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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, $T_{stg}$ .....	$-65^\circ$ 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
<b>OFF Characteristics</b>						
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	
<b>ON Characteristics</b>							
DC Current Gain	$h_{FE}$	$V_{CE} = 15\text{V}, I_C = 50\text{mA}$	30	—	300		
<b>Dynamic Characteristics</b>							
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	
<b>Functional Test</b>							
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 <sup>nd</sup> 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

