

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

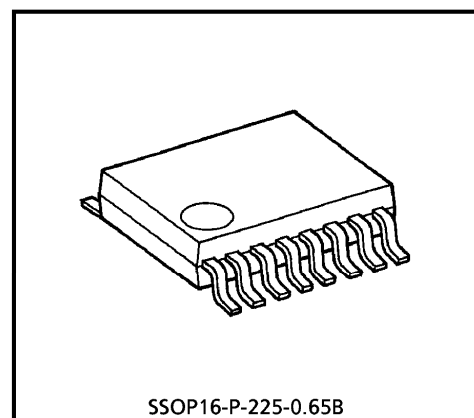
# TD62304AFN, TD62305AFN

## 7ch LOW INPUT ACTIVE DARLINGTON SINK DRIVER

The TD62304AFN and TD62305AFN are non-inverting transistor arrays, which are comprised of seven NPN darlington output stages PNP input stages. These devices are Low Level input active drivers and are suitable for operations with TTL, 5V CMOS and 5V Microprocessor which have sink current output drivers. Applications include relay, hammer, lamp and led driver.

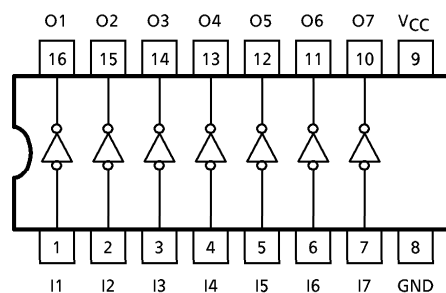
### FEATURES

- Package Type : SSOP16 pin
- High Sustaining Voltage :  $V_{CE(SUS)} = 50V$  (MIN.)
- Output Current (Single Output):  $I_{OUT} = 500mA / ch$  (MAX.)
- Low Level Active Input
- Input Compatible with TTL and 5V CMOS
- Standard Supply Voltage



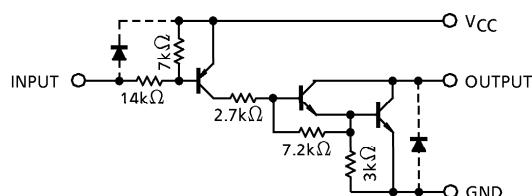
Weight : 0.07g (Typ.)

### PIN CONNECTION (TOP VIEW)

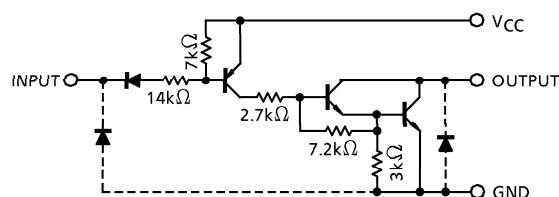


### SCHEMATICS (EACH DRIVER)

TD62304AFN



TD62305AFN



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

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**MAXIMUM RATINGS** ( $T_a = 25^\circ\text{C}$ )

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		$V_{CC}$	$-0.5 \sim 7.0$	V
Output Sustaining Voltage		$V_{CE(SUS)}$	$-0.5 \sim 50$	V
Output Current		$I_{OUT}$	500	mA / ch
Input Voltage	TD62304	$V_{IN}$	$-22 \sim V_{CC} + 0.5$	V
	TD62305		$-0.5 \sim 7$	
Input Current		$I_{IN}$	$-10$	mA
Power Dissipation		$P_D$	$0.78 (*1)$	W
Operating Temperature		$T_{opr}$	$-40 \sim 85$	$^\circ\text{C}$
Storage Temperature		$T_{stg}$	$-55 \sim 150$	$^\circ\text{C}$

\*1 : On Glass Epoxy PCB ( $50 \times 50 \times 1.6\text{mm}$  Cu 40%)

**RECOMMENDED OPERATING CONDITIONS** ( $T_a = -40 \sim 85^\circ\text{C}$ )

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage		$V_{CC}$		4.5	5.0	5.5	V
Output Sustaining Voltage		$V_{CE(SUS)}$		0	—	50	V
Output Current		$I_{OUT*}$	DC 1 Circuit	0	—	400	mA / ch
			$T_{pw} \leq 25\text{ms}$ 7 Circuit $T_j = 120^\circ\text{C}$ $T_a = 85^\circ\text{C}$ Duty = 10%	0	—	260	
			Duty = 50%	0	—	65	
Input Voltage	TD62304	$V_{IN}$		$-20$	—	$V_{CC}$	V
	TD62305			0	—	5.5	
Input Voltage (Output On)	TD62304	$V_{IN(ON)}$		$-22$	—	$V_{CC} - 3.5$	V
	TD62305			$-0.5$	—	$V_{CC} - 3.7$	
Input Voltage (Output Off)	TD62304	$V_{IN(OFF)}$		$V_{CC} - 0.4$	—	$V_{CC}$	V
	TD62305			$V_{CC} - 0.6$	—	$V_{CC}$	
Power Dissipation		$P_D^*$		—	—	0.325	W

