

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	80	Vdc
Collector-Base Voltage	V _{CBO}	120	Vdc
Emitter-Base Voltage	V _{EBO}	7.0	Vdc
Collector Current - Continuous	I _C	1.0	Adc
Total Device Dissipation Derate above 25°C	P _D	1.0 8.0	Watts mW/°C
Total Device Dissipation Derate above 25°C	P _D	2.5 20	Watts mW/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R _{θJC}	50	°C/W
Thermal Resistance, Junction to Ambient	R _{θJA}	125	°C/W

P2N3019
P2N3020

CASE 29-3, STYLE 1
TO-92 (TO-226AE)

ONE WATT
AMPLIFIER TRANSISTORS

NPN SILICON

ELECTRICAL CHARACTERISTICS (T_A = 25 °C unless otherwise noted.)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Breakdown Voltage (1) (I _C = 30 mAdc, I _B = 0)	V _{(BR)CEO}	80	—	Vdc
Collector-Base Breakdown Voltage (I _C = 100 μAdc, I _E = 0)	V _{(BR)CBO}	120	—	Vdc
Emitter-Base Breakdown Voltage (I _E = 100 μAdc, I _C = 0)	V _{(BR)EBO}	7.0	—	Vdc
Collector Cutoff Current (V _{CB} = 90 Vdc, I _E = 0) (V _{CB} = 90 Vdc, I _E = 0, T _A = + 150°C)	I _{CBO}	—	0.01 10	μAdc
Emitter Cutoff Current (V _{BE} = 5.0 Vdc, I _C = 0)	I _{EBO}	—	0.010	μAdc
ON CHARACTERISTICS				
DC Current Gain (1) (I _C = 0.1 mAdc, V _{CE} = 10 Vdc)	h _{FE}	P2N3020	50	—
		P2N3019	30	100
(I _C = 10 mAdc, V _{CE} = 10 Vdc)		P2N3019	90	—
		P2N3020	40	120
(I _C = 150 mAdc, V _{CE} = 10 Vdc)		P2N3019	100	300
		P2N3020	40	120
(I _C = 150 mAdc, V _{CE} = 10 Vdc, T _C = - 55 °C)		P2N3019	40	—
(I _C = 500 mAdc, V _{CE} = 10 Vdc)		P2N3019	50	—
		P2N3020	30	100
(I _C = 1.0 Adc, V _{CE} = 10 Vdc)		All Types	15	—
Collector-Emitter Saturation Voltage (I _C = 150 mAdc, I _B = 15 mAdc) (I _C = 500 mAdc, I _B = 50 mAdc)	V _{CE(sat)}	—	0.2 0.5	Vdc
Base-Emitter Saturation Voltage (I _C = 150 mAdc, I _B = 15 mAdc)	V _{BE(sat)}	—	1.1	Vdc
SMALL-SIGNAL CHARACTERISTICS				
Current-Gain - Bandwidth Product (I _C = 50 mAdc, V _{CE} = 10 Vdc, f = 20 MHz)	f _T	80 100	—	MHz

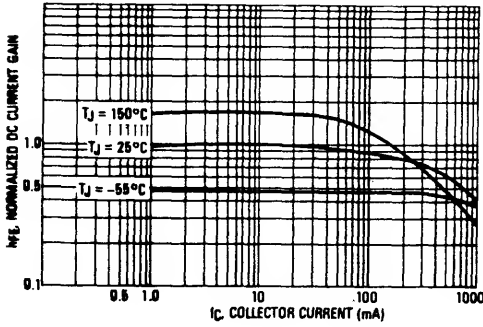
P2N3019, P2N3020

ELECTRICAL CHARACTERISTICS (continued) ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

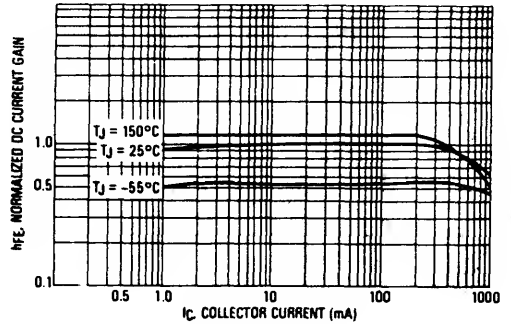
Characteristic	Symbol	Min	Max	Unit
Output Capacitance ($V_{CB} = 10\text{ Vdc}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	C_{obo}	—	12	pF
Input Capacitance ($V_{BE} = 0.5\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{ibo}	—	60	pF
Small-Signal Current Gain ($I_C = 1.0\text{ mA}$, $V_{CE} = 5.0\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{fe}	80 30	400 200	—
Collector Base Time Constant ($I_E = 10\text{ mA}$, $V_{CB} = 10\text{ Vdc}$, $f = 4.0\text{ MHz}$)	$rb'C_c$	— 15	400 400	ps
Noise Figure ($I_C = 100\text{ }\mu\text{A}$, $V_{CE} = 10\text{ Vdc}$, $R_S = 1.0\text{ kohms}$, $f = 1.0\text{ kHz}$)	NF	—	4	dB

(1) Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 1.0\%$.

