

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

## TD62601P,TD62601F,TD62602P,TD62602F TD62603P,TD62603F,TD62604P,TD62604F

### 6CH THRESHOLD FREE DRIVER

#### TD62601P, TD62601F INVERTER

#### TD62602P, TD62602F INVERTER / OPEN COLLECTOR

#### TD62603P, TD62603F NON-INVERTER

#### TD62604P, TD62604F NON-INVERTER / OPEN COLLECTOR

The TD62601P, TD62601F series are threshold free drivers which are comprised of six NPN transistor output stages and comparator input stages.

The TD62601P, TD62601F series are pin compatible with CMOS 4049B and 4050B type except  $V_{ref}$  terminal.

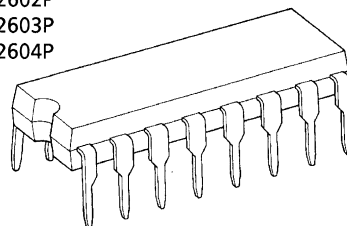
$V_{ref}$  is set at  $1/2 V_{CC}$  with internal resistors and it is changeable using external resistors.

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

### FEATURES

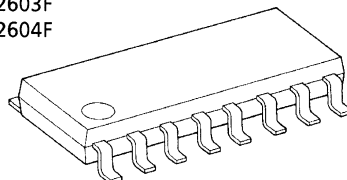
- Wide supply voltage range  $V_{CC} = 4\sim 18\text{ V}$
- $V_{ref} = 1/2 V_{CC}$  @16 pin is non-connected
- Pin compatible with CMOS logic 4049B, 4050B type  
TD62601P, TD62601F (4049B type)  
TD62602P, TD62602F (4049B type open-collector)  
TD62603P, TD62603F (4050B type)  
TD62604P, TD62604F (4050B type open-collector)
- Package type-P : DIP-16 pin
- Package type-F : SOP-16 pin

TD62601P  
TD62602P  
TD62603P  
TD62604P



DIP16-P-300-2.54A

TD62601F  
TD62602F  
TD62603F  
TD62604F



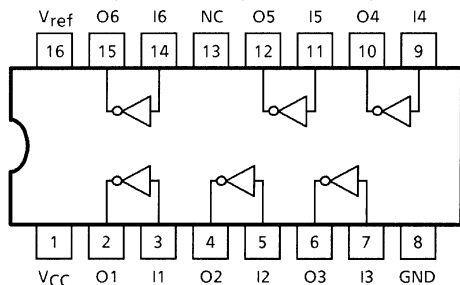
SOP16-P-225-1.27

#### Weight

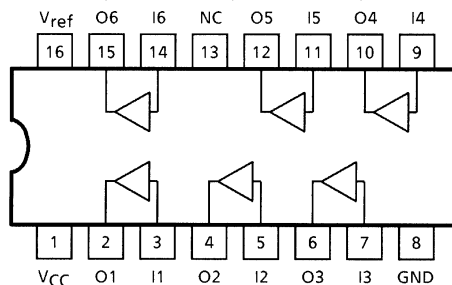
DIP16-P-300-2.54A : 1.11 g (Typ.)  
SOP16-P-225-1.27 : 0.16 g (Typ.)

### PIN CONNECTION (TOP VIEW)

TD62601P, TD62601F, TD62602P, TD62602F

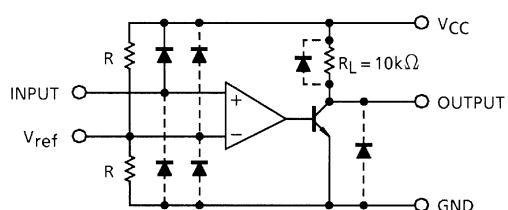


TD62603P, TD62603F, TD62604P, TD62604F



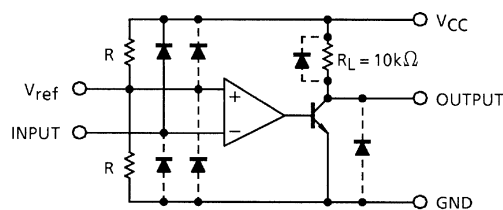
## SCHEMATICS (EACH DRIVER)

TD62601P, TD62601F, TD62602P, TD62602F



TD62601P, TD62601F : With  $R_L$   
TD62602P, TD62602F : Without  $R_L$

TD62603P, TD62603F, TD62604P, TD62604F



TD62603P, TD62603F : With  $R_L$   
TD62604P, TD62604F : Without  $R_L$

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

## MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		$V_{CC}$	20	V
Output Sustaining Voltage		$V_{OUT}$	-0.5~20	V
Output Current		$I_{OUT}$	10	mA / ch
Input Voltage		$V_{IN}$	-0.5~ $V_{CC} + 0.5$	V
Power Dissipation	P	$P_D$ (Note 2)	1.0	W
	F		0.625 (Note 1)	
Operating Temperature		$T_{opr}$	-40~85	$^\circ\text{C}$
Storage Temperature		$T_{stg}$	-55~150	$^\circ\text{C}$

Note 1: On PCB ( $30 \times 30 \times 1.6$  mm Cu 50%)

Note 2: Delated above  $25^\circ\text{C}$  in the proportion of 8.0 mW /  $^\circ\text{C}$  (P Type), 5.0 mW /  $^\circ\text{C}$  (F Type).

