

TOSHIBA Bipolar Digital Integrated Circuit Silicon Monolithic

TD62164APG, TD62164AFG

4ch High-Current Darlington Sink Driver

The TD62164APG and TD62164AFG are high-voltage, high-current darlington drivers comprised of four NPN darlington pairs.

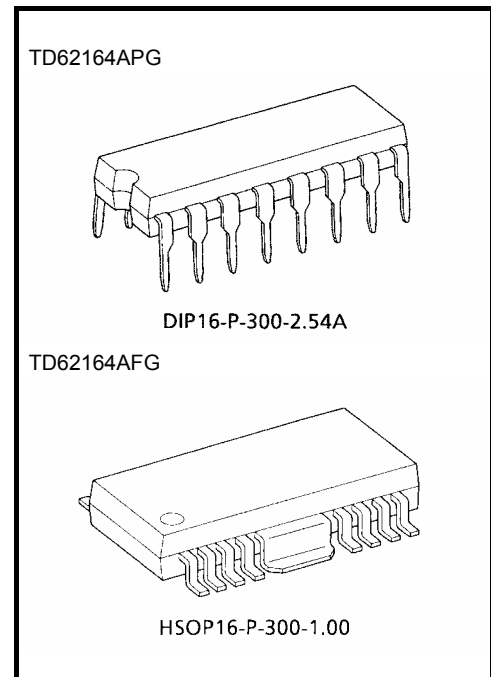
All units feature integral clamp diodes for switching inductive loads.

Applications include relay, hammer, lamp and stepping motor drivers.

Please observe the thermal condition for using.

Features

- Output current (single output) 700 mA (max)
- High sustaining voltage output 50 V (min)
- Output clamp diodes
- Input compatible with TTL and 5-V CMOS
- GND and SUB terminal heat sink
- Package type-APG: DIP-16 pin
- Package type-AFG: HSOP-16 pin



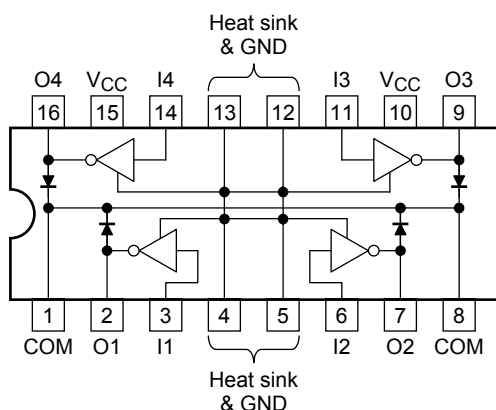
Weight

DIP16-P-300-2.54A : 1.11 g (typ.)

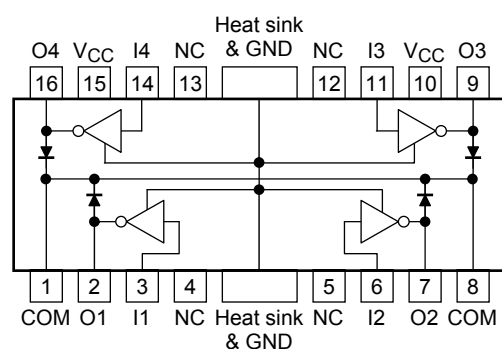
HSOP16-P-300-1.00 : 0.50 g (typ.)

