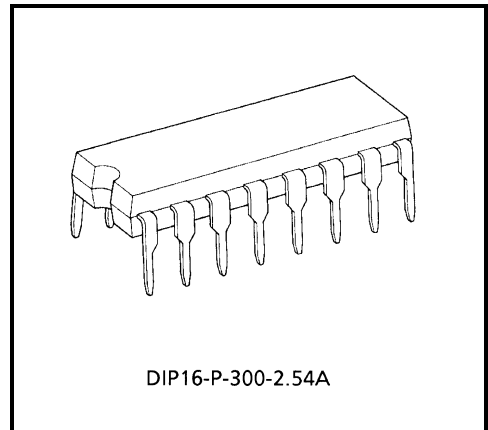


**TD62003PA,TD62003APA,TD62004PA,TD62004APA****7CH DARLINGTON SINK DRIVER**

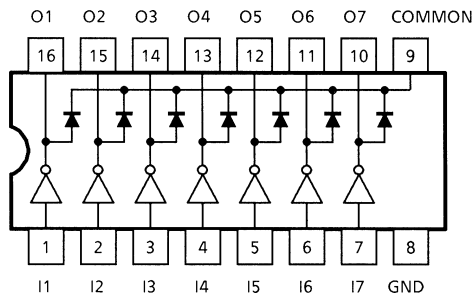
The TD62003PA / APA Series are high-voltage, high-current darlington drivers comprised of seven NPN darlington pairs. All units feature integral clamp diodes for switching inductive loads. Applications include relay, hammer, lamp and display (LED) drivers.

**FEATURES**

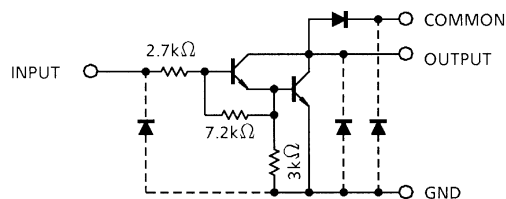
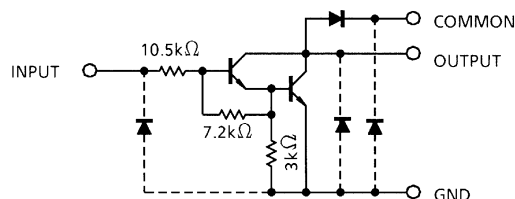
- Output current (single output) 500 mA (Max.)
- High sustaining voltage output  
35 V (Min.) (TD62003PA series)  
50 V (Min.) (TD62003APA series)
- Output clamp diodes
- Inputs compatible with various types of logic.  
TD62003PA, APA  $R_{IN} = 2.7 \text{ k}\Omega$   
TD62004PA, APA  $R_{IN} = 10.5 \text{ k}\Omega$
- Package DIP-16 pin



Weight: 1.11g ( Typ. )

**PIN CONNECTION (TOP VIEW)**

## SCHEMATICS (EACH DRIVER)

**TD62003PA / APA**

**TD62004PA / APA**


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	PA	$V_{CE(SUS)}$	-0.5~35	V
	APA		-0.5~50	
Output Current		$I_{OUT}$	500	mA / ch
Input Voltage		$V_{IN}$	-0.5~30	V
Clamp Diode Reverse Voltage	PA	$V_R$	35	V
	APA		50	
Clamp Diode Forward Current		$I_F$	500	mA
Power Dissipation		$P_D$	1.47	W
Operating Temperature	PA	$T_{opr}$	-30~75	°C
	APA		-40~85	
Storage Temperature		$T_{stg}$	-55~150	°C

## RECOMMENDED OPERATING CONDITIONS

(Ta = -40~85°C for Type-APA and Ta = -30~75°C for Type-PA)

