P-Channel MOSFET MEM2303X

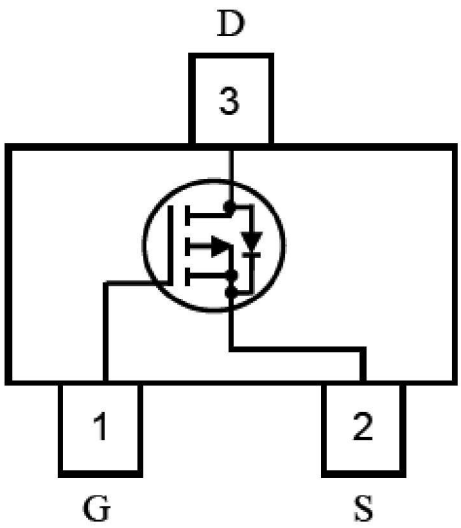
General Description

MEM2303XG 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
  $R_{DS(ON)}$ =55mΩ@ V_{GS}=-10V,I_D=-4.2A
  $R_{DS(ON)}$ =62mΩ@ V_{GS}=-4.5V,I_D=-4A
  $R_{DS(ON)}$ =72mΩ@ V_{GS}=-2.5V,I_D=-2.5A
- High Density Cell Design For Ultra Low On-Resistance
- Subminiature surface mount package:SOT23

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℃	I_D	-4.2	A
	T_A=70℃		-3.5	
Pulsed Drain Current[1,2]		I_{DM}	-30	A
Total Power Dissipation	T_A=25℃	Pd	1.4	W
	T_A=70℃		1	
Operating Temperature Range		T_{Opr}	150	℃
Storage Temperature Range		T_{stg}	-65/150	℃

Thermal Characteristics

Parameter		Symbol	TYP.	MAX.	Unit
Thermal Resistance, Junction-to-Ambient	t≤10s	RθJA	65	90	℃/W
Thermal Resistance, Junction-to-Ambient	Steady-State	RθJA	85	125	℃/W
Thermal Resistance, Junction-to-Lead	Steady-State	RθJL	43	60	℃/W

Electrical Characteristics

MEM2303XG

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250uA	-30	-35		V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=-250uA	-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	mΩ
	$R_{DS(ON)2}$	V_{GS}=-4.5V,I_D=-4A		62	65	mΩ
	$R_{DS(ON)3}$	V_{GS}=-2.5V,I_D=-2.5A		72	90	mΩ
Forward Transconductance	g_{FS}	V_{DS} = –5 V, I_D = –2.8 A	7	11		S
Maximum Body-Diode Continuous Current	Is				-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	Ciss	VGS=0V, VDS=-15V, f=1MHz		954		pF
Output Capacitance	Coss			115		
Reverse Transfer Capacitance	Crss			77		
Gate resistance	Rg	VGS=0V, VDS=0V, f=1MHz		6		Ω
Switching Characteristics						
Turn-On Delay Time	td(on)	VGS=-10V,VDS=-15V, RL=3.6Ω,RGEN=6Ω		6.5		ns
Rise Time	tr			3.5		
Turn-Off Delay Time	td(off)			38		
Fall-Time	tf			12		
Total Gate Charge	Qg	V_{DS} = -15 V, V_{GS} = -4.5 V, I_D = -4A		9.5		nc
Gate-Source Charge	Qgs			2		
Gate-Drain Charge	Qgd			3		

1、Pulse width limited by Max. junction temperature.

