

NTE108 and NTE108-1 Silicon NPN Transistor High Frequency Amplifier

Description:

The NTE108 (TO92) and NTE108-1 (TO106) are silicon NPN transistors designed for low-noise, high-frequency amplifiers, 1GHz local oscillators, non-neutralized IF amplifiers, and non-saturating circuits with rise and fall times less than 2.5ns.

Absolute Maximum Ratings:

Collector-Emitter Voltage, V_{CEO}	15V
Collector-Base Voltage, V_{CBO}	30V
Emitter-Base Voltage, V_{EBO}	3V
Continuous Collector Current, I_C	50mA
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}	$+83.3^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient (Note 1), R_{thJA}	$+200^\circ\text{C/W}$

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 specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 3\text{mA}$, $I_B = 0$, Note 2	15	-	-	V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 1\mu\text{A}$, $I_E = 0$	30	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$, $I_C = 0$	3	-	-	V
Collector Cutoff Current	I_{CBO}	$V_{CB} = 15\text{V}$, $I_E = 0$	-	-	10	nA

Note 2. Pulse Test: Pulse Width < 300 μs , Duty Cycle < 1%.

Electrical Characteristics (Cont'd): ($T_A = +25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
ON Characteristics						
DC Current Gain	h_{FE}	$I_C = 3\text{mA}, V_{CE} = 1\text{V}, \text{Note 2}$	20	-	-	
		$I_C = 8\text{mA}, V_{CE} = 10\text{V}, \text{Note 2}$	20	-	200	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$	-	-	0.4	V
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{mA}, I_B = 1\text{mA}$	-	-	1.0	V
Small-Signal Characteristics						
Current Gain-Bandwidth Product	f_T	$I_C = 4\text{mA}, V_{CE} = 10\text{V}, f = 100\text{MHz}, \text{Note 2}$	600	-	-	MHz
Output Capacitance	C_{obo}	$V_{CB} = 0\text{V}, I_E = 0, f = 140\text{kHz}$	-	-	3.0	pF
		$V_{CB} = 10\text{V}, I_E = 0, f = 140\text{kHz}$	-	-	1.7	pF
Input Capacitance	C_{ibo}	$V_{EB} = 0.5\text{V}, I_C = 0, f = 140\text{kHz}$	-	-	2.0	pF
Noise Figure	NF	$I_C = 1\text{mA}, V_{CE} = 6\text{V}, R_S = 400\Omega, f = 60\text{MHz}$	-	-	6	dB
Functional Test						
Common-Emitter Amplifier Power Gain	G_{pe}	$I_C = 6\text{mA}, V_{CB} = 12\text{V}, f = 200\text{MHz} (G_{fd} + G_{re} < -20\text{dB})$	15	-	-	dB
Power Output	P_{out}	$I_C = 8\text{mA}, V_{CB} = 15\text{V}, f = 500\text{MHz}$	30	-	-	mW
Oscillator Collector Efficiency	η	$I_C = 8\text{mA}, V_{CB} = 15\text{V}, P_{out} = 30\text{mW}, f = 500\text{MHz}$	25	-	-	%

Note 2. Pulse Test: Pulse Width < 300 μs , Duty Cycle < 1%.

