MT3238

N-Channel Power MOSFET

80V, 120A, 5.5mΩ

MT Semiconductor®

http://www.mtsemi.com

Features

- Max $R_{DS(on)}$ = 5.5mΩ at V_{GS} = 10V, I_D = 45A
- 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

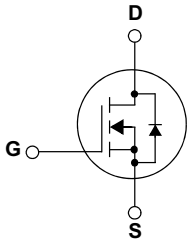
General Description

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.

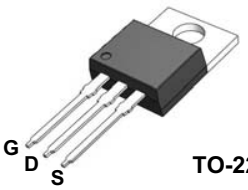
Applications

- 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		Rating	Unit
Common Ratings (T_C=25°C Unless Otherwise Noted)				
V_{DSS}	Drain-Source Voltage		80	V
V_{GSS}	Gate-Source Voltage		±25	
T_J	Maximum Junction Temperature		175	°C
T_{STG}	Storage Temperature Range		55 to 175	°C
I_S	Diode Continuous Forward Current	T_C=25°C	120	A
Mounted on Large Heat Sink				
I_{DM}		T_C=25°C	480**	A
I_D	Continuous Drain Current	T_C=25°C	120	A
		T_C=100°C	85	
P_D	Maximum Power Dissipation	T_C=25°C	226	W
		T_C=100°C	113	
$R_{\theta JC}$	Thermal Resistance-Junction to Case		0.66	°C/W
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient		62.5	
Avalanche Ratings				
E_{AS}	Avalanche Energy, Single Pulsed	L=0.5mH	630***	mJ

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
MT3238	MT3238	TO-220	-	-	50

Electrical Characteristics (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_{DS}=250μA	80		-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}= 80 V, V_{GS}=0V	-	-	1	μA
		T_J=85°C	-	-	10	
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_{DS}=250μA	2.0	3.0	4.0	V
I_{GSS}	Gate Leakage Current	V_{GS}=±25V, V_{DS}=0V	-	-	±100	nA
$R_{DS(ON)}$	Drain-Source On-state Resistance	V_{GS}=10V, I_{DS}=60A	-	5.5	7.0	mΩ
Diode Characteristics						
V_{SD}	Diode Forward Voltage	I_{SD}=60A, V_{GS}=0V	-	0.8	1	V
t_{rr}	Reverse Recovery Time	I_{SD}=60A, dI_{SD}/dt=100A/μs	-	46	-	ns
Q_{rr}	Reverse Recovery Charge		-	98	-	nC

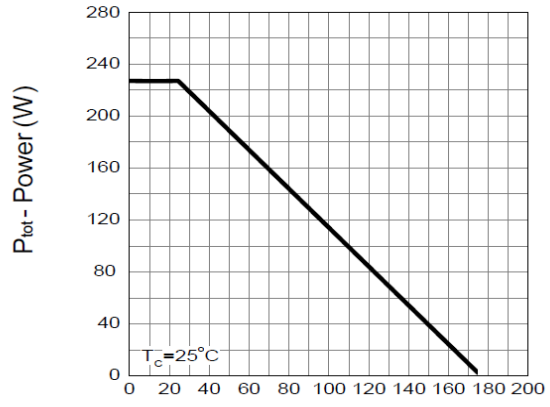
Electrical Characteristics (Cont.) (T_C = 25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	0.6	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, Frequency=1.0MHz	-	3680	-	pF
C_{oss}	Output Capacitance		-	552	-	
C_{rss}	Reverse Transfer Capacitance		-	192	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=40V, R_G= 6 Ω, I_{DS} =60A, V_{GS}=10V,	-	23	-	ns
T_r	Turn-on Rise Time		-	35	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	77	-	
T_f	Turn-off Fall Time		-	44	-	
Gate Charge Characteristics						
Q_g	Total Gate Charge	V_{DS}=64V, V_{GS}=10V, I_{DS}=60A	-	87.9	-	nC
Q_{gs}	Gate-Source Charge		-	15	-	
Q_{gd}	Gate-Drain Charge		-	30	-	

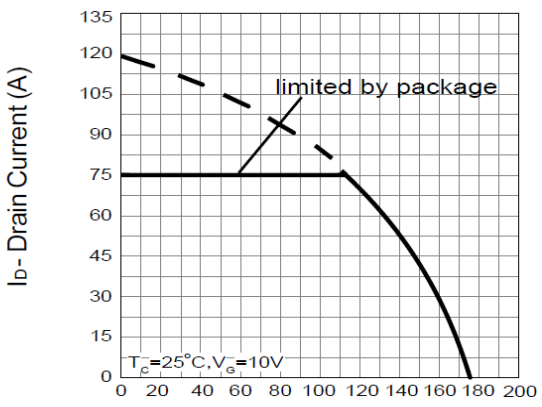
Note * : Pulse test ; pulse width ≤300μs, duty cycle≤2%.

