

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

**TD62001P,TD62001AP,TD62001F,TD62001AF,TD62002P
TD62002AP,TD62002F,TD62002AF,TD62003P,TD62003AP,TD62003F
TD62003AF,TD62004P,TD62004AP,TD62004F,TD62004AF**

7CH DARLINGTON SINK DRIVER

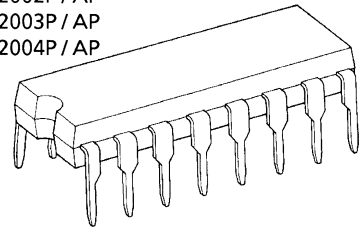
The TD62001P / AP / F / AF Series are high-voltage, high-current darlington drivers comprised of seven NPN darlington pairs. All units feature integral clamp diodes for switching inductive loads. Applications include relay, hammer, lamp and display (LED) drivers.

FEATURES

- Output current (single output) 500 mA MAX.
- High sustaining voltage output
35 V MIN. (TD62001P / F Series)
50 V MIN. (TD62001AP / AF Series)
- Output clamp diodes
- Inputs compatible with various types of logic
- Package Type-P, AP: DIP-16 pin
- Package Type-F, AF: SOP-16 pin

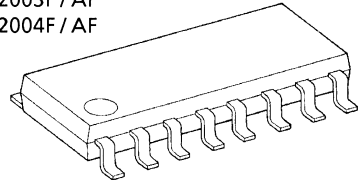
TYPE	INPUT BASE RESISTOR	DESIGNATION
TD62001P / AP / F / AF	External	General Purpose
TD62002P / AP / F / AF	10.5-k Ω + 7 V Zener diode	14~25 V PMOS
TD62003P / AP / F / AF	2.7 k Ω	TTL, 5 V CMOS
TD62004P / AP / F / AF	10.5 k Ω	6~15 V PMOS, CMOS

TD62001P / AP
TD62002P / AP
TD62003P / AP
TD62004P / AP



DIP16-P-300-2.54A

TD62001F / AF
TD62002F / AF
TD62003F / AF
TD62004F / AF



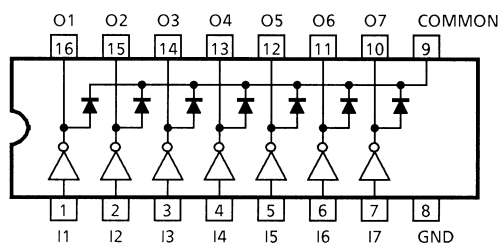
SOP16-P-225-1.27

Weight

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

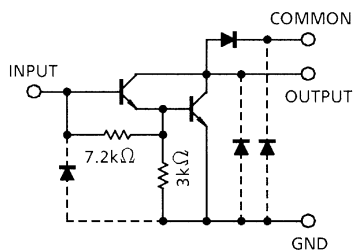
SOP16-P-225-1.27 : 0.16 g (Typ.)

PIN CONNECTION (TOP VIEW)

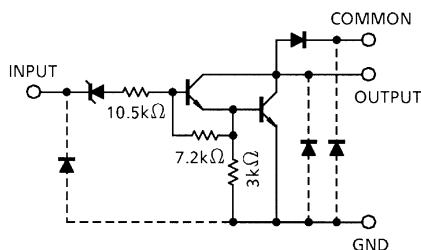


SCHEMATICS (EACH DRIVER)

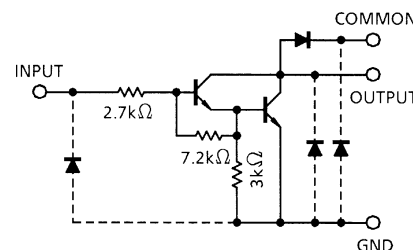
TD62001P / AP / F / AF



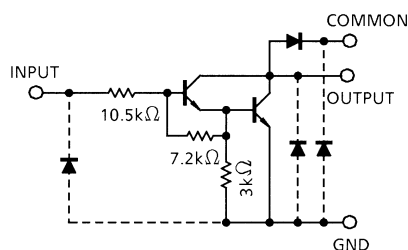
TD62002P / AP / F / AF



TD62003P / AP / F / AF



TD62004P / AP / F / AF



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	P, F	$V_{CE(SUS)}$	-0.5~35	V
	AP, AF		-0.5~50	
Output Current		I_{OUT}	500	mA / ch
Input Voltage		V_{IN} (Note 1)	-0.5~30	V
Input Current		I_{IN} (Note 2)	25	mA
Clamp Diode Reverse Voltage	P, F	V_R	35	V
	AP, AF		50	
Clamp Diode Forward Current		I_F	500	mA
Power Dissipation	P	P_D	1.0	W
	AP		1.47	
	F, AF		0.54 / 0.625 (Note 3)	
Operating Temperature	P	T_{opr}	-30~75	°C
	AP, F, AF		-40~85	
Storage Temperature		T_{stg}	-55~150	°C

Note 1: Except TD62001P / AP / F / AF

Note 2: Only TD62001P / AP / F / AF

Note 3: On glass epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

RECOMMENDED OPERATING CONDITIONS

(Ta = -40~85°C and Ta = -30~75°C for only Type-P)

