

NTE52 Silicon NPN Transistor High Voltage, High Speed Switch

Description:

The NTE52 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. This device is particularly suited for line-operated switch-mode applications.

Applications:

- Switching Regulators
- Motor Controls
- Inverters
- Solenoid and Relay Drivers

Features:

- Fast Turn-Off Times:
 - 100ns Inductive Fall Time @ +25°C (Typ)
 - 150ns Inductive Crossover Time @ +25°C (Typ)
 - 400ns Inductive Storage Time @ +25°C (Typ)
- Operating Temperature Range: -65° to +200°C

Absolute Maximum Ratings:

Collector-Emitter Voltage, $V_{CEO(sus)}$	450V
Collector-Emitter Voltage, V_{CEV}	750V
Emitter-Base Voltage, V_{EB}	6V
Collector Current, I_C	
Continuous	5A
Peak (Note 1)	8A
Base Current, I_B	
Continuous	2A
Peak (Note 1)	4A
Total Device Dissipation ($T_C = +25^\circ\text{C}$), P_D	125W
Derate Above 25°C	0.714W/°C
Total Device Dissipation ($T_C = +100^\circ\text{C}$), P_D	71.5W
Operating Junction Temperature Range, T_J	-65° to +200°C
Storage Temperature Range, T_{stg}	-65° to +200°C
Thermal Resistance, Junction-to-Case, R_{thJC}	1.4°C/W
Maximum Lead temperature (During Soldering, 1/8" from case, 5sec), T_L	+275°C

Note 1. Pulse test: Pulse Width = 5ms, Duty Cycle ≤ 10%.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
OFF Characteristics (Note 2)						
Collector–Emitter Sustaining Voltage	V _{CEO(sus)}	I _C = 100mA, I _B = 0	450	–	–	V
Collector Cutoff Current	I _{CEV}	V _{CEV} = 750V, V _{BE(off)} = 1.5V	–	–	0.5	mA
		V _{CEV} = 750V, V _{BE(off)} = 1.5V, T _C = +100°C	–	–	2.5	mA
	I _{CER}	V _{CEV} = 750V, R _{BE} = 50Ω, T _C = +100°C	–	–	3.0	mA
Emitter Cutoff Current	I _{EBO}	V _{EB} = 6V, I _C = 0	–	–	1.0	mA
ON Characteristics (Note 2)						
DC Current Gain	h _{FE}	V _{CE} = 5V, I _C = 3A	8	–	–	
Collector–Emitter Saturation Voltage	V _{CE(sat)}	I _C = 3A, I _B = 0.6A	–	–	1.0	V
		I _C = 3A, I _B = 0.6A, T _C = +100°C	–	–	2.0	V
		I _C = 5A, I _B = 1A	–	–	3.0	V
Base–Emitter Saturation Voltage	V _{BE(sat)}	I _C = 3A, I _B = 0.6A	–	–	1.5	V
		I _C = 3A, I _B = 0.6A, T _C = +100°C	–	–	1.5	V
Dynamic Characteristics						
Output Capacitance	C _{ob}	V _{CB} = 10V, I _E = 0, f = 1kHz	–	–	250	pF
Switching Characteristics (Resistive Load)						
Delay Time	t _d	V _{CC} = 250V, I _C = 3A, I _{B1} = 0.4A, V _{BE(off)} = 5V, t _p = 300μs, Duty Cycle ≤ 2%	–	0.03	0.05	μs
Rise Time	t _r		–	0.10	1.40	μs
Storage Time	t _s		–	0.40	0.50	μs
Fall Time	t _f		–	0.175	0.500	μs
Switching Characteristics (Inductive Load, Clamped)						
Storage Time	t _{sv}	I _C = 3A peak, V _{clamp} = 250V, I _{B1} = 0.4A, V _{BE(off)} = 5V	–	0.40	–	μs
Crossover Time	t _c		–	0.15	–	μs
Fall Time	t _{fi}		–	0.10	–	μs
Storage Time	t _{sv}	I _C = 3A peak, V _{clamp} = 250V, I _{B1} = 0.4A, V _{BE(off)} = 5V, T _J = +100°C	–	0.70	2.0	μs
Crossover Time	t _c		–	0.28	0.50	μs
Fall Time	t _{fi}		–	0.15	0.30	μs

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