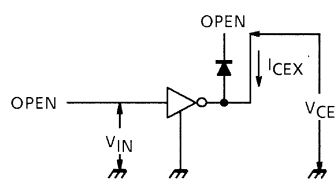
CHARACTERISTIC		SYMBOL	CONDITION		MIN	TYP.	MAX	UNIT
Output Sustaining Voltage	PA	V <sub>CE (SUS)</sub>			0	—	35	V
	APA				0	—	50	
Output Current	PA	I <sub>OUT</sub>	T <sub>pw</sub> = 25 ms 7 Circuits	Duty = 10%	0	—	370	mA / ch
	Duty = 50%			0	—	140		
	APA			Duty = 10%	0	—	400	
				Duty = 50%	0	—	170	
Input Voltage		V <sub>IN</sub>			0	—	24	V
	TD62003	V <sub>IN (ON)</sub>	I <sub>OUT</sub> = 400 mA, h <sub>FE</sub> = 800		2.8	—	24	V
	TD62004				6.2	—	24	
	TD62003	V <sub>IN (OFF)</sub>			0	—	0.7	V
	TD62004				0	—	1.0	
Clamp Diode Reverse Voltage	PA	V <sub>R</sub>			—	—	35	V
	APA				—	—	50	
Clamp Diode Forward Current		I <sub>F</sub>			—	—	350	mA
Power Dissipation		P <sub>D</sub>	Ta = 85°C		—	—	0.52	W

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

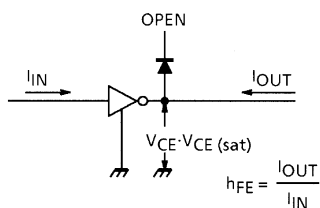
CHARACTERISTIC		SYMBOL	TEST CIR- CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT	
Output Leakage Current	APA	I <sub>CEX</sub>	1	V <sub>CE</sub> = 50 V, Ta = 25°C	—	—	50	μA	
				V <sub>CE</sub> = 50 V, Ta = 85°C	—	—	100		
	PA			V <sub>CE</sub> = 35 V, Ta = 25°C	—	—	50		
				V <sub>CE</sub> = 35 V, Ta = 75°C	—	—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

