

# TD62387AFNG, TD62388AFNG

## 8CH LOW INPUT ACTIVE DARLINGTON SINK DRIVER

The TD62387AFNG and TD62388AFNG are non-inverting transistor arrays, which are comprised of eight NPN darlington output stages and PNP input stages.

All unites feature integral clamp diodes for switching inductive loads.

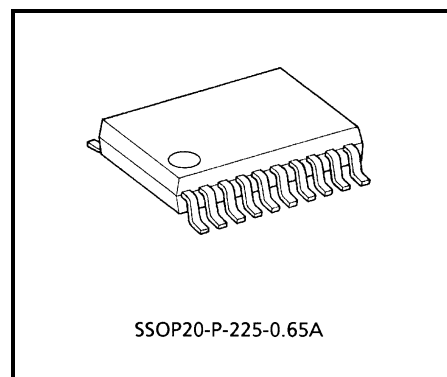
These devices are Low Level input active drivers and are suitable for operations with TTL, 5 V CMOS and 5 V Microprocessor which have sink current output drivers.

Applications include relay, hammer, lamp and LED driver.

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

### FEATURES

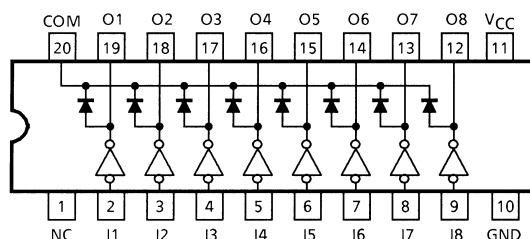
- Package Type : SSOP20 pin (0.65 mm pitch)
- High Sustaining Voltage : 50 V (Min)
- Output Current (Single Output) : 500 mA / ch (Max)
- Output Clamp Diodes
- Input : LOW LEVEL ACTIVE
- Standard Supply Voltage
- Inputs Compatible with TTL and 5 V CMOS



Weight: 0.09 g (Typ.)

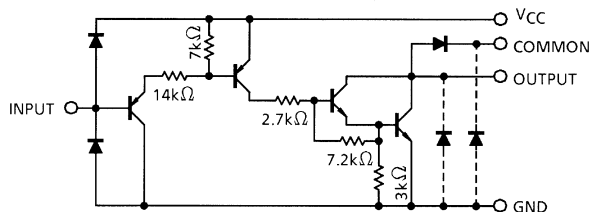
TYPE	$V_{IN(ON)}$
TD62387AFNG	0 V~ $V_{CC}$ - 3.7 V
TD62388AFNG	

### PIN CONNECTION (TOP VIEW)

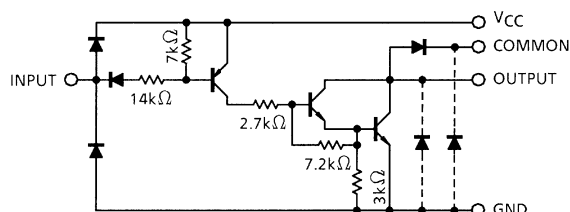


### SCHEMATICS (EACH DRIVER)

TD62387AFNG



TD62388AFNG



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 <sub>CC</sub>	-0.5~7.0	V
Output Sustaining Voltage	V <sub>CE (SUS)</sub>	-0.5~50	V
Output Current	I <sub>OUT</sub>	500	mA / ch
Input Voltage	V <sub>IN</sub>	-0.5~7.0	V
Input Current	I <sub>IN</sub>	-10	mA
Clamp Diode Reverse Voltage	V <sub>R</sub>	50	V
Clamp Diode Forward Current	I <sub>F</sub>	500	mA
Power Dissipation	P <sub>D</sub>	0.96 (Note)	W
Operating Temperature	T <sub>opr</sub>	-40~85	°C
Storage Temperature	T <sub>stg</sub>	-55~150	°C

Note: On Glass Epoxy PCB  
(50 × 50 × 1.6 mm Cu 40%)