CHARACTERISTIC		SYMBOL	CONDITION		MIN	TYP.	MAX	UNIT
Output Sustaining Voltage	P, F	V _{CE (SUS)}			0	—	35	V
	AP, AF				0	—	50	
Output Current	AP	I _{OUT}	T _{pw} = 25 ms 7 Circuits Ta = 85°C Tj = 120°C	Duty = 10%	0	—	370	mA / ch
				Duty = 50%	0	—	130	
	P			Duty = 10%	0	—	295	
				Duty = 50%	0	—	95	
	F, AF			Duty = 10%	0	—	233	
				Duty = 50%	0	—	70	
Input Voltage	Except TD62001P / AP / F / AF	V _{IN}			0	—	24	V
Input Voltage (Output On)	TD62002	V _{IN (ON)}	I _{OUT} = 400 mA h _{FE} = 800		14.5	—	24	V
	TD62003				2.8	—	24	
	TD62004				6.2	—	24	
Input Voltage (Output Off)	TD62001	V _{IN (OFF)}			0	—	0.6	V
	TD62002				0	—	7.4	
	TD62003				0	—	0.7	
	TD62004				0	—	1.0	
Input Current	Only TD62001	I _{IN}			0	—	10	mA
Clamp Diode Reverse Voltage	P, F	V _R			—	—	35	V
	AP, AF				—	—	50	
Clamp Diode Forward Current		I _F			—	—	350	mA
Power Dissipation	P	P _D	Ta = 85°C		—	—	0.6	W
	AP				—	—	0.76	
	AF, F		Ta = 85°C (Note)		—	—	0.325	

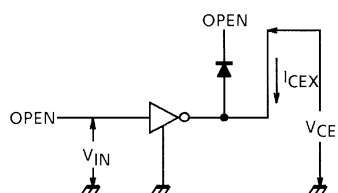
Note: On glass epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C unless otherwise noted)

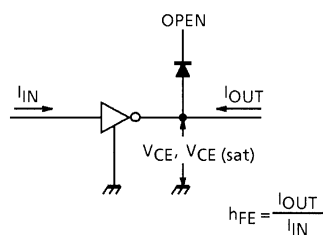
CHARACTERISTIC		SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT	
Output Leakage Current	AP, AF	I _{CEX}	1	V _{CE} = 50 V, Ta = 25°C	—	—	50	μA	
				V _{CE} = 50 V, Ta = 85°C	—	—	100		
	F			V _{CE} = 35 V, Ta = 25°C	—	—	50		
				V _{CE} = 35 V, Ta = 85°C	—	—	100		
	P			V _{CE} = 35 V, Ta = 25°C	—	—	50		
				V _{CE} = 35 V, Ta = 75°C	—	—	100		
Collector–Emitter Saturation Voltage		V _{CE (sat)}	2	I _{OUT} = 350 mA, I _{IN} = 500 μA	—	1.3	1.6	V	
				I _{OUT} = 200 mA, I _{IN} = 350 μA	—	1.1	1.3		
				I _{OUT} = 100 mA, I _{IN} = 250 μA	—	0.9	1.1		
DC Current Transfer Ratio		h _{FE}	2	V _{CE} = 2 V, I _{OUT} = 350 mA	1000	—	—		
Input Current (Output On)	TD62002	I _{IN (ON)}	3	V _{IN} = 20 V, I _{OUT} = 350 mA	—	1.1	1.7	mA	
	TD62003			V _{IN} = 2.4 V, I _{OUT} = 350 mA	—	0.4	0.7		
	TD62004			V _{IN} = 9.5 V, I _{OUT} = 350 mA	—	0.8	1.2		
Input Current (Output Off)	P	I _{IN (OFF)}	4	I _{OUT} = 500 μA, Ta = 75°C	50	65	—	μA	
	AP, F, AF			I _{OUT} = 500 μA, Ta = 85°C	50	65	—		
Input Voltage (Output On)	TD62002	V _{IN (ON)}	5	V _{CE} = 2 V h _{FE} = 800	I _{OUT} = 350 mA	—	—	13.7	V
					I _{OUT} = 200 mA	—	—	11.4	
	TD62003				I _{OUT} = 350 mA	—	—	2.6	
					I _{OUT} = 200 mA	—	—	2.0	
	TD62004				I _{OUT} = 350 mA	—	—	4.7	
					I _{OUT} = 200 mA	—	—	4.4	
Clamp Diode Reverse Current	AP, AF	I _R	6	V _R = 50 V, Ta = 25°C	—	—	50	μA	
				V _R = 50 V, Ta = 85°C	—	—	100		
	F			V _R = 35 V, Ta = 25°C	—	—	50		
				V _R = 35 V, Ta = 85°C	—	—	100		
	P			V _R = 35 V, Ta = 25°C	—	—	50		
				V _R = 35 V, Ta = 75°C	—	—	100		
Clamp Diode Forward Voltage		V _F	7	I _F = 350 mA	—	—	2.0	V	
Input Capacitance		C _{IN}	—		—	15	—	pF	
Turn-On Delay	P, F	t _{ON}	8	V _{OUT} = 35 V, R _L = 87.5 Ω C _L = 15 pF	—	0.1	—	μs	
	AP, AF			V _{OUT} = 50 V, R _L = 125 Ω C _L = 15 pF	—	0.1	—		
Turn-Off Delay	P, F	t _{OFF}	8	V _{OUT} = 35 V, R _L = 87.5 Ω C _L = 15 pF	—	0.2	—		
	AP, AF			V _{OUT} = 50 V, R _L = 125 Ω C _L = 15 pF	—	0.2	—		

