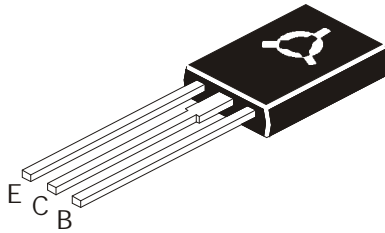


**NPN SILICON POWER TRANSISTOR**

**CR13003**

**TO126  
Plastic Package**



Suitable for Lighting, Switching Regulator and Motor Control

**ABSOLUTE MAXIMUM RATINGS**

DESCRIPTION	SYMBOL	VALUE	UNIT
Collector Base Voltage	$V_{CBO}$	700	V
Collector Emitter (sus) Voltage	$V_{CEO}$	400	V
Emitter Base Voltage	$V_{EBO}$	9.0	V
Collector Current Continuous	$I_C$	1.5	A
Peak (1)	$I_{CM}$	3.0	A
Base Current Continuous	$I_B$	0.75	A
Peak (1)	$I_{BM}$	1.5	A
Emitter Current Continuous	$I_E$	2.25	A
Peak (1)	$I_{EM}$	4.5	A
Power Dissipation at $T_a=25^\circ\text{C}$	$P_D$	1.4	W
Derate Above $25^\circ\text{C}$		11.2	mW/°C
Power Dissipation at $T_c=25^\circ\text{C}$	$P_D$	40	W
Derate Above $25^\circ\text{C}$		320	mW/°C
Operating And Storage Junction Temperature Range	$T_j, T_{stg}$	- 65 to+150	°C

**THERMAL RESISTANCE**

Junction to Case	$R_{th(j-c)}$	3.12	°C/W
Junction to Ambient	$R_{th(j-a)}$	89	°C/W
Maximum Lead Temperature for Soldering Purpose: 1/8" from Case for 5 Seconds	$T_L$	275	°C

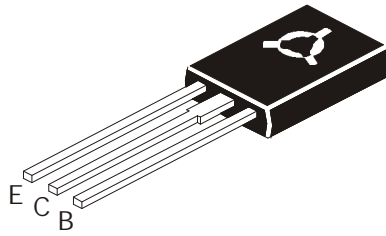
(1) Pulse Test: Pulse Width=5ms, Duty Cycle=10%

**ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ\text{C}$  unless specified otherwise)**

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Collector Base Voltage	$V_{CBO}$	$I_C=1\text{mA}, I_E=0$	600			V
Collector Emitter (sus) Voltage	$*V_{CEO(sus)}$	$I_C=10\text{mA}, I_B=0$	400			V
Collector Cut Off Current	$I_{CBO}$	$V_{CB}=700\text{V}, I_E=0$ $V_{CB}=700\text{V}, I_E=0, T_c=100^\circ\text{C}$			1.0 5.0	mA mA
Emitter Cut Off Current	$I_{EBO}$	$V_{EB}=9\text{V}, I_C=0$			1.0	mA

\*Pulse Test: PW=300ms, Duty Cycle=2%

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ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ\text{C}$  unless specified otherwise)

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
DC Current Gain	* $h_{FE}$	** $I_C=0.3\text{A}$ , $V_{CE}=2\text{V}$	10		30	
		$I_C=0.5\text{A}$ , $V_{CE}=2\text{V}$	8		40	
		$I_C=1\text{A}$ , $V_{CE}=2\text{V}$	4		25	
Collector Emitter Saturation Voltage	* $V_{CE(sat)}$	$I_C=0.5\text{A}$ , $I_B=0.1\text{A}$			0.5	V
		$I_C=1\text{A}$ , $I_B=0.25\text{A}$			1.0	V
		$I_C=1.5\text{A}$ , $I_B=0.5\text{A}$			3.0	V
		$I_C=1\text{A}$ , $I_B=0.25\text{A}$ , $T_c=100^\circ\text{C}$			1.0	V
Base Emitter Saturation Voltage	* $V_{BE(sat)}$	$I_C=0.5\text{A}$ , $I_B=0.1\text{A}$			1.0	V
		$I_C=1\text{A}$ , $I_B=0.25\text{A}$			1.2	V
		$I_C=1\text{A}$ , $I_B=0.25\text{A}$ , $T_c=100^\circ\text{C}$			1.1	V

## DYNAMIC CHARACTERISTICS

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Current Gain Bandwidth Product	$f_T$	$I_C=100\text{mA}$ , $V_{CE}=10\text{V}$ , $f=1\text{MHz}$	4.0			MHz
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}$ , $f=0.1\text{MHz}$		21		pF

## SWITCHING TIME

Delay Time	$t_d$	$V_{CC}=125\text{V}$ , $I_C=1\text{A}$ , $I_{B1}=I_{B2}=0.2\text{A}$ , $t_p=25\mu\text{s}$ , Duty Cycle=1%			0.1	$\mu\text{s}$
Rise Time	$t_r$				1.0	$\mu\text{s}$
Storage Time	$t_s$				4.0	$\mu\text{s}$
Fall Time	$t_f$				0.7	$\mu\text{s}$

Voltage Storage Time	$t_{sv}$	$V_{Clamp}=300\text{V}$ , $I_C=1\text{A}$ , $I_{B1}=0.2\text{A}$ , $V_{BE(off)}=5\text{V}$ , $T_c=100^\circ\text{C}$			4.00	$\mu\text{s}$
Crossover Time	$t_c$				0.75	$\mu\text{s}$
Fall Time	$t_{fi}$			0.15		$\mu\text{s}$

