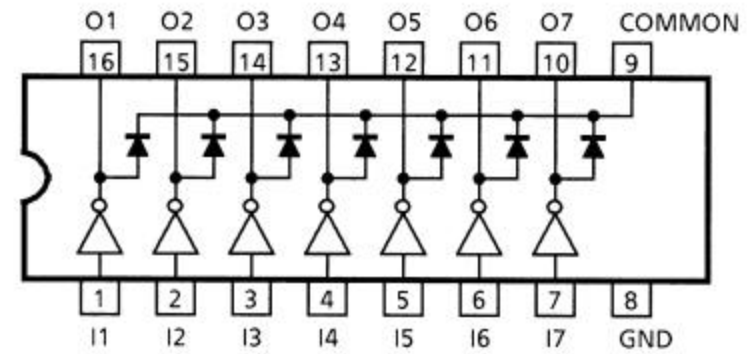


The XDXL62003 Series are high-voltage, high-current darlington drivers comprised of seven NPN darlington pairs. All units feature integral clamp diodes for switching inductive loads.

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

The suffix (G) appended to the part number represents a Lead (Pb)-Free product.

### Pin Connection (top view)



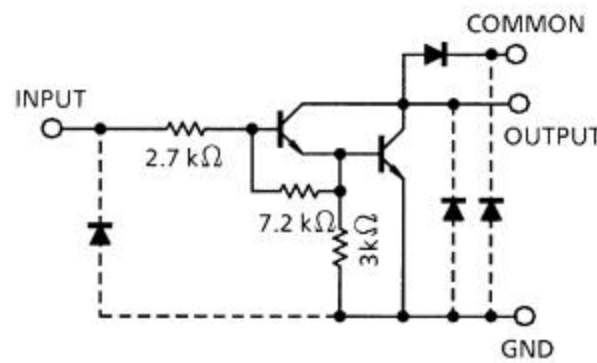
### Features

- Output current (single output): 500 mA max
- High sustaining voltage output: 50 V min
- Output clamp diodes
- Inputs compatible with various types of logic

Type	Input Base Resistor	Designation
XDXL62003	2.7 k $\Omega$	TTL, 5 V CMOS

### Schematics (each driver)

XDXL62003



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

### Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Output sustaining voltage	V <sub>CE(SUS)</sub>	-0.5~50	V
Output current	I <sub>OUT</sub>	500	mA/ch
Input voltage	V <sub>IN</sub>	-0.5~30	V
Clamp diode reverse voltage	V <sub>R</sub>	50	V
Clamp diode forward current	I <sub>F</sub>	500	mA
Power dissipation	P <sub>D</sub>	1.47	W
		1.25 (Note)	
Operating temperature	T <sub>opr</sub>	-40~85	°C
Storage temperature	T <sub>stg</sub>	-55~150	°C

Note: On PCB (Test Board: JEDEC 2s2p)

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

Characteristic		Symbol	Test Condition	Min	Typ.	Max	Unit	
Output sustaining voltage		$V_{CE(SUS)}$		0	—	50	V	
Output current	XD62003	$I_{OUT}$	$T_{pw} = 25\text{ ms}$ 7 Circuits $T_a = 85^\circ\text{C}$ $T_j = 120^\circ\text{C}$	Duty = 10%	0	—	350	mA/ch
				Duty = 50%	0	—	100	
	XL62003			Duty = 10%	0	—	300	
				Duty = 50%	0	—	90	
Input voltage		$V_{IN}$		0	—	24	V	
Input voltage (output on)	XD62003	$V_{IN(ON)}$	$I_{OUT} = 400\text{ mA}$ $h_{FE} = 800$	2.8	—	24	V	
Input voltage (output off)	XD62003	$V_{IN(OFF)}$		0	—	0.7	V	
Clamp diode reverse voltage		$V_R$		—	—	50	V	
Clamp diode forward current		$I_F$		—	—	350	mA	
Power dissipation	XD62003	$P_D$	$T_a = 85^\circ\text{C}$	—	—	0.76	W	
	XL62003		$T_a = 85^\circ\text{C}$ (Note)	—	—	0.65		

