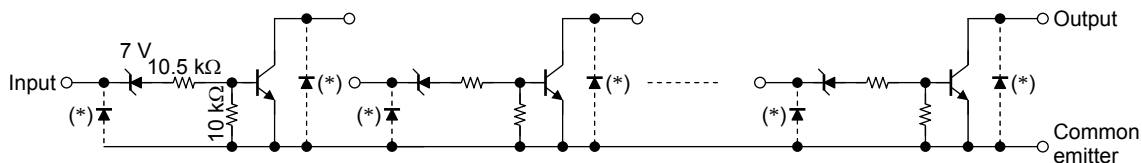
The NC pin is not assigned to an internal chip of these products; hence, no need to assign necessarily. If it is needed, Toshiba recommends that you connect the NC pin to the common emitter (GND).

Schematics (each driver)

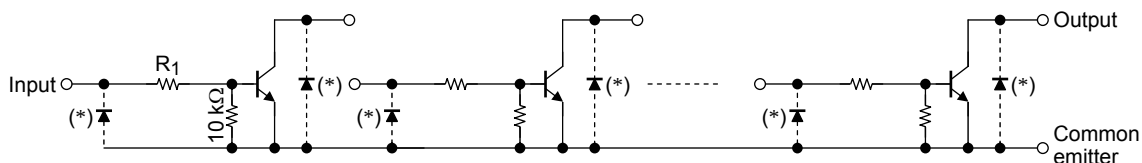
TD62501PG/FG



TD62502PG/FG



TD62503PG/FG
TD62504PG/FG



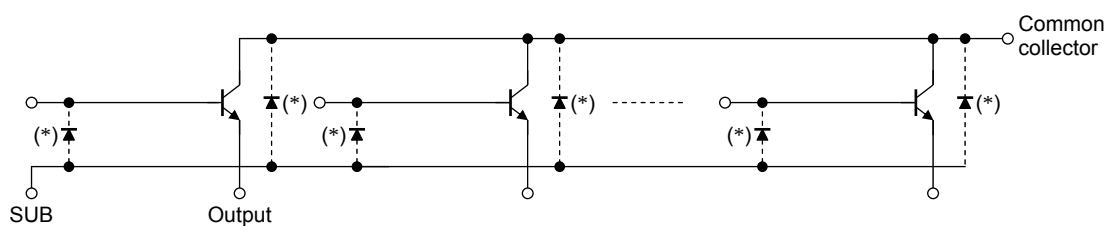
TD62503PG/FG $R_1 = 2.7 \text{ k}\Omega$,
TD62504PG/FG $R_1 = 10.5 \text{ k}\Omega$

*: Parasitic diodes

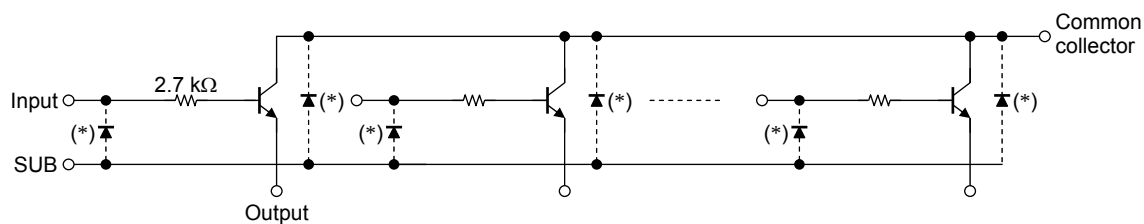
Note: The input and output parasitic diodes cannot be used as clamp diodes.

Schematics (Each driver)