TEST CIRCUIT

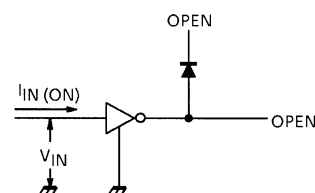
1. I_{CEX}



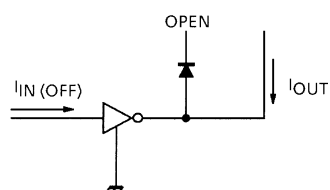
2. $V_{CE} \text{ (sat)}, h_{FE}$



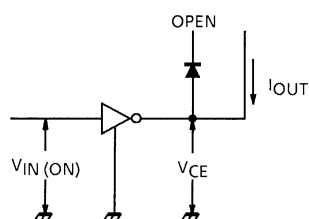
3. $I_{IN} \text{ (ON)}$



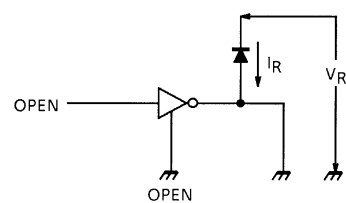
4. $I_{IN} \text{ (OFF)}$



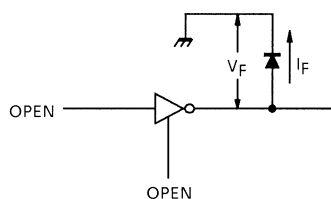
