MT3275

N-Channel Power MOSFET

75V, 190A, 3.0mΩ

MT Semiconductor®

http://www.mtsemi.com

Features

- Max $R_{DS(on)}$ = 3.0mΩ at V_{GS} = 10V, I_D = 75A
- Fast Switching Speed
- Low Gate Charge
- High Performance Trench Technology for Extr emely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- RoHS Compliant

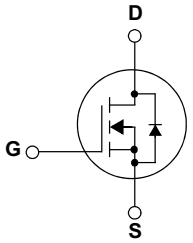
General Description

This N-Channel MOSFET is produced using MOS-TECH Semiconductor's advanced PowerTrench process that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

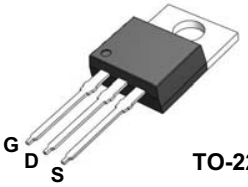
Applications

- DC-DC primary bridge
- DC-DC Synchronous rectification
- Hot swap

Simplified Schematic



MARKING DIAGRAM & PIN ASSIGNMENT



TO-220

MOSFET Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter			Ratings	Units
V_{DSS}	Drain to Source Voltage			75	V
V_{GSS}	Gate to Source Voltage			±25	V
I_D	Drain Curren	- Continuous (Silicon Limited)	T_C = 25°C	190	A
		- Continuous(Package Limited)	T_C = 25°C	120	
		- Continuous	T_C = 25°C(Note 1a)	75	
		- Pulsed		730	A
E_{AS}	Single Pulsed Avalanche Energy		(Note 3)	1300	mJ
P_D	Power Dissipation	- T_C = 25°C	(Note 1a)	298	W
		- T_A = 25°C	(Note 1b)	2.4	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range			-55 to +175	°C

Thermal Characteristics

Symbol	Parameter		Ratings	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	(Note 1)	0.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	62.5	

Package Marking and Ordering Information

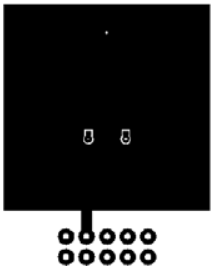
Device Marking	Device	Package	Reel Size	Tape Width	Quantity
MT3275	MT3275	TO-220	-	-	50

Electrical Characteristics T_C = 25°C unless otherwise noted

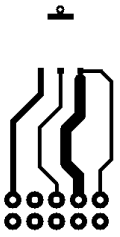
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V, T_C = 25°C	75	-	-	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250μA, Referenced to 25°C	-	0.07	-	V/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 80V, V_{GS} = 0V	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	2.0	-	4.0	V
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10V, I_D = 75A	-	3.0	4.0	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 10V, I_D = 75A	-	167	-	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V f = 1MHz	-	17280	-	pF
C_{oss}	Output Capacitance		-	1055	-	pF
C_{rss}	Reverse Transfer Capacitance		-	631	-	pF
$Q_{g(tot)}$	Total Gate Charge at 10V	V_{DS} = 80V, I_D = 75A V_{GS} = 10V	-	89	-	nC
Q_{gs}	Gate to Source Gate Charge		-	27	-	nC
Q_{gs2}	Gate Charge Threshold to Plateau		-	8	-	nC
Q_{gd}	Gate to Drain “Miller” Charge		-	60	-	nC
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 50V, I_D = 75A V_{GS} = 10V, R_{GEN} = 4.7Ω	-	22	54	ns
t_r	Turn-On Rise Time		-	54	118	ns
$t_{d(off)}$	Turn-Off Delay Time		-	37	84	ns
t_f	Turn-Off Fall Time		-	11	32	ns
Drain-Source Diode Characteristics						
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_{SD} = 75A (Note 2)	-	-	1.25	V
t_{rr}	Reverse Recovery Time	V_{GS} = 0V, I_{SD} = 75A, V_{DD} = 80V dI_F/dt = 100A/μs	-	72	-	ns
Q_{rr}	Reverse Recovery Charge		-	129	-	nC

