

## NTE157 Silicon NPN Transistor Audio Power Amp, High Voltage Converter (Compl to NTE39)

### **Description:**

The NTE157 is a silicon NPN transistor in a TO126 type package designed for use in line-operated equipment such as audio output amplifiers, low-current, high-voltage converters, and AC line relays.

### **Features:**

- Excellent DC Current Gain:  $h_{FE} = 30$  to  $250$  @  $I_C = 100\text{mA}$
- Current-Gain – Bandwidth Product:  $f_T = 10\text{MHz}$  (Min) @  $I_C = 50\text{mA}$

### **Absolute Maximum Ratings:**

|                                                              |                                     |
|--------------------------------------------------------------|-------------------------------------|
| Collector–Emitter Voltage, $V_{CEO}$                         | 300V                                |
| Collector–Base Voltage, $V_{CB}$                             | 325V                                |
| Emitter–Base Voltage, $V_{EB}$                               | 6V                                  |
| Collector Current, $I_C$                                     |                                     |
| Continuous                                                   | 500mA                               |
| Peak                                                         | 1A                                  |
| Base Current, $I_B$                                          | 250mA                               |
| Total Power Dissipation ( $T_C = +25^\circ\text{C}$ ), $P_D$ | 20W                                 |
| Derate Above $25^\circ\text{C}$                              | $0.16\text{W}/^\circ\text{C}$       |
| Operating Junction Temperature Range, $T_J$                  | $-65^\circ$ to $+150^\circ\text{C}$ |
| Storage Temperature Range, $T_{stg}$                         | $-65^\circ$ to $+150^\circ\text{C}$ |
| Thermal Resistance, Junction to case, $R_{\theta JC}$        | $6.25^\circ\text{C}/\text{W}$       |

### **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 Sustaining Voltage | $V_{CEO(sus)}$ | $I_C = 100\text{mA}$ (Inductive), $L = 50\text{mH}$                               | 300 | –   | –   | V             |
| Collector–Emitter Breakdown Voltage  | $V_{(BR)CEO}$  | $I_C = 1\text{mA}$ , $I_B = 0$                                                    | 300 | –   | –   | V             |
| Collector Cutoff Current             | $I_{CEO}$      | $V_{CE} = 200\text{V}$ , $I_B = 0$                                                | –   | –   | 0.1 | mA            |
|                                      | $I_{CEX}$      | $V_{CE} = 300\text{V}$ , $V_{EB(off)} = 1.5\text{V}$                              | –   | –   | 0.1 | mA            |
|                                      |                | $V_{CE} = 300\text{V}$ , $V_{EB(off)} = 1.5\text{V}$ , $T_C = +100^\circ\text{C}$ | –   | –   | 1.0 | mA            |
|                                      | $I_{CBO}$      | $V_{CB} = 325\text{V}$ , $I_E = 0$                                                | –   | –   | 10  | $\mu\text{A}$ |
| Emitter Cutoff Current               | $I_{EBO}$      | $V_{EB} = 6\text{V}$ , $I_C = 0$                                                  | –   | –   | 10  | $\mu\text{A}$ |

**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> (Note 1)   |               |                                                                           |     |     |     |      |
| DC Current Gain                      | $h_{FE}$      | $I_C = 50\text{mA}$ , $V_{CE} = 10\text{V}$                               | 25  | —   | —   |      |
|                                      |               | $I_C = 100\text{mA}$ , $V_{CE} = 10\text{V}$                              | 30  | —   | 250 |      |
|                                      |               | $I_C = 250\text{mA}$ , $V_{CE} = 10\text{V}$                              | 15  | —   | —   |      |
|                                      |               | $I_C = 500\text{mA}$ , $V_{CE} = 10\text{V}$                              | 5   | —   | —   |      |
| Collector–Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 100\text{mA}$ , $I_B = 10\text{mA}$                                | —   | —   | 1   | V    |
|                                      |               | $I_C = 250\text{mA}$ , $I_B = 25\text{mA}$                                | —   | —   | 2.5 |      |
|                                      |               | $I_C = 500\text{mA}$ , $I_B = 100\text{mA}$                               | —   | —   | 10  |      |
| Base–Emitter Voltage                 | $V_{BE}$      | $I_C = 100\text{mA}$ , $V_{CE} = 10\text{V}$                              | —   | —   | 1   | V    |
| <b>Dynamic Characteristics</b>       |               |                                                                           |     |     |     |      |
| Current–Gain–Bandwidth Product       | $f_T$         | $I_C = 50\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 10\text{MHz}$ , Note 2 | 10  | —   | —   | MHz  |
| Output Capacitance                   | $C_{ob}$      | $V_{CB} = 10\text{V}$ , $I_E = 0$ , $f = 100\text{kHz}$                   | —   | —   | 25  | pF   |
| Small–Signal Current Gain            | $h_{fe}$      | $I_C = 100\text{mA}$ , $V_{CE} = 10\text{V}$ , $f = 1\text{kHz}$          | 20  | —   | —   |      |

Note 1. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

Note 2.  $f_T$  is defined as the frequency at which  $|h_{fe}|$  extrapolates to unity.