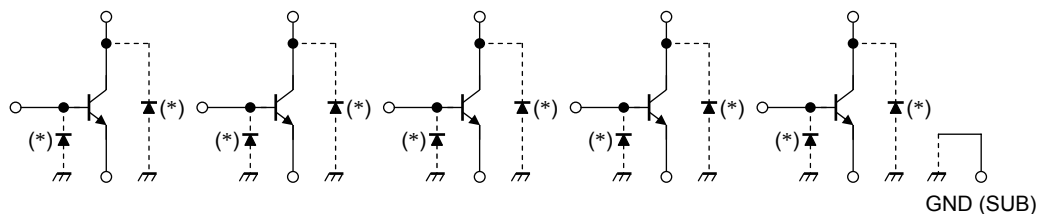
TD62505PG/FG



TD62506PG/FG



TD62507PG/FG



*: Parasitic diodes

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

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Collector-emitter voltage	V_{CEO}	35	V
Collector-base voltage	V_{CBO}	50	V
Collector current	I_C	200	mA/ch
Input voltage	V_{IN} (Note 1)	-0.5 to 45	V
	V_{IN} (Note 2)	-0.5 to 30	
Input current	I_{IN} (Note 3)	25	mA
Isolation voltage	V_{SUB}	35	V
Power dissipation	PG	P_D 1.0	W
	FG	0.625 (Note 4)	
Operating temperature	T_{opr}	-40 to 85	°C
Storage temperature	T_{stg}	-55 to 150	°C

Note 1: TD62506PG/FG

Note 2: TD62502PG/FG, TD62503PG/FG, TD62504PG/FG

Note 3: TD62501PG/FG, TD62505PG/FG, TD62507PG/FG

Note 4: On Glass Epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

Recommended Operating Conditions (Ta = -40 to 85°C)

Characteristics		Symbol	Condition	Min	Typ.	Max	Unit
Collector-emitter voltage		V_{CEO}	—	0	—	35	V
Collector-base voltage		V_{CBO}	—	0	—	50	V
Collector current		I_C	—	0	—	150	mA/ch
Input voltage	TD62506PG/FG	V_{IN}	—	0	—	35	V
Input voltage (Output on)	TD62502PG/FG	$V_{IN (ON)}$	$I_{IN} = 1 \text{ mA}, I_C = 10 \text{ mA}$	14.0	—	25	V
	TD62503PG/FG			2.4	—	25	
	TD62504PG/FG			7.0	—	25	
Input voltage (Output off)	TD62502PG/FG	$V_{IN (OFF)}$	$I_C \leq 10 \mu\text{A}$	0	—	7.0	V
	TD62503PG/FG			0	—	0.4	
	TD62504PG/FG			0	—	0.8	
Input current	TD62501PG/FG	I_{IN}	—	0	—	10	mA
	TD62505PG/FG						
	TD62507PG/FG						
Power dissipation	PG	P_D	—	—	—	0.360	W
	FG		(Note 1)	—	—	0.325	

Note 1: 30 × 30 × 1.6 mm Cu 50%

Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output leakage current		I_{CEX}	1	$V_{CE} = 25 \text{ V}, V_{IN} = 0 \text{ V}$	—	—	10	μA
Collector-emitter saturation voltage		$V_{CE (sat)}$	2	$I_{IN} = 1 \text{ mA}, I_C = 10 \text{ mA}$	—	—	0.2	V
				$I_{IN} = 3 \text{ mA}, I_C = 150 \text{ mA}$ (Note 1)	—	—	0.8	
DCCurrent transfer ratio	(Note 2)	h_{FE}	2	$V_{CE} = 10 \text{ V}, I_C = 10 \text{ mA}$	70	—	—	—
	(Note 3)				50	—	—	
Turn-on delay		t_{ON}	4	$V_{OUT} = 35 \text{ V}, R_L = 3.3 \text{ k}\Omega$ $C_L = 15 \text{ pF}$	—	50	—	ns
Turn-off delay		t_{OFF}	4		—	200	—	ns

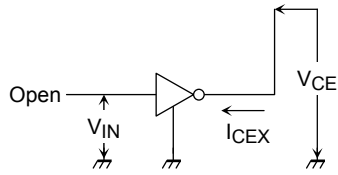
Note 1: Except TD62502PG/FG Only

Note 2: Only TD62501PG/FG, TD62505PG/FG, TD62506PG/FG, TD62507PG/FG

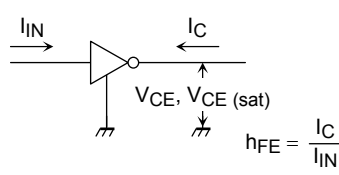
Note 3: Only TD62502PG/FG, TD62503PG/FG, TD62504PG/FG

