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NTE272 (NPN) & NTE273 (PNP) Silicon Darlington Complementary Power Amplifiers

Description:

The NTE272 (NPN) and NTE273 (PNP) are silicon complementary Power Amplifiers in a TO202 type case designed for use in complementary amplifiers and driver applications.

Features:

- High DC Current Gain:
 $h_{FE} = 25,000$ (Min) @ $I_C = 200\text{mA}$
 $= 15,000$ (Min) @ $I_C = 500\text{mA}$
- Collector–Emitter Breakdown Voltage:
 $V_{(BR)CES} = 40\text{V}$ @ $I_C = 500\text{mA}$
- Low Collector–Emitter Saturation Voltage:
 $V_{CE(sat)} = 1.5\text{V}$ @ $I_C = 1\text{A}$
- Monolithic Construction for High Reliability

Absolute Maximum Ratings:

| | |
|--|--------------------------------|
| Collector–Emitter Voltage (Note 2), V_{CEO} | 40V |
| Collector–Emitter Voltage, V_{CES} | 40V |
| Collector–Base Voltage, V_{CB} | 50V |
| Emitter–Base Voltage, V_{EB} | 12V |
| Collector Current, I_C | 2A |
| Total Power Dissipation ($T_A = +25^\circ\text{C}$), P_D | 1W |
| Derate above 25°C | 8mW/ $^\circ\text{C}$ |
| Total Power Dissipation ($T_C = +25^\circ\text{C}$), P_D | 10W |
| Derate above 25°C | 80mW/ $^\circ\text{C}$ |
| Operating Junction Temperature Range, T_J | -55 to $+150^\circ\text{C}$ |
| Storage Temperature Range, T_{stg} | -55 to $+150^\circ\text{C}$ |
| Thermal Resistance, Junction–to–Ambient, R_{thJA} | 125 $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction–to–Case, R_{thJC} | 12.5 $^\circ\text{C}/\text{W}$ |

Note 1. **NTE273** is a **discontinued** device and **no longer** available.

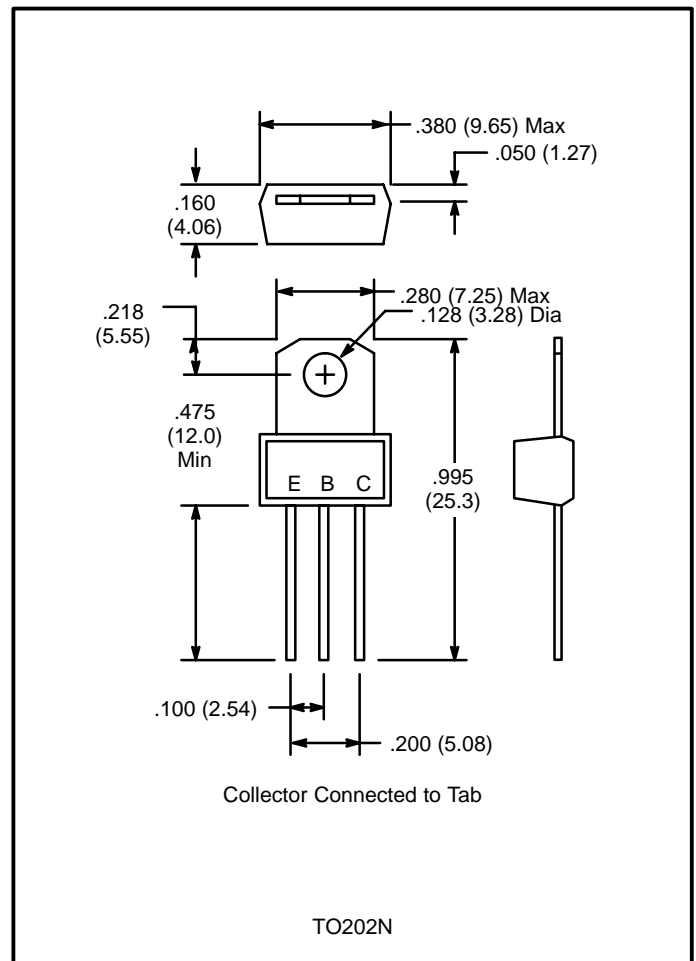
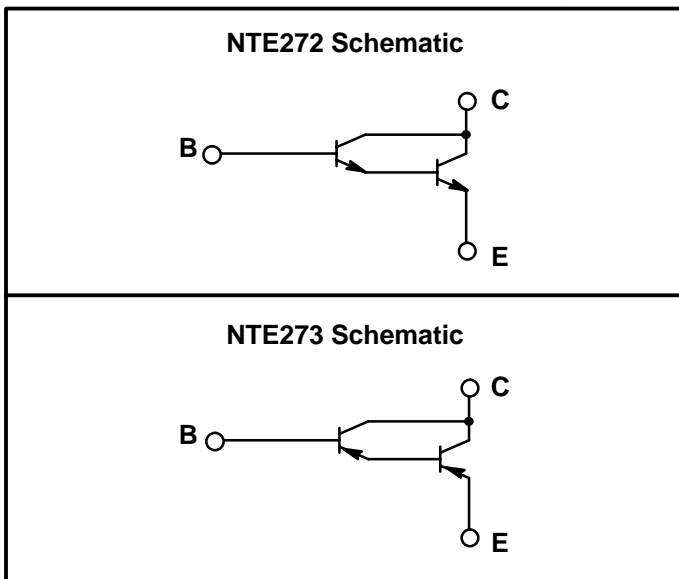
Note 2. Due to the monolithic construction of this device, breakdown voltages of both transistor elements are identical. $V_{(BR)CES}$ is tested in lieu of $V_{(BR)CEO}$ in order to avoid errors caused by noise pickup. The voltage measured during the $V_{(BR)CES}$ test is the $V_{(BR)CEO}$ of the output transistor.