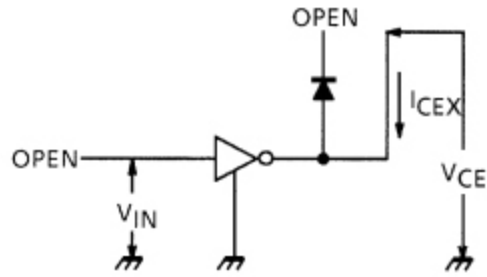
Note: On PCB (Test Board: JEDEC 2s2p)

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

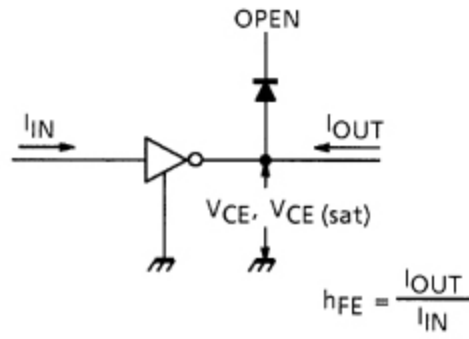
Characteristic		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit	
Output leakage current		$I_{CEX}$	1	$V_{CE} = 50\text{ V}, T_a = 25^\circ\text{C}$	—	—	50	$\mu\text{A}$	
				$V_{CE} = 50\text{ V}, T_a = 85^\circ\text{C}$	—	—	100		
Collector-emitter saturation voltage		$V_{CE(sat)}$	2	$I_{OUT} = 350\text{ mA}, I_{IN} = 500\text{ }\mu\text{A}$	—	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)	XD62003	$I_{IN(ON)}$	3	$V_{IN} = 2.4\text{ V}, I_{OUT} = 350\text{ mA}$	—	0.4	0.7	mA	
Input current (output off)		$I_{IN(OFF)}$	4	$I_{OUT} = 500\text{ }\mu\text{A}, T_a = 85^\circ\text{C}$	50	65	—	$\mu\text{A}$	
Input voltage (output on)	XD62003	$V_{IN(ON)}$	5	$V_{CE} = 2\text{ V}$ $h_{FE} = 800$	$I_{OUT} = 350\text{ mA}$	—	—	2.6	V
					$I_{OUT} = 200\text{ mA}$	—	—	2.0	
Clamp diode reverse current		$I_R$	6	$V_R = 50\text{ V}, T_a = 25^\circ\text{C}$	—	—	50	$\mu\text{A}$	
				$V_R = 50\text{ V}, T_a = 85^\circ\text{C}$	—	—	100		
Clamp diode forward voltage		$V_F$	7	$I_F = 350\text{ mA}$	—	—	2.0	V	
Input capacitance		$C_{IN}$	—		—	15	—	pF	
Turn-on delay		$t_{ON}$	8	$V_{OUT} = 50\text{ V}, R_L = 125\text{ }\Omega$ $C_L = 15\text{ pF}$	—	0.1	—	$\mu\text{s}$	
Turn-off delay		$t_{OFF}$	8	$V_{OUT} = 50\text{ V}, R_L = 125\text{ }\Omega$ $C_L = 15\text{ pF}$	—	0.2	—		

