

# MT3208A/B

## N-Channel Power MOSFET

80V, 110A, 6.5mΩ

### Features

- $R_{DS(on)} = 6.5m\Omega$  /  $V_{GS} = 10V$ ,  $I_D = 30A$
- 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

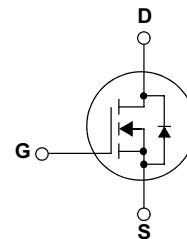
- DC-DC primary bridge
- DC-DC Synchronous rectification
- Hot swap



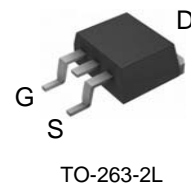
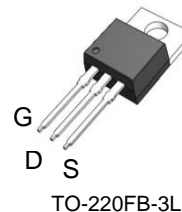
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### Simplified Schematic



### MARKING DIAGRAM & PIN ASSIGNMENT



		<b>Package Code</b> MT3208A: T0-220FB-3L MT3208B: T0-263-2L	
		<b>Date Code</b> PYWWM	<b>Lot No</b> XX

### MOSFET Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Ratings	Units	
$V_{DSS}$	Drain to Source Voltage	80	V	
$V_{GSS}$	Gate to Source Voltage	±25	V	
$I_D$	Drain Current - Continuous (Silicon Limited) $T_C = 25^\circ C$	110	A	
	- Continuous( Package Limited) $T_C = 100^\circ C$	70		
	- Continuous $T_C = 125^\circ C$ (Note 1a)	50	A	
	- Pulsed	400		
$E_{AS}$	Single Pulsed Avalanche Energy (Note 3)	530	mJ	
$P_D$	Power Dissipation	- $T_C = 25^\circ C$ (Note 1a)	200	W
		- $T_A = 25^\circ C$ (Note 1b)	2.2	W/°C
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	°C	

**Thermal Characteristics**

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case (Note 1)	0.75	°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
MT3208A/B	MT3208A/B	TO-220/TO-263	-	-	50

**Electrical Characteristics**  $T_C = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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**Off Characteristics**

$V_{BDSS}$	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$	80	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 24\text{V}$ $V_{GS} = 0\text{V}$ $T_C = 150^\circ\text{C}$	-	-	1	$\mu\text{A}$
$I_{GSS}$	Gate to Source Leakage Current	$V_{GS} = \pm 20\text{V}$	-	-	$\pm 100$	nA

**On Characteristics**

$V_{GS(TH)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	-	3.0	-	V
$r_{DS(ON)}$	Drain to Source On Resistance	$I_D = 30\text{A}, V_{GS} = 10\text{V}$	-	6.5	-	m $\Omega$
		$I_D = 30\text{A}, V_{GS} = 4.5\text{V}$	-	-	-	
		$I_D = 30\text{A}, V_{GS} = 10\text{V}, T_J = 175^\circ\text{C}$	-	-	-	

**Dynamic Characteristics**

$C_{ISS}$	Input Capacitance	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$	-	3150	-	pF
$C_{OSS}$	Output Capacitance		-	890	-	pF
$C_{RSS}$	Reverse Transfer Capacitance		-	441	-	pF
$R_G$	Gate Resistance	$V_{GS} = 0\text{V}, V_{DS} = 0\text{V}, f = 1\text{MHz}$	-	1	-	$\Omega$
$Q_{g(TOT)}$	Total Gate Charge at 10V	$V_{GS} = 0\text{V to } 10\text{V}$	-	158	-	nC
$Q_{g(5)}$	Total Gate Charge at 5V	$V_{GS} = 0\text{V to } 5\text{V}$	-	80	-	nC
$Q_{g(TH)}$	Threshold Gate Charge	$V_{GS} = 0\text{V to } 1\text{V}$	-	3.0	4.0	nC
$Q_{gs}$	Gate to Source Gate Charge	$V_{DD} = 15\text{V}$ $I_D = 20\text{A}$ $I_g = 1.0\text{mA}$	-	17	-	nC
$Q_{gs2}$	Gate Charge Threshold to Plateau		-	6.0	-	nC
$Q_{gd}$	Gate to Drain "Miller" Charge		-	31	-	nC