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

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|--------------------------------------|---------------|--|--------|--------|---------|------|
| OFF Characteristics | | | | | | |
| Collector–Emitter Breakdown Voltage | $V_{(BR)CES}$ | $I_C = 100\mu\text{A}, V_{BE} = 0$ | 40 | – | – | V |
| Collector–Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C = 100\mu\text{A}, I_E = 0$ | 50 | – | – | V |
| Emitter–Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E = 10\mu\text{A}, I_C = 0$ | 12 | – | – | V |
| Collector Cutoff Current | I_{CBO} | $V_{CB} = 30\text{V}, I_E = 0$ | – | – | 100 | nA |
| Emitter Cutoff Current | I_{EBO} | $V_{EB} = 10\text{V}, I_C = 0$ | – | – | 100 | nA |
| ON Characteristics (Note 3) | | | | | | |
| DC Current Gain | $ h_{fe} $ | $I_C = 200\text{mA}, V_{CE} = 5\text{V}$ | 25,000 | 65,000 | 150,000 | |
| | | $I_C = 500\text{mA}, V_{CE} = 5\text{V}$ | 15,000 | 35,000 | – | |
| | | $I_C = 1\text{A}, V_{CE} = 5\text{V}$ | 4,000 | 12,000 | – | |
| Collector–Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 1\text{A}, I_B = 2\text{mA}$ | – | 1.2 | 1.5 | V |
| Base–Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C = 1\text{A}, I_B = 2\text{mA}$ | – | 1.85 | 2.0 | V |
| Base–Emitter ON Voltage | $V_{BE(ON)}$ | $I_C = 1\text{A}, V_{CE} = 5\text{V}$ | – | 1.7 | 2.0 | V |
| Dynamic Characteristics | | | | | | |
| Small–Signal Current Gain | h_{FE} | $I_C = 200\text{mA}, V_{CE} = 5\text{V}, f = 100\text{MHz}, \text{Note 2}$ | 1.0 | 3.2 | – | |
| Collector–Base Capacitance | C_{cb} | $V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$ | – | 2.5 | 6.0 | pF |

Note 3. Pulse test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$.



Uniwatt darlington transistors can be used in any number of low power applications, such as relay drivers, motor control and as general purpose amplifiers. As an audio amplifier these devices, when used as a complementary pair, can drive 3.5 watts into a 3.2ohm speaker using a 14 volt supply with less than one per cent distortion. Because of the high gain the base drive requirement is as low as 1mA in this application. They are also useful as power drivers for high current application such as voltage regulators.