P-Channel MOSFET MEM2313SG

General Description

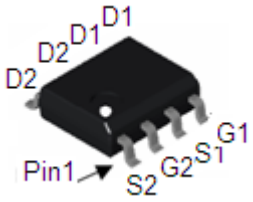
MEM2313SG Series Dual P-channel enhancement mode field-effect transistor, produced with high cell density DMOS trench technology, which is especially used to minimize on-state resistance. This device particularly suits low voltage applications, and low power dissipation.

Features

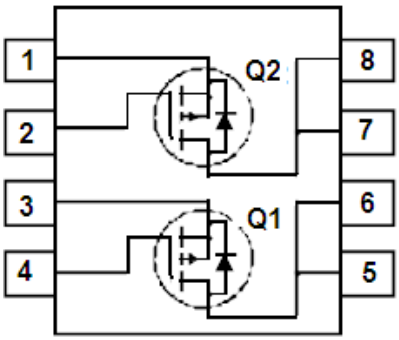
- 30V/-6A

  $R_{DS(ON)}$ =52mΩ@ V_{GS}=-10V,I_D=-6A

  $R_{DS(ON)}$ =67mΩ@ V_{GS}=-4.5V,I_D=-4A
- High Density Cell Design For Ultra Low On-Resistance
- Surface mount package:SOP8



Pin Configuration



Typical Application

- Power management
- Load switch
- Battery protection

Absolute Maximum Ratings

Parameter		Symbol	Ratings	Units
Drain-Source Voltage		V_{DSS}	-30V	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current	T_A=25℃	I_D	-6	A
	T_A=70℃		-4	
Pulsed Drain Current[1,2]		I_{DM}	-30	A
Total Power Dissipation	T_A=25℃	Pd	1.3	W
	T_A=70℃		0.8	
Operating Junction Temperature Range		T_J	-40 ~ 150	℃
Storage Temperature Range		T_{stg}	-55 ~ 150	℃

Thermal Characteristics

Parameter		Symbol	Ratings	Units
Thermal Resistance, Junction-to-Ambient[3]	Steady-State	$R_{\theta JA}$	62.5	℃/W

Electrical Characteristics

Parameter	Symbol	Test Condition	Min	Typ.	Max	Units
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=-250μA	-30	-34		V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}= V_{GS}, I_D=-250μA	-1.0	-1.3	-2.5	V
Gate-Body Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=20V		0.8	100	nA
		V_{DS}=0V, V_{GS}=-20V		-0.8	-100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V , V_{GS}=0V		-3.5	-300	nA
Static Drain-Source On-Resistance	$R_{DS(ON)1}$	V_{GS}=-10V, I_D=-6A	33	52	65	mΩ
	$R_{DS(ON)2}$	V_{GS}=-4.5V, I_D=-4A	50	67	100	mΩ
Forward Transconductance	g_{FS}	V_{DS} = -5V, I_D = -5A		10		S
Drain-Source Diode Forward Current	I_S				-1.3	A
Source-drain (diode forward) voltage	V_{SD}	V_{GS}=0V, I_S=-1A		-0.8	-1.2	V
Dynamic Characteristics						
Input Capacitance	Ciss	V_{DS} = -15V,		530		pF
Output Capacitance	Coss	V_{GS} = 0V,		140		
Reverse Transfer Capacitance	Crss	f = 1MHz		70		
Switching Characteristics						
Turn-On Delay Time	td(on)	V_{DD} = -15V,		8	15	ns
Rise Time	tr	I_D=-1A,		15	25	
Turn-Off Delay Time	td(off)	V_{GEN} = -10V,		15	25	
Fall-Time	tf	Rg = 6Ω		10	17	
Total Gate Charge	Qg	V_{DS} = -15V,		10	15	nc
Gate-Source Charge	Qgs	V_{GS} = -5V,		2.2		
Gate-Drain Charge	Qgd	I_D = -5A		2		

1、Pulse width limited by Max. junction temperature.

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

3、Surface Mounted on FR4 Board, t < 10 sec.

