



**ELECTRONICS, INC.**  
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## NTE243 (NPN) & NTE244 (PNP) Silicon Complementary Transistors Darlington Power Amplifier

### **Description:**

The NTE243 (NPN) and NTE244 (PNP) are silicon complementary Darlington transistors in a TO3 type case designed for general-purpose amplifier and low-frequency switching applications.

### **Features:**

- High DC Current Gain:  $h_{FE} = 3000$  Typ @  $I_C = 4A$
- Collector–Emitter Sustaining Voltage:  $V_{CEO(sus)} = 80V$  Min @ 100mA
- Low Collector–Emitter Saturation Voltage:  
 $V_{CE(sat)} = 2V$  Max @  $I_C = 4A$   
 $= 3V$  Max @  $I_C = 8A$
- Monolithic Construction with Built–In Base–Emitter Shunt Resistors

### **Absolute Maximum Ratings:**

|  |                               |
|--|-------------------------------|
| Collector–Emitter Voltage, $V_{CEO}$ .....                   | 80V                           |
| Collector–Base Voltage, $V_{CB}$ .....                       | 80V                           |
| Emitter–Base Voltage, $V_{EB}$ .....                         | 5V                            |
| Collector Current, $I_C$                                     |                               |
| Continuous .....   | 8A                            |
| Peak .....   | 16A                           |
| Base Current, $I_B$ .....                                    | 120mA                         |
| Total Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ ..... | 100W                          |
| Derate Above $25^\circ C$ .....                              | 0.571W/ $^\circ C$            |
| Operating Junction Temperature Range, $T_J$ .....            | $-65^\circ$ to $+200^\circ C$ |
| Storage Temperature Range, $T_{stg}$ .....                   | $-65^\circ$ to $+200^\circ C$ |
| Thermal Resistance, Junction–to–Case, $R_{thJC}$ .....       | 1.78 $^\circ C/W$             |

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

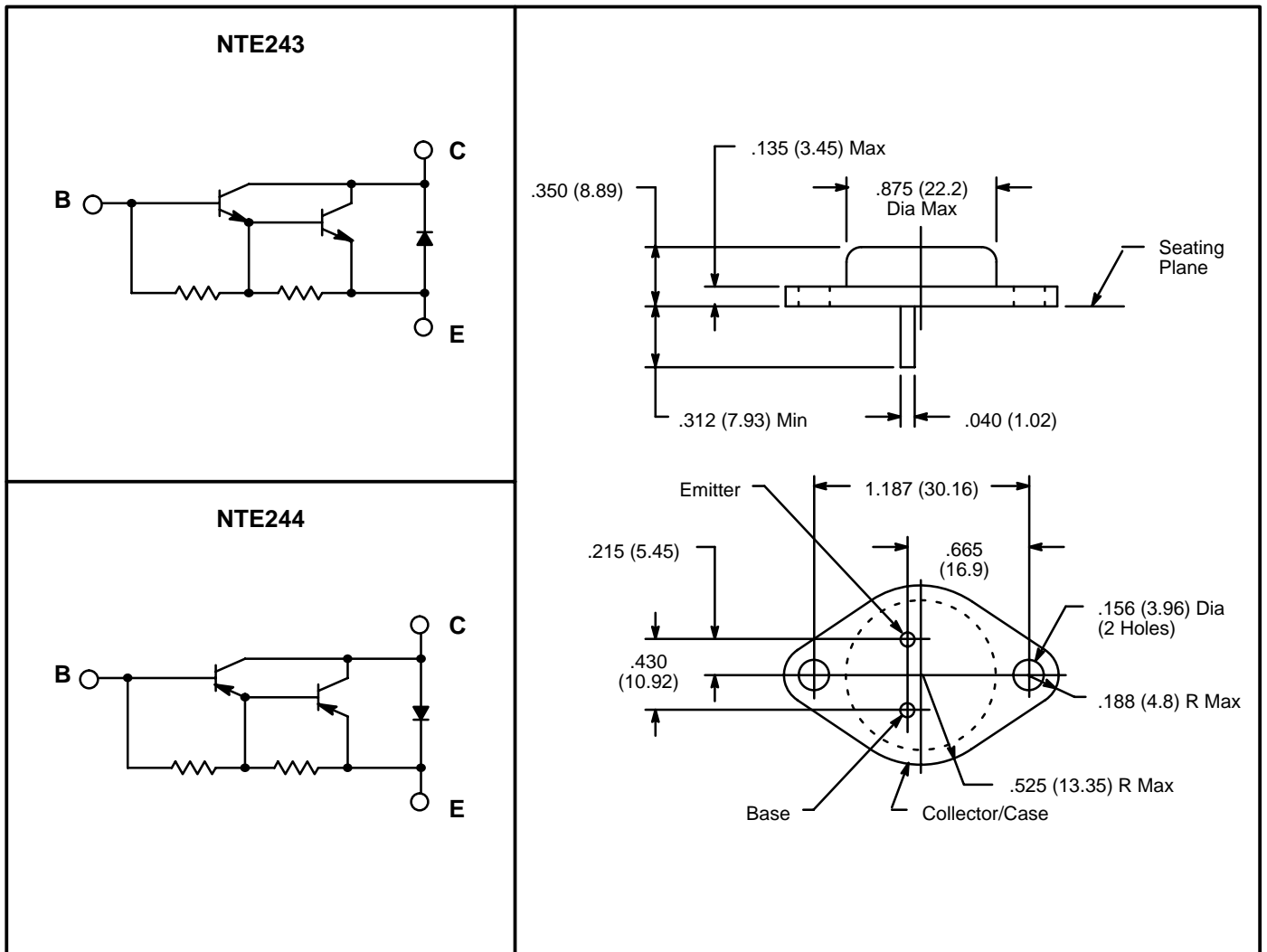
| Parameter                            | Symbol         | Test Conditions  | Min | Typ | Max | Unit |
|--------------------------------------|----------------|--|-----|-----|-----|------|
| <b>OFF Characteristics</b>           |                |  |     |     |     |      |
| Collector–Emitter Sustaining Voltage | $V_{CEO(sus)}$ | $I_C = 100mA, I_B = 0$ , Note 1                        | 80  | –   | –   | V    |
| Collector Cutoff Current             | $I_{CEO}$      | $V_{CE} = 40V, I_E = 0$                                | –   | –   | 0.5 | mA   |
|                                      |                | $V_{CE} = 80V, V_{BE(off)} = 1.5V$                     | –   | –   | 0.5 | mA   |
|                                      |                | $V_{CE} = 80V, V_{BE(off)} = 1.5V, T_A = +150^\circ C$ | –   | –   | 5.0 | mA   |
| Emitter Cutoff Current               | $I_{EBO}$      | $V_{BE} = 5V, I_C = 0$                                 | –   | –   | 2.0 | mA   |