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

Typical Performance Characteristics

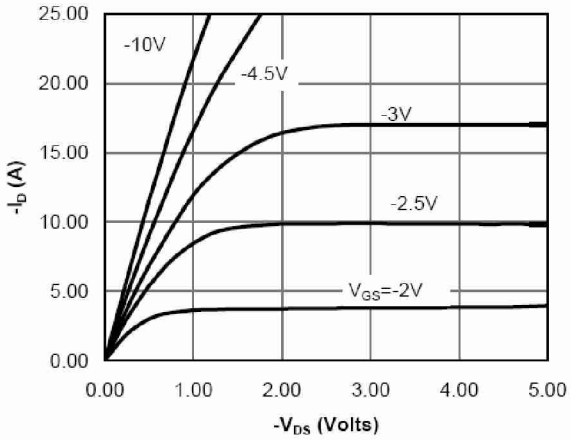


Fig 1: On-Region Characteristics

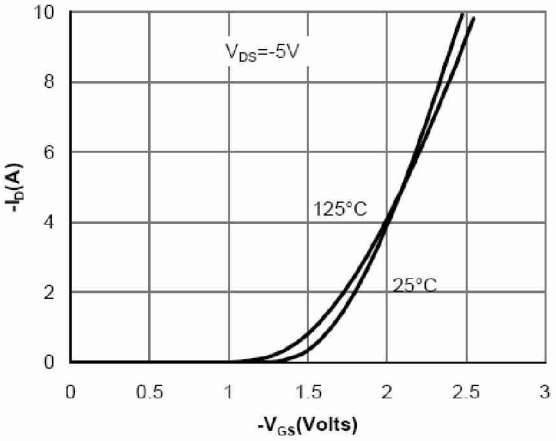


Figure 2: Transfer Characteristics

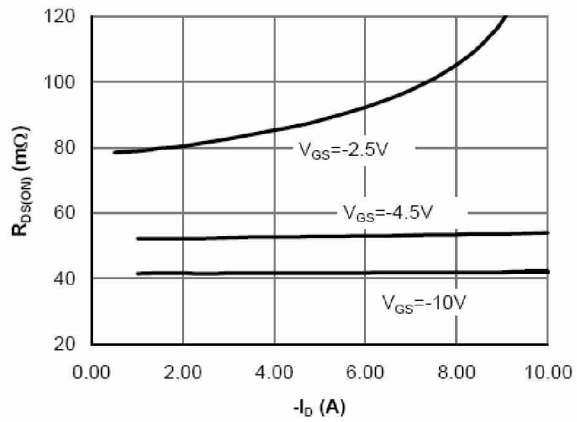


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

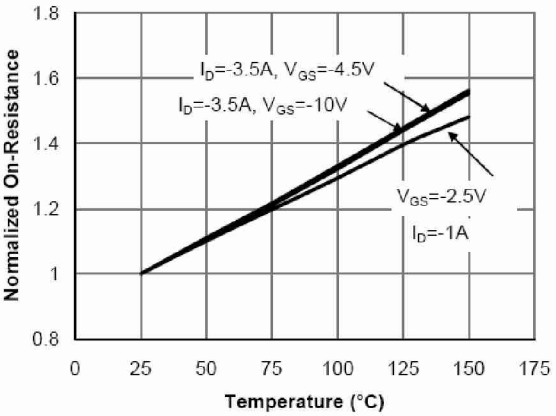