5. $V_{IN} \text{ (ON)}$

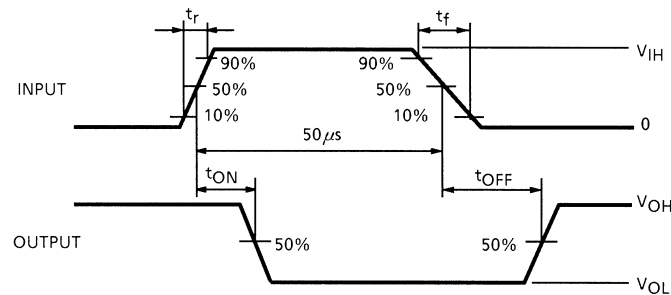


6. I_R



7. V_F



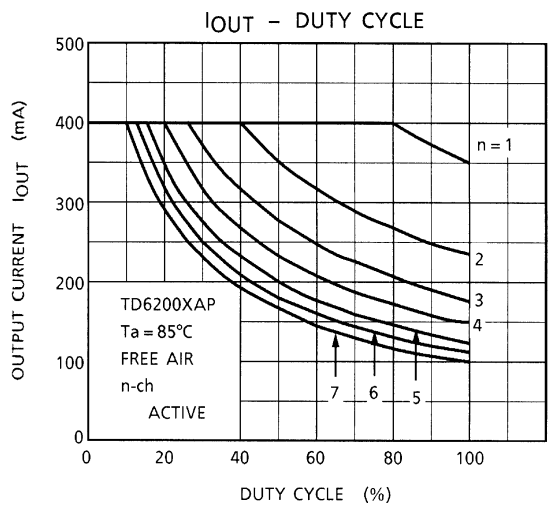
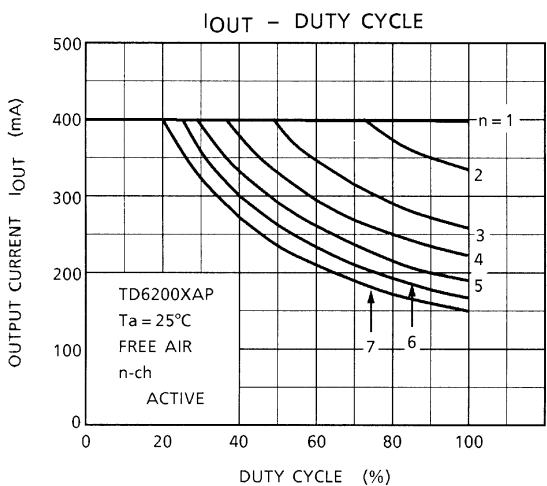
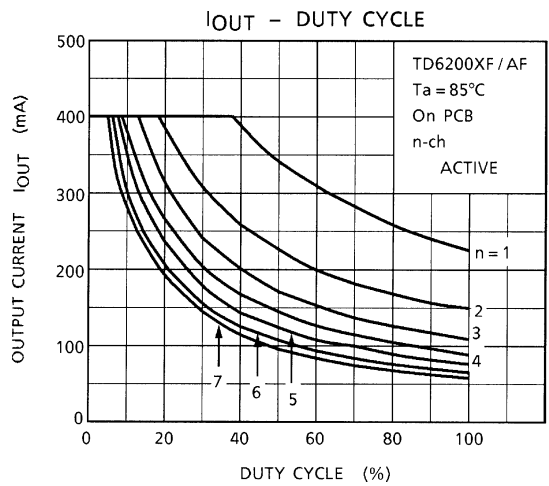
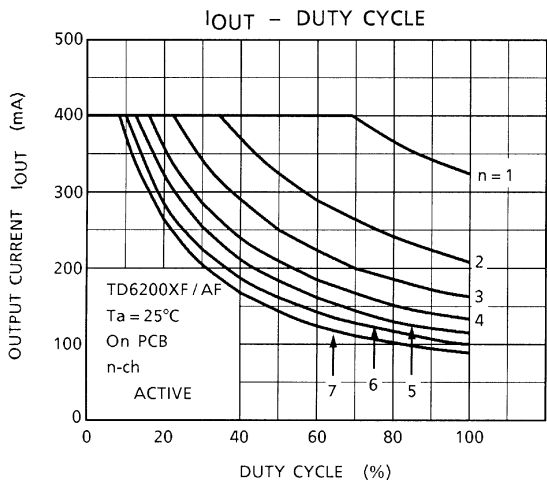
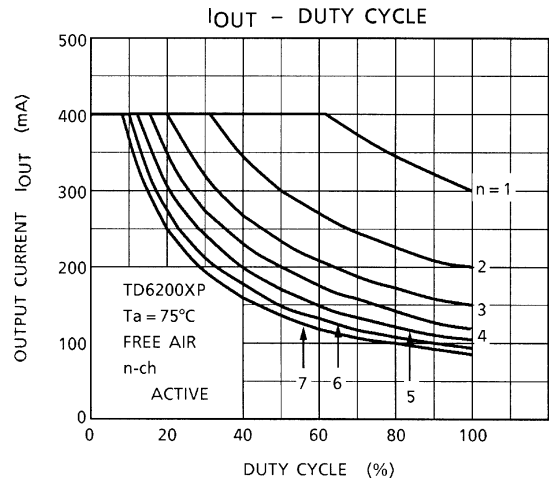
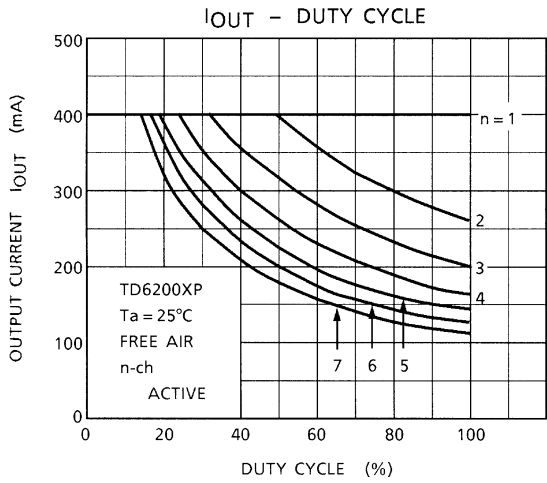


