

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62591APG, TD62592APG, TD62593APG, TD62594APG  
TD62595APG, TD62595AFG, TD62596APG, TD62596AFG  
TD62597APG, TD62597AFG, TD62598APG, TD62598AFG

## 8CH SINGLE DRIVER

The TD62591APG Series are comprised of eight NPN Transistor Arrays.

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

This devices are a product for the Pb free(Sn-Ag).

## FEATURES

- Output current (single output) 200 mA (Max)
- High sustaining voltage output 50V (Min)
- Low saturation voltage  $V_{CE(sat)} = 0.8\text{ V}$   
@ $I_{out} = 150\text{mA}$  inputs compatible with various type logic.

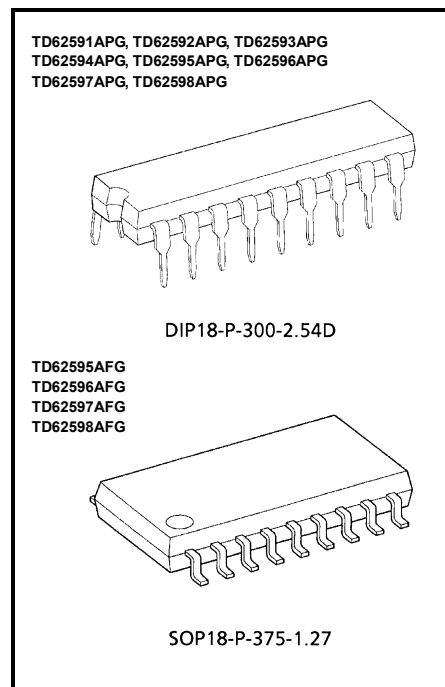
**Include Input Resistor**

TD62591A, TD62595APG/FG :	external.
	general purpose
TD62592A, TD62596APG/FG :	10.5 k $\Omega$ + 7V
	zener diode 14~25 V
	PMOS

TD62593A, TD62597APG/FG : 2.7 k $\Omega$   
TTL, 5 V CMOS

TD62594A, TD62598APG/FG : 10.5 k $\Omega$   
6~15 V PMOS, CMOS

- Include Clamp Diode  
TD62595APG, TD62595AFG, TD62596APG, TD62596AFG  
TD62597APG, TD62597AFG, TD62598APG, TD62598AFG
- Package type-APG : DIP-18pin
- Package type-AFG : SOP-18pin

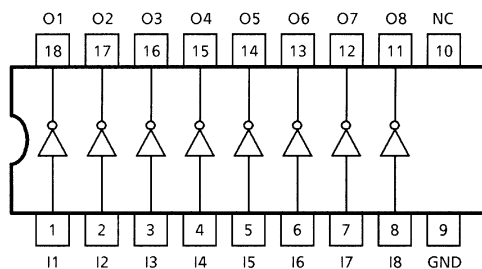


Weight

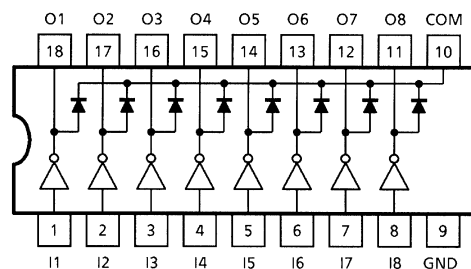
DIP18-P-300-2.54D : 1.47 g (Typ.)  
SOP18-P-375-1.27 : 0.5 g (Typ.)

