

TOSHIBA Bipolar Digital Integrated Circuit Silicon Monolithic

**TD62001APG,TD62001AFG,TD62002APG,TD62002AFG,
TD62003APG,TD62003AFG,TD62004APG,TD62004AFG**

7-channel Darlington Sink Driver

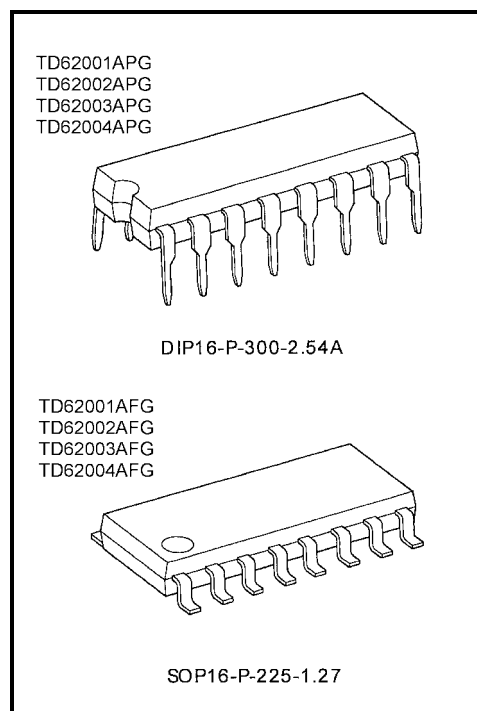
The TD62001APG/AFG Series are high-voltage, high-current darlington drivers comprised of seven NPN darlington pairs. All units feature integral clamp diodes for switching inductive loads.

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

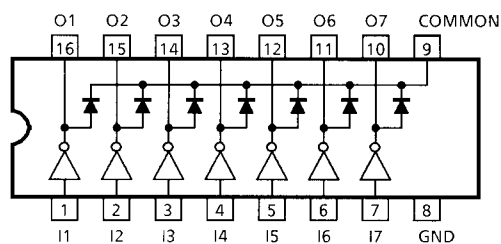
Features

- Output current (single output): 500 mA (max)
- High sustaining voltage output: 50 V (min)
- Output clamp diodes
- Inputs compatible with various types of logic
- Package type
 - APG: DIP-16 pin (Pb free package)
 - AFG: SOP-16 pin (Pb free package)

Type	Input base resistor	Designation
TD62001APG/AFG	External	General purpose
TD62002APG/AFG	10.5-k Ω + 7-V Zenner diode	14-V to 25-V PMOS
TD62003APG/AFG	2.7 k Ω	TTL, 5-V CMOS
TD62004APG/AFG	10.5 k Ω	6-V to 15-V PMOS, CMOS

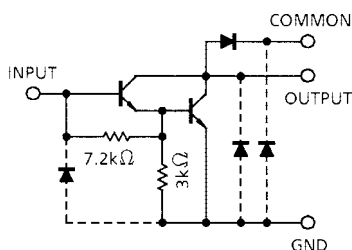


Pin Connection (top view)

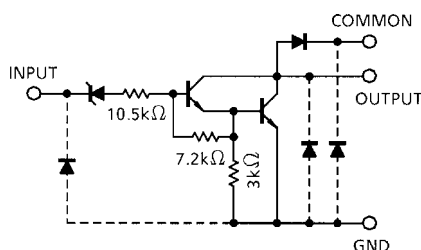


Schematics (each driver)

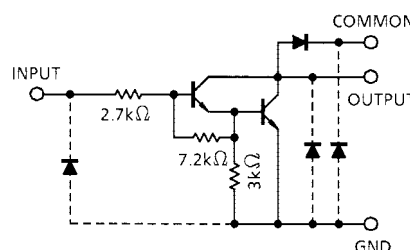
TD62001APG/AFG



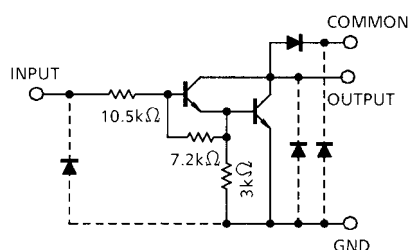
TD62002APG/AFG



TD62003PAPG/AFG



TD62004APG/AFG



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

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Output sustaining voltage	$V_{CE(SUS)}$	-0.5 to 50	V
Output current	I_{OUT}	500	mA/ch
Input voltage	V_{IN} (Note 1)	-0.5 to 30	V
Input current	I_{IN} (Note 2)	25	mA
Clamp diode reverse voltage	V_R	50	V
Clamp diode forward current	I_F	500	mA
Power dissipation	APG	P_D	1.47
	AFG		0.625 (Note 3)
Operating temperature	T_{opr}	-40 to 85	°C
Storage temperature	T_{stg}	-55 to 150	°C

