



NPN 2N3019 – 2N3020

SILICON PLANAR EPITAXIAL TRANSISTORS

The 2N3019 and 2N3020 are NPN transistors mounted in TO-39 metal case .
 They are intended for high-current, high-frequency amplifier applications.
 They feature high gain and low saturation voltages.

Compliance to RoHS

ABSOLUTE MAXIMUM RATINGS

Symbol	Ratings		Value	Unit
V_{CEO}	Collector-Emitter Voltage	2N3019	80	V
		2N3020		
V_{CBO}	Collector-Base Voltage	2N3019	140	V
		2N3020		
V_{EBO}	Emitter-Base Voltage	2N3019	7	V
		2N3020		
I_C	Collector Current	2N3019	1	A
		2N3020		
P_D	Total Power Dissipation	@ $T_{amb} = 25^\circ$	0.8	Watts
		@ $T_{case} = 25^\circ$		
P_D	Total Power Dissipation		2N3019	
		2N3020		
T_J	Junction Temperature	2N3019	200	$^\circ\text{C}$
		2N3020		
T_{Stg}	Storage Temperature range	2N3019	-65 to +200	$^\circ\text{C}$
		2N3020		

THERMAL CHARACTERISTICS

Symbol	Ratings		Value	Unit
R_{thJ-a}	Thermal Resistance, Junction to ambient in free air	2N3019	35	$^\circ\text{C/W}$
		2N3020		
R_{thJ-c}	Thermal Resistance, Junction to case	2N3019	219	$^\circ\text{C/W}$
		2N3020		

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ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

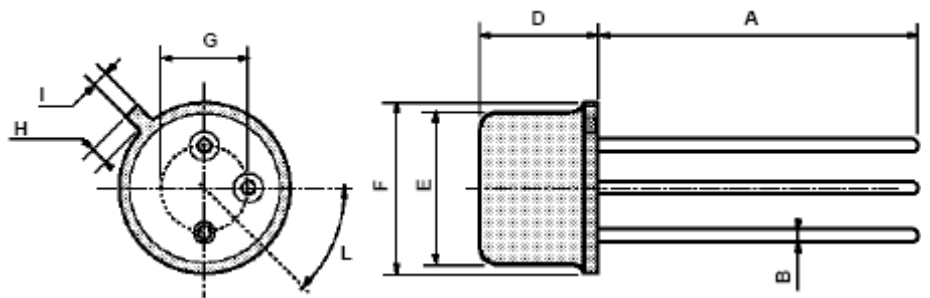
Symbol	Ratings	Test Condition(s)	Min	Typ	Mx	Unit	
I_{CBO}	Collector Cutoff Current	$V_{CB}=950\text{ V}, I_E=0$	2N3019	-	-	10	nA
		2N3020	-	-	-	-	
		$V_{CB}=90\text{ V}, I_E=0, T_j=150^\circ\text{C}$	2N3019	-	-	10	μA
		2N3020	-	-	-	-	
I_{EBO}	Emitter Cutoff Current	$V_{EB}=5\text{ V}, I_C=0$	2N3019	-	-	10	nA
			2N3020	-	-	-	-
V_{CEO}	Collector Emitter Breakdown Voltage	$I_C=10\text{ mA}, I_B=0$	2N3019	80	-	-	V
			2N3020	-	-	-	-
V_{CBO}	Collector Base Breakdown Voltage	$I_C=100\text{ }\mu\text{A}, I_E=0$	2N3019	140	-	-	V
			2N3020	-	-	-	-
V_{EBO}	Emitter Base Breakdown Voltage	$I_E=100\text{ }\mu\text{A}, I_C=0$	2N3019	7	-	-	V
			2N3020	-	-	-	-
$h_{FE} (1)$	DC Current Gain	$I_C=0.1\text{ mA}, V_{CE}=10\text{ V}$	2N3019	50	-	-	-
		2N3020	30	-	100		
		$I_C=10\text{ mA}, V_{CE}=10\text{ V}$	2N3019	90	-	-	
		2N3020	40	-	120		
		$I_C=150\text{ mA}, V_{CE}=10\text{ V}$	2N3019	100	-	300	
		2N3020	40	-	120		
		$I_C=500\text{ mA}, V_{CE}=10\text{ V}$	2N3019	50	-	-	
2N3020	30	-	100				
		$I_C=1\text{ A}, V_{CE}=10\text{ V}$	2N3019	15	-	-	
			2N3020	-	-	-	
		$I_C=150\text{ mA}, V_{CE}=10\text{ V}$ $T_{amb} = -55^\circ\text{C}$	2N3019	40	-	-	
$V_{CE(SAT)} (1)$	Collector-Emitter saturation Voltage	$I_C=150\text{ mA}, I_B=15\text{ mA}$	2N3019	-	-	0.2	V
		2N3020	-	-	0.5		
		$I_C=500\text{ mA}, I_B=50\text{ mA}$	2N3019	-	-	0.5	
			2N3020	-	-	-	
$V_{BE(SAT)} (1)$	Base-Emitter saturation Voltage	$I_C=150\text{ mA}, I_B=15\text{ mA}$	2N3019	-	-	1.1	
f_T	Transition frequency	$I_C=50\text{ mA}, V_{CE}=10\text{ V}$ $f = 20\text{ MHz}$	2N3019	100	-	-	MHz
		2N3020	80	-	-		
h_{fe}	Small Signal Current Gain	$I_C=1\text{ mA}, V_{CE}=5\text{ V}$ $f = 1\text{ kHz}$	2N3019	80	-	400	-
		2N3020	30	-	200		
NF	Noise Figure	$I_C=100\text{ }\mu\text{A}, V_{CE}=10\text{ V}$ $f = 1\text{ kHz}, R_g = 1\text{ k}\Omega$	2N3019	-	-	4	dB
C_{CBO}	Collector-Base capacitance	$I_E = 0, V_{CB}=10\text{ V}$ $f = 1\text{ MHz}$	2N3019	-	-	12	pF
		2N3020	-	-	-		
C_{EBO}	Emitter-Base capacitance	$I_C = 0, V_{EB}=0.5\text{ V}$ $f = 1\text{ MHz}$	2N3019	-	-	60	pF
		2N3020	-	-	-		
$r_{bb'} \cdot C_{b'c}$	Feedback Time Constant	$I_C=10\text{ mA}, V_{CE}=10\text{ V}$ $f = 4\text{ MHz}$	2N3019	-	-	400	ps
		2N3020	-	-	-		

(1) Pulse conditions : $t_p < 300\text{ }\mu\text{s}$, $\delta = 2\%$

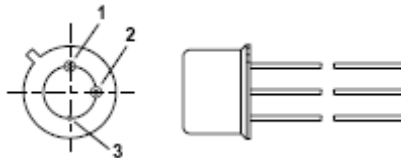
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MECHANICAL DATA CASE TO-39

DIMENSIONS (mm)			
	min	typ	max
A	12.7	-	-
B	-	-	0.49
D	-	-	6.6
E	-	-	8.5
F	-	-	9.4
G	5.08	-	-
H	-	-	1.2
I	-	-	0.9
L	45°	-	-



Pin 1 :	Emitter
Pin 2 :	Base
Case :	Collector



Information furnished is believed to be accurate and reliable. However, CS assumes no responsibility for the consequences of use of such information nor for errors that could appear.
Data are subject to change without notice.