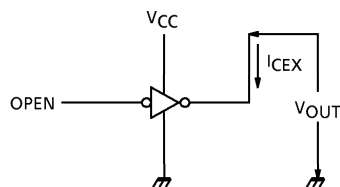
\* : On Glass Epoxy PCB ( $50 \times 50 \times 1.6\text{mm}$  Cu 40%)

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

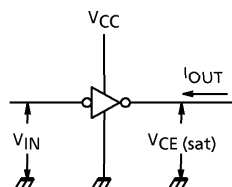
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX	UNIT
Output Leakage Current	I <sub>CEX</sub>	1	V <sub>CC</sub> = 5.5V, V <sub>OUT</sub> = 50V Ta = 85°C, I <sub>IN</sub> = 0	—	—	100	μA
Output Saturation Voltage	V <sub>CE (sat)</sub>	2	V <sub>CC</sub> = 4.5V I <sub>OUT</sub> = 350mA	—	1.4	2.0	V
			V <sub>IN</sub> = V <sub>IN (ON)</sub> MAX. V <sub>IN</sub> = 0.8V	—	1.4	2.2	
Input Current	I <sub>IN (ON)</sub>	3	V <sub>CC</sub> = 5.5V, V <sub>IN</sub> = 0.4V	—	-0.32	-0.45	mA
			V <sub>CC</sub> = 5.5V, V <sub>IN</sub> = -20V	—	—	-2.6	
Output Current	I <sub>IN (OFF)</sub>	4		—	—	-40	μA
Output Voltage	TD62304	5		—	—	V <sub>CC</sub> -2.8	V
	TD62305			—	—	V <sub>CC</sub> -3.7	
Supply Current	I <sub>CC (ON)</sub>	6	V <sub>CC</sub> = 5.5V, V <sub>IN</sub> = 0V	—	17	22	mA
Supply Current	I <sub>CC (OFF)</sub>		V <sub>CC</sub> = V <sub>IN</sub> = 5.5V	—	—	100	
Turn-On Delay	t <sub>ON</sub>	7	V <sub>CC</sub> = 5V, C <sub>L</sub> = 15pF V <sub>OUT</sub> = 50V, R <sub>L</sub> = 125Ω	—	0.1	—	μs
Turn-Off Delay	t <sub>OFF</sub>			—	3	—	

## TEST CIRCUIT

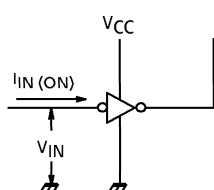
## 1. I CEX



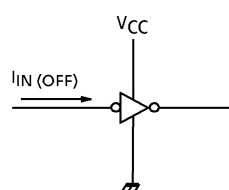
2.  $V_{CE}(\text{sat})$



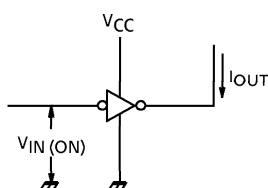
### 3. I<sub>IN</sub> (ON)



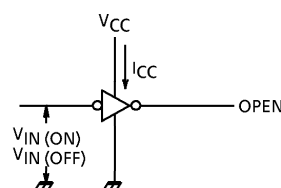
#### 4. I<sub>IN</sub> (OFF)



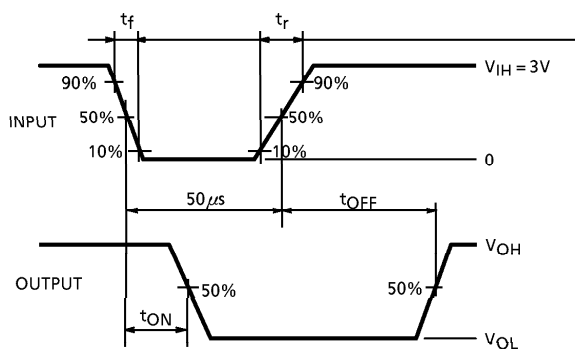
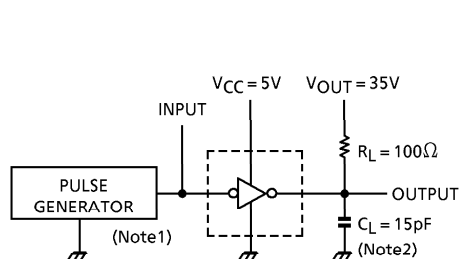
## 5. $V_{IN} (ON)$