Note 1: Except TD62001APG/AFG

Note 2: Only TD62001APG/AFG

Note 3: When mounted on a glass-epoxy PCB (30 mm × 30 mm × 1.6 mm, Cu area: 50%)

Recommended Operating Conditions (Ta = -40°C to 85°C)

Characteristics		Symbol	Condition		Min	Typ.	Max	Unit
Output sustaining voltage		V _{CE (SUS)}			0	—	50	V
Output current	APG	I _{OUT}	T _{pw} = 25 ms 7 circuits Ta = 85°C Tj = 120°C	Duty = 10%	0	—	370	mA/ch
				Duty = 50%	0	—	130	
	AFG			Duty = 10%	0	—	233	
				Duty = 50%	0	—	70	
Input voltage	Except TD62001APG/AFG	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		V _R			—	—	50	V
Clamp diode forward current		I _F			—	—	350	mA
Power dissipation	APG	P _D	Ta = 85°C		—	—	0.76	W
	AFG		Ta = 85°C (Note)		—	—	0.325	

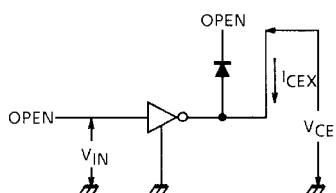
Note: When mounted on a glass-epoxy PCB (30 mm × 30 mm × 1.6 mm, Cu area: 50%)

Electrical Characteristics (Ta = 25°C unless otherwise noted)

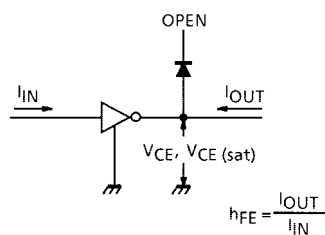
Characteristics		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit	
Ooutput leakage current		I _{CEX}	1	V _{CE} = 50 V, Ta = 25°C	—	—	50	μA	
				V _{CE} = 50 V, Ta = 85°C	—	—	100		
Collector–emitter saturation voltage		V _{CE (sat)}	2	I _{OUT} = 350 mA, I _{IN} = 500 μA	—	1.3	1.6	V	
				I _{OUT} = 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)		I _{IN (OFF)}	4	I _{OUT} = 500 μA, Ta = 85°C	50	65	—	μA	
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		I _R	6	V _R = 50 V, Ta = 25°C	—	—	50	μA	
				V _R = 50 V, Ta = 85°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		t _{ON}	8	V _{OUT} = 50 V, R _L = 125 Ω C _L = 15 pF	—	0.1	—	μs	
Turn–off delay		t _{OFF}	8	V _{OUT} = 50 V, R _L = 125 Ω C _L = 15 pF	—	0.2	—		