### PIN CONNECTION (TOP VIEW)

TD62591APG, TD62592APG, TD62593APG  
TD62594APG

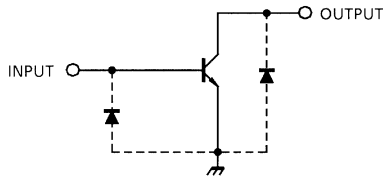


TD62595APG, TD62595AFG, TD62596APG, TD62596AFG  
TD62597APG, TD62597AFG, TD62598APG, TD62598AFG

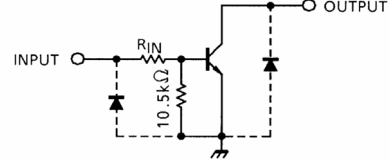


## SCHEMATICS (EACH DRIVER)

TD62591APG

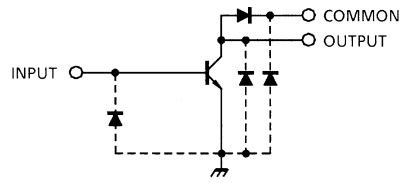


TD62592APG, TD62593APG, TD62594APG

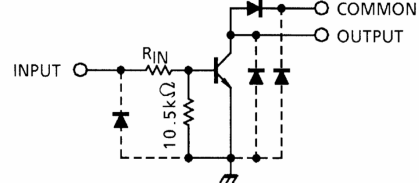


TD62592  $R_{IN} = 10.5k\Omega + V_Z = 7V$   
 TD62593  $R_{IN} = 2.7k\Omega$   
 TD62594  $R_{IN} = 10.5k\Omega$

TD62595APG, TD62595AFG



TD62596APG, TD62596AFG, TD62597APG,  
 TD62597AFG, TD62598APG, TD62598AFG



TD62596  $R_{IN} = 10.5k\Omega + V_Z = 7V$   
 TD62597  $R_{IN} = 2.7k\Omega$   
 TD62598  $R_{IN} = 10.5k\Omega$

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

## MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Emitter Voltage	$V_{CEO}$	50	V
Collector-Base Voltage	$V_{CBO}$	50	V
Clamp Diode Reverse Voltage	$V_R$ (Note 1)	50	V
Collector Current	$I_C$	200	mA / ch
Input Voltage	$V_{IN}$ (Note 2)	-0.5~30	V
Input Current	$I_{IN}$ (Note 3)	25	mA
Power Dissipation	$P_D$ (Note 4)	0.96 (Note 5) / 1.47	W
Operating Temperature	$T_{opr}$	-40~85	°C
Storage Temperature	$T_{stg}$	-55~150	°C

Note 1: Except TD62591~TD62594APG

Note 2: Except TD62591APG, TD62595APG, TD62595AFG

Note 3: Only TD62591APG, TD62595APG, TD62595AFG

Note 4: Delated above 25°C in the proportion of 11.7mW / °C (APG-Type), 7.7mW / °C (AFG-Type)

Note 5: SOP-18pin

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

CHARACTERISTIC		SYMBOL	CONDITION	MIN	TYP.	MAX	UNIT
Collector-Emitter Voltage		$V_{CE0}$	—	0	—	50	V
Collector-Base Voltage		$V_{CB0}$	—	0	—	50	V
Collector Current		$I_C$	—	0	—	150	mA / ch
Clamp Diode Reverse Voltage		$V_R$	(Note1)	7	—	50	V
Input Voltage		$V_{IN}$	(Note2)	0	—	25	V
Input Current		$I_{IN}$	(Note3)	0	—	10	mA
Input Voltage (Output On)	TD62592 TD62596	$V_{IN (ON)}$	—	14.0	—	25	V
	TD62593 TD62597			2.4	—	25	
	TD62594 TD62598			7.0	—	25	
Power Dissipation	APG	$P_D$	—	—	—	0.52	W
	AFG		—	—	—	0.355	

