

## NTE253 (NPN) & NTE254 (PNP) Silicon Complementary Transistors Darlington Power Amplifier

### **Description:**

The NTE253 (NPN) and NTE254 (PNP) are silicon complementary Darlington transistors in a TO126 type case designed for general-purpose amplifier and low-speed switching applications.

### **Features:**

- High DC Current Gain:  $h_{FE} = 2000$  (Typ) @  $I_C = 2A$
- Monolithic Construction with Built-In Base-Emitter Resistors to Limit Leakage Multiplication

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

Collector-Emitter Voltage, $V_{CEO}$ .....	80V
Collector-Base Voltage, $V_{CB}$ .....	80V
Emitter-Base Voltage, $V_{EB}$ .....	5V
Collector Current, $I_C$ .....	4A
Base Current, $I_B$ .....	100mA
Total Power Dissipation ( $T_C = +25^\circ C$ ), $P_D$ .....	40W
Derate Above $25^\circ C$ .....	0.32W/ $^\circ C$
Operating Junction Temperature Range, $T_J$ .....	$-65^\circ$ to $+150^\circ C$
Storage Temperature Range, $T_{stg}$ .....	$-65^\circ$ to $+150^\circ C$
Thermal Resistance, Junction-to-Case, $R_{thJC}$ .....	3.23 $^\circ C/W$

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>OFF Characteristics</b>						
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = 50mA, I_B = 0$ , Note 1	80	–	–	V
Collector Cutoff Current	$I_{CEO}$	$V_{CE} = 80V, I_B = 0$	–	–	100	$\mu A$
		$V_{CE} = 80V, I_E = 0$	–	–	100	$\mu A$
	$V_{CE} = 80V, I_E = 0, T_C = +100^\circ C$	–	–	500	$\mu A$	
Emitter Cutoff Current	$I_{EBO}$	$V_{BE} = 5V, I_C = 0$	–	–	2.0	mA

**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 NTE253	$h_{FE}$	$V_{CE} = 3V, I_C = 1.5A$	750	2000	–	
NTE254		$V_{CE} = 3V, I_C = 2A$	750	2000	–	
NTE253 & NTE253		$V_{CE} = 3V, I_C = 4A$	100	–	–	
Collector–Emitter Saturation Voltage NTE253	$V_{CE(sat)}$	$I_C = 1.5A, I_B = 30mA$	–	–	2.5	V
NTE254		$I_C = 2.0A, I_B = 40mA$	–	–	2.8	V
NTE253 & NTE254		$I_C = 4.0A, I_B = 40mA$	–	–	3.0	V
Base–Emitter ON Voltage NTE253	$V_{BE(on)}$	$V_{CE} = 3V, I_C = 1.5A$	–	–	2.5	V
NTE254		$V_{CE} = 3V, I_C = 2.0A$	–	–	2.5	V
NTE253 & NTE254		$V_{CE} = 3V, I_C = 4.0A$	–	–	3.0	V
<b>Dynamic Characteristics</b>						
Small–Signal Current Gain	$ h_{fe} $	$V_{CE} = 3V, I_C = 1.5A, f = 1MHz$	1.0	–	–	

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

Note 2. NTE253MCP is a matched complementary pair containing 1 each of NTE253 (NPN) and NTE254 (PNP).

