

## NTE47 Silicon NPN Transistor High Gain, Low Noise Amp

**Absolute Maximum Ratings:**

Collector–Emitter Voltage, $V_{CE0}$ .....	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 $25^\circ\text{C}$ .....	12mW/ $^\circ\text{C}$
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ 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
<b>OFF Characteristics</b>						
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
<b>ON Characteristics (Note 2)</b>						
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
<b>Small-Signal Characteristics</b>						
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

