



**ELECTRONICS, INC.**  
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## NTE46

### Silicon NPN Transistor

### Darlington, General Purpose Amplifier, Preamp, Driver

**Absolute Maximum Ratings:**

Collector–Emitter Voltage, $V_{CES}$ .....	100V
Collector–Base Voltage, $V_{CBO}$ .....	100V
Emitter–Base Voltage, $V_{EBO}$ .....	12V
Continuous Collector Current, $I_C$ .....	500mA
Total Device Dissipation ( $T_A = +25^\circ\text{C}$ ), $P_D$ .....	625mW
Derate Above $25^\circ\text{C}$ .....	5mW/ $^\circ\text{C}$
Total Device Dissipation ( $T_C = +25^\circ\text{C}$ ), $P_D$ .....	1.5W
Derate Above $25^\circ\text{C}$ .....	12mW/ $^\circ\text{C}$
Operating Junction Temperature Range, $T_J$ .....	$-55^\circ$ to $+150^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-55^\circ$ to $+150^\circ\text{C}$
Thermal Resistance, Junction to Case, $R_{\theta JC}$ .....	83.3 $^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient, $R_{\theta JA}$ .....	200 $^\circ\text{C}/\text{W}$

**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 Breakdown Voltage	$V_{(BR)CES}$	$I_C = 100\mu\text{A}$ , $V_{BE} = 0$	100	–	–	V
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$ , $I_E = 0$	100	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 10\mu\text{A}$ , $I_C = 0$	12	–	–	V
Collector Cutoff Voltage	$I_{CBO}$	$V_{CB} = 80\text{V}$ , $I_E = 0$	–	–	100	nA
	$I_{CES}$	$V_{CE} = 80\text{V}$ , $V_{BE} = 0$	–	–	500	nA
Emitter Cutoff Current	$I_{EBO}$	$V_{BE} = 10\text{V}$ , $I_C = 0$	–	–	100	nA

**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	$h_{FE}$	$I_C = 10\text{mA}, V_{CE} = 5\text{V}$	10,000	–	–	
		$I_C = 100\text{mA}, V_{CE} = 5\text{V}$	10,000	–	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 10\text{mA}, I_B = 0.01\text{mA}$	–	0.7	1.2	V
		$I_C = 100\text{mA}, I_B = 0.1\text{mA}$	–	0.8	1.5	V
Base–Emitter ON Voltage	$V_{BE(on)}$	$I_C = 100\text{mA}, V_{CE} = 5\text{V}$	–	1.4	2.0	V
<b>Small–Signal Characteristics</b>						
Current Gain–Bandwidth Product	$f_T$	$I_C = 10\text{mA}, V_{CE} = 5\text{V},$ $f = 100\text{MHz}, \text{Note 2}$	125	200	–	MHz
Output Capacitance	$C_{obo}$	$V_{CB} = 10\text{V}, I_E = 0, f = 100\text{kHz}$	–	5.0	8.0	pF

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

Note 2.  $f_T = h_{fe} \cdot f_{test}$