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

CHARACTERISTIC	SYMBOL	CONDITION	MIN	TYP.	MAX	UNIT
Supply Voltage	V <sub>CC</sub>		4.5	5.0	5.5	V
Output Sustaining Voltage	V <sub>CE (SUS)</sub>		0	—	50	V
Output Current	I <sub>OUT</sub> (Note)	DC 1 Circuit	0	—	350	mA / ch
		T <sub>pW</sub> = 25 ms 8 Circuits Ta = 85°C Tj = 120°C	Duty = 10%	0	—	180
			Duty = 50%	0	—	90
Input Voltage	V <sub>IN</sub>		0	—	5.5	V
Clamp Diode Reverse Voltage	V <sub>R</sub>		—	—	50	V
Clamp Diode Forward Current	I <sub>F</sub>		—	—	400	mA
Power Dissipation	P <sub>D</sub>		—	—	0.4	W

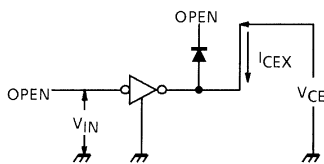
Note: On Glass Epoxy PCB (50 × 50 × 1.6 mm Cu 40%)

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

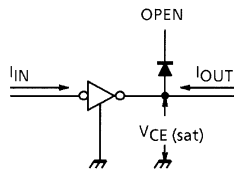
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Leakage Current		$I_{CEX}$	1	$V_{CC} = 5.5 \text{ V}$ , $I_{IN} = 0$ $V_{OUT} = 50 \text{ V}$ , $T_a = 85^\circ\text{C}$	—	—	100	$\mu\text{A}$
Output Saturation Voltage		$V_{CE (sat)}$	2	$V_{CC} = 4.5 \text{ V}$ $V_{IN} = V_{IN (ON)}$ Max. $I_{OUT} = 350 \text{ mA}$	—	1.4	2.0	V
Input Current	Output On	$I_{IN (ON)}$	3	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 0.4 \text{ V}$	—	-0.32	-0.45	mA
	Output Off	$I_{IN (OFF)}$	4	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = -20 \text{ V}$	—	—	-2.6	
Input Voltage (Output on)		$V_{IN (ON)}$	5		—	—	$V_{CC} - 3.7$	V
Clamp Diode Reverse Current		$I_R$	6	$V_R = 50 \text{ V}$ , $T_a = 25^\circ\text{C}$ (Note 1)	—	—	50	$\mu\text{A}$
				$V_R = 50 \text{ V}$ , $T_a = 85^\circ\text{C}$ (Note 1)	—	—	100	
Clamp Diode Forward Current		$V_F$	7	$I_F = 350 \text{ mA}$	—	—	2.0	V
				$I_F = 280 \text{ mA}$	—	—	1.8	
Supply Current	$I_{CC (ON)}$		8	$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = 0$	—	17	22	mA
	$I_{CC (OFF)}$			$V_{CC} = 5.5 \text{ V}$ , $V_{IN} = V_{CC}$	—	—	100	
Turn-On Delay	$t_{ON}$		9	$V_{CC} = 5 \text{ V}$ , $V_{OUT} = 50 \text{ V}$ (Note 1) $R_L = 125 \Omega$ , $C_L = 15 \text{ pF}$	—	0.1	—	$\mu\text{s}$
Turn-Off Delay	$t_{OFF}$				—	3	—	

