

## N-Channel MOSFET MEM2302M3

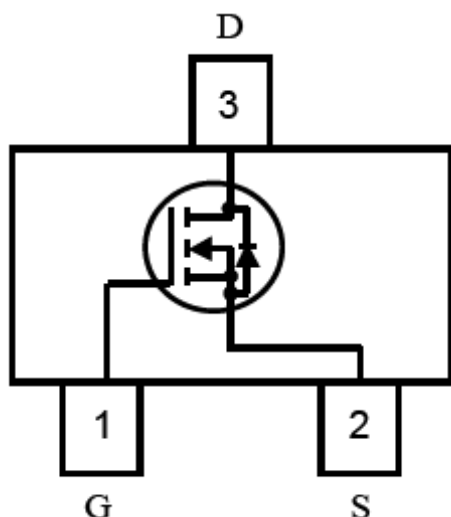
### General Description

MEM2302M3G Series N-channel enhancement mode field-effect transistor, produced with high cell density DMOS trench technology, which is especially used to minimize on-state resistance. This device particularly suits low voltage applications, and low power dissipation in a very small outline surface mount package.

### Features

- 20V/3A
- $R_{DS(ON)} = 29m\Omega @ V_{GS}=4.5V, I_D=3A$
- $R_{DS(ON)} = 36m\Omega @ V_{GS}=2.5V, I_D=2A$
- High Density Cell Design For Ultra Low On-Resistance
- Subminiature surface mount package: SOT23-3L

### Pin Configuration



### Typical Application

- Battery management
- High speed switch
- Low power DC to DC converter

### Absolute Maximum Ratings

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		$V_{DSS}$	20V	V
Gate-Source Voltage		$V_{GSS}$	$\pm 8$	V
Drain Current	$T_A=25^\circ C$	$I_D$	3	A
	$T_A=70^\circ C$		2	
Pulsed Drain Current <sup>1,2</sup>		$I_{DM}$	15	A
Total Power Dissipation	$T_A=25^\circ C$	Pd	0.7	W
	$T_A=70^\circ C$		0.46	
operating junction temperature		$T_j$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	-65/150	$^\circ C$

## Thermal Characteristics

Parameter	Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Ambient	R $\theta$ JA	140	°C/W

