

P-Channel MOSFET MEM2307M3G

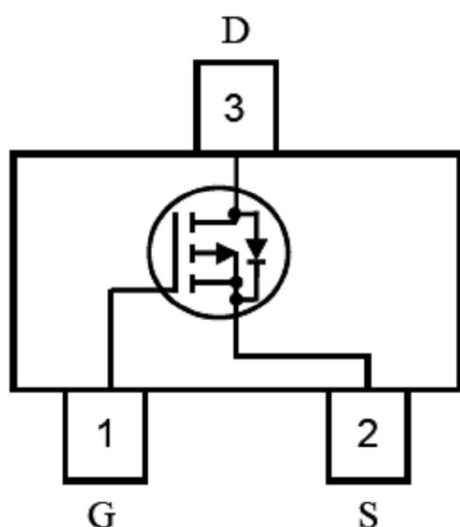
General Description

MEM2307M3G 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
- | $R_{DS(ON)} < 88m\Omega @ V_{GS} = -10V, I_D = -4.1A$
- | $R_{DS(ON)} < 108m\Omega @ V_{GS} = -4.5V, I_D = -3A$
- | High Density Cell Design For Ultra Low On-Resistance
- | Subminiature surface mount package: SOT23-3

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	$T_A = 25$	P_d	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	$t \leq 10s$	$R_{\theta JA}$	65	90	$^{\circ}W$
Thermal Resistance, Junction-to-Ambient	Steady-State	$R_{\theta JA}$	85	125	$^{\circ}W$
Thermal Resistance, Junction-to-Lead	Steady-State	$R_{\theta JL}$	43	60	$^{\circ}W$

Electrical Characteristics

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-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	m Ω
	$R_{DS(ON)2}$	$V_{GS}=-4.5V, I_D=-3A$			108	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=-5V, I_D=-4A$	5.5	8.2		S
Maximum Body-Diode Continuous Current	I_S				-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	C_{iss}	$V_{GS}=0V, V_{DS}=-15V, f=1MHz$		700	840	pF
Output Capacitance	C_{oss}			120		
Reverse Transfer Capacitance	C_{rss}			75		
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, f=1MHz$		10	15	Ω
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=-10V, V_{DS}=-15V, R_L=3.6\Omega, R_{GEN}=6\Omega$		8.6		ns
Rise Time	t_r			5		
Turn-Off Delay Time	$t_{d(off)}$			28.2		
Fall-Time	t_f			13.5		
Total Gate Charge	Q_g	$V_{DS}=-15V, V_{GS}=-4.5V, I_D=-4A$		14.3		nC
Gate-Source Charge	Q_{gs}			3.1		
Gate-Drain Charge	Q_{gd}			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

