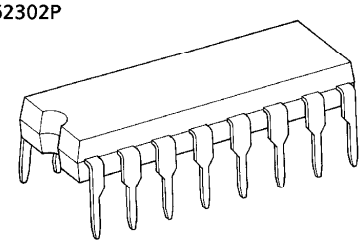
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62301P, TD62301F, TD62302P, TD62302F

7CH LOW SATURATION SINK DRIVER

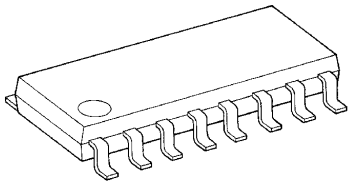
The TD62301P / F and TD62302P / F are comprised of seven NPN low saturation drivers.
All units feature integral clamp diodes for switching inductive loads. Applications include relay, hammer, lamp and LED drive in low voltage system.

TD62301P
TD62302P



DIP16-P-300-2.54A

TD62301F
TD62302F



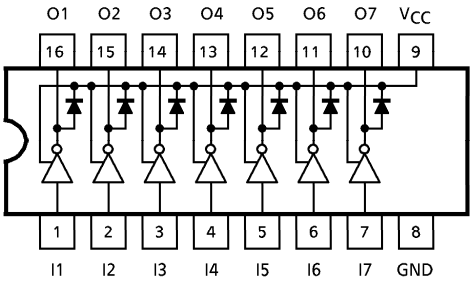
SOP16-P-225-1.27

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

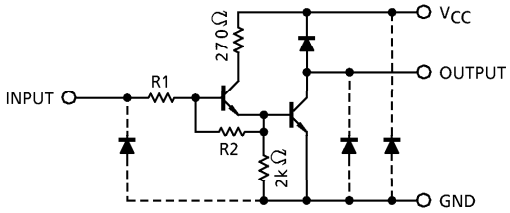
FEATURES

- Low saturation output $V_{CE\ (sat)}$ = 0.7V (Max.)
- Output rating (single output) 15V (Min.) / 200mA (Max.)
- High DC transfer ratio 1000 (Min.)
- Output clamp diodes
- Input register : TD62301P / F R1 = 2kΩ, R2 = 20kΩ
  : TD62302P / F R1 = 8.4kΩ, R2 = 15kΩ
- Inputs compatible with TTL and 3~6V CMOS
- Package type-P : DIP-16 pin
- Package type-F : SOP-16 pin

PIN CONNECTION (TOP VIEW)



SCHEMATICS (EACH DRIVER)



TD62301P : R1 = 2kΩ, R2 = 20kΩ
TD62302P : R1 = 8.4kΩ, R2 = 15kΩ

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

961001EBA2

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	−0.5 ~ 15	V
Output Sustaining Voltage		$V_{CE\ (SUS)}$	−0.5~V_{CC} + 0.5	V
Output Current		I_{OUT}	200	mA / ch
Input Voltage		V_{IN}	−0.5~15	V
Input Current		I_{IN}	15	mA
Clamp Diode Reverse Voltage		V_R	15	V
Clamp Diode Forward Current		I_F	200	mA
Power Dissipation	P	P_D	1.0	W
	F		0.625 (Note)	
Operating Temperature	P	T_{opr}	−30~75	°C
	F		−40~85	
Storage Temperature		T_{stg}	−55~150	°C

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

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

CHARACTERISTIC		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage		V_{CC}		3	—	6	V
Output Current		I_{OUT}	DC 1 Circuit	0	—	180	mA
	P		T_{pw} = 25ms, Duty = 50%, 4 Circuits	0	—	150	
Input Voltage		V_{IN}		—	—	V_{CC}	V
Clamp Diode Reverse Voltage		V_R		—	—	V_{CC}	V
Clamp Diode Forward Current		I_F		—	—	180	mA
Power Dissipation	P	P_D		—	—	0.44	W
	F		(Note)	—	—	0.325	

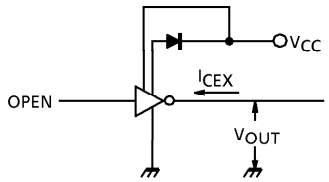
(Note) On Glass Epoxy PCB (30 × 30 × 1.6mm Cu 50%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

