

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

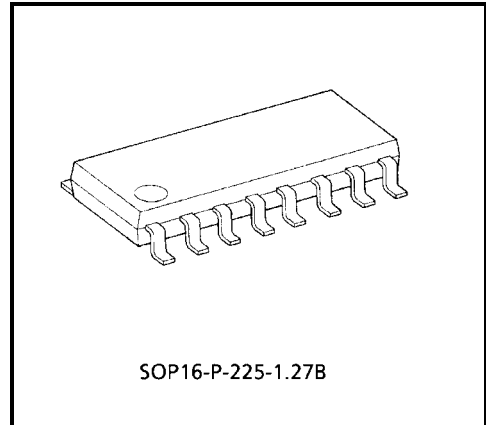
## TD62304FB,TD62305FB

### 7CH LOW INPUT ACTIVE DARLINGTON SINK DRIVER

The TD62304FB and TD62305FB are non-inverting transistor arrays, which are comprised of seven NPN darlington buffer-transistor output stages PNP input stages. These devices can be operated by source input voltage and are suitable for operations with a 5-V general purposed logic IC such as 5-V TTL, 5-V CMOS and 5-V Microprocessor which have sink current output drivers. Please observe the thermal condition for using.

### FEATURES

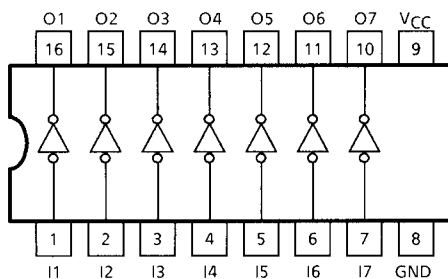
- Output current (single output) : 500 mA (Max.)
- High sustaining voltage : 35 V (Min.)
- Low level active input
- Inputs compatible with 5-V TTL and 5-V CMOS
- Package type-FB: SOP-16 pin



SOP16-P-225-1.27B

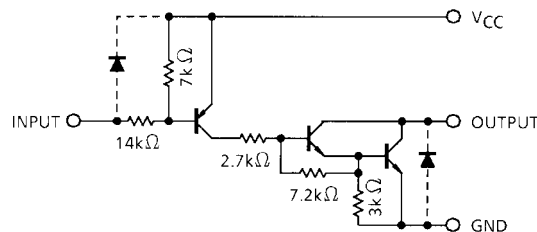
Weight: 0.16 g (Typ.)

### PIN CONNECTION (TOP VIEW)

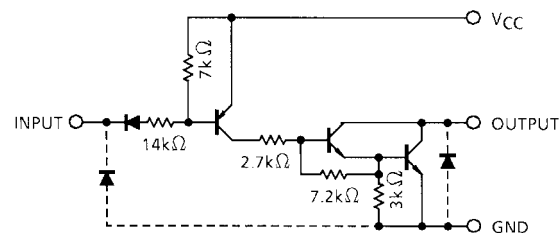


### SCHEMATICS (EACH DRIVER)

#### TD62304FB



#### TD62305FB



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>	-0.5~35	V
Output Current	I <sub>OUT</sub>	500	mA / ch
Input Voltage	V <sub>IN</sub>	-22~V <sub>CC</sub> + 0.5	V
		-0.5~7 (Note 1)	
Input Current	I <sub>IN</sub>	-10	mA
Power Dissipation	P <sub>D</sub>	0.625 (Note 2)	W
Operating Temperature	T <sub>opr</sub>	-40~85	°C
Storage Temperature	T <sub>stg</sub>	-55~150	°C

Note 1: On glass epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

Note 2: TD62305FB only

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

CHARACTERISTIC		SYMBOL	CONDITION	MIN	TYP.	MAX	UNIT
Supply Voltage		V <sub>CC</sub>	—	4.5	—	5.5	V
Output Sustaining Voltage		V <sub>CE (SUS)</sub>	—	0	—	35	V
Output Current		I <sub>OUT</sub>	DC 1 Circuit	0	—	400	mA / ch
			T <sub>pw</sub> ≤ 25 ms 7 circuits	0	—	240	
			T <sub>j</sub> = 120°C	0	—	60	
			Ta = 85°C (Note)	0	—	60	
Input Voltage	TD62304FB	V <sub>IN</sub>	—	-20	—	V <sub>CC</sub>	V
	TD62305FB			0	—	5.5	
Input Voltage (Outout On)	TD62304FB	V <sub>IN(ON)</sub>	—	-22	—	V <sub>CC</sub> - 3.5	V
	TD62305FB		—	-0.5	—	V <sub>CC</sub> - 3.7	
Input Voltage (Outout Off)	TD62304FB	V <sub>IN(OFF)</sub>	—	V <sub>CC</sub> - 0.4	—	V <sub>CC</sub>	V
	TD62305FB		—	V <sub>CC</sub> - 0.6	—	V <sub>CC</sub>	
Power Dissipation		P <sub>D</sub>	(Note)	—	—	0.325	W

