P-Channel MOSFET MEM2307XG

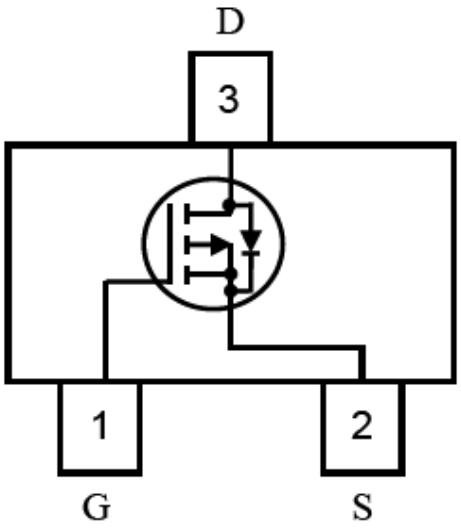
General Description

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_S=-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

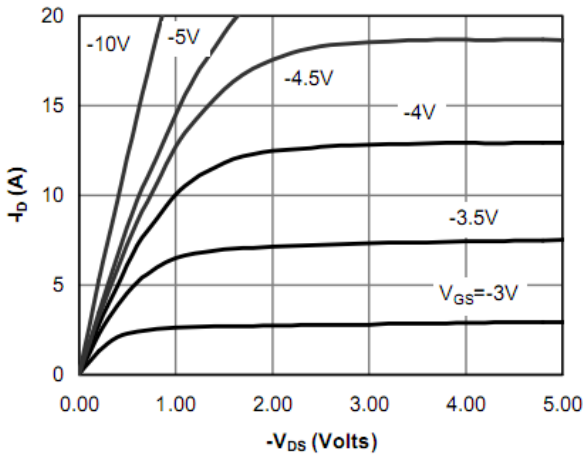


Figure 1: On-Region Characteristics

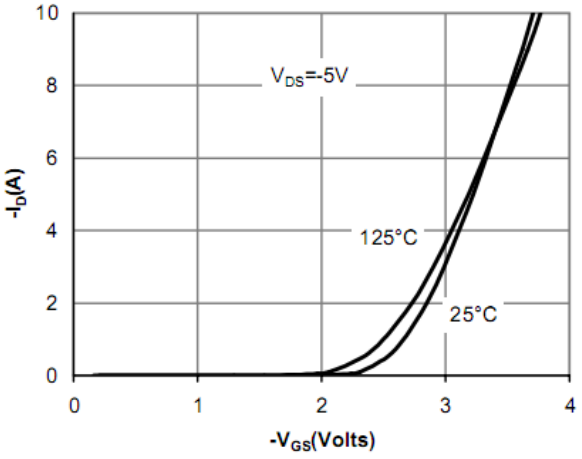


Figure 2: Transfer Characteristics

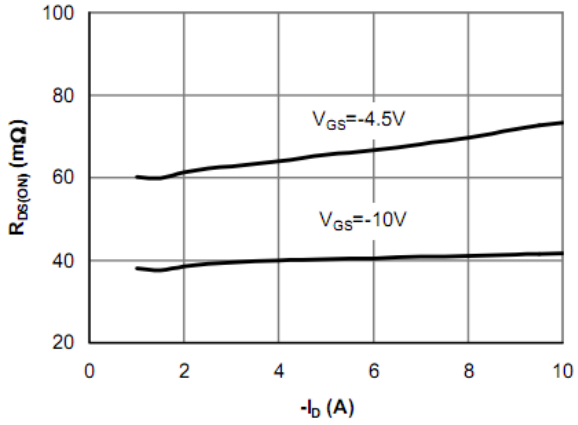


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

