

P-Channel MOSFET MEM2303M3

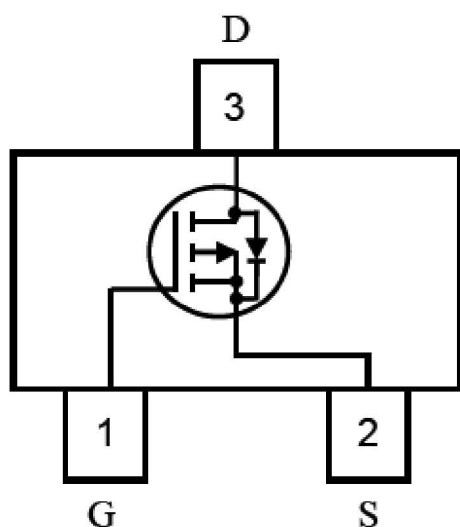
General Description

MEM2303M3G Series P-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, and low power dissipation in a very small outline surface mount package.

Features

- -30V/-4.2A
 $R_{DS(ON)} = 55m\Omega @ V_{GS} = -10V, I_D = -4.2A$
 $R_{DS(ON)} = 62m\Omega @ V_{GS} = -4.5V, I_D = -4A$
 $R_{DS(ON)} = 72m\Omega @ V_{GS} = -2.5V, I_D = -2.5A$
- High Density Cell Design For Ultra Low On-Resistance
- Subminiature surface mount package: SOT23-3L

Pin Configuration



Typical Application

- Power management
- Load switch
- Battery protection

Absolute Maximum Ratings

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	-30V	V
Gate-Source Voltage		V_{GSS}	± 12	V
Drain Current	$T_A = 25^\circ C$	I_D	-4.2	A
	$T_A = 70^\circ C$		-3.5	
Pulsed Drain Current ^{1,2}		I_{DM}	-30	A
Total Power Dissipation	$T_A = 25^\circ C$	Pd	1.4	W
	$T_A = 70^\circ C$		1	
Operating Temperature Range		T_{Opr}	150	$^\circ C$
Storage Temperature Range		T_{stg}	-65/150	

Thermal Characteristics

Parameter		Symbol	TYP.	MAX.	Unit
Thermal Resistance, Junction-to-Ambient	$t \leq 10s$	R θ JA	65	90	$^{\circ}C/W$
Thermal Resistance, Junction-to-Ambient	Steady-State	R θ JA	85	125	$^{\circ}C/W$
Thermal Resistance, Junction-to-Lead	Steady-State	R θ JL	43	60	$^{\circ}C/W$

Electrical Characteristics

MEM2303M3G

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =-250 μ A	-30	-35		V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =-250 μ A	-0.7	-1.0	-1.3	V
Gate-Body Leakage	I _{GSS}	V _{DS} =0V, V _{GS} =12V		3	100	nA
		V _{DS} =0V, V _{GS} =-12V		-3	-100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =-24V, V _{GS} =0V		-3.5	-1000	nA
Static Drain-Source On-Resistance	R _{DS(ON)1}	V _{GS} =-10V, I _D =-4.2A		55	58	m Ω
	R _{DS(ON)2}	V _{GS} =-4.5V, I _D =-4A		62	65	m Ω
	R _{DS(ON)3}	V _{GS} =-2.5V, I _D =-2.5A		72	90	m Ω
Forward Transconductance	g _{FS}	V _{DS} = -5 V, I _D = -2.8 A	7	11		S
Maximum Body-Diode Continuous Current	I _S				-2.2	A
Source-drain(diode forward) voltage	V _{SD}	V _{GS} =0V, I _D =-1A		-0.8	-1.0	V
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =-15V, f=1MHz		954		pF
Output Capacitance	C _{oss}			115		
Reverse Transfer Capacitance	C _{rss}			77		
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz		6		Ω
Switching Characteristics						
Turn-On Delay Time	t _{d(on)}	V _{GS} =-10V, V _{DS} =-15V, R _L =3.6 Ω , R _{GEN} =6 Ω		6.5		ns
Rise Time	t _r			3.5		
Turn-Off Delay Time	t _{d(off)}			38		
Fall-Time	t _f			12		
Total Gate Charge	Q _g	V _{DS} = -15 V,		9.5		nC
Gate-Source Charge	Q _{gs}	V _{GS} = -4.5 V,		2		
Gate-Drain Charge	Q _{gd}	I _D = -4A		3		

1、Pulse width limited by Max. junction temperature.