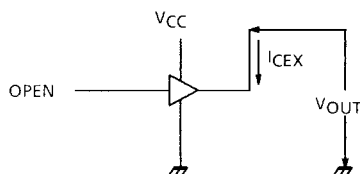
Note: On glass epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

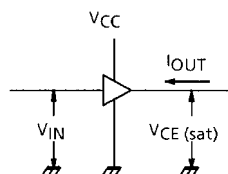
CHARACTERISTIC		SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT	
Output Leakage Current		I <sub>CEX</sub>	1	V <sub>CC</sub> = 5.5 V, V <sub>OUT</sub> = 35 V Ta = 85°C, I <sub>IN</sub> = 0	—	—	-100	μA	
Output Saturation Voltage		V <sub>CE (sat)</sub>	2	V <sub>CC</sub> = 4.5 V, I <sub>OUT</sub> = 350 mA	V <sub>IN</sub> = V <sub>IN (ON)</sub> (Max.)	—	1.4	2.0	V
					V <sub>IN</sub> = 0.8 V	—	1.4	2.2	
Input Current	(Output On)	I <sub>IN (ON)</sub>	3	V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0.4 V	—	-0.32	-0.45	mA	
				V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = -20 V	—	—	-2.6		
	(Output Off)	I <sub>IN (OFF)</sub>	4	—	—	—	-40	μA	
Input Voltage (Output On)	TD62304FB	V <sub>IN(ON)</sub>	5	—	—	—	V <sub>CC</sub> -2.8	V	
	TD62305FB				—	—	V <sub>CC</sub> -3.7		
Supply Current	(Output On)	I <sub>CC (ON)</sub>	6	V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0 V	—	17	22	mA	
	(Output Off)	I <sub>CC (OFF)</sub>		V <sub>CC</sub> = V <sub>IN</sub> = 5.5 V	—	—	100		μA
Turn-On Delay		t <sub>ON</sub>	7	V <sub>CC</sub> = 5 V, C <sub>L</sub> = 15 pF V <sub>OUT</sub> = 35 V, R <sub>L</sub> = 87.5 Ω	—	0.1	—	μs	
Turn-Off Delay		t <sub>OFF</sub>			—	3	—		

## TEST CIRCUIT

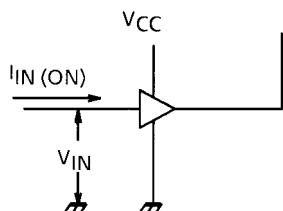
### 1. $I_{CEX}$



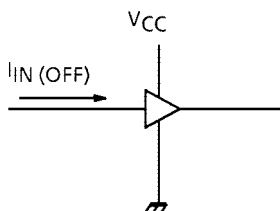
### 2. $V_{CE(sat)}$



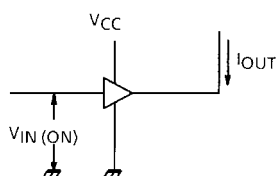
### 3. $I_{IN(ON)}$



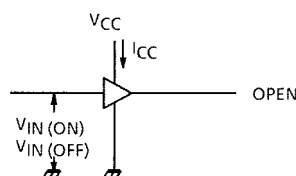
### 4. $I_{IN(OFF)}$



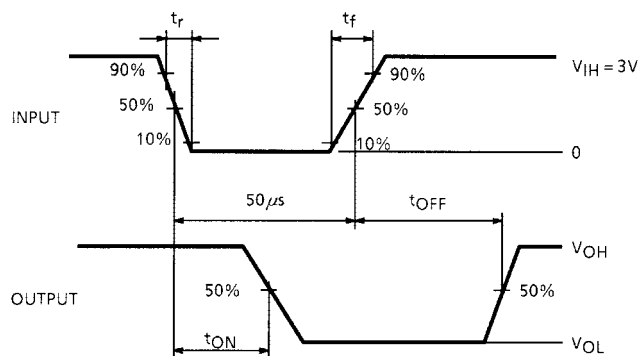
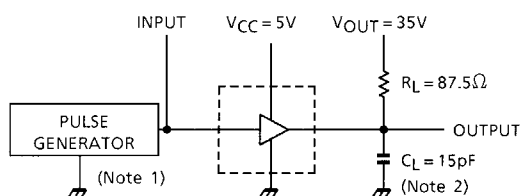
### 5. $V_{IN(ON)}$