**ELECTRICAL CHARACTERISTICS (Ta = 25°C unless otherwise noted)**

CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Leakage Current		$I_{CEX}$	1	$V_{CE} = 50 \text{ V}, V_{IN} = 0$	—	—	10	$\mu\text{A}$
Collector-Emitter Saturation Voltage		$V_{CE (sat)}$	2	$I_C = 10 \text{ mA}, I_{IN} = 0.4 \text{ mA}$	—	—	0.2	V
				$I_C = 150 \text{ mA}, I_{IN} = 3.0 \text{ mA}$	—	—	0.8	
DC Current Transfer Ratio		$h_{FE}$	2	$V_{CE} = 10 \text{ V}$ $I_C = 10 \text{ mA}$	(Note 3) 70	—	—	—
					(Note 2) 50	—	—	
Input Current	TD62591 TD62595	$I_{IN (ON)}$	3	$I_C = 50 \text{ mA}$	—	—	0.65	mA
	TD62592 TD62596			$V_{IN} = 14 \text{ V}, I_C = 50 \text{ mA}$	—	—	0.9	
	TD62593 TD62597			$V_{IN} = 2.4 \text{ V}, I_C = 50 \text{ mA}$	—	—	0.9	
	TD62594 TD62598			$V_{IN} = 7.0 \text{ V}, I_C = 50 \text{ mA}$	—	—	0.9	
Turn-On Delay		$t_{ON}$	4	$V_{OUT} = 50 \text{ V}, R_L = 330 \Omega$	—	0.1	—	$\mu\text{s}$
Turn-Off Delay		$t_{OFF}$			—	0.3	—	$\mu\text{s}$

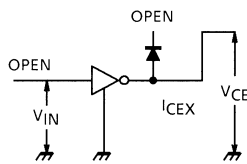
Note 1: Except TD62591~TD62594APG

Note 2: Except TD62591APG, TD62595APG, TD62595AFG

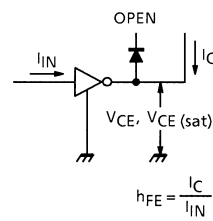
Note 3: Only TD62591APG, TD62595APG, TD62595AFG

## TEST CIRCUIT

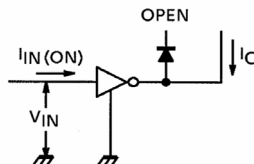
### 1. $I_{CEX}$



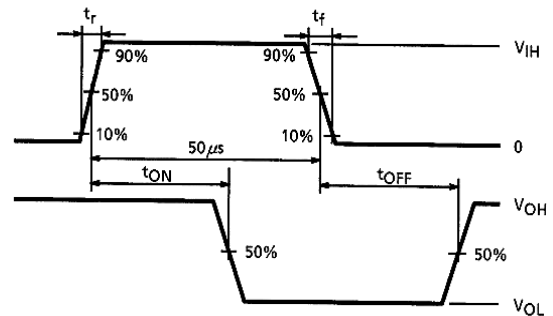
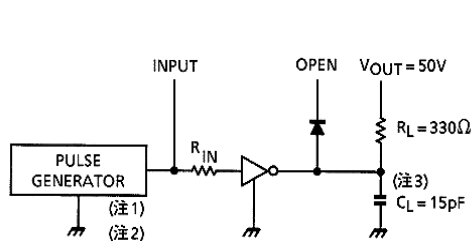
### 2. $h_{FE}$ , $V_{CE(sat)}$



### 3. $V_{IN(ON)}$



### 4. $t_{ON}$ , $t_{OFF}$



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

Note 2: See below

Input Condition

TYPE NUMBER	$R_{IN}$	$V_{IH}$
TD62591APG, TD62595APG, TD62595AFG	2.7 k $\Omega$	3 V
TD62592APG, TD62596APG, TD62596AFG	0 $\Omega$	15 V
TD62593APG, TD62597APG, TD62597AFG	0 $\Omega$	3 V
TD62594APG, TD62598APG, TD62598AFG	0 $\Omega$	10 V