## Electrical Characteristics

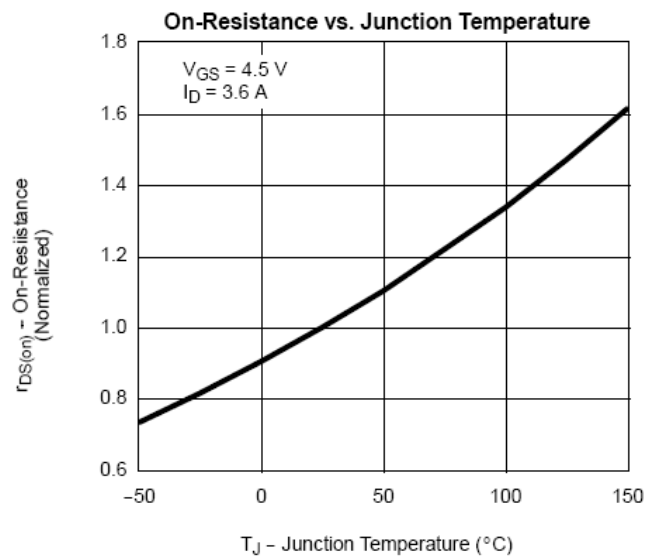
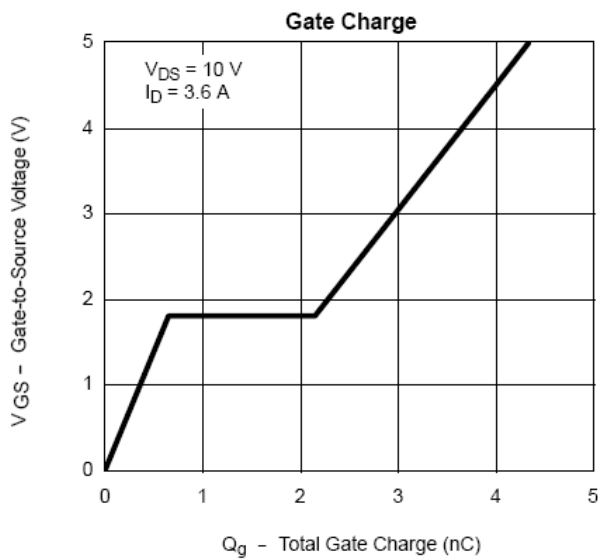
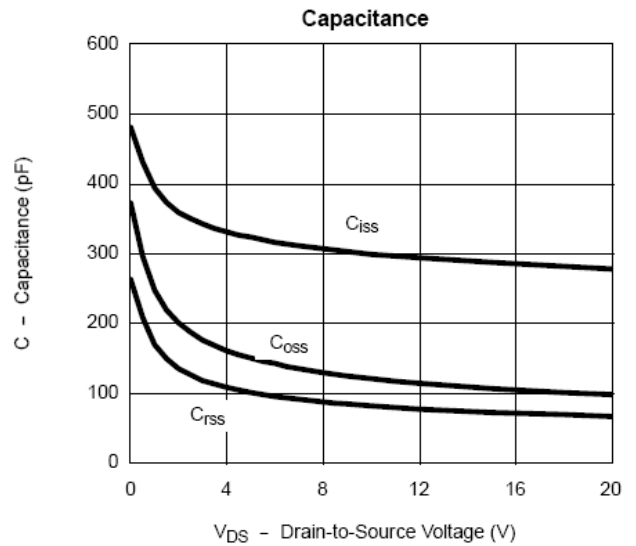
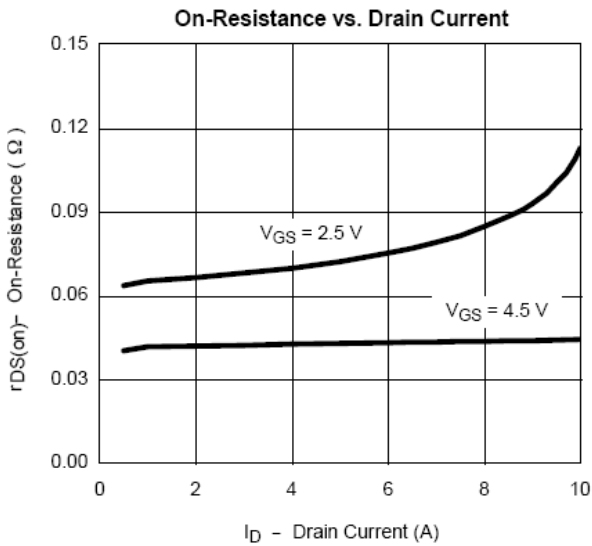
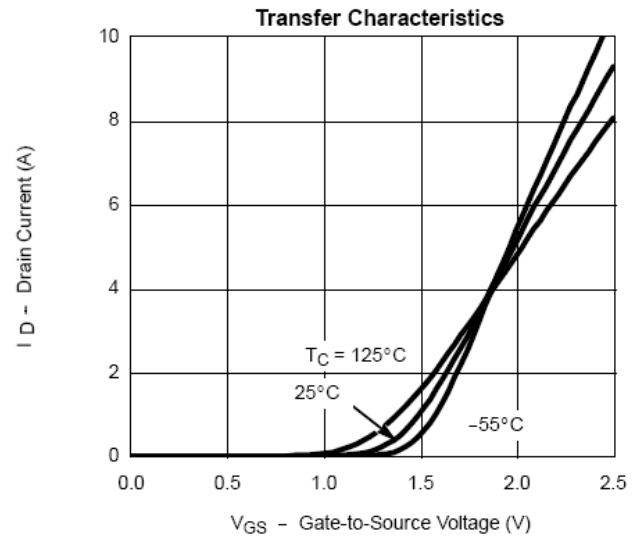
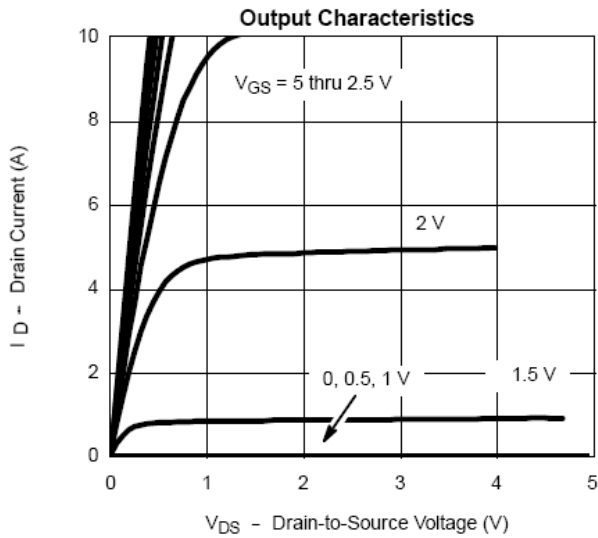
MEM2302M3