NOTES:

1. $R_{\theta JA}$ is determined with the device mounted on a 1 in^2 pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) 40 °C/W when mounted on a 1 in^2 pad of 2 oz copper

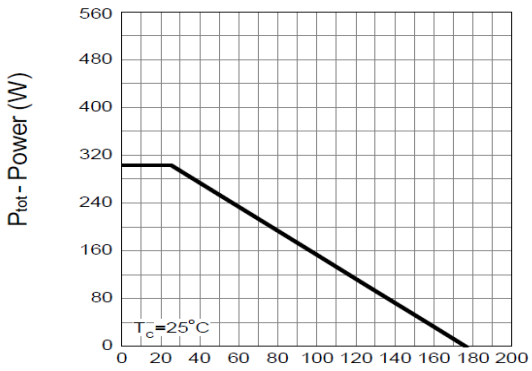


b) 62.5 °C/W when mounted on a minimum pad of 2 oz copper

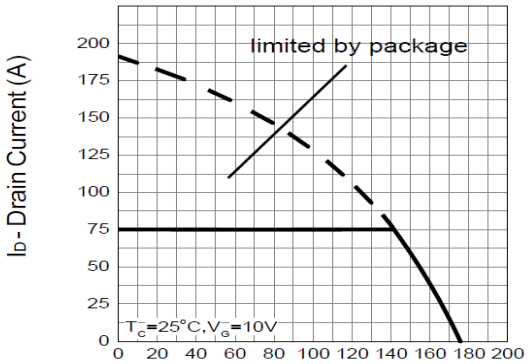
2. Pulse Test: Pulse Width < 300 μs, Duty cycle < 2.0 %.
3. Starting T_J = 25 °C, L = 1 mH, I_{AS} = 36.3 A, V_{DD} = 100 V, V_{GS} = 10 V.

