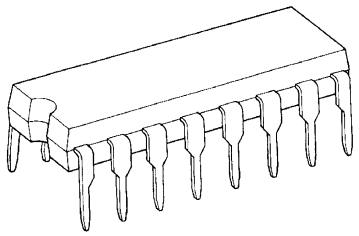
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62309P,TD62309F

6CH LOW SATURATION HIGH−CURRENT SINK DRIVER

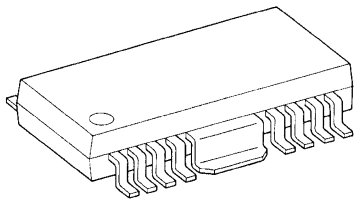
The TD62309P, TD62309F are comprised of six NPN low saturation drivers.
All units feature integral clamp diodes for switching inductive loads. These devices are specifically designed for relay, lamp and LED drive in low voltage systems.

TD62309P



DIP16-P-300-2.54A

TD62309F



HSOP16-P-300-1.00

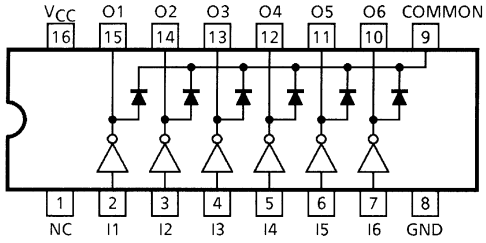
Weight
DIP16−P−300−2.54A : 1.11 g (Typ.)
HSOP16−P−300−1.00 : 0.50 g (Typ.)

FEATURES

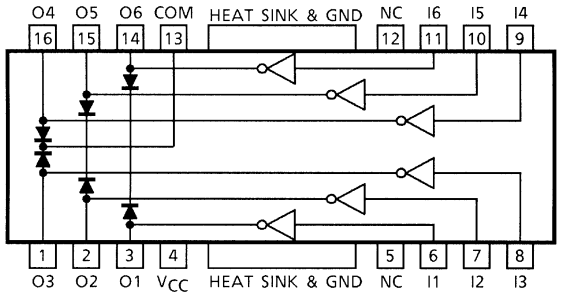
- Low saturation output : $V_{CE\ (sat)}$ = 0.8 V (Max.) @I_{OUT} = 450 mA
- Output rating (single output) 20 V (Min.) / 700 mA (Max.) Output clamp diodes
- Inputs compatible with TTL and 3~6 V CMOS
- Package type-P: DIP-16 pin
- Package type-F: PFP-16 pin

PIN CONNECTION (TOP VIEW)

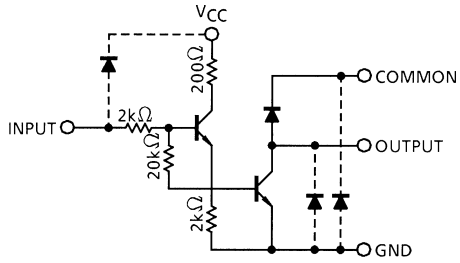
TD62309P



TD62309F



SCHEMATICS (EACH DRIVER)



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

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	10	V
Output Sustaining Voltage		$V_{CE\ (SUS)}$	20	V
Output Current		I_{OUT}	700	mA / ch
Input Voltage		V_{IN}	10	V
Input Current		I_{IN}	10	mA
Clamp Diode Reverse Voltage		V_R	20	V
Clamp Diode Forward Current		I_F	700	mA
Power Dissipation	P	P_D	1.47	W
	F		1.4 (Note)	
Operating Temperature		T_{opr}	−40~85	°C
Storage Temperature		T_{stg}	−55~150	°C

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

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

CHARACTERISTIC		SYMBOL	CONDITION	MIN	TYP.	MAX	UNIT
Supply Voltage		V_{CC}	—	3	5	7	V
Output Sustaining Voltage		$V_{CE\ (SUS)}$	—	—	—	20	V
Output Current		I_{OUT}	DC 1 circuit	0	—	700	mA
			Tpw = 25 ms, 6 circuits	0	—	200	
Input Voltage		V_{IN}	—	0	—	V_{CC}	V
Clamp Diode Reverse Voltage		V_R	—	—	—	20	V
Clamp Diode Forward Current		I_F	—	—	—	700	mA
Power Dissipation	P	P_D	—	—	—	0.52	W
	F		(Note)	—	—	0.5	

