

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62003FB,TD62004FB

7CH DARLINGTON SINK DRIVER

The TD62003FB series are high-voltage, high-current darlington drivers comprised of seven NPN darlington pairs.

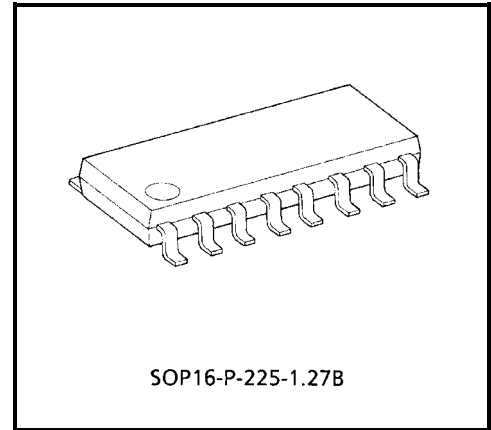
All units feature integral clamp diodes for switching inductive loads.

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

Please observe the thermal condition for using.

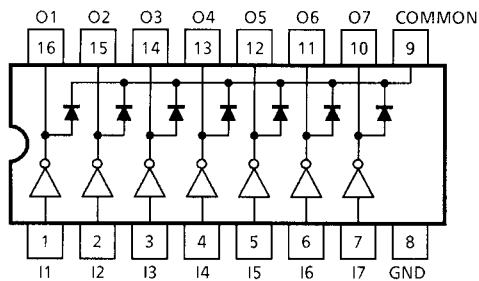
FEATURES

- Output current (single output) : 500 mA / ch (Max)
- High sustaining voltage output : 35 V (Min)
- Output clamp diodes
- Inputs compatible with various types of logic.
TD62003FB : $R_{IN} = 2.7\text{ k}\Omega$
TD62004FB : $R_{IN} = 10.5\text{ k}\Omega$
- Package SOP-16 pin

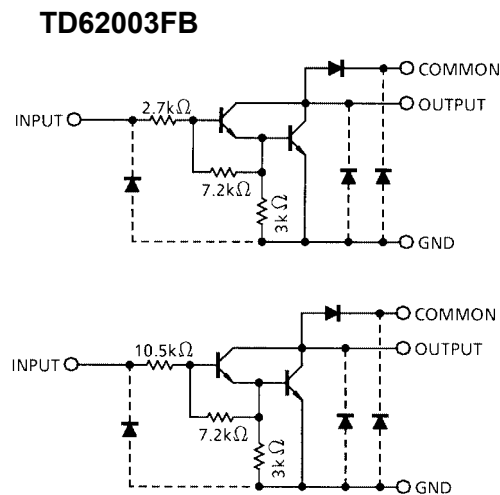


Weight: 0.16 g (Typ.)

PIN CONNECTION (TOP VIEW)



SCHEMATICS (EACH DRIVER)



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

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Output Sustaining Voltage	V _{CE (SUS)}	-0.5~35	V
Output Current	I _{OUT}	500	mA / ch
Input Voltage	V _{IN}	-0.5~30	V
Clamp Diode Reverse Voltage	V _R	35	V
Clamp Diode Forward Current	I _F	500	mA
Power Dissipation	P _D	0.54 / 0.625 (Note)	W
Operating Temperature	T _{opr}	-40~85	°C
Storage Temperature	T _{stg}	-55~150	°C

Note: On Glass Epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

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

CHARACTERISTIC		SYMBOL	CONDITION	MIN	TYP.	MAX	UNIT
Output Sustaining Voltage		V _{CE (SUS)}	—	0	—	35	V
Output Current		I _{OUT}	DC 1 Circuit	0	—	350	mA / ch
			T _{pw} = 25 ms T _j = 120°C 7 Circuits	Duty = 10%	0	—	275
			Ta = 85°C	Duty = 50%	0	—	90
Input Voltage		V _{IN}	—	0	—	24	V
Input Voltage (Output On)	TD62003	V _{IN (ON)}	I _{OUT} = 400 mA, h _{FE} = 800	2.8	—	24	V
	TD62004			6.2	—	24	
Input Voltage (Output Off)	TD62003	V _{IN (OFF)}	—	0	—	0.7	V
	TD62004			0	—	1.0	
Clamp Diode Reverse Voltage		V _R	—	—	—	35	V
Clamp Diode Forward Current		I _F	—	—	—	350	mA
Power Dissipation		P _D	Ta = 85°C (Note)	—	—	0.325	W