Typical Operating Characteristics

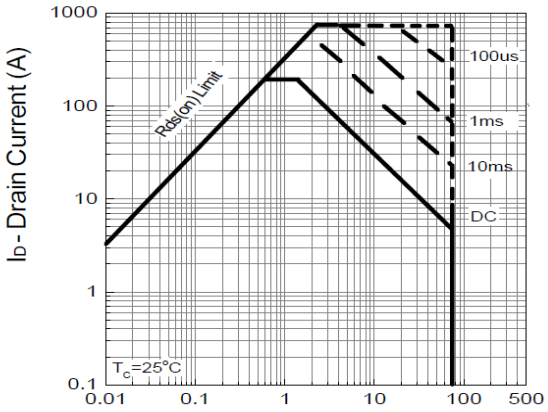
Power Dissipation



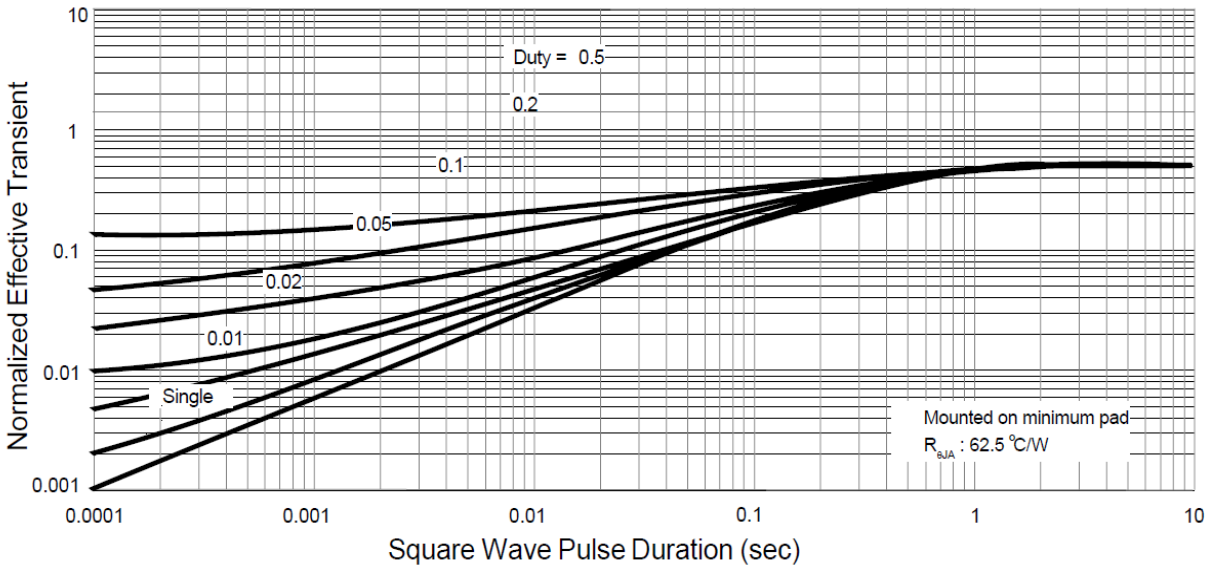
Drain Current



Safe Operation Area

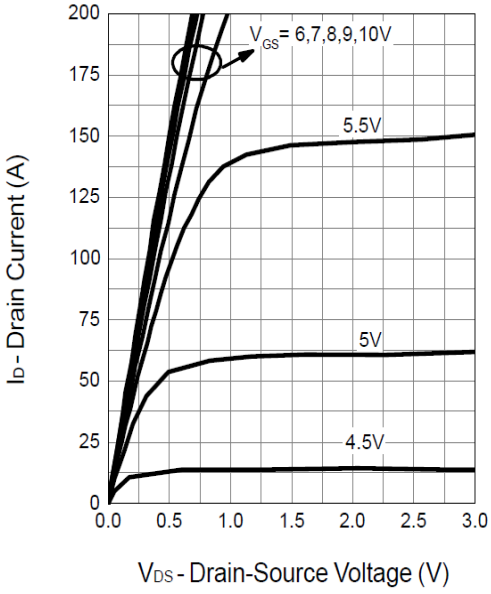


Thermal Transient Impedance

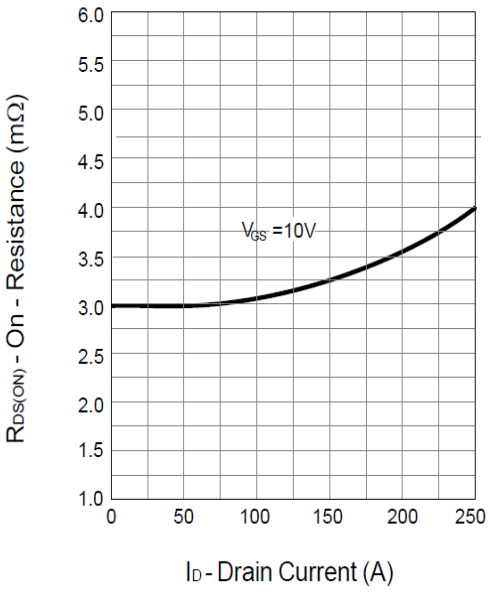


Typical Operating Characteristics (Cont.)

