

## NTE2313 Silicon NPN Transistor High Speed Switch

**Description:**

The NTE2313 is a high-voltage, high-speed, glass-passivated NPN power transistor in a TO220 type package designed for use in converters, inverters, switching regulators, motor control systems, and switching applications.

**Absolute Maximum Ratings:**

Collector–Emitter Voltage, $V_{CEO(sus)}$ .....	450V
Collector–Emitter Voltage, $V_{CES}$ .....	1000V
Emitter–Base Voltage, $V_{EBO}$ .....	5V
Collector Current, $I_C$	
Continuous .....	2A
Peak (Note 1) .....	3A
Base Current, $I_B$	
Continuous .....	0.75A
Peak (Note 1) .....	1A
Peak Reverse Base Current, $-I_{BM}$ .....	1A
Total Power Dissipation ( $T_C = +25^\circ\text{C}$ ), $P_{tot}$ .....	50W
Derate Above $25^\circ\text{C}$ .....	400mW/ $^\circ\text{C}$
Operating Junction Temperature Range, $T_J$ .....	$-65^\circ$ to $+150^\circ\text{C}$
Storage Temperature range, $T_{stg}$ .....	$-65^\circ$ to $+150^\circ\text{C}$
Thermal Resistance, Junction–to–Case, $R_{thJC}$ .....	2.5 $^\circ\text{C}/\text{W}$
Thermal Resistance, Junction–to–Ambient, $R_{thJA}$ .....	62.5 $^\circ\text{C}/\text{W}$
Lead Temperature (During Soldering, 1/8" from case, 5sec), $T_L$ .....	$+275^\circ\text{C}$

Note 1. 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> (Note 2)						
Collector–Emitter Sustaining Voltage	$V_{CEO(sus)}$	$I_C = 100\text{mA}$ , $L = 25\text{mH}$	450	–	–	V
Collector Cutoff Current	$I_{CES}$	$V_{CS} = 1000\text{V}$	–	–	0.2	mA
		$V_{CS} = 1000\text{V}$ , $T_C = +125^\circ\text{C}$	–	–	1.5	mA
Emitter Cutoff Current	$I_{EBO}$	$I_C = 0$ , $V_{EB} = 5\text{V}$	–	–	1	mA

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

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>ON Characteristics</b> (Note 2)						
DC Current Gain	$h_{FE}$	$I_C = 0.1\text{A}, V_{CE} = 5\text{V}$	30	50	–	
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 0.3\text{A}, I_B = 30\text{mA}$	–	–	0.8	V
		$I_C = 1\text{A}, I_B = 200\text{mA}$	–	–	1.0	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 1\text{A}, I_B = 0.2\text{A}$	–	–	1.1	V
<b>Dynamic Characteristics</b>						
Current–Gain Bandwidth Product	$f_T$	$I_C = 500\text{mA}, V_{CE} = 10\text{V}, f = 1\text{MHz}$	4	–	–	MHz
<b>Switching Characteristics</b>						
Turn–On Time	$t_{on}$	$V_{CC} = 250\text{V}, I_C = 1\text{A}, I_{B1} = 0.2\text{A}, I_{B2} = 0.4\text{A}$	–	0.3	0.5	$\mu\text{s}$
Storage Time	$t_s$		–	2.0	3.5	$\mu\text{s}$
Fall Time	$t_f$		–	0.3	–	$\mu\text{s}$

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