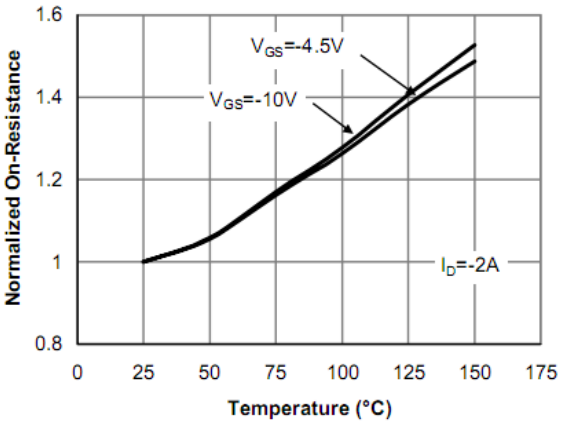


Figure 4: On-Resistance vs. Junction Temperature

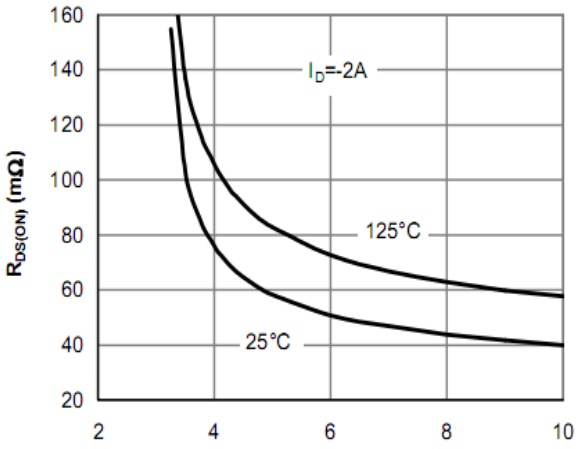


Figure 5: On-Resistance vs. Gate-Source Voltage

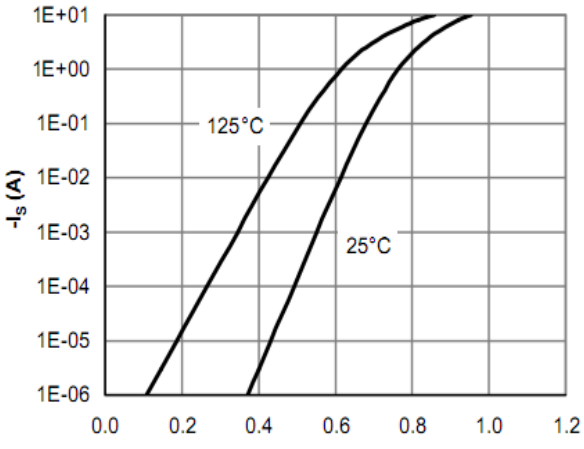


Figure 6: Body-Diode Characteristics

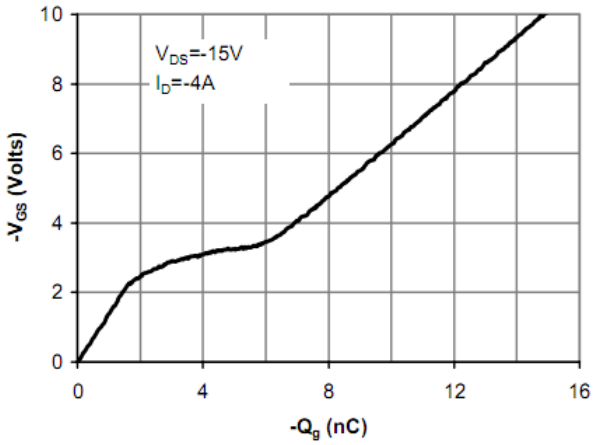


Figure 7: Gate-Charge Characteristics

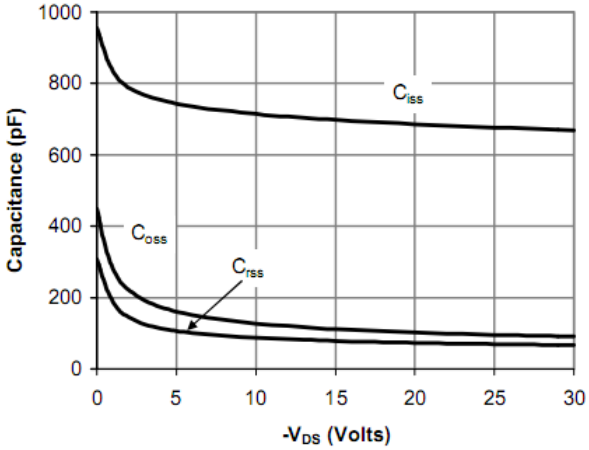


Figure 8: Capacitance Characteristics