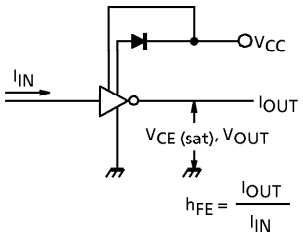
CHARACTERISTIC			SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current			I_{CEX}	1	V_{CC} = 6V, V_{OUT} = 6V, Ta = 50°C	—	—	7	μA
					V_{CC} = 6V, V_{OUT} = 6V, Ta = 25°C	—	—	1	
Output Saturation Voltage			$V_{CE\ (sat)}$	2	V_{CC} = 5V, I_{IN} = 0.14mA, I_{OUT} = 70mA	—	—	0.5	V
					V_{CC} = 5V, I_{IN} = 0.3mA, I_{OUT} = 150mA	—	—	0.7	
DC Current Transfer Ratio			h_{FE}	2	V_{CC} = 5V, V_{OUT} = 2V, I_{OUT} = 120mA	1000	2000	—	
Input Current	Output On	TD62301P / F	$I_{IN\ (ON)}$	3	V_{CC} = 5V, V_{IN} = 2.4V, I_{OUT} = 120mA	—	—	0.60	mA
		TD62302P / F				—	—	0.14	
Input Voltage	Output On	TD62301P / F	$V_{IN\ (ON)}$	4	V_{CC} = 5V, I_{IN} = 0.2mA, I_{OUT} = 120mA	—	—	2.3	V
		TD62302P / F				—	—	4.0	
Clamp Diode Forward Voltage			V_F	5	I_F = 120mA	—	—	2.0	V
Supply Current			I_{CC}	6	I_F = 120mA	—	15	22	mA / Gate
Input Capacitance			C_{IN}	—	V_{IN} = 0, f = 1MHz	—	15	—	pF
Turn-On Delay			t_{ON}	7	V_{CC} = 6V, R_L = 33Ω, C_L = 15pF	—	0.1	—	μs
Turn-Off Delay			t_{OFF}			—	0.2	—	μs

