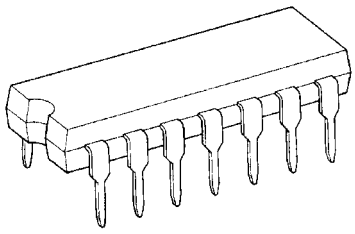
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62306P,TD62306F

6CH LOW SATURATION SINK DRIVER

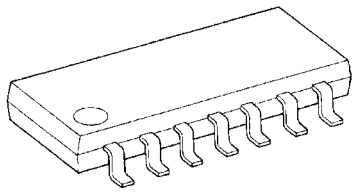
The TD62306P, TD62306F are comprised of six NPN low saturation drivers.
All units feature integral clamp diodes for switching inductive loads and protective diodes against a negative input voltage.
Applications include relay, hammer, lamp and LED driver.

TD62306P



DIP14-P-300-2.54

TD62306F



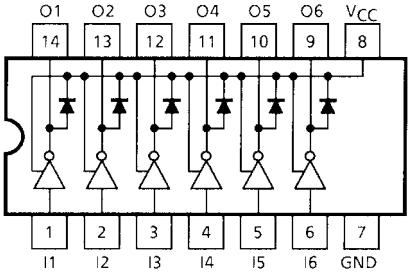
SOP14-P-225-1.27

Weight
DIP14−P−300−2.54 : 1.11 g (Typ.)
SOP14−P−225−1.27 : 0.16 g (Typ.)

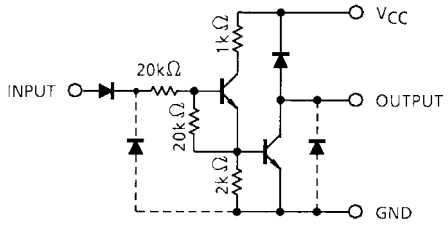
FEATURES

- Low saturation output voltage : $V_{CE\ (sat)}$ = 0.6 V (Max.) @I_{OUT} = 120 mA
- Output rating (single output) 20 V (Min.) / 150 mA (Max.)
- Inputs compatible with 5~15 V PMOS, CMOS
- Input protective diodes against a negative input voltage
- Package type−P : DIP−14 pin
- Package type−F : SOP−14 pin

PIN CONNECTION (TOP VIEW)



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}	−0.5~20	V
Output Sustaining Voltage		$V_{CE\ (SUS)}$	−0.5~V_{CC} + 0.5	V
Output Current		I_{OUT}	150	mA / ch
Input Voltage		V_{IN}	−37~20	V
Input Current		I_{IN}	1.5	mA
Clamp Diode Reverse Voltage		V_R	20	V
Clamp Diode Forward Current		I_F	120	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 (50 × 50 × 1.6 mm Cu 30%)

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

CHARACTERISTIC		SYMBOL	CONDITION	MIN	TYP.	MAX	UNIT
Supply Voltage		V_{CC}	—	4.75	—	18	V
Output Current		I_{OUT}	DC 1 Circuit	0	—	120	mA / ch
			T_{pw} = 25 ms, Duty = 10% 6 Circuits	0	—	100	
Input Voltage		V_{IN}	—	−35	—	V_{CC}	V
Clamp Diode Reverse Voltage		V_R	—	—	—	18	V
Clamp Diode Forward Current		I_F	—	—	—	120	mA
Power Dissipation	P	P_D	—	—	—	0.44	W
	F		(Note)	—	—	0.325	

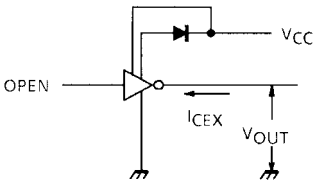
Note: On Glass Epoxy PCB (50 × 50 × 1.6 mm Cu 30%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

