



Continental Device India Pvt. Limited

An IATF 16949, ISO9001 and ISO 14001 Certified Company



NPN SILICON PLANAR TRANSISTORS

2N1893



TO-39

TO-39
Metal Can Package
RoHS compliant

APPLICATION: General Purpose Transistor

ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C Unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNIT
Collector Emitter Voltage	V_{CEO}	80	V
Collector Emitter Voltage	V_{CER}	100	V
Collector Base Voltage	V_{CBO}	120	V
Emitter Base Voltage	V_{EBO}	7.0	V
Collector Current Continuous	I_C	0.5	A
Total Device Dissipation @ $T_a=25^{\circ}\text{C}$	P_D	0.8	W
Derate Above 25°C		4.57	mW/°C
Total Device Dissipation @ $T_c=25^{\circ}\text{C}$	P_D	3.0	W
Derate Above 25°C		17.2	mW/°C
Operating And Storage Junction Temperature Range	T_j, T_{stg}	-65 to +200	°C

Thermal Resistance

Junction to Ambient	$R_{th(j-a)}$	219	°C/W
Junction to Case	$R_{th(j-c)}$	58.3	

2N1893

Rev01 21102020E

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

PARAMETER	SYMBOL	TEST CONDITION	VALUE			UNIT
			MIN	TYP	MAX	
Collector Emitter Breakdown Voltage	$BV_{CER(sus)}$	$I_C=100\text{mA}, R_{BE}=10\Omega$	100	--	--	V
Collector Emitter Sustaining Voltage	$BV_{CEO(sus)}^1$	$I_C=10\text{mA}, I_B=0$	80	--	--	V
Collector Base Breakdown Voltage	BV_{CBO}	$I_C=100\mu\text{A}, I_E=0$	120	--	--	V
Emitter Base Breakdown Voltage	BV_{EBO}	$I_E=100\mu\text{A}, I_C=0$	7.0	--	--	V
Collector Cutoff Current	I_{CBO}	$V_{CB}=90\text{V}, I_E=0$	--	--	10	nA
		$V_{CB}=90\text{V}, I_E=0, T_A=150^\circ\text{C}$	--	--	15	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=5\text{V}, I_C=0$	--	--	10	nA
DC Current Gain	h_{FE}^1	$I_C=1\text{mA}, V_{CE}=10\text{V}$	20	--	--	--
		$I_C=10\text{mA}, V_{CE}=10\text{V}$	35	--	--	--
		$I_C=10\text{mA}, V_{CE}=10\text{V}, T_C=-55^\circ\text{C}$	20	--	--	--
		$I_C=150\text{mA}, V_{CE}=10\text{V}$	40	--	120	--
Collector Emitter (Sat) Voltage	$V_{CE(Sat)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$	--	--	1.2	V
		$I_C=150\text{mA}, I_B=15\text{mA}$	--	--	5.0	V
Base Emitter (Sat) Voltage	$V_{BE(Sat)}$	$I_C=50\text{mA}, I_B=5.0\text{mA}$	--	--	0.9	V
		$I_C=150\text{mA}, I_B=15\text{mA}$	--	--	1.3	V

SMALL SIGNAL CHARACTERISTICS

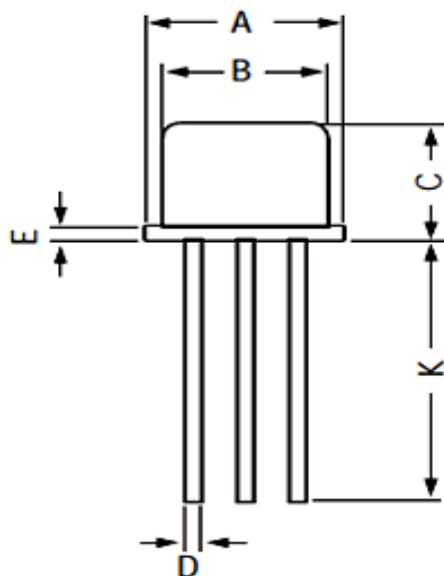
Current Gain Bandwidth Product	f_T	$I_C=50\text{mA}, V_{CE}=10\text{V}, f=20\text{MHz}$	50	--	--	MHz
Output Capacitance	C_{ob}	$V_{CB}=10\text{V}, I_E=0, f=1\text{MHz}$	--	--	15	pF
Input Capacitance	C_{ib}	$V_{EB}=0.5\text{V}, I_C=0, f=1\text{MHz}$	--	--	85	pF
Input Impedance	h_{ib}	$I_C=1.0\text{mA}, V_{CB}=5.0\text{V}, f=1.0\text{kHz}$	20	--	30	Ω
		$I_C=5.0\text{mA}, V_{CB}=10\text{V}, f=1.0\text{kHz}$	4.0	--	8.0	--
Voltage Feedback Ratio	h_{rb}	$I_C=1.0\text{mA}, V_{CB}=5.0\text{V}, f=1.0\text{kHz}$	--	--	1.25	$\times 10^{-4}$
		$I_C=5.0\text{mA}, V_{CB}=10\text{V}, f=1.0\text{kHz}$	--	--	1.5	--
Small Signal Current Gain	$ h_{fe} $	$I_C=1.0\text{mA}, V_{CB}=5.0\text{V}, f=1.0\text{kHz}$	30	--	100	--
Output Admittance	h_{ob}	$I_C=1.0\text{mA}, V_{CB}=5.0\text{V}, f=1.0\text{kHz}$	--	--	0.5	μmho
		$I_C=5.0\text{mA}, V_{CB}=10\text{V}, f=1.0\text{kHz}$	--	--	0.5	--

Note:

1. Pulse Test: Pulse Width $<300\mu\text{s}$, Duty Cycle $<2\%$

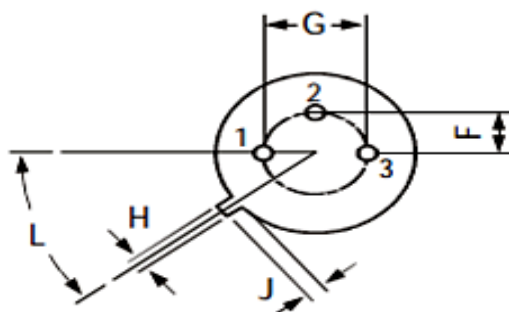
PACKAGE DETAILS

TO-39 Metal Can Package



DIM	MIN	MAX
A	8.50	9.39
B	7.74	8.50
C	6.09	6.60
D	0.40	0.53
E	-	0.88
F	2.41	2.66
G	4.82	5.33
H	0.71	0.86
J	0.73	1.02
K	12.70	-
L	42 DEG	48 DEG

All Dimension are in mm



PIN CONFIGURATION

1. EMITTER
2. BASE
3. COLLECTOR

Packing Detail

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-39	500 pcs/polybag	540 gm/500 pcs	3" x 7.5" x 7.5"	20K	17" x 15" x 13.5"	32K	40 kgs



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Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down. They should not be placed against the wall.

Shelf Life of CDIL Products

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.

If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.

The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

Floor Life of CDIL Products and MSL Level

When the products are opened from the original packing, the floor life will start.

For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	Time	Condition
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH



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Customer Notes

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).

CDIL strives for continuous improvement and reserves the right to change the specifications of its products without prior notice.



CDIL is a registered trademark of

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