Test Circuit

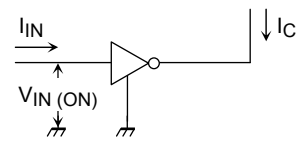
1. I_{CEX}



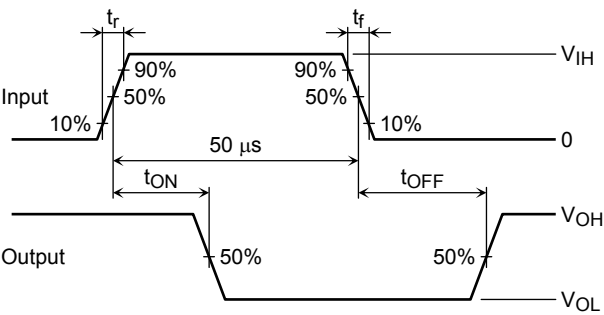
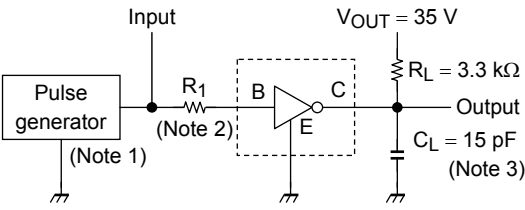
2. h_{FE} , $V_{CE} \text{ (sat)}$



3. $V_{IN} \text{ (ON)}$



4. 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: See below

Input Condition

Type Number	R_1	V_{IH}
TD62501PG/FG	2.7 k Ω	3 V
TD62502PG/FG	0 Ω	15 V
TD62503PG/FG	0 Ω	3 V
TD62504PG/FG	0 Ω	10 V
TD62505PG/FG	2.7 k Ω	3 V
TD62506PG/FG	0 Ω	3 V
TD62507PG/FG	2.7 k Ω	3 V

