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 2N3020	80	V
V_{CBO}	Collector-Base Voltage		2N3019 2N3020	140	V
V_{EBO}	Emitter-Base Voltage		2N3019 2N3020	7	V
I_C	Collector Current		2N3019 2N3020	1	A
P_D	Total Power Dissipation	@ T_{amb} = 25°	2N3019 2N3020	0.8	Watts
P_D	Total Power Dissipation	@ T_{case}= 25°	2N3019 2N3020	5	Watts
T_J	Junction Temperature		2N3019 2N3020	200	°C
T_{Stg}	Storage Temperature range		2N3019 2N3020	-65 to +200	°C

THERMAL CHARACTERISTICS

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

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

(1) Pulse conditions : tp < 300 µs, δ =2%

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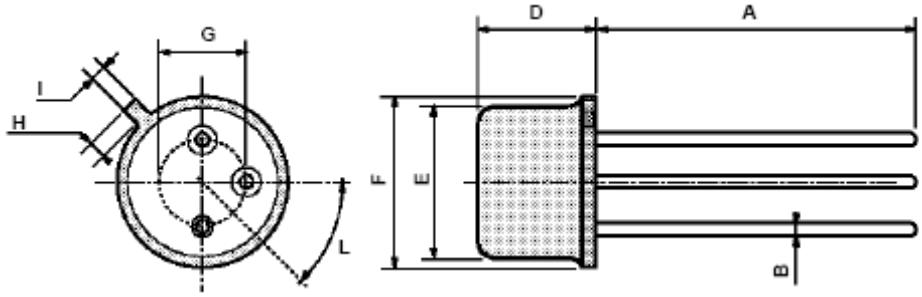
MECHANICAL DATA CASE TO-39

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