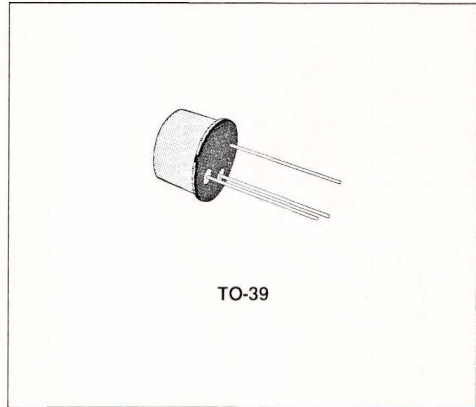


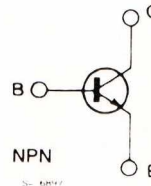
## HIGH CURRENT, HIGH FREQUENCY AMPLIFIERS

### 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.



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

## 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 $\mu A$
$I_{EBO}$	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	$I_C = 150\ mA$ $I_C = 500\ mA$	$I_B = 15\ mA$ $I_B = 50\ mA$		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	$I_C = 0.1\ mA$ $I_C = 10\ mA$ $I_C = 150\ mA$ $I_C = 500\ mA$ $I_C = 1\ A$ $I_C = 150\ mA$ $T_{amb} = -55^{\circ}C$	$V_{CE} = 10\ V$ For <b>2N3019</b> For <b>2N3020</b> $V_{CE} = 10\ V$ For <b>2N3019</b> For <b>2N3020</b> $V_{CE} = 10\ V$ For <b>2N3019</b> For <b>2N3020</b> $V_{CE} = 10\ V$ For <b>2N3019</b> For <b>2N3020</b> $V_{CE} = 10\ V$ For <b>2N3019</b> For <b>2N3020</b> $V_{CE} = 10\ V$ For <b>2N3019</b> For <b>2N3020</b>	50 30 90 40 100 40 50 30 15 40	100 120 300 120 100	
$h_{fe}$	Small Signal Current Gain	$I_C = 1\ mA$ $f = 1\ kHz$	$V_{CE} = 5\ V$ For <b>2N3019</b> For <b>2N3020</b>	80 30	400 200	
$f_T$	Transition Frequency	$I_C = 50\ mA$ $f = 20\ MHz$	$V_{CE} = 10\ V$ For <b>2N3019</b> For <b>2N3020</b>	100 80		MHz MHz
$C_{EBO}$	Emitter-base Capacitance	$I_C = 0$ $f = 1\ MHz$	$V_{EB} = 0.5\ V$		60	pF
$C_{CBO}$	Collector-base Capacitance	$I_E = 0$ $f = 1\ MHz$	$V_{CB} = 10\ V$		12	pF
NF	Noise Figure for ( <b>2N3019</b> ) only	$I_C = 100\ \mu A$ $f = 1\ kHz$	$V_{CE} = 10\ V$ $R_g = 1\ K\Omega$		4	dB
$r_{bb}C_{b'c}$	Feedback Time Constant	$I_C = 10\ mA$ $f = 4\ MHz$	$V_{CE} = 10\ V$		400	ps

\* Pulsed : pulse duration = 300  $\mu s$ , duty cycle = 1 %.