Typical Operating Characteristics

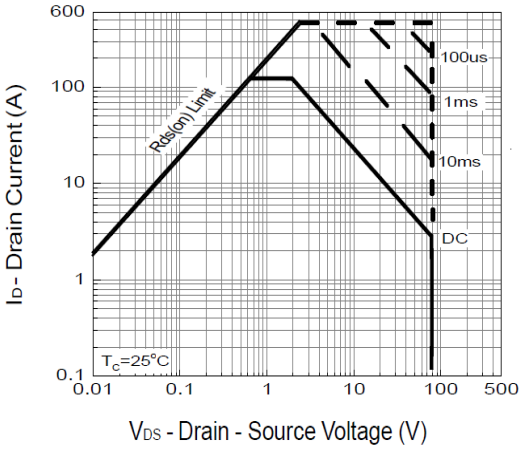
Power Dissipation



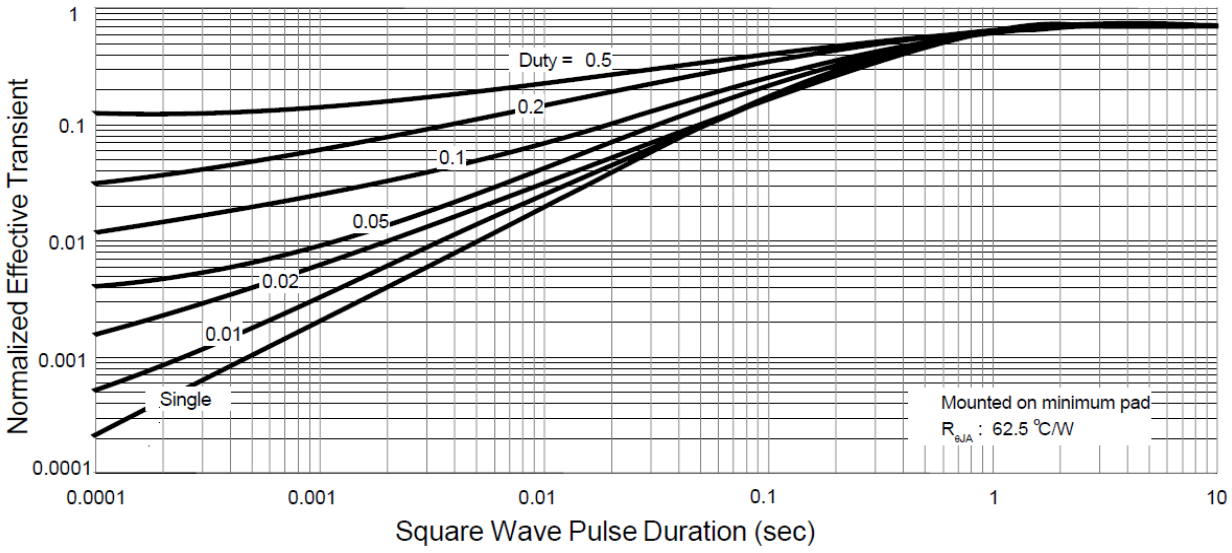
Drain Current



Safe Operation Area

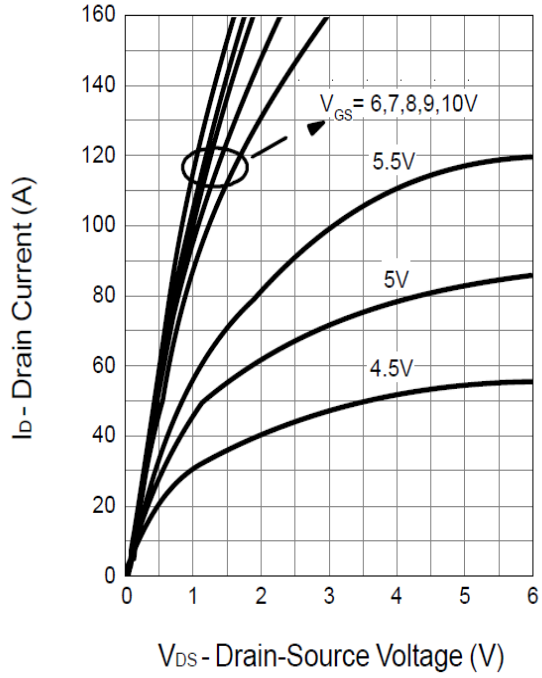


Thermal Transient Impedance

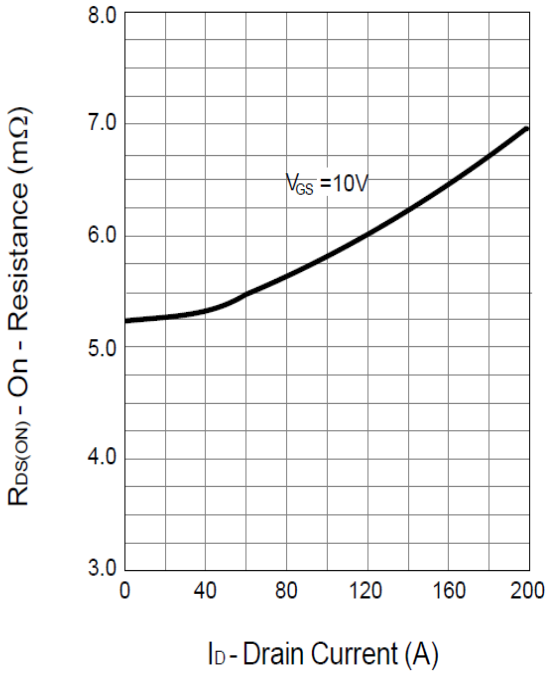


Typical Operating Characteristics (Cont.)

