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## NTE87 (NPN) & NTE88 (PNP) Silicon Complementary Transistors High Power Audio, Disk Head Positioner for Linear Applications

**Description:**

The NTE87 (NPN) and NTE88 (PNP) are complementary silicon power transistors in a TO3 type package designed for high power audio, disk head positioners, and other linear applications. These devices can also be used in power switching circuits such as relay or solenoid drivers, DC-to-DC converters or inverters.

**Features:**

- High Safe Operating Area: 1.2A @ 100V
- Completely Characterized for Linear Operation
- High DC Current Gain:  $h_{FE} = 20$  Min @  $I_C = 2A$
- Low Saturation Voltage: 2V
- For Low Distortion Complementary Designs

**Absolute Maximum Ratings:**

Collector–Emitter Voltage, $V_{CEO(sus)}$ .....	250V
Collector–Emitter Voltage, $V_{CEX}$ .....	250V
Emitter–Base Voltage, $V_{EB}$ .....	5V
Collector Current, $I_C$	
Continuous .....	10A
Peak (Note 2) .....	15A
Base Current, $I_B$	
Continuous .....	2A
Peak (Note 2) .....	5A
Emitter Current, $I_E$	
Continuous .....	12A
Peak (Note 2) .....	20A
Total Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	200W
Derate Above $25^\circ C$ .....	1.14W/ $^\circ C$
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, $R_{thJC}$ .....	0.875 $^\circ C/W$
Lead Temperature (During Soldering), $T_L$ .....	$+265^\circ C$

Note 1. Matched complementary pairs are available upon request (NTE88MCP). Matched complementary pairs have their gain specification ( $h_{FE}$ ) matched to within 10% of each other.

Note 2. Pulse Test: Pulse Width = 5ms, Duty Cycle  $\leq$  10%.

**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 Breakdown Voltage	$V_{CEO(sus)}$	$I_C = 100\text{mA}$ , Note 3	250	–	–	V
Collector Cutoff Current	$I_{CEO}$	$V_{CE} = 250\text{V}$	–	–	1	mA
	$I_{CEX}$	$V_{CE} = 250\text{V}$ , $V_{BE(off)} = 1.5\text{V}$	–	–	500	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB} = 5\text{V}$	–	–	500	$\mu\text{A}$
<b>Second Breakdown</b>						
Second Breakdown Collector Current with Base Forward Bias	$I_{S/b}$	$V_{CE} = 40\text{V}$ , $t = 0.5\text{s}$ (non-repetitive)	5	–	–	A
		$V_{CE} = 100\text{V}$ , $t = 0.5\text{s}$ (non-repetitive)	1.4	–	–	A
<b>ON Characteristics</b> (Note 3)						
DC Current Gain	$h_{FE}$	$V_{CE} = 2\text{V}$ , $I_C = 2\text{A}$	20	–	100	
		$V_{CE} = 2\text{V}$ , $I_C = 4\text{A}$	5	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 2\text{A}$ , $I_B = 200\text{mA}$	–	–	0.8	V
		$I_C = 4\text{A}$ , $I_B = 400\text{mA}$	–	–	2.5	V
Base–Emitter On Voltage	$V_{BE(on)}$	$V_{CE} = 2\text{V}$ , $I_C = 4\text{A}$	–	–	2	V
<b>Dynamic Characteristics</b>						
Current Gain–Bandwidth Product	$f_T$	$V_{CE} = 10\text{V}$ , $I_C = 1\text{A}$ , $f_{test} = 1\text{MHz}$	4	–	–	MHz
Output Capacitance	$C_{ob}$	$V_{CB} = 10\text{V}$ , $I_E = 0$ , $f_{test} = 1\text{MHz}$	–	–	500	pF

Note 3. Pulse Test: Pulse Width =  $300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .