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	20	23		V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250uA	0.51	0.53	0.85	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =8V		1.6	100	nA
		V <sub>DS</sub> =0V, V <sub>GS</sub> =-8V		-0.2	-100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =20V V <sub>GS</sub> =0V		6.3	1000	nA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A		29	50	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =2A		36	65	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 5 V, I <sub>D</sub> = 3.6A		8		S
Source-drain (diode forward) voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1.25A	0.4	0.7	1	V
<b>Dynamic Characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 0 V, f = 1 MHz		300		pF
Output Capacitance	C <sub>oss</sub>			120		
Reverse Transfer Capacitance	C <sub>rss</sub>			80		
<b>Switching Characteristics</b>						
Turn-On Delay Time	td(on)	V <sub>DD</sub> = 15 V, R <sub>L</sub> = 2.8Ω I <sub>D</sub> =3.6A V <sub>GEN</sub> = 4.5V, R <sub>g</sub> = 36Ω		8	15	ns
Rise Time	tr			50	80	
Turn-Off Delay Time	td(off)			15	60	
Fall-Time	tf			10	25	
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 10V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 3.6A		4	10	nC
Gate-Source Charge	Q <sub>gs</sub>			0.65		
Gate-Drain Charge	Q <sub>gd</sub>			1.5		

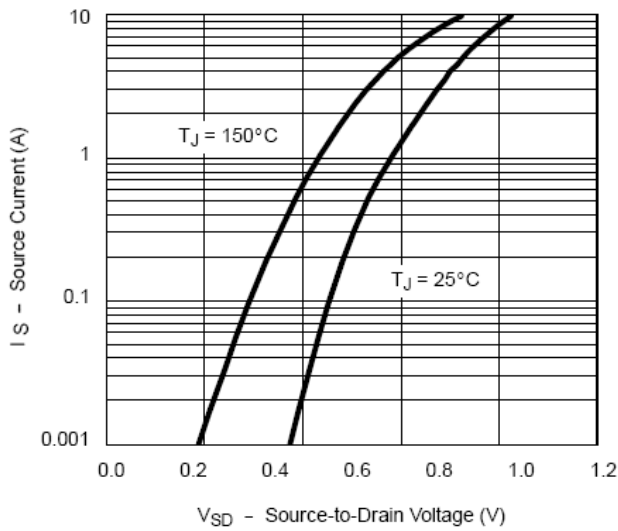
1、Repetitive rating, pulse width limited by junction temperature.

2、Pulse width <300us , duty cycle <0.5%.

