P-Channel MOSFET MEM2307XG

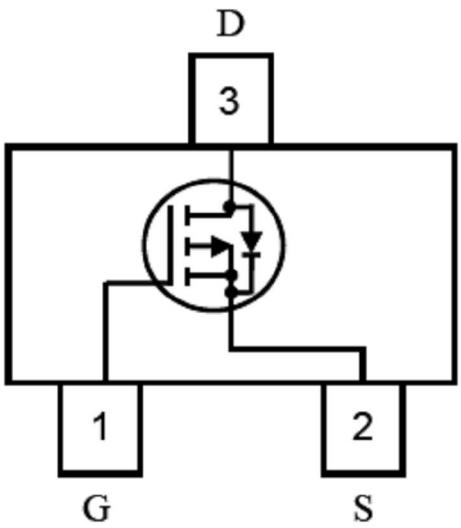
General Description

MEM2307XG 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/-4.1A
  $R_{DS(ON)}$＜88mΩ@ V_{GS}=-10V,I_D=-4.1A
  $R_{DS(ON)}$＜108mΩ@ V_{GS}=-4.5V,I_D=-3A
- 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}	±20	V
Drain Current	T_A=25℃	I_D	-4.1	A
	T_A=70℃		-3.5	
Pulsed Drain Current[1,2]		I_{DM}	-20	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}	-55/150	℃

Thermal Characteristics

Parameter		Symbol	TYP.	MAX.	Unit
Thermal Resistance, Junction-to-Ambient	t≤10s	$R_{\theta JA}$	65	90	℃/W
Thermal Resistance, Junction-to-Ambient	Steady-State	$R_{\theta JA}$	85	125	℃/W
Thermal Resistance, Junction-to-Lead	Steady-State	$R_{\theta JL}$	43	60	℃/W

Electrical Characteristics

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250uA	-30			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=-250uA	-1	-1.3	-2	V
Gate-Body Leakage	I_{GSS}	V_{DS}=0V，V_{GS}=20V			100	nA
		V_{DS}=0V，V_{GS}=-20V			-100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V V_{GS}=0V			-1000	nA
Static Drain-Source On-Resistance	$R_{DS(ON)1}$	V_{GS}=-10V,I_D=-4.1A			88	mΩ
	$R_{DS(ON)2}$	V_{GS}=-4.5V,I_D=-3A			108	mΩ
Forward Transconductance	g_{FS}	V_{DS} = –5 V, I_D = –4A	5.5	8.2		S
Maximum Body-Diode Continuous Current	Is				-2.2	A
Source-drain (diode forward) voltage	V_{SD}	V_{GS}=0V,I_D=-1A		0.77	-1.0	V
Dynamic Characteristics						
Input Capacitance	Ciss	VGS=0V, VDS=-15V, f=1MHz		700	840	pF
Output Capacitance	Coss			120		
Reverse Transfer Capacitance	Crss			75		
Gate resistance	Rg	VGS=0V, VDS=0V, f=1MHz		10	15	Ω
Switching Characteristics						
Turn-On Delay Time	td(on)	VGS=-10V,VDS=-15V, RL=3.6Ω,RGEN=6Ω		8.6		ns
Rise Time	tr			5		
Turn-Off Delay Time	td(off)			28.2		
Fall-Time	tf			13.5		
Total Gate Charge	Qg	V_{DS} = -15 V, V_{GS} = -4.5 V, I_D = -4A		14.3		nc
Gate-Source Charge	Qgs			3.1		
Gate-Drain Charge	Qgd			3		

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

2、The static characteristics are obtained using 80 μs pulses, duty cycle 0.5% max.