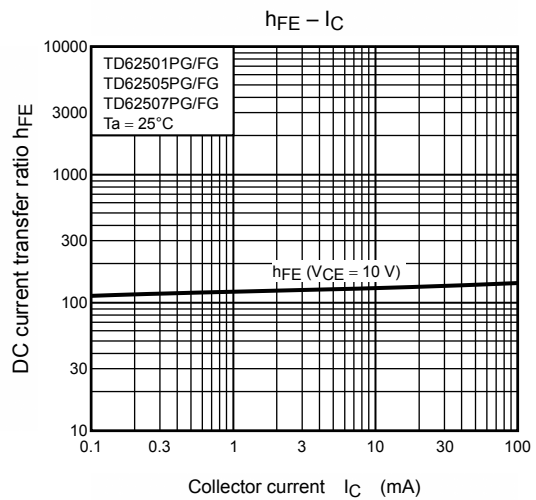
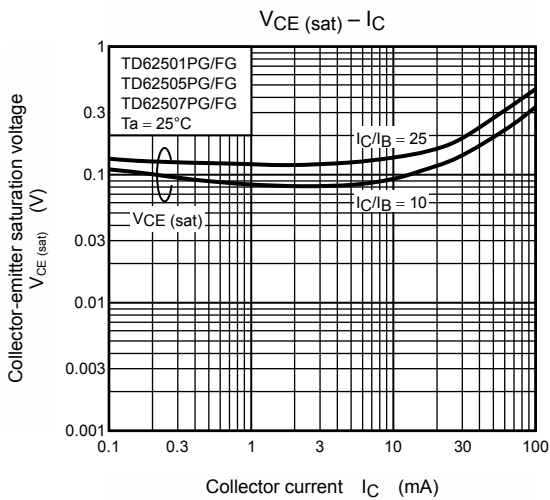
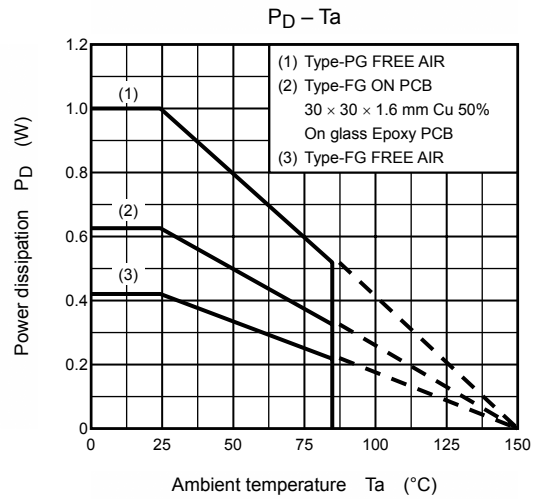
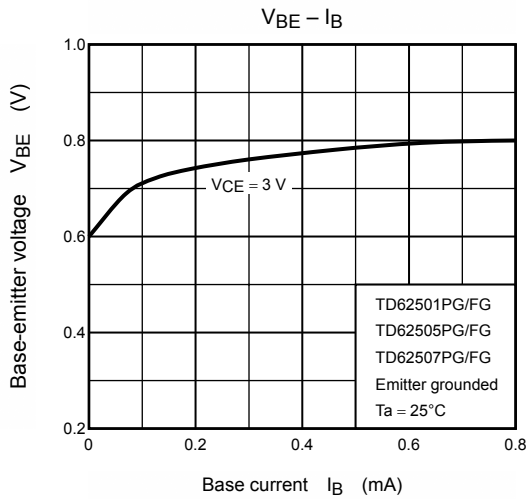
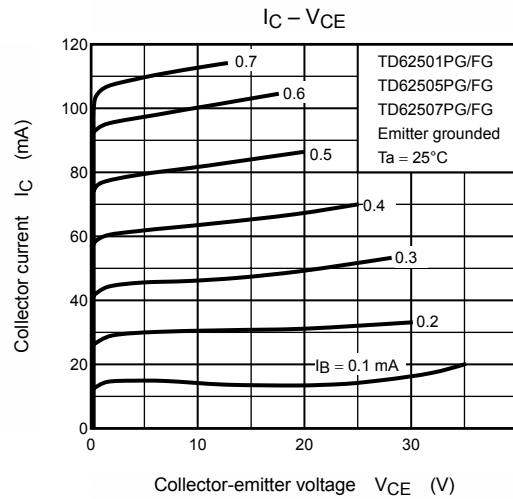
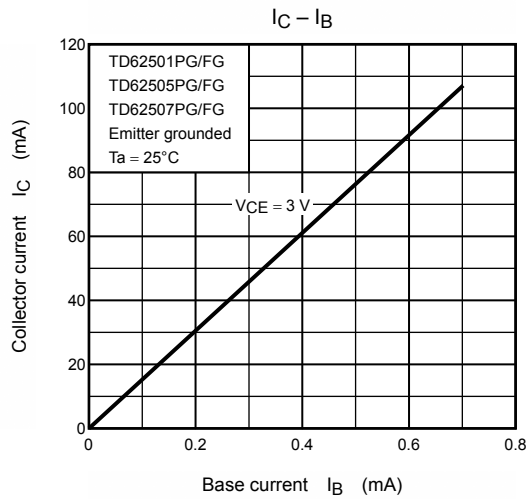
Note 3: C_L includes probe and jig capacitance