**Switching Characteristics** ( $V_{GS} = 10\text{V}$ )

$t_{ON}$	Turn-On Time	$V_{DD} = 15\text{V}, I_D = 30\text{A}, V_{GS} = 4.5\text{V}, R_{GS} = 4.7\Omega$	-	45	-	ns
$t_{d(ON)}$	Turn-On Delay Time		-	20	-	ns
$t_r$	Rise Time		-	20	-	ns
$t_{d(OFF)}$	Turn-Off Delay Time		-	80	-	ns
$t_f$	Fall Time		-	45	-	ns
$t_{OFF}$	Turn-Off Time		-	62	-	ns

**Drain-Source Diode Characteristics**

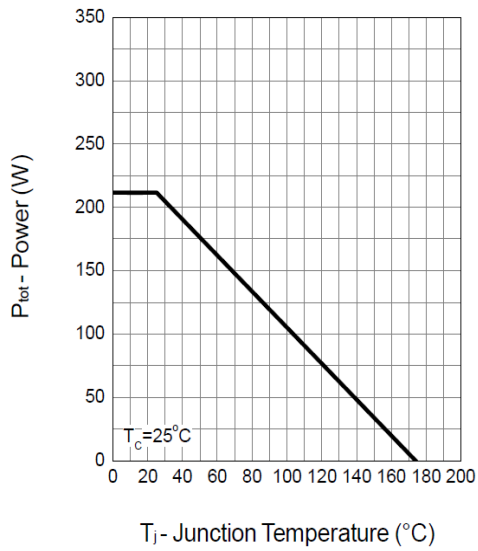
$V_{SD}$	Source to Drain Diode Voltage	$I_{SD} = 30\text{A}$	-	-	1.25	V
		$I_{SD} = 30\text{A}$	-	-	1.0	V
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 30\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	32	ns
$Q_{RR}$	Reverse Recovered Charge	$I_{SD} = 30\text{A}, dI_{SD}/dt = 100\text{A}/\mu\text{s}$	-	-	18	nC

**Notes:**

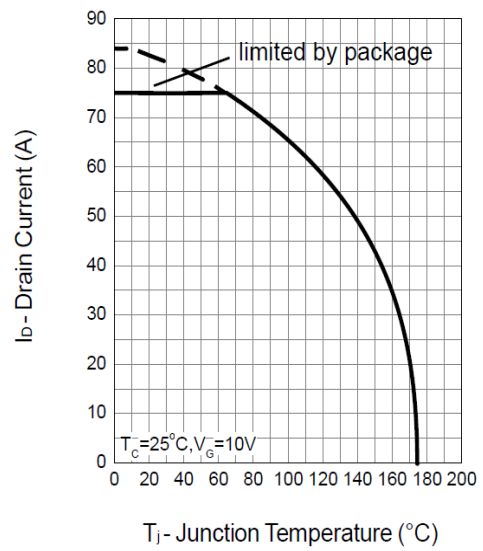
- Package current limitation is 80A.
- Starting  $T_J = 25^\circ\text{C}$ ,  $L = 0.5\text{MH}$ ,  $I_{AS} = 64\text{A}$ ,  $V_{DD} = 37\text{V}$ ,  $V_{GS} = 10\text{V}$ .
- Pulse width = 100s.