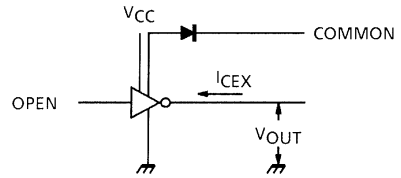
Note: On Glass Epoxy PCB (30 × 30 × 1.6 mm Cu 30%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

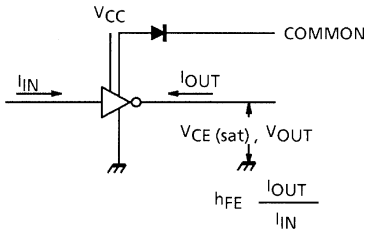
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Leakage Current		I_{CEX}	1	V_{OUT} = 20 V, Ta = 85°C	—	—	100	μA
Output Saturation Voltage		$V_{CE\ (sat)}$	2	V_{CC} = 5 V, I_{OUT} = 450 mA	—	—	0.8	V
				V_{CC} = 5 V, I_{OUT} = 200 mA	—	—	0.45	
Input Current (Output On)		$I_{IN\ (ON)}$	3	V_{IN} = 3.2V	—	0.84	1.4	mA
D.C Forward Current Transfer Ratio		h_{FE}	2	V_{CE} = 4 V, V_{CC} = 6 V I_{OUT} = 300 mA	3000	—	—	
Supply Current	Output On	$I_{CC\ (ON)}$	6	V_{CC} = 7 V, V_{IN} = 3.2 V 6 circuits	—	120	300	mA
	Output Off	$I_{CC\ (OFF)}$	6	V_{CC} = 7 V	—	—	10	μA
Clamp Diode Reverse Current		I_R	4	V_R = 20 V	—	—	100	μA
Clamp Diode Forward Voltage		V_F	5	I_F = 350 mA	—	—	2.7	V
Turn−On Delay		t_{ON}	7	V_{CC} = 5.0 V, R_L = 36 Ω C_L = 15 pF, V_{OUT} = 20 V	—	0.1	—	μs
Turn−Off Delay		t_{OFF}			—	0.2	—	