## RECOMMENDED OPERATING CONDITIONS ( $T_a = -40\sim 85^\circ\text{C}$ , $V_{CC} = 0$ V)

CHARACTERISTIC		SYMBOL	CONDITION	MIN	TYP.	MAX	UNIT
Supply Voltage		$V_{CC}$	—	4.0	—	18	V
Output Sustaining Voltage	62602P, 62602F 62604P, 62604F	$V_{OUT}$	—	0	—	18	V
Output Current		$I_{OUT}$	$V_{CC} = 5$ V	0	—	8	mA / ch
Input Voltage		$V_{IN}$	—	0	—	$V_{CC}$	V
REF, Input Voltage		$V_{ref}$	$T_a = 25^\circ\text{C}$	0.4	—	$V_{CC} - 1.6$	V
Power Dissipation	P	$P_D$	—	—	—	0.36	W
	F		On PCB	—	—	0.325	

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

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Input Voltage	"H" Level	$V_{IH}$	—	—	$V_{ref} + 0.1$	—	—	V
	"L" Level	$V_{IL}$	—	—	—	—	$V_{ref} - 0.1$	
Output Current	"H" Level	$I_{OH}$	—	$V_{CC} = 4.5V, V_O = 18V$	—	—	10	$\mu A$
Output Voltage	"H" Level	$V_{OH}$	—	$V_{CC} = 4.5V, I_O = -10 \mu A$	4.0	—	—	V
	"L" Level	$V_{OL}$	—	$V_{CC} = 4.5V, I_O = 8 mA$	—	0.1	0.4	
Input Current	"H" Level	$I_{IH}$	—	—	—	—	2	$\mu A$
	"L" Level	$I_{IL}$	—	—	—	-0.2	-1.5	
Vref Terminal Voltage		$V_{ref(OUT)}$	—	—	$1/2 V_{CC} - 0.1$	—	$1/2 V_{CC} + 0.1$	V
Vref Resistor		$R_{ref}$	—	—	3.5	5	6.5	k $\Omega$
Supply Current		$I_{CC}$	—	—	—	—	12	mA
	TD62601P TD62601F TD62603P TD62603F	$I_{CCL}$	—	—	—	—	27	mA
Turn-On Delay		$t_{ON}$	—	$V_{CC} = 5V, V_{OUT} = 18V$ $R_L = 2 k\Omega$	—	0.5	—	$\mu s$
Turn-Off Delay		$t_{OFF}$	—		—	0.2	—	

**PRECAUTIONS for USING**

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

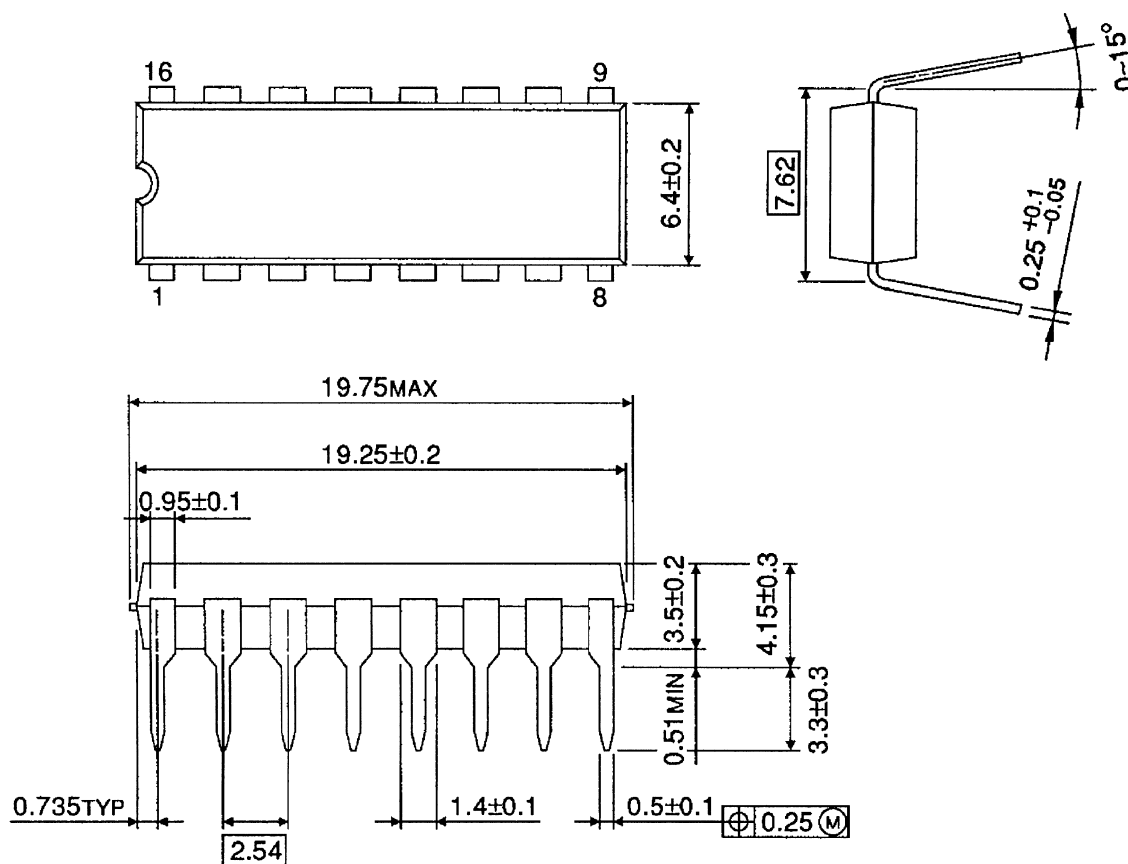
Thus, if excess current or voltage is applied to the IC, the IC may be damaged. Please design the IC so that excess current or voltage will not be applied to the IC.