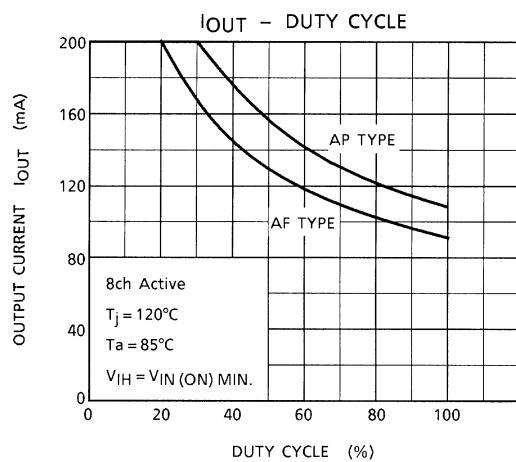
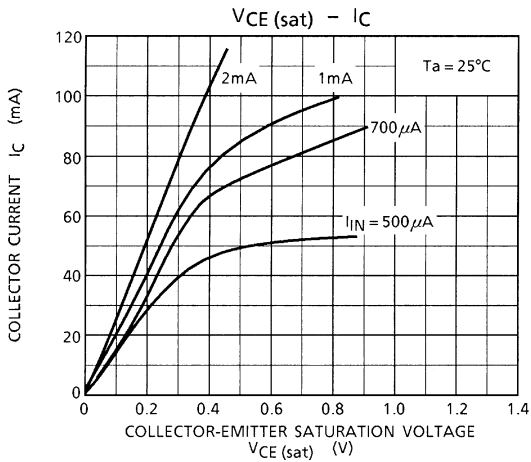
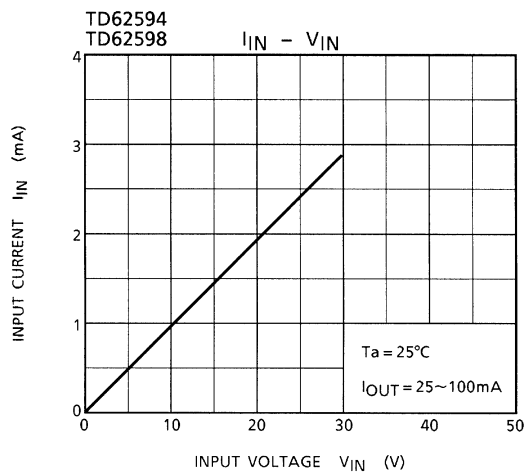
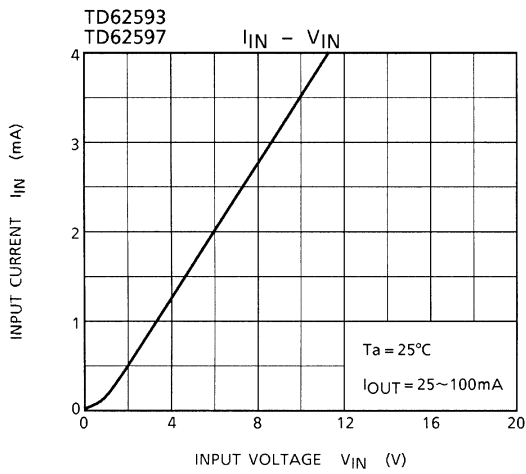
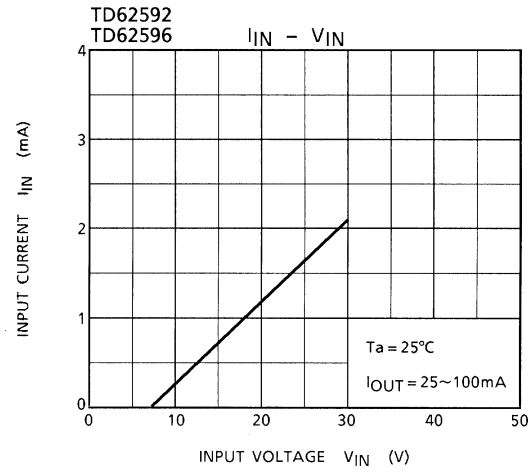
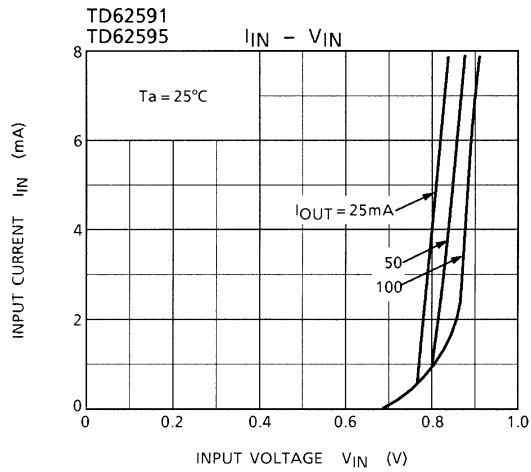
Note 3:  $C_L$  includes probe and jig capacitance