## TEST CIRCUIT

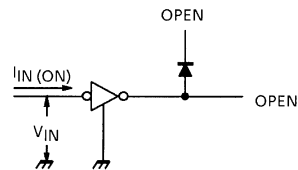
1.  $I_{CEX}$



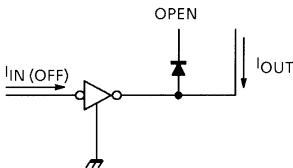
2.  $V_{CE (sat)}$



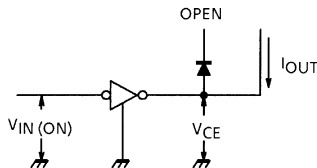
3.  $I_{IN (ON)}$



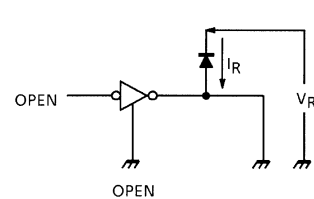
4.  $I_{IN (OFF)}$



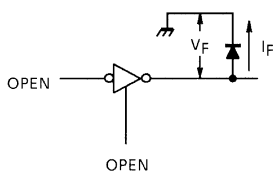
5.  $V_{IN (ON)}$



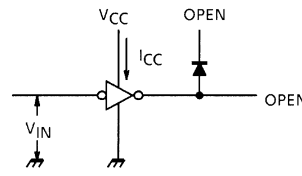
6.  $I_R$



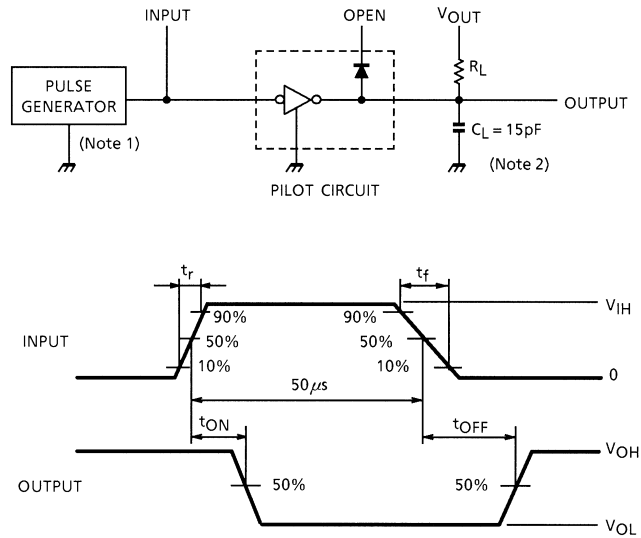