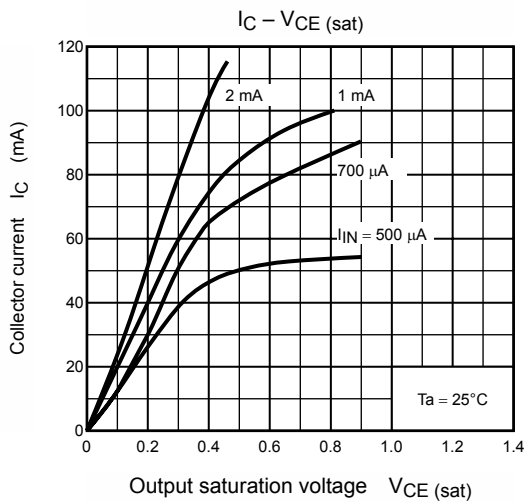
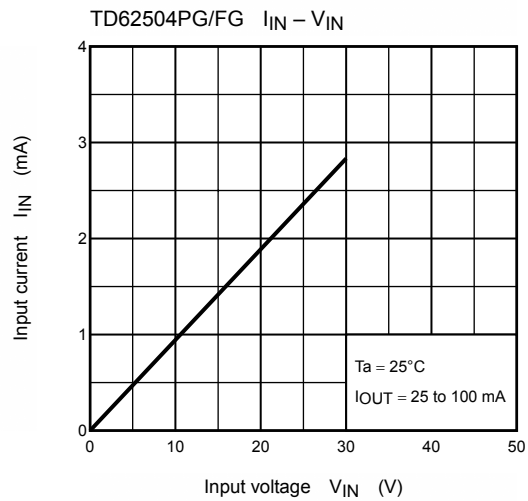
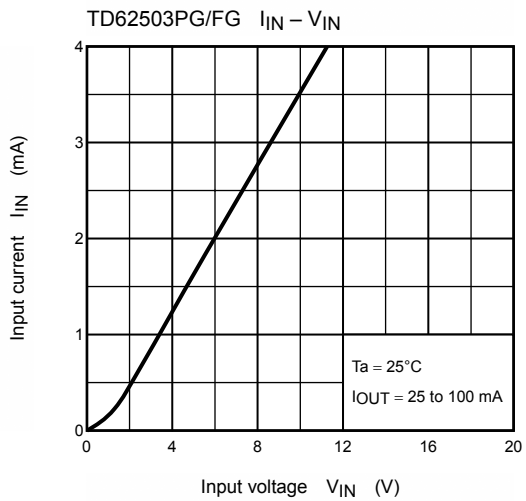
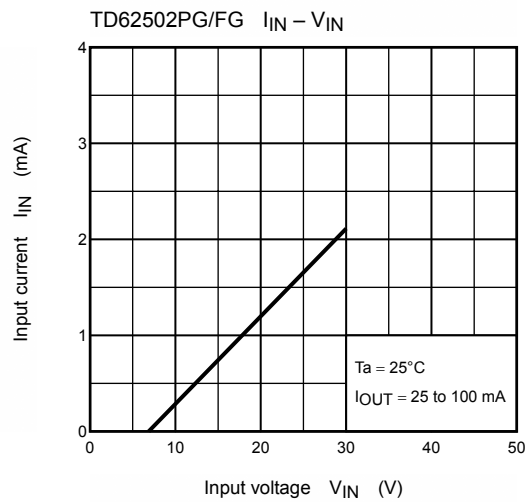
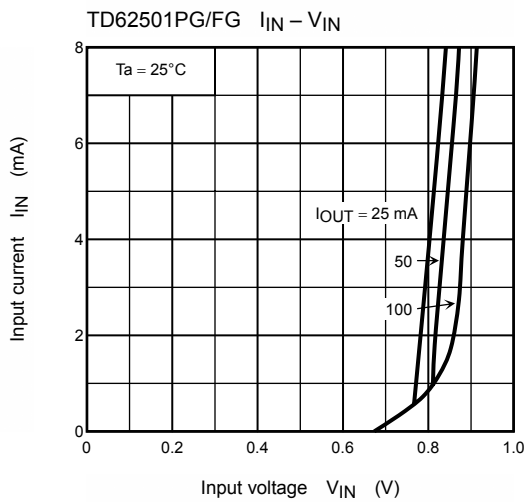
Precautions for Using

This IC does not integrate protection circuits such as overcurrent and overvoltage protectors.

Thus, if excess current or voltage is applied to the IC, the IC may be damaged. Please design the IC so that excess current or voltage will not be applied to the IC.