**Test Circuit**

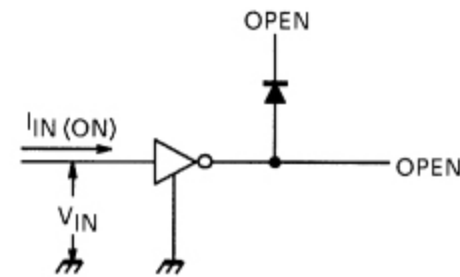
**1.  $I_{CEX}$**



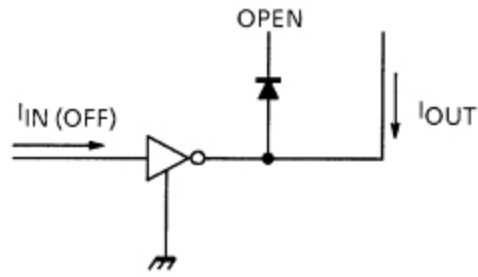
**2.  $V_{CE(sat)}$ ,  $h_{FE}$**



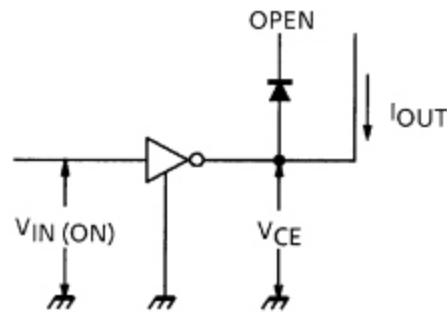
**3.  $I_{IN(ON)}$**



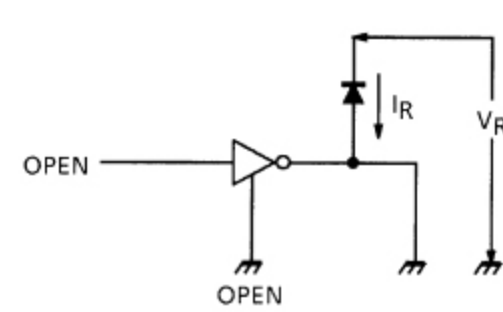
**4.  $I_{IN(OFF)}$**



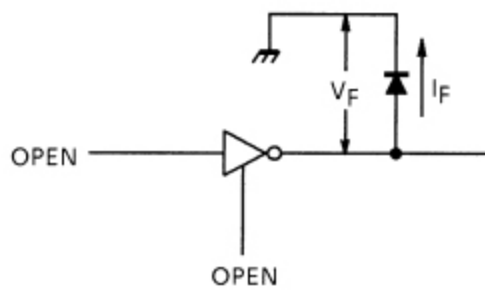
**5.  $V_{IN(ON)}$**



**6.  $I_R$**

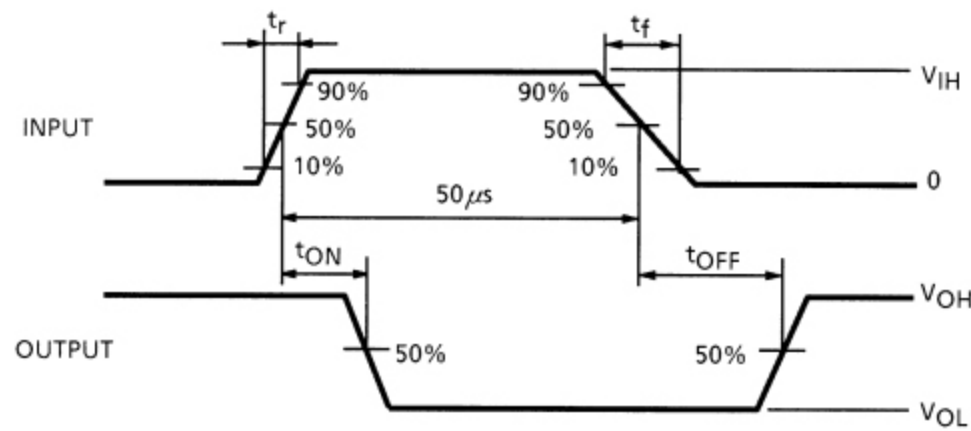
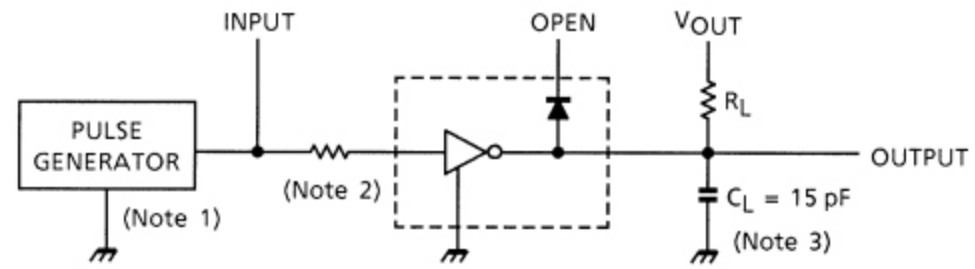