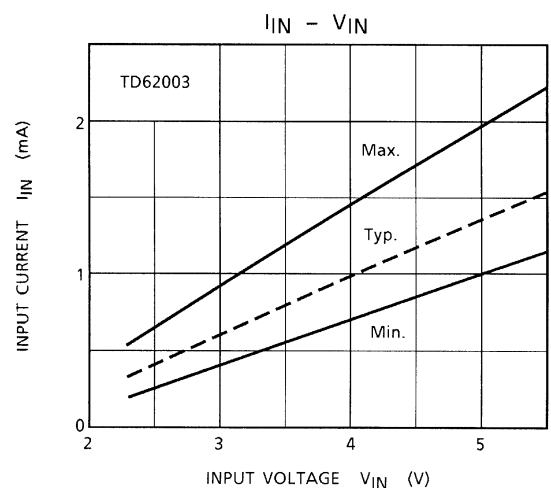
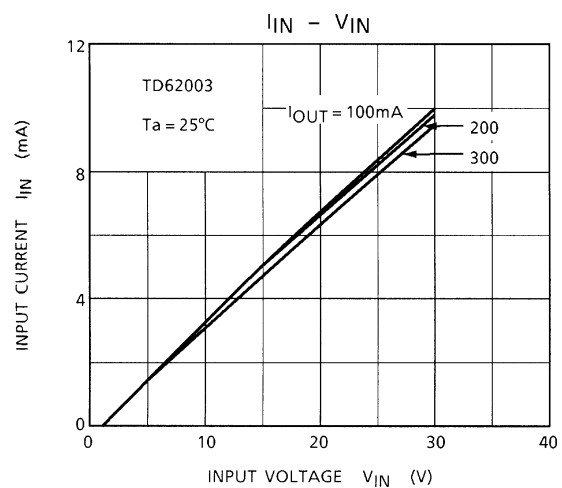
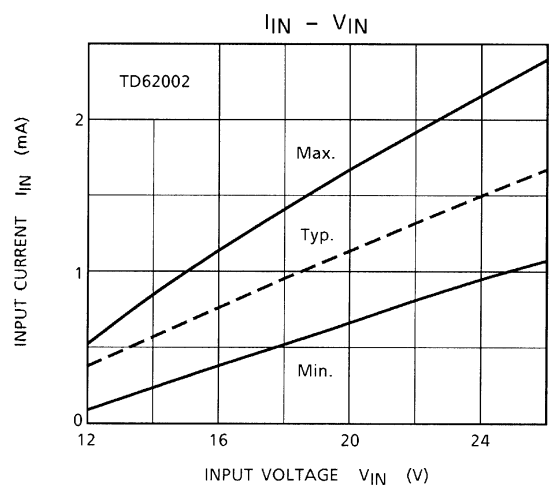
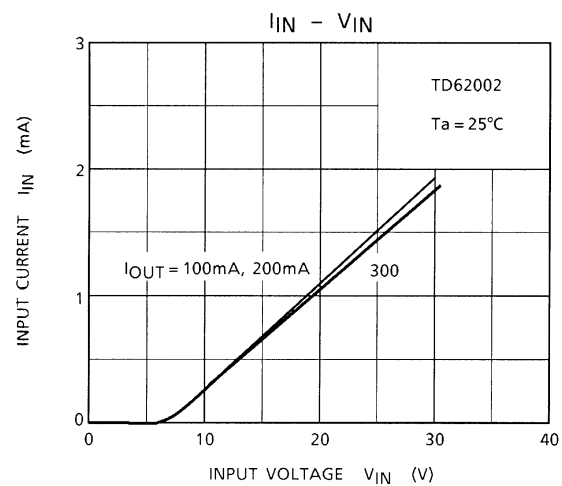
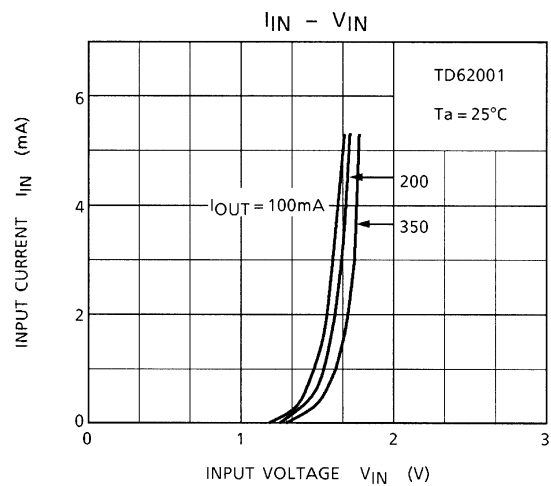
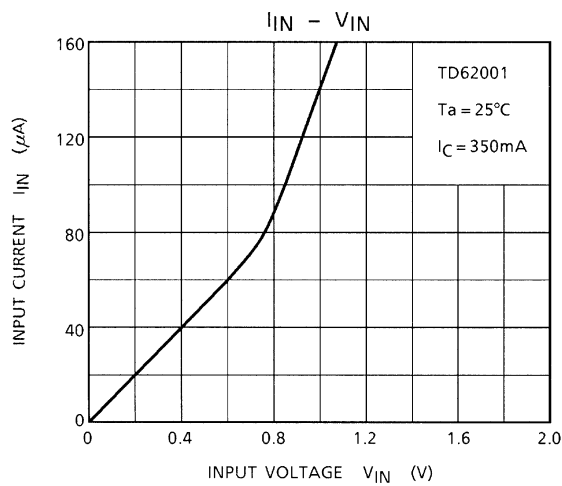
INPUT CONDITION