TEST CIRCUIT

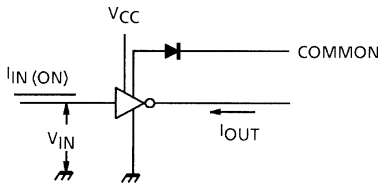
1. I_{CEX}



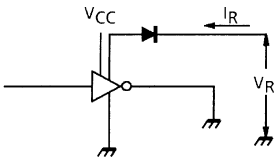
2. h_{FE}, $V_{CE\ (sat)}$



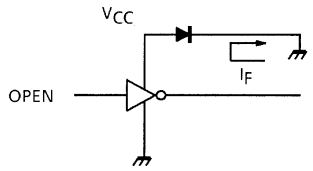
3. $I_{IN\ (ON)}$



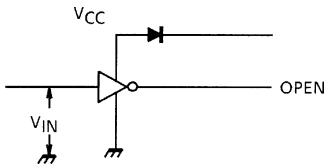
4. I_R



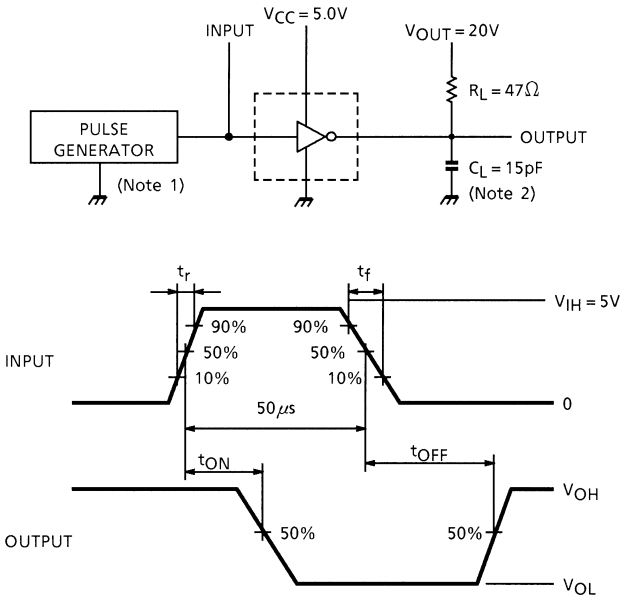
5. V_F



6. $I_{CC\ (ON)}$, $I_{CC\ (OFF)}$



7. t_{ON}, t_{OFF}

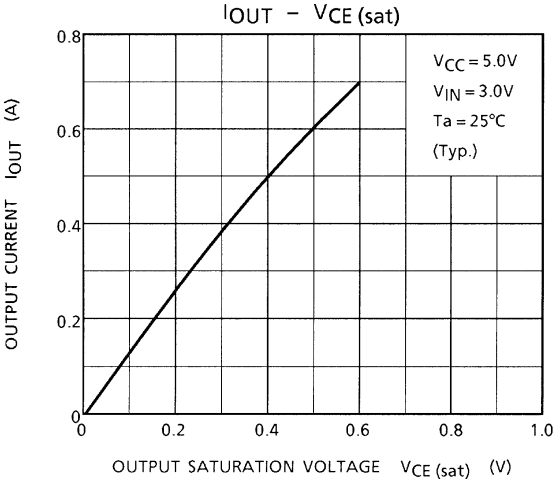


Note 1: Pulse Width 50 μs, duty cycle 10%
Output impedance 50 Ω, $t_r \leq 5$ ns, $t_f \leq 10$ ns
Note 2: C_L includes probe and jig capacitance.

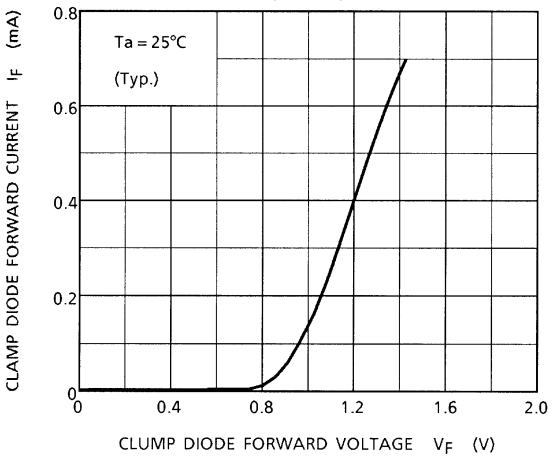
PRECAUTIONS for USING

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, V_{CC}, COMMON and GND line since IC may be destroyed due to short−circuit between outputs, air contamination fault, or fault by improper grounding.