## TEST CIRCUIT

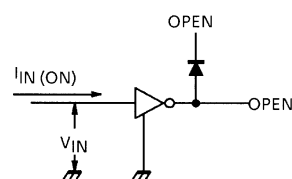
### 1. $I_{CEX}$



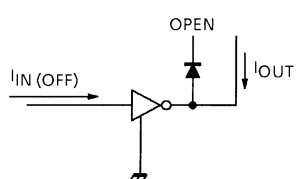
### 2. $V_{CE} (sat), h_{FE}$



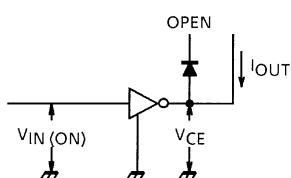
### 3. $I_{IN} (ON)$



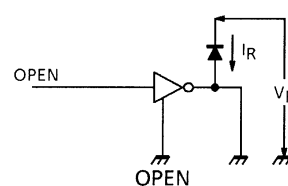
### 4. $I_{IN} (OFF)$



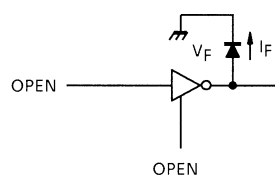
### 5. $V_{IN} (ON)$



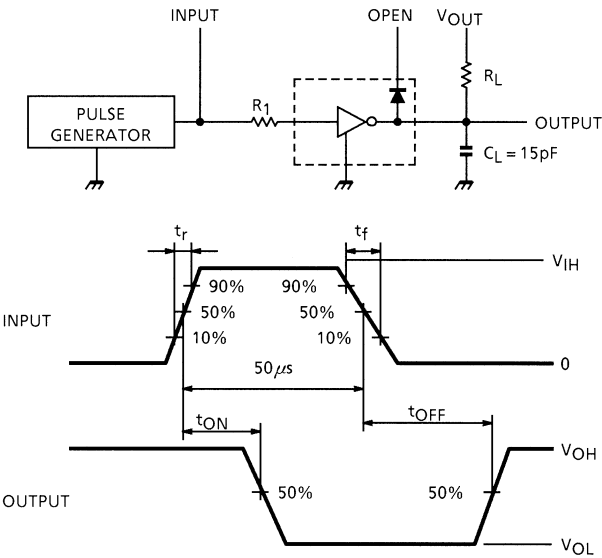
### 6. $I_R$



### 7. $V_F$



8.  $t_{ON}$ ,  $t_{OFF}$



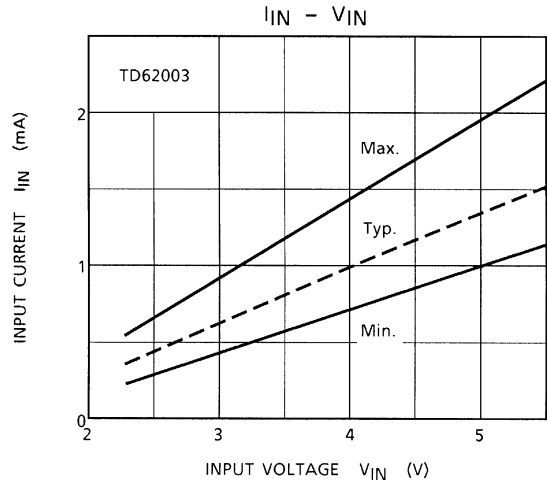
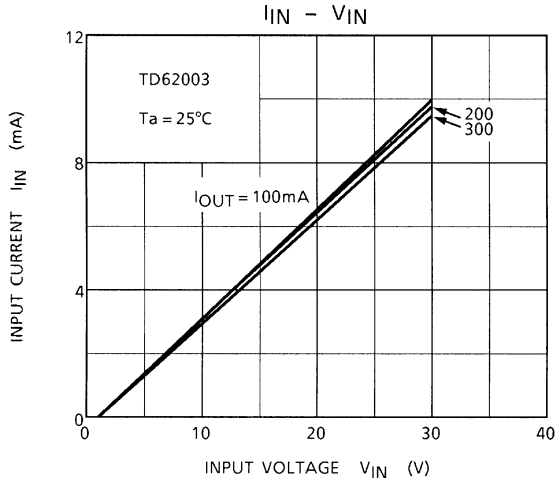
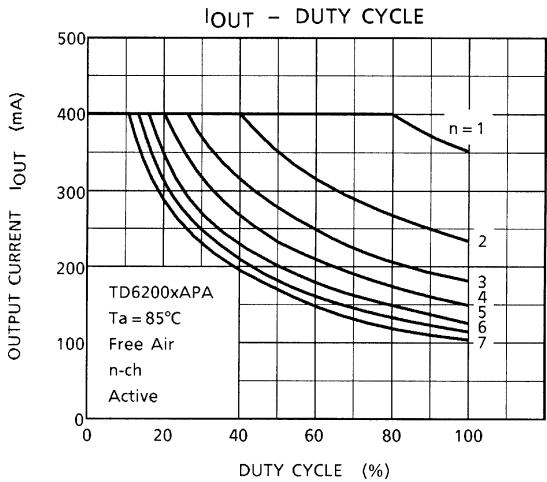
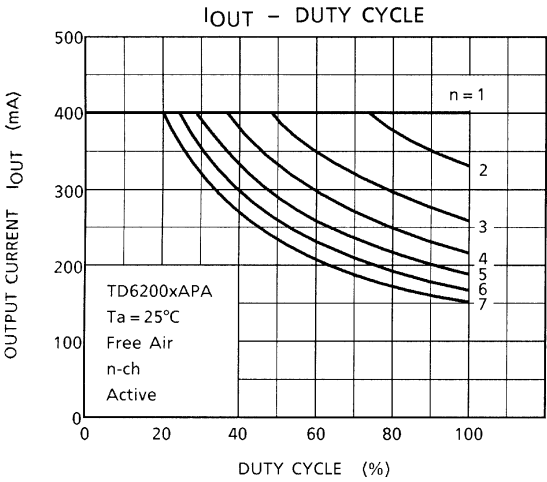
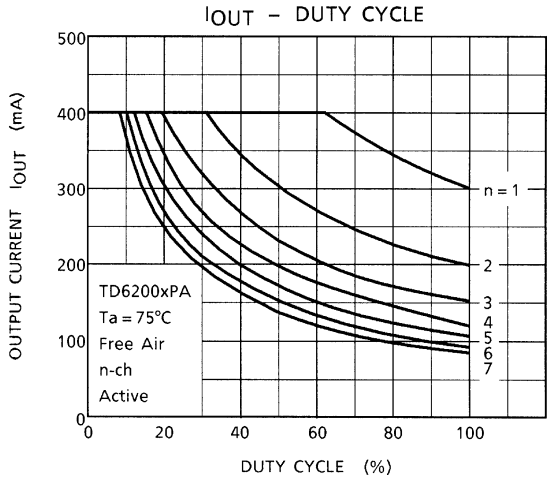
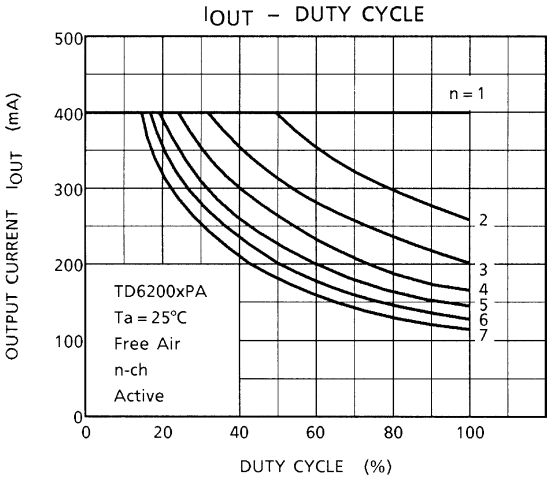
Note 1: Pulse Width  $50\mu\text{s}$ , Duty Cycle 10%  
Output Impedance  $50\Omega$ ,  $t_r \leq 5\text{ns}$ ,  $t_f \leq 10\text{ns}$   
Note 2: See below