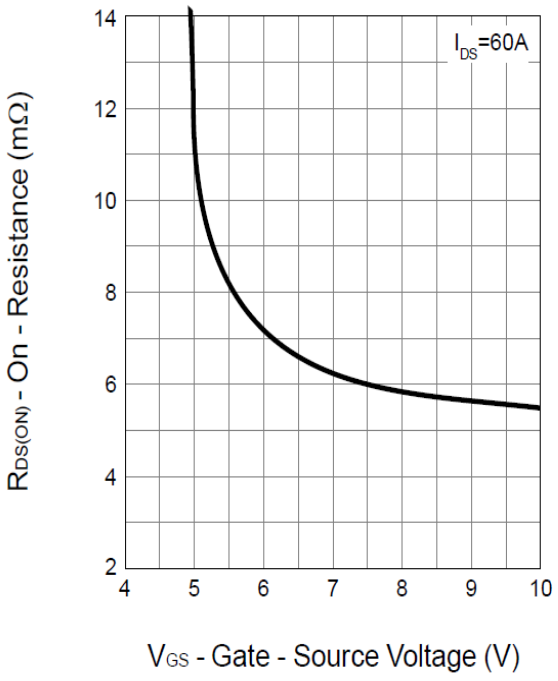
Output Characteristics



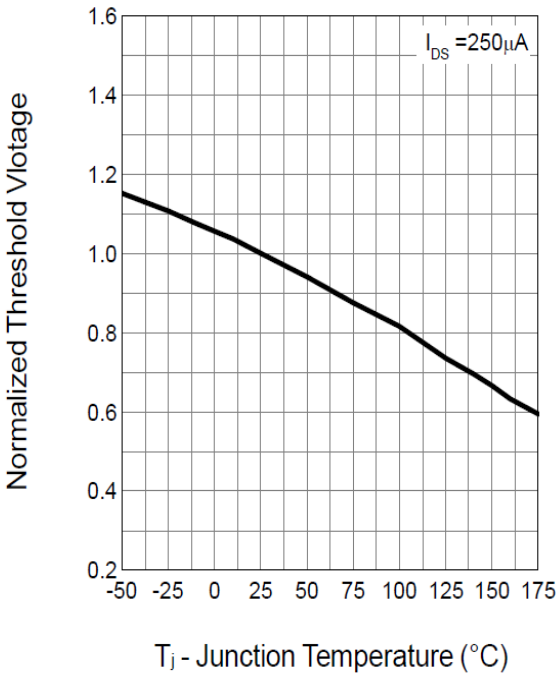
Drain-Source On Resistance



Drain-Source On Resistance

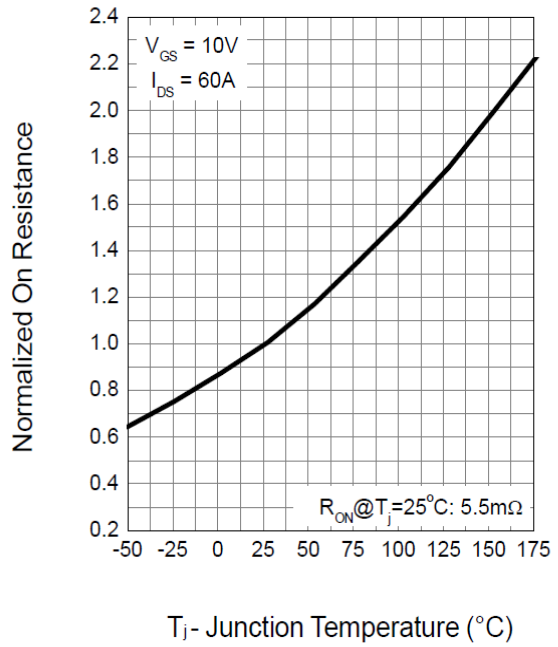


Gate Threshold Voltage

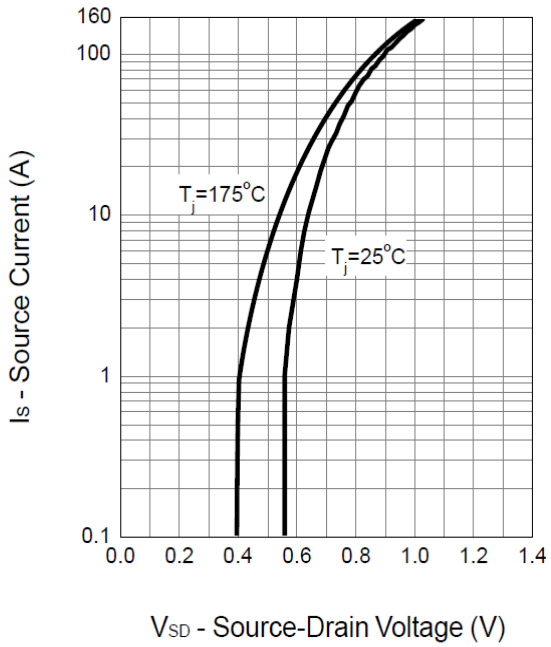


Typical Operating Characteristics (Cont.)