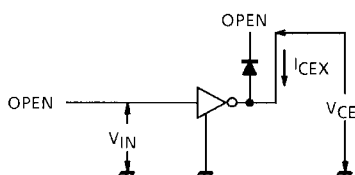
Note: On Glass Epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

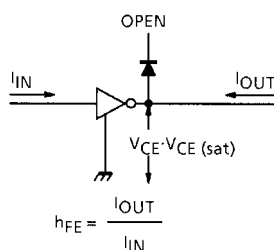
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Leakage Current	I_{CEX}	1	$V_{CE} = 35\text{ V}$, $T_a = 25^\circ\text{C}$	—	—	50	μA
			$V_{CE} = 35\text{ V}$, $T_a = 85^\circ\text{C}$	—	—	100	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	2	$I_{OUT} = 350\text{ mA}$, $I_{IN} = 500\text{ }\mu\text{A}$	—	1.3	1.6	V
			$I_{OUT} = 200\text{ mA}$, $I_{IN} = 350\text{ }\mu\text{A}$	—	1.1	1.3	
			$I_{OUT} = 100\text{ mA}$, $I_{IN} = 250\text{ }\mu\text{A}$	—	0.9	1.1	
DC Current Transfer Ratio	h_{FE}	2	$V_{CE} = 2\text{ V}$, $I_{OUT} = 350\text{ mA}$	1000	—	—	
Input Current (Output On)	TD62003	$I_{IN(ON)}$	$V_{IN} = 2.4\text{ V}$, $I_{OUT} = 350\text{ mA}$	—	0.4	0.7	mA
	TD62004		$V_{IN} = 9.5\text{ V}$, $I_{OUT} = 350\text{ mA}$	—	0.8	1.2	
Input Current (Output Off)	$I_{IN(OFF)}$	4	$I_{OUT} = 500\text{ }\mu\text{A}$, $T_a = 85^\circ\text{C}$	50	65	—	μA
Input Voltage (Output On)	TD62003	$V_{IN(ON)}$	$V_{CE} = 2\text{ V}$ $h_{FE} = 800$	—	—	$I_{OUT} = 350\text{ mA}$	V
						$I_{OUT} = 200\text{ mA}$	
						$I_{OUT} = 350\text{ mA}$	
	TD62004					$I_{OUT} = 200\text{ mA}$	
Clamp Diode Reverse Current	I_R	6	$V_R = 35\text{ V}$, $T_a = 25^\circ\text{C}$	—	—	50	μA
			$V_R = 35\text{ V}$, $T_a = 85^\circ\text{C}$	—	—	100	
Clamp Diode Forward Voltage	V_F	7	$I_F = 350\text{ mA}$	—	—	2.0	V
Input Capacitance	C_{IN}	8	—	—	15	—	pF
Turn-On Delay	t_{ON}	9	$V_{OUT} = 35\text{ V}$, $R_L = 87.5\text{ }\Omega$ $C_L = 15\text{ pF}$	—	0.1	—	μs
Turn-Off Delay	t_{OFF}	9	$V_{OUT} = 35\text{ V}$, $R_L = 87.5\text{ }\Omega$ $C_L = 15\text{ pF}$	—	0.2	—	