**7.  $V_F$**





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



Note 1: Pulse width 50  $\mu$ s, duty cycle 10%  
 Output impedance 50  $\Omega$ ,  $t_r \leq 5$  ns,  $t_f \leq 10$  ns

Note 2: See below

Input Condition

Type Number	R1	$V_{IH}$
XDXL62003	0	3 V

Note 3:  $C_L$  includes probe and jig capacitance.

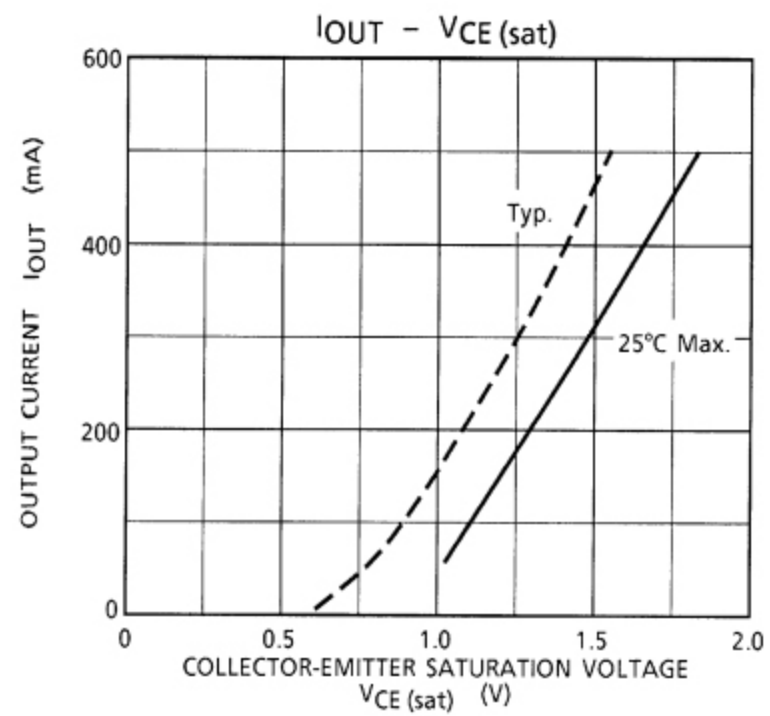
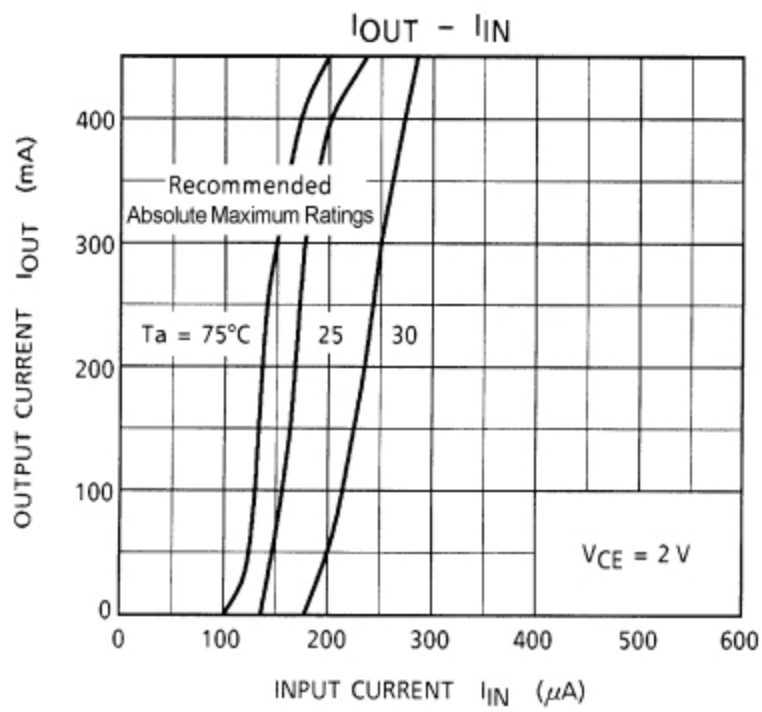
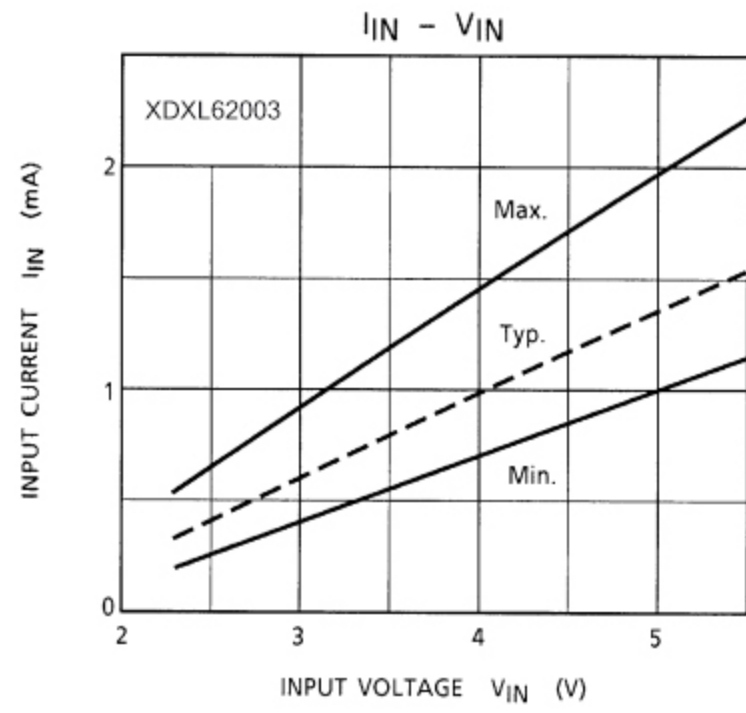
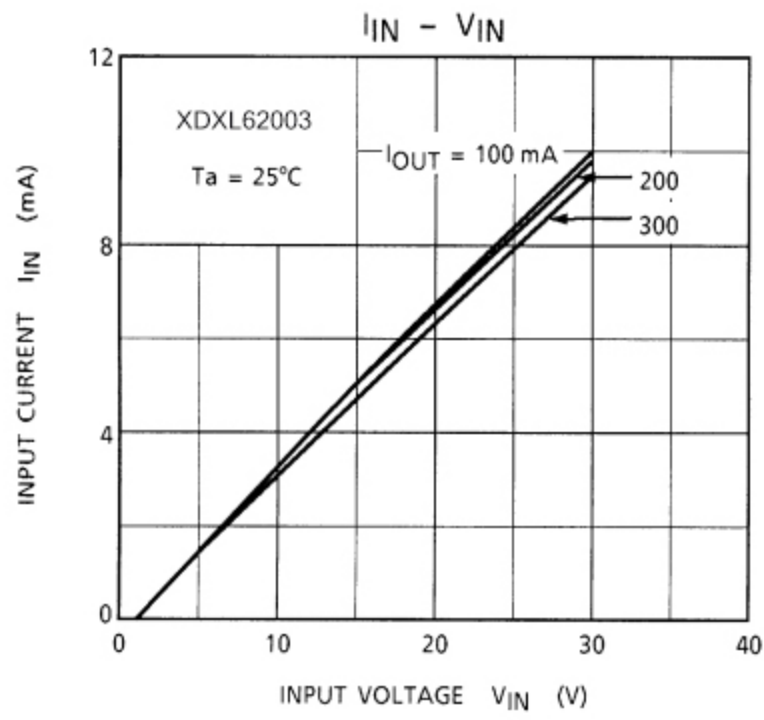
### Precautions for Using