## 7. $V_F$



## 8. $I_{CC}$



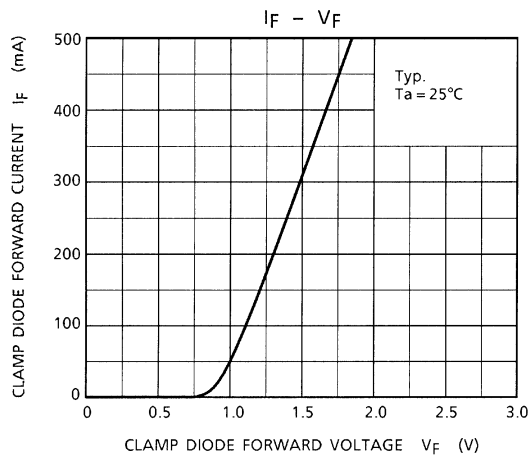
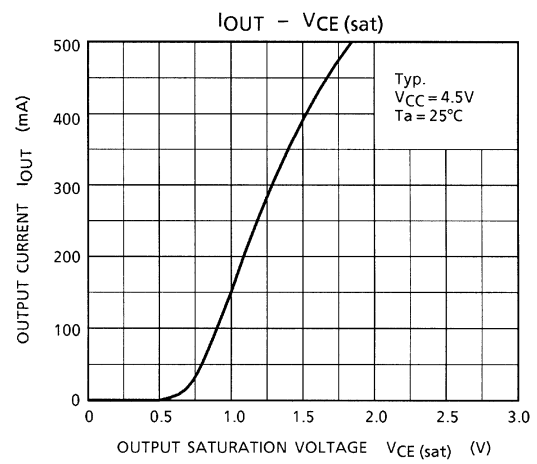
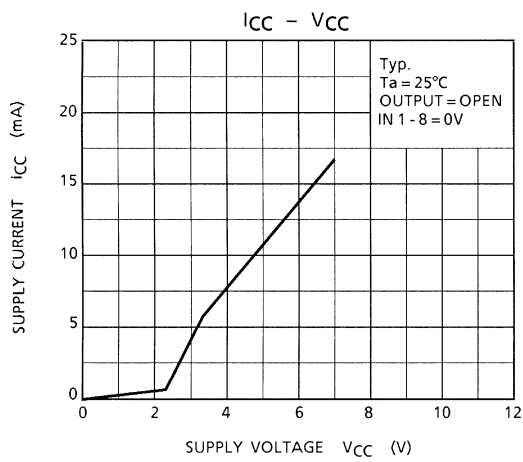
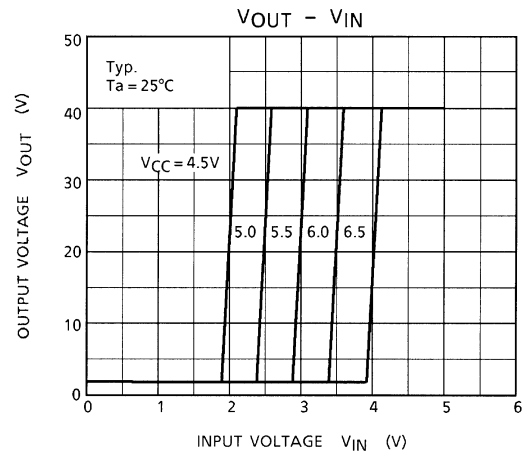
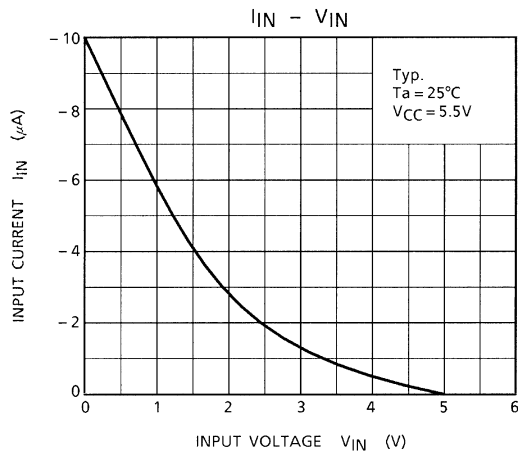
## 9. $t_{ON}$ , $t_{OFF}$

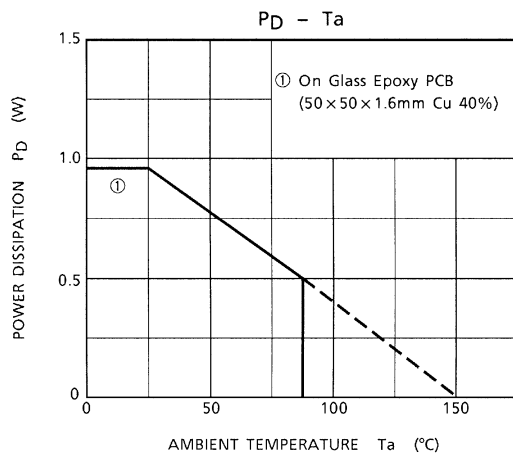
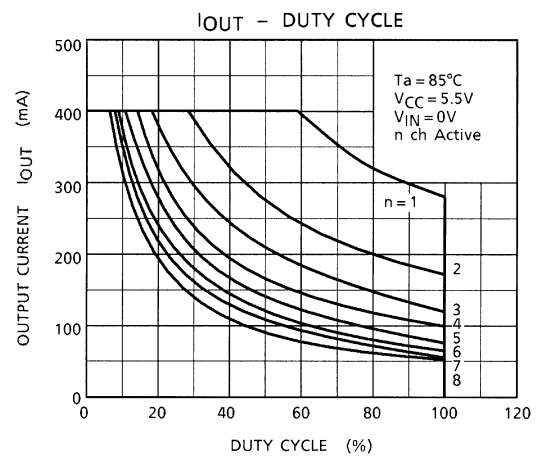
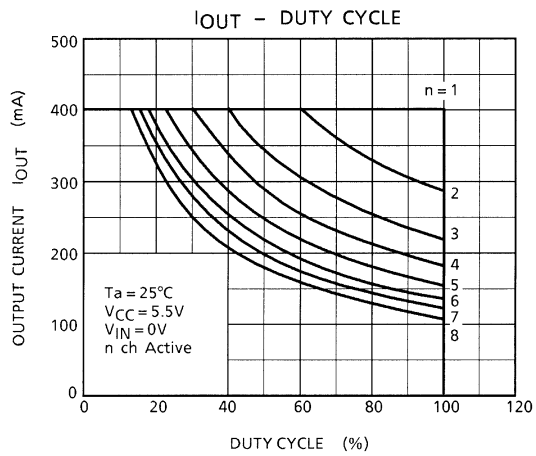


