

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

**TD62501P,TD62501F,TD62502P,TD62502F,TD62503P,TD62503F,TD62504P  
TD62504F,TD62505P,TD62505F,TD62506P,TD62506F,TD62507P,TD62507F**

## 7CH SINGLE DRIVER

**TD62501, 502, 503, 504P / F : COMMON EMITTER**

**TD62505, 506P / F : COMMON COLLECTOR**

**TD62507P / F : ISOLATED**

The TD62501P / F Series are comprised of seven or five NPN Transistor Arrays.

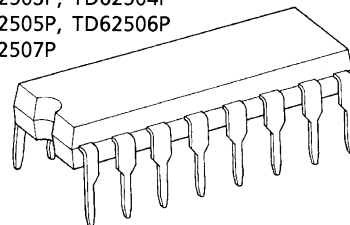
For proper operation, the substrate (SUB) must be connected to the most negative voltage.

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

## FEATURES

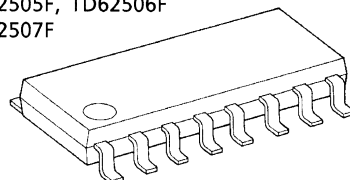
- Output Current (Single Output) 200 mA MAX.
- High Sustaining Voltage Output 35 V MIN.
- Inputs Compatible with Various Types of Logic.
- TD62501P / F, TD62505P / F and TD62507P / F: Using external resistor...General Purpose
- TD62502P / F  
:  $R_{IN} = 10.5 \text{ k}\Omega + 7\text{V Zener Diode}$ ...14~25 V P-MOS
- TD62503P / F, TD62506P / F  
:  $R_{IN} = 2.7 \text{ k}\Omega$ ...TTL, 5 V C-MOS
- TD62504P / F, :  $R_{IN} = 10.5 \text{ k}\Omega$ ...6~15 V P-MOS, C-MOS
- Package Type-P : DIP-16 pin
- Package Type-F : SOP-16 pin

