

N-Channel MOSFET MEM2310X

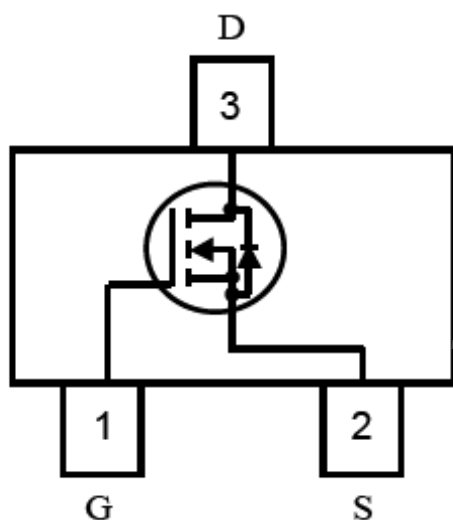
General Description

MEM2310XG 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

- 30V/5.8A
 $R_{DS(ON)} = 25m\Omega @ V_{GS} = 10V, I_D = 5.8A$
 $R_{DS(ON)} = 28m\Omega @ V_{GS} = 4.5V, I_D = 5A$
 $R_{DS(ON)} = 37m\Omega @ V_{GS} = 2.5V, I_D = 4A$
- 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}	30V	V
Gate-Source Voltage		V_{GSS}	± 12	V
Drain Current	$T_A = 25^\circ C$	I_D	5.8	A
	$T_A = 70^\circ C$		4.9	
Pulsed Drain Current ^{1,2}		I_{DM}	30	A
Total Power Dissipation	$T_A = 25^\circ C$	P_d	1.4	W
	$T_A = 70^\circ C$		1	
operating junction temperature		T_j	150	$^\circ C$
Storage Temperature Range		T_{stg}	-65/150	$^\circ C$

Thermal Characteristics

Parameter		Symbol	TYP.	MAX.	Unit
Thermal Resistance, Junction-to-Ambient	t≤10s	R θ JA	65	90	°C/W
Thermal Resistance, Junction-to-Ambient	Steady-State	R θ JA	85	125	°C/W
Thermal Resistance, Junction-to-Lead	Steady-State	R θ JL	43	60	°C/W

Electrical Characteristics

MEM2310X

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	0.88	1.4	V
Gate-Body Leakage	I _{GSS}	V _{DS} =0V, V _{GS} =12V		0.5	100	nA
		V _{DS} =0V, V _{GS} =-12V		-0.2	-100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =24V V _{GS} =0V			1000	nA
Static Drain-Source On-Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =5.8A		25	30	m Ω
		V _{GS} =4.5V, I _D =5A		28	33	m Ω
		V _{GS} =2.5V, I _D =4A		37	50	m Ω
Forward Transconductance	g _{FS}	V _{DS} = 5 V, I _D = 5A	10	15		S
Maximum Body-Diode Continuous Current	I _S				2.5	A
Source-drain (diode forward) voltage	V _{SD}	V _{GS} =0V, I _D =1A		0.72	1.0	V
Dynamic Characteristics						
Input Capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz		823	1030	pF
Output Capacitance	C _{oss}			99		
Reverse Transfer Capacitance	C _{rss}			77		
Gate resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.2	3.6	Ω
Switching Characteristics						
Turn-On Delay Time	td(on)	V _{DD} = 15 V, R _L = 2.7 Ω V _{GEN} = 10V, R _g = 3 Ω		7	14	ns
Rise Time	tr			15	30	
Turn-Off Delay Time	td(off)			38	76	
Fall-Time	tf			3	6	
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 5.8A		11	14.3	nC
Gate-Source Charge	Q _{gs}			1.6	2.08	
Gate-Drain Charge	Q _{gd}			2.8	3.64	