Test Circuit

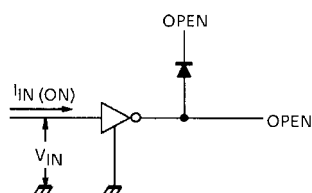
1. I_{CEX}



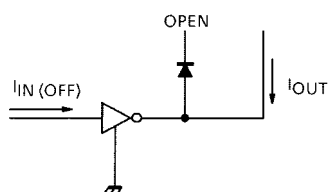
2. $V_{CE} (sat)$, h_{FE}



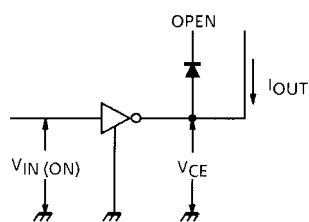
3. $I_{IN} (ON)$



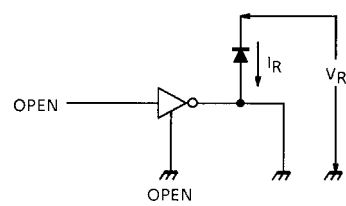
4. $I_{IN} (OFF)$



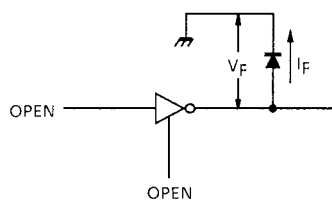
5. $V_{IN} (ON)$

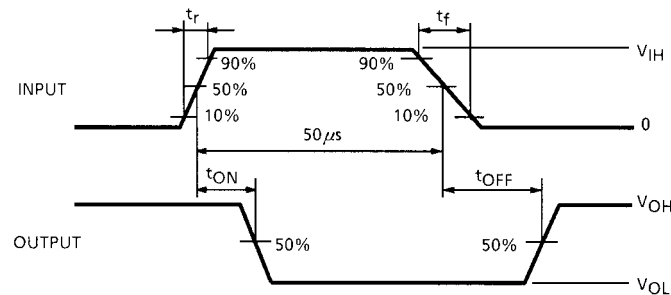


6. I_R



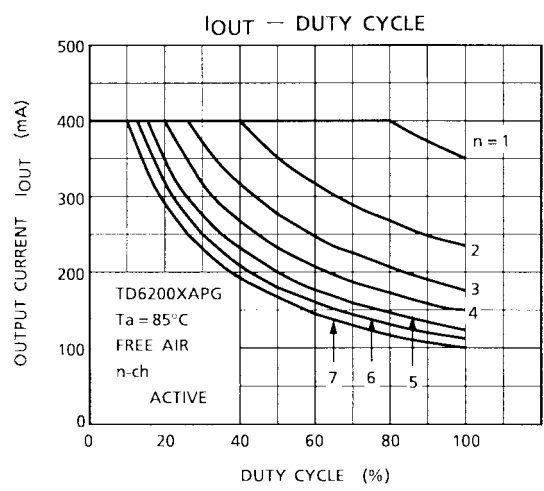
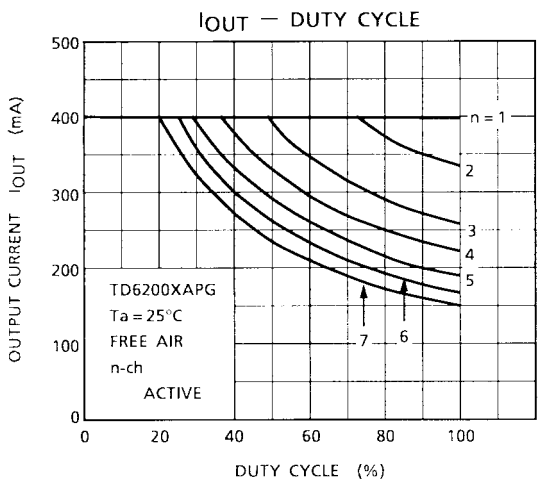
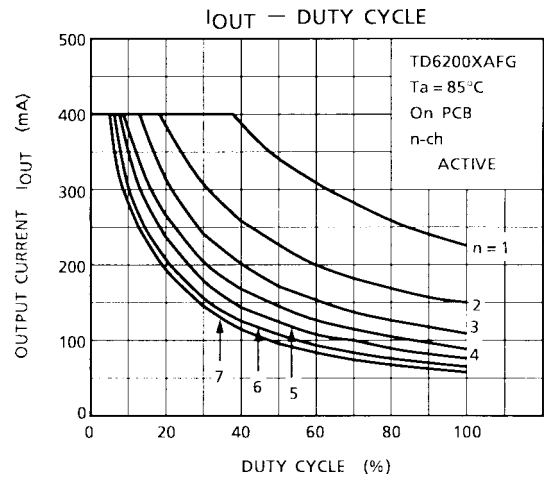
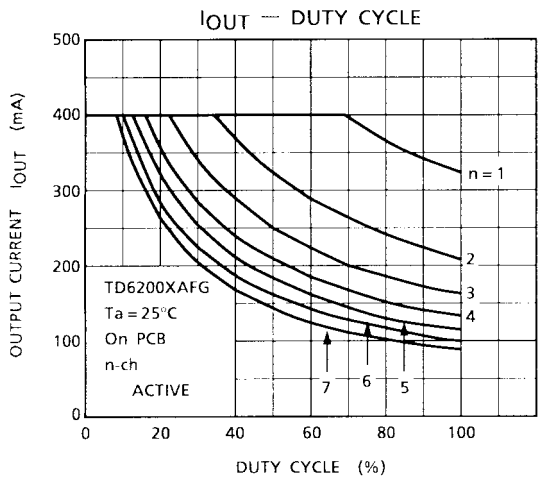
7. V_F

