

N-Channel MOSFET MEM2302X

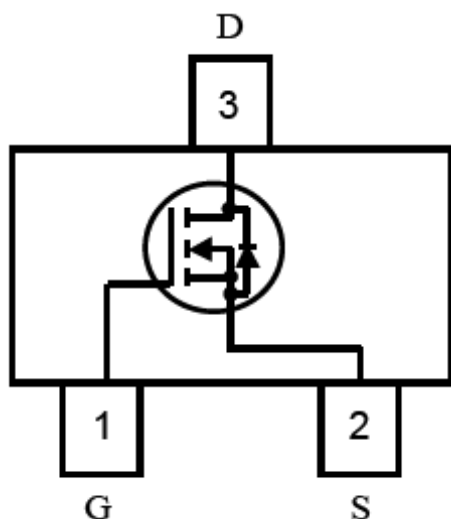
General Description

MEM2302XG 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

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}	± 8	V
Drain Current	I_D	$T_A=25^\circ C$	3
		$T_A=70^\circ C$	2
Pulsed Drain Current ^{1,2}	I_{DM}	15	A
Total Power Dissipation	P_d	$T_A=25^\circ C$	0.7
		$T_A=70^\circ C$	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 θ JA	140	$^{\circ}$ C/W

Electrical Characteristics

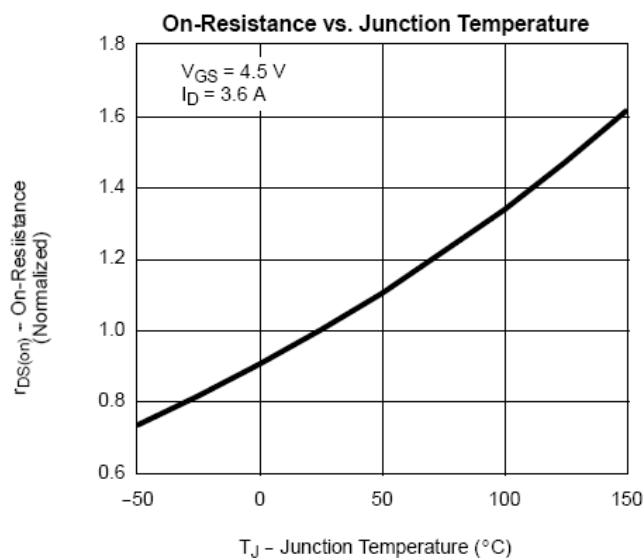
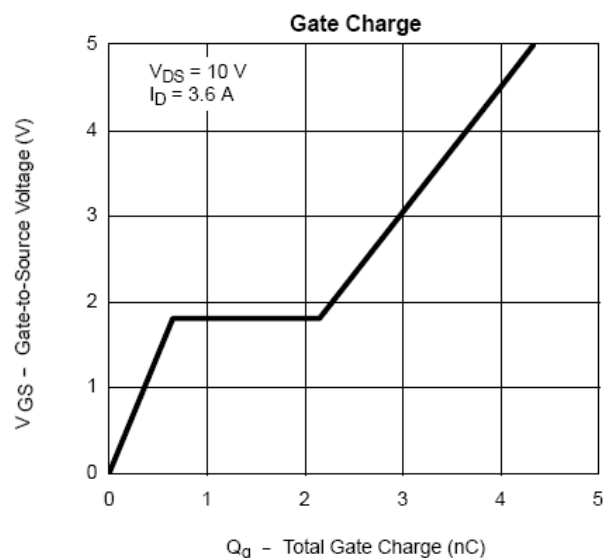
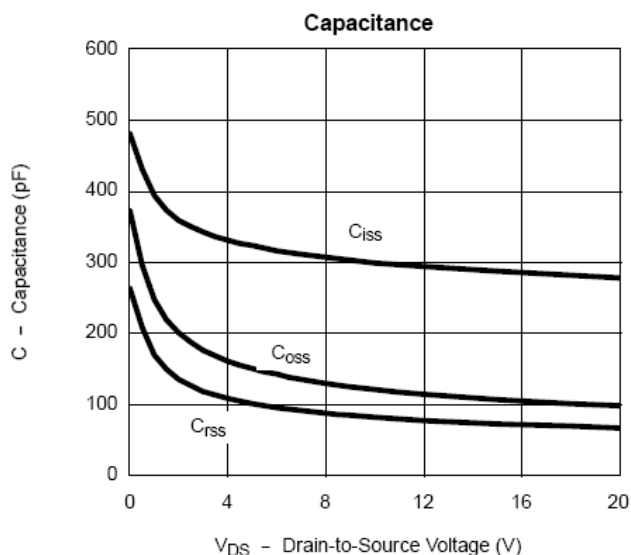
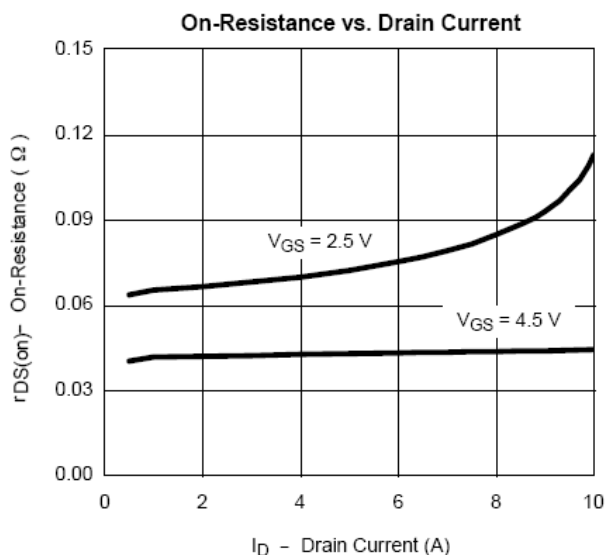
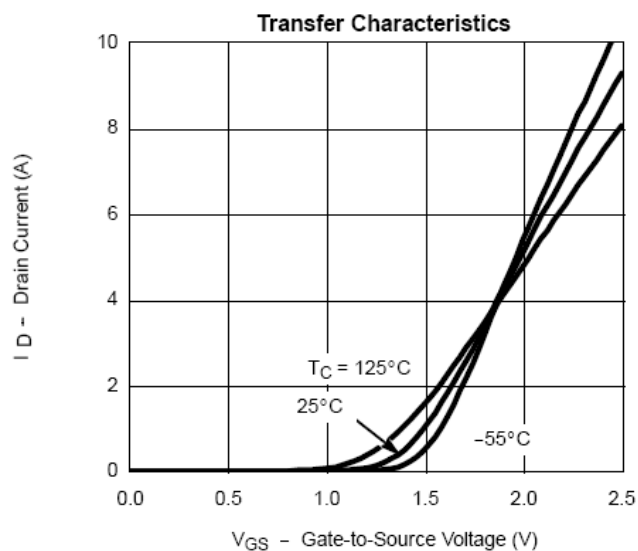
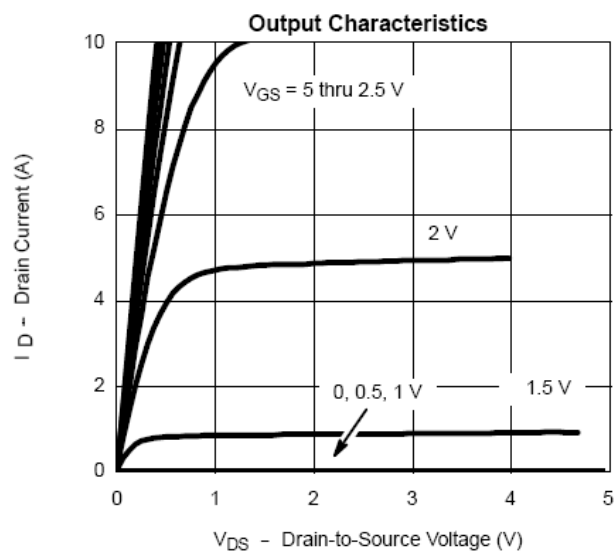
MEM2302X