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

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

Typical Performance Characteristics

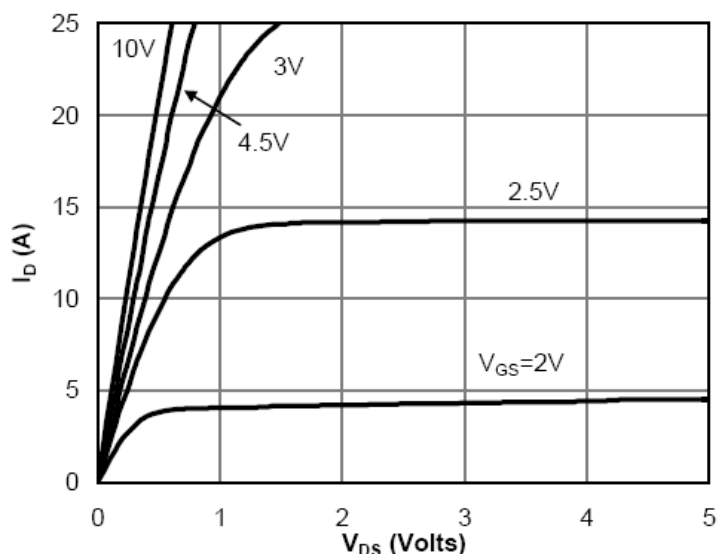


Fig 1: On-Region Characteristics

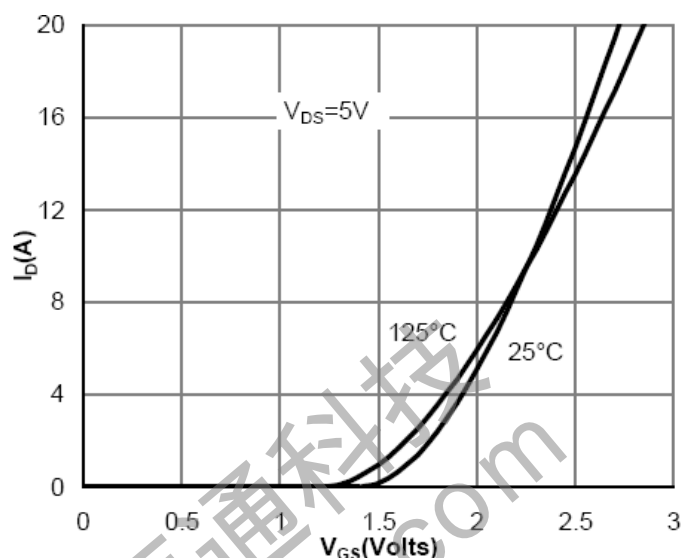


Figure 2: Transfer Characteristics

