

P-Channel MOSFET MEM2303M3

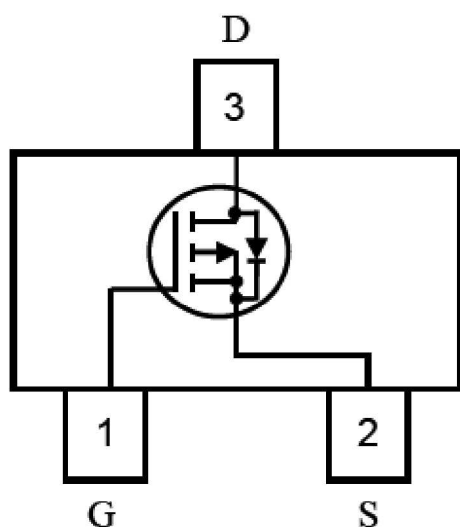
General Description

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

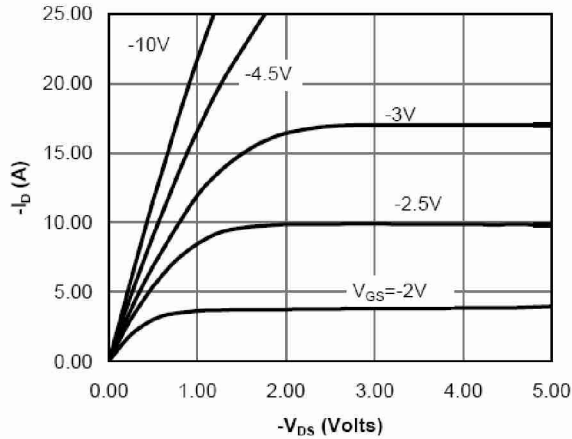


Fig 1: On-Region Characteristics

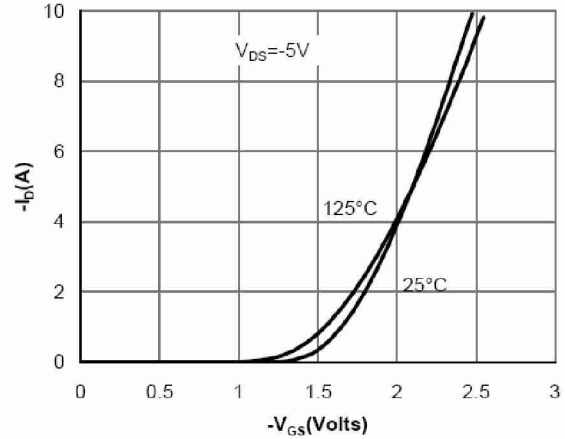


Figure 2: Transfer Characteristics

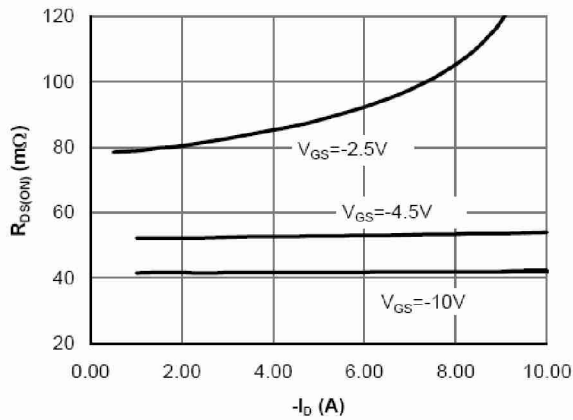


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