Pin Connection (top view)

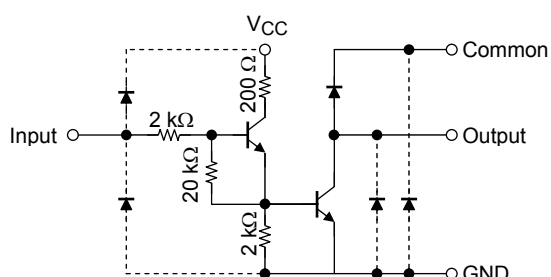
TD62164APG



AD62164AFG



Schematics (each driver)



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

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	-0.5 to 17	V
Output sustaining voltage	$V_{CE(SUS)}$	-0.5 to 50	V
Output current	I_{OUT}	700	mA/ch
Input current	I_{IN}	50	mA
Input voltage	V_{IN}	17	V
Clamp diode reverse voltage	V_R	50	V
Clamp diode forward current	I_F	700	mA
Operating temperature	APG	P_D	1.47/2.7 (Note 1)
	AFG		
			0.9/1.4 (Note 2)
Operating temperature	T_{opr}	-40 to 85	°C
Storage temperature	T_{stg}	-55 to 150	°C

Note 1: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

Note 2: On glass epoxy PCB (60 × 60 × 1.6 mm Cu 30%)

Recommended Operating Conditions (Ta = -40 to 85°C)

Characteristics	Symbol	Condition	Min	Typ.	Max	Unit
Supply voltage	V_{CC}		4.5	—	5.5	V
Output sustaining voltage	$V_{CE(SUS)}$		0	—	50	V
Output current	I_{OUT}	DC 1 circuit, Ta = 25°C	0	—	570	mA/ch
		$T_{pw} = 25\text{ ms}$				
		4 circuits				
		Ta = 85°C				
		Tj = 120°C				
Input voltage	V_{IN}	Duty = 10%	0	—	570	V
		Duty = 50%	0	—	570	
		Duty = 10%	0	—	570	
		Duty = 50%	0	—	480	
Input voltage	$V_{IN(ON)}$	$I_{OUT} = 500\text{ mA}$	10.0	—	15	V
		$h_{FE} = 150$	2.4	—	15	
		$h_{FE} = 2000$	0	—	0.4	
Input current	I_{IN}		0	—	20	mA
Clamp diode reverse voltage	V_R		—	—	50	V
Clamp diode forward current	I_F		—	—	500	mA
Power dissipation	APG	P_D	Ta = 85°C (Note 1)	—	1.4	W
	AFG		Ta = 85°C (Note 2)	—	0.7	

Note 1: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

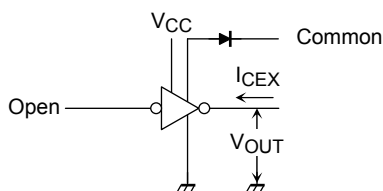
Note 2: On glass epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

Electrical Characteristics (Ta = 25°C)

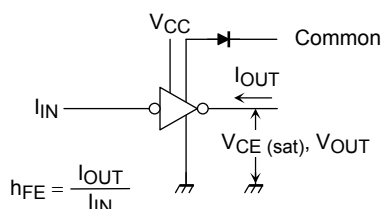
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output leakage current	I_{CEX}	1	$V_{CE} = 50 \text{ V}$, $T_a = 25^\circ\text{C}$	—	—	50	μA
			$V_{CE} = 50 \text{ V}$, $T_a = 85^\circ\text{C}$	—	—	100	
Collector-emitter saturation voltage	$V_{CE}(\text{sat})$	2	$I_{OUT} = 500 \text{ mA}$, $V_{CC} = 5 \text{ V}$	—	—	0.8	V
			$I_{OUT} = 200 \text{ mA}$, $V_{CC} = 5 \text{ V}$	—	—	0.45	
DC current transfer ratio	h_{FE}	2	$V_{CE} = 2 \text{ V}$, $I_{OUT} = 500 \text{ mA}$	2000	—	—	
Input voltage (Output on)	$V_{IN}(\text{ON})$	3	$I_{OUT} = 500 \text{ mA}$, $h_{FE} = 150$	7.0	—	10.0	V
			$I_{OUT} = 500 \text{ mA}$, $h_{FE} = 2000$	1.8	—	2.4	
Clamp diode reverse current	I_R	4	$V_R = 50 \text{ V}$, $T_a = 25^\circ\text{C}$	—	—	50	μA
			$V_R = 50 \text{ V}$, $T_a = 85^\circ\text{C}$	—	—	100	
Clamp diode forward voltage	V_F	5	$I_F = 500 \text{ mA}$	—	—	2.0	V
Supply current	Output on	6	$V_{CC} = 5.5 \text{ V}$, $V_{IN} = 2.4 \text{ V}$	—	35	40	mA/ch
	Output off		$V_{CC} = 5.5 \text{ V}$, $V_{IN} = 0.4 \text{ V}$	—	—	10	μA
Input capacitance	C_{IN}	—	$V_{IN} = 0 \text{ V}$, $f = 1 \text{ MHz}$	—	15	—	pF
Turn-on delay	t_{ON}	7	$V_{OUT} = 50 \text{ V}$, $R_L = 72 \Omega$ $V_{CC} = 5.0 \text{ V}$, $C_L = 15 \text{ pF}$	—	0.2	0.4	μs
Turn-off delay	t_{OFF}			—	4.0	8.0	