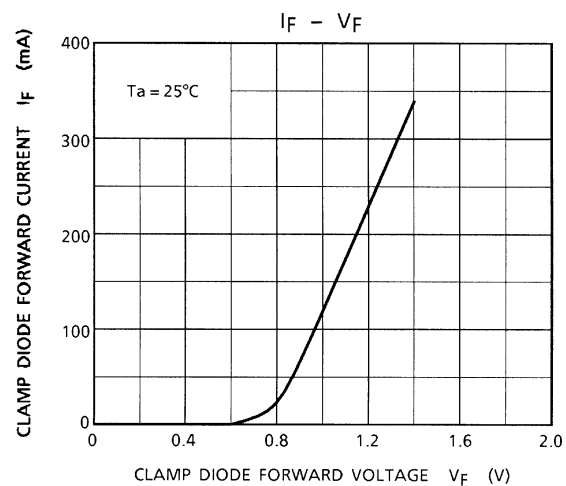
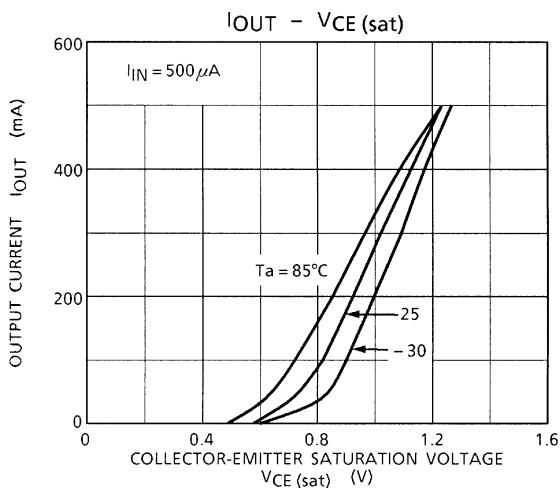
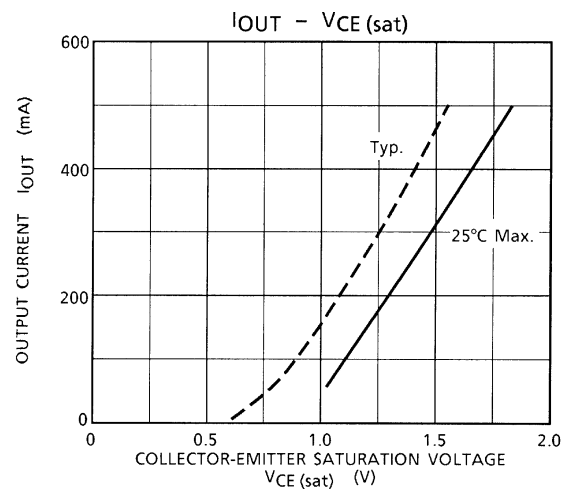
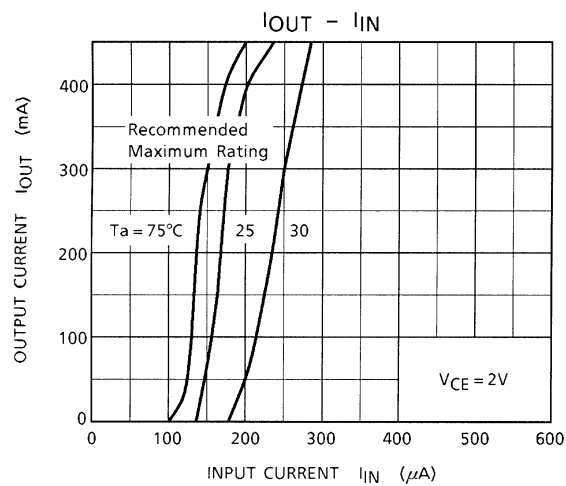
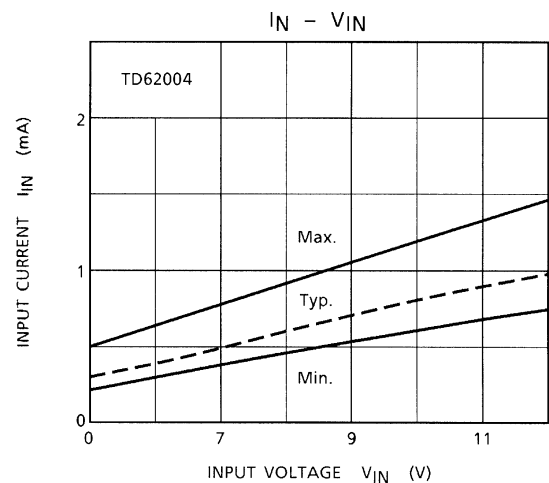
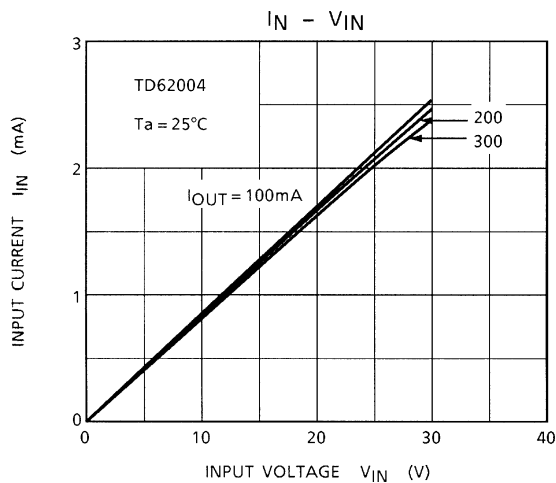
TYPE NUMBER	R1	V _{IH}
TD62001P / AP / F / AF	2.7 kΩ	3 V
TD62002P / AP / F / AF	0	13 V
TD62003P / AP / F / AF	0	3 V
TD62004P / AP / F / AF	0	8 V