## 6. ICC



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

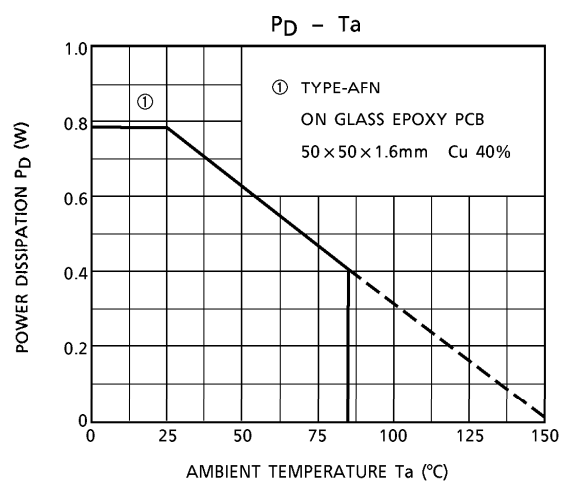
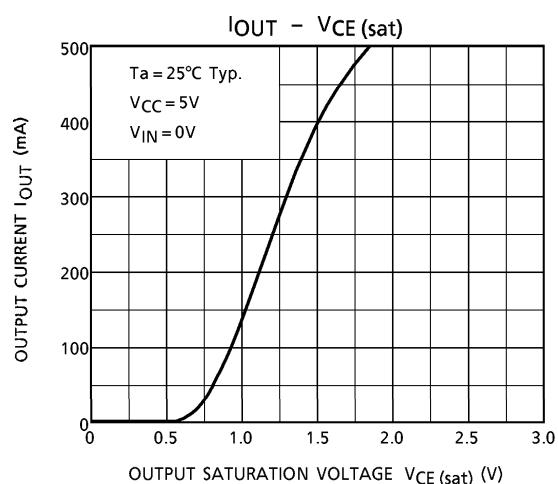
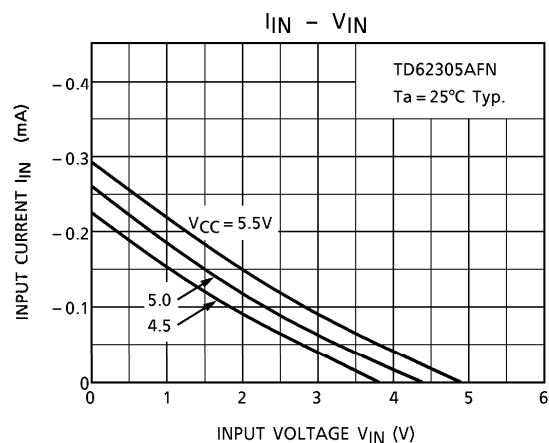
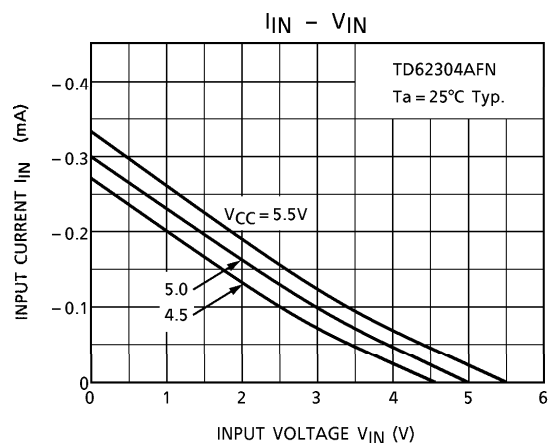
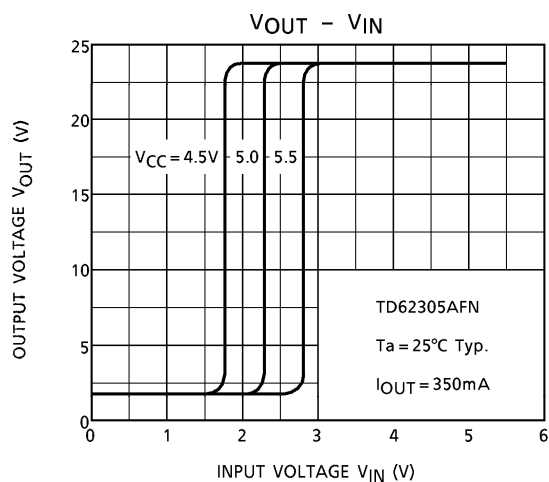
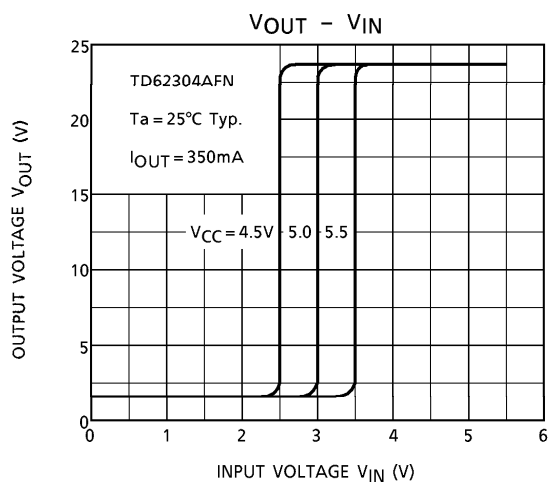