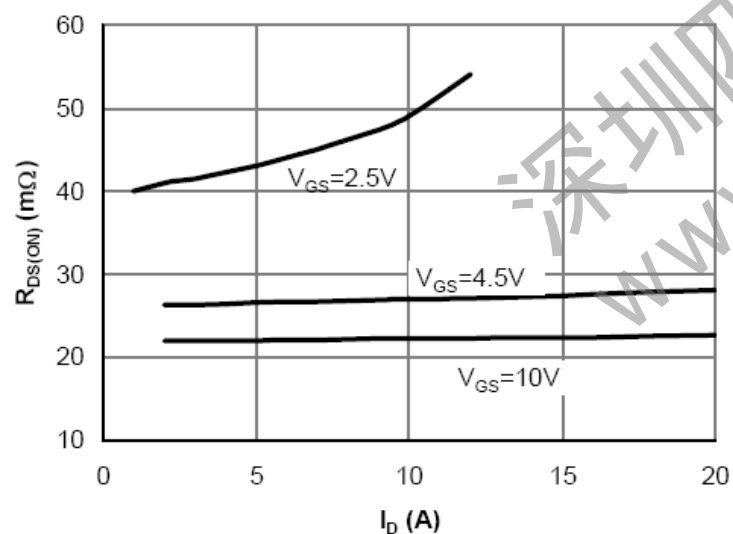


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

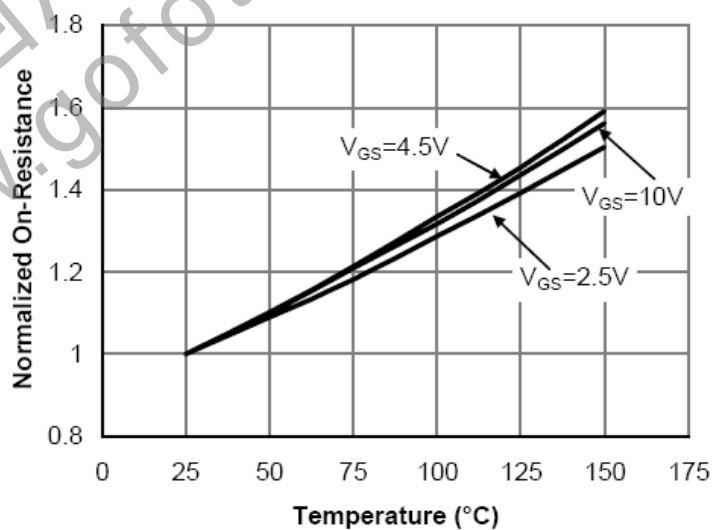


Figure 4: On-Resistance vs. Junction Temperature

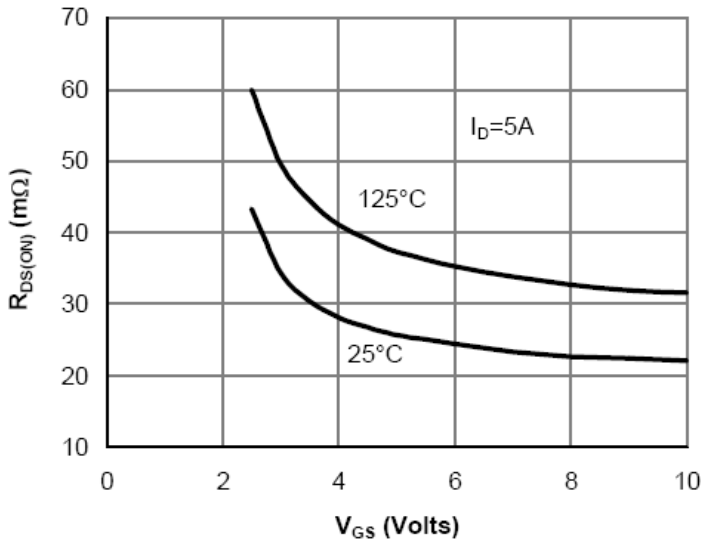


Figure 5: On-Resistance vs. Gate-Source Voltage

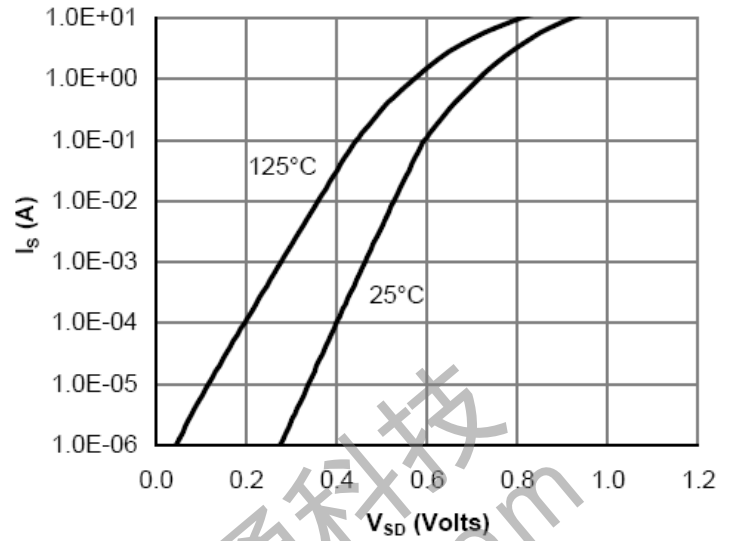