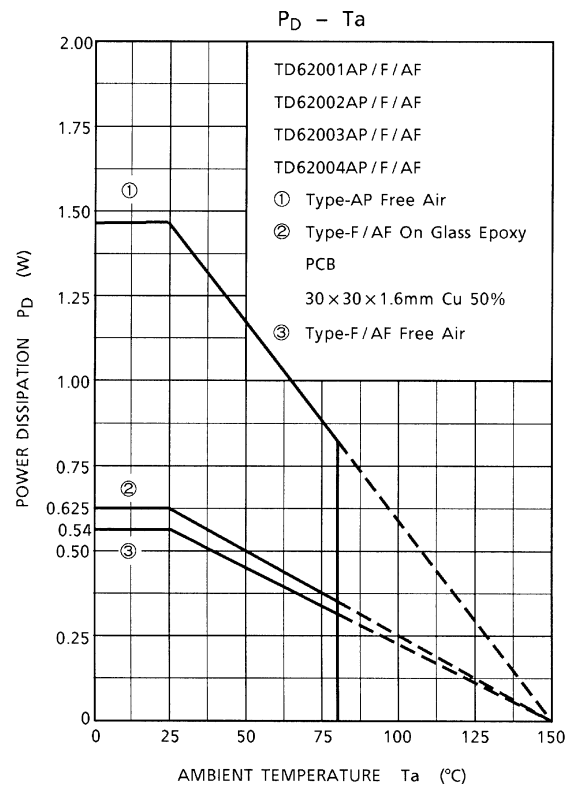
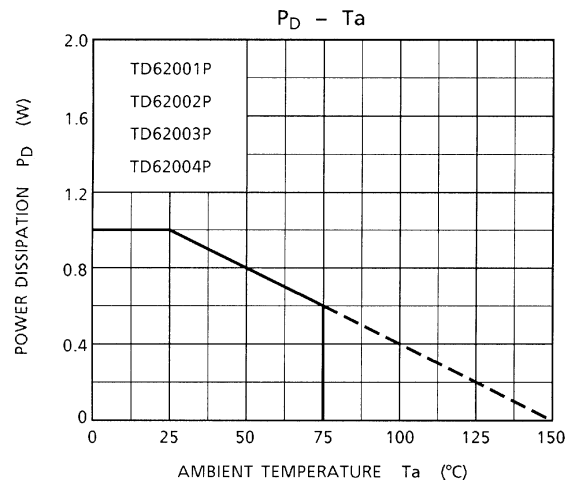
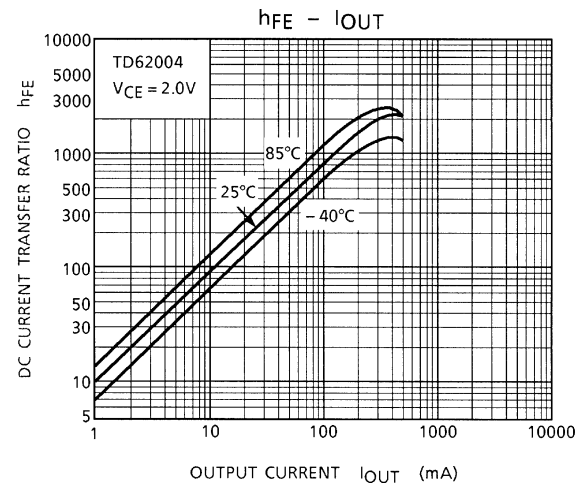
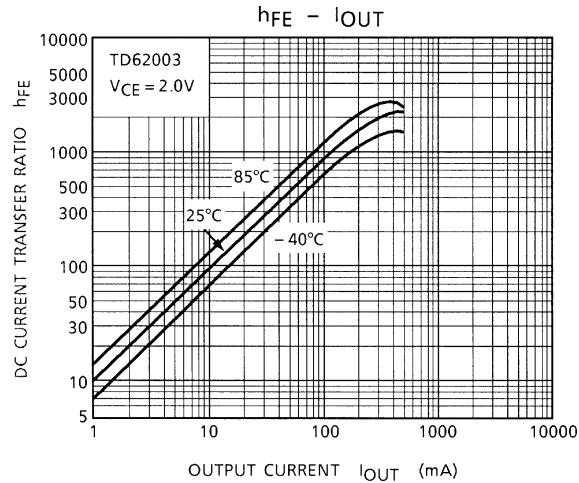
PRECAUTIONS for USING

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.