Typical Performance Characteristics

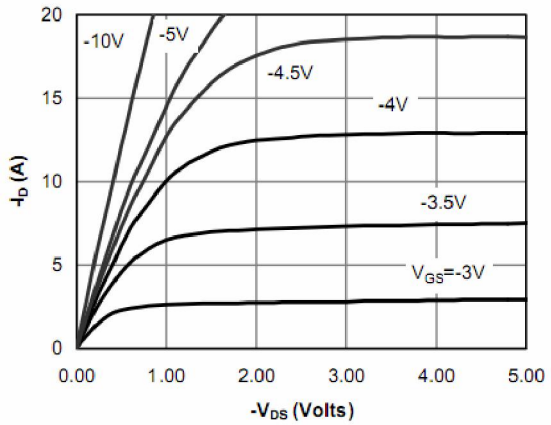


Figure 1: On-Region Characteristics

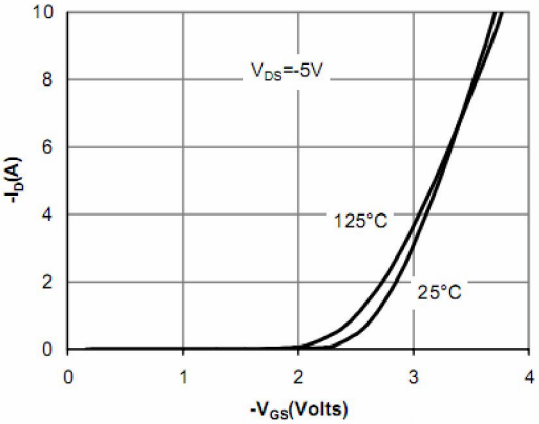


Figure 2: Transfer Characteristics

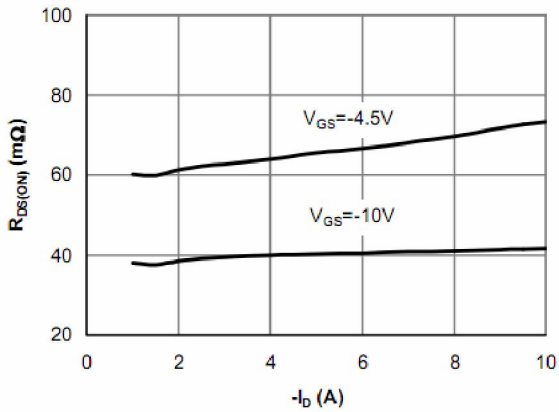


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

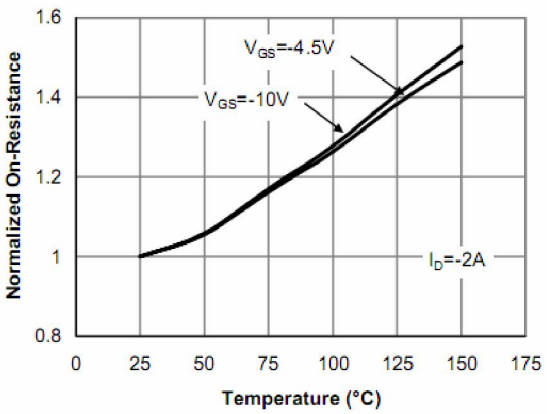


Figure 4: On-Resistance vs. Junction Temperature