Figure 6: Body-Diode Characteristics

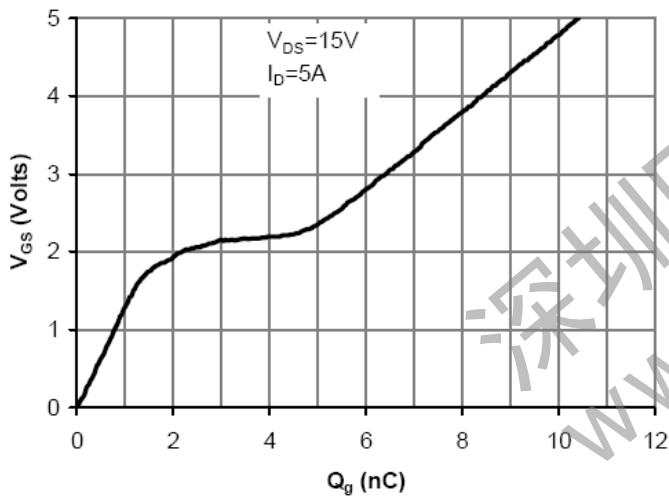


Figure 7: Gate-Charge Characteristics

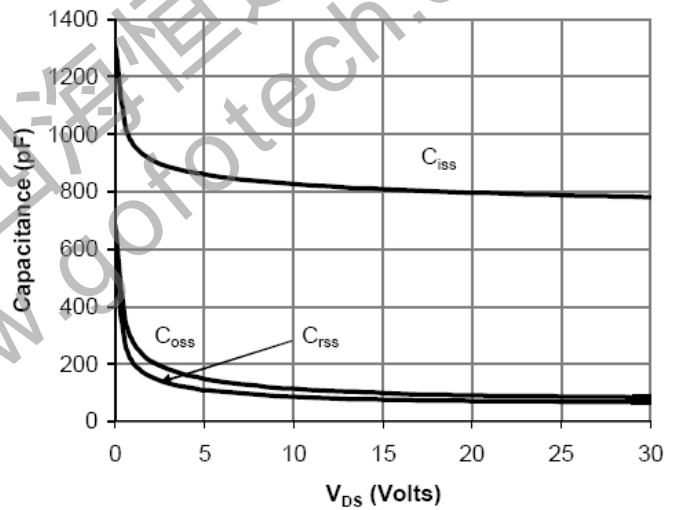


Figure 8: Capacitance Characteristics

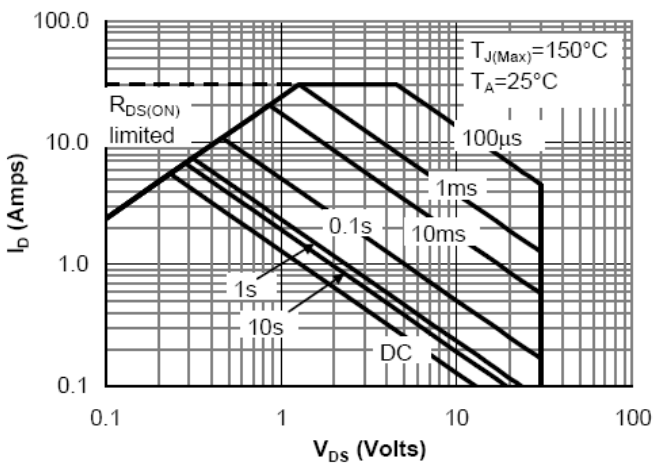


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