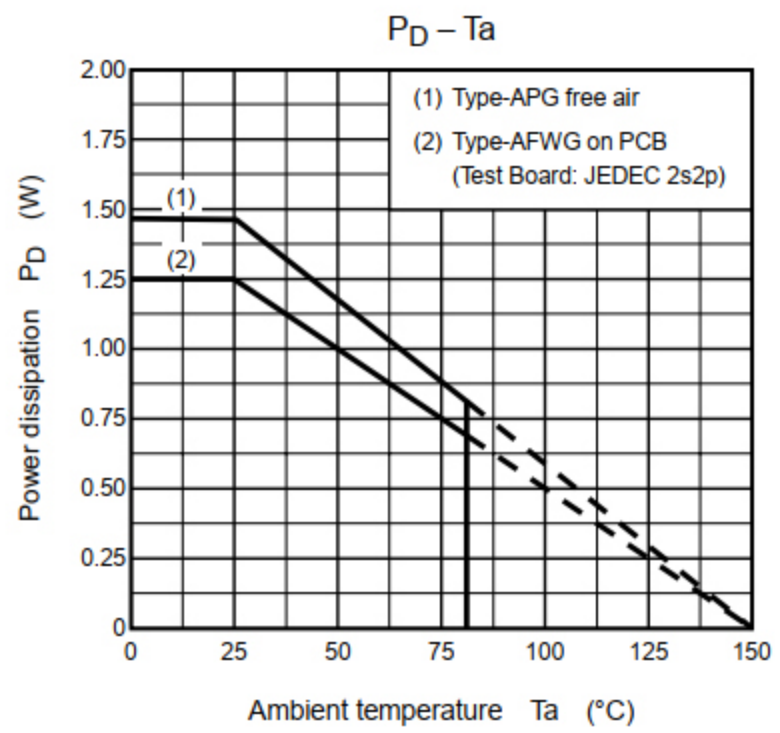
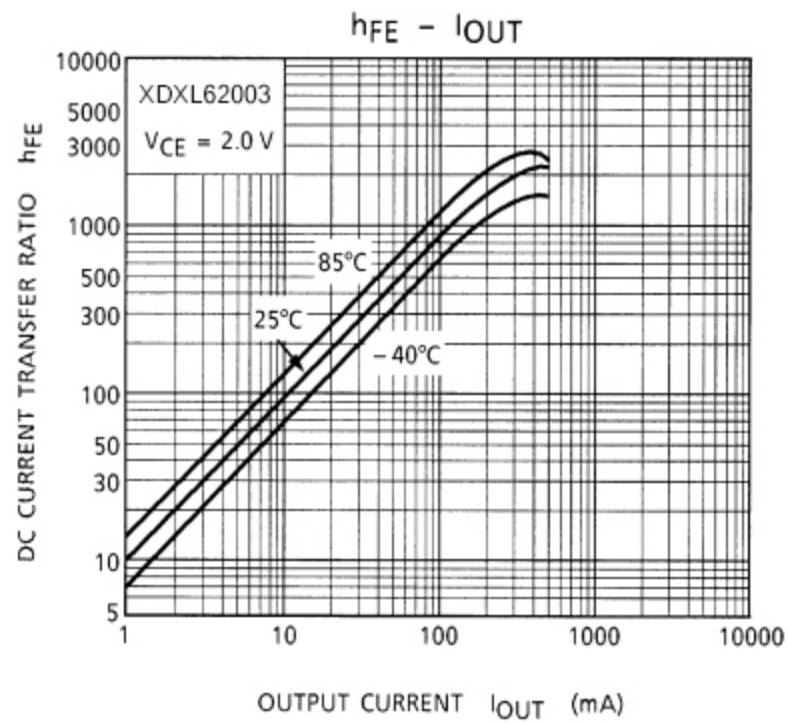
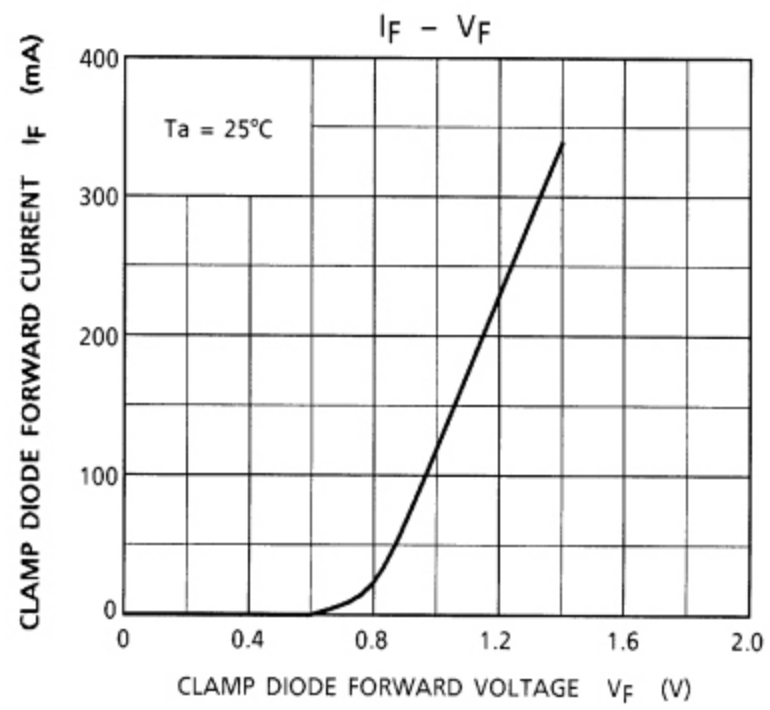
