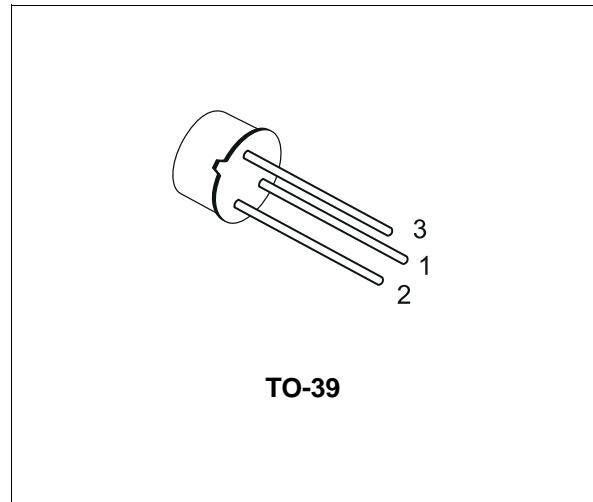


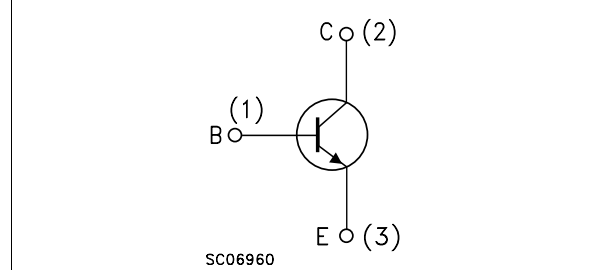
SMALL SIGNAL NPN TRANSISTOR

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 features 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	W
		5	W
T_{stg}	Storage Temperature	-65 to 175	$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	175	$^\circ\text{C}$

THERMAL DATA

$R_{thj-case}$	Thermal Resistance Junction-Case	Max	30	$^{\circ}C/W$
$R_{thj-amb}$	Thermal Resistance Junction-Ambient	Max	187.5	$^{\circ}C/W$

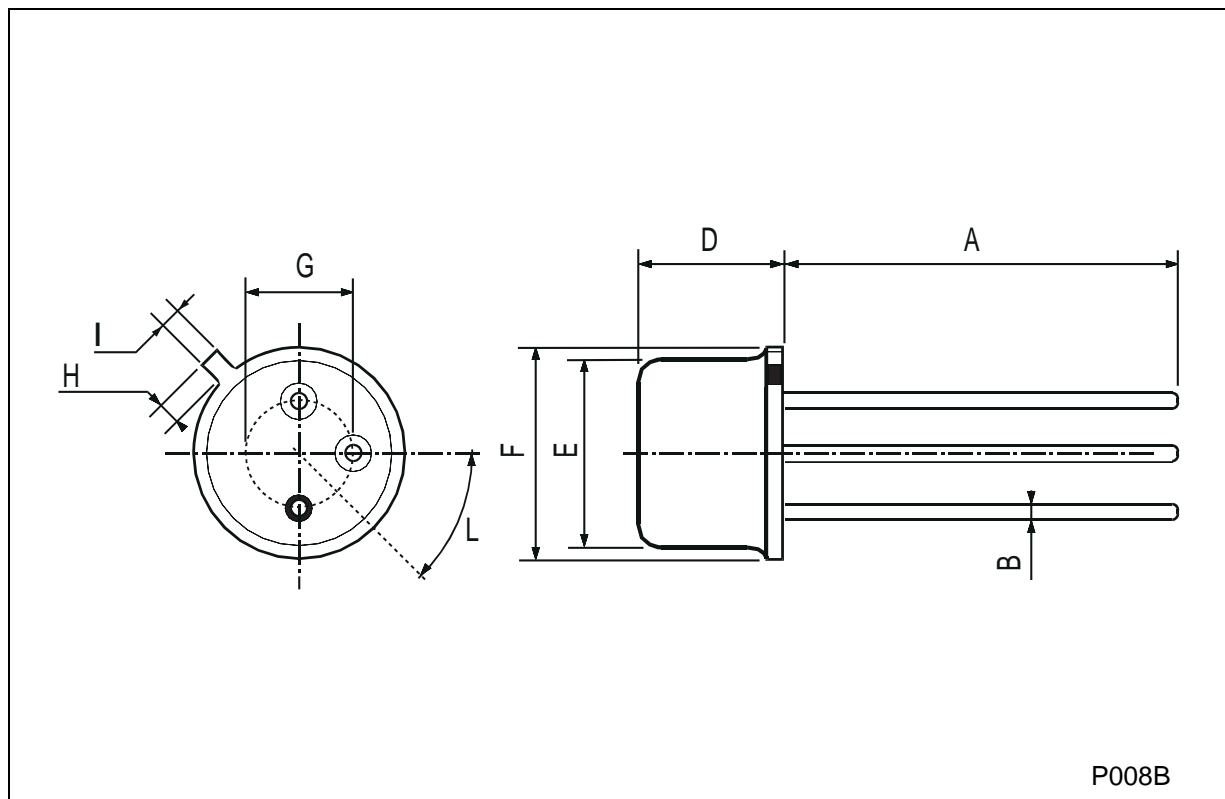
ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cut-off Current ($I_E = 0$)	$V_{CB} = 90 V$ $V_{CB} = 90 V \quad T_C = 150^{\circ}C$			10 10	nA μA
I_{EBO}	Emitter Cut-off Current ($I_C = 0$)	$V_{EB} = 5 V$			10	nA
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage ($I_E = 0$)	$I_C = 100 \mu A$	140			V
$V_{(BR)CEO}^*$	Collector-Emitter Breakdown Voltage ($I_B = 0$)	$I_C = 10 mA$	80			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage ($I_C = 0$)	$I_E = 100 \mu A$	7			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 150 mA \quad I_B = 15 mA$ $I_C = 500 mA \quad I_B = 50 mA$			0.2 0.5	V V
$V_{BE(sat)}^*$	Base-Emitter Saturation Voltage	$I_C = 150 mA \quad I_B = 15 mA$			1.1	V
h_{FE}^*	DC Current Gain	$I_C = 0.1 mA \quad V_{CE} = 10 V$ $I_C = 10 mA \quad V_{CE} = 10 V$ $I_C = 150 mA \quad V_{CE} = 10 V$ $I_C = 500 mA \quad V_{CE} = 10 V$ $I_C = 1 A \quad V_{CE} = 10 V$ $I_C = 150 mA \quad V_{CE} = 10 V$ $T_{amb} = -55^{\circ}C$	50 90 100 50 15 40		300	
h_{fe}^*	Small Signal Current Gain	$I_C = 1 mA \quad V_{CE} = 5 V \quad f = 1 KHz$	80		400	
f_T	Transition Frequency	$I_C = 50 mA \quad V_{CE} = 10 V \quad f = 20 MHz$	100			MHz
C_{CBO}	Collector-Base Capacitance	$I_E = 0 \quad V_{CB} = 10 V \quad f = 1 MHz$			12	pF
C_{EBO}	Emitter-Base Capacitance	$I_C = 0 \quad V_{EB} = 0.5 V \quad f = 1 MHz$			60	pF
NF	Noise Figure	$I_C = 0.1 mA \quad V_{CE} = 10 V$ $f = 1 KHz \quad R_g = 1 K\Omega$			4	dB
$r_{bb'} \quad C_{b'c}$	Feedback Time Constant	$I_C = 10 mA \quad V_{CE} = 10 V \quad f = 4 MHz$			400	ps

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

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.)					



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