

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.

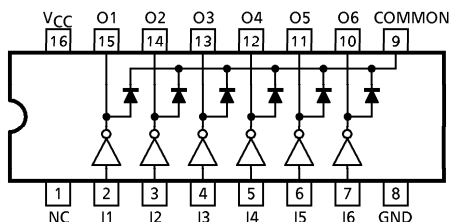
All units feature integral clamp diodes for switching inductive loads. These devices are specifically designed for relay, lamp and LED drive in low voltage systems.

FEATURES

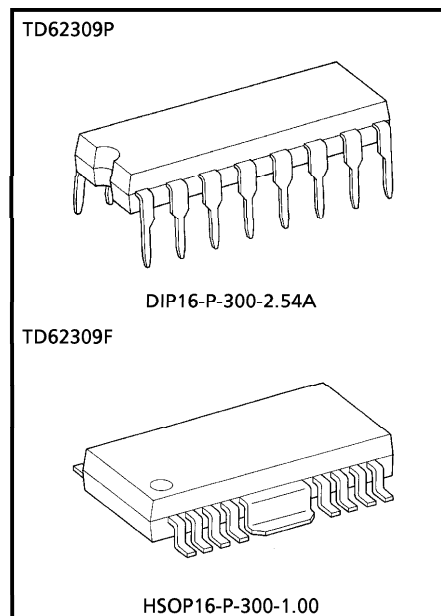
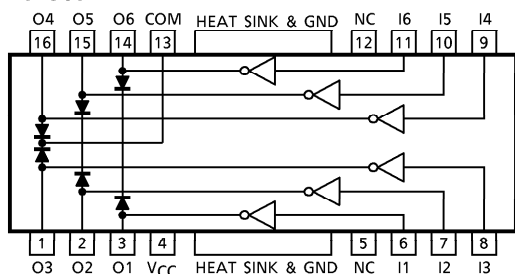
- Low saturation output : $V_{CE(sat)} = 0.8V$ (Max.)
@ $I_{OUT} = 450mA$
- Output rating (single output) 20V (Min.) / 700mA (Max.)
Output clamp diodes
- Inputs compatible with TTL and 3~6V CMOS
- Package type-P : DIP-16pin
- Package type-F : PFP-16pin

PIN CONNECTION (TOP VIEW)

TD62309P

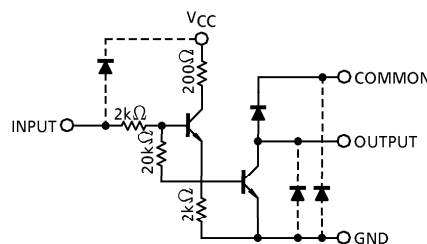


TD62309F



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

SCHEMATICS (EACH DRIVER)



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

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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	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 (60×30×1.6mm 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
		T _{pw} = 25ms, 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	—	—	—	0.52	W
	F	(Note)	—	—	0.5	

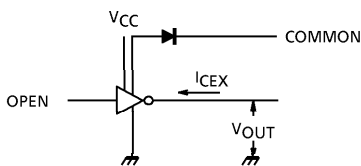
(Note) On Glass Epoxy PCB (60×30×1.6mm Cu 30%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

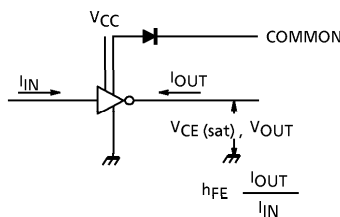
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current	I_{CEX}	1	$V_{OUT} = 20V, T_a = 85^\circ C$	—	—	100	μA
Output Saturation Voltage	$V_{CE(sat)}$	2	$V_{CC} = 5V, I_{OUT} = 450mA$	—	—	0.8	V
			$V_{CC} = 5V, I_{OUT} = 200mA$	—	—	0.45	
Input Current (Output On)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