Test Circuit

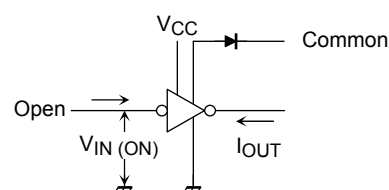
1. I_{CEX}



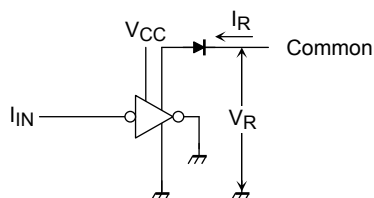
2. h_{FE} , $V_{CE}(\text{sat})$



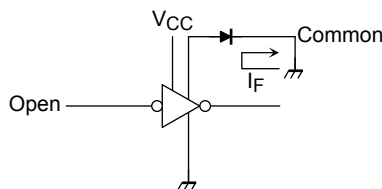
3. $V_{IN}(\text{ON})$



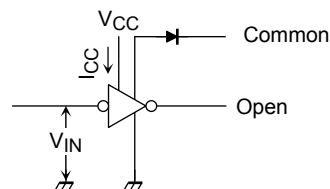
4. I_R



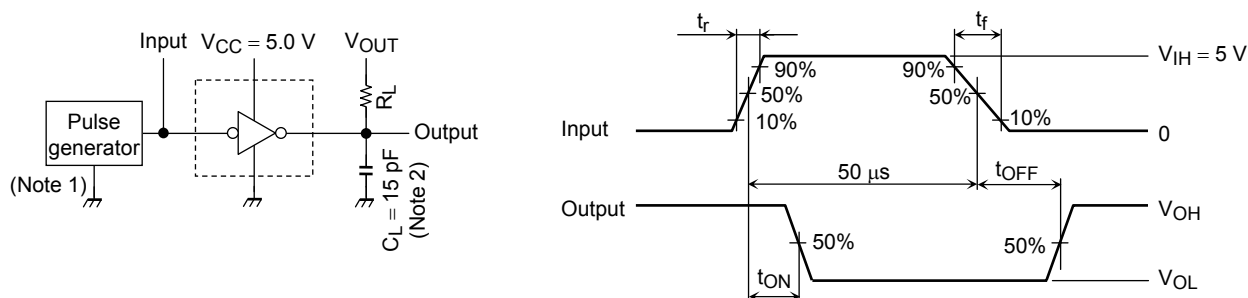
5. V_F



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



7. t_{ON} , t_{OFF}



Note 1: Pulse width $50 \mu\text{s}$, duty cycle 10%, output impedance 50Ω , $t_r \leq 5 \text{ ns}$, $t_f \leq 10 \text{ ns}$.

Note 2: C_L includes probe and jig capacitance.

