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NTE77 Silicon NPN Transistor Broadband CATV Driver

Description:

The NTE77 is an NPN transistor in a TO39 type case designed to be utilized in broadband and linear amplifier circuitry requiring low noise and low intermodulation distortion. This device is suitable for use in CATV driver stages in trunk line, bridger, and line extender amplifiers.

Features:

- High Gain-Bandwidth Product: $f_T = 1.5\text{GHz Typ}$
- Low Intermodulation, Low Cross-Modulation Distortion: $X\text{-MOD} = -57\text{dB}$
- Low Noise Figure: $NF = 2.7\text{dB Typ}$
- Low Output Capacitance: $C_{ob} = 3.5\text{pF Max @ } V_{CB} = 30\text{V}$

Absolute Maximum Ratings: ($T_C = +25^\circ\text{C}$ unless otherwise specified)

Collector-Base Voltage, V_{CBO}	50V
Collector-Emitter Voltage, V_{CEO}	30V
Emitter-Base Voltage, V_{EBO}	5V
Maximum Collector Current, I_C	400mA
Total Device Dissipation ($T_A = +25^\circ\text{C}$), P_{tot}	3.5W
Junction Temperature, T_J	$+200^\circ\text{C}$
Storage Temperature Range, T_{stg}	-65° to $+200^\circ\text{C}$
Thermal Resistance, Junction-to-Case, R_{thJC}	$+50^\circ\text{C/W}$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 5\text{mA}, I_B = 0$, Note 1	30	-	-	V
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 0.1\text{mA}, I_E = 0$, Note 1	50	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 0.1\text{mA}, I_C = 0$	5	-	-	V
Collector Cutoff Current	I_{CEO}	$V_{CE} =, 28\text{V}, I_B = 0$	-	-	0.1	mA

Note 1. Pulsed through 25mH Inductor.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
ON Characteristics							
DC Current Gain	h_{FE}	$V_{CE} = 15\text{V}, I_C = 50\text{mA}$	30	–	300		
Dynamic Characteristics							
Current Gain–Bandwidth Product	f_T	$V_{CE} = 15\text{V}, I_C = 50\text{mA},$ $f = 200\text{MHz}$	1500	1800	–	MHz	
Collector Output Capacitance	C_{ob}	$V_{CB} = 30\text{V}, I_E = 0, f = 1\text{MHz}$	–	2.5	3.5	pF	
Collector Input Capacitance	C_{ib}	$V_{EB} = 0.5\text{V}, I_C = 0, f = 1\text{MHz}$	–	8.0	10	pF	
Functional Test							
Noise Figure	Narrow Band	NF_{NB}	$V_{CE} = 10\text{V}, I_C = 10\text{mA},$ $f = 200\text{MHz}$	–	2.7	–	dB
	Broad Band	NF_{BB}	$V_{CE} = 15\text{V}, I_C = 50\text{mA},$ $f = 216\text{MHz}$	–	7.0	8.0	dB
Power Gain at Optimum Noise Figure	G_{VE}	$V_{CE} = 15\text{V}, I_C = 50\text{mA},$ $f = 260\text{MHz}$	6.8	7.2	–	dB	
Cross–Modulation	X–MOD	$V_{CE} = 15\text{V}, I_C = 50\text{mA},$ $P_O = +45\text{dBmV}, \text{Note 2}$	–	–60	–57	dB	
Second Order Distortion	2 nd O	$V_{CE} = 15\text{V}, I_C = 50\text{mA},$ $P_O = +45\text{dBmV}, \text{Note 3}$	–	–60	–57	dB	

Note 2. 12 Channel Flat — NCTA Channel 2 through 12 100% Mod (Square wave) Channel 13CW

Note 3. Channel 2 and Channel G Intermod Product on Channel 13