TEST CIRCUIT

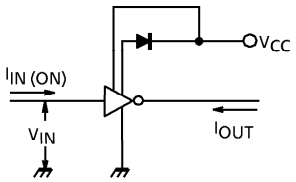
1. I_{CEX}



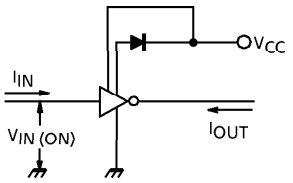
2. h_{FE}, $V_{CE\ (sat)}$



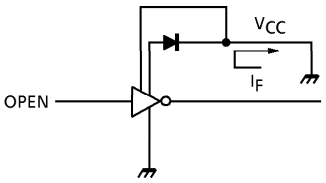
3. $I_{IN\ (ON)}$



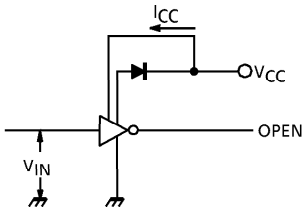
4. $V_{IN\ (ON)}$



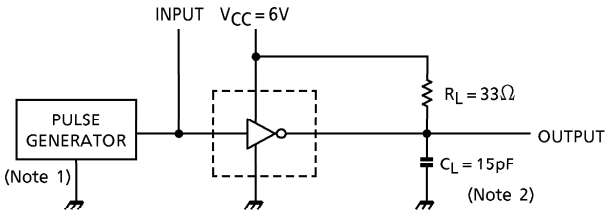
5. V_F

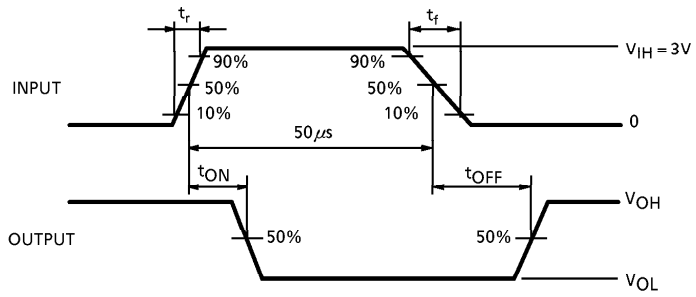


6. I_{CC}



7. t_{ON}, t_{OFF}





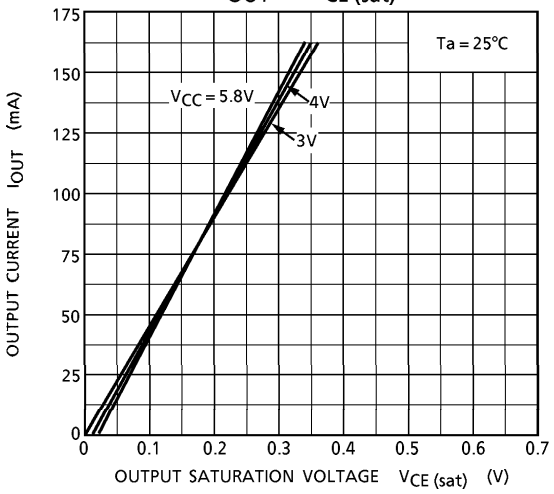
(Note 1) Pulse Width 50μs
Duty Cycle 10%
Output Impedance 50Ω
$t_r \leqq 5$ns, $t_f \leqq 10$ns

(Note 2) C_L includes probe and jig capacitance.