TD62501P, TD62502P  
TD62503P, TD62504P  
TD62505P, TD62506P  
TD62507P



DIP16-P-300-2.54A

TD62501F, TD62502F  
TD62503F, TD62504F  
TD62505F, TD62506F  
TD62507F



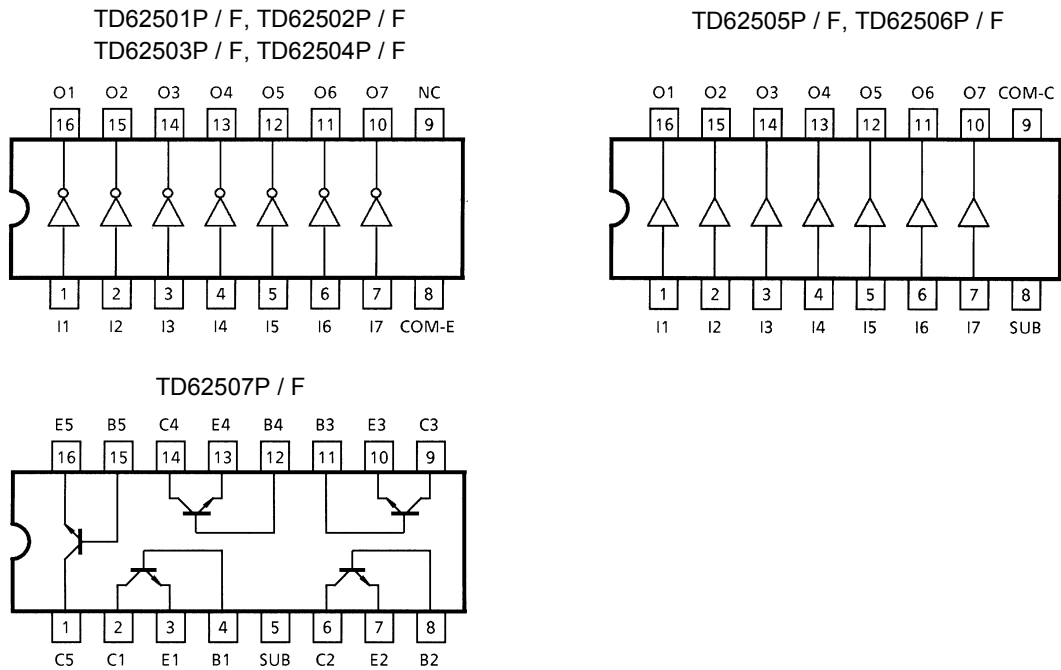
SOP16-P-225-1.27

Weight

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

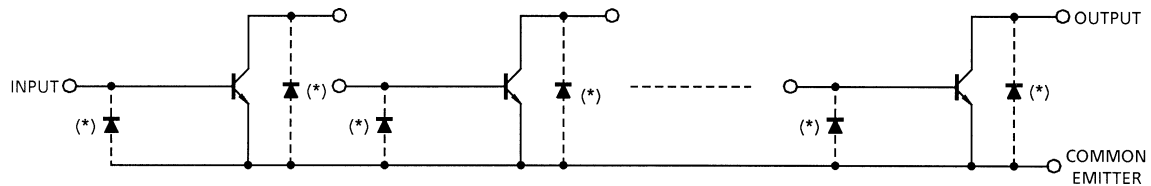
SOP16-P-225-1.27 : 0.16 g (Typ.)

## PIN CONNECTION (Top view)

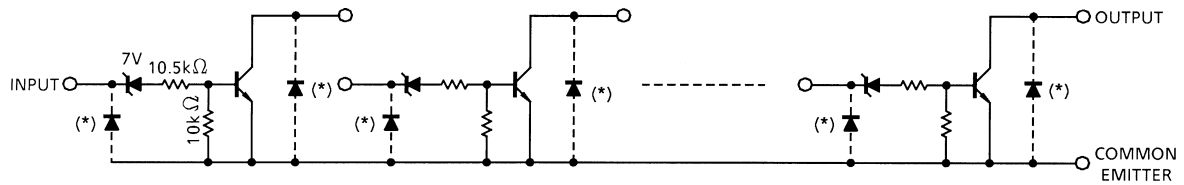


## SCHEMATICS (Each driver)

TD62501P / F

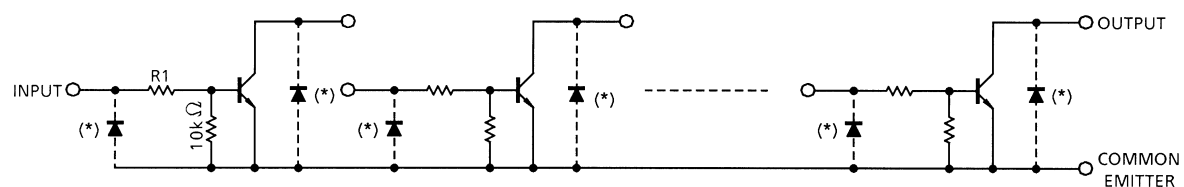


TD62502P / F



TD62503P / F

TD62504P / F

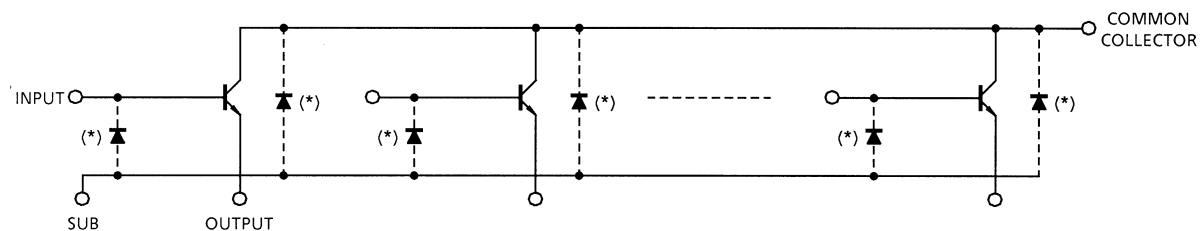


TD62503P / F  $R1 = 2.7 \text{ k}\Omega$ , TD62504P / F  $R1 = 10.5 \text{ k}\Omega$