TEST CIRCUIT

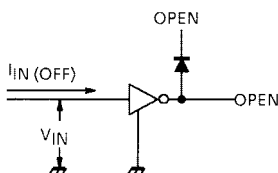
1. I_{CEX}



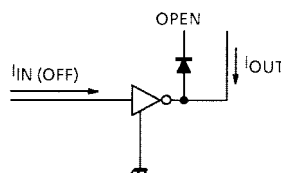
2. $V_{CE(sat)}$, h_{FE}



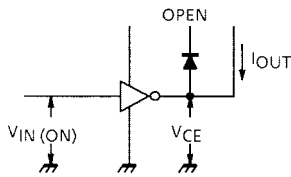
3. $I_{IN(ON)}$



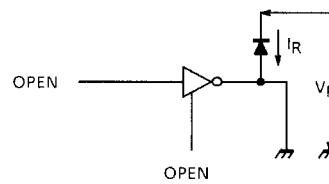
4. $I_{IN(OFF)}$



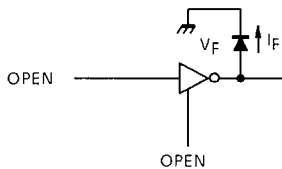
5. $V_{IN(ON)}$



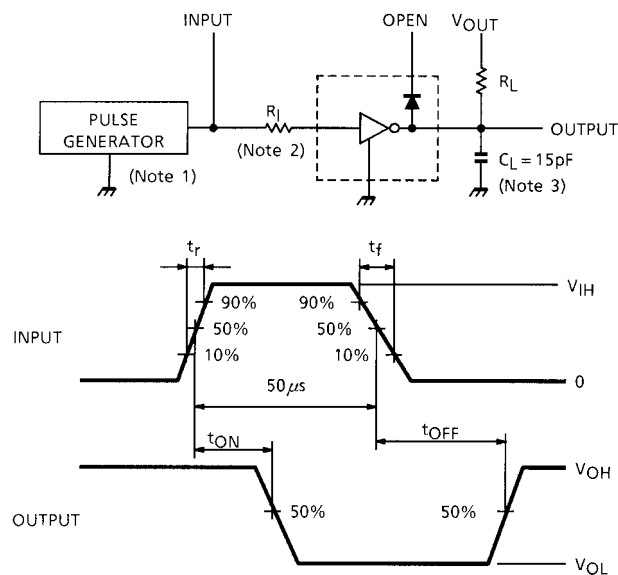
6. I_R



7. V_F



8. t_{ON} , t_{OFF}



Note 1: Pulse Width 50 μ s, Duty Cycle 10%
Output Impedance 50 Ω , $t_r \leq 5$ ns, $t_f \leq 10$ ns

Note 2: See below.

INPUT CONDITION

TYPE NUMBER	R _I	V _{IH}
TD620003FB	0	3 V
TD620004FB	0	8 V

Note 3: C_L includes probe and jig capacitance.