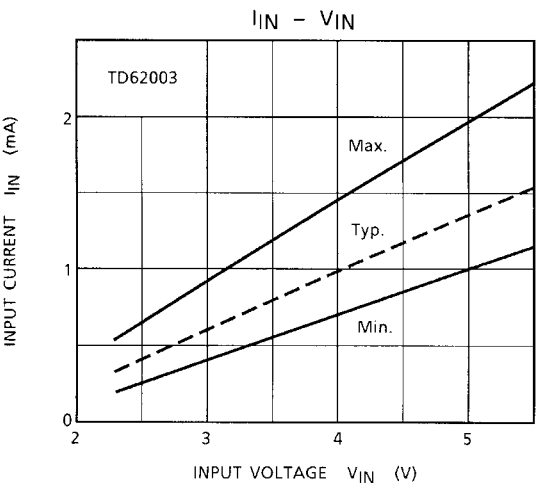
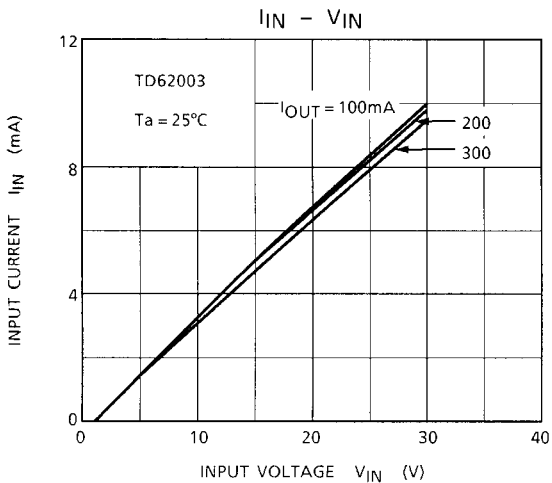
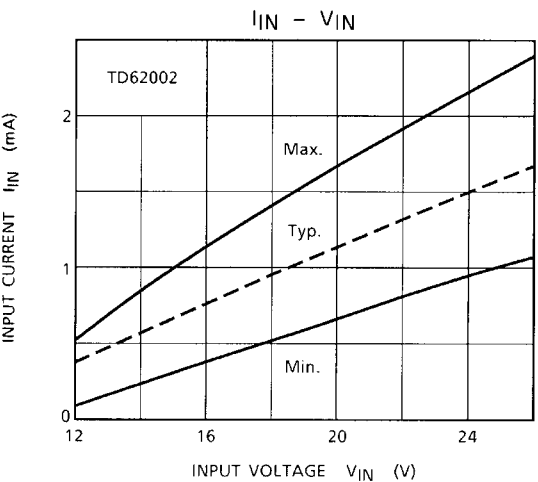
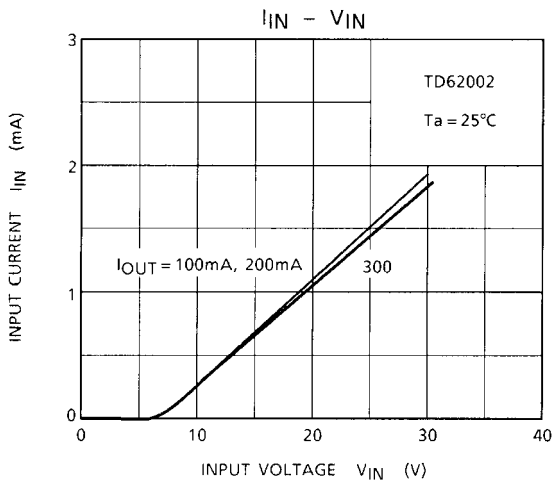
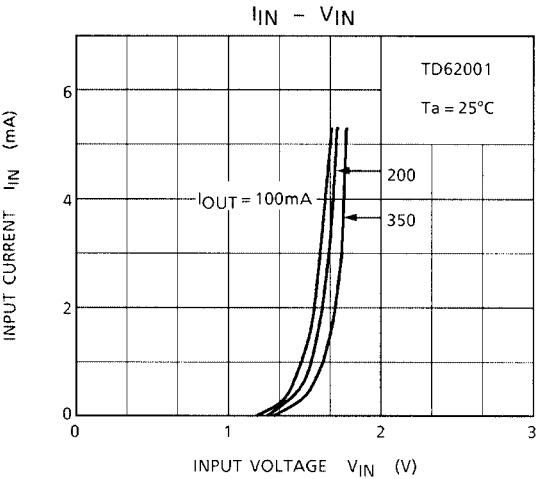
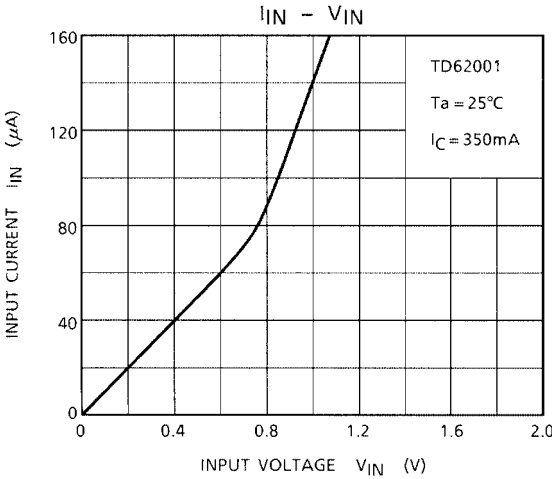


