

## NPN SILICON PLANAR TRANSISTOR

2N3019 / 2N3020



TO-39  
Metal Can Package

### General Transistor

#### ABSOLUTE MAXIMUM RATINGS

DESCRIPTION	SYMBOL	VALUE	UNIT
Collector Emitter Voltage	$V_{CEO}$	80	V
Collector Base Voltage	$V_{CBO}$	140	V
Emitter Base Voltage	$V_{EBO}$	7.0	V
Collector Current Continuous	$I_C$	1.0	A
Power Dissipation at $T_a=25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	$P_D$	0.8 4.6	W mW/ $^\circ\text{C}$
Power Dissipation at $T_c=25^\circ\text{C}$ Derate Above $25^\circ\text{C}$	$P_D$	5.0 28.6	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_j, T_{stg}$	- 65 to +200	$^\circ\text{C}$

#### THERMAL RESISTANCE

Junction to Case	$R_{th(j-c)}$	16.5	$^\circ\text{C/W}$
Junction to Ambient in free air	$R_{th(j-a)}$	89.5	$^\circ\text{C/W}$

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

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Collector Emitter Voltage	$V_{CEO}$	$I_C=1\text{mA}, I_B=0$	80			V
Collector Base Voltage	$V_{CBO}$	$I_C=100\mu\text{A}, I_E=0$	140			V
Emitter Base Voltage	$V_{EBO}$	$I_E=100\mu\text{A}, I_C=0$	7.0			V
Collector Cut Off Current	$I_{CBO}$	$V_{CB}=90\text{V}, I_E=0$			10	nA
		$V_{CB}=90\text{V}, I_E=0, T_a=150^\circ\text{C}$			10	$\mu\text{A}$
Emitter Cut Off Current	$I_{EBO}$	$V_{EB}=5\text{V}, I_C=0$			10	nA
DC Current Gain	$h_{FE}$	$I_C=0.1\text{mA}, V_{CE}=10\text{V}$	>50		30 - 100	
		$I_C=10\text{mA}, V_{CE}=10\text{V}$	>90		40 - 120	
		$I_C=150\text{mA}, V_{CE}=10\text{V}$	100 - 300		40 - 120	
		$I_C=150\text{mA}, V_{CE}=10\text{V}, T_c=-55^\circ\text{C}$	>40		-	
		$I_C=500\text{mA}, V_{CE}=10\text{V}$	>50		30 - 100	
		$I_C=1\text{A}, V_{CE}=10\text{V}$	>15		>15	
			<b>MIN</b>	<b>TYP</b>	<b>MAX</b>	<b>UNIT</b>
Collector Emitter Saturation Voltage	$*V_{CE(sat)}$	$I_C=150\text{mA}, I_B=15\text{mA}$			0.2	V
		$I_C=500\text{mA}, I_B=50\text{mA}$			0.5	V
Base Emitter Saturation Voltage	$*V_{BE(sat)}$	$I_C=150\text{mA}, I_B=15\text{mA}$			1.1	V

\*Pulse Test: Pulse Width  $\leq 300\text{ms}$ , Duty Cycle  $\leq 1\%$

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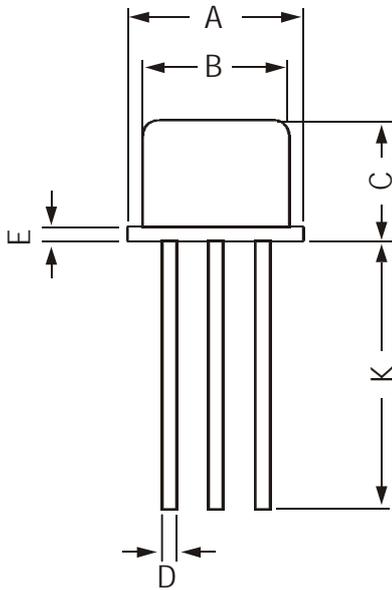
## ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ\text{C}$ unless specified otherwise)

### SMALL SIGNAL CHARACTERISTICS

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}$ , $I_E=0$ , $f=1\text{MHz}$			12	pF
Input Capacitance	$C_{ib}$	$V_{EB}=0.5\text{V}$ , $I_C=0$ , $f=1\text{MHz}$			60	pF
Small Signal Current Gain	$h_{fe}$	$I_C=1\text{mA}$ , $V_{CE}=5\text{V}$ , $f=1\text{KHz}$ <b>2N3019</b> <b>2N3020</b>	80 30		400 200	
Collector Base Time Constant	$r_b'C_C$	$I_E=10\text{mA}$ , $V_{CB}=10\text{V}$ , $f=79.8\text{MHz}$			400	ps
Noise Figure	NF	$I_C=100\mu\text{A}$ , $V_{CE}=10\text{V}$ , $R_S=1\text{K}\Omega$ , $f=1.0\text{KHz}$ <b>2N3019</b>			4.0	dB

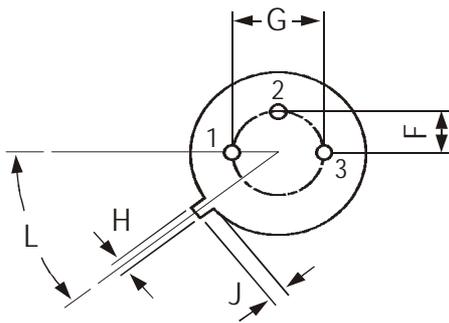
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TO-39 Metal Can Package



All dimensions are in mm

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



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

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).

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**Disclaimer**

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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