Note 1. Pulse Test: Pulse Width = 300 $\mu s$ , Duty Cycle = 2%

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

| Parameter   | Symbol        | Test Conditions  | Min | Typ | Max   | Unit |
|---|---------------|--|-----|-----|-------|------|
| <b>ON Characteristics (Note 1)</b>  |               |  |     |     |       |      |
| DC Current Gain   | $h_{FE}$      | $V_{CE} = 3\text{V}, I_C = 4\text{A}$                  | 750 | –   | 18000 |      |
|   |               | $V_{CE} = 3\text{V}, I_C = 8\text{A}$                  | 100 | –   | –     |      |
| Collector–Emitter Saturation Voltage  | $V_{CE(sat)}$ | $I_C = 4\text{A}, I_B = 16\text{mA}$                   | –   | –   | 2.0   | V    |
|   |               | $I_C = 8\text{A}, I_B = 80\text{mA}$                   | –   | –   | 3.0   | V    |
| Base–Emitter Saturation Voltage   | $V_{BE(sat)}$ | $I_C = 8\text{A}, I_B = 80\text{mA}$                   | –   | –   | 4.0   | V    |
| Base–Emitter ON Voltage   | $V_{BE(on)}$  | $V_{CE} = 3\text{V}, I_C = 4\text{A}$                  | –   | –   | 2.8   | V    |
| <b>Dynamic Characteristics</b>  |               |  |     |     |       |      |
| Small–Signal Current Gain   | $h_{fe}$      | $V_{CE} = 3\text{V}, I_C = 3\text{A}, f = 1\text{kHz}$ | 300 | –   | –     |      |
| Magnitude of Common Emitter<br>Small–Signal Short–Circuit<br>Forward Current Transfer Ratio | $ h_{fe} $    | $V_{CE} = 3\text{V}, I_C = 3\text{A}, f = 1\text{MHz}$ | 4.0 | –   | –     | MHz  |
| Output Capacitance<br>NTE243<br>NTE244  | $C_{ob}$      | $V_{CB} = 10\text{V}, I_E = 0, f = 0.1\text{MHz}$      | –   | –   | 200   | pF   |
|   |               |  | –   | –   | 300   | pF   |

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



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