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

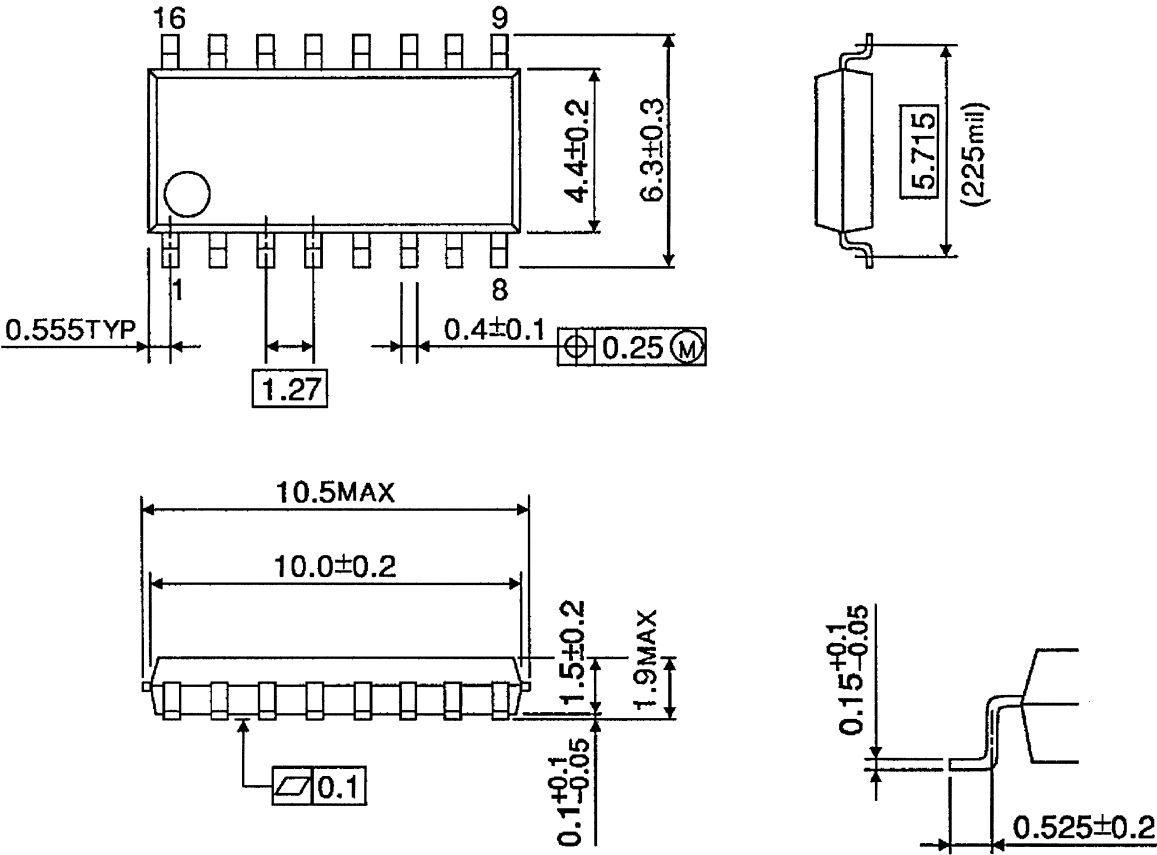


Weight: 1.11 g (Typ.)

PACKAGE DIMENSIONS

SOP16-P-225-1.27

Unit: mm



Weight: 0.16 g (Typ.)

**RESTRICTIONS ON PRODUCT USE**

000707EBA

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