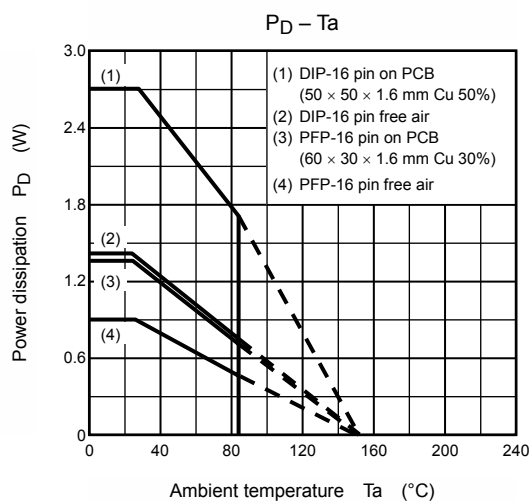
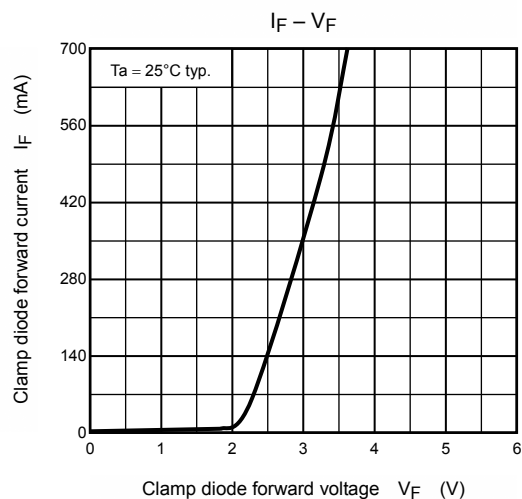
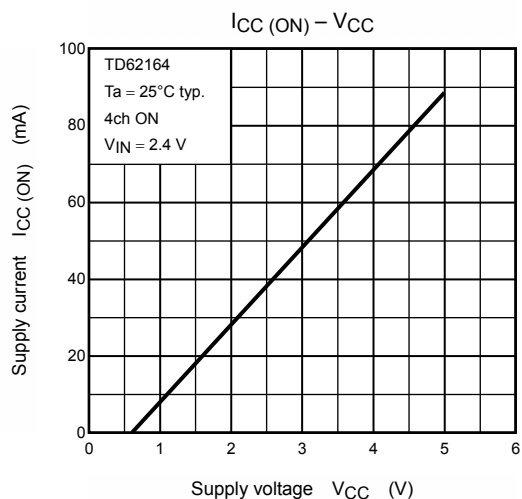
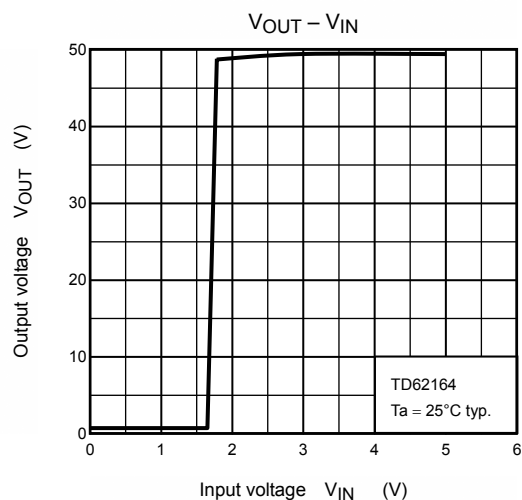
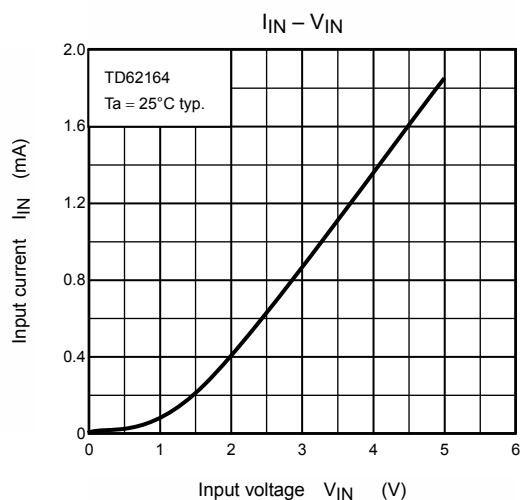
Precautions for Using