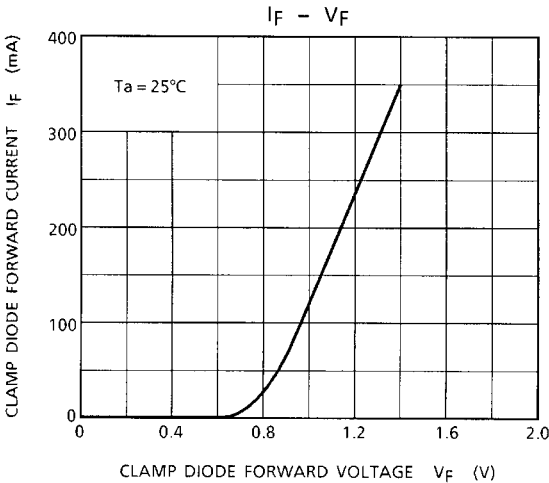
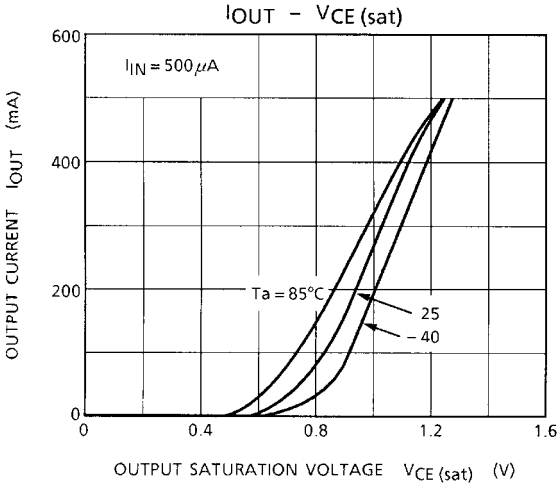
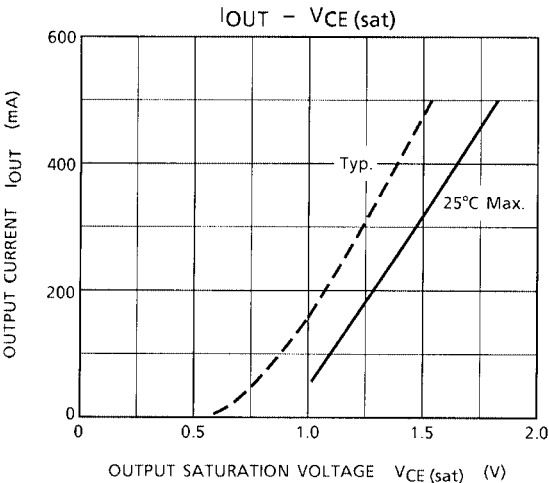
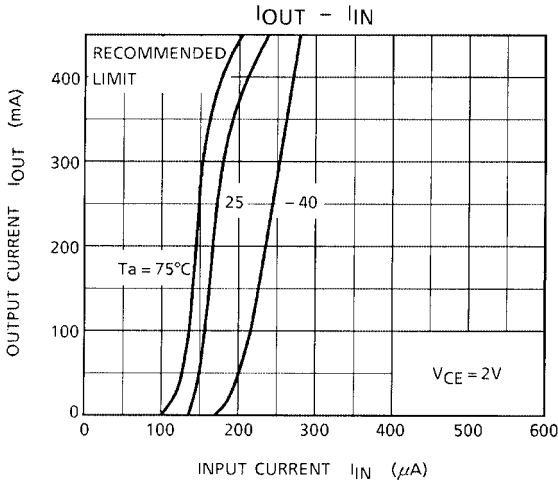
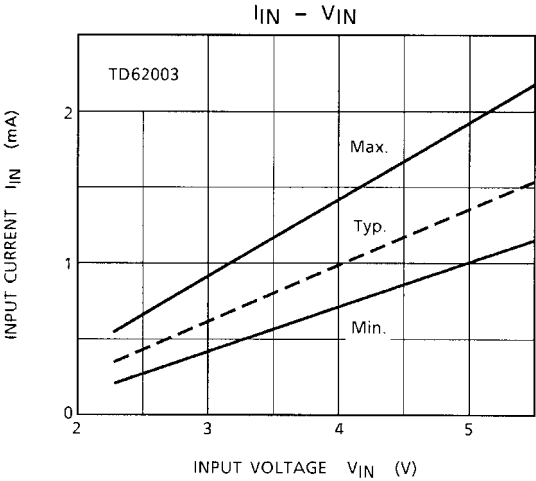
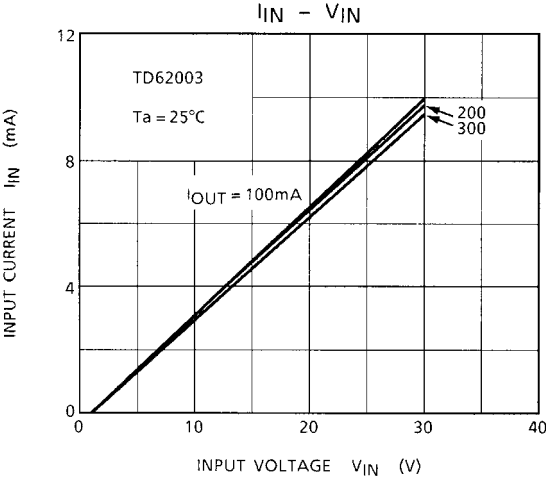
PRECAUTIONS for USING