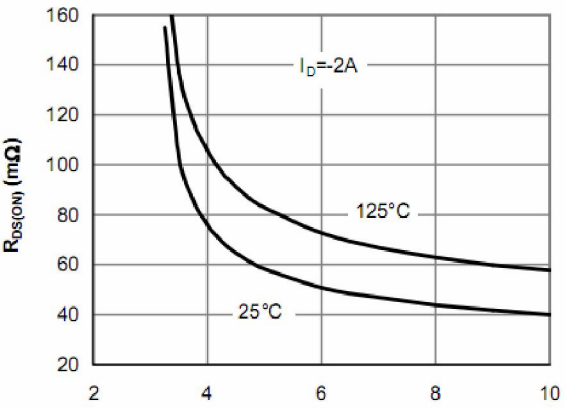


Figure 5: On-Resistance vs. Gate-Source Voltage

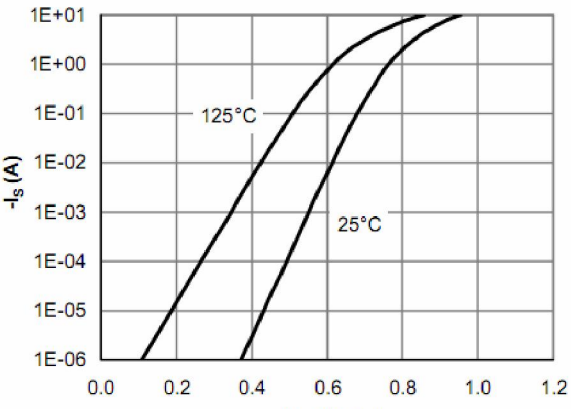


Figure 6: Body-Diode Characteristics

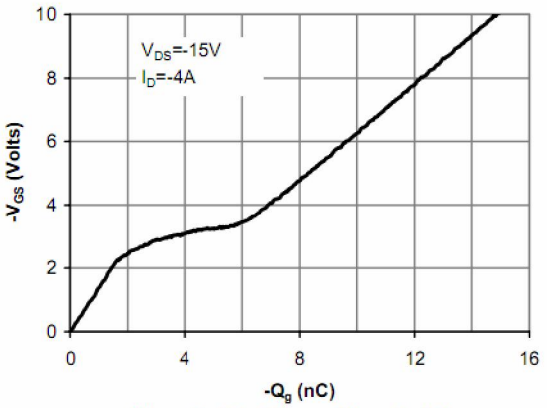


Figure 7: Gate-Charge Characteristics

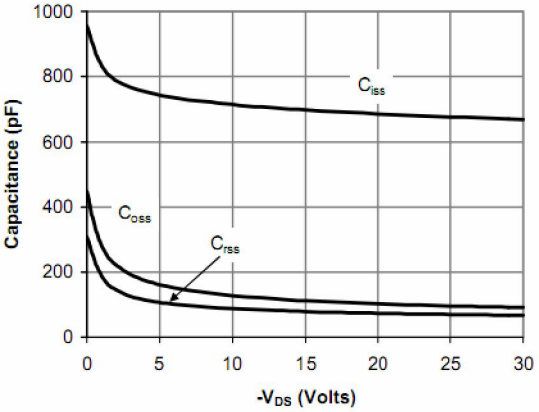


Figure 8: Capacitance Characteristics