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

Typical Performance Characteristics

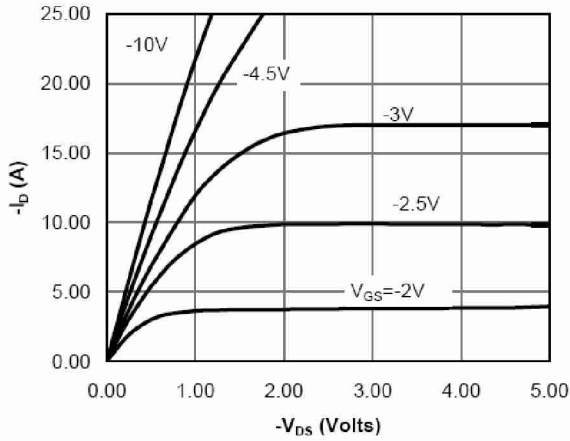


Fig 1: On-Region Characteristics

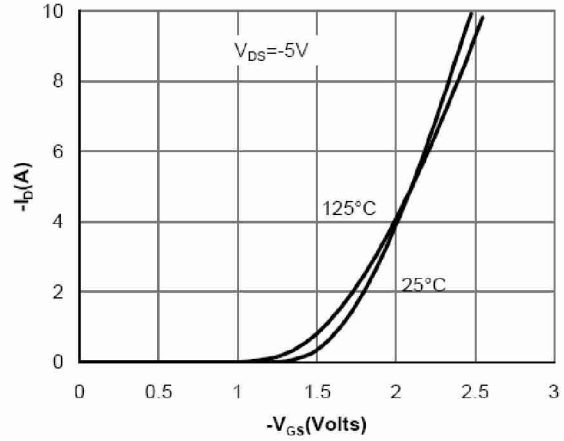


Figure 2: Transfer Characteristics

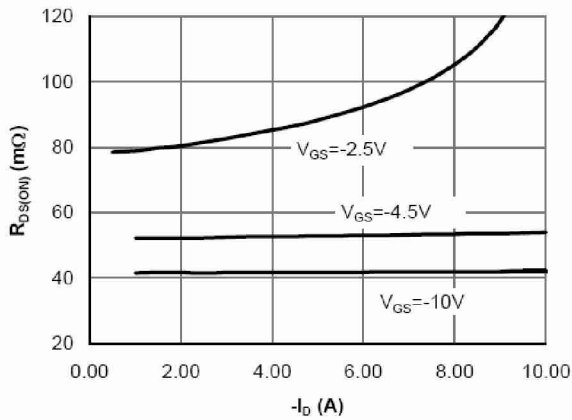


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

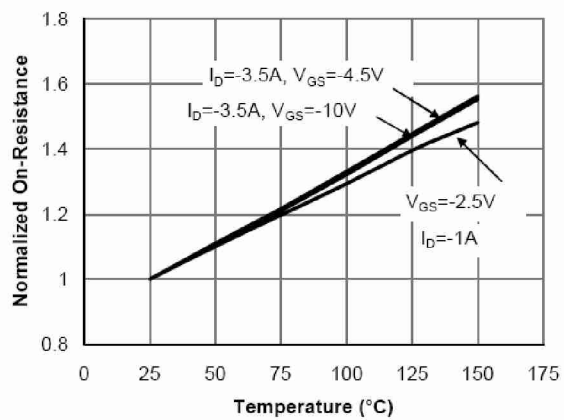


Figure 4: On-Resistance vs. Junction Temperature

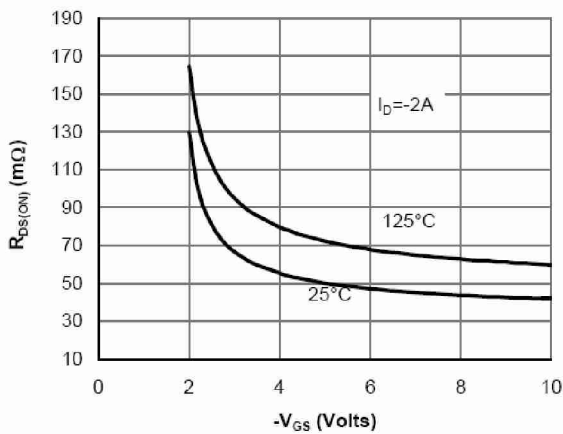


Figure 5: On-Resistance vs. Gate-Source Voltage

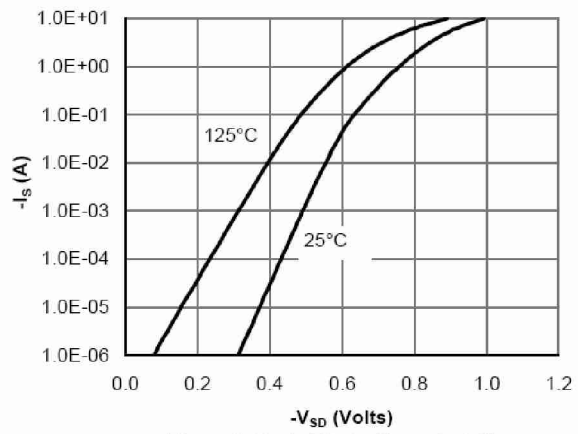


Figure 6: Body-Diode Characteristics