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	20	23		V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D =250 μ A	0.51	0.53	0.85	V
Gate-Body Leakage	I _{GSS}	V _{DS} =0V, V _{GS} =8V		1.6	100	nA
		V _{DS} =0V, V _{GS} =-8V		-0.2	-100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V V _{GS} =0V		6.3	1000	nA
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =4.5V, I _D =3A		29	50	m Ω
		V _{GS} =2.5V, I _D =2A		36	65	m Ω
Forward Transconductance	g _{FS}	V _{DS} = 5 V, I _D = 3.6A		8		S
Source-drain (diode forward) voltage	V _{SD}	V _{GS} =0V, I _S =1.25A	0.4	0.7	1	V
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz		300		pF
Output Capacitance	C _{oss}			120		
Reverse Transfer Capacitance	C _{rss}			80		
Switching Characteristics						
Turn-On Delay Time	td(on)	V _{DD} = 15 V, R _L = 2.8 Ω I _D =3.6A V _{GEN} = 4.5V, R _g = 36 Ω		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 _g	V _{DS} = 10V, V _{GS} = 4.5 V, I _D = 3.6A		4	10	nC
Gate-Source Charge	Q _{gs}			0.65		
Gate-Drain Charge	Q _{gd}			1.5		

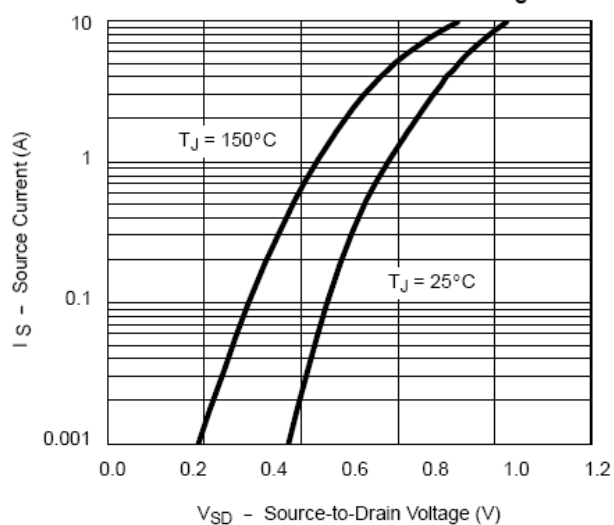
1、Repetitive rating, pulse width limited by junction temperature.

