



**ELECTRONICS, INC.**  
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## NTE106 Silicon PNP Transistor Switching Transistor

**Absolute Maximum Ratings:**

Collector–Emitter Voltage, $V_{CEO}$ .....	15V
Collector–Base Voltage, $V_{CBO}$ .....	15V
Emitter–Base Voltage, $V_{EBO}$ .....	4.5V
Continuous Collector Current, $I_C$ .....	200mA
Total Device Dissipation ( $T_A = +25^\circ\text{C}$ ), $P_D$ .....	0.36W
Derate Above $25^\circ\text{C}$ .....	2.06mW/ $^\circ\text{C}$
Total Device Dissipation ( $T_C = +25^\circ\text{C}$ ), $P_D$ .....	1.2W
Derate Above $25^\circ\text{C}$ .....	6.9mW/ $^\circ\text{C}$
Operating Junction Temperature Range, $T_J$ .....	$-65^\circ$ to $+200^\circ\text{C}$
Storage Temperature Range, $T_{stg}$ .....	$-65^\circ$ to $+200^\circ\text{C}$

**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	$V_{(BR)CEO}$	$I_C = 3\text{mA}, I_B = 0$ , Note 1	15	–	–	V
	$V_{(BR)CES}$	$I_C = 100\mu\text{A}, V_{BE} = 0$	15	–	–	V
Collector–Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}, I_E = 0$	15	–	–	V
Emitter–Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E = 100\mu\text{A}, I_C = 0$	4.5	5.9	–	V
Collector Cutoff Current	$I_{CES}$	$V_{CE} = 8\text{V}, V_{BE} = 0$	–	–	10	nA
		$V_{CE} = 8\text{V}, V_{BE} = 0, T_A = +125^\circ\text{C}$	–	–	5	$\mu\text{A}$
Base Current	$I_B$	$V_{CE} = 8\text{V}, V_{BE} = 0$	–	–	1	nA
<b>ON Characteristics</b>						
DC Current Gain	$h_{FE}$	$I_C = 1\text{mA}, V_{CE} = 500\text{mV}$	35	–	–	
		$I_C = 10\text{mA}, V_{CE} = 300\text{mV}$	50	–	120	
		$I_C = 10\text{mA}, V_{CE} = 300\text{mV}, T_A = -55^\circ\text{C}$	20	–	–	
		$I_C = 50\text{mA}, V_{CE} = 1\text{V}$ , Note 1	40	–	–	

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

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>ON Characteristics (Cont'd)</b>						
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 1\text{mA}, I_B = 0.1\text{mA}$	–	–	0.15	V
		$I_C = 10\text{mA}, I_B = 1\text{mA}$	–	–	0.18	V
		$I_C = 50\text{mA}, I_B = 5\text{mA}, \text{Note 1}$	–	–	0.6	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 1\text{mA}, I_B = 0.1\text{mA}$	–	0.7	0.8	V
		$I_C = 10\text{mA}, I_B = 1\text{mA}$	0.75	0.86	0.90	V
		$I_C = 50\text{mA}, I_B = 5\text{mA}, \text{Note 1}$	–	1.1	1.5	V
<b>Small–Signal Characteristics</b>						
Current Gain–Bandwidth Product	$f_T$	$I_C = 10\text{mA}, V_{CE} = 10\text{V}, f = 100\text{MHz}$	850	1100	–	MHz
Output Capacitance	$C_{obo}$	$V_{CB} = 5\text{V}, I_E = 0, f = 140\text{kHz}$	–	2.0	3.0	pF
Input Capacitance	$C_{ibo}$	$V_{BE} = 500\text{mV}, I_C = 0, f = 140\text{kHz}$	–	2.0	3.5	pF
<b>Switching Characteristics</b>						
Turn–On Time	$t_{on}$	$V_{CC} = 1.5\text{V}, V_{BE} = 0, I_C = 10\text{mA}, I_{B1} = 1\text{mA}$	–	10	15	ns
Delay Time	$t_d$		–	5	10	ns
Rise Time	$t_r$		–	5	15	ns
Turn–Off Time	$t_{off}$	$V_{CC} = 1.5\text{V}, I_C = 10\text{mA}, I_{B1} = I_{B2} = 1\text{mA}$	–	16	20	ns
Storage Time	$t_s$		–	17	20	ns
Fall Time	$t_f$		–	8	10	ns
Storage Time	$t_s$	$I_C = 10\text{mA}, I_{B1} = 10\text{mA}, I_{B2} = 10\text{mA}$	–	–	20	ns

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

Note 2.  $f_T$  is defined as the frequency at which  $|h_{fe}|$  extrapolates to unity.