### 6. $I_{CC}$



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



Note 1: Pulse width 50  $\mu$ s, duty cycle 10%

Output impedance 50  $\Omega$ ,  $t_r \leq 10$  ns,  $t_f \leq 5$  ns

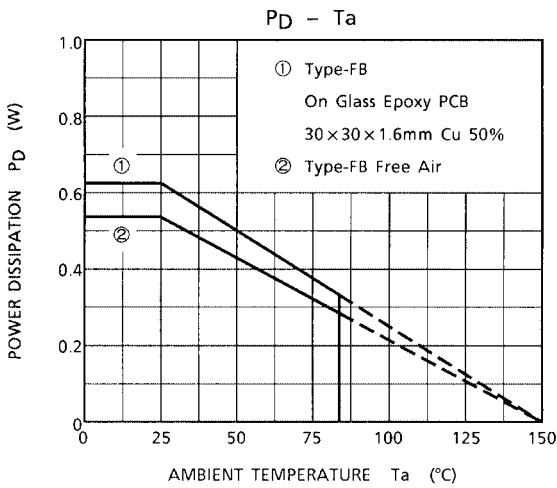
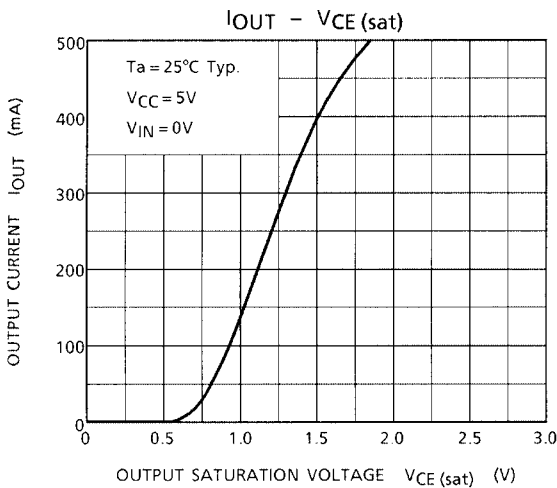
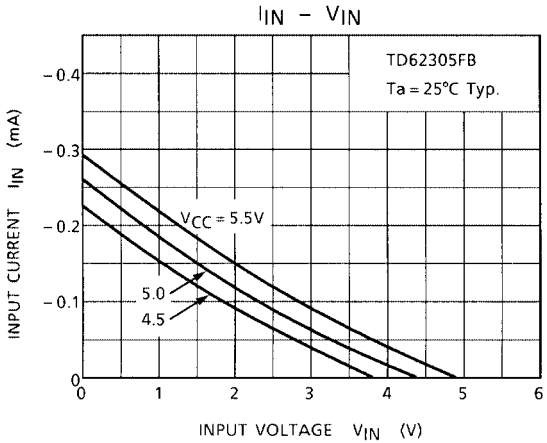
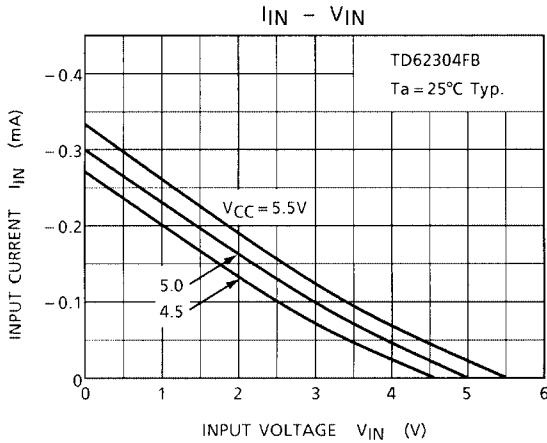
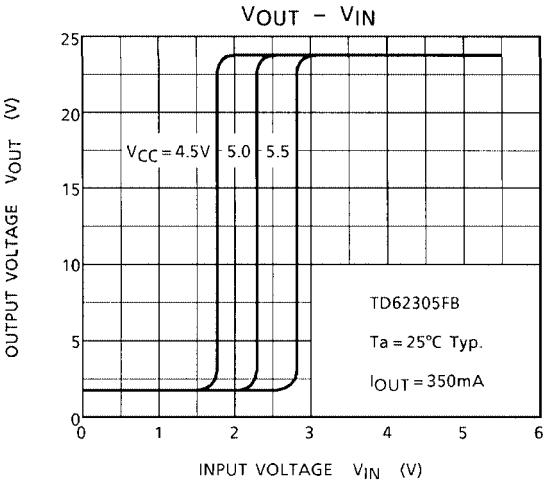
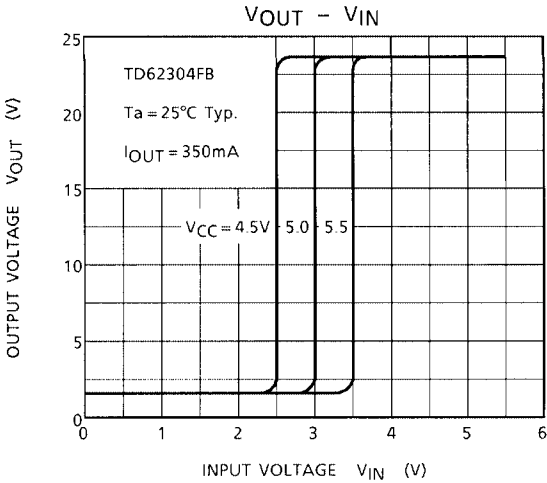
Note 2:  $C_L$  includes probe and jig capacitance

