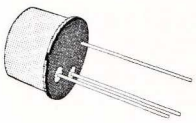
SGS-THOMSON
MICROELECTRONICS

2N3019
2N3020

HIGH CURRENT, HIGH FREQUENCY AMPLIFIERS

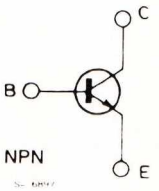
DESCRIPTION

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.



TO-39

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 $T_{amb} \leq 25$ °C at $T_{case} \leq 25$ °C	0.8 5	W W
T_{stg}, T_j	Storage and Junction Temperature	– 65 to 200	°C

THERMAL DATA

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

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current (I_E = 0)	V_{CB} = 90 V				10	nA
		V_{CB} = 90 V	T_{amb} = 150 °C			10	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 μA		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 μA		7			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = 150 mA	I_B = 15 mA			0.2	V
		I_C = 500 mA	I_B = 50 mA			0.5	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**	50			
			For **2N3020**	30		100	
		I_C = 10 mA	V_{CE} = 10 V				
			For **2N3019**	90			
			For **2N3020**	40		120	
		I_C = 150 mA	V_{CE} = 10 V				
			For **2N3019**	100		300	
			For **2N3020**	40		120	
		I_C = 500 mA	V_{CE} = 10 V				
			For **2N3019**	50			
			For **2N3020**	30		100	
		I_C = 1 A	V_{CE} = 10 V	15			
		I_C = 150 mA	V_{CE} = 10 V				
		T_{amb} = − 55 °C					
			For **2N3019**	40			
h_{fe}	Small Signal Current Gain	I_C = 1 mA	V_{CE} = 5 V				
		f = 1 kHz					
			For **2N3019**	80		400	
			For **2N3020**	30		200	
f_T	Transition Frequency	I_C = 50 mA	V_{CE} = 10 V				
		f = 20 MHz					
			For **2N3019**	100			MHz
			For **2N3020**	80			MHz
C_{EBO}	Emitter-base Capacitance	I_C = 0	V_{EB} = 0.5 V			60	pF
		f = 1 MHz					
C_{CBO}	Collector-base Capacitance	I_E = 0	V_{CB} = 10 V			12	pF
		f = 1 MHz					
NF	Noise Figure for (**2N3019**) only	I_C = 100 μA	V_{CE} = 10 V			4	dB
		f = 1 kHz	R_g = 1 KΩ				
$r_{bb'}C_{b'c}$	Feedback Time Constant	I_C = 10 mA	V_{CE} = 10 V			400	ps
		f = 4 MHz					

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