## Typical Operating Characteristics

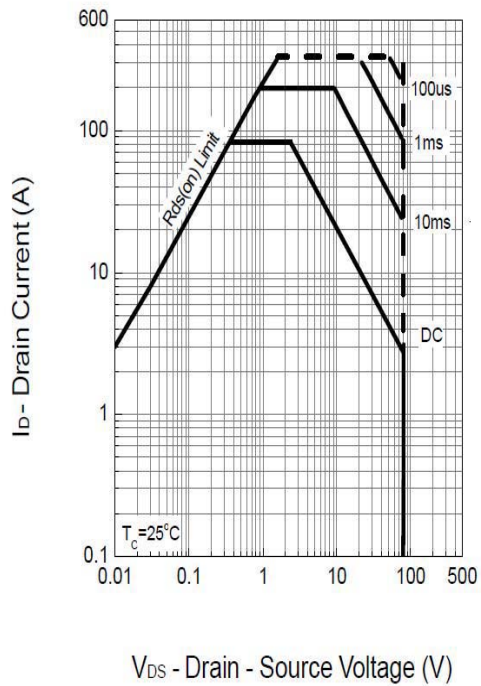
Power Dissipation



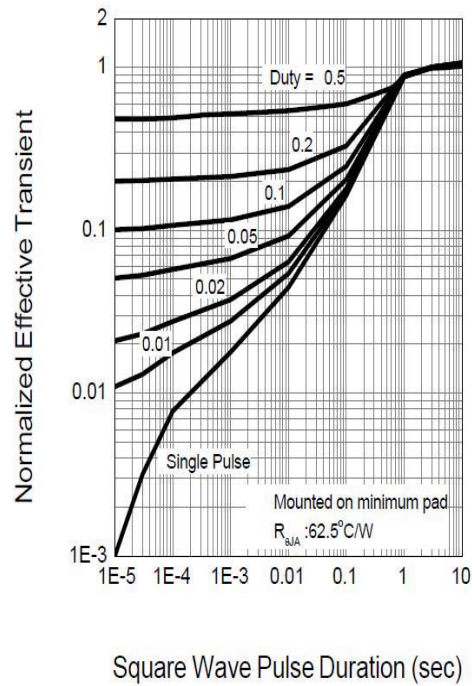
Drain Current



Safe Operation Area

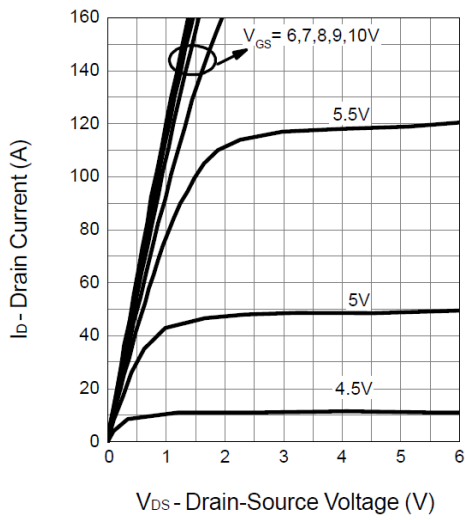


Thermal Transient Impedance

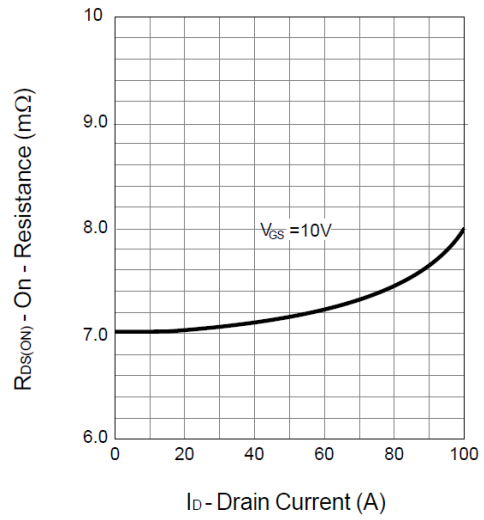


## Typical Operating Characteristics (Cont.)

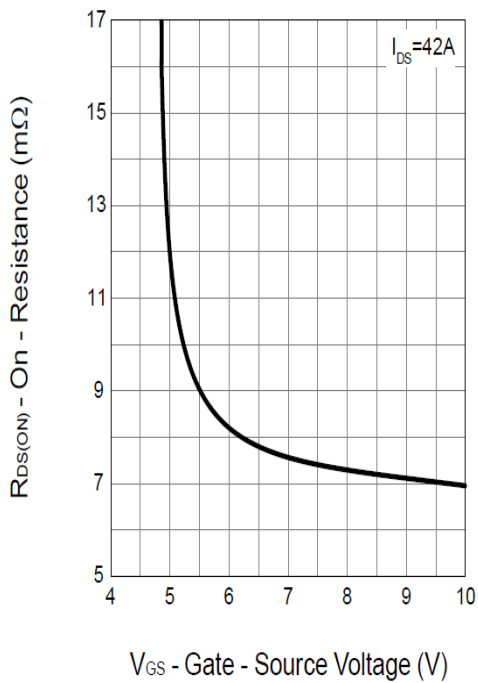