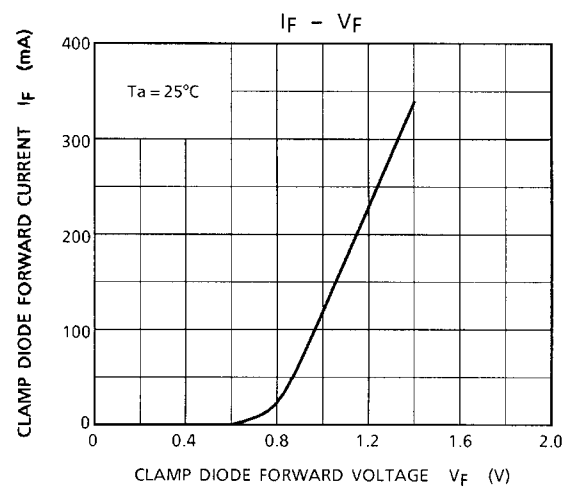
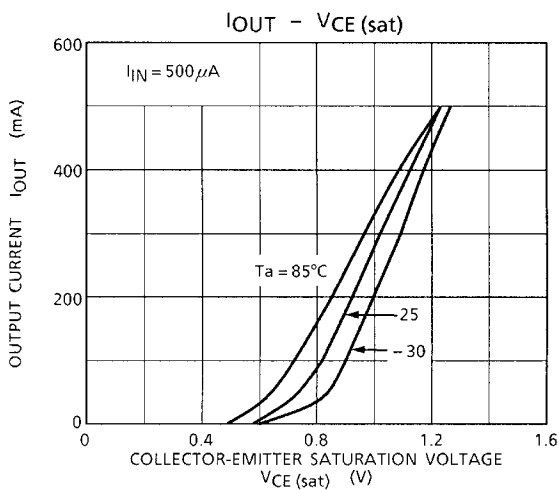
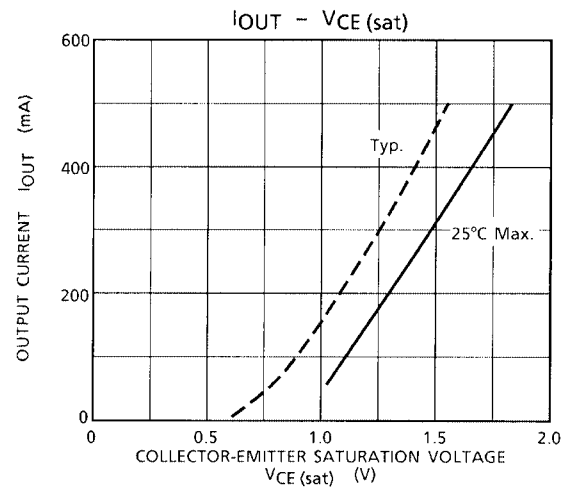
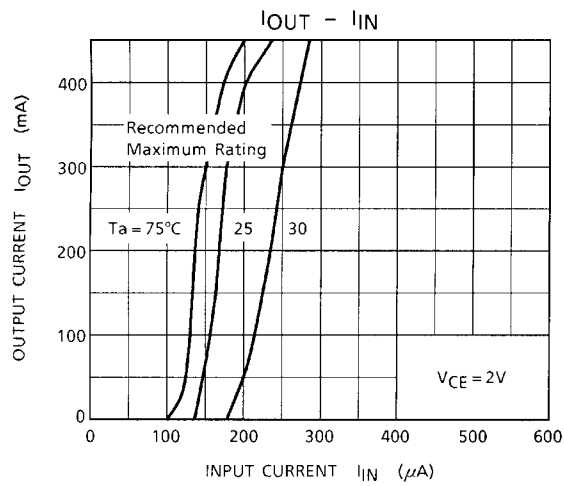
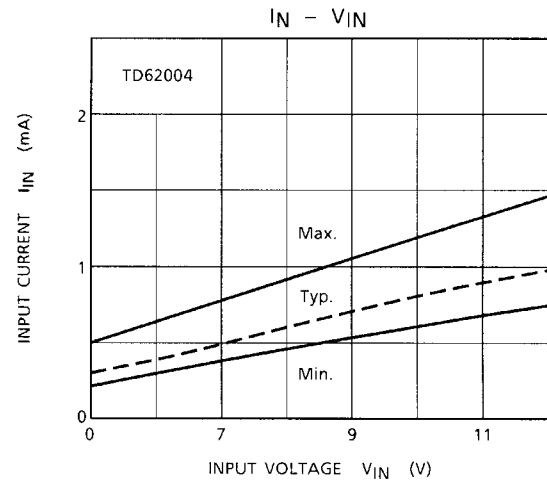
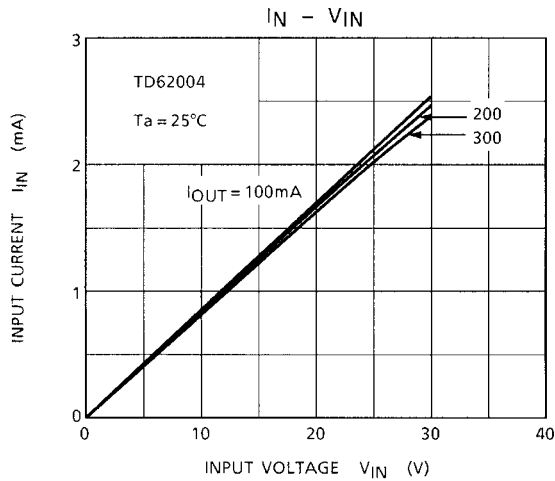