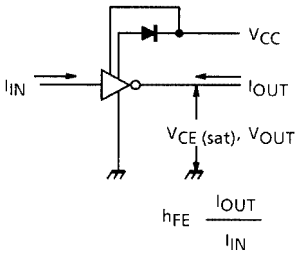
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION		MIN	TYP.	MAX	UNIT
Output Leakage Current	P	I_{CEX}	1	V_{CC} = 18 V, V_{OUT} = 18 V	Ta = 75°C	—	—	100	μA
	F				Ta = 85°C	—	—	100	
Output Saturation Voltage		$V_{CE\ (sat)}$	2	V_{CC} = 5 V, I_{IN} = 0.2 mA, I_{OUT} = 120 mA		—	0.45	0.6	V
DC Forward Current Transfer Ratio		h_{FE}	2	V_{CC} = 5 V, V_{OUT} = 2 V, I_{OUT} = 120 mA		1000	—	—	—
Input Current	Output On	$I_{IN\ (ON)}$	3	V_{IN} = 5 V, I_{OUT} = 120 mA		—	0.16	0.23	mA
				V_{IN} = 15 V, I_{OUT} = 120 mA		—	0.66	0.94	
	Output Off	$I_{IN\ (OFF)}$	4	V_{IN} = −35 V		—	—	−10	μA
Clamp Diode Forward Voltage		V_F	5	I_F = 120 mA		—	1.25	1.6	V
Supply Current	Output On	$I_{CC\ (ON)}$	6	V_{CC} = V_{IN} = 5 V		—	4.0	6.0	mA / Gate
				V_{CC} = V_{IN} = 15 V		—	14.0	22	
	Output Off	$I_{CC\ (OFF)}$	6	V_{CC} = 18 V, V_{IN} = 0 V		—	—	10	μA
Turn−On Delay		t_{ON}	7	V_{CC} = 18 V, R_L = 150 Ω, C_L = 15 pF		—	0.1	—	μs
Turn−Off Delay		t_{OFF}				—	0.8	—	μs