Figure 4: On-Resistance vs. Junction Temperature

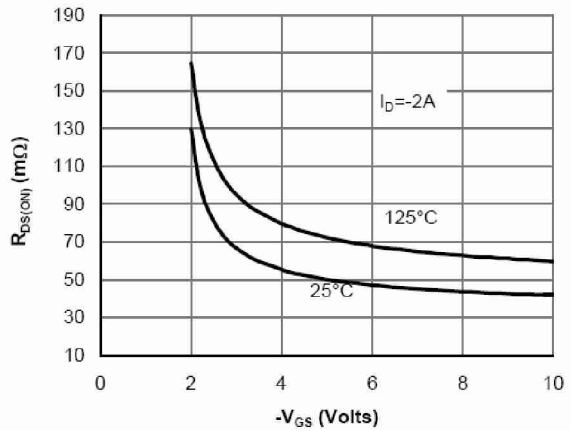


Figure 5: On-Resistance vs. Gate-Source Voltage

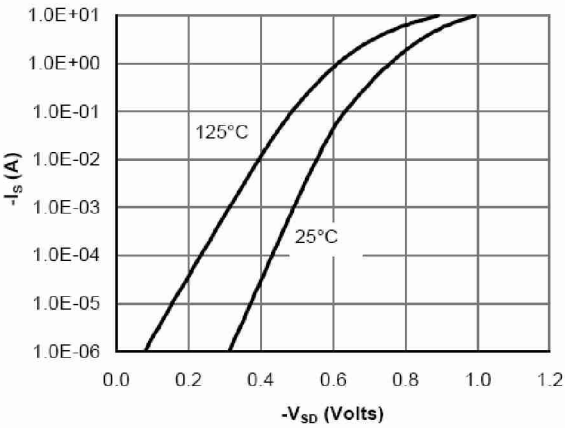


Figure 6: Body-Diode Characteristics

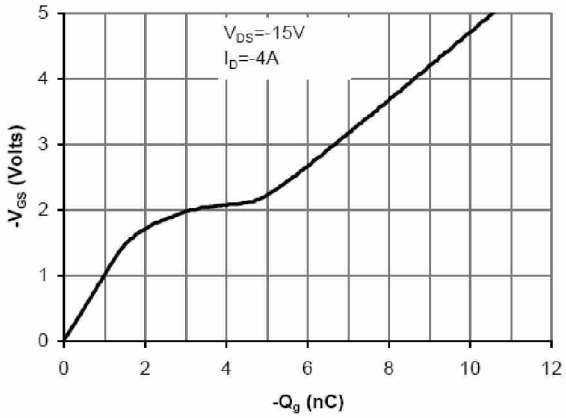


Figure 7: Gate-Charge Characteristics

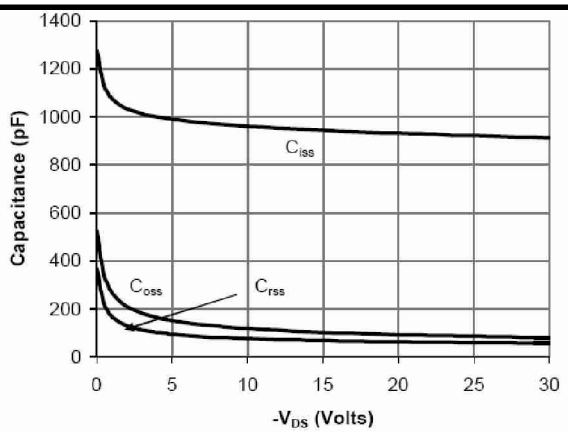


Figure 8: Capacitance Characteristics