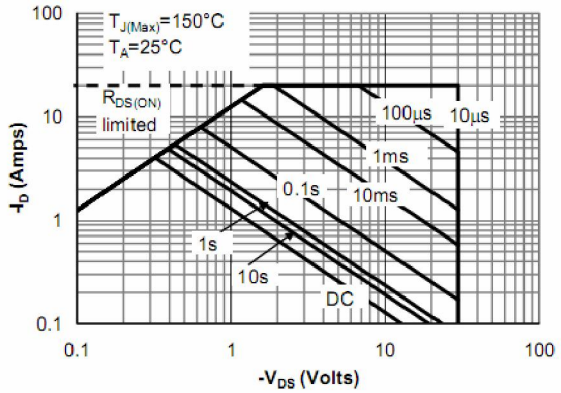


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

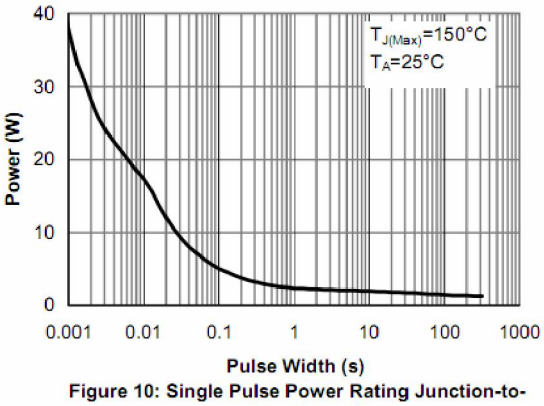


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

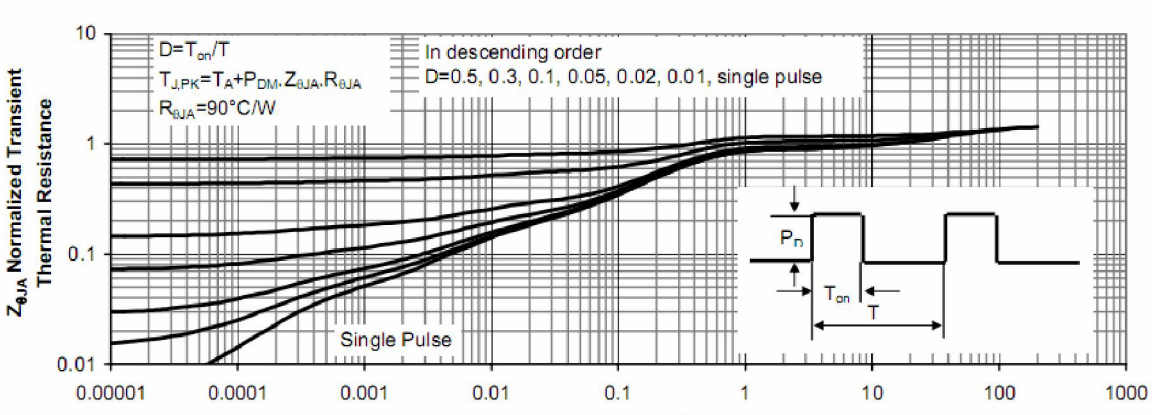
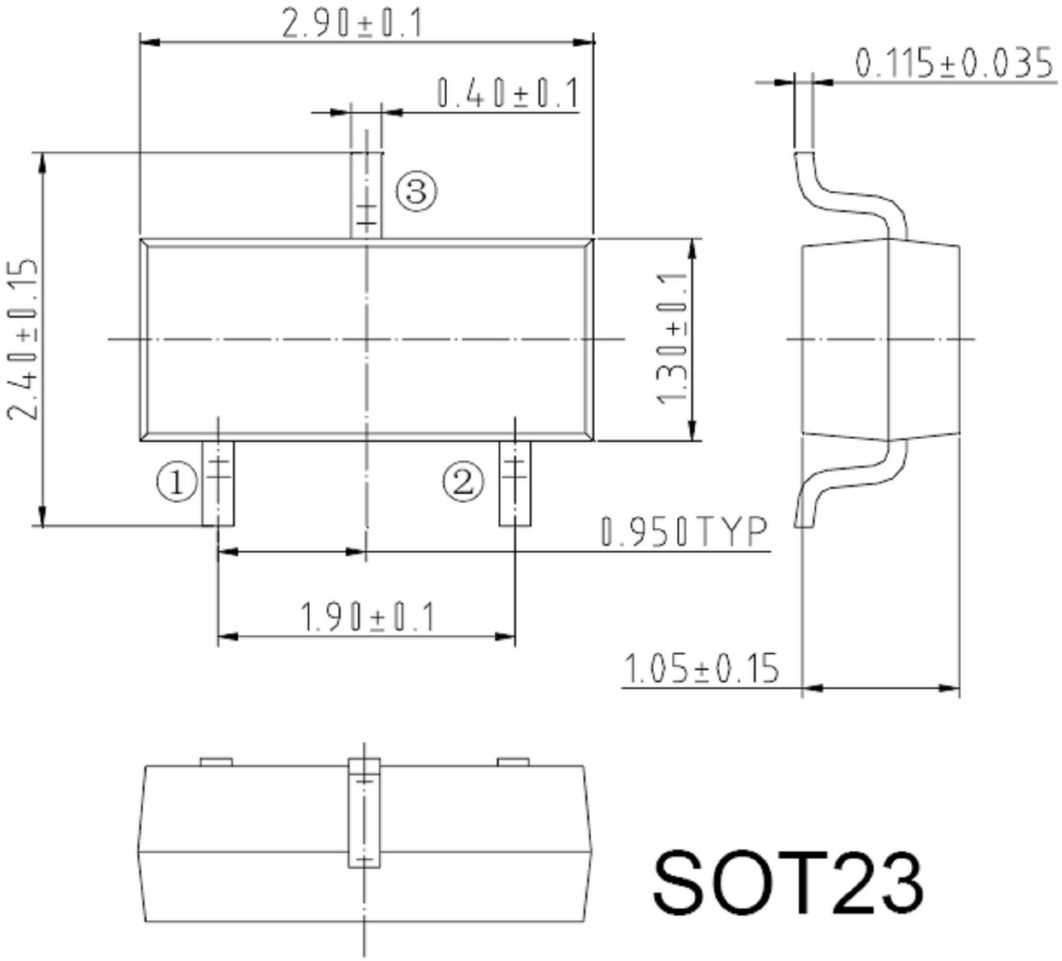


Figure 11: Normalized Maximum Transient Thermal Impedance

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.