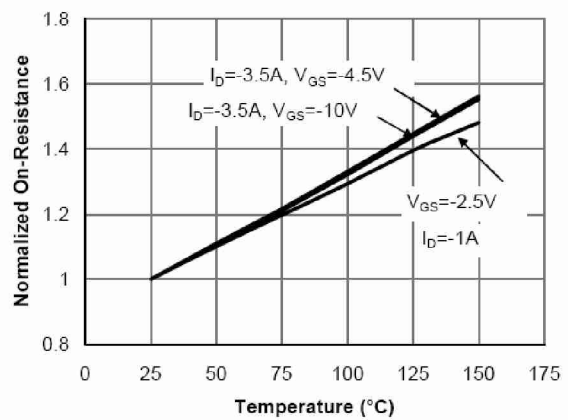


Figure 4: On-Resistance vs. Junction Temperature

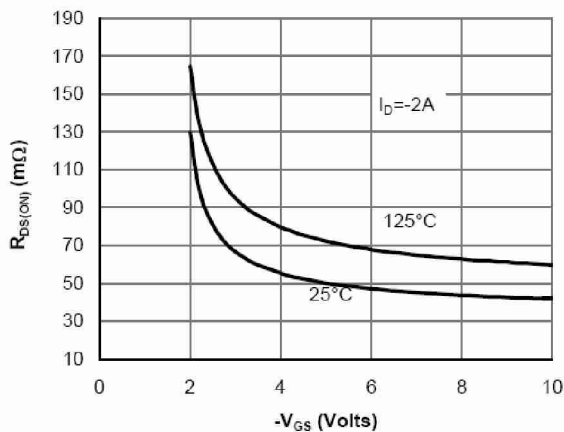


Figure 5: On-Resistance vs. Gate-Source Voltage

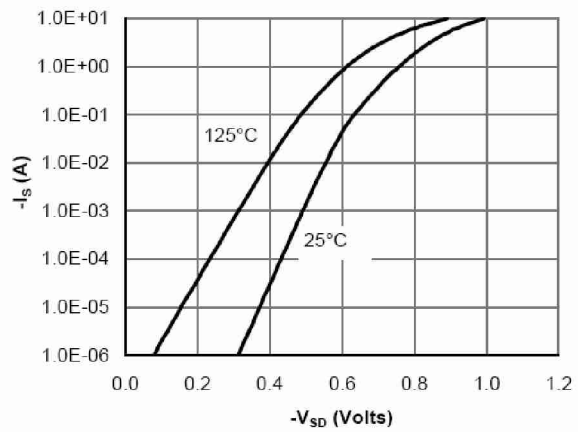


Figure 6: Body-Diode Characteristics

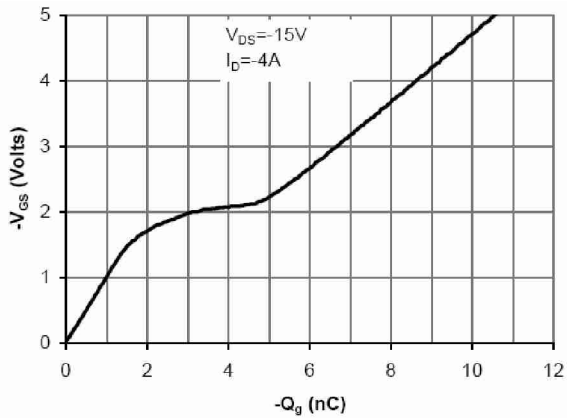


Figure 7: Gate-Charge Characteristics

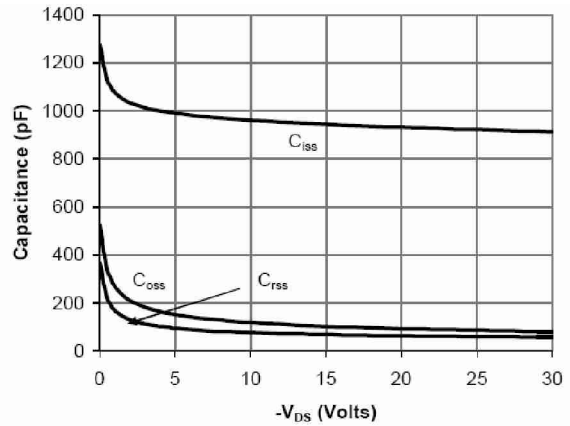


Figure 8: Capacitance Characteristics