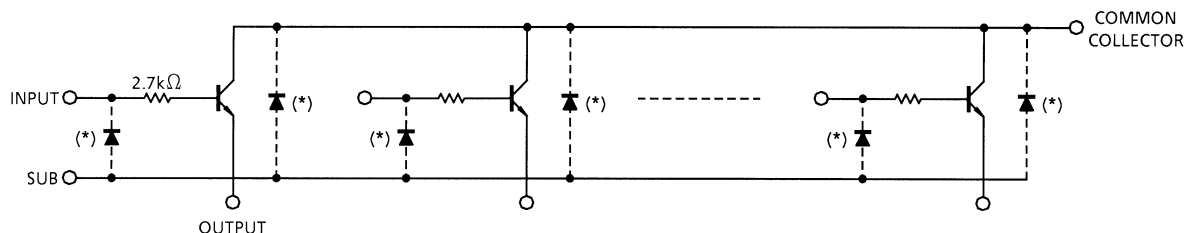
\*: Parasitic Diodes

## SCHEMATICS (Each driver)

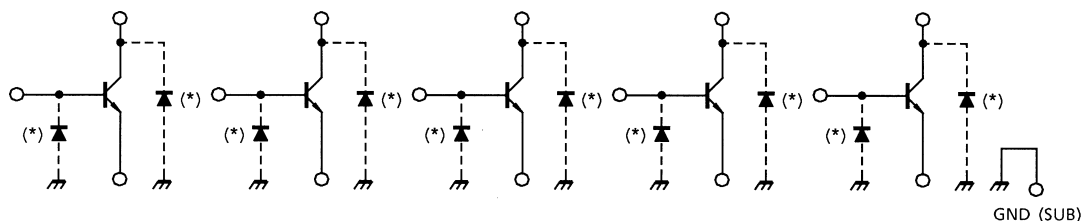
TD62505P / F



TD62506P / F



TD62507P / F



\*: Parasitic Diodes

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

## MAXIMUM RATINGS (Ta = 25°C Unless otherwise noted)

CHARACTERISTIC		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)	-0.5~45	V
		$V_{IN}$ (Note 2)	-0.5~30	
Input Current		$I_{IN}$ (Note 3)	25	mA
Isolation Voltage		$V_{SUB}$	35	V
Power Dissipation	P	$P_D$	1.0	W
	F		0.625 (Note 4)	
Operating Temperature		$T_{opr}$	-40~85	°C
Storage Temperature		$T_{stg}$	-55~150	°C

Note 1: TD62506P / F

Note 2: TD62502P / F, TD62503P / F, TD62504P / F

Note 3: TD62501P / F, TD62505P / F, TD62507P / F

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

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

CHARACTERISTIC		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	TD62506P / F	$V_{IN}$		0	—	35	V
	TD62502P / F						
	TD62503P / F			0	—	25	
	TD62504P / F						
Input Current	TD62501P / F	$I_{IN}$		0	—	10	mA
	TD62505P / F						
	TD62507P / F						
Power Dissipation	P	$P_D$		—	—	0.360	W
	F		On PCB (Note)	—	—	0.325	

Note: 30 × 30 × 1.6 mm, Cu 50%

**ELECTRICAL CHARACTERISTICS (Ta = 25°C Unless otherwise noted)**

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Leakage Current		$I_{CEX}$	1	$V_{CE} = 25\text{ V}, V_{IN} = 0$	—	—	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	—	—	
Input Voltage	TD62502P / F	$V_{IN(ON)}$	3	$I_{IN} = 1\text{ mA}$ $I_C = 10\text{ mA}$	13	17	23	V
	TD62503P / F				2.4	3.4	4.2	
	TD62504P / F				7.5	11.5	15	
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		$t_{OFF}$			—	200	—	

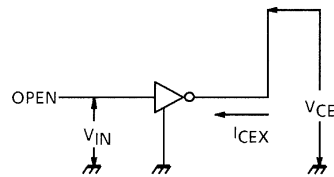
Note 1: Except TD62502P / F Only

Note 2: Only TD62501P / F, TD62505P / F, TD62506P / F, TD62507P / F

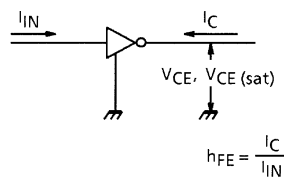
Note 3: Only TD62502P / F, TD62503P / F, TD62504P / F