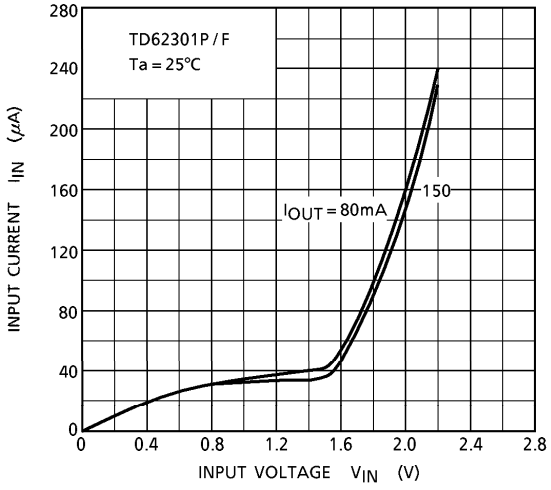
PRECAUTIONS for USING

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

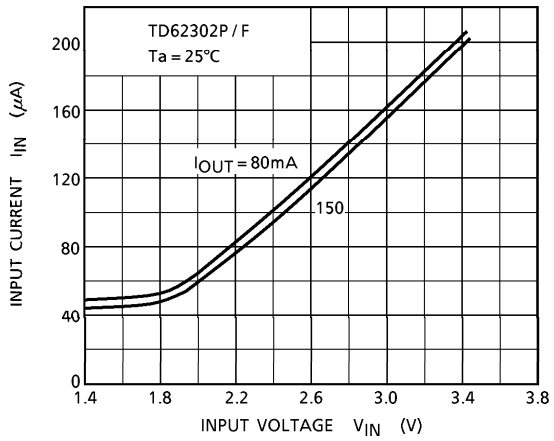
I_{OUT} – $V_{CE\,(sat)}$



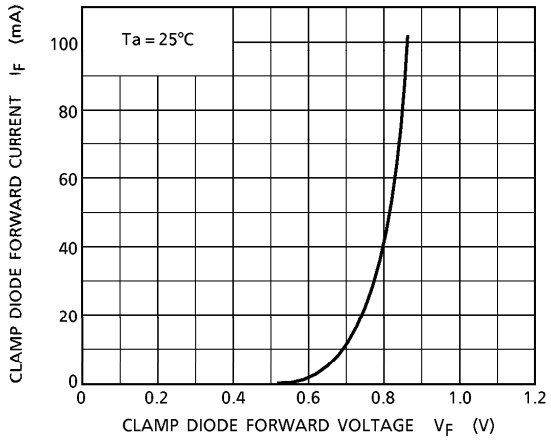
I_{IN} – V_{IN}



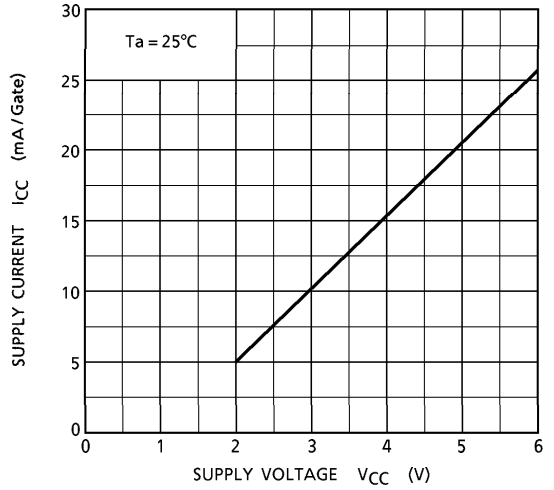
I_{IN} – V_{IN}