Note 1: Pulse Width 50  $\mu$ s, Duty Cycle 10%  
Output Impedance 50  $\Omega$ ,  $t_r \leq 5$  ns,  $t_f \leq 10$  ns  
Note 2:  $C_L$  includes probe and jig capacitance.

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

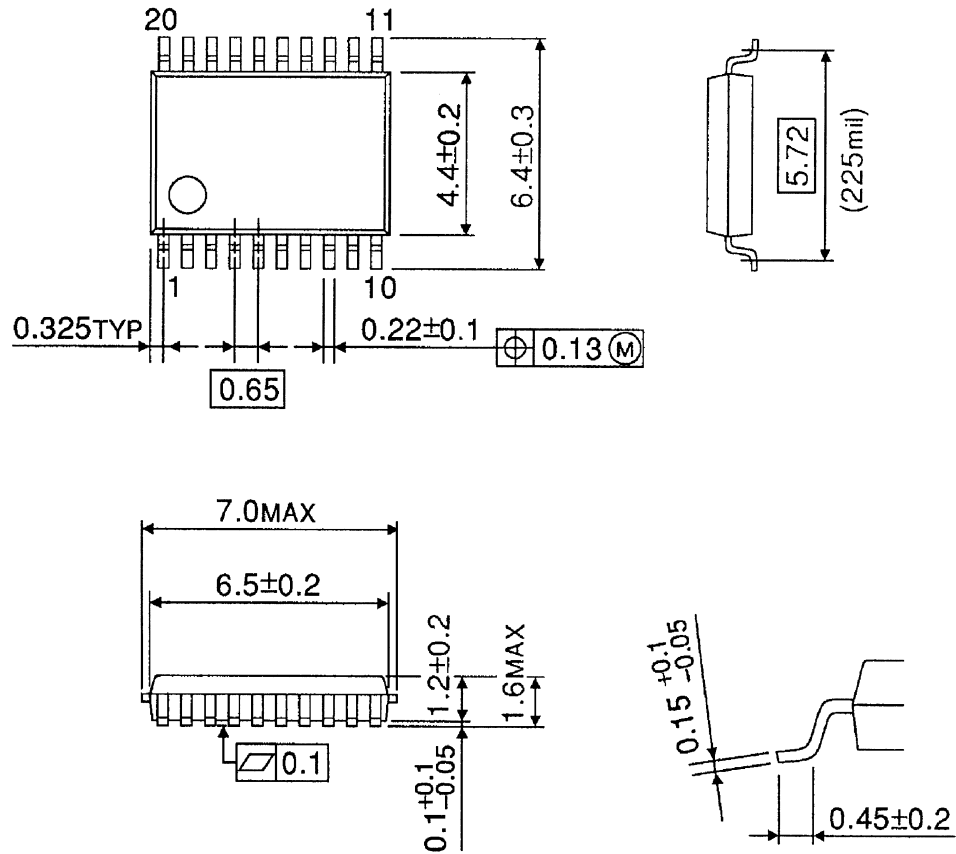




## PACKAGE DIMENSIONS

SSOP20-P-225-0.65A

Unit: mm



Weight: 0.09 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

- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.  
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.