

## NTE188 (NPN) & NTE189 (PNP) Silicon Complementary Transistors High Voltage Amplifier & Driver

### **Description:**

The NTE188 (NPN) and NTE189 (PNP) are complementary silicon transistors in a TO202N type package designed for general purpose, high voltage amplifier and driver applications.

### **Features:**

- High Collector–Emitter Breakdown Voltage:  $V_{(BR)CEO} = 80V @ I_C = 1mA$
- High Power Dissipation:  $P_D = 10W @ T_C = +25^\circ C$

### **Absolute Maximum Ratings:**

Collector–Emitter Voltage, $V_{CEO}$ .....	80V
Collector–Base Voltage, $V_{CB}$ .....	80V
Emitter–Base Voltage, $V_{EB}$ .....	4V
Continuous Collector Current, $I_C$ .....	2A
Total Power Dissipation ( $T_A = +25^\circ C$ ), $P_D$ .....	1W
Derate Above $25^\circ C$ .....	8mW/ $^\circ C$
Total Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	10W
Derate Above $25^\circ C$ .....	80mW/ $^\circ C$
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ C$
Thermal Resistance, Junction–to–Ambient (Note 1), $R_{thJA}$ .....	125 $^\circ C/W$
Thermal Resistance, Junction–to–Case, $R_{thJC}$ .....	12.5 $^\circ C/W$

Note 1.  $R_{thJA}$  is measured with the device soldered into a typical printed circuit board.

### **Electrical Characteristics:** ( $T_A = +25^\circ C$ unless otherwise specified)

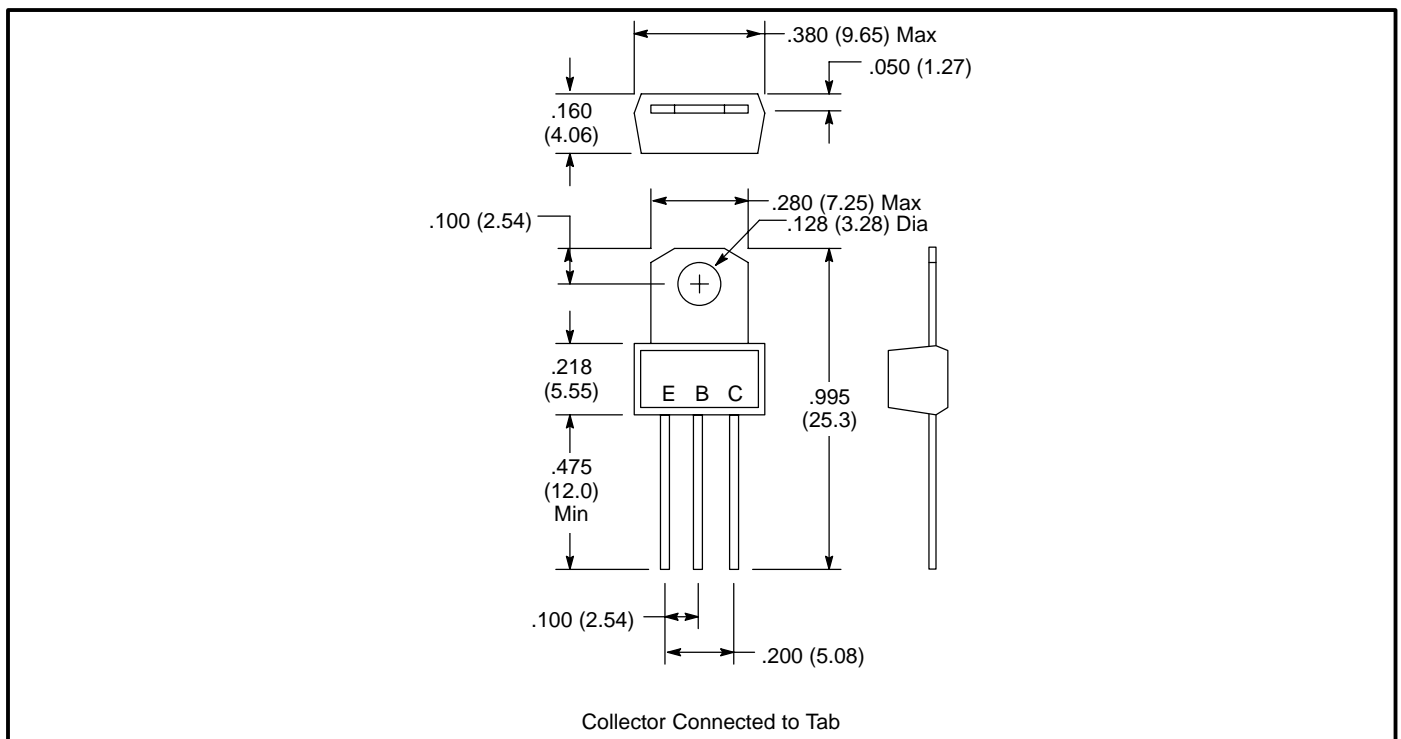
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Collector–Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 1mA, I_B = 0, \text{Note 2}$	80	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 100\mu A, I_C = 0$	4	–	–	V
Collector Cutoff Current	$I_{CBO}$	$V_{CB} = 80V, I_E = 0$	–	–	100	nA
NTE188			–	–	100	nA
NTE189		$V_{CB} = 60V, I_E = 0$	–	–	100	nA

Note 2. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics (Note 3)</b>						
DC Current Gain NTE188  NTE189	$h_{FE}$	$I_C = 50\text{mA}, V_{CE} = 1\text{V}$	60	110	–	
		$I_C = 250\text{mA}, V_{CE} = 1\text{V}$	30	65	–	
		$I_C = 50\text{mA}, V_{CE} = 1\text{V}$	–	33	–	
		$I_C = 50\text{mA}, V_{CE} = 1\text{V}$	80	160	–	
		$I_C = 50\text{mA}, V_{CE} = 1\text{V}$	50	130	–	
		$I_C = 50\text{mA}, V_{CE} = 1\text{V}$	–	8	–	
Collector–Emitter Saturation Voltage NTE188  NTE189	$V_{CE(sat)}$	$I_C = 250\text{mA}, I_B = 10\text{mA}$	–	0.18	0.4	V
		$I_C = 250\text{mA}, I_B = 25\text{mA}$	–	0.1	–	V
		$I_C = 250\text{mA}, I_B = 10\text{mA}$	–	0.22	0.5	V
		$I_C = 250\text{mA}, I_B = 25\text{mA}$	–	0.15	–	V
Base–Emitter ON Voltage NTE188  NTE189	$V_{BE(on)}$	$I_C = 250\text{mA}, V_{CE} = 5\text{V}$	–	0.76	1.2	V
			–	0.78	1.2	V
<b>Small–Signal Characteristics</b>						
Current Gain–Bandwidth Product NTE188  NTE189	$f_T$	$I_C = 250\text{mA}, V_{CE} = 5\text{V}, f = 100\text{MHz},$ Note 2	50	150	–	MHz
			50	100	–	MHz
Output Capacitance NTE188  NTE189	$C_{ob}$	$V_{CB} = 10\text{V}, I_E = 0, f = 100\text{MHz}$	–	6	12	pF
			–	10	15	pF

Note 2. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .



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