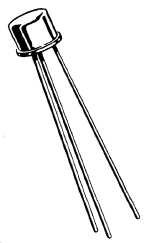
2N3019 (SILICON)
2N3020



CASE 31
(TO-5)

Collector connected to case

NPN silicon annular transistors designed for high-current, high-frequency amplifier applications.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	80	Vdc
Collector-Base Voltage	V_{CB}	140	Vdc
Emitter-Base Voltage	V_{EB}	7.0	Vdc
Collector Current	I_C	1.0	Adc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	0.8 4.6	W mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	5.0 28.6	W mW/°C
Operating Junction Temperature Range	T_J	-65 to +200	°C
Storage Temperature Range	T_{stg}	-65 to +200	°C

ELECTRICAL CHARACTERISTICS (At 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage [1] (I_C = 30 mAdc, I_B = 0)		BV_{CEO}	80	–	Vdc
Collector-Base Breakdown Voltage (I_C = 100 μAdc, I_E = 0)		BV_{CBO}	140	–	Vdc
Emitter-Base Breakdown Voltage (I_E = 100 μAdc, I_C = 0)		BV_{EBO}	7.0	–	Vdc
Collector Cutoff Current (V_{CB} = 90 Vdc, I_E = 0)		I_{CBO}	–	0.010	μAdc
(V_{CB} = 90 Vdc, I_E = 0, T_A = 150°C)			–	10	
Emitter Cutoff Current (V_{BE} = 5 Vdc, I_C = 0)		I_{EBO}	–	0.010	μAdc
ON CHARACTERISTICS					
DC Current Gain [1] (I_C = 0.1 mAdc, V_{CE} = 10 Vdc)	2N3019	h_{FE}	50	–	–
	2N3020		30	100	
(I_C = 10 mAc, V_{CE} = 10 Vdc)	2N3019		90	–	
	2N3020		40	120	
(I_C = 150 mAdc, V_{CE} = 10 Vdc)	2N3019		100	300	
	2N3020		40	120	
(I_C = 150 mAdc, V_{CE} = 10 Vdc, T_C = -55°C)	2N3019		40	–	
(I_C = 500 mAdc, V_{CE} = 10 Vdc)	2N3019		50	–	
	2N3020		30	100	
(I_C = 1 Adc, V_{CE} = 10 Vdc)	Both Types		15	–	
Collector-Emitter Saturation Voltage [1] (I_C = 150 mAdc, I_B = 15 mAdc)		$V_{CE(sat)}$	–	0.2	Vdc
(I_C = 500 mAdc, I_B = 50 mAdc)			–	0.5	
Base-Emitter Saturation Voltage [1] (I_C = 150 mAdc, I_B = 15 mAdc)		$V_{BE(sat)}$	–	1.1	Vdc
DYNAMIC CHARACTERISTICS					
Current-Gain – Bandwidth Product (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 20 MHz)	2N3019	f_T	100	–	MHz
	2N3020		80		
Output Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1 MHz)		C_{ob}	–	12	pF
Input Capacitance (V_{BE} = 0.5 Vdc, I_C = 0, f = 1 MHz)		C_{ib}	–	60	pF
Small-Signal Current Gain (I_C = 1mAdc, V_{CE} = 5 Vdc, f = 1 kHz)	2N3019	h_{fe}	80	400	–
	2N3020		30	200	
Collector-Base Time Constant (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 4 MHz)		$r'_b C_c$	–	400	ps
Noise Figure (I_C = 100 μAdc, V_{CE} = 10 Vdc, f = 1 kHz, R_S = 1 kohm)	2N3019	NF	–	4.0	dB

[1] Pulse Test: Pulse Width ≤ 300 μs, duty cycle ≤ 1%