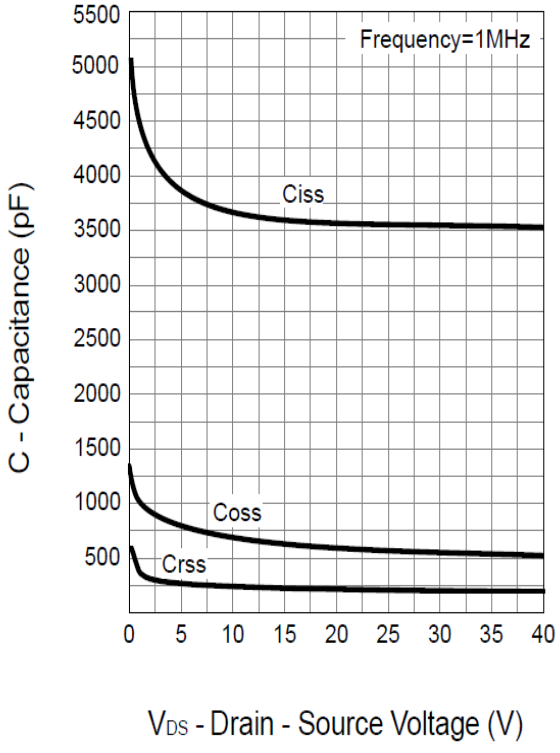
Drain-Source On Resistance



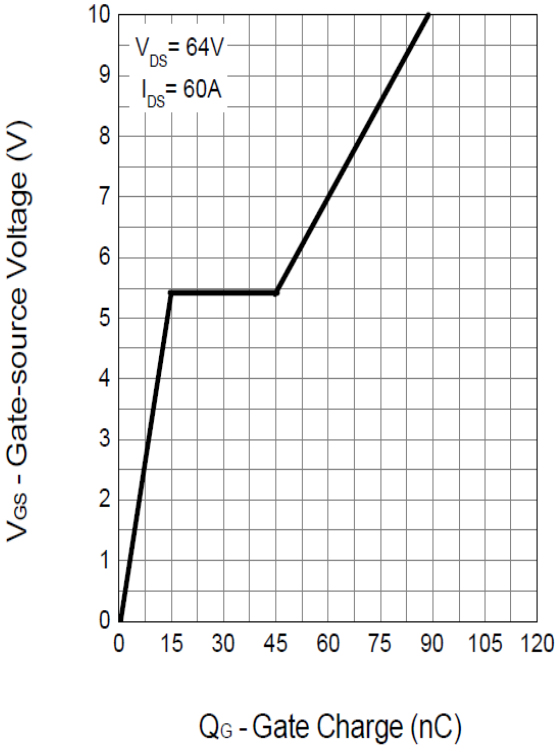
Source-Drain Diode Forward



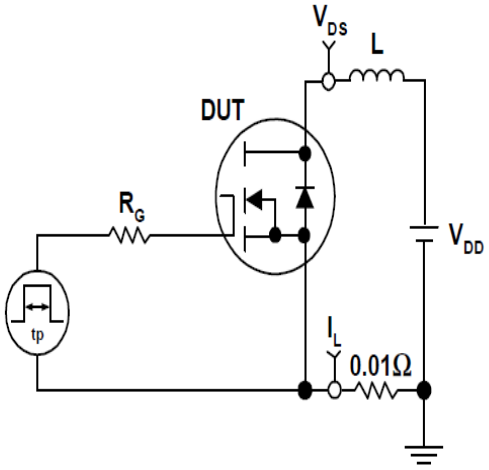
Capacitance

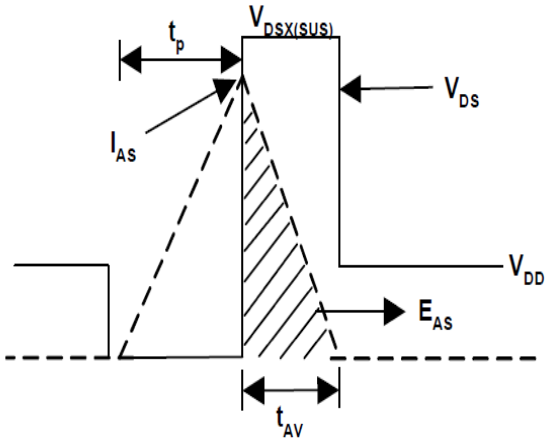