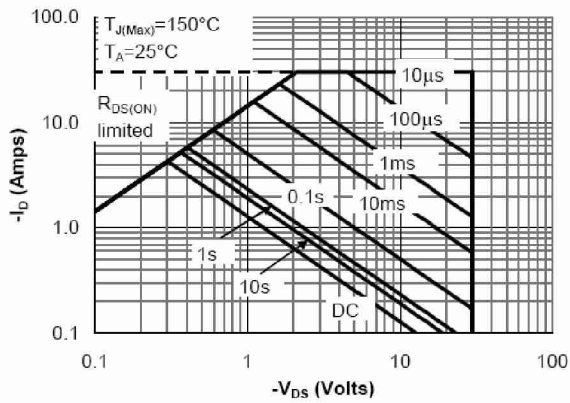


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

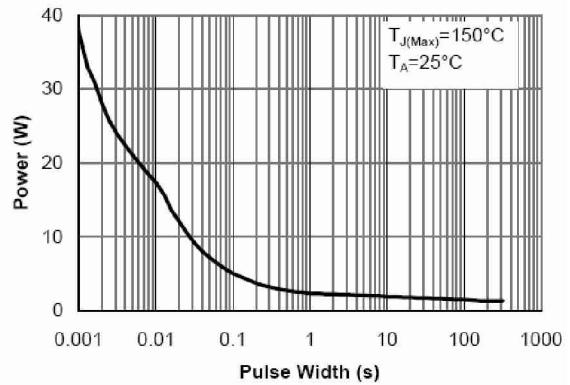


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

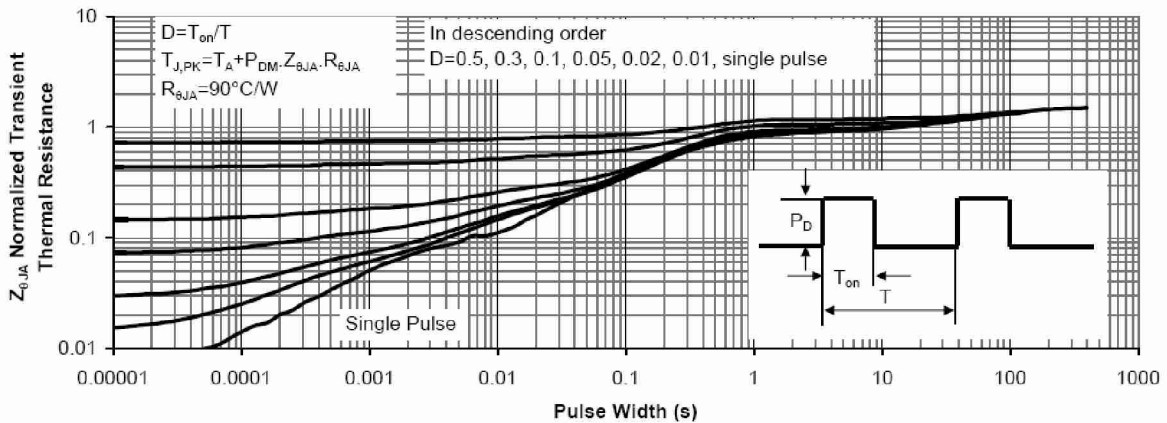
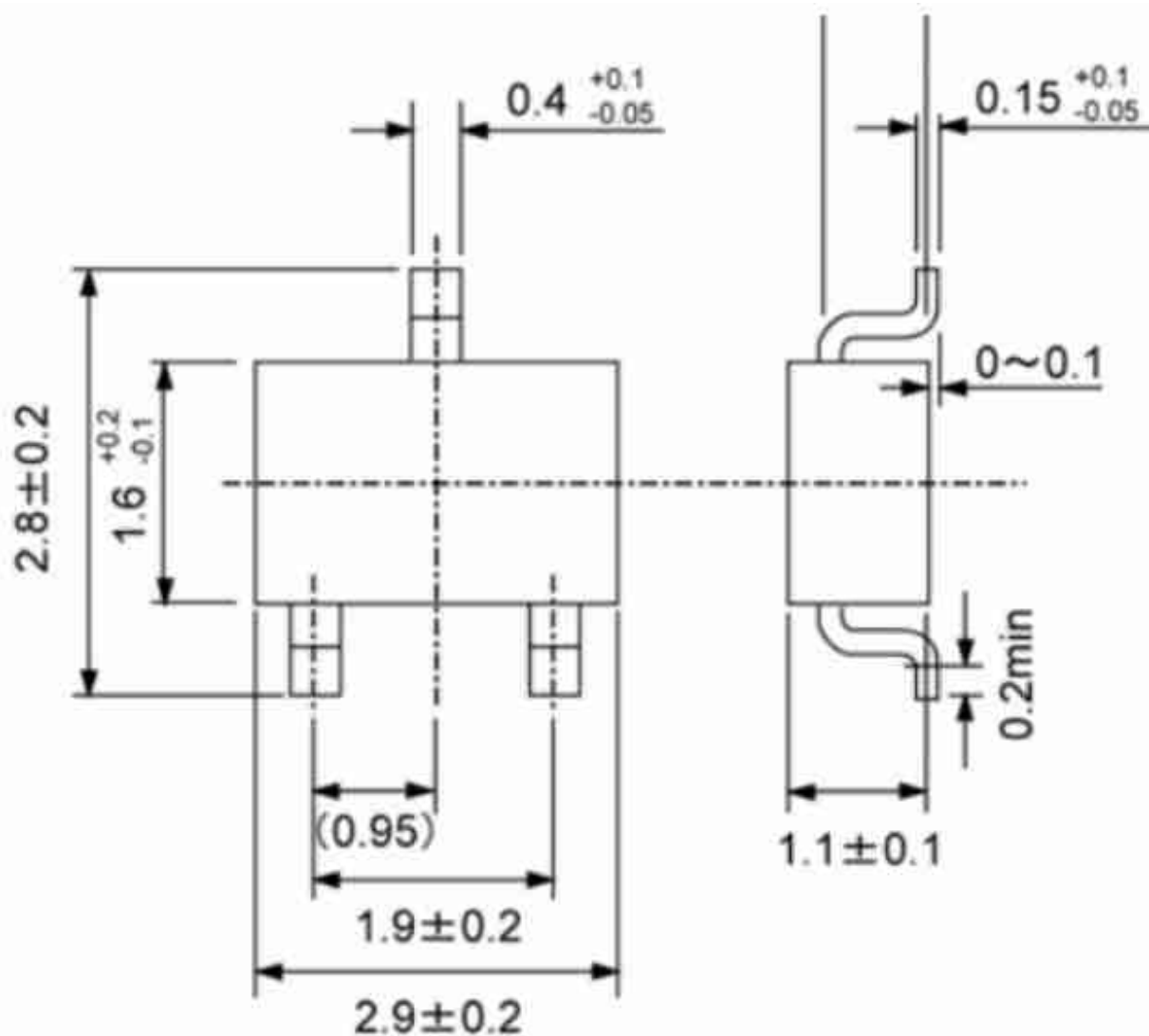


Figure 11: Normalized Maximum Transient Thermal Impedance

Package Information



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