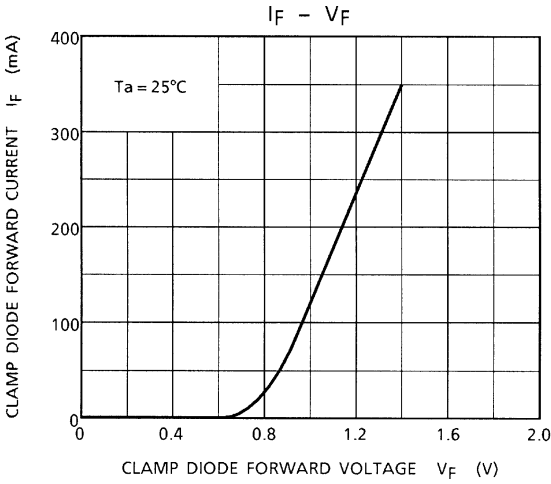
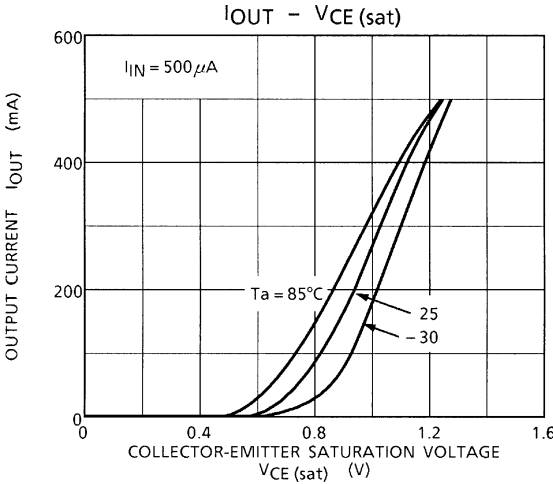
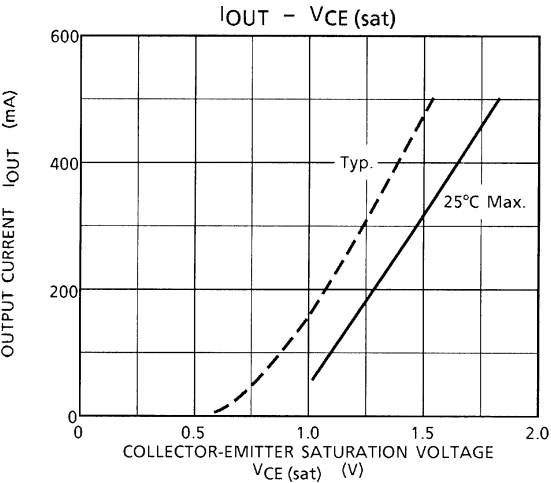
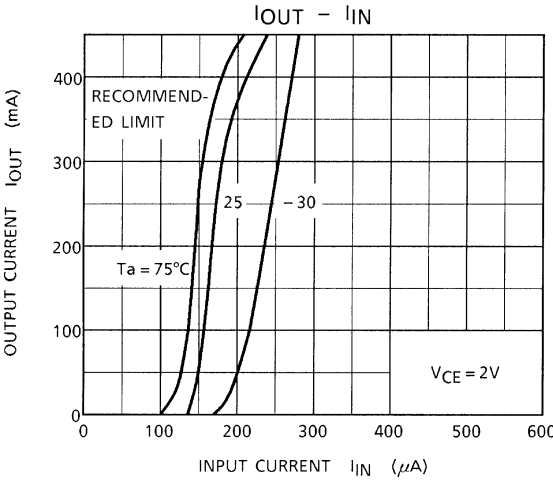
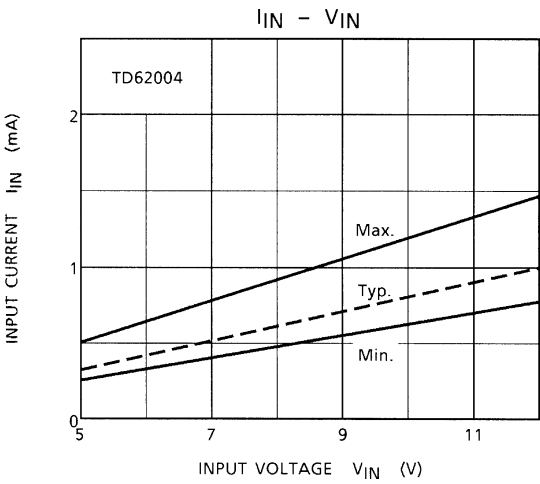
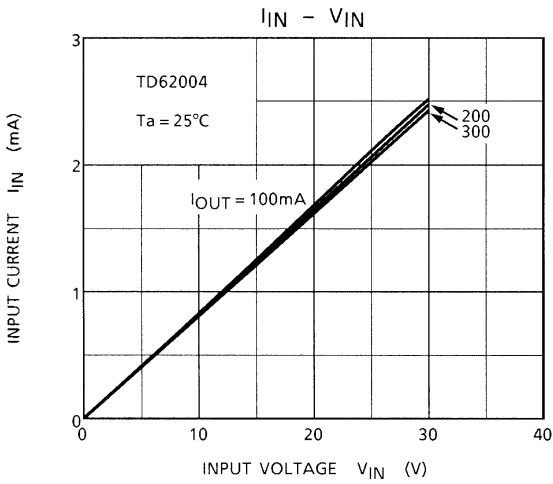
INPUT CONDITION		
TYPE NUMBER	$R_L$	$V_{IH}$
TD620003PA / APA	0	3 V
TD620004 / APA	0	8 V