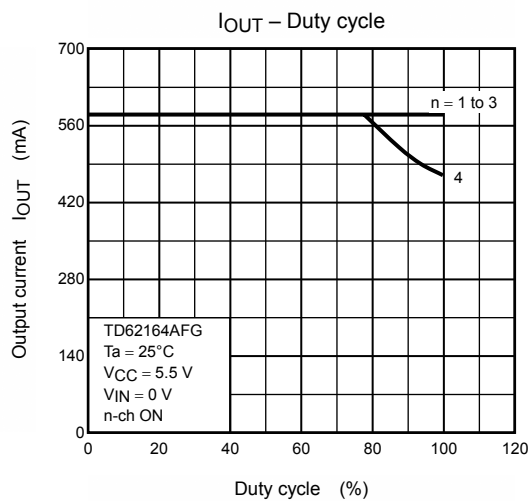
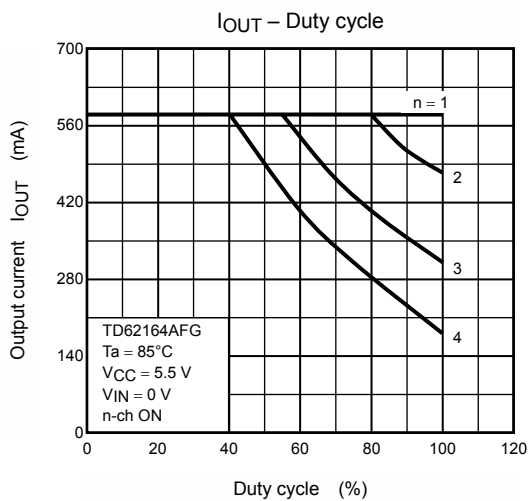
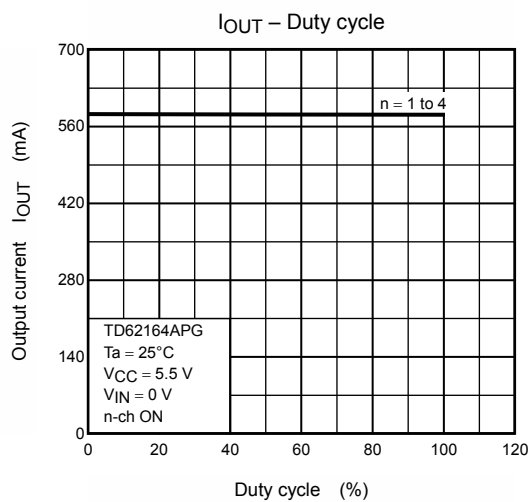
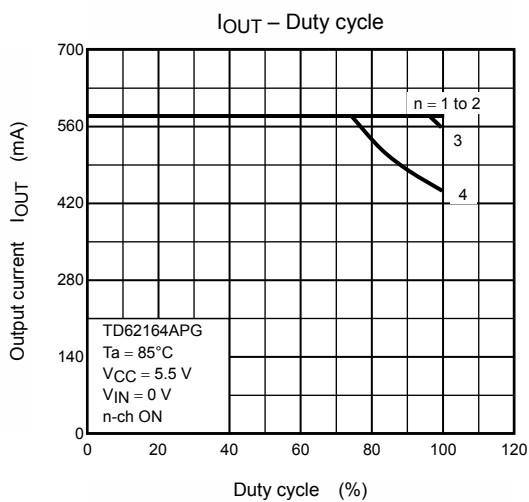
This IC does not include built-in protection circuits for excess current or overvoltage.