**Output Characteristics**



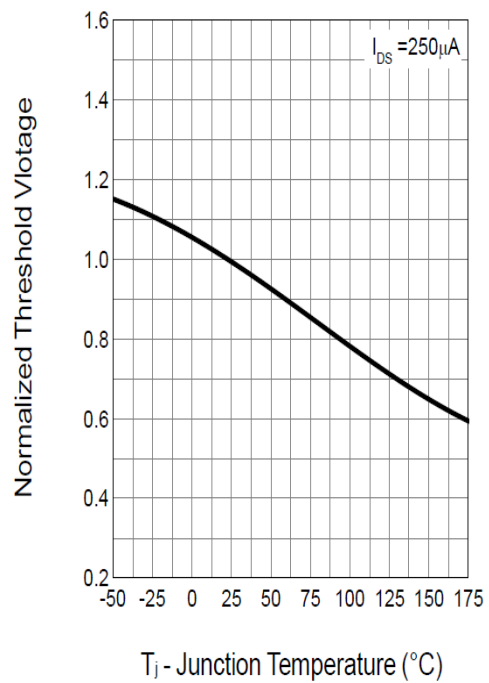
**Drain-Source On Resistance**



**Drain-Source On Resistance**

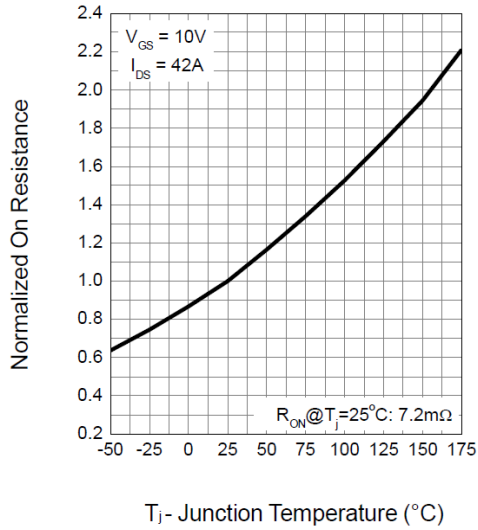


**Gate Threshold Voltage**

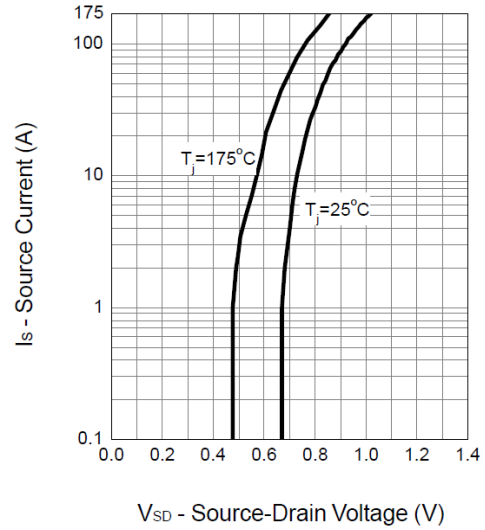


### Typical Operating Characteristics (Cont.)

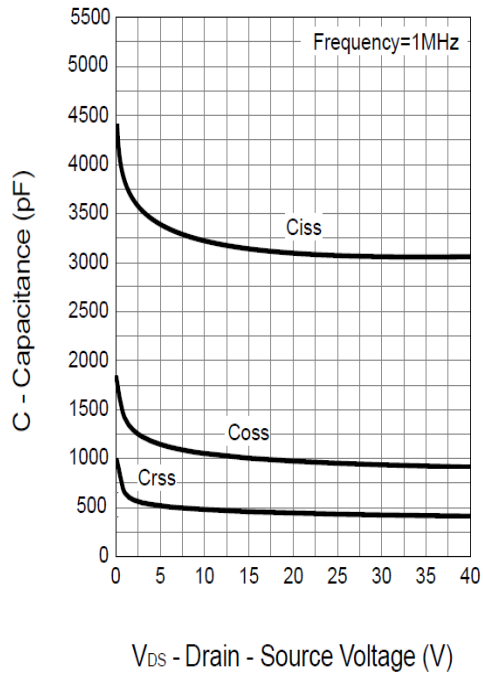
**Drain-Source On Resistance**



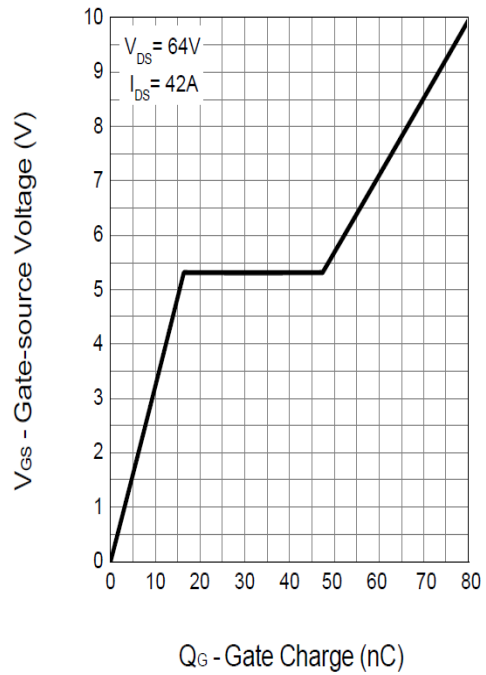