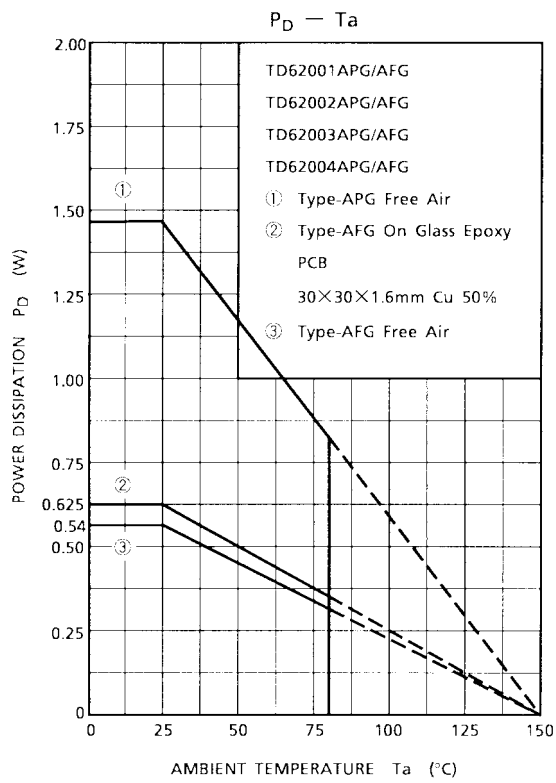
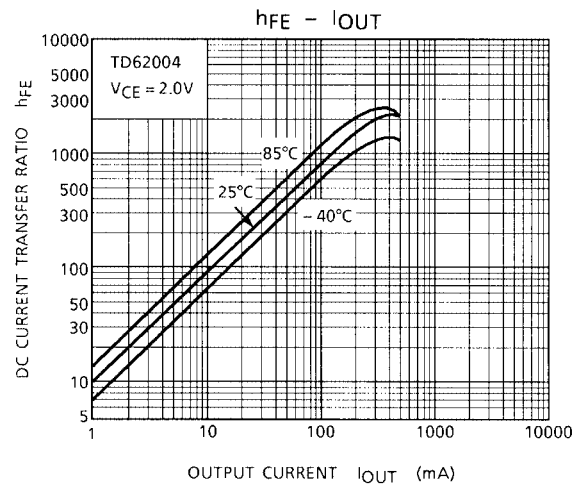
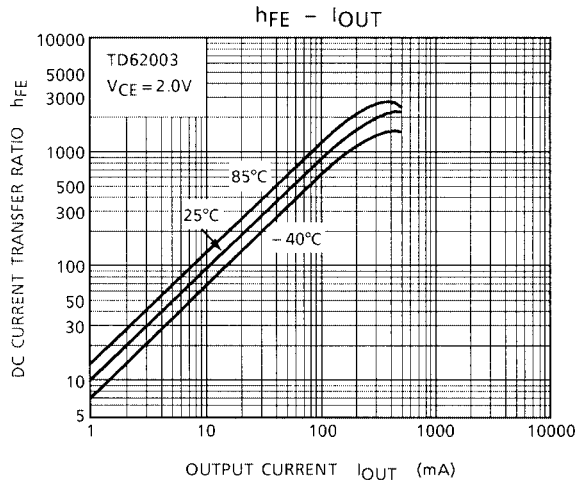
Type Number	R1	V _{IH}
TD62001APG/AFG	2.7 kΩ	3 V
TD62002APG/AFG	0	13 V
TD62003APG/AFG	0	3 V
TD62004APG/AFG	0	8 V