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

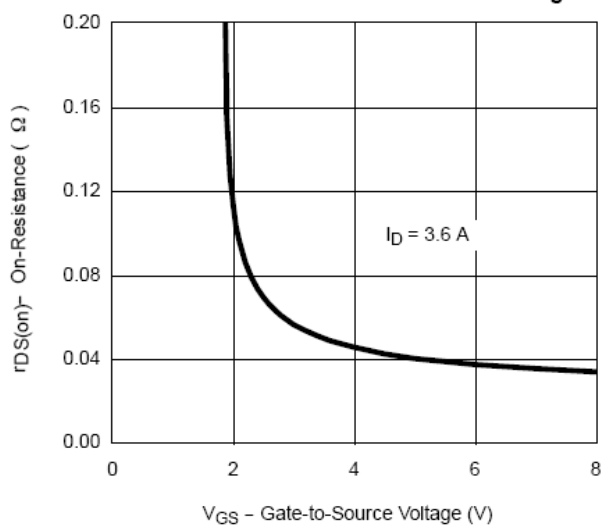
Typical Performance Characteristics



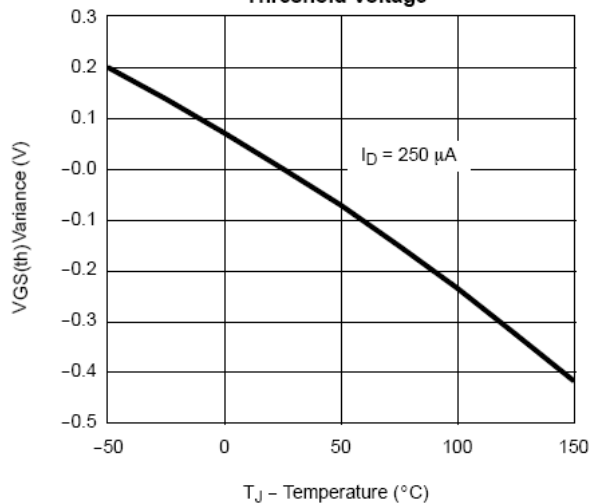
Source-Drain Diode Forward Voltage



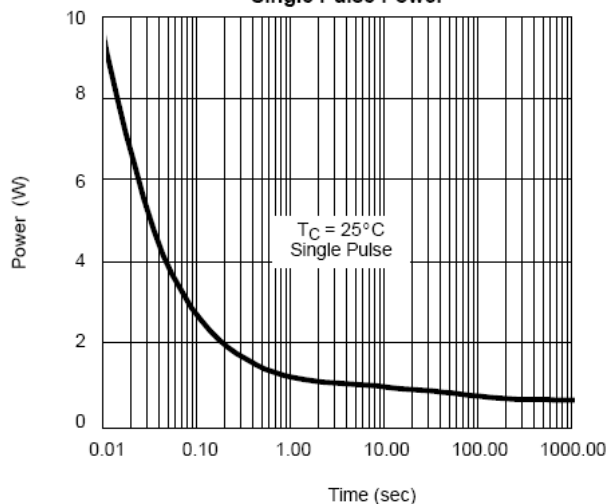
On-Resistance vs. Gate-to-Source Voltage



