



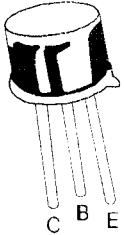
# SOLID STATE INC.

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## 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

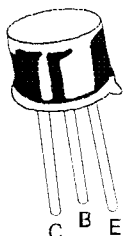
### ELECTRICAL CHARACTERISTICS (Ta=25°C unless specified otherwise)

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)

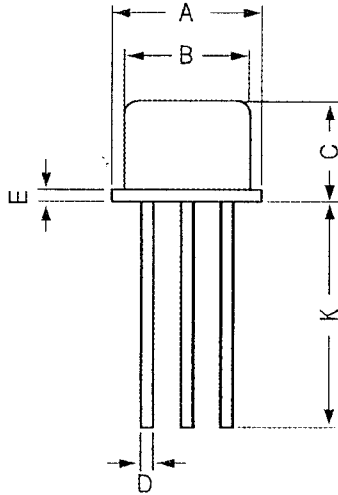
DESCRIPTION	SYMBOL	TEST CONDITION	MIN	MAX	UNITS
<b>DC Current Gain</b>	$h_{FE}^*$	$I_C=0.1mA, V_{CE}=10V$			
2N3019			50		
2N3020			30	100	
	$h_{FE}^*$	$I_C=10mA, V_{CE}=10V$			
2N3019			90		
2N3020			40	120	
	$h_{FE}^*$	$I_C=150mA, V_{CE}=10V$			
2N3019			100	300	
2N3020			40	120	
	$h_{FE}^*$	$I_C=500mA, V_{CE}=10V$			
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_{re} $	$I_C=1mA, V_{CE}=5V, f=1KHz$			
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>	$r_{bb'}c_{b'c}$	$I_C=10mA, V_{CB}=10V, f=4MHz$ $f=1MHz$		400	ps

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

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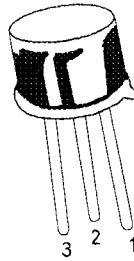
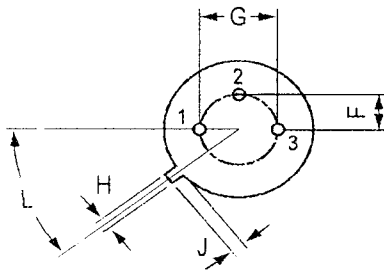
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Metal Can Package

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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