## PRECAUTIONS for USING

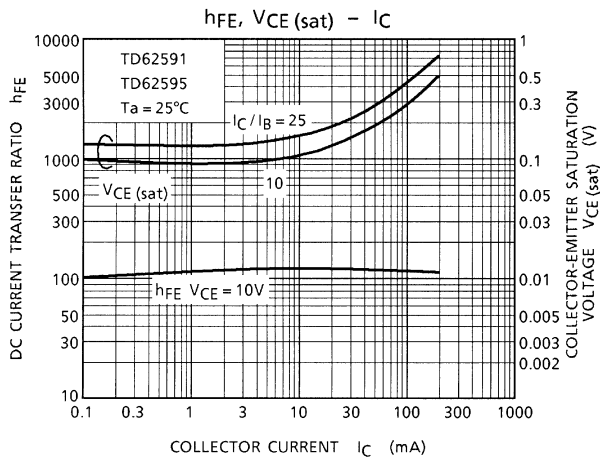
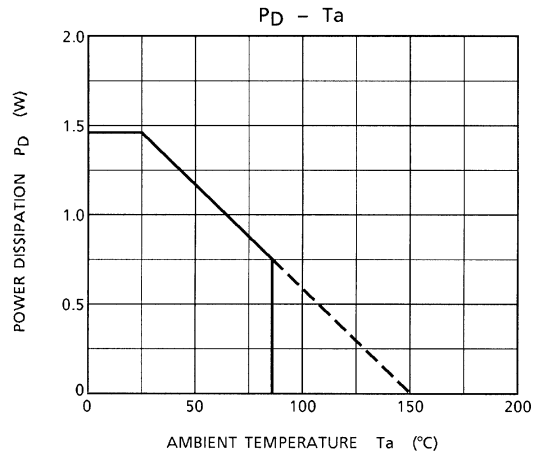
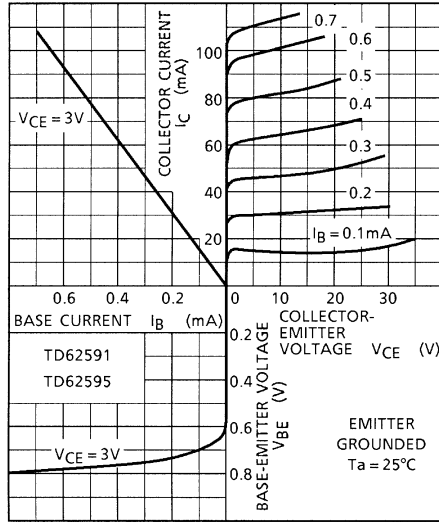
This IC does not integrate protection circuits such as overcurrent and overvoltage protectors.

