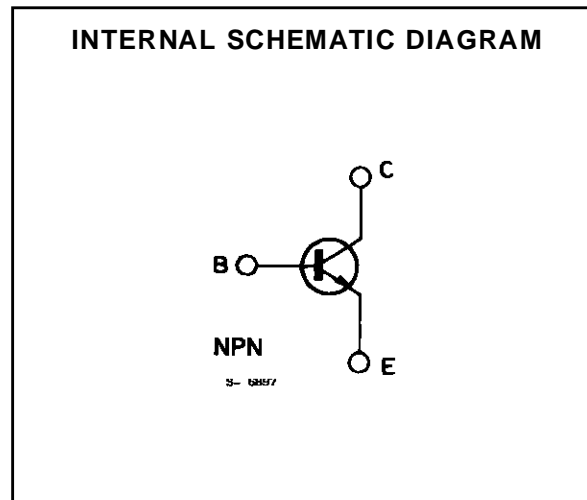
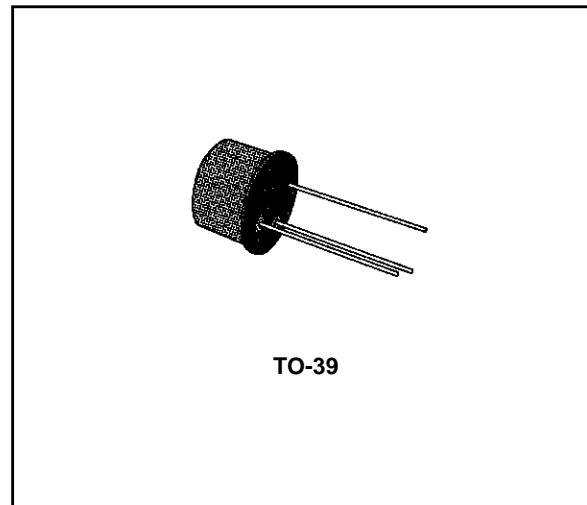


HIGH CURRENT, HIGH FREQUENCY AMPLIFIERS

DESCRIPTION

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



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	mA
P_{tot}	Total Power Dissipation at $T_{amb} \leq 25\text{ }^\circ\text{C}$ at $T_{case} \leq 25\text{ }^\circ\text{C}$	0.8	W
		5	W
T_{stg}, T_j	Storage and Junction Temperature	- 65 to 200	$^\circ\text{C}$

2N3019-2N3020

THERMAL DATA

$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	35	$^{\circ}C/W$
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	219	$^{\circ}C/W$

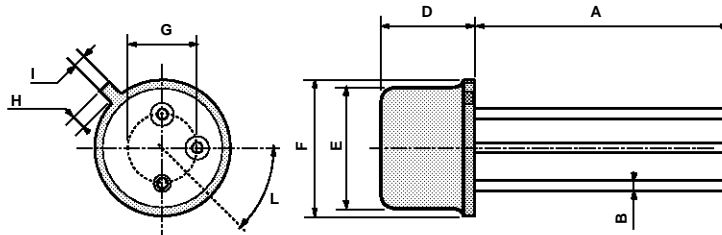
ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	$V_{CB} = 90\ V$ $V_{CB} = 90\ V$ $T_{amb} = 150^{\circ}C$			10 10	nA μA
I_{EBO}	Emitter Cutoff 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	$I_C = 150\ mA$ $I_B = 15\ mA$ $I_C = 500\ mA$ $I_B = 50\ mA$			0.2 0.5	V V
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 150\ mA$ $I_B = 15\ mA$			1.1	V
h_{FE}^*	DC Current Gain	$I_C = 0.1\ mA$ $V_{CE} = 10\ V$ For 2N3019 For 2N3020 $I_C = 10\ mA$ $V_{CE} = 10\ V$ For 2N3019 For 2N3020 $I_C = 150\ mA$ $V_{CE} = 10\ V$ For 2N3019 For 2N3020 $I_C = 500\ mA$ $V_{CE} = 10\ V$ For 2N3019 For 2N3020 $I_C = 1\ A$ $V_{CE} = 10\ V$ $I_C = 150\ mA$ $V_{CE} = 10\ V$ $T_{amb} = -55^{\circ}C$ For 2N3019	50 30 90 40 100 40 50 30 15 40		100 120 300 120 100	
h_{fe}	Small Signal Current Gain	$I_C = 1\ mA$ $V_{CE} = 5\ V$ $f = 1\ kHz$ For 2N3019 For 2N3020	80 30		400 200	
f_T	Transition Frequency	$I_C = 50\ mA$ $V_{CE} = 10\ V$ $f = 20\ MHz$ For 2N3019 For 2N3020	100 80			MHz MHz
C_{EBO}	Emitter-base Capacitance	$I_C = 0$ $V_{EB} = 0.5\ V$ $f = 1\ MHz$			60	pF
C_{CBO}	Collector-base Capacitance	$I_E = 0$ $V_{CB} = 10\ V$ $f = 1\ MHz$			12	pF
NF	Noise Figure for (2N3019) only	$I_C = 100\ \mu A$ $V_{CE} = 10\ V$ $f = 1\ kHz$ $R_g = 1\ k\Omega$			4	dB
$r_{bb} \cdot C_{b'c}$	Feedback Time Constant	$I_C = 10\ mA$ $V_{CE} = 10\ V$ $f = 4\ MHz$			400	ps

* Pulsed : pulse duration = 300 μs , duty cycle = 1 %.

TO39 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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