ELECTRONICS, INC.
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NTE2638
Silicon NPN Transistor
Darlington
TO220 Type Package

Features:

- High Voltage, High Forward and Clamped Reverse Energy
- 10A Peak Collector Current
- 80W at +25°C Case Temperature
- Collector–Emitter Sustaining Voltage: 400V Min at 7A

Absolute Maximum Ratings: (T_C = +25°C unless otherwise specified)

Collector–Emitter Voltage (I_B = 0), V_{CEO} 400V
Collector–Base Voltage, V_{CBO} 400V
Emitter–Base Voltage, V_{EBO} 8V
Collector Current, I_C
  Continuous 7A
  Peak (Note 1) 10A
Continuous Base Current, I_B 1.5A
Continuous Device Dissipation (T_C = +25°C), P_D 80W
  Derate Linearly to 150°C . . . . . 0.64W/°C
Continuous Device Dissipation (T_A = +25°C), P_D 2W
  Derate Linearly to 150°C . . . . . 16mW/°C
Operating Junction Temperature Range, T_J . . . . . –65° to +150°C
Storage Temperature Range, T_{stg} . . . . . –65° to +150°C
Thermal Resistance, Junction–to–Case, R_{thJC} . . . . . 1.56°C/W
Thermal Resistance, Junction–to–Ambient, R_{thJA} . . . . . 62.5°C/W
Typical Thermal Resistance, Case–to–Heat Sink (Note 2), R_{thCHS} . . . . . 0.7°C/W
Lead Temperature (During Soldering, 1/8” from case, 10sec), T_L . . . . . +260°C

Note 1. This value applies for $t_w \leq 5$ms, duty cycle ≤ 10%.

Note 2. This parameter is measured using 0.003” (0.08mm) mica insulator with Dow–Corning 11 compound on both sides of the insulator, a 0.138–32 (formally 6–32) mounting screw with bushing, and a mounting torque of 8 in•lb (0.9 n•m).