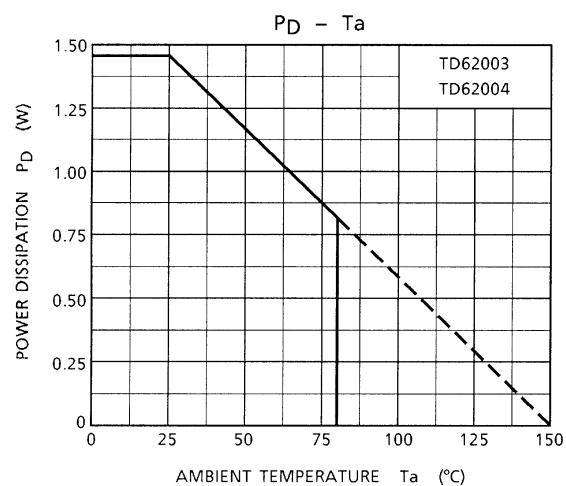
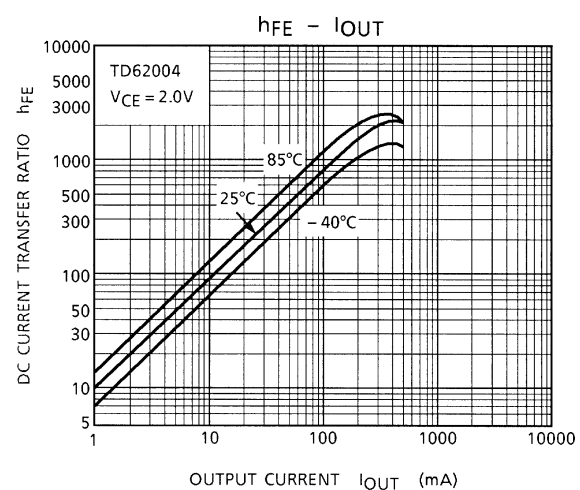
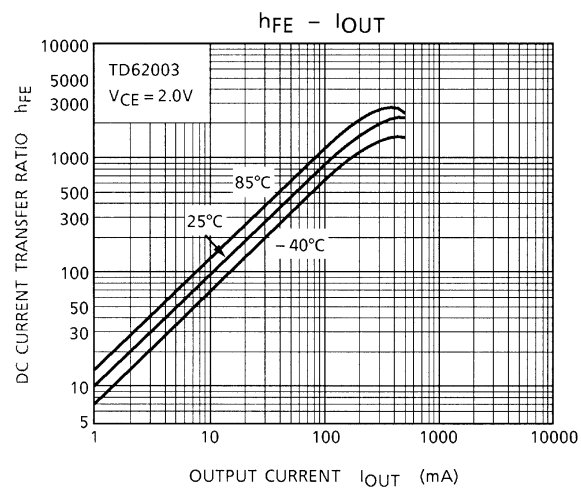
Note 3:  $C_L$  includes probe and jig capacitance