Typical Performance Characteristics

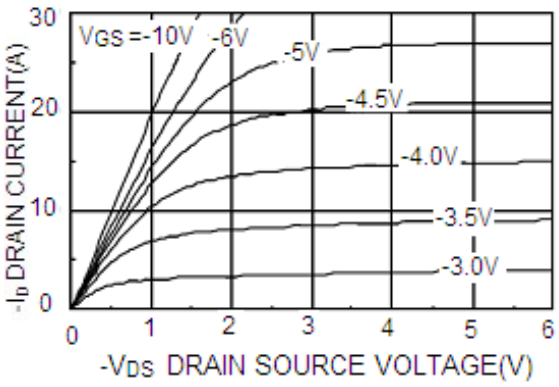


Fig.1 On-region characteristics

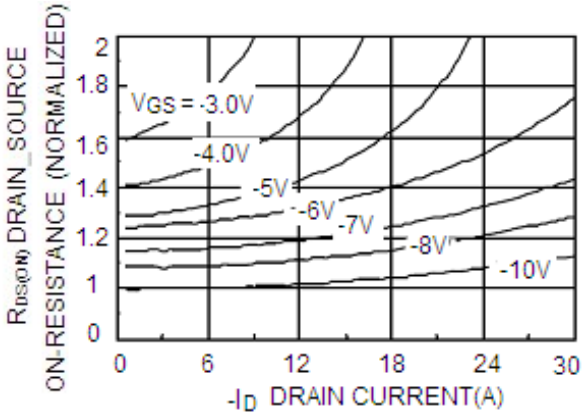


Fig.2 On_resistance variation with drain current and gate voltage

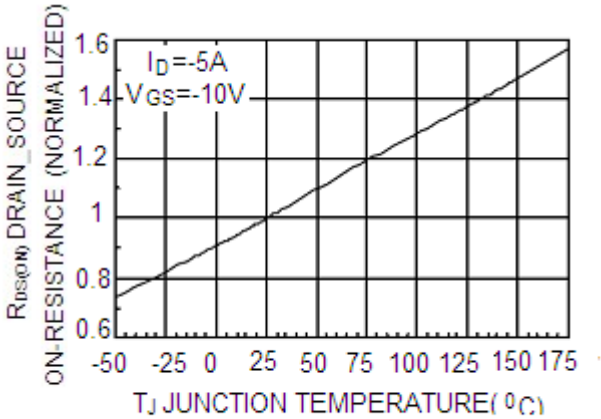


Fig.3 On-resistance viariation with temperature

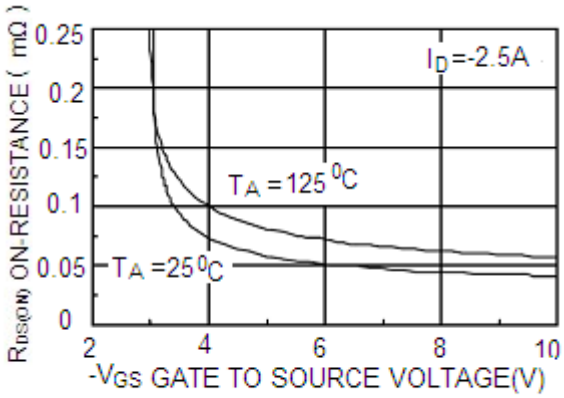


Fig.4 On-resistance variation with gate-to source voltage

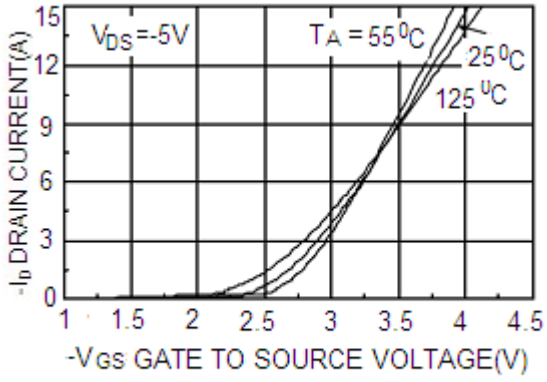


Fig.5 Transfer characteristics

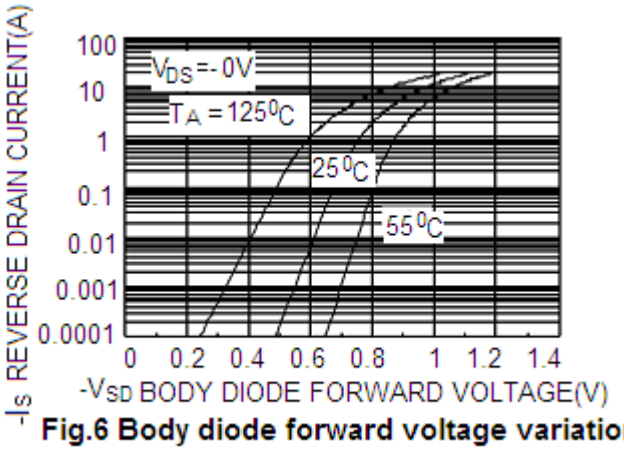


Fig.6 Body diode forward voltage variation with source current and temperature

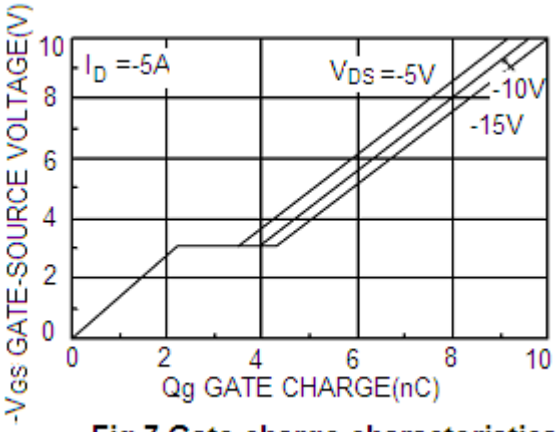


Fig.7 Gate charge characteristics

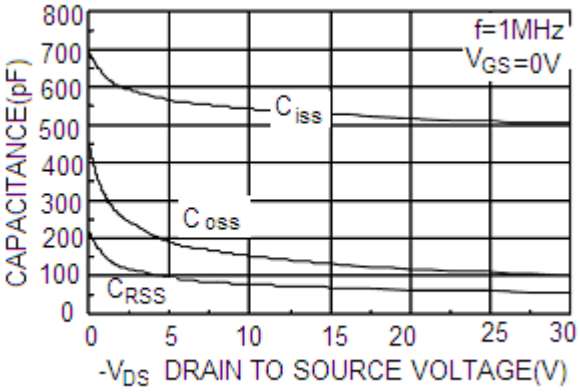


Fig.8 Capacitance characteristics