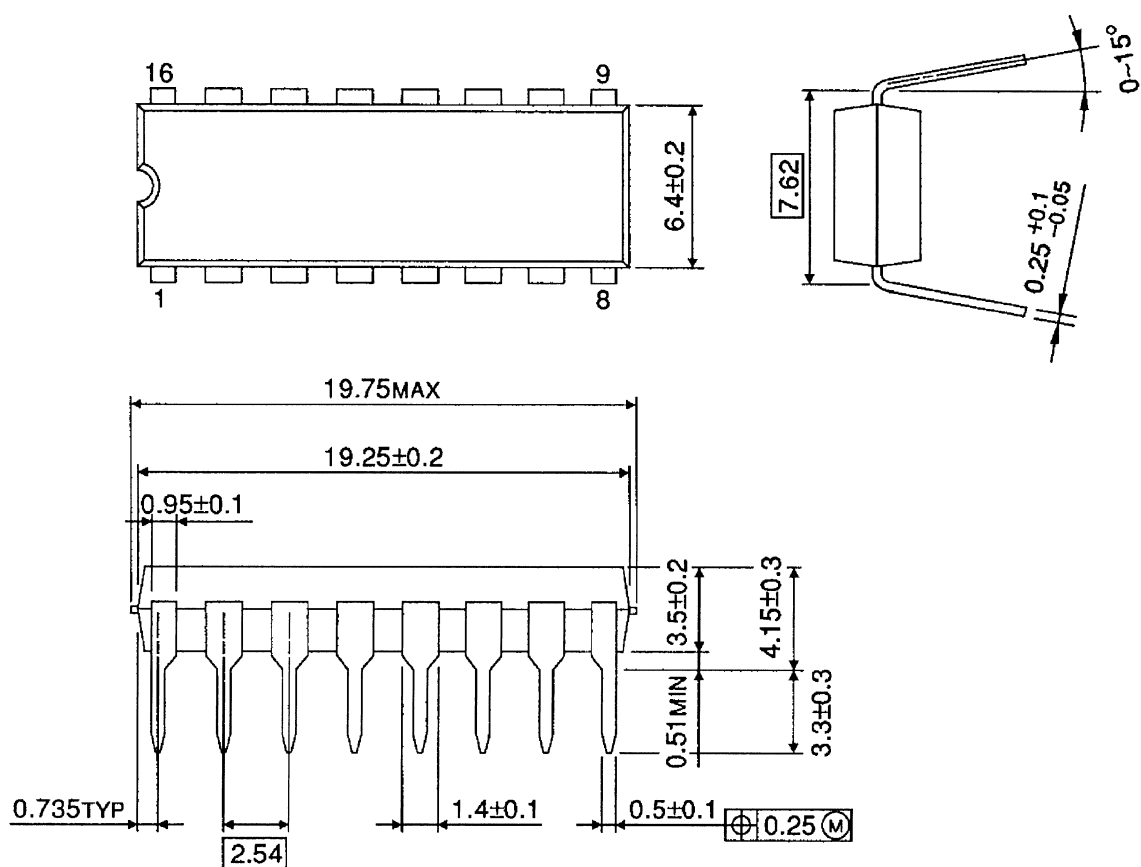




PACKAGE DIMENSIONS

DIP16-P-300-2.54A

Unit : mm

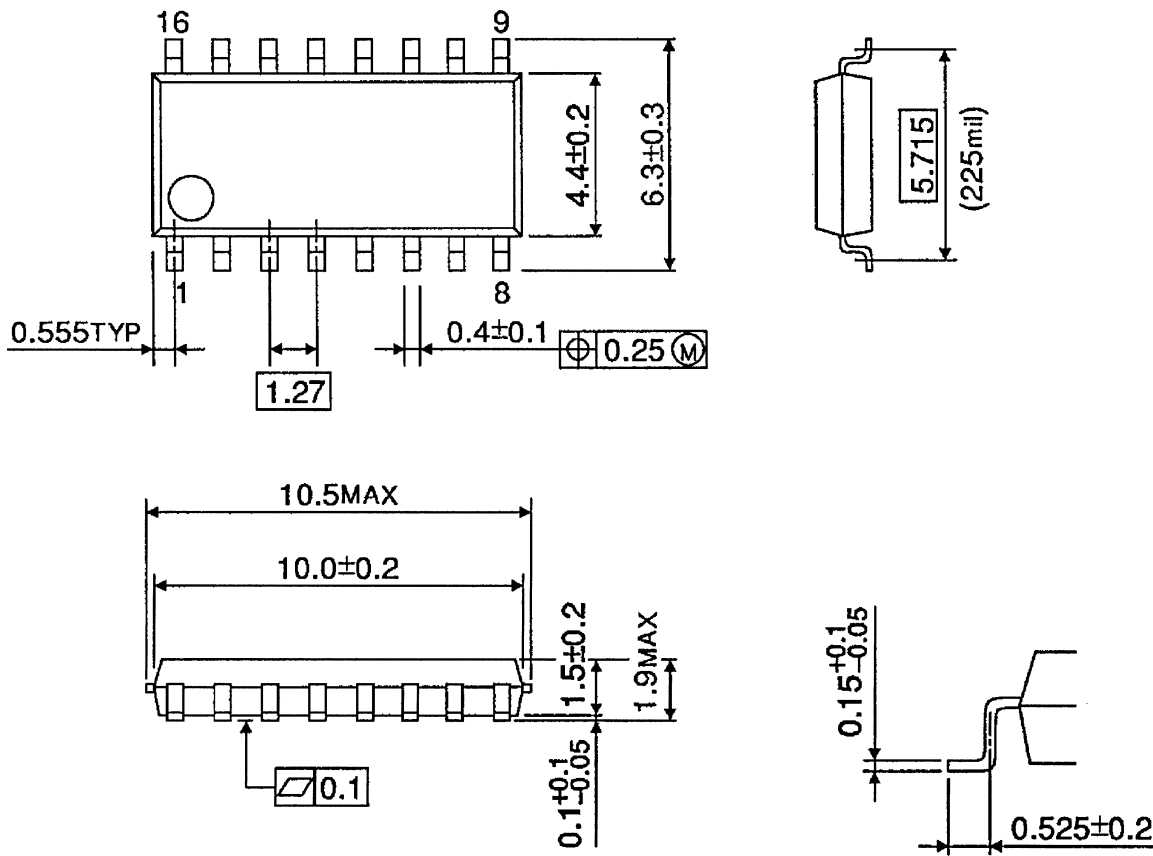


Weight: 1.11 g (Typ.)

PACKAGE DIMENSIONS

SOP16-P-225-1.27

Unit : mm



Weight: 0.16 g (Typ.)

RESTRICTIONS ON PRODUCT USE

000707EBA

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