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

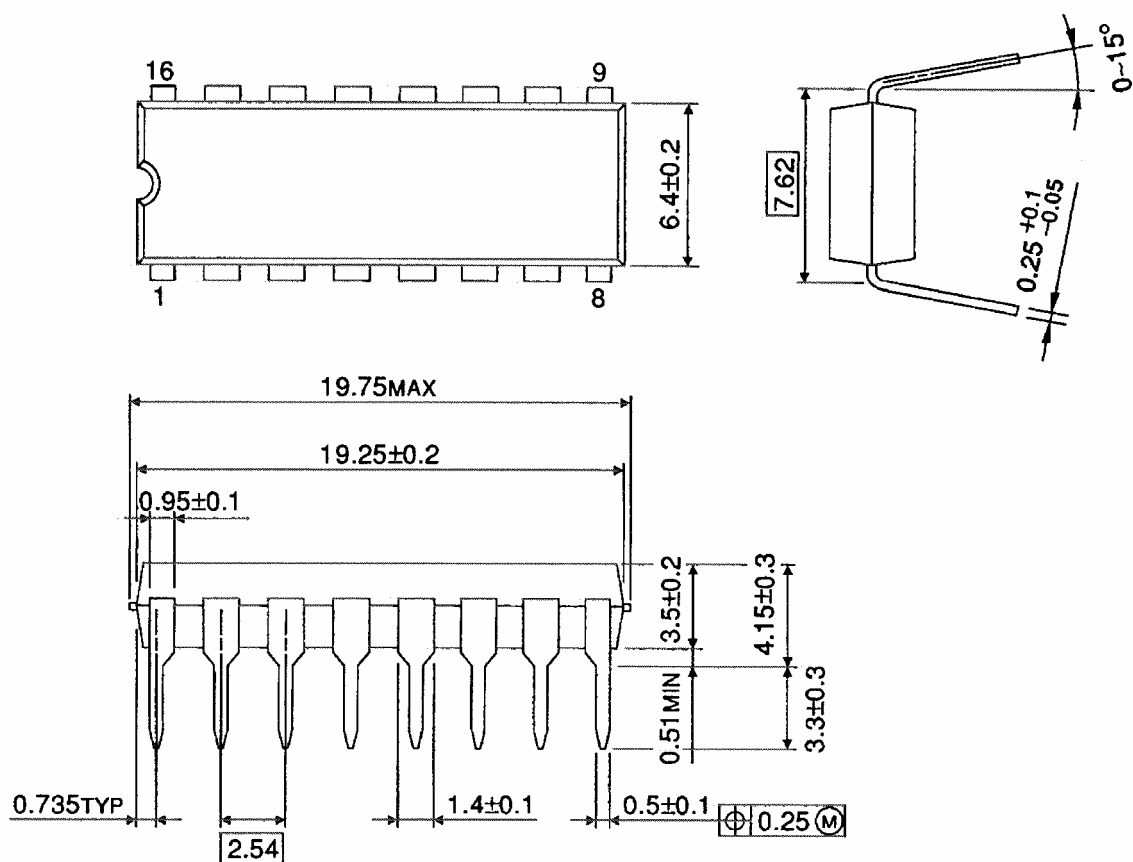




Package Dimensions

DIP16-P-300-2.54A

Unit : mm

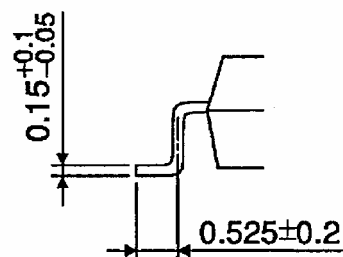
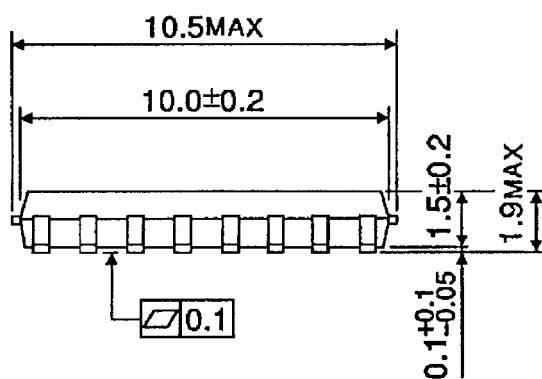
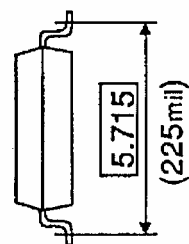
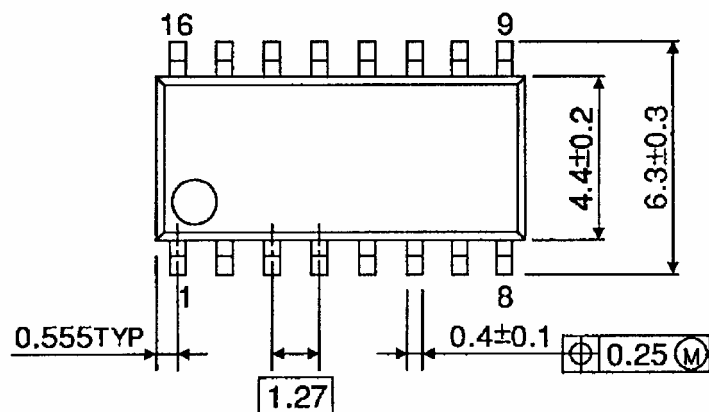


Weight: 1.11 g (typ.)

Package Dimensions

SOP16-P-225-1.27

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

030619EBA

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