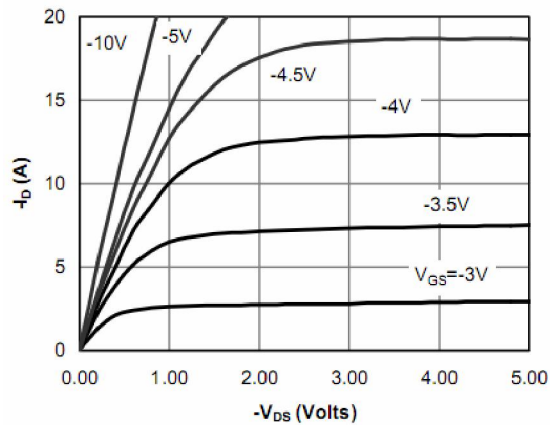


Figure 1: On-Region Characteristics

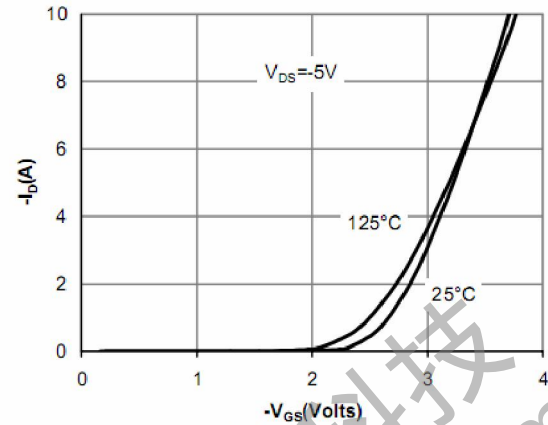


Figure 2: Transfer Characteristics

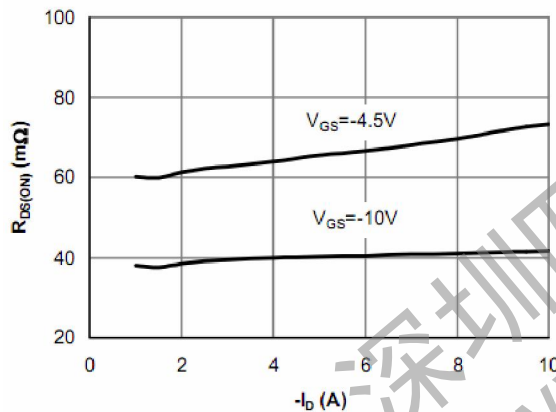


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

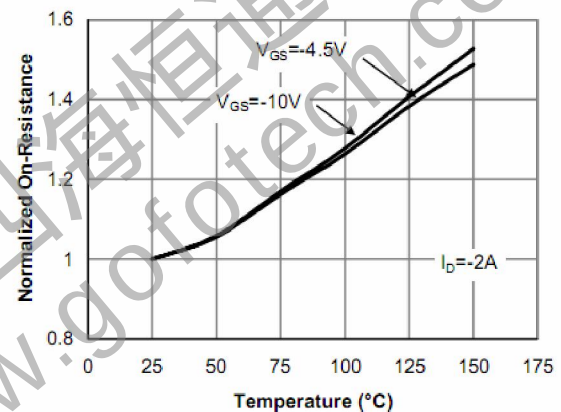


Figure 4: On-Resistance vs. Junction Temperature

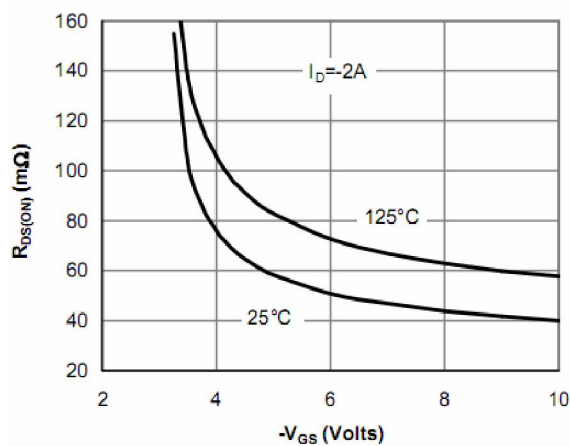


Figure 5: On-Resistance vs. Gate-Source Voltage

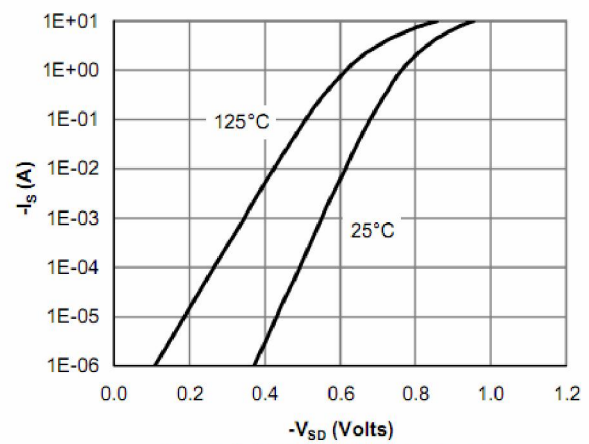


Figure 6: Body-Diode Characteristics