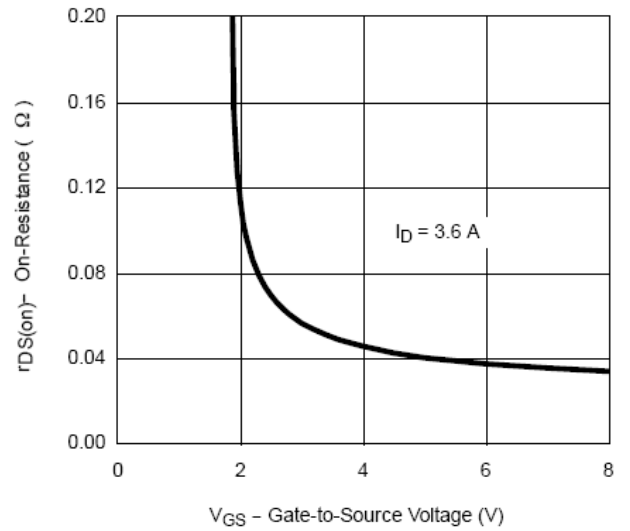
## Typical Performance Characteristics



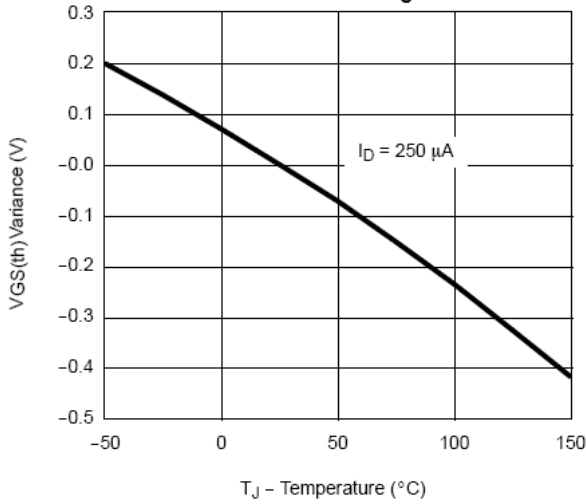
Source-Drain Diode Forward Voltage



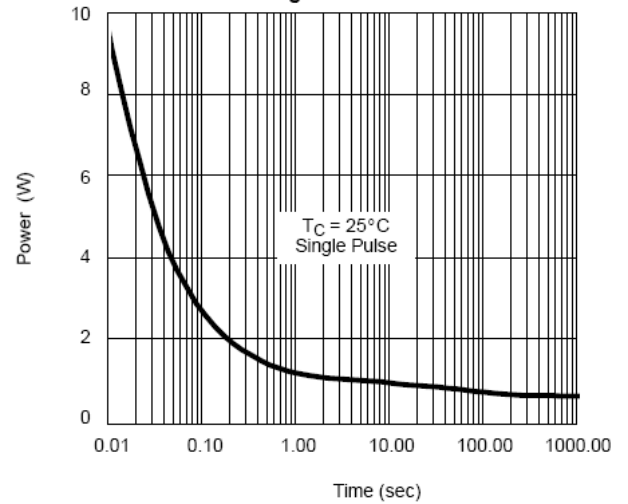
On-Resistance vs. Gate-to-Source Voltage



