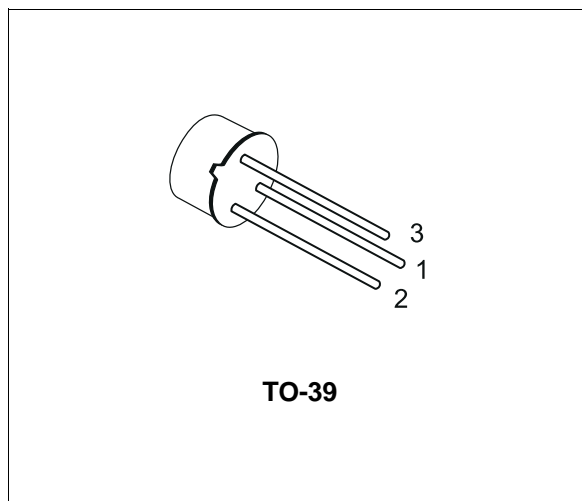


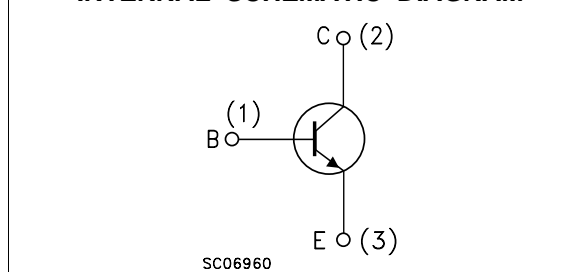
## SMALL SIGNAL NPN TRANSISTOR

### DESCRIPTION

The 2N3019 is a silicon Planar Epitaxial NPN transistor in Jedec TO-39 metal case, designed for high-current, high frequency amplifier application. It feature high gain and low saturation voltage.



### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-Base Voltage ( $I_E = 0$ )	140	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	80	V
$V_{EBO}$	Emitter-Base Voltage ( $I_C = 0$ )	7	V
$I_C$	Collector Current	1	A
$P_{tot}$	Total Dissipation at $T_{amb} \leq 25\text{ }^{\circ}\text{C}$ at $T_C \leq 25\text{ }^{\circ}\text{C}$	0.8 5	W W
$T_{stg}$	Storage Temperature	-65 to 175	$^{\circ}\text{C}$
$T_j$	Max. Operating Junction Temperature	175	$^{\circ}\text{C}$

## THERMAL DATA

R <sub>thj-case</sub>	Thermal Resistance Junction-Case	Max	30	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-Ambient	Max	187.5	°C/W

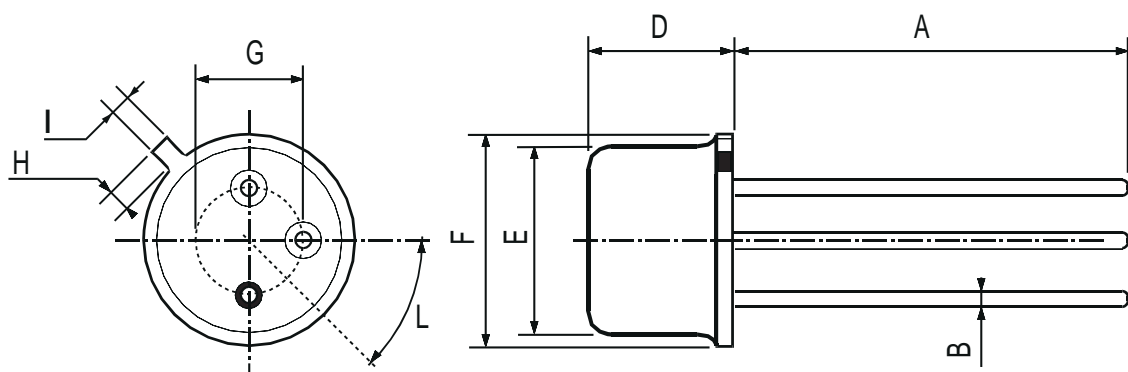
ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CBO</sub>	Collector Cut-off Current (I <sub>E</sub> = 0)	V <sub>CB</sub> = 90 V V <sub>CB</sub> = 90 V T <sub>C</sub> = 150 °C			10 10	nA μA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 5 V			10	nA
V <sub>(BR)CBO</sub>	Collector-Base Breakdown Voltage (I <sub>E</sub> = 0)	I <sub>C</sub> = 100 μA	140			V
V <sub>(BR)CEO*</sub>	Collector-Emitter Breakdown Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 10 mA	80			V
V <sub>(BR)EBO</sub>	Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = 100 μA	7			V
V <sub>CE(sat)*</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 150 mA I <sub>B</sub> = 15 mA I <sub>C</sub> = 500 mA I <sub>B</sub> = 50 mA			0.2 0.5	V V
V <sub>BE(sat)*</sub>	Base-Emitter Saturation Voltage	I <sub>C</sub> = 150 mA I <sub>B</sub> = 15 mA			1.1	V
h <sub>FE*</sub>	DC Current Gain	I <sub>C</sub> = 0.1 mA V <sub>CE</sub> = 10 V I <sub>C</sub> = 10 mA V <sub>CE</sub> = 10 V I <sub>C</sub> = 150 mA V <sub>CE</sub> = 10 V I <sub>C</sub> = 500 mA V <sub>CE</sub> = 10 V I <sub>C</sub> = 1A V <sub>CE</sub> = 10 V I <sub>C</sub> = 150 mA V <sub>CE</sub> = 10 V T <sub>amb</sub> = -55 °C	50 90 100 50 15 40		300	
h <sub>fe*</sub>	Small Signal Current Gain	I <sub>C</sub> = 1 mA V <sub>CE</sub> = 5 V f = 1KHz	80		400	
f <sub>T</sub>	Transition Frequency	I <sub>C</sub> = 50 mA V <sub>CE</sub> = 10 V f = 20MHz	100			MHz
C <sub>CBO</sub>	Collector-Base Capacitance	I <sub>E</sub> = 0 V <sub>CB</sub> = 10 V f = 1MHz			12	pF
C <sub>EBO</sub>	Emitter-Base Capacitance	I <sub>C</sub> = 0 V <sub>EB</sub> = 0.5 V f = 1MHz			60	pF
NF	Noise Figure	I <sub>C</sub> = 0.1 mA V <sub>CE</sub> = 10 V f = 1KHz R <sub>g</sub> = 1KΩ			4	dB
r <sub>bb'</sub> C <sub>b'b'</sub>	Feedback Time Constant	I <sub>C</sub> = 10 mA V <sub>CE</sub> = 10 V f = 4MHz			400	ps

\* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 1 %

## TO-39 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	12.7			0.500		
B			0.49			0.019
D			6.6			0.260
E			8.5			0.334
F			9.4			0.370
G	5.08			0.200		
H			1.2			0.047
I			0.9			0.035
L	45° (typ.)					



P008B

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