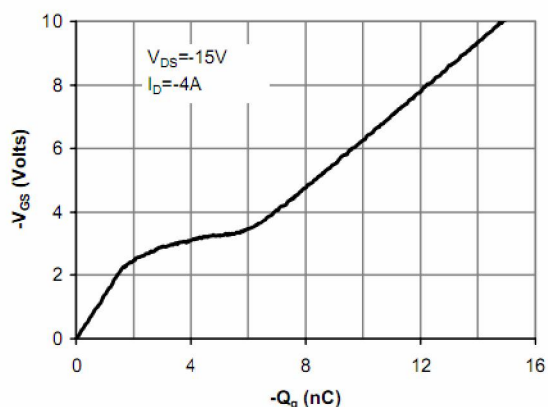


Figure 7: Gate-Charge Characteristics

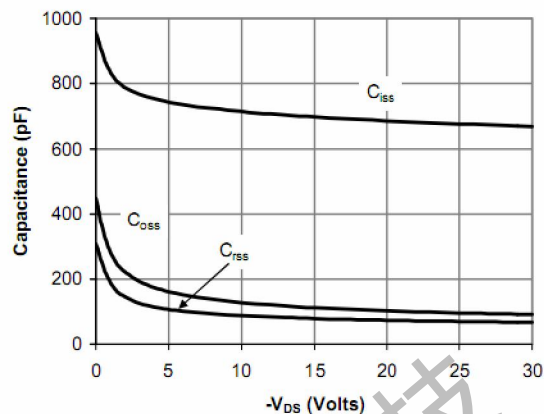


Figure 8: Capacitance Characteristics

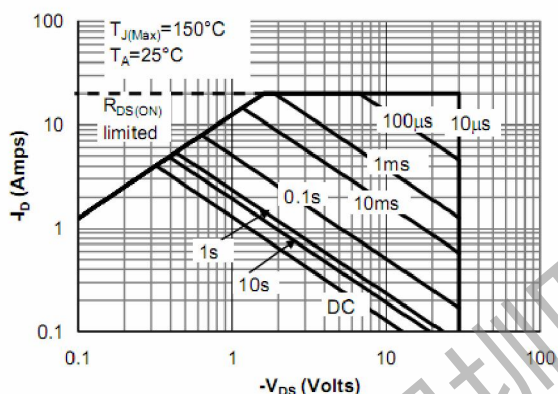


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

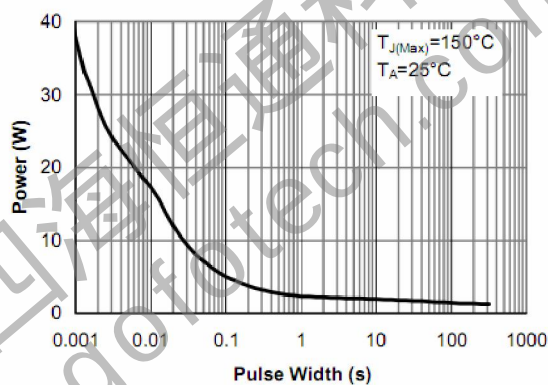


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

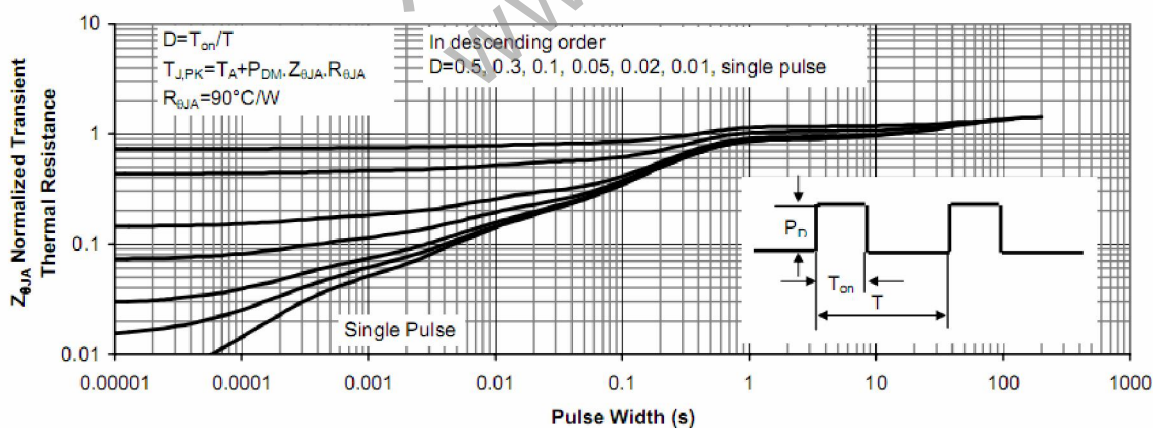


Figure 11: Normalized Maximum Transient Thermal Impedance

Package Information

Packaging Type: SOT23-3