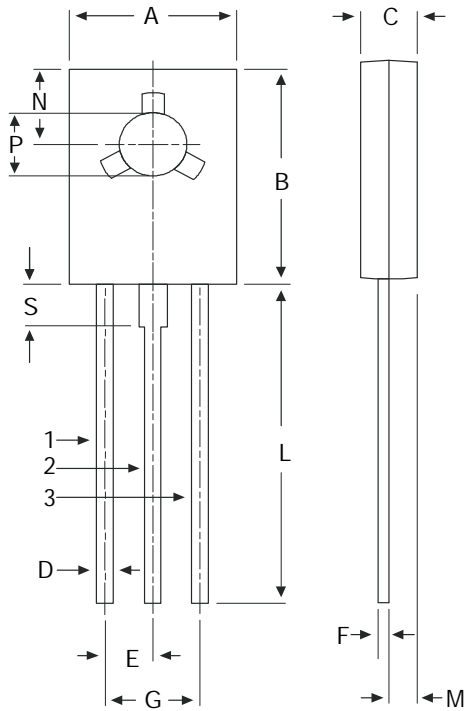
\*Pulse Test:  $PW=300\mu\text{s}$ , Duty Cycle=2%\*\*  $h_{FE}$  Classification:-

Note:- Product is pre selected in DC current gain (Groups A to F). CDIL reserves the right to ship any of the groups according to production availability.	A	B	C	E	F
	11-16	15-19	18-22	21-25	24-30
MARKING	CR 13003A XY	CR 13003B XY	CR 13003C XY	CR 13003E XY	CR 13003F XY
X = Year of Manufacturer Code					
Y = Month Code					

\*Pulse Test:-  $PW=300\mu\text{s}$ , Duty Cycle=2%

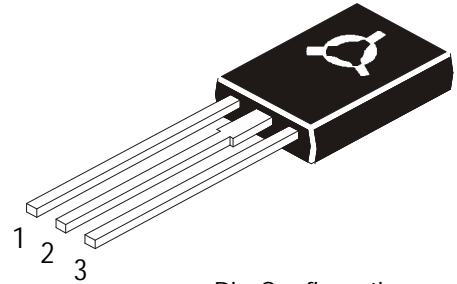
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**TO-126 (SOT-32) Plastic Package**



DIM	MIN	MAX
A	7.4	7.8
B	10.5	10.8
C	2.4	2.7
D	0.7	0.9
E	2.25 TYP.	
F	0.49	0.75
G	4.5 TYP.	
L	15.7 TYP.	
M	1.27 TYP.	
N	3.75 TYP.	
P	3.0	3.2
S	2.5 TYP.	

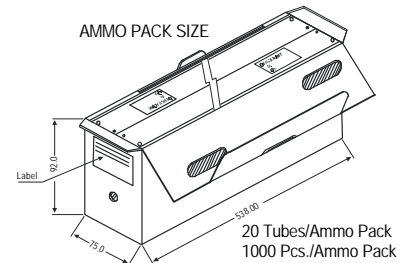
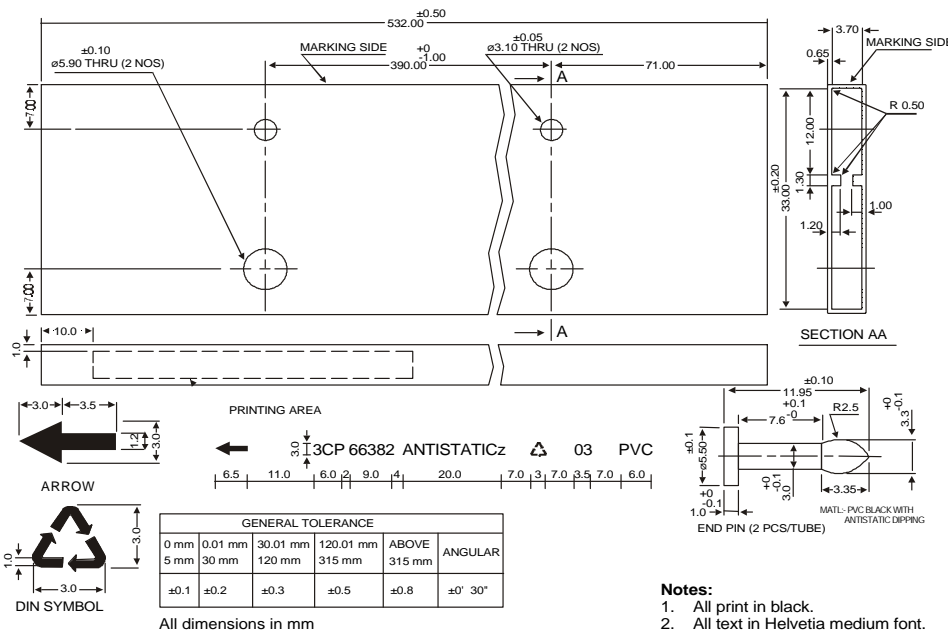
All dimensions in mm.



**Pin Configuration**

- 1. Emitter
- 2. Collector
- 3. Base

**TO-126 TUBE PACKING**



- Notes:**
- 1. All print in black.
  - 2. All text in Helvetia medium font.

**Packing Detail**

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-126 Bulk	500 pcs/polybag	340 gm/500 pcs	3" x 7.5" x 7.5"	2K	17" x 15" x 13.5"	32K	31 kgs
TO-126 Tube	50 pcs/tube	73 gm/50 pcs	3" x 3.7" x 21.5"	1K	19" x 19" x 19"	10K	15 kgs

**Component Disposal Instructions**

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

**Disclaimer**

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is recommended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).

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CDIL is a registered Trademark of  
Continental Device India Limited

C-120 Naraina Industrial Area, New Delhi 110 028, India.  
Telephone + 91-11-2579 6150, 4141 1112 Fax + 91-11-2579 5290, 4141 1119  
email@cdil.com www.cdilsemi.com