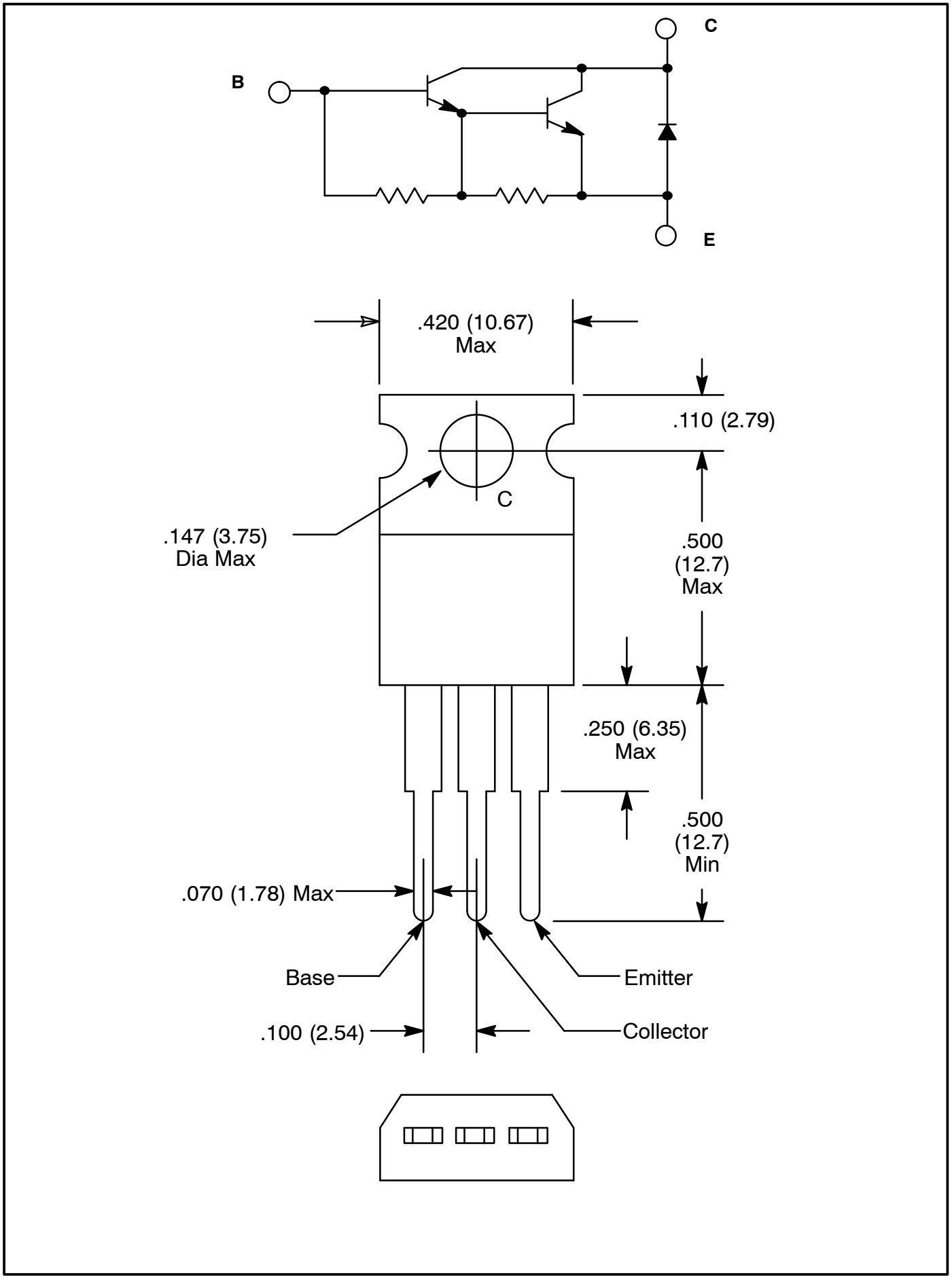
Electrical Characteristics: (T_C = +25°C unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector−Base Breakdown Voltage	$V_{(BR)CBO}$	I_C = 1mA, I_E = 0, Note 3	400	–	–	V
Collector−Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C = 10mA, I_B = 0, Note 3	400	–	–	V
Collector−Emitter Sustaining Voltage	$V_{CEX(sus)}$	I_C = 7A	400	–	–	V
Collector Cutoff Current	I_{CEO}	V_{CE} = 400V, I_B = 0	–	–	250	μA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 8V, I_C = 0	–	–	15	mA
DC Current Gain	h_{FE}	I_C = 2.5A, V_{CE} = 5V, Note 3, Note 4	150	–	–	
		I_C = 5A, V_{CE} = 5V, Note 3, Note 4	50	–	–	
		I_C = 7A, V_{CE} = 5V, Note 3, Note 4	15	–	–	
Base−Emitter Voltage	V_{BE}	I_B = 100mA, I_C = 2A, Note 3, Note 4	–	–	2.2	V
		I_B = 250mA, I_C = 5A, Note 3, Note 4	–	–	2.3	V
Collector−Emitter Saturation Voltage	$V_{CE(sat)}$	I_B = 10mA, I_C = 1A, Note 3, Note 4	–	–	1.5	V
		I_B = 100mA, I_C = 2A, Note 3, Note 4	–	–	1.5	V
		I_B = 250mA, I_C = 5A, Note 3, Note 4	–	–	2.0	V
Diode Forward Voltage	V_F	I_F = 7A, Note 3, Note 4	–	–	3.5	V
Small−Signal Current Gain	h_{fe}	V_{CE} = 5V, I_C = 500mA, f = 1kHz	200	–	–	
Small−Signal Forward Current Transfer Ratio	$\|h_{fe}\|$	V_{CE} = 5V, I_C = 500mA, f = 1kHz	10	–	–	
Collector Capacitance	C_{obo}	I_E = 0, V_{CB} = 10V, f = 1MHz	–	–	100	pF
Resistive−Load Switching Characteristics (T_C = +25°C unless otherwise specified)						
Turn−Off Storage Time	t_s	I_C = 5A, I_{B1} = 250mA, I_{B2} = −250mA, $V_{BE(off)}$ = −7.3V, R_L = 50Ω, Note 5	–	3400	–	ns
Turn−Off Fall Time	t_f		–	1520	–	ns
Turn−Off Rise Time	t_r		–	160	–	ns
Turn−On Delay Time	t_d		–	20	–	ns
Inductive−Load Switching Characteristics (T_C = +25°C unless otherwise specified)						
Voltage Storage Time	t_{sv}	$V_{(clamp)}$ = Min $V_{CEX(sus)}$, I_{CM} = 5A, I_{B1} = 250mA, I_{B2} = −250mA, Note 5	–	3900	–	ns
Current Storage Time	t_{si}		–	4700	–	ns
Voltage Rise Time	t_{rv}		–	1200	–	ns
Storage Rise Time	t_{ri}		–	1200	–	ns
Turn−Off Crossover Time	t_{xo}		–	2000	–	ns

Note 3. These parameters must be measured using pulse techniques, t_w = 300μs, duty cycle ≤ 2%.

Note 4. These parameters are measured with voltage−sensing contacts separate from the current−carrying contacts located within 1/8” (3.2mm) from the device body.

Note 5. Voltage and current values shown are nominal; exact values vary slightly with transistor parameters.


C
B
E
.420 (10.67)
Max
.110 (2.79)
C
.147 (3.75)
Dia Max
.500
(12.7)
Max
.250 (6.35)
Max
.500
(12.7)
Min
.070 (1.78) Max
Base
Emitter
.100 (2.54)
Collector

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