TEST CIRCUIT

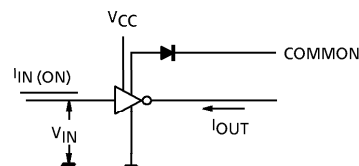
1. I_{CEX}



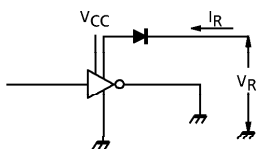
2. $h_{FE}, V_{CE(sat)}$



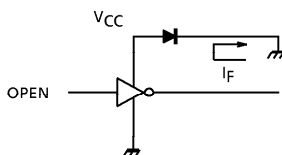
3. $I_{IN(ON)}$



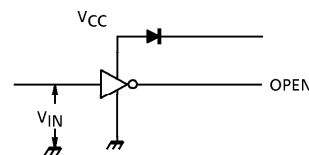
4. I_R

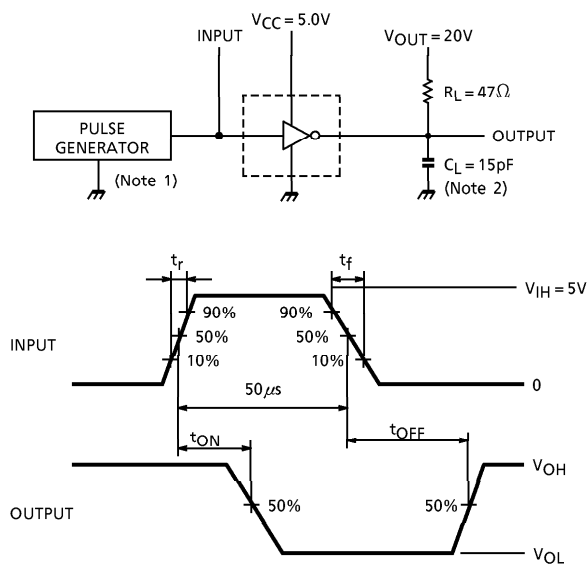


5. V_F