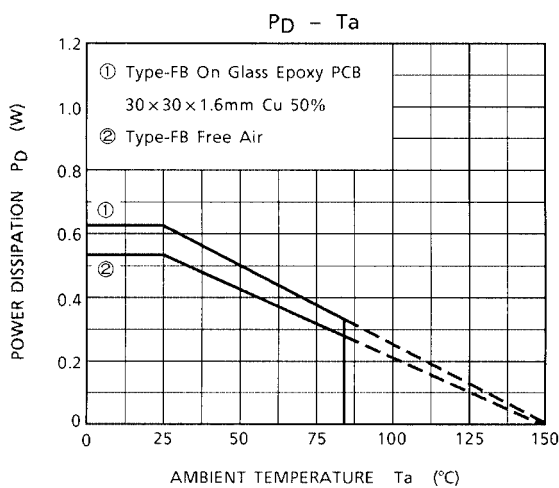
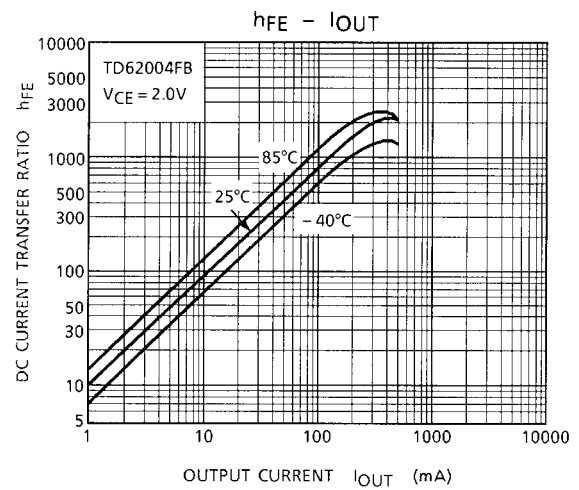
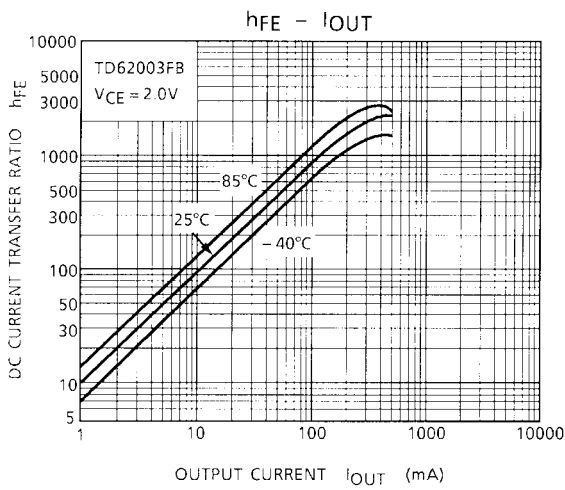
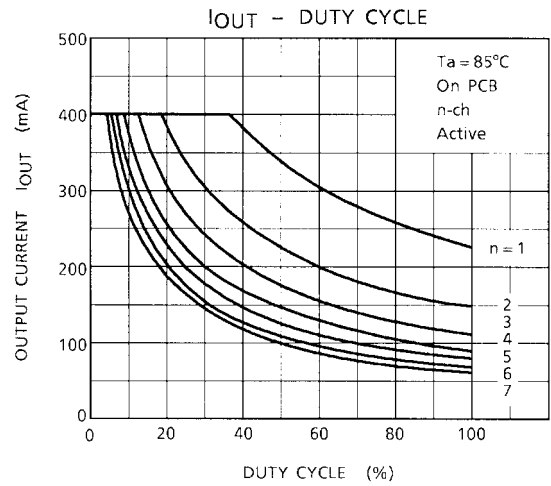
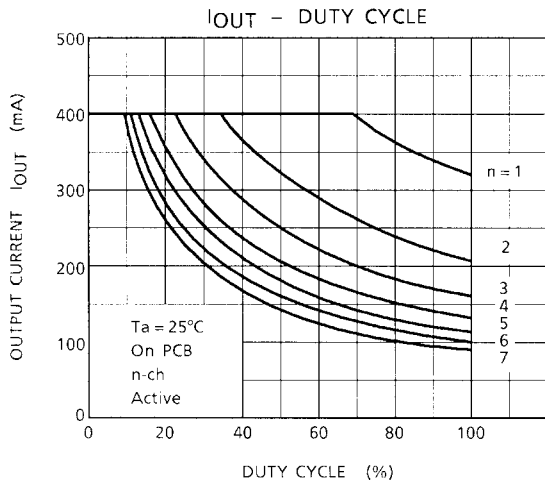
This IC does not include built-in protection circuits for excess current or overvoltage.

