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NTE256
Silicon NPN Transistor
Darlington w/Damper Diode

Description:
The NTE256 is a silicon epitaxial planer NPN Darlington transistor in a TO218 type package with an integrated Base–Emitter speed–up diode. This device is particularly suitable for use as an output stage in high power, fast switching applications.

Absolute Maximum Ratings:
Collector–Base Voltagte (I_E = 0), V_{CBO} 600V
Collector–Emitter Voltage (I_B = 0), V_{CEO} 400V
Emitter–Base Voltage (I_C = 0), V_{EBO} 10V
Collector Current, I_C
Continuous 28A
Peak (t_p = 10ms) 35A
Base Current, I_B 6A
Total Power Dissipation ($T_C \le +25°C$), P_{tot} 150W
Operating Junction Temperature, T_J . . . . . +175°C
Storage Temperature Range, T_{stg} . . . . . –65° to + 175°C
Thermal Resistance, Junction–to–Case, R_{thJC} . . . . . 1.0°C/W

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Collector Cutoff Current	I_{CEO}	V_{CEO} = 400V, I_B = 0	–	–	1	mA
	I_{CEV}	V_{CE} = 600V, V_{BE} = 1.5V, Note 1	–	–	100	µA
		V_{CE} = 600V, V_{BE} = 1.5V, T_C = +100°C, Note 1	–	–	2	mA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 2V, I_C = 0, Note 1	–	–	175	mA
Collector–Emitter Sustaining Voltage	$V_{CEO(sus)}$	I_C = 100mA, Note 1	400	–	–	V
Collector–Emitter Saturation Voltage	$V_{CE(sat)}$	I_C = 10A, I_B = 0.5A	–	–	2.0	V
		I_C = 18A, I_B = 1.8A	–	–	2.5	V
		I_C = 22A, I_B = 2.2A	–	–	3.0	V
		I_C = 28A, I_B = 5.6A	–	–	5.0	V

Note 1. Pulsed: Pulse Width = 300µs, Duty Cycle = 1.5%.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Base–Emitter Saturation Voltage	$V_{BE(sat)}$	I_C = 10A, I_B = 0.5A, Note 1	–	–	2.5	V
		I_C = 18A, I_B = 1.8A, Note 1	–	–	3.0	V
		I_C = 22A, I_B = 2.2A, Note 1	–	–	3.3	V
DC Current Gain	h_{FE}	V_{CE} = 5V, I_C = 10A	30	–	–	
		V_{CE} = 5V, I_C = 18A	20	–	–	
Diode Forward Voltage	V_F	I_F = 22A	–	–	4	V
Resistive Switching Times						
Turn–On Time	t_{on}	V_{CC} = 250V, I_C = 10A, I_{B1} = 0.5A, $V_{BE(off)}$ = –5V	–	0.35	0.6	µs
Storage Time	t_s		–	0.8	1.5	µs
Fall Time	t_f		–	0.25	0.6	µs
Inductive Switching Times						
Storage Time	t_s	V_{Clamp} = 250V, I_C = 10A, I_{B1} = 0.5A, $V_{BE(off)}$ = –5V	–	0.8	1.5	µs
Fall Time	t_f		–	0.08	0.5	µs
Storage Time	t_s	V_{Clamp} = 250V, I_C = 20A, I_{B1} = 2A, $V_{BE(off)}$ = –5V	–	0.8	1.5	µs
Fall Time	t_f		–	0.35	0.7	µs

Note 1. Pulsed: Pulse Width = 300µs, Duty Cycle = 1.5%.