TEST CIRCUIT

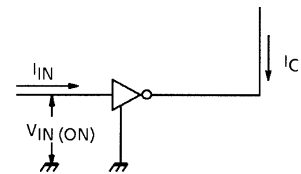
1.  $I_{CEX}$



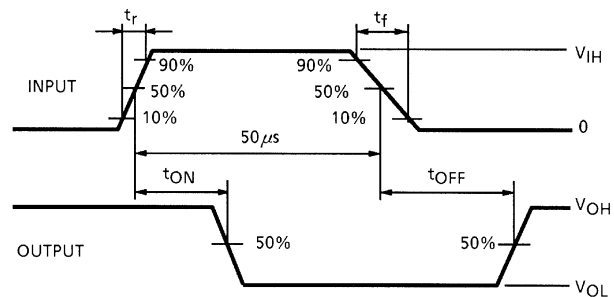
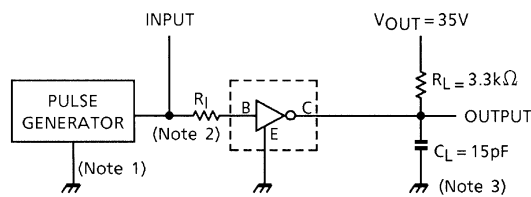
2.  $h_{FE}$ ,  $V_{CE} (sat)$



3.  $V_{IN} (ON)$



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



Note 1: Pulse Width 50  $\mu$ s, Duty Cycle 10%  
Output Impedance 50  $\Omega$ ,  $t_r \leq 5$  ns,  $t_f \leq 10$  ns  
Note 2: See below

INPUT CONDITION

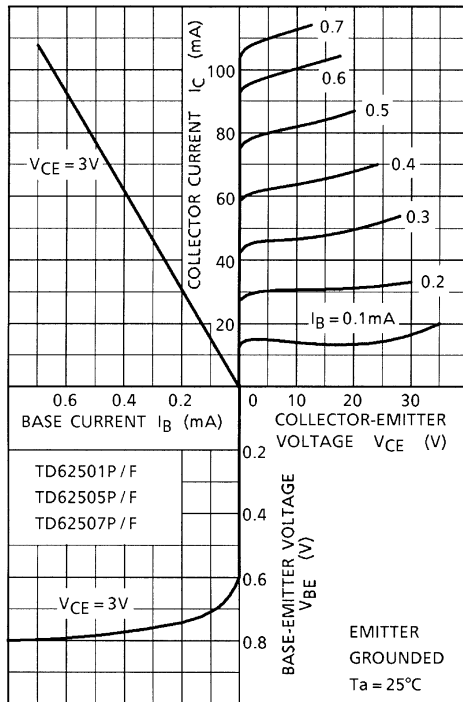
TYPE NUMBER	$R_I$	$V_{IH}$
TD62501P / F	2.7 k $\Omega$	3 V
TD62502P / F	0 $\Omega$	15 V
TD62503P / F	0 $\Omega$	3 V
TD62504P / F	0 $\Omega$	10 V
TD62505P / F	2.7 k $\Omega$	3 V
TD62506P / F	0 $\Omega$	3 V
TD62507P / F	2.7 k $\Omega$	3 V

Note 3:  $C_L$  includes probe and jig capacitance

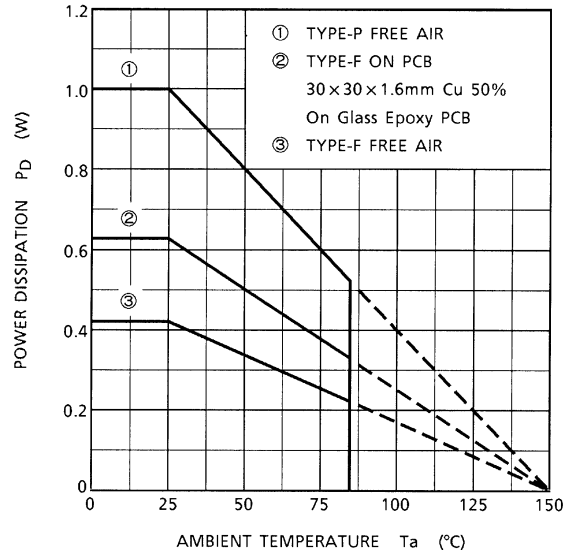
PRECAUTIONS for USING

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.

