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NTE47 Silicon NPN Transistor High Gain, Low Noise Amp

Absolute Maximum Ratings:

Collector–Emitter Voltage, V_{CEO}	45V
Collector–Base Voltage, V_{CBO}	45V
Emitter–Base Voltage, V_{EBO}	6.5V
Continuous Collector Current, I_C	200mA
Total Device Dissipation ($T_A = +25^\circ\text{C}$), P_D	625mW
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	45	–	–	V
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$, $I_E = 0$	45	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$, $I_C = 0$	6.5	–	–	V
Collector Cutoff Current	I_{CBO}	$V_{CB} = 30\text{V}$, $I_E = 0$	–	1.0	50	nA
ON Characteristics (Note 2)						
DC Current Gain	h_{FE}	$V_{CE} = 5\text{V}$, $I_C = 10\mu\text{A}$	400	580	–	
		$V_{CE} = 5\text{V}$, $I_C = 100\mu\text{A}$	500	850	–	
		$V_{CE} = 5\text{V}$, $I_C = 1\text{mA}$	500	1100	–	
		$V_{CE} = 5\text{V}$, $I_C = 10\text{mA}$	500	1150	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}$, $I_B = 0.5\text{mA}$	–	–	0.2	V
		$I_C = 50\text{mA}$, $I_B = 0.5\text{mA}$	–	0.08	0.3	V
Base–Emitter ON Voltage	$V_{BE(on)}$	$V_{CE} = 5\text{V}$, $I_C = 1\text{mA}$	–	0.6	0.7	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	$V_{CE} = 5\text{V}, I_C = 1\text{mA}, f = 100\text{MHz}$	100	160	–	MHz
Output Capacitance	C_{obo}	$V_{CB} = 5\text{V}, I_E = 0, f = 1\text{MHz}$	–	1.7	3.0	pF
Noise Figure	NF	$V_{CE} = 5\text{V}, I_C = 100\mu\text{A}, R_S = 10\text{k}\Omega,$ $f = 10\text{Hz to } 15.7\text{MHz}$	–	0.5	1.5	dB
		$V_{CE} = 5\text{V}, I_C = 100\mu\text{A}, R_S = 1.0\text{k}\Omega,$ $f = 100\text{Hz}$	–	4.0	–	dB