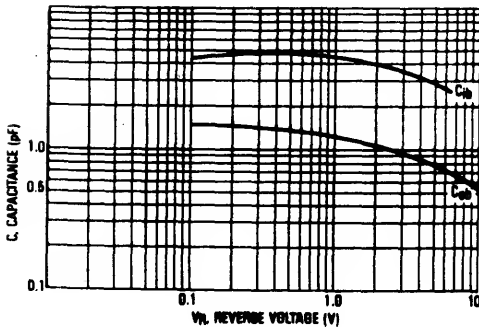
DC CURRENT GAIN
P2N3019



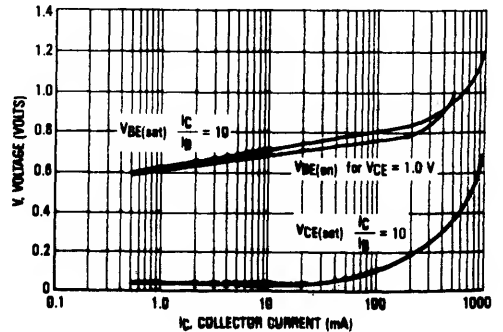
DC CURRENT GAIN
P2N3020



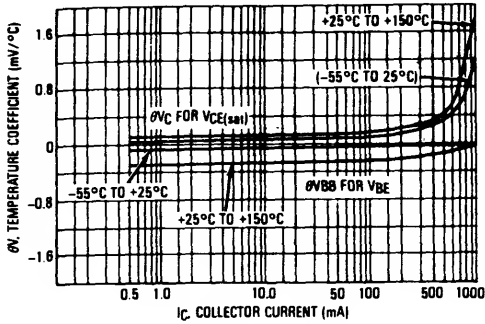
CAPACITANCE



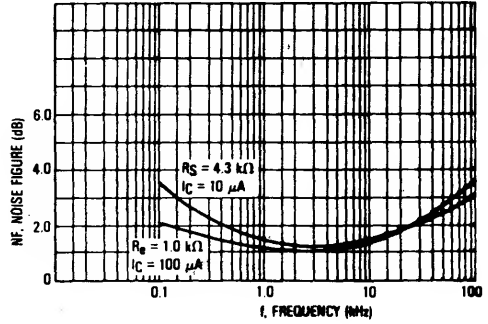
"ON" VOLTAGES



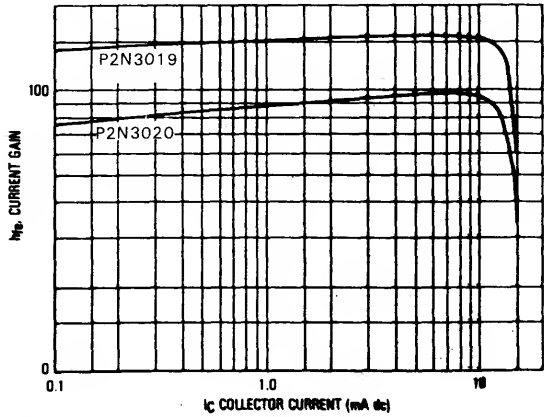
TEMPERATURE COEFFICIENTS



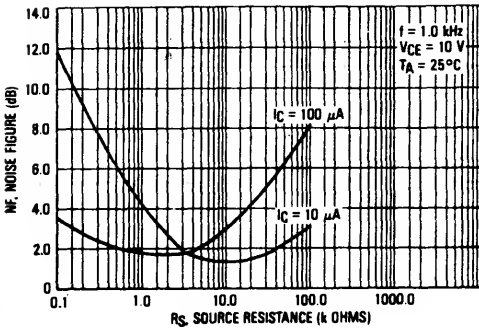
FREQUENCY EFFECTS



CURRENT GAIN BANDWIDTH PRODUCT versus COLLECTOR CURRENT — 1 kHz f_{β}



SOURCE RESISTANCE EFFECTS



CURRENT GAIN — BANDWIDTH PRODUCT

