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## NTE251 (NPN) & NTE252 (PNP) Silicon Complementary Transistors Darlington Power Amplifier

**Description:**

The NTE251 (NPN) and NTE252 (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 @  $I_C = 10A$ :  
 $h_{FE} = 2400$  Typ (NTE251)  
 $h_{FE} = 4000$  Typ (NTE252)
- Collector-Emitter Sustaining Voltage:  $V_{CEO(sus)} = 100V$  Min
- Monolithic Construction with Built-In Base-Emitter Shunt Resistors

**Absolute Maximum Ratings:** ( $T_A = +25^\circ C$  unless otherwise specified)

Collector-Emitter Voltage, $V_{CEO}$ .....	100V
Collector-Base Voltage, $V_{CB}$ .....	100V
Emitter-Base Voltage, $V_{EB}$ .....	5V
Collector Current, $I_C$	
Continuous .....	20A
Peak .....	40A
Base Current, $I_B$ .....	500mA
Total Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	160W
Derate Above $25^\circ C$ .....	0.915W/ $^\circ C$
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, $R_{thJC}$ .....	1.09 $^\circ C/W$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Collector–Emitter Sustaining Voltage	$V_{CEO(sus)}$	$I_C = 100\text{mA}, I_B = 0$	100	–	–	V
Collector Cutoff Current	$I_{CEO}$	$V_{CE} = 50\text{V}, I_E = 0$	–	–	1.0	mA
		$V_{CE} = 100\text{V}, V_{BE(off)} = 1.5\text{V}$	–	–	0.5	mA
	$I_{CEX}$	$V_{CE} = 100\text{V}, V_{BE(off)} = 1.5\text{V}, T_A = +150^\circ\text{C}$	–	–	5.0	mA
Emitter Cutoff Current	$I_{EBO}$	$V_{BE} = 5\text{V}, I_C = 0$	–	–	2.0	mA
<b>ON Characteristics (Note 1)</b>						
DC Current Gain	$h_{FE}$	$V_{CE} = 3\text{V}, I_C = 10\text{A}$	750	–	18000	
		$V_{CE} = 3\text{V}, I_C = 20\text{A}$	100	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{A}, I_B = 40\text{mA}$	–	–	2.0	V
		$I_C = 20\text{A}, I_B = 200\text{mA}$	–	–	3.0	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 20\text{A}, I_B = 200\text{mA}$	–	–	4.0	V
Base–Emitter ON Voltage	$V_{BE(on)}$	$V_{CE} = 3\text{V}, I_C = 10\text{A}$	–	–	2.8	V
<b>Dynamic Characteristics</b>						
Small–Signal Current Gain	$h_{fe}$	$V_{CE} = 3\text{V}, I_C = 10\text{A}, f = 1\text{kHz}$	300	–	–	
Magnitude of Common Emitter Small–Signal Short–Circuit Forward Current Transfer Ratio	$ h_{fe} $	$V_{CE} = 3\text{V}, I_C = 10\text{A}, f = 1\text{MHz}$	4.0	–	–	MHz
Output Capacitance NTE251 NTE252	$C_{ob}$	$V_{CB} = 10\text{V}, I_E = 0, f = 0.1\text{MHz}$	– –	– –	400 600	pF

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