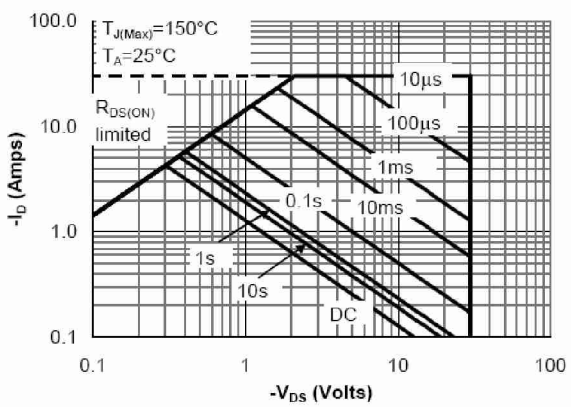


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

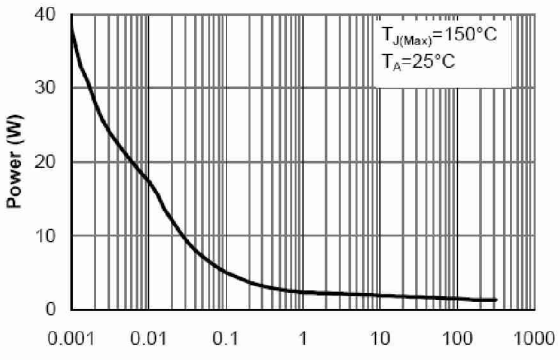


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

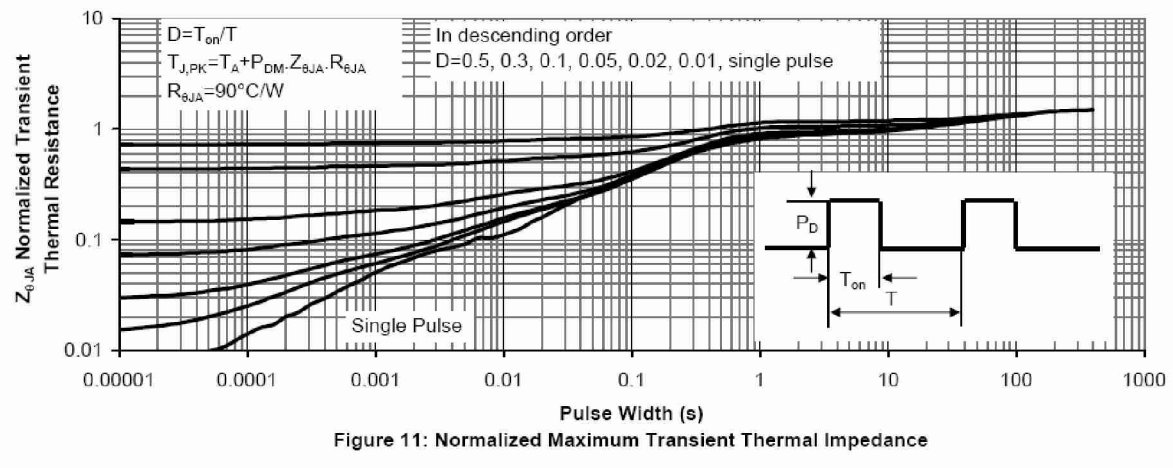
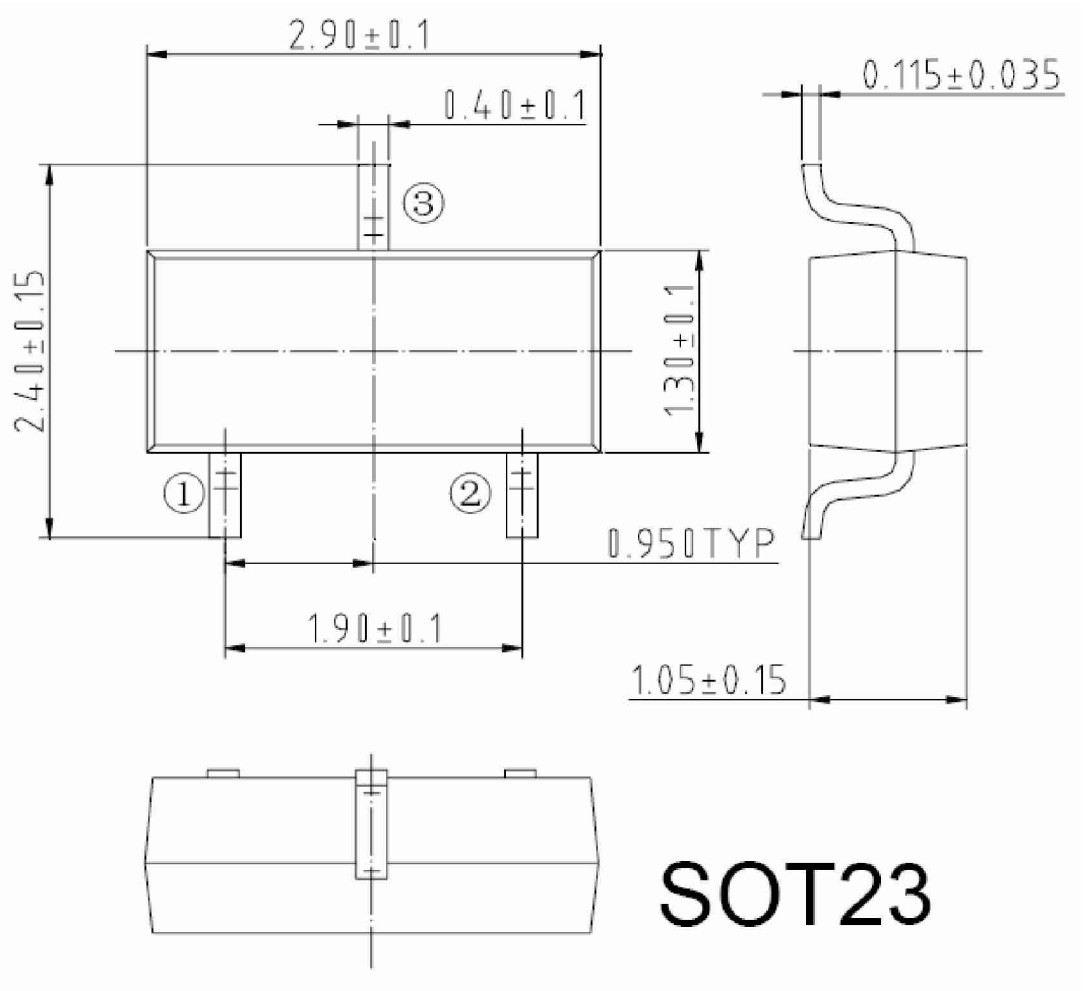


Figure 11: Normalized Maximum Transient Thermal Impedance

Package Information



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