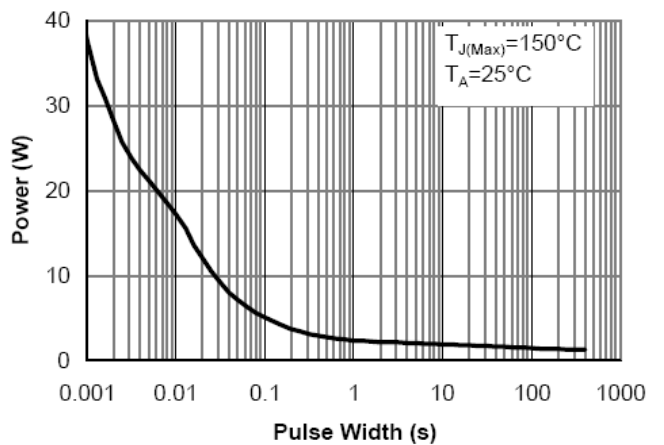


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

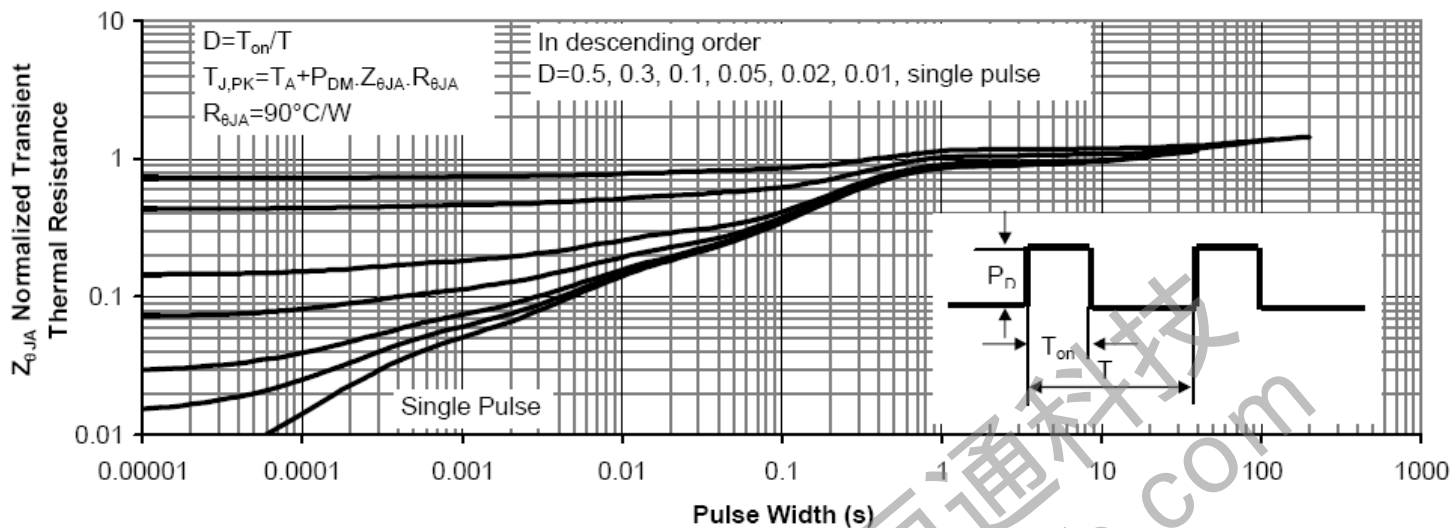
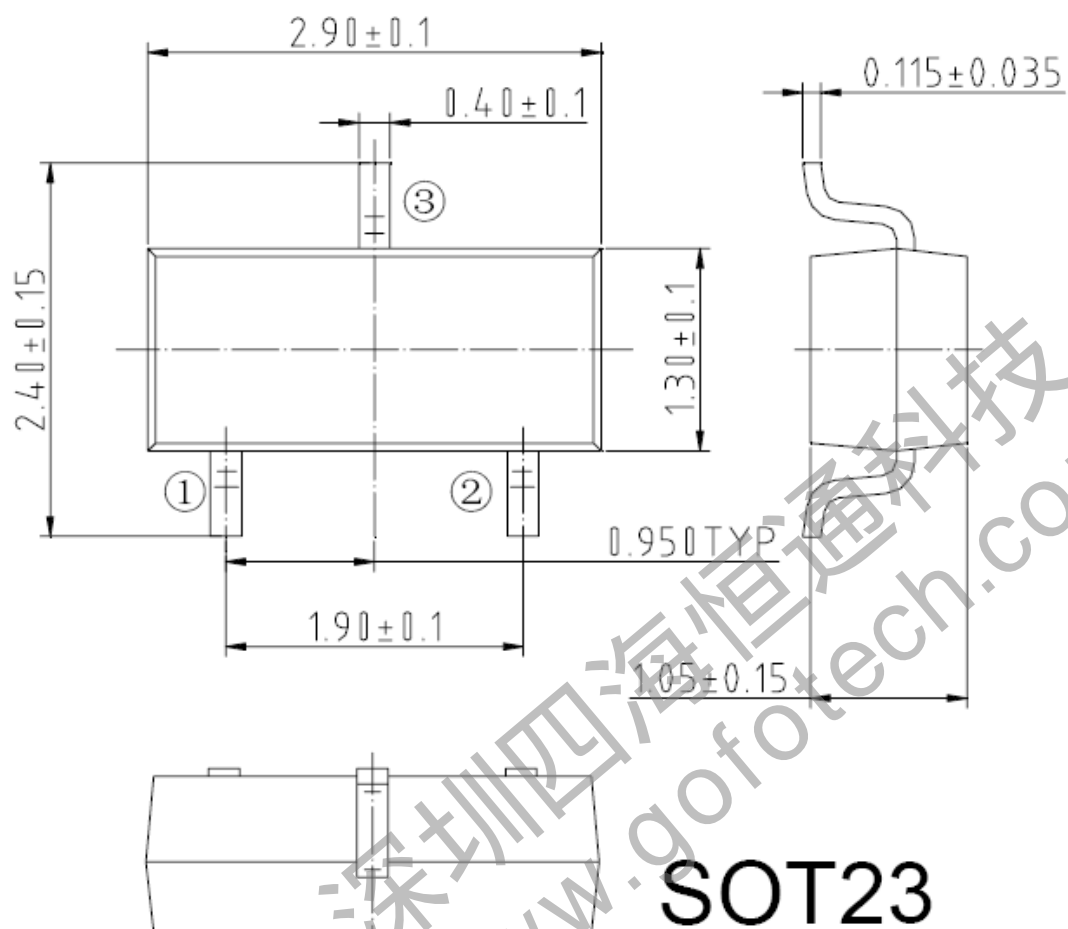


Figure 11: Normalized Maximum Transient Thermal Impedance

Package Information



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