TEST CIRCUIT

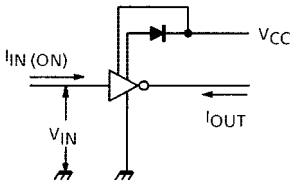
1. I_{CEX}



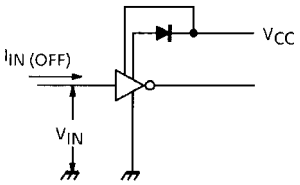
2. h_{FE}, $V_{CE\ (sat)}$



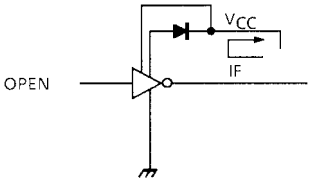
3. $I_{IN\ (ON)}$



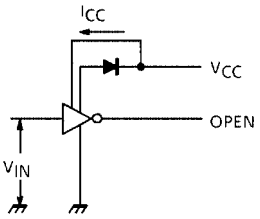
4. $I_{IN\ (OFF)}$



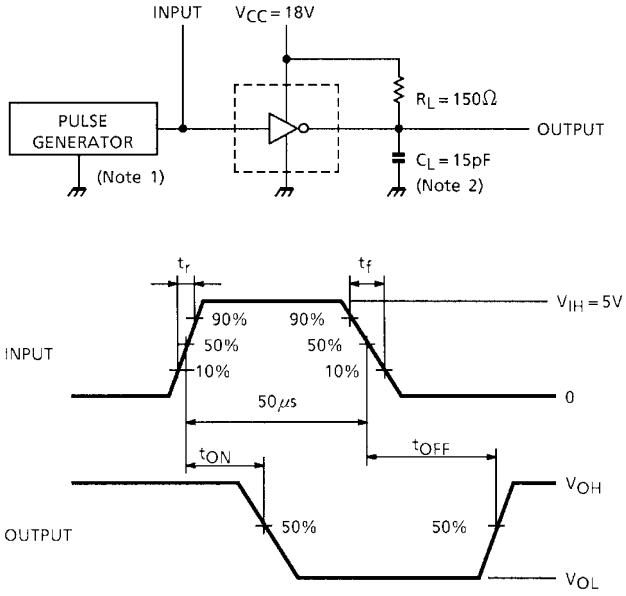
5. V_F



6. I_{CC}



7. t_{ON}, t_{OFF}

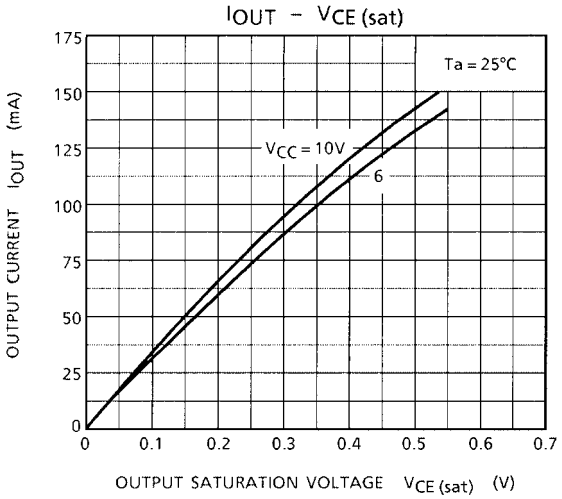


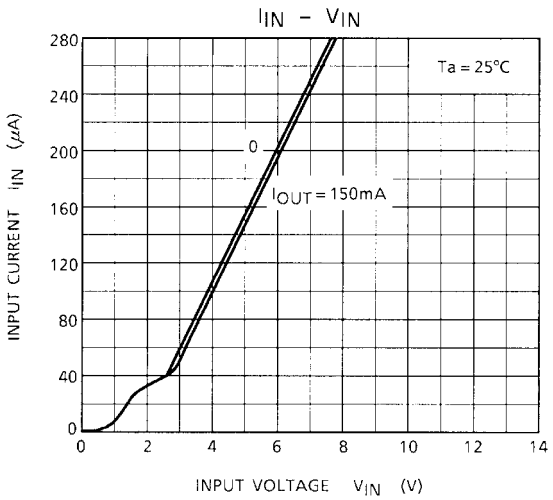
Note 1: Pulse Width 50 μs, Duty Cycle 10%
Output Impedance 50 Ω, $t_r \leq 5$ ns, $t_f \leq 10$ ns

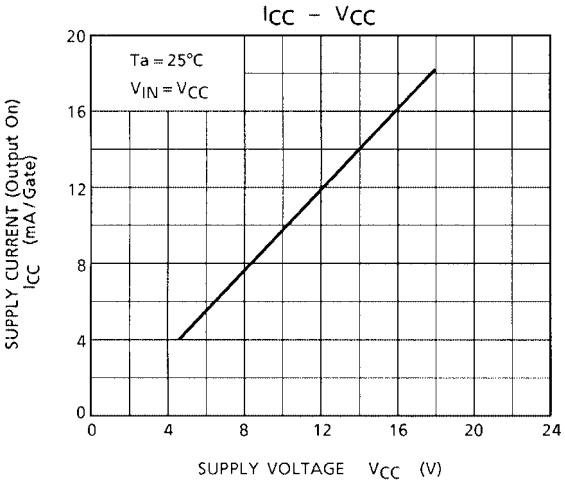
Note 2: C_L includes probe and jig capacitance

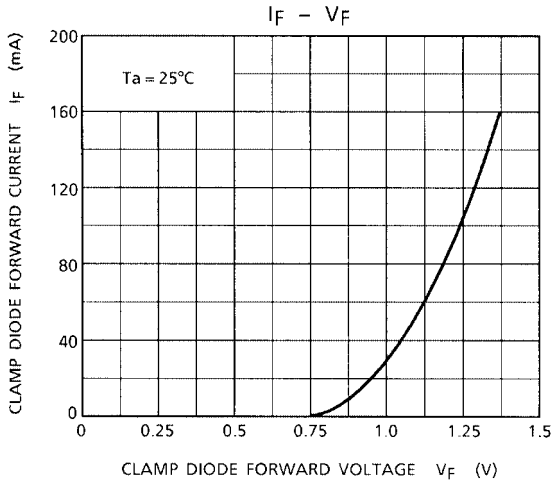
PRECAUTIONS for USING

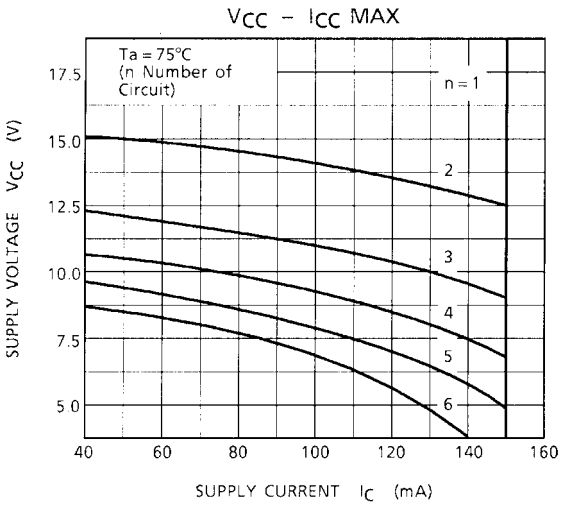
This IC does not include built-in protection circuits for excess current or overvoltage.
If this IC is subjected to excess current or overvoltage, it may be destroyed.
Hence, the utmost care must be taken when systems which incorporate this IC are designed.
Utmost care is necessary in the design of the output line, V_{CC} and GND line since IC may be destroyed due to short−circuit between outputs, air contamination fault, or fault by improper grounding.

