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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 appliations.

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:

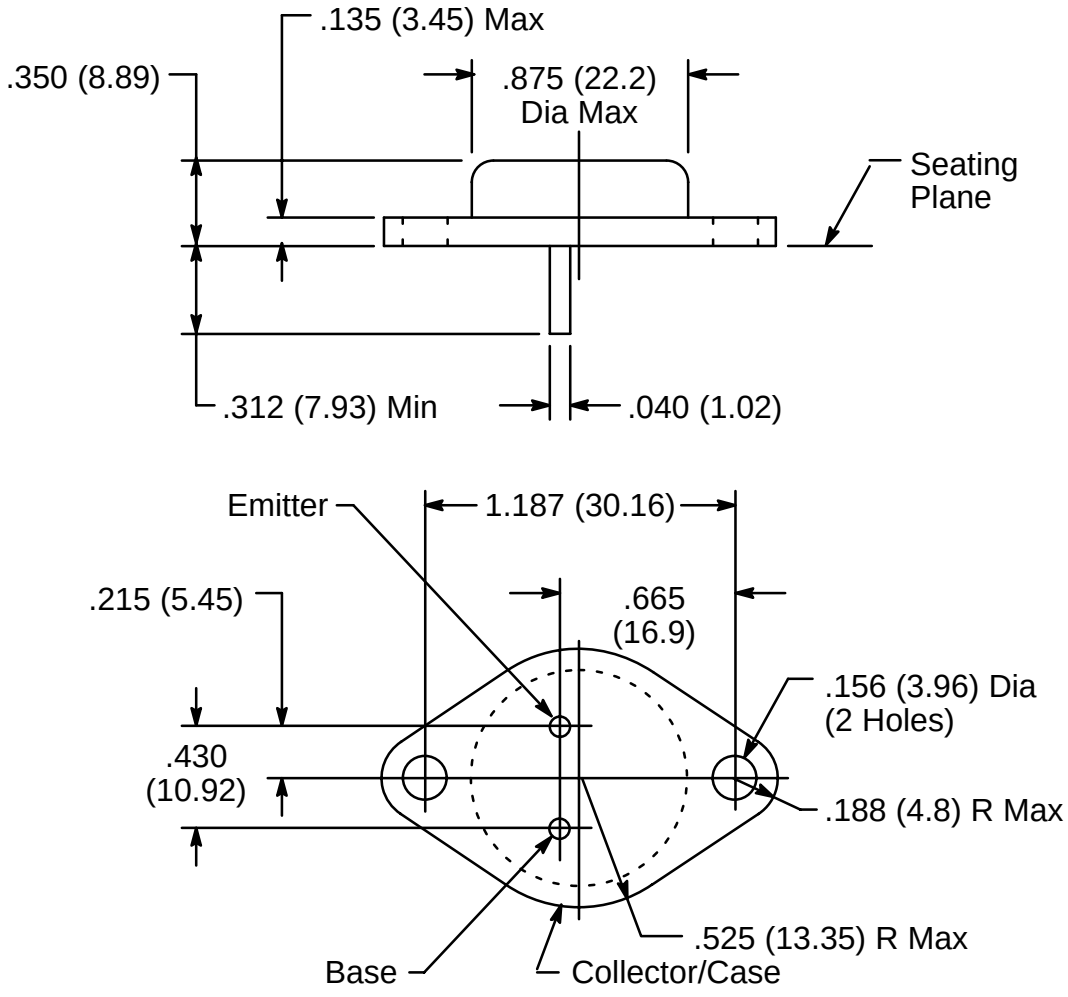
Collector–Emitter Voltage, $V_{CEO(sus)}$ 450V
Collector–Emitter Voltage, V_{CEV} 750V
Emitter–Base Voltage, V_{EB} 6V
Collector Current, I_C
  Continuous 5A
  Peak (Note 1) 8A
Base Current, I_B
  Continuous 2A
  Peak (Note 1) 4A
Total Device Dissipation (T_C = +25°C), P_D 125W
  Derate Above 25°C . . . . . 0.714W/°C
Total Device Dissipation (T_C = +100°C), P_D 71.5W
Operating Junction Temperatur Range, T_J . . . . . –65° to +200°C
Storage Temperatur 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 Charactetristics: (T_C = +25°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 = 300µs, Duty Cycle ≤ 2%.


.135 (3.45) Max
.350 (8.89)
.875 (22.2)
Dia Max
Seating
Plane
.312 (7.93) Min
.040 (1.02)
Emitter
1.187 (30.16)
.215 (5.45)
.665
(16.9)
.156 (3.96) Dia
(2 Holes)
.430
(10.92)
.188 (4.8) R Max
.525 (13.35) R Max
Base
Collector/Case