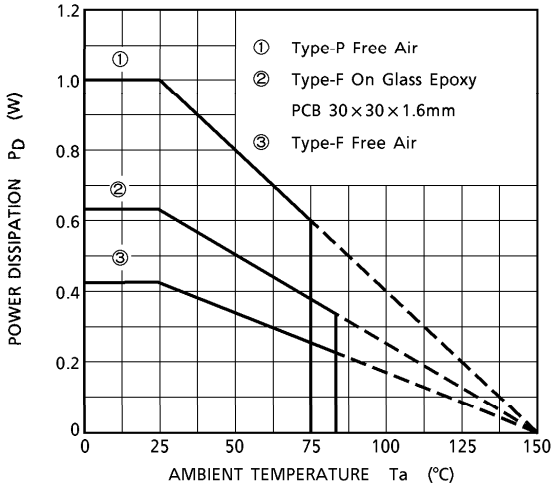
I_F – V_F



I_{CC} – V_{CC}



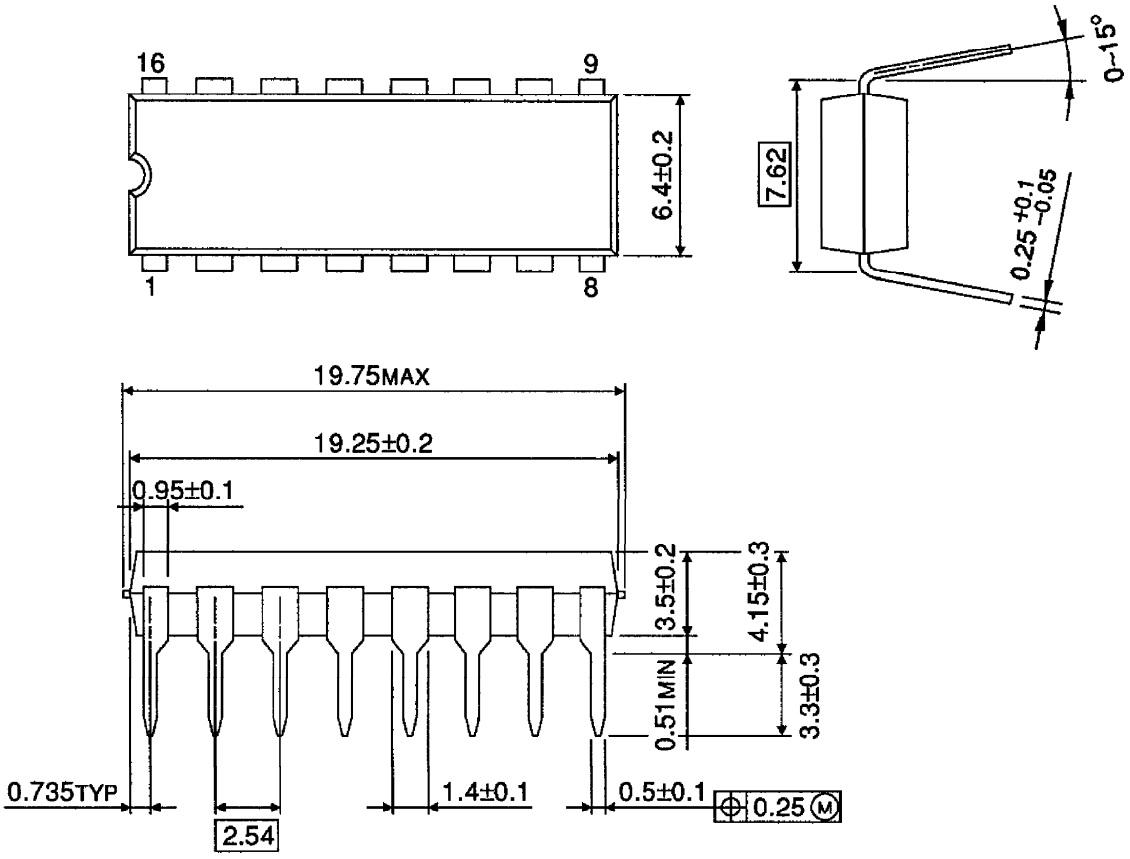
P_D – Ta



OUTLINE DRAWING

DIP16-P-300-2.54A

Unit : mm

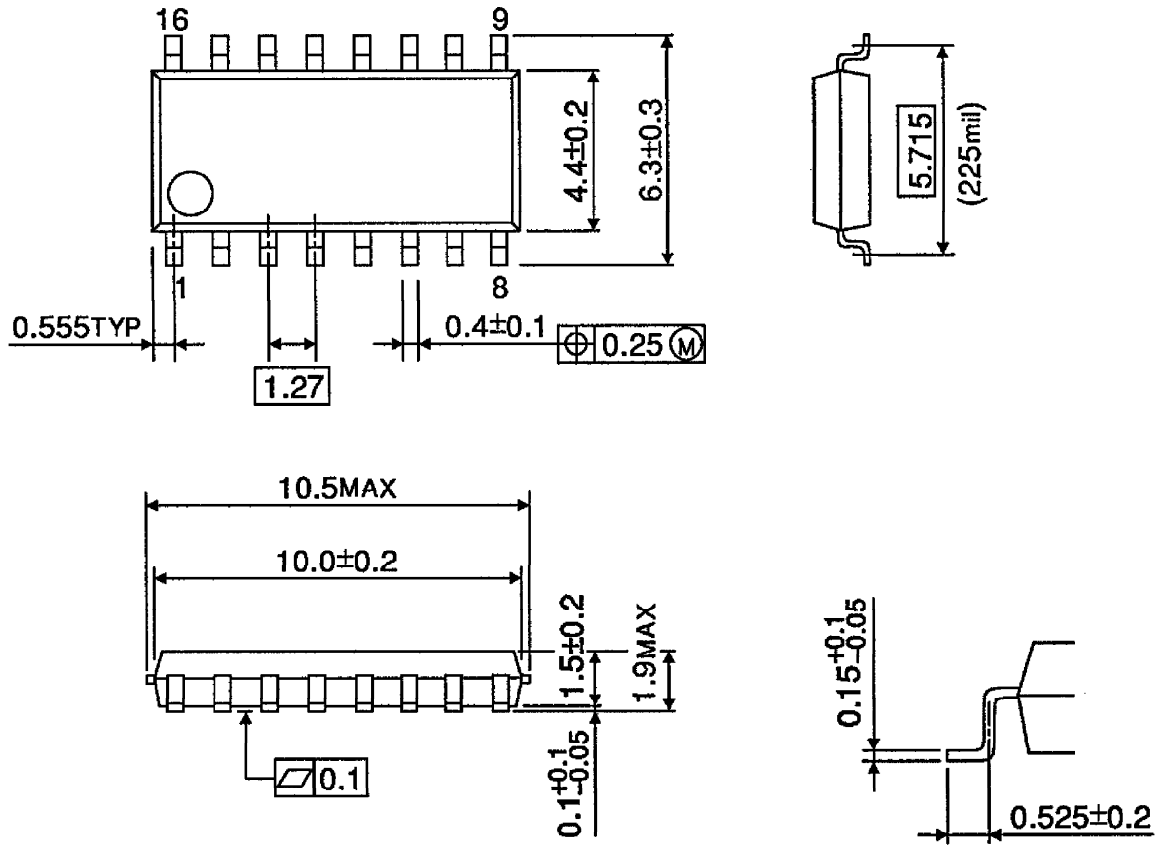


Weight : 1.11g (Typ.)

OUTLINE DRAWING

SOP16-P-225-1.27

Unit : mm



Weight : 0.16g (Typ.)