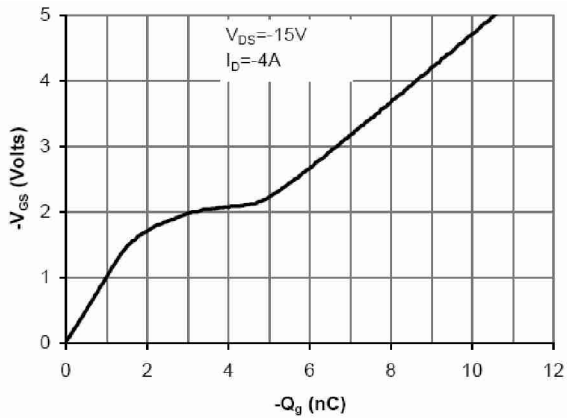


Figure 7: Gate-Charge Characteristics

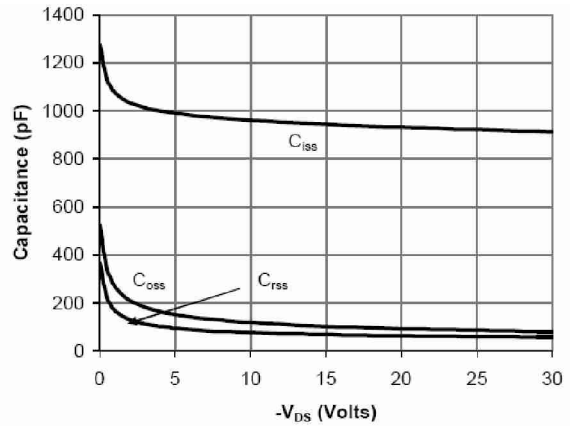


Figure 8: Capacitance Characteristics

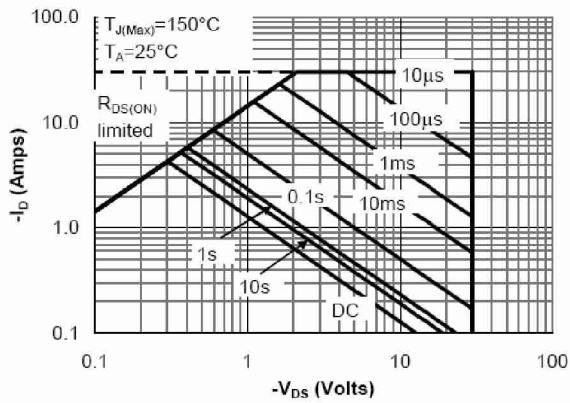


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

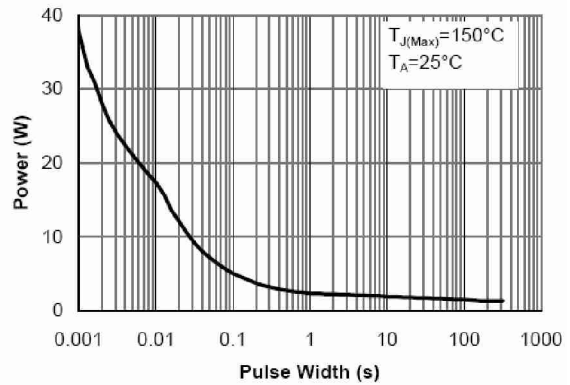


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

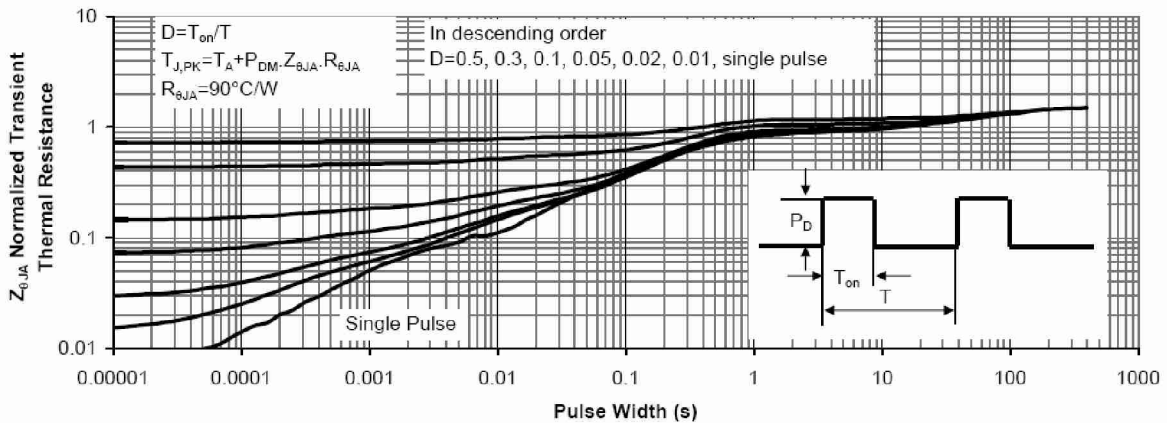
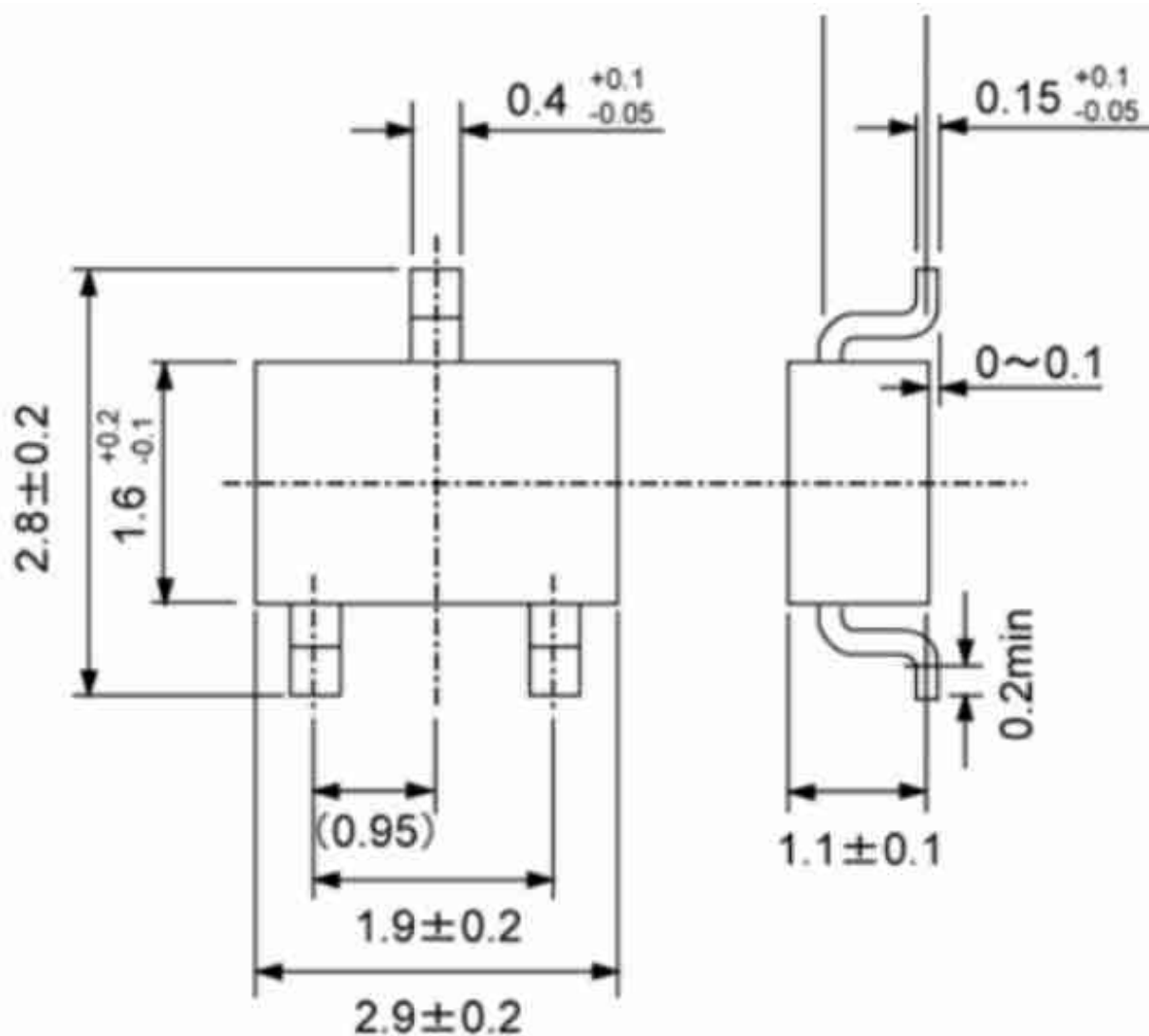


Figure 11: Normalized Maximum Transient Thermal Impedance

Package Information



- The information described herein is subject to change without notice.
- Nanjing Micro One Electronics Inc is not responsible for any problems caused by circuits or diagrams described herein whose related industrial properties, patents, or other rights belong to third parties. The application circuit examples explain typical applications of the products, and do not guarantee the success of any specific mass-production design.
- Use of the information described herein for other purposes and/or reproduction or copying without the express permission of Nanjing Micro One Electronics Inc is strictly prohibited.
- The products described herein cannot be used as part of any device or equipment affecting the human body, such as exercise equipment, medical equipment, security systems, gas equipment, or any apparatus installed in airplanes and other vehicles, without prior written permission of Nanjing Micro One Electronics Inc.
- Although Nanjing Micro One Electronics Inc exerts the greatest possible effort to ensure high quality and reliability, the failure or malfunction of semiconductor products may occur. The user of these products should therefore give thorough consideration to safety design, including redundancy, fire-prevention measures, and malfunction prevention, to prevent any accidents, fires, or community damage that may ensue.