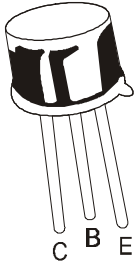


**NPN SILICON PLANAR EPITAXIAL TRANSISTORS**

**2N3019  
2N3020**

**TO-39  
Metal Can Package**



**Designed for use in General Purpose Amplifier and High Speed Switching Applications  
These Transistors are also Suitable for High Current Amplifier Applications**

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

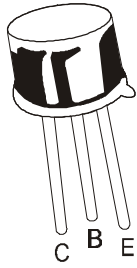
DESCRIPTION	SYMBOL	VALUE	UNITS
Collector Emitter Voltage	$V_{CEO}$	80	V
Collector Base Voltage	$V_{CBO}$	140	V
Emitter Base Voltage	$V_{EBO}$	7	V
Collector Current	$I_{CM}$	1	A
Power Dissipation @ Ta=25° C	$P_D$	800	mW
Power Dissipation @ Tc=25°C		5	W
Junction Temperature	$T_j$	+200	°C
Storage Temperature	$T_{stg}$	-65 to +200	°C
<b>THERMAL RESISTANCE</b>			
Junction to Ambient	$R_{th(j-a)}$	218.7	°C/W
Junction to Case	$R_{th(j-c)}$	35	°C/W

**ELECTRICAL CHARACTERISTICS (Ta=25°C unless specified otherwise)**

DESCRIPTION	SYMBOL	TEST CONDITION	MIN	MAX	UNITS
Collector Emitter Breakdown Voltage	$BV_{CEO}^*$	$I_C=30mA, I_B=0$	80		V
Collector Base Breakdown Voltage	$BV_{CBO}$	$I_C=100\mu A, I_E=0$	140		V
Emitter Base Breakdown Voltage	$BV_{EBO}$	$I_E=100\mu A, I_C=0$	7		V
Collector Leakage Current	$I_{CBO}$	$V_{CB}=90V, I_E=0$		10	nA
		$V_{CB}=90V, I_E=0, T_a=150^\circ C$		10	$\mu A$
Emitter Leakage Current	$I_{EBO}$	$V_{EB}=5V, I_C=0$		10	nA
Collector Emitter Saturation Voltage	$V_{CE(sat)}^*$	$I_C=150mA, I_B=15mA$		0.2	V
		$I_C=500mA, I_B=50mA$		0.5	V
Base Emitter Saturation Voltage	$V_{BE(sat)}^*$	$I_C=150mA, I_B=15mA$		1.1	V

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**ELECTRICAL CHARACTERISTICS (Ta=25°C unless specified otherwise)**

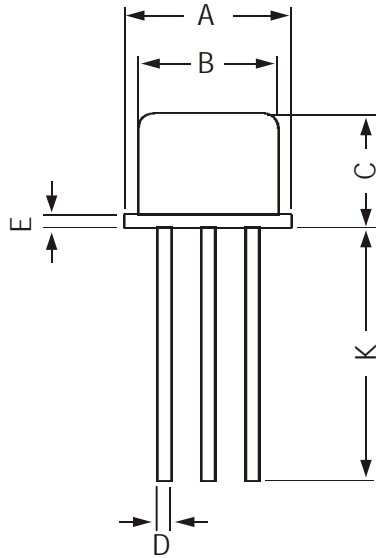
DESCRIPTION	SYMBOL	TEST CONDITION	MIN	MAX	UNITS
<b>DC Current Gain</b>	$h_{FE}^*$	$I_C=0.1mA, V_{CE}=10V$			
2N3019			50		
2N3020			30	100	
	$h_{FE}^*$	$I_C=10mA, V_{CE}=10V$			
2N3019			90		
2N3020			40	120	
	$h_{FE}^*$	$I_C=150mA, V_{CE}=10V$			
2N3019			100	300	
2N3020			40	120	
	$h_{FE}^*$	$I_C=500mA, V_{CE}=10V$			
2N3019			50		
2N3020			30	100	
	$h_{FE}^*$	$I_C=1A, V_{CE}=10V$			
2N3019			15		
2N3020			15		
	$h_{FE}^*$	$I_C=150mA, V_{CE}=10V$ $T_C = -55^\circ C$			
2N3019			40		
<b>SMALL SIGNAL CHARACTERISTICS</b>					
<b>Small Signal Current Gain</b>	$ h_{fe} $	$I_C=1mA, V_{CE}=5V, f=1KHz$			
2N3019			80	400	
2N3020			30	200	
<b>Transition Frequency</b>	$f_T$	$I_C=50mA, V_{CE}=10V$			
2N3019		$f=20MHz$	100		MHz
2N3020			80		MHz
<b>Output Capacitance</b>	$C_{ob}$	$V_{CB}=10V, I_E=0, f=1MHz$		12	pF
<b>Input Capacitance</b>	$C_{ib}$	$V_{EB}=0.5V, I_C=0, f=1MHz$		60	pF
<b>Noise Figure</b>	NF	$I_C=100\mu A, V_{CE}=10V$			
2N3019		$R_s=1K\Omega, f=1KHz$		4	dB
<b>Collector Base Time Constant</b>	$r_{bb'}cb'c$	$I_C=10mA, V_{CB}=10V, f=4MHz$		400	ps
		$f=1MHz$			

\*Pulse Test: Pulse Width  $\leq 300ms$ , Duty Cycle  $\leq 1.0\%$

2N3019  
2N3020

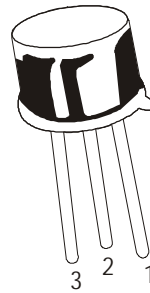
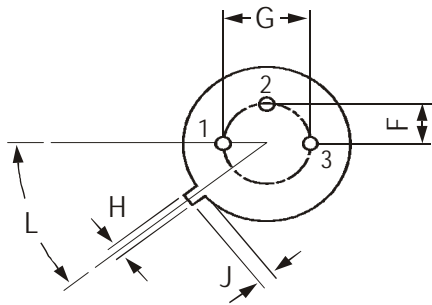
TO-39  
Metal Can Package

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 dimensions 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

### **Disclaimer**

The product information and the selection guides facilitate selection of the CDIL's Discrete 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 Datasheet and on the CDIL Web Site/CD is 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 Discrete 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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