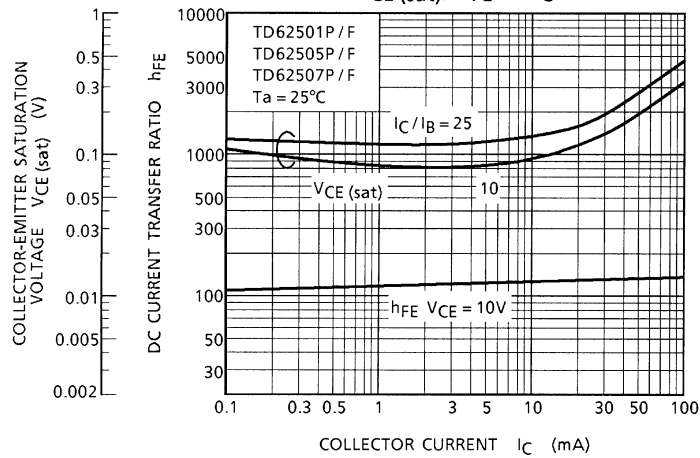
STATIC CHARACTERISTICS

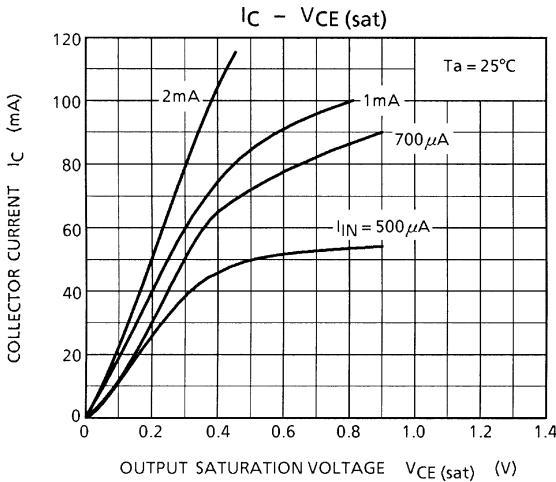
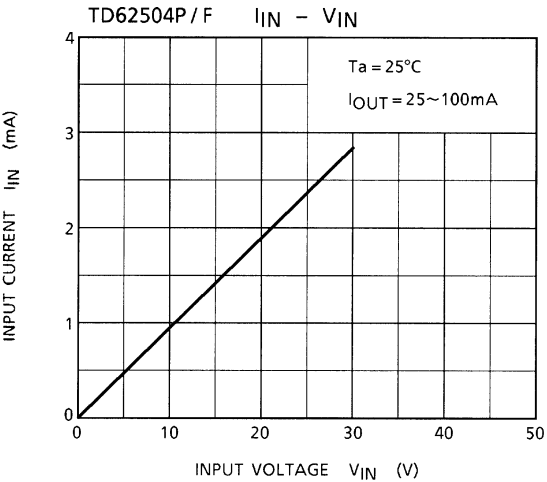
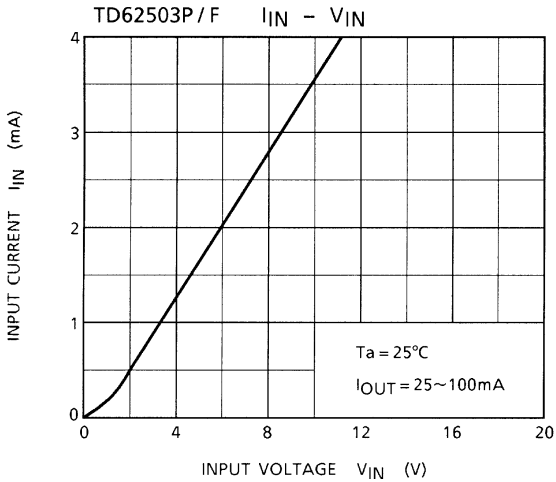
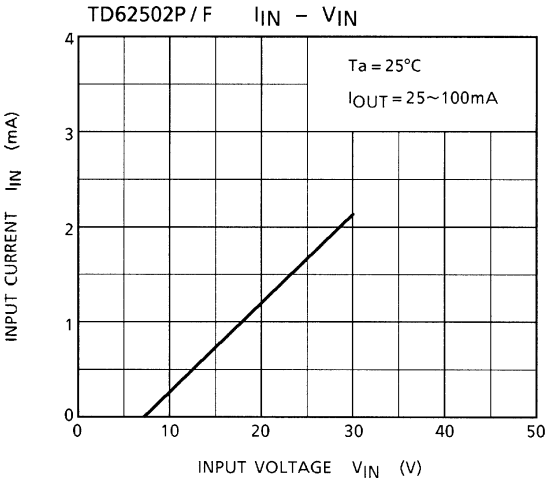
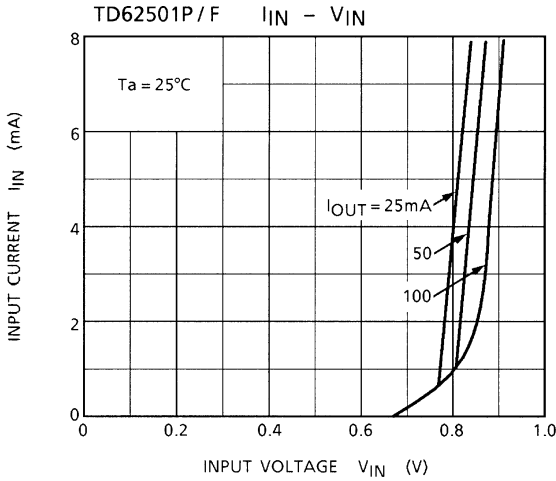