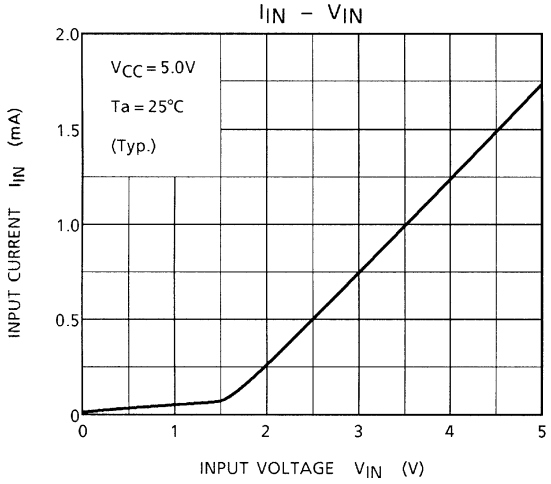
I_{OUT} – $V_{CE\,(sat)}$



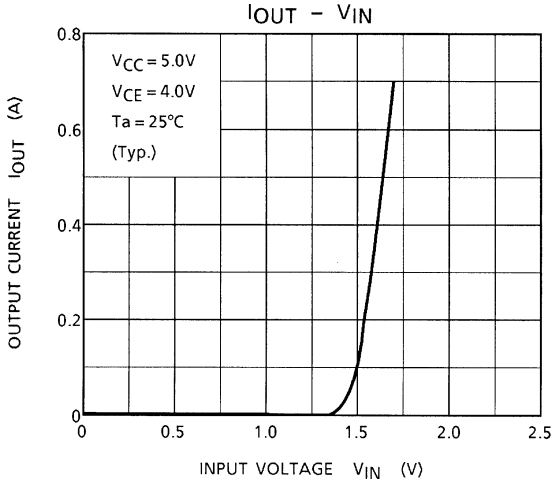
I_F – V_F



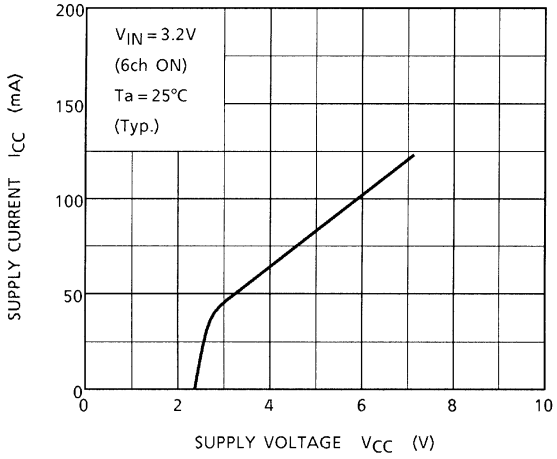
I_{IN} – V_{IN}



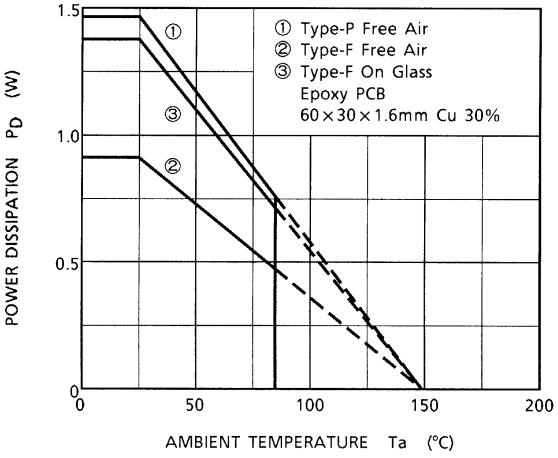
I_{OUT} – V_{IN}



I_{CC} – V_{CC}