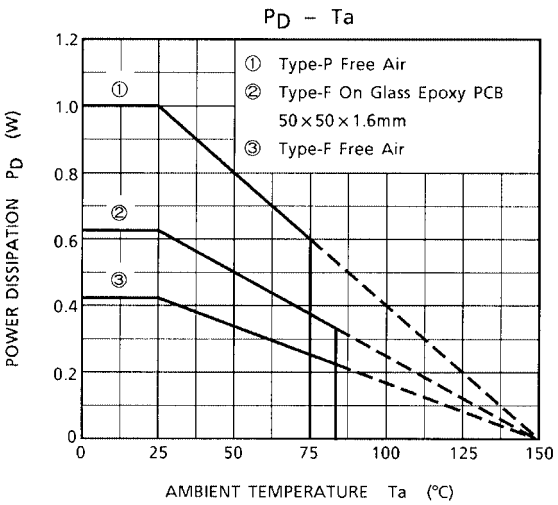

I_{OUT} – V_{CE} (sat)
Ta = 25°C
V_{CC} = 10V
6
OUTPUT CURRENT I_{OUT} (mA)
OUTPUT SATURATION VOLTAGE $V_{CE(sat)}$ (V)


I_{IN} – V_{IN}
Ta = 25°C
0
I_{OUT} = 150mA
INPUT CURRENT I_{IN} (μA)
INPUT VOLTAGE V_{IN} (V)


I_{CC} – V_{CC}
Ta = 25°C
V_{IN} = V_{CC}
SUPPLY CURRENT (Output On) I_{CC} (mA / Gate)
SUPPLY VOLTAGE V_{CC} (V)

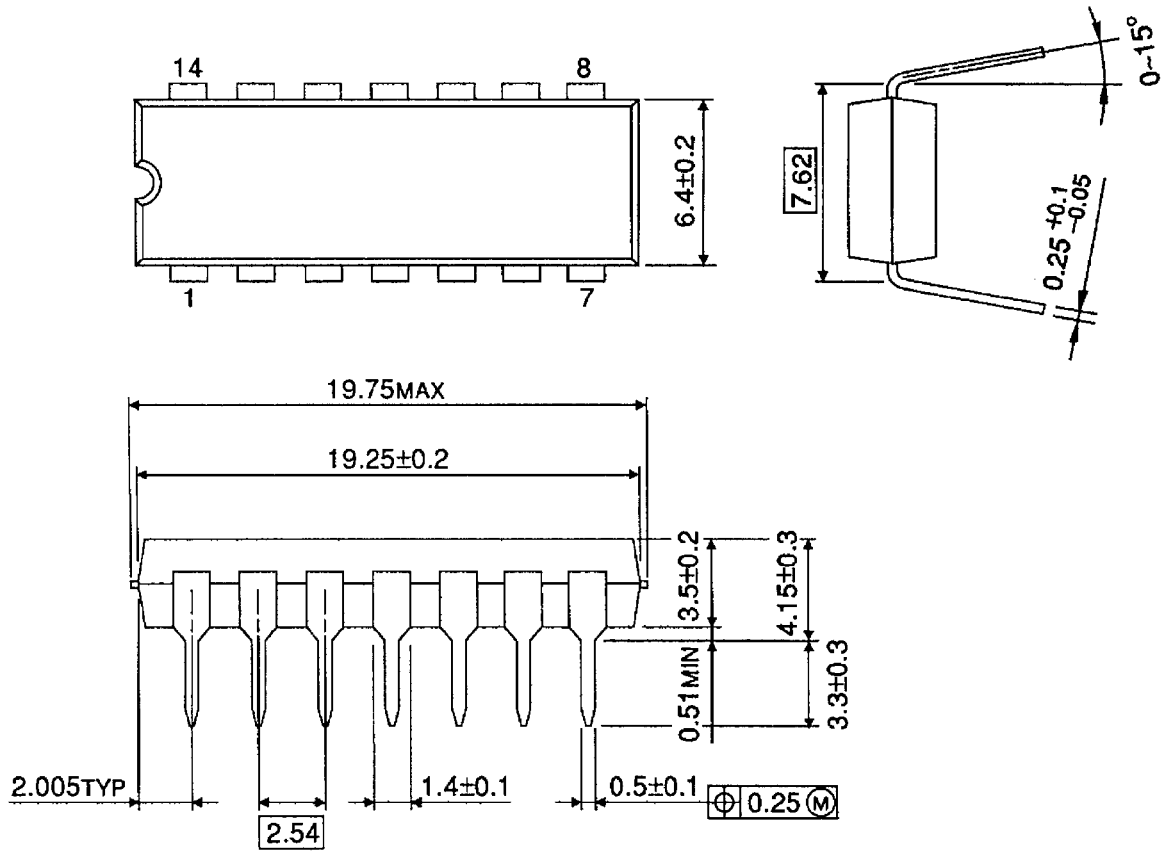

I_F – V_F
Ta = 25°C
CLAMP DIODE FORWARD CURRENT I_F (mA)
CLAMP DIODE FORWARD VOLTAGE V_F (V)