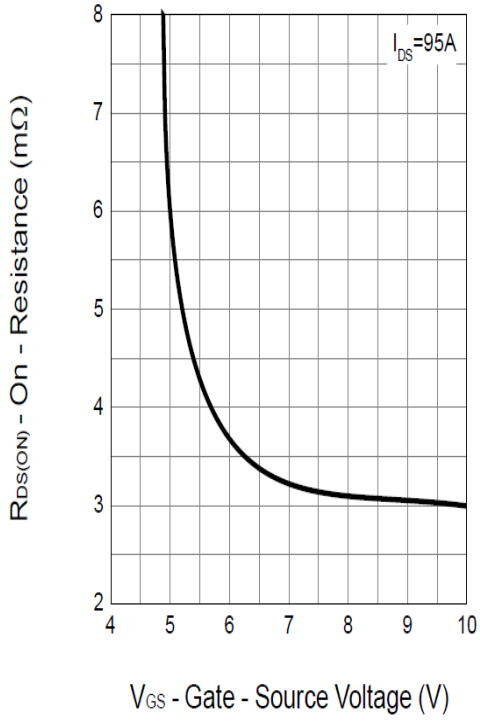
Output Characteristics



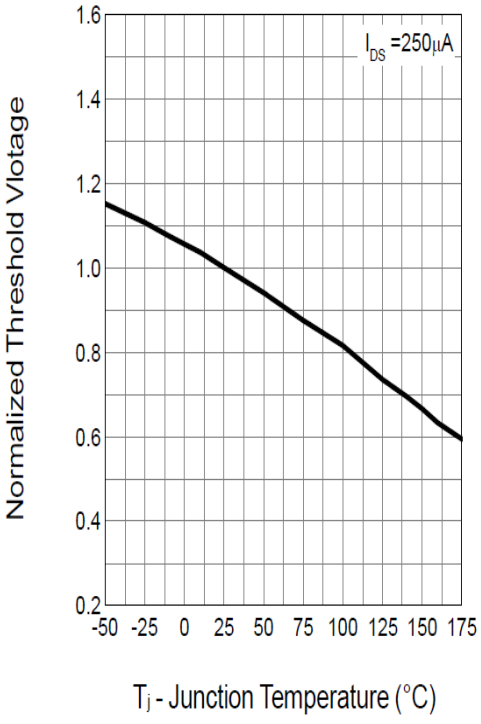
Drain-Source On Resistance



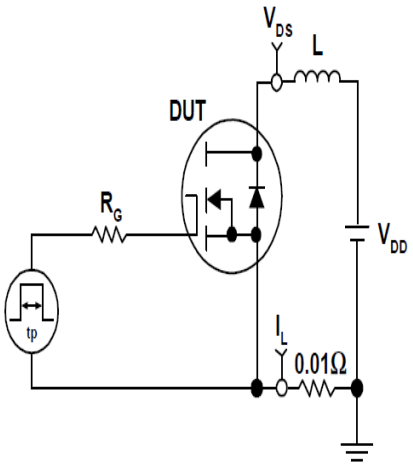
Drain-Source On Resistance

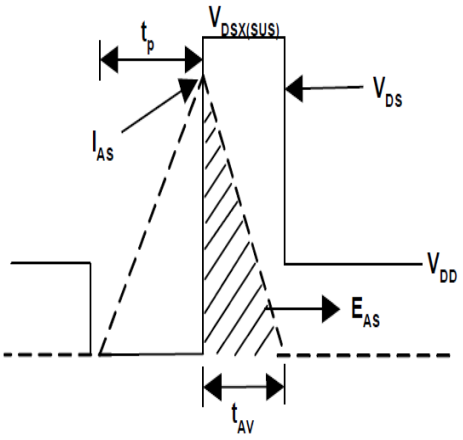


Gate Threshold Voltage

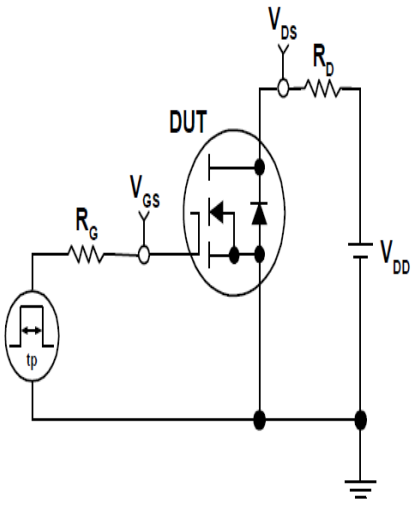