Gate Charge



Avalanche Test Circuit and Waveforms





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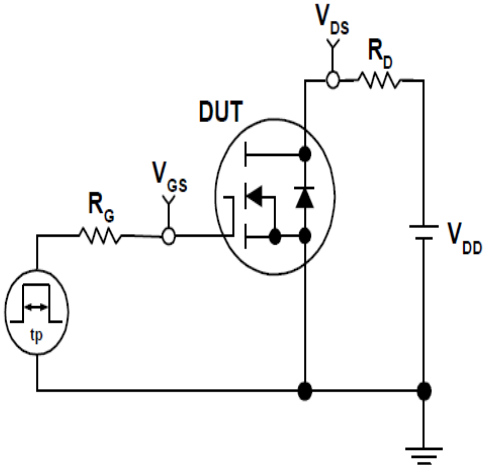

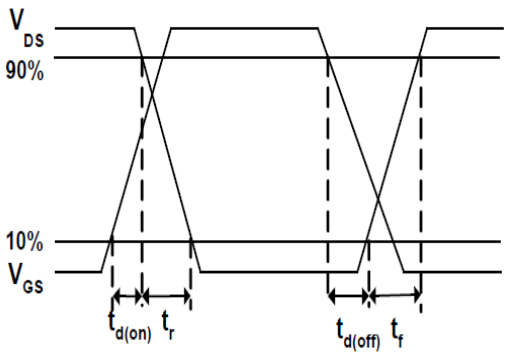

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