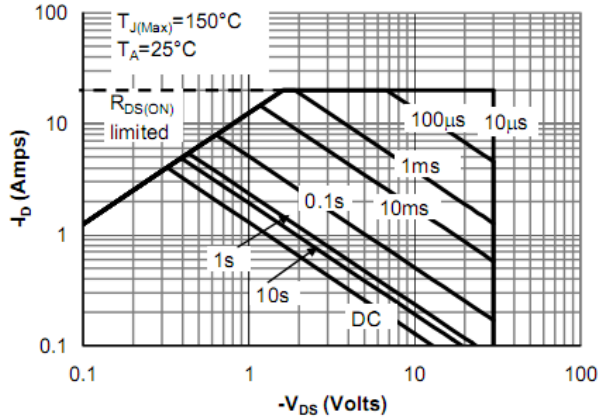


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

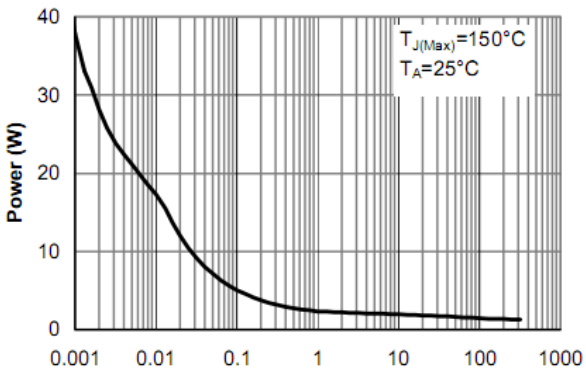


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

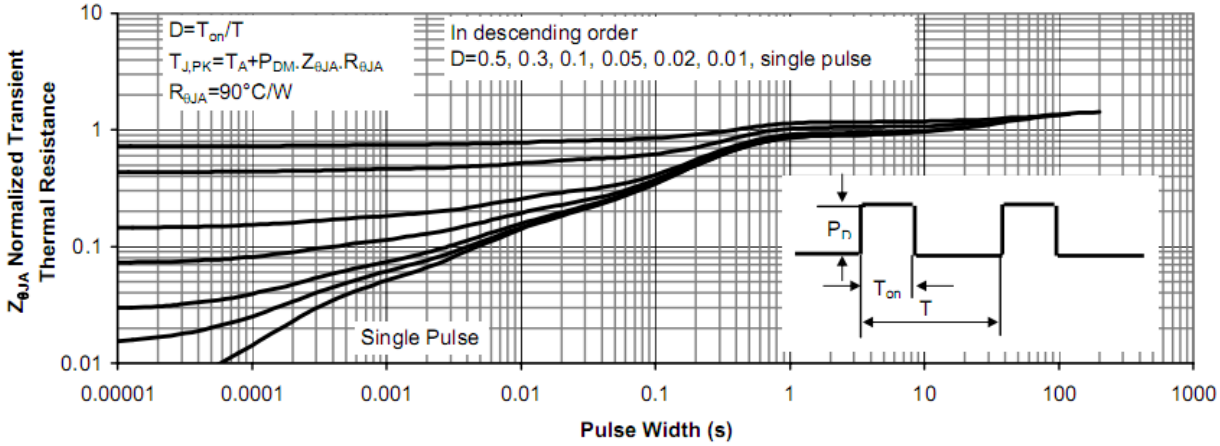
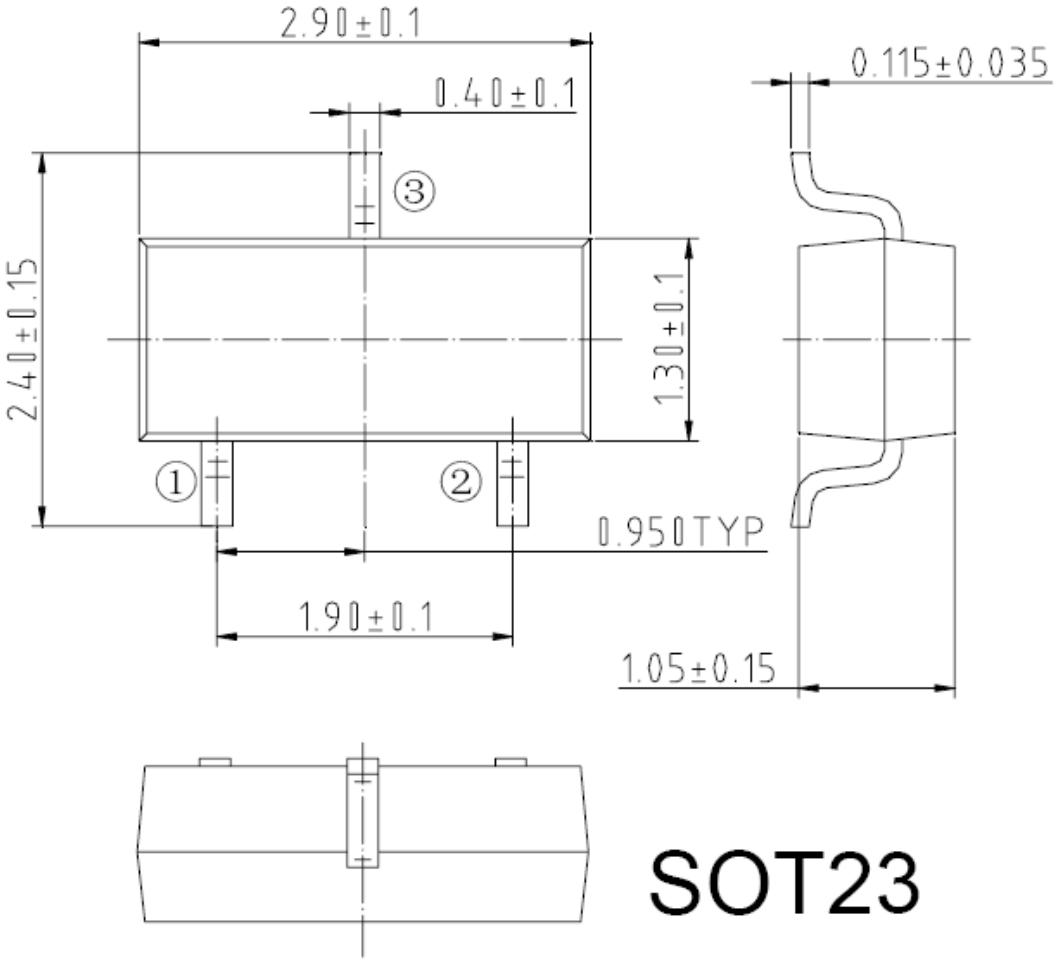


Figure 11: Normalized Maximum Transient Thermal Impedance

Package Information



SOT23

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