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.





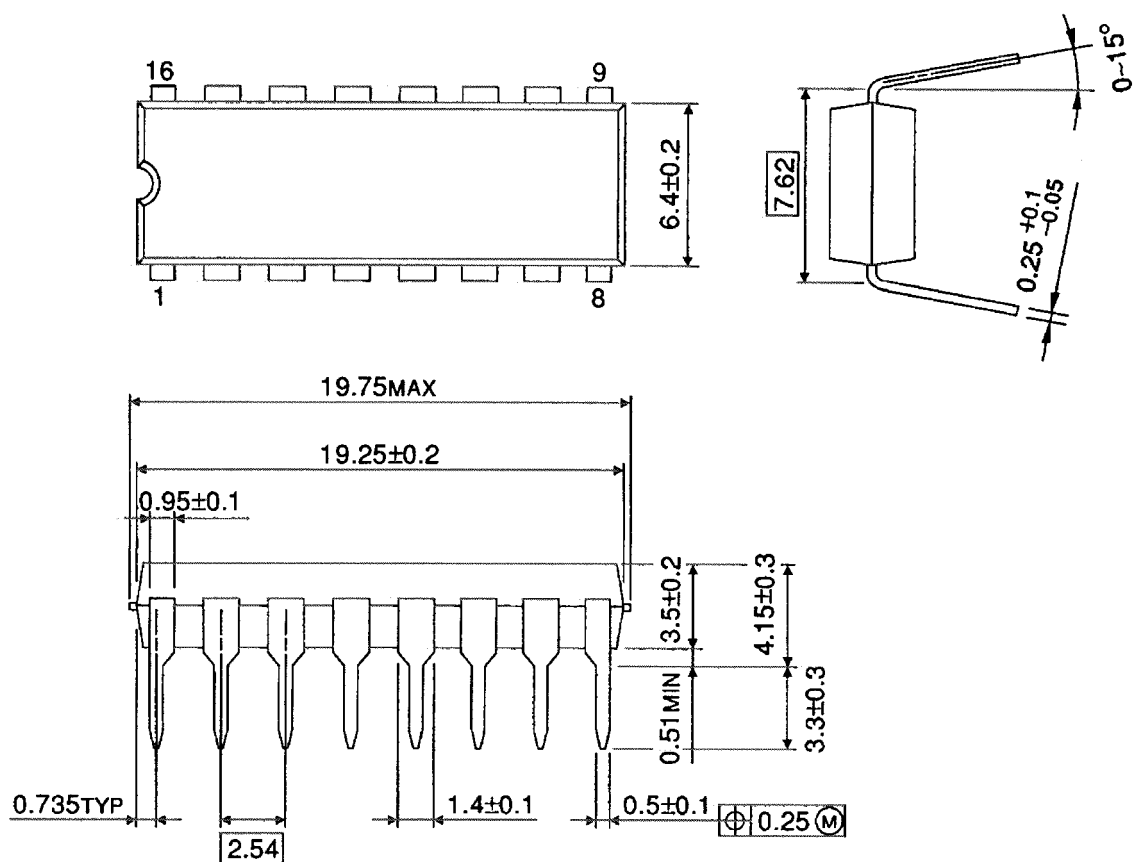




Package Dimensions

DIP16-P-300-2.54A

Unit : mm