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



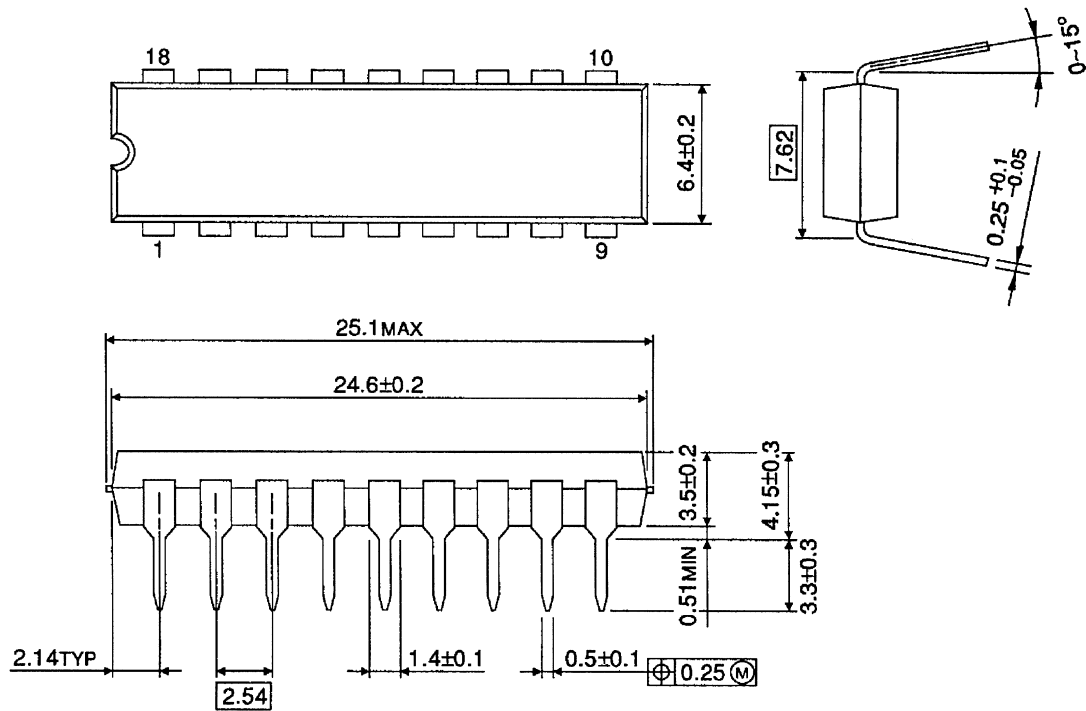
STATIC CHARACTERISTICS



## PACKAGE DIMENSIONS

DIP18-P-300-2.54D

Unit: mm

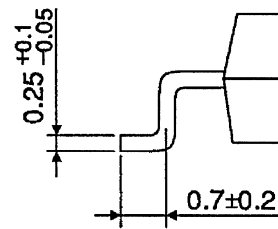
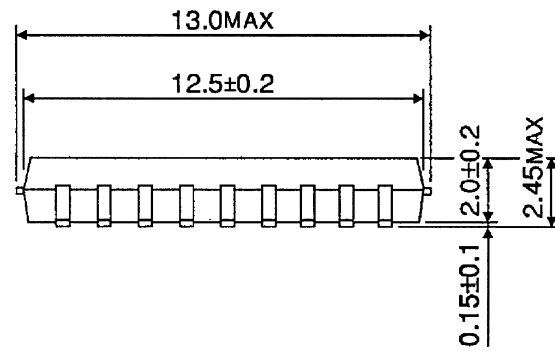
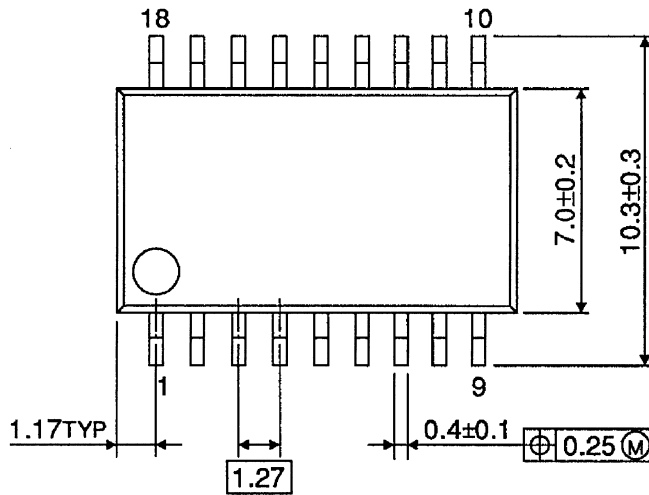


Weight: 1.47 g (Typ.)

## PACKAGE DIMENSIONS

SOP18-P-375-1.27

Unit: mm



Weight: 0.50 g (Typ.)



About solderability, following conditions were confirmed

- Solderability

- (1) Use of Sn-63Pb solder Bath

- solder bath temperature = 230°C
    - dipping time = 5 seconds
    - the number of times = once
    - use of R-type flux

- (2) Use of Sn-3.0Ag-0.5Cu solder Bath

- solder bath temperature = 245°C
    - dipping time = 5 seconds
    - the number of times = once
    - use of R-type flux

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