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2N5089

Silicon NPN Transistor

High Gain, Low Noise Amp

Absolute Maximum Ratings:

Collector–Emitter Voltage, V_{CEO}	25V
Collector–Base Voltage, V_{CBO}	30V
Emitter–Base Voltage, V_{EBO}	3.0V
Continuous Collector Current, I_C	50mA
Total Device Dissipation ($T_A = +25^\circ\text{C}$), P_D	625mW
Derate above 25°C	5mW/ $^\circ\text{C}$
Total Device Dissipation ($T_C = +25^\circ\text{C}$), P_D	1.5W
Derate above 25°C	12mW/ $^\circ\text{C}$
Operating Junction Temperature Range, T_J	-55° to $+150^\circ\text{C}$
Storage Temperature Range, T_{stg}	-55° to $+150^\circ\text{C}$
Thermal Resistance, Junction–to–Case, R_{thJC}	83.3 $^\circ\text{C}/\text{W}$
Thermal Resistance, Junction–to–Ambient (Note 1), R_{thJA}	200 $^\circ\text{C}/\text{W}$

Note 1 R_{thJA} is measured with the device soldered into a typical printed circuit board.

Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 10\text{mA}$, $I_B = 0$, Note 2	25	–	–	V
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$, $I_E = 0$	30	–	–	V
Emitter Cutoff Current	I_{CBO}	$V_{EB(off)} = 4.5V_{dc}$, $I_C = 0$	–	–	100	nA
Collector Cutoff Current	I_{CBO}	$V_{CB} = 30\text{V}$, $I_E = 0$	–	1.0	50	nA
ON Characteristics						
DC Current Gain	h_{FE}	$V_{CE} = 5\text{V}$, $I_C = 100\mu\text{A}$	400	1200	–	
		$V_{CE} = 5\text{V}$, $I_C = 1\text{mA}$	450	–	–	
		$V_{CE} = 5\text{V}$, $I_C = 10\text{mA}$	400	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}$, $I_B = 0.5\text{mA}$	–	–	0.5	V
Base–Emitter ON Voltage (Note 2)	$V_{BE(on)}$	$V_{CE} = 5\text{V}$, $I_C = 10\text{mA}$	–	–	0.8	V

Note 2 Pulse test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

Electrical Characteristics: ($T_A = +25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Small-Signal Characteristics						
Current Gain-Bandwidth Product	f_T	$V_{CE} = 5\text{V}, I_C = 500\mu\text{A}, f = 20\text{MHz}$	50	-	-	MHz
Collector-Base Capacitance	C_{obo}	$V_{CB} = 5\text{V}, I_E = 0, f = 1\text{MHz}$	-	-	4.0	pF
Emitter-Base Capacitance	C_{eb}	$V_{CB} = 5\text{V}, I_E = 0, f = 1\text{MHz}$	-	-	10	pF
Small Signal Current Gain	h_{fe}	$V_{CE} = 5\text{V}, I_C = 1\text{mA}, f = 1\text{kHz}$	450	-	1800	-
Noise Figure	NF	$V_{CE} = 5\text{V}, I_C = 100\mu\text{A}, R_S = 1\text{k}\Omega, f = 1\text{kHz}$	-	-	2.0	dB