## 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.

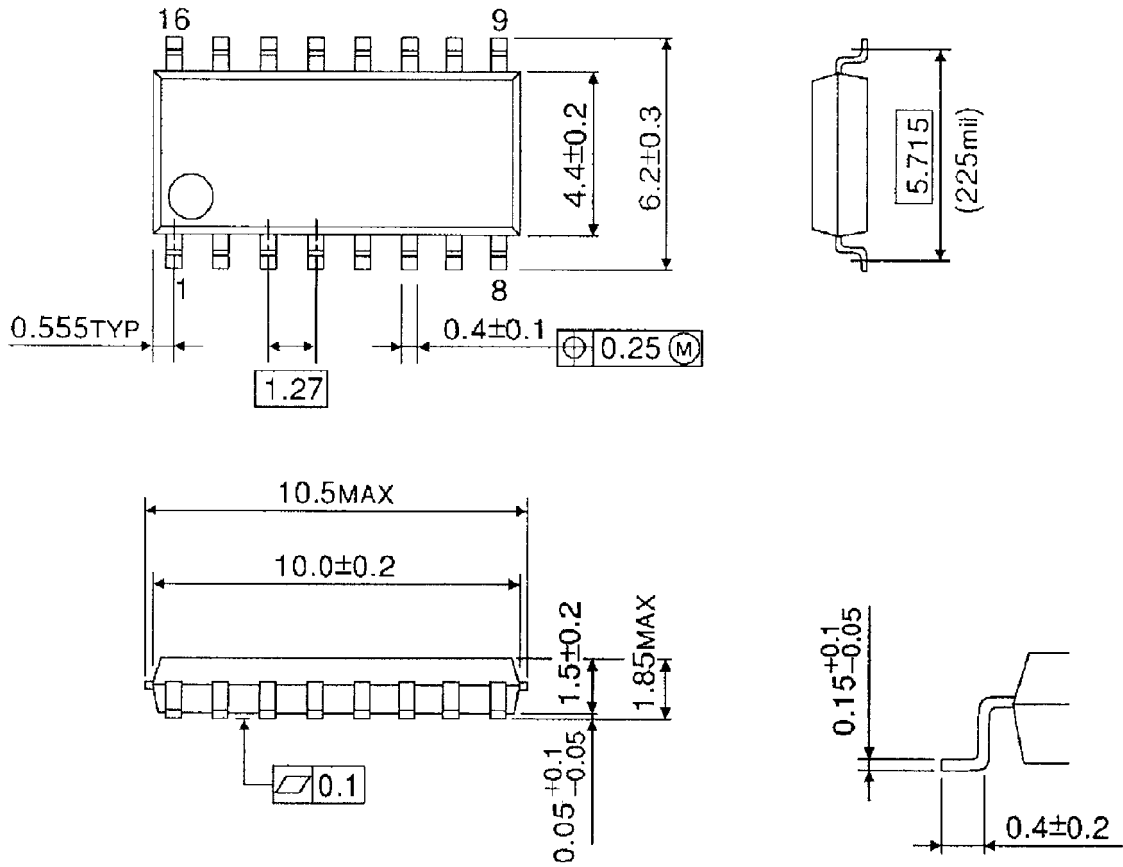
Hence, the utmost care must be taken when systems which incorporate this IC are designed. Utmost care is necessary in the design of the output line,  $V_{CC}$  and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.



PACKAGE DIMENSIONS

SOP16-P-225-1.27B

Unit : mm



Weight: 0.16 g (Typ.)

**RESTRICTIONS ON PRODUCT USE**

000707EBA

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