$P_D - T_a$



$V_{CE(sat)}, h_{FE} - I_C$

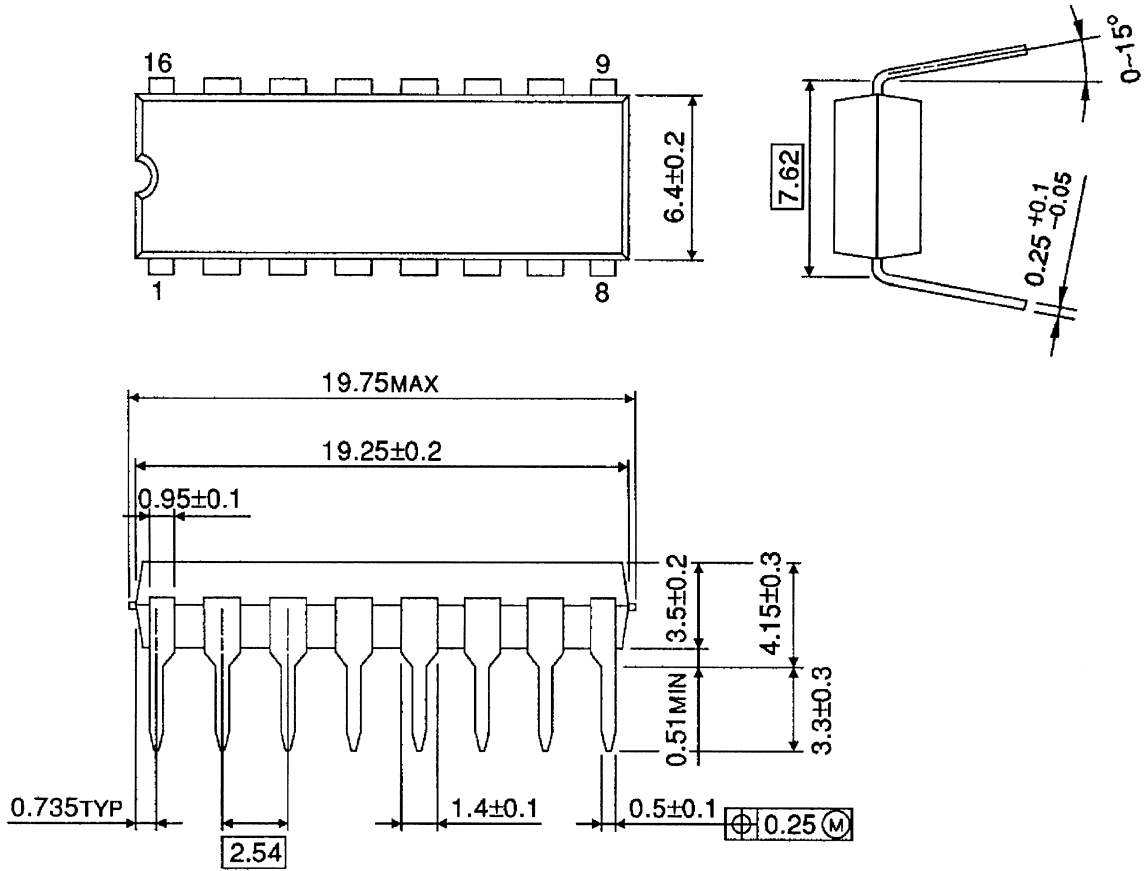




PACKAGE DIMENSIONS

DIP16-P-300-2.54A

Unit: mm



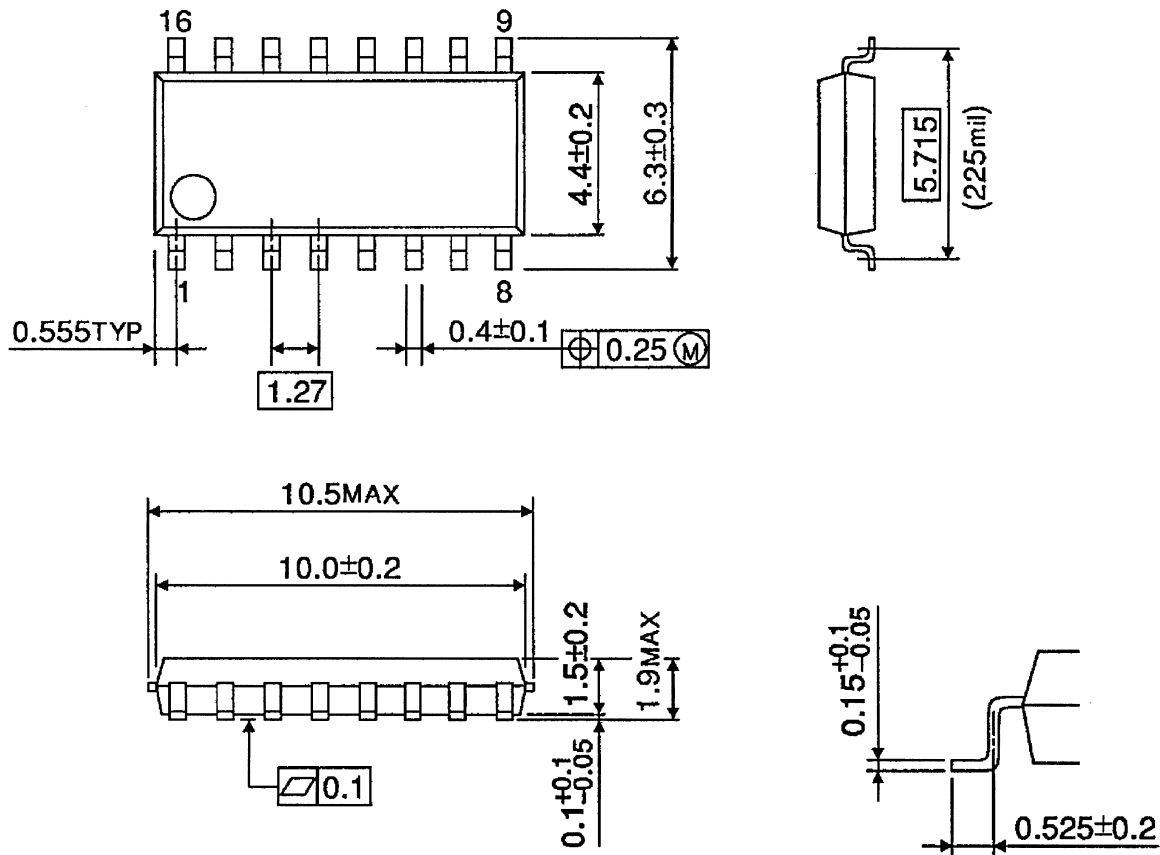
Weight: 1.11 g (Typ.)



PACKAGE DIMENSIONS

SOP16-P-225-1.27

Unit: mm



Weight: 0.16 g (Typ.)

**RESTRICTIONS ON PRODUCT USE**

000707EBA

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In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
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