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.





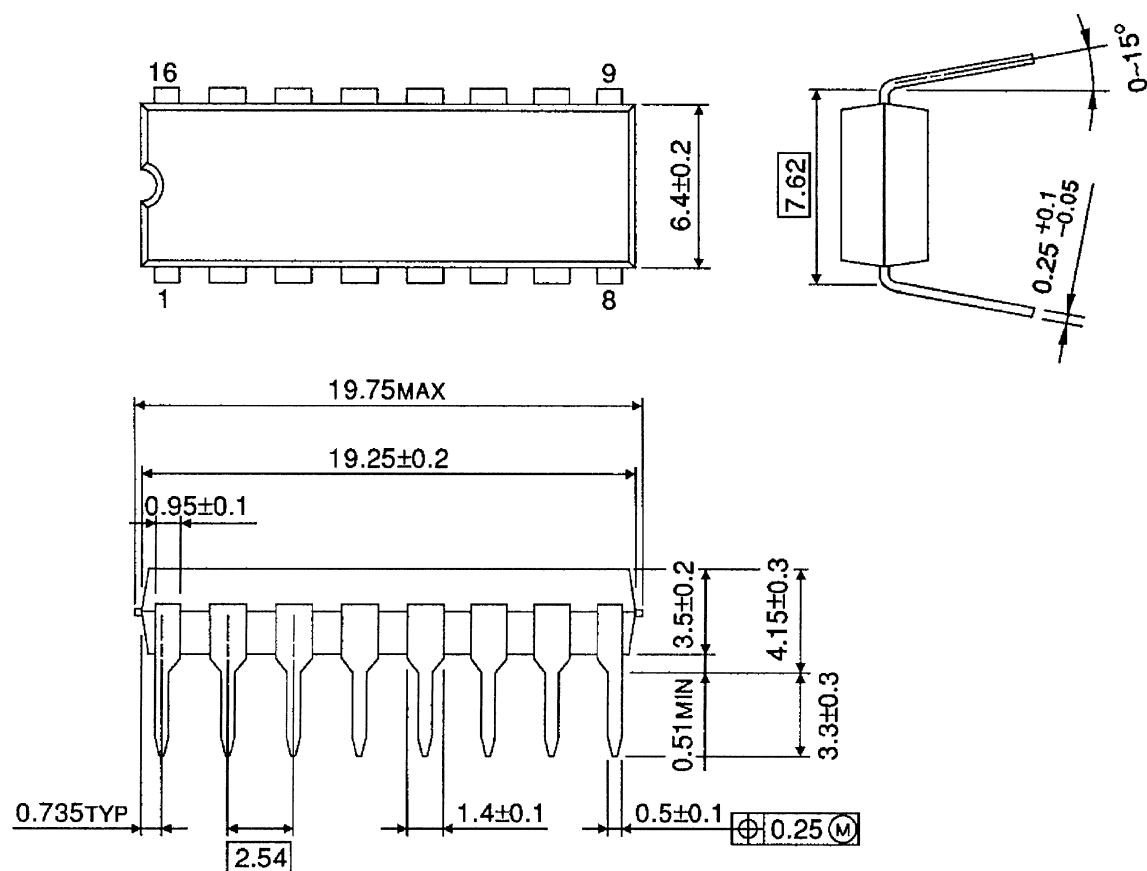




## PACKAGE DIMENSIONS

DIP16-P-300-2.54A

Unit : mm



Weight: 1.11 g (Typ.)

**RESTRICTIONS ON PRODUCT USE**

000707EBA

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