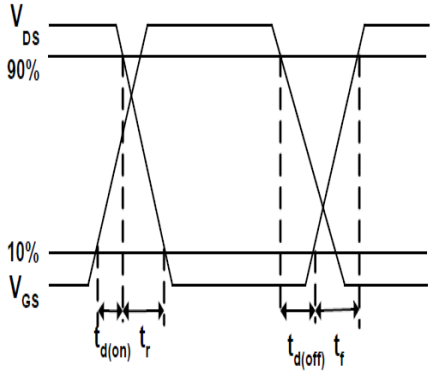
Avalanche Test Circuit and Waveforms



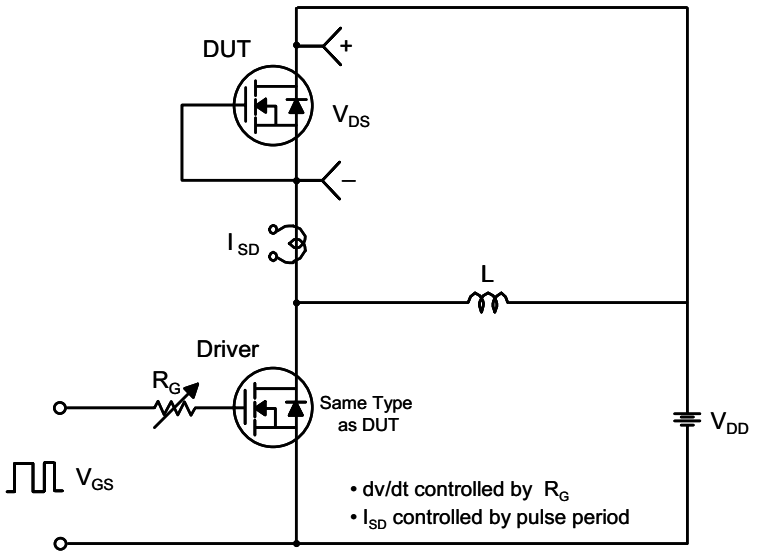


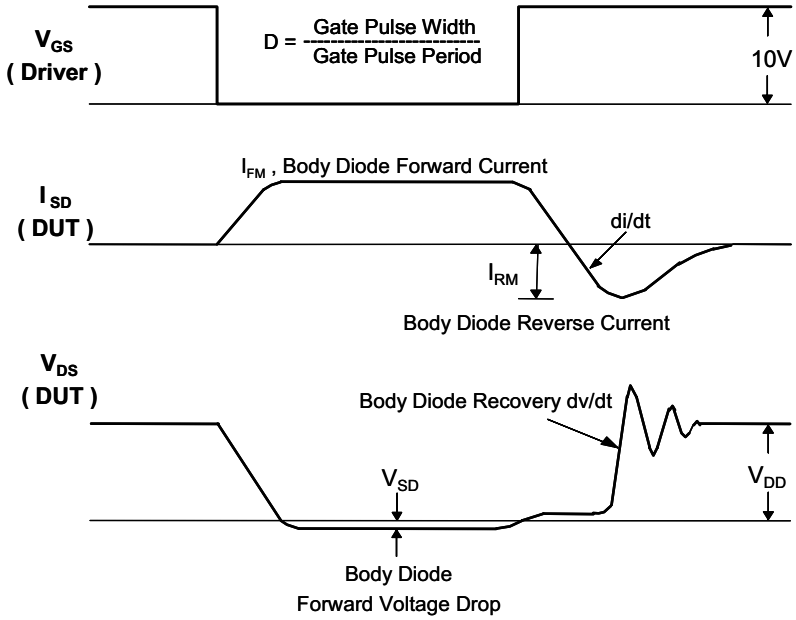
Avalanche Test Circuit and Waveforms





Peak Diode Recovery dv/dt Test Circuit & Waveforms





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