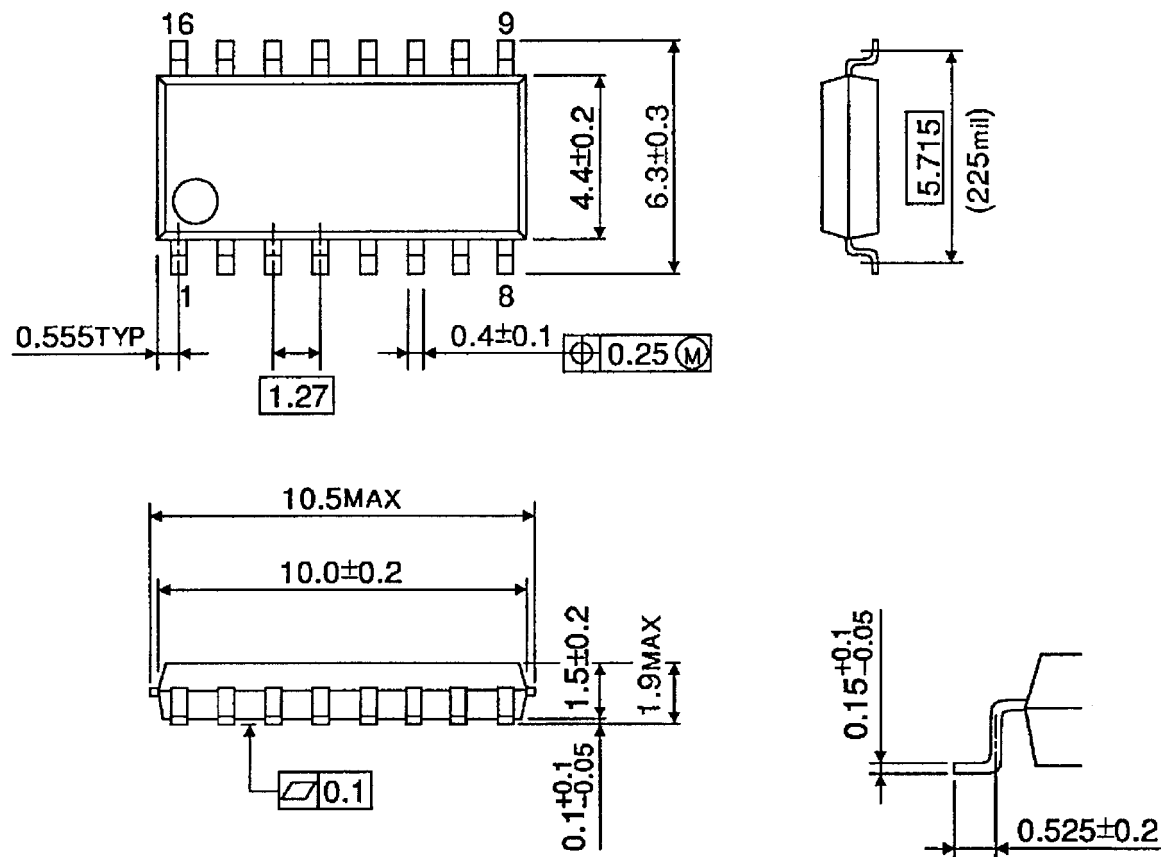


Weight: 1.11 g (Typ.)

Package Dimensions

SOP16-P-225-1.27

Unit : mm



Weight: 0.16 g (Typ.)

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