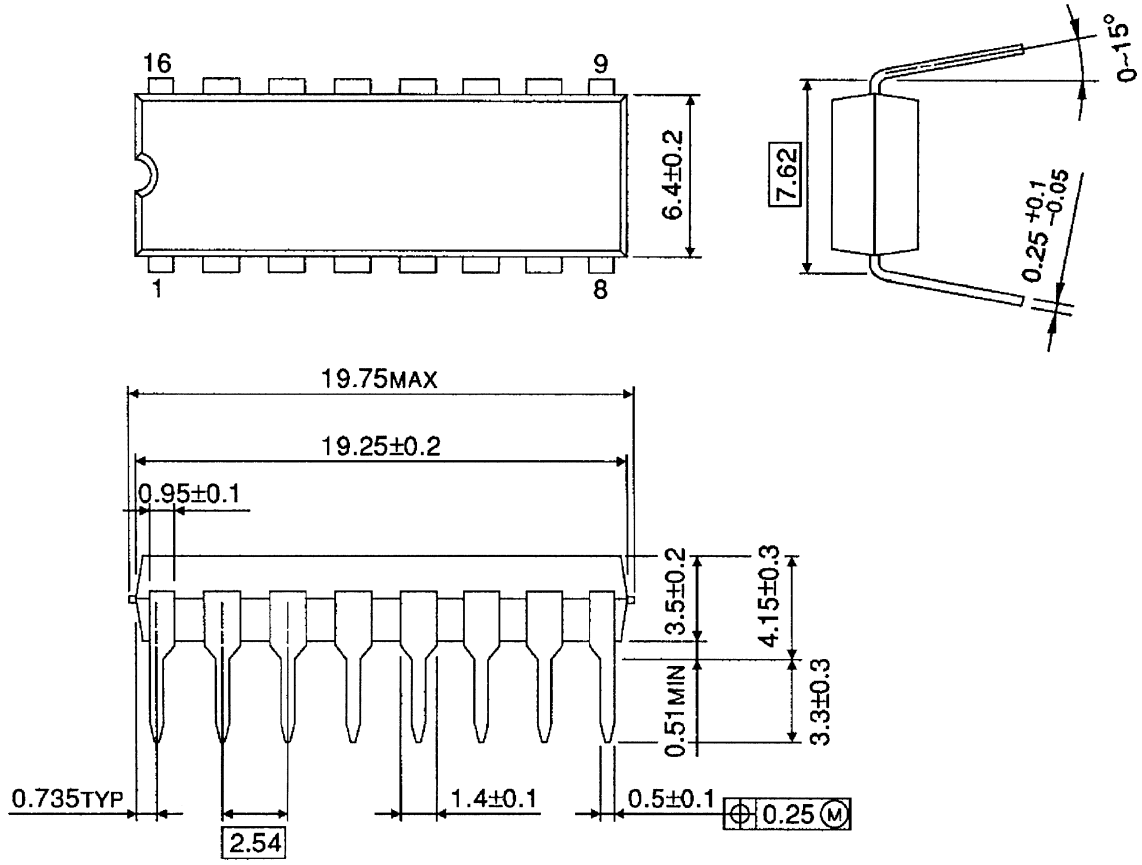


P_D – Ta



PACKAGE DIMENSIONS

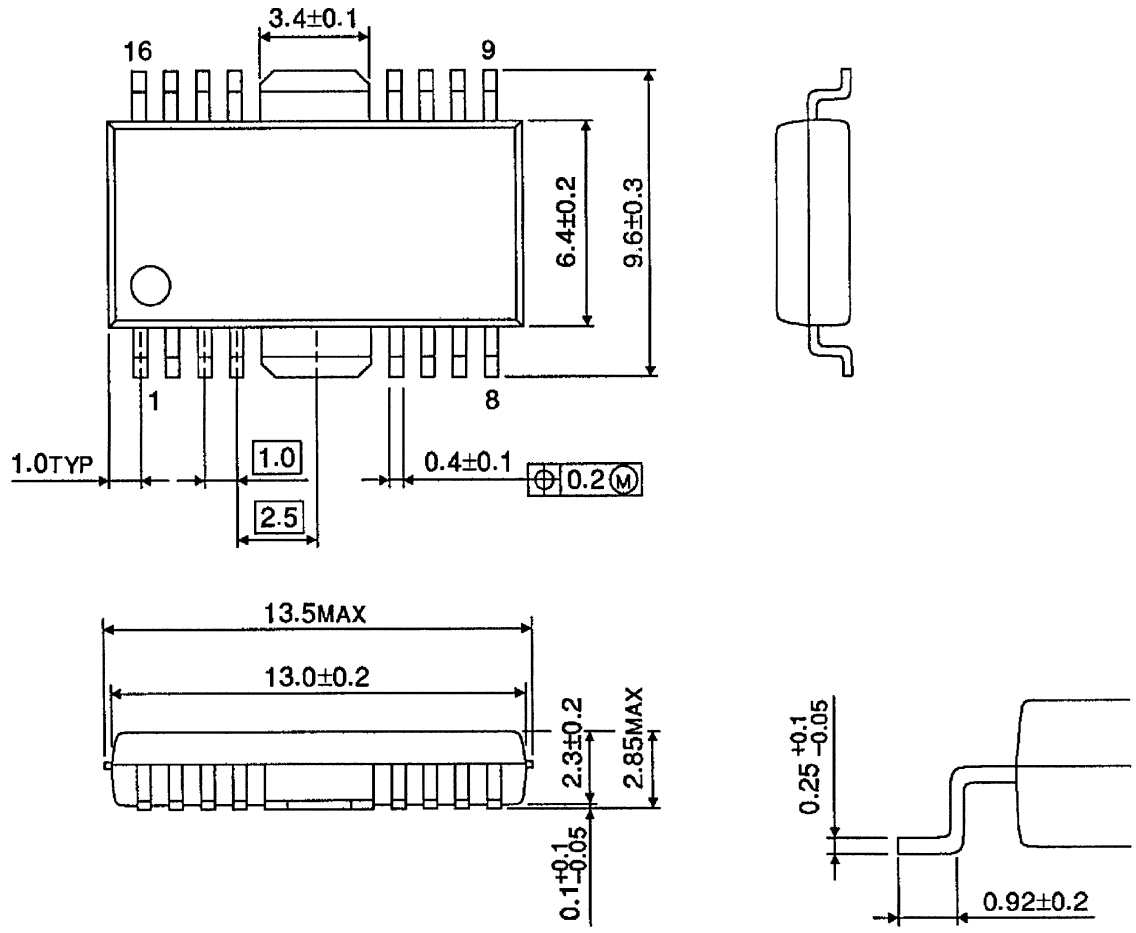
DIP16−P−300−2.54A Unit: mm



Weight: 1.11 g (Typ.)

PACKAGE DIMENSIONS

HOSP16-P-300-1.00 Unit: mm



Weight: 0.50 g (Typ.)

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