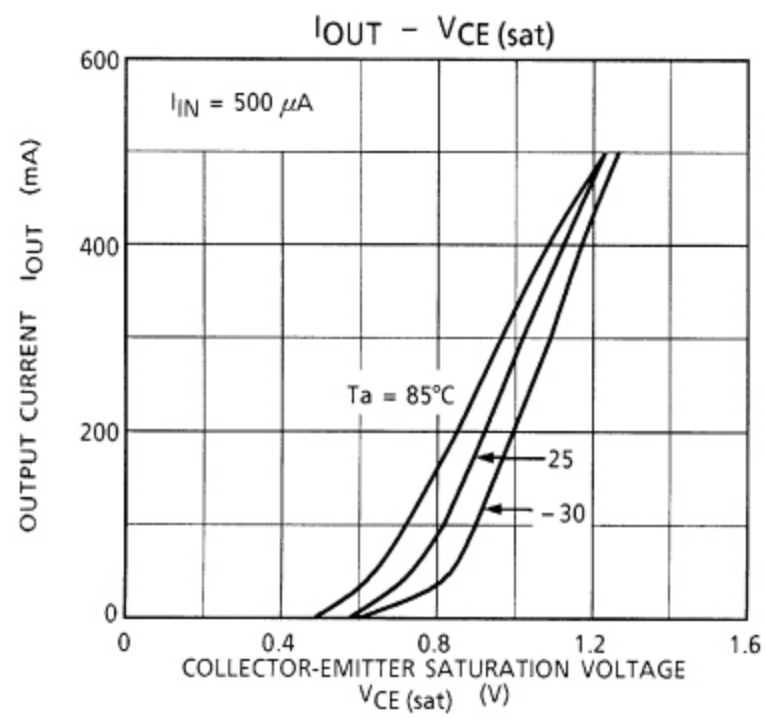
This IC does not include built-in protection circuits for excess current or overvoltage.

