

2N2270

CASE 79-02, STYLE TO-39 (TO-205AD) AMPLIFIER TRANSISTOR

NPN SILICON

Refer to 2N3019 for graphs.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CE0}	45	Vdc
Collector-Emitter Voltage, $R_{BE} \leq 10$ Ohms	V_{CER}	60	Vdc
Collector-Base Voltage	V_{CBO}	60	Vdc
Emitter-Base Voltage	V_{EBO}	7.0	Vdc
Collector Current — Continuous	I_C	1.0	Adc
Total Device Dissipation (@ $T_A = 25^\circ\text{C}$ Derate above 25°C)	P_D	1.0 5.71	Watt mW/ $^\circ\text{C}$
Total Device Dissipation (@ $T_C = 25^\circ\text{C}$ Derate above 25°C)	P_D	5.0 28.6	Watts mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +200	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	35	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient	$R_{\theta JA}(1)$	175	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage(2) ($I_C = 100$ mAdc, $R_{BE} \leq 10$ Ohms)	$V_{(BR)CER}$	60	—	—	Vdc
Collector-Emitter Sustaining Voltage(2) ($I_C = 100$ mAdc, $I_B = 0$)	$V_{CE0(sus)}$	45	—	—	Vdc
Collector-Base Breakdown Voltage ($I_C = 0.05$ μ Adc, $I_E = 0$)	$V_{(BR)CBO}$	60	—	—	Vdc
Emitter-Base Breakdown Voltage ($I_E = 0.1$ mAdc, $I_C = 0$)	$V_{(BR)EBO}$	7.0	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 60$ Vdc, $I_E = 0$, $T_C = 25^\circ\text{C}$) ($V_{CB} = 60$ Vdc, $I_E = 0$, $T_C = 150^\circ\text{C}$)	I_{CBO}	—	—	0.05 100	μ Adc
Emitter Cutoff Current ($V_{BE} = 5.0$ Vdc, $I_C = 0$)	I_{EBO}	—	—	100	nAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 1.0$ mAdc, $V_{CE} = 10$ Vdc) ($I_C = 150$ mAdc, $V_{CE} = 10$ Vdc)	h_{FE}	30 50	90 135	— 200	—
Collector-Emitter Saturation Voltage ($I_C = 150$ mAdc, $I_B = 15$ mAdc)	$V_{CE(sat)}$	—	0.15	0.9	Vdc
Base-Emitter Saturation Voltage ($I_C = 150$ mAdc, $I_B = 15$ mAdc)	$V_{BE(sat)}$	—	0.88	1.2	Vdc

SMALL-SIGNAL CHARACTERISTICS

Current-Gain — Bandwidth Product ($I_C = 50$ mAdc, $V_{CE} = 10$ Vdc, $f = 20$ MHz)	f_T	100	250	—	MHz
Output Capacitance ($V_{CB} = 10$ Vdc, $I_E = 0$, $f = 100$ kHz)	C_{obo}	—	10	15	pF
Input Capacitance ($V_{BE} = 0.5$ Vdc, $I_C = 0$, $f = 100$ kHz)	C_{ibo}	—	60	80	pF
Small-Signal Current Gain ($I_C = 5.0$ mAdc, $V_{CE} = 10$ Vdc, $f = 1.0$ kHz)	h_{fe}	50	—	275	—
Noise Figure ($I_C = 0.3$ mAdc, $V_{CE} = 10$ Vdc, $R_S = 1.0$ k Ohm, $f = 1.0$ kHz, B.W. = 1.0 Hz)	NF	—	7.0	10	dB

SWITCHING CHARACTERISTICS

Total Switching Time	$t_{on} + t_{off}$	—	—	30	ns
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(1) $R_{\theta JA}$ is measured with the device soldered into a typical printed circuit board.

(2) Pulse Test: Pulse Width ≤ 300 μ s, Duty Cycle $\leq 2.0\%$.