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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° to $+150^{\circ}C$ |
| Storage Temperature Range, T_{stg} | -55° 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 |
|-------------------------------------|---------------|-------------------------------------|-----|-----|-----|------|
| OFF Characteristics | | | | | | |
| 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 | | | | | | |
| 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 |
|--|---------------|--|-----|------|-----|------|
| OFF Characteristics (Note 3) | | | | | | |
| 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 |
| Small–Signal Characteristics | | | | | | |
| 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 $\leq 2\%$.