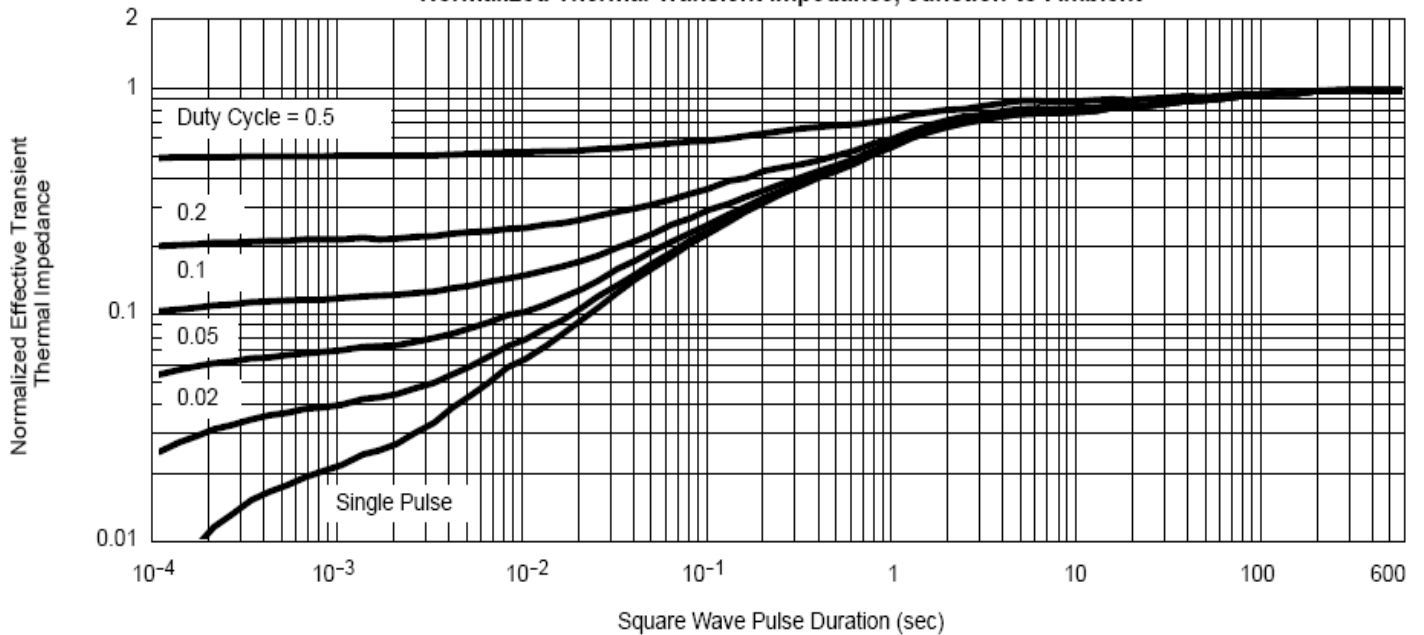
Threshold Voltage



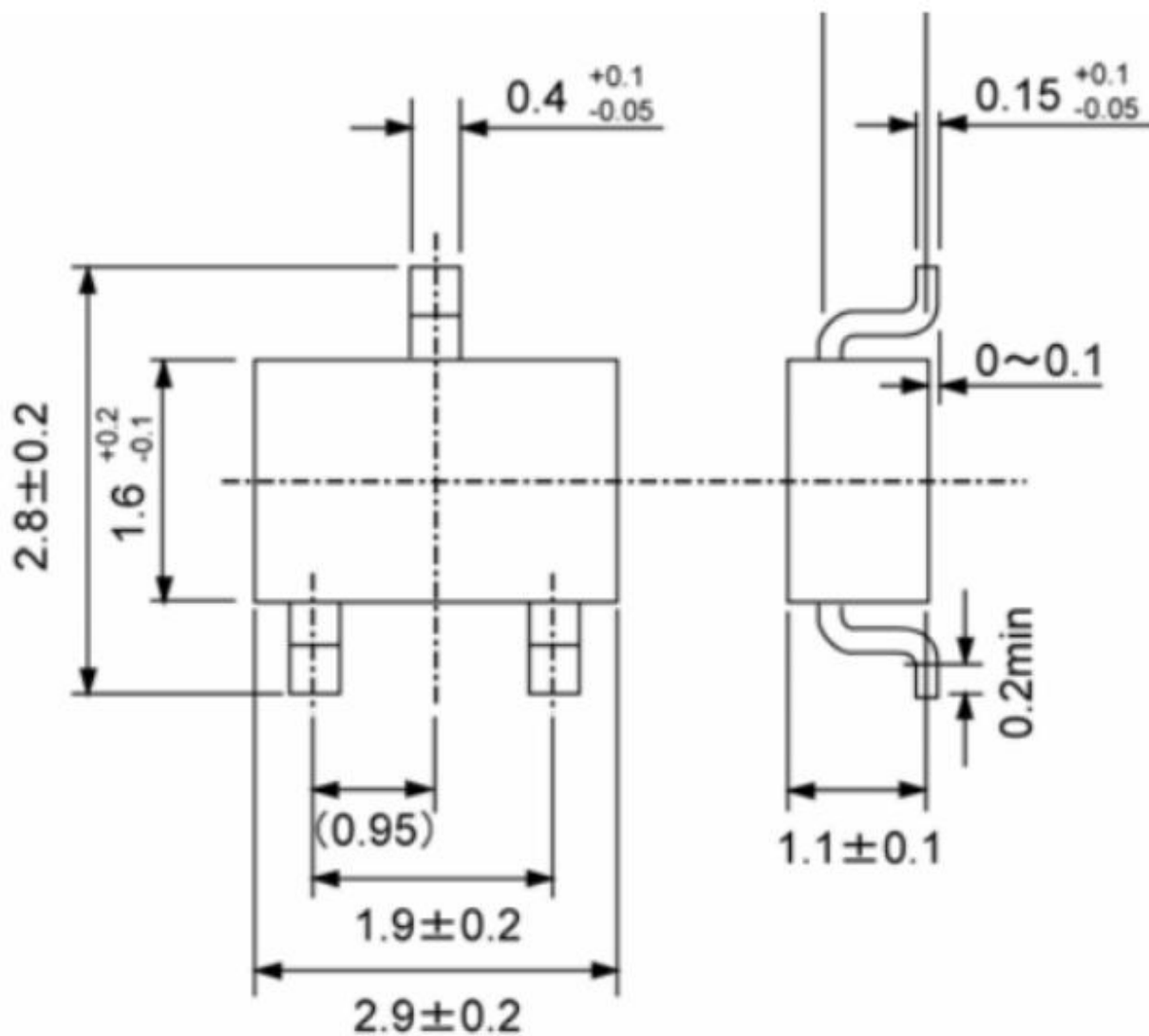
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient



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