**Source-Drain Diode Forward**



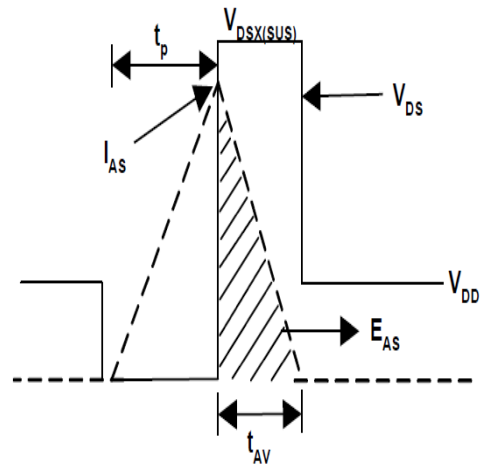
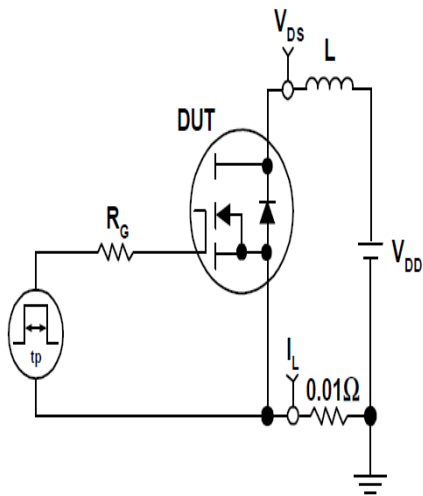
**Capacitance**



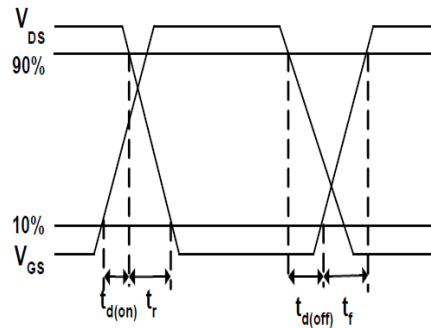
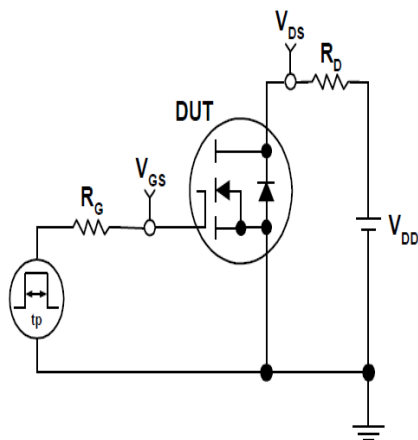
**Gate Charge**



## Avalanche Test Circuit and Waveforms



## Avalanche Test Circuit and Waveforms



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