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

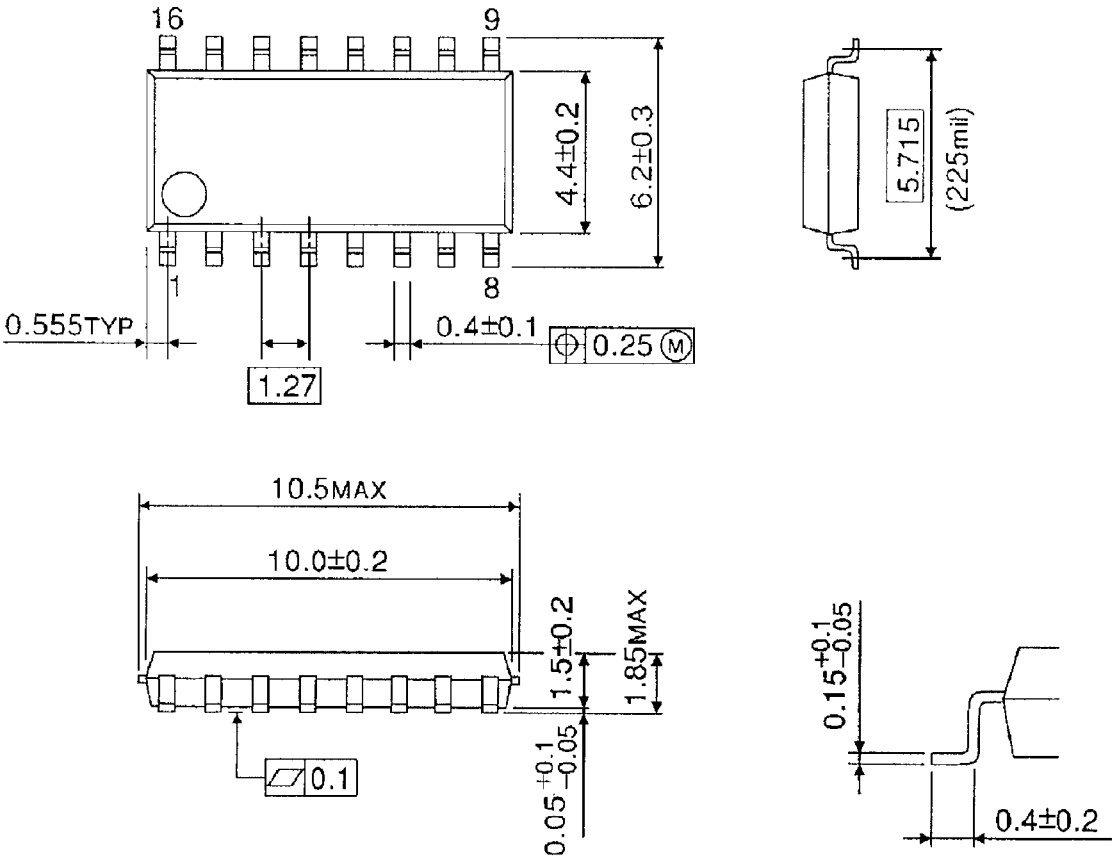




PACKAGE DIMENSIONS

SOP16-P-225-1.27B

Unit : mm



Weight: 0.16 g (Typ.)

RESTRICTIONS ON PRODUCT USE

000707EBA

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