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



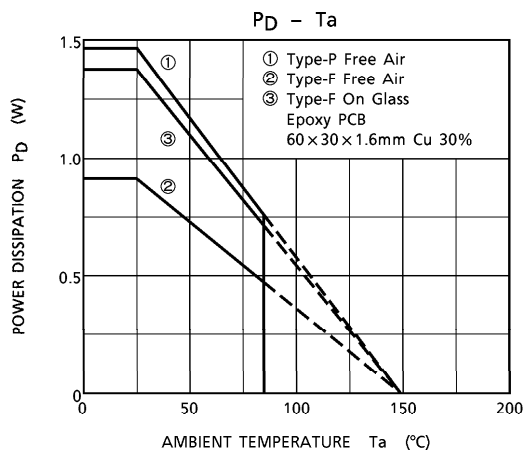
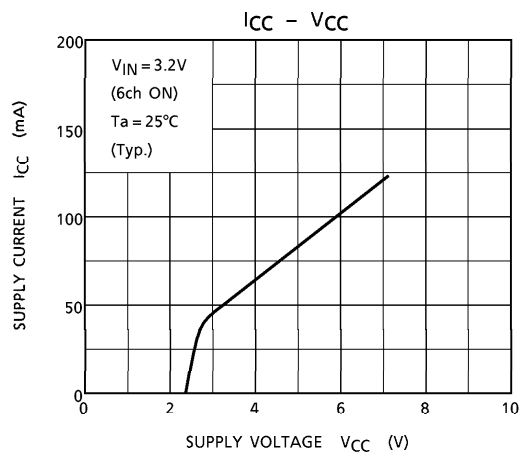
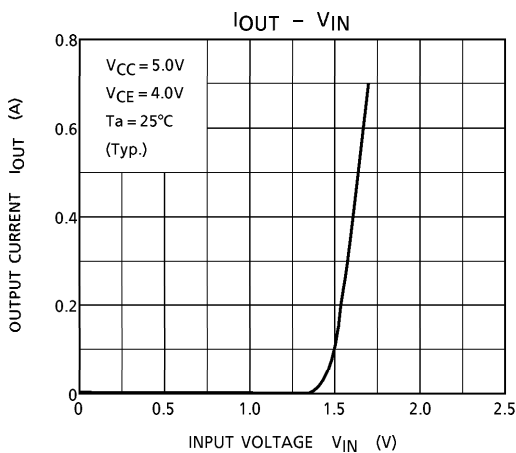
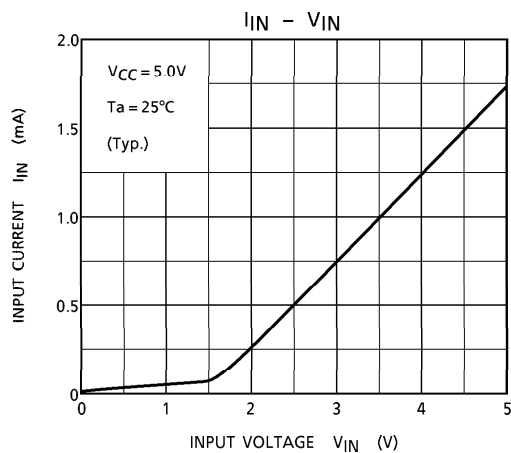
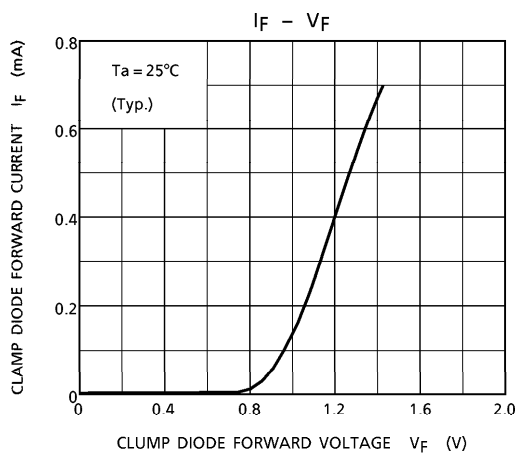
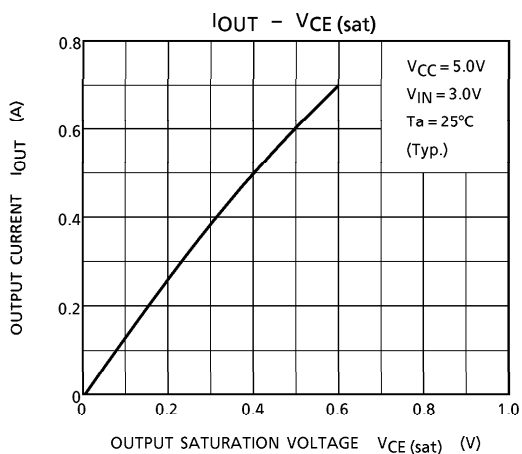
7. t_{ON} , t_{OFF} 