(Note 1) Pulse Width  $50\mu s$ , Duty Cycle 10%,  
Output Impedance  $50\Omega$ ,  $t_r \leq 10ns$ ,  $t_f \leq 5ns$

(Note 2) CL includes probe and jig capacitance

## PRECAUTIONS for USING

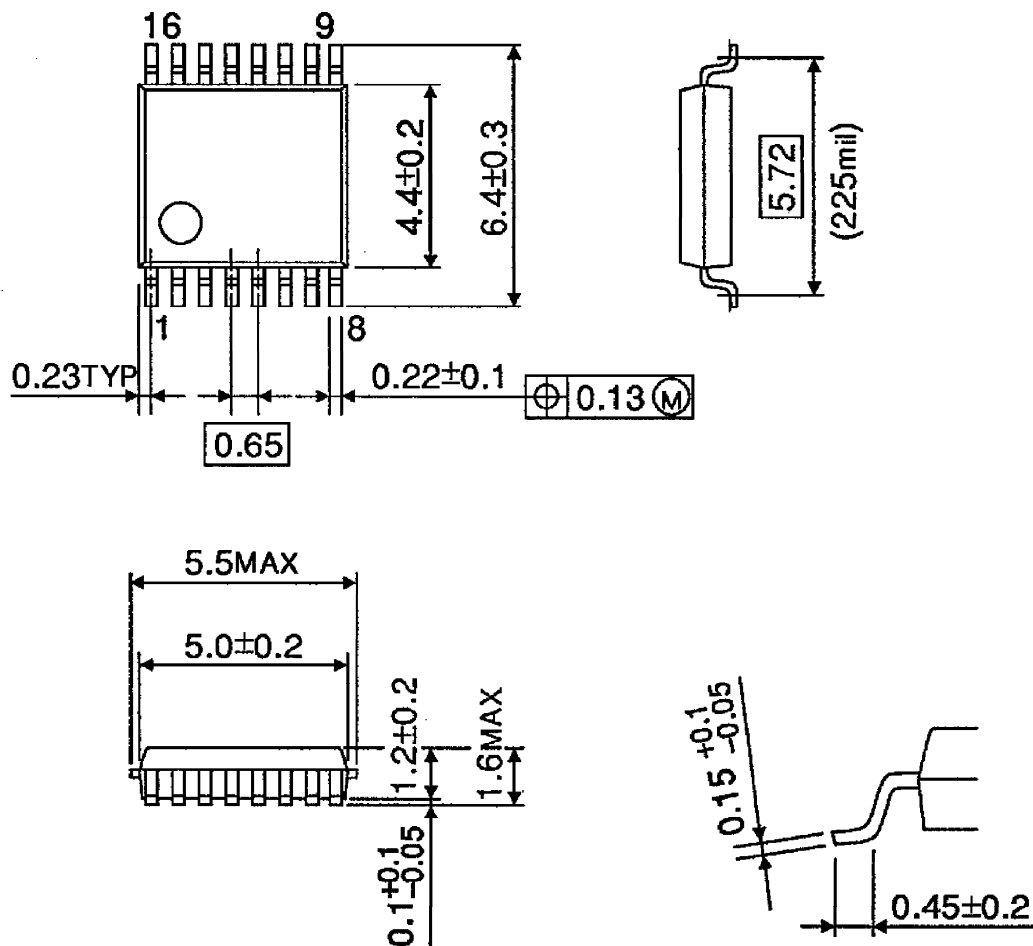
Utmost care is necessary in the design of the output line,  $V_{CC}$  and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.



**OUTLINE DRAWING**

SSOP16-P-225-0.65B

Unit : mm



Weight : 0.07g (Typ.)