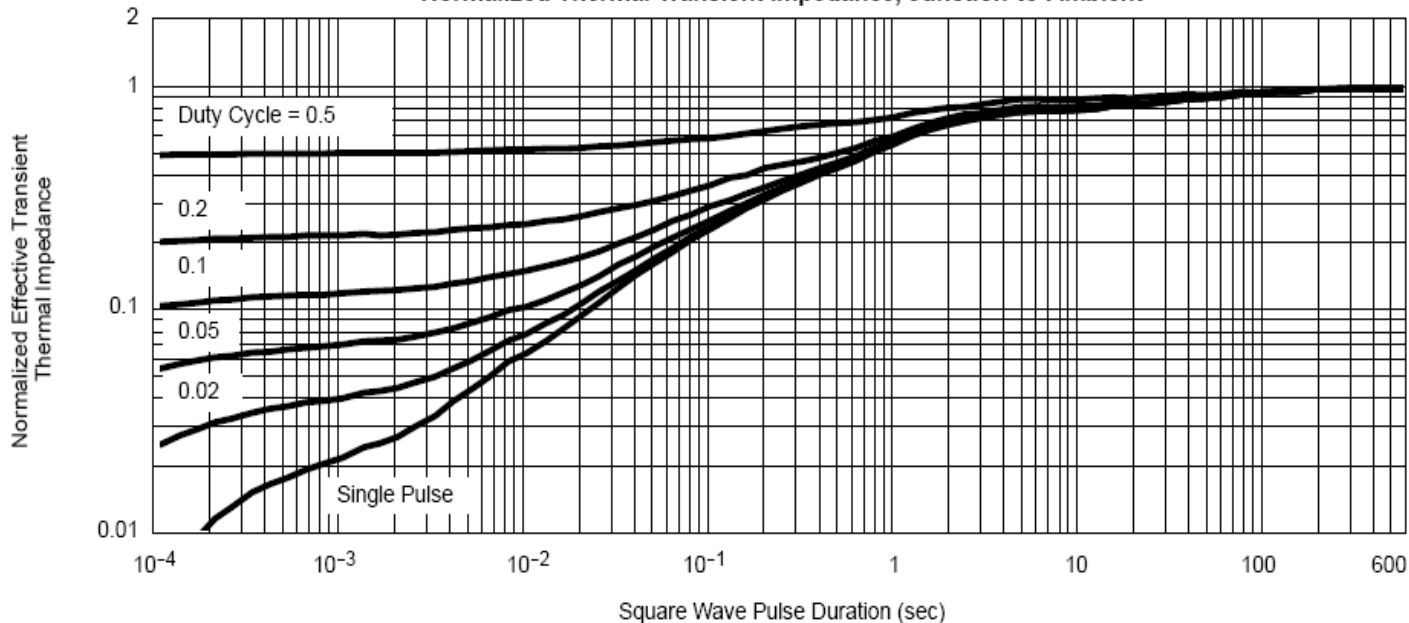
Threshold Voltage



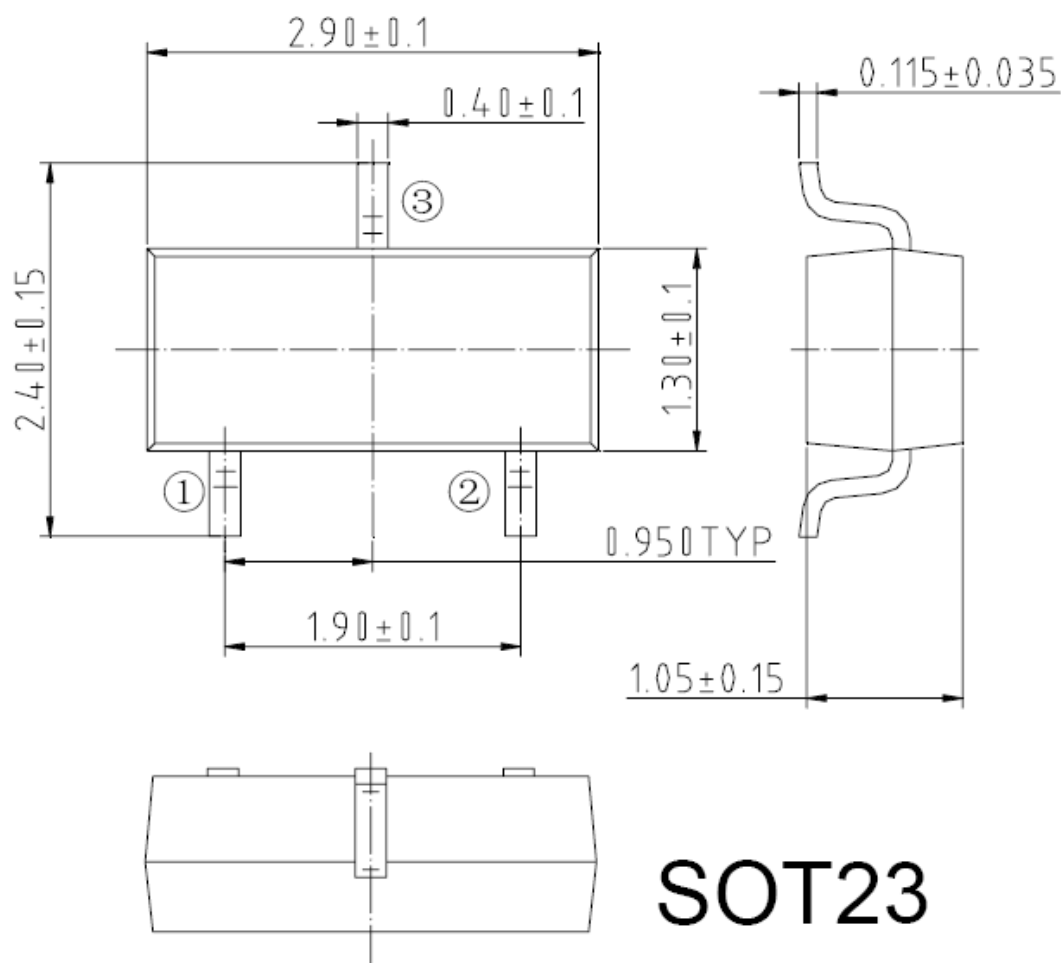
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient



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