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NTE5728 Powerblock Module

Description:

The NTE5728 uses high voltage power thyristors/diodes and is electrically isolated from the metal base, allowing common heatsinks and compact assemblies to be built. This device is intended for general purpose applications such as battery chargers, welders and plating equipment and where high voltage and high current are required.

Features:

- High Voltage
- Electrically Isolated Base Plate
- 3000V_{RMS} Isolating Voltage
- High Surge Capability
- Large Creepage Distances

Ratings and Characteristics:

Average Forward Current ($T_C = +85^\circ\text{C}$, 180° Conduction, Half Sine Wave), $I_{F(AV)}$	250A
Maximum RMS On-State Current (As AC Switch), $I_{T(RMS)}$	555A
Maximum Repetitive Peak Reverse and Off-State Blocking Voltage, V_{RRM} , V_{DRM}	1600V
Maximum Non-Repetitive Peak Reverse Voltage, V_{RSM}	1700V
Maximum Peak Reverse and Off-State Leakage Current ($T_J = +130^\circ\text{C}$), I_{RRM} , I_{DRM}	50mA
RMS Isolation Voltage (50Hz, Circuit to Base, All Terminals Shorted, $t = 1\text{s}$), V_{ISO}	3000V
Critical Rate of Rise of Off-State Voltage ($T_J = +130^\circ\text{C}$), dv/dt	
(Linear to 80% Rated V_{DRM})	500V/ μs
(Linear to 67% Rated V_{DRM})	1000V/ μs
Operating Junction Temperature Range, T_J	-40° to $+130^\circ\text{C}$
Storage Temperature Range, T_{stg}	-40° to $+150^\circ\text{C}$
Thermal Resistance, Junction-to-Case (Per Junction, DC Operation), R_{thJC}	0.125°C/W
Thermal Resistance, Case-to-Sink (Per Module, Note 1), R_{thCS}	0.02°C/W

Note 1. Mounting surface flat, smooth and greased.

Electrical Specifications:

Parameter	Symbol	Test Conditions		Rating	Unit
Maximum Peak One-Cycle Non-Repetitive Surge Current	I_{FSM}	$t = 10ms$	Sinusoidal Half Wave, 100% V_{RRM} Reapplied, Initial $T_J = +130^\circ C$	7150	A
		$t = 8.3ms$		7500	A
		$t = 10ms$	Sinusoidal Half Wave, No Voltage Reapplied, Initial $T_J = +130^\circ C$	8500	A
		$t = 8.3ms$		8900	A
Maximum I^2t for Fusing	I^2t	$t = 10ms$	Sinusoidal Half Wave, 100% V_{RRM} Reapplied, Initial $T_J = +130^\circ C$	255	A^2s
		$t = 8.3ms$		233	A^2s
		$t = 10ms$	Sinusoidal Half Wave, No Voltage Reapplied, Initial $T_J = +130^\circ C$	361	A^2s
		$t = 8.3ms$		330	A^2s
Maximum $I^2\sqrt{t}$	$I^2\sqrt{t}$	$t = 0.1$ to $10ms$, no voltage reapplied		3610	$A^2\sqrt{t}$
Threshold Voltage, Low level	$V_{T(TO)1}$	$T_J = +130^\circ C, (16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$		0.97	V
Threshold Voltage, High level	$V_{T(TO)2}$	$T_J = +130^\circ C, (\pi \times I_{T(AV)} < I < 20 \times \pi \times I_{T(AV)})$		1.00	V
On-State Slope Resistance, Low Level	r_{t1}	$T_J = +130^\circ C, (16.7\% \times \pi \times I_{T(AV)} < I < \pi \times I_{T(AV)})$		0.60	$m\Omega$
On-State Slope Resistance, High Level	r_{t2}	$T_J = +130^\circ C, (\pi \times I_{T(AV)} < I < 20 \times \pi \times I_{T(AV)})$		0.57	$m\Omega$
Maximum On-State Voltage Drop	V_{TM}	$T_J = +130^\circ C, I_{TM} = \pi \times I_{T(AV)}, 180^\circ$ Condition, Av. Power = $V_{T(TO)} \times I_{T(AV)} + r_t \times (I_{T(RMS)})^2$		1.44	V
Maximum Holding Current	I_H	Anode Supply = 12V, Initial $I_T = 30A, T_J = +25^\circ C$		500	mA
Maximum Latching Current	I_L	Anode Supply = 12V, Resistive Load = 1 Ω , Gat Pulse: 10V, 100 $\mu s, T_J = +25^\circ C$		1000	mA
Maximum Peak Gate Power	P_{GM}	$T_J = +130^\circ C, t_p \leq 5ms$		10	W
Maximum Average Gate Power	$P_{G(AV)}$	$T_J = +130^\circ C, f = 50Hz$		2.0	W
Maximum Peak Gate Current	$+I_{GM}$	$T_J = +130^\circ C, t_p \leq 5ms$		3.0	A
Maximum Peak Negative Gate Voltage	$-V_{GT}$	$T_J = +130^\circ C, t_p \leq 5ms$		5.0	V
Maximum Required DC Gate Trigger Voltage to Trigger	V_{GT}	$T_J = -40^\circ C$	Anode Supply = 12V, Resistive Load: $R_A = 1\Omega$	4.0	V
		$T_J = +25^\circ C$		3.0	V
		$T_J = +130^\circ C$		2.0	V
Maximum Required DC Gate Trigger Current to Trigger	I_{GT}	$T_J = -40^\circ C$	Anode Supply = 12V, Resistive Load: $R_A = 1\Omega$	350	mA
		$T_J = +25^\circ C$		200	mA
		$T_J = +130^\circ C$		100	mA
Maximum Gate Voltage that will not Trigger	V_{GD}	$T_J = +130^\circ C, \text{Rated } V_{DRM} \text{ Applied}$		0.25	V
Maximum Gate Current that will not Trigger	I_{GD}	$T_J = +130^\circ C, \text{Rated } V_{DRM} \text{ Applied}$		10	mA
Maximum Rate of Rise of Turned-On Current	di/dt	$T_J = +130^\circ C, I_{TM} = 400A, \text{Rated } V_{DRM} \text{ Applied}$		500	$A/\mu s$
Typical Delay Time	t_d	$T_J = +25^\circ C, \text{Gate Current} = 1A, di_G/dt = 1A/\mu s, V_D = 0.67\% V_{DRM}$		1.0	μs
Typical Rise Time	t_r			2.0	μs
Typical Turn-Off Time	t_q	$T_J = +25^\circ C, I_{TM} = 300A, -di/dt = 15A/\mu s, V_R = 50V, dV/dt = 20V/\mu s, \text{Gate } 0V, 100\Omega$		50-150	μs