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.

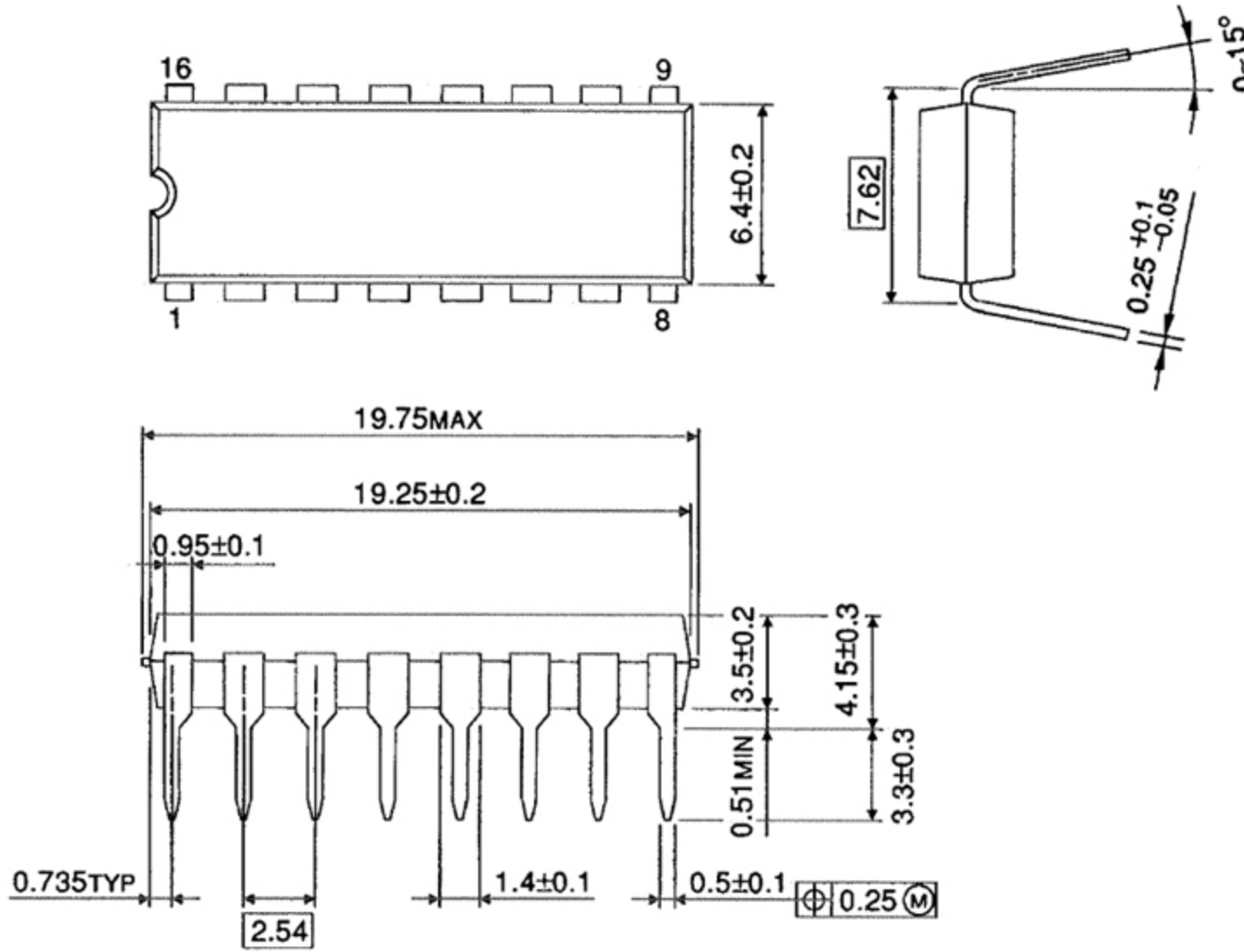




Package Dimensions

DIP16

Unit : mm



Package Dimensions

SOP16

Unit : mm