(Note 1) Pulse width $50\mu s$, duty cycle 10%
Output impedance 50Ω , $t_r \leq 5ns$, $t_f \leq 10ns$

(Note 2) C_L includes probe and jig capacitance.

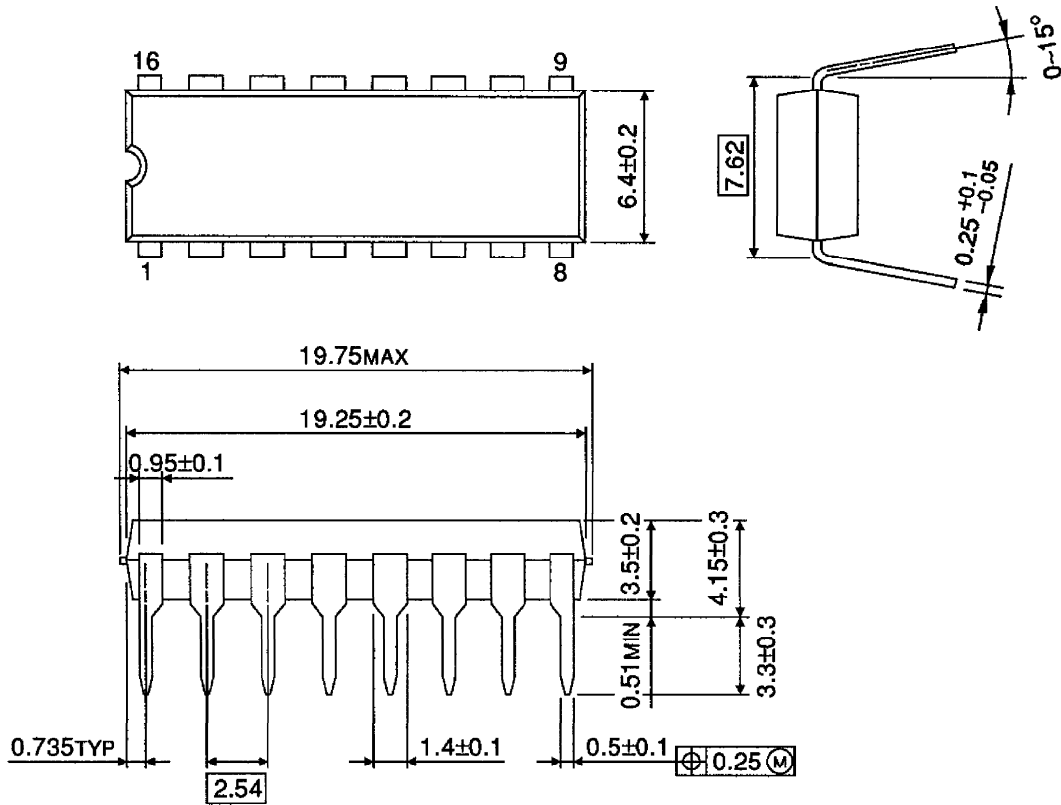
PRECAUTIONS for USING

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



OUTLINE DRAWING
DIP16-P-300-2.54A

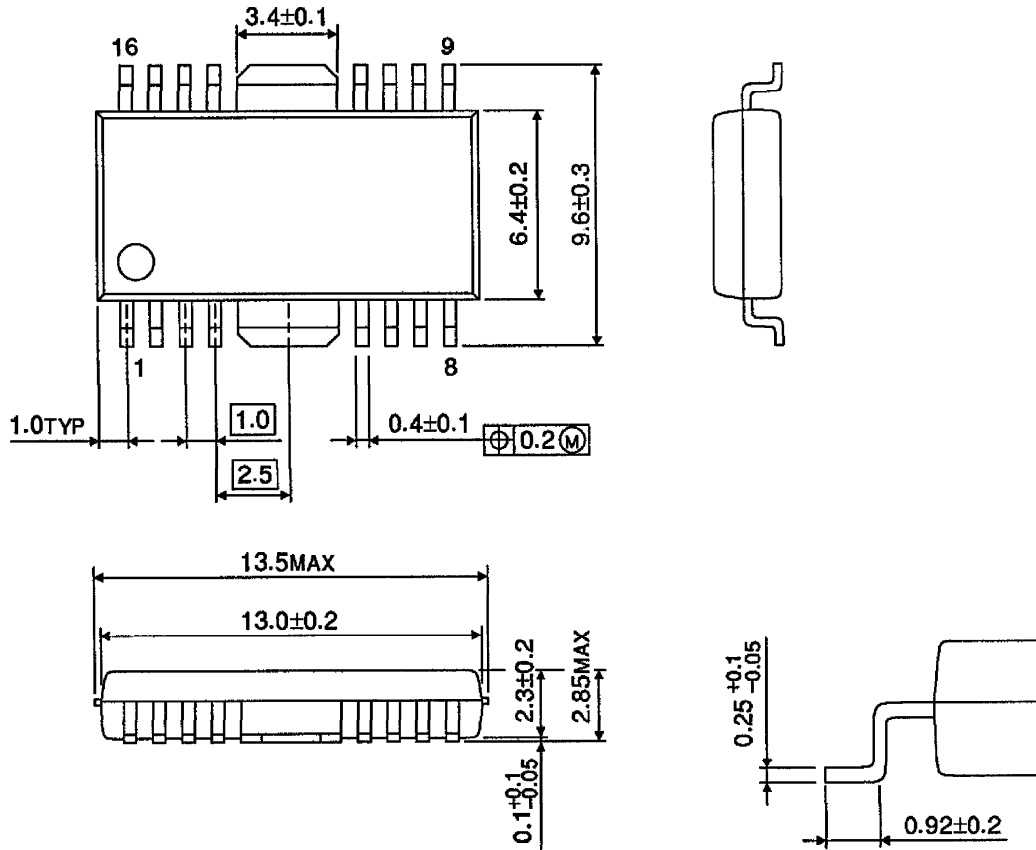
Unit : mm



Weight : 1.11g (Typ.)

OUTLINE DRAWING
HSOP16-P-300-1.00

Unit : mm



Weight : 0.50g (Typ.)