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NTE2319 Silicon NPN Transistor High Voltage, High Speed Power Switch

Description:

The NTE2319 is a silicon NPN transistor in a TO3 type package designed for high voltage, high speed, power switching in inductive circuits where fall time is critical. It is particularly suited for line-operated switchmode applications.

Features:

- Fast Turn-On Times @ $T_C = +100^\circ\text{C}$:
 Inductive Fall Time: 50ns Typ
 Inductive Crossover Time: 90ns Typ
 Inductive Storage Time: 800ns Typ
- 100°C Performance Specified for:
 Reverse-Biased SOA with Inductive Loads
 Switching Times with Inductive Loads
 Saturation Voltages
 Leakage Current

Applications:

- Switching Regulators
- Inverters
- Solenoids
- Relay Drivers
- Motor Controls
- Deflection Circuits

Absolute Maximum Ratings:

Collector-Emitter Voltage, V_{CEO}	450V
Collector-Emitter Voltage, V_{CEV}	850V
Emitter-Base Voltage, V_{EB}	6V
Collector Current, I_C	
Continuous	15A
Peak (Note 1)	20A
Base Current, I_B	
Continuous	10A
Peak (Note 1)	15A
Total Device Dissipation, P_D	
$T_C = +25^\circ\text{C}$	175W
$T_C = +100^\circ\text{C}$	100W
Derate Above 25°C	1W/ $^\circ\text{C}$
Operating Junction Temperature Range, T_J	-65° to $+200^\circ\text{C}$
Storage Temperature Range, T_{stg}	-65° to $+200^\circ\text{C}$
Thermal Resistance, Junction-to-Case, R_{thJC}	1 $^\circ\text{C}/\text{W}$
Lead Temperature (During Soldering, 1/8" from case, 5sec), T_L	$+275^\circ\text{C}$

Note 1. Pulse Test: Pulse Width $\leq 5\mu\text{s}$, Duty Cycle $\geq 10\%$.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
OFF Characteristics							
Collector–Emitter Sustaining Voltage	$V_{CEO(sus)}$	Table 2, $I_C = 100\text{mA}$, $I_B = 0$	450	–	–	V	
Collector Cutoff Current	I_{CEV}	$V_{CEV} = 850\text{V}$, $V_{BE(off)} = 1.5\text{V}$	$T_C = +25^\circ\text{C}$	–	–	0.25	mA
			$T_C = +100^\circ\text{C}$	–	–	1.5	mA
	I_{CER}	$V_{CE} = 850\text{V}$, $R_{BE} = 50\Omega$, $T_C = +100^\circ\text{C}$	–	–	2.5	mA	
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 6\text{V}$, $I_C = 0$	–	–	1.0	mA	
ON Characteristics (Note 2)							
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 5\text{A}$, $I_B = 700\text{mA}$	$T_C = +25^\circ\text{C}$	–	–	2.5	V
			$T_C = +100^\circ\text{C}$	–	–	3.0	V
		$I_C = 10\text{A}$, $I_B = 1.3\text{A}$	$T_C = +25^\circ\text{C}$	–	–	3.0	V
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	$I_C = 10\text{A}$, $I_B = 1.3\text{A}$	$T_C = +25^\circ\text{C}$	–	–	1.5	V
			$T_C = +100^\circ\text{C}$	–	–	1.5	V
DC Current Gain	h_{FE}	$I_C = 15\text{A}$, $V_{CE} = 5\text{V}$	5	–	–		
Dynamic Characteristics							
Output Capacitance	C_{ob}	$V_{CB} = 10\text{V}$, $I_E = 0$, $f_{test} = 1\text{kHz}$	–	–	400	pF	
Switching Characteristics							
Resistive Load (Table 1)							
Delay Time	t_d	$I_C = 10\text{A}$, $V_{CC} = 250\text{V}$, $I_{B1} = 1.3\text{A}$, $PW = 30\mu\text{s}$, Duty Cycle $\leq 2\%$	$I_{B2} = 2.6\text{A}$, $R_B = 1.6\Omega$	–	20	–	ns
Rise Time	t_r			–	200	–	ns
Storage Time	t_s			–	1200	–	ns
Fall Time	t_f			–	200	–	ns
Storage Time	t_s			$V_{BE(off)} = 5\text{V}$	–	650	–
Fall Time	t_f		–		80	–	ns
Inductive Load (Table 2)							
Storage Time	t_{sv}	$I_C = 10\text{A}$, $I_{B1} = 1.3\text{A}$, $V_{BE(off)} = 5\text{V}$, $V_{CE(pk)} = 400\text{V}$	$T_C = +100^\circ\text{C}$	–	800	1800	ns
Fall Time	t_{fi}			–	50	200	ns
Crossover Time	t_c			–	90	250	ns
Storage Time	t_{sv}		$T_C = +150^\circ\text{C}$	–	1050	–	ns
Fall Time	t_{fi}			–	70	–	ns
Crossover Time	t_c			–	120	–	ns

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