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.

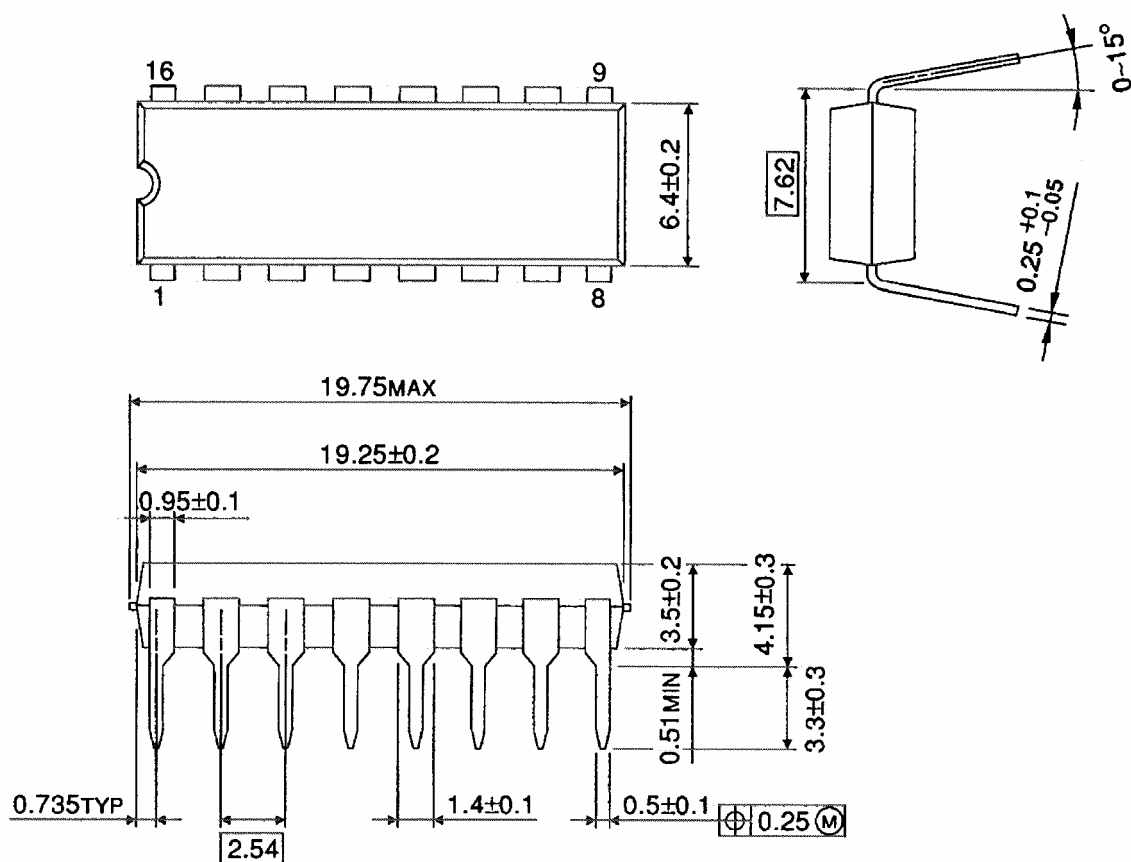




Package Dimensions

DIP16-P-300-2.54A

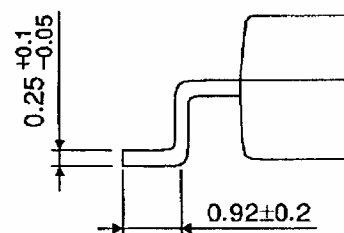
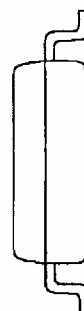
Unit : mm



Weight: 1.11 g (typ.)

HSOP16-P-300-1.00

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

RESTRICTIONS ON PRODUCT USE

030619EBA

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