V_{CC} – I_{CC} MAX
Ta = 75°C
(n Number of Circuit)
n = 1
2
3
4
5
6
SUPPLY VOLTAGE V_{CC} (V)
SUPPLY CURRENT I_C (mA)


P_D – Ta
① Type-P Free Air
② Type-F On Glass Epoxy PCB
50×50×1.6mm
③ Type-F Free Air
POWER DISSIPATION P_D (W)
AMBIENT TEMPERATURE Ta (°C)

PACKAGE DIMENSIONS

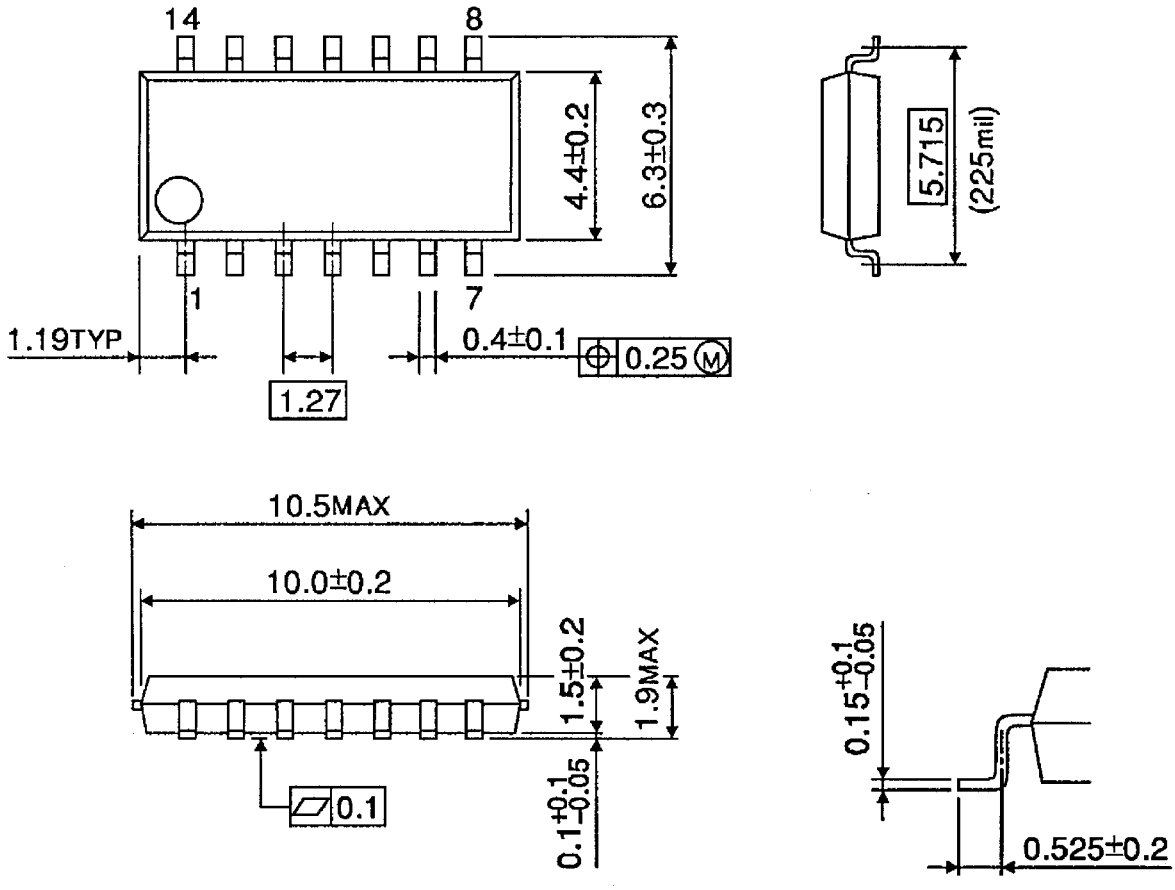
DIP14−P−300−2.54A Unit: mm



Weight: 1.11 g (Typ.)

PACKAGE DIMENSIONS

SOP14−P−225−1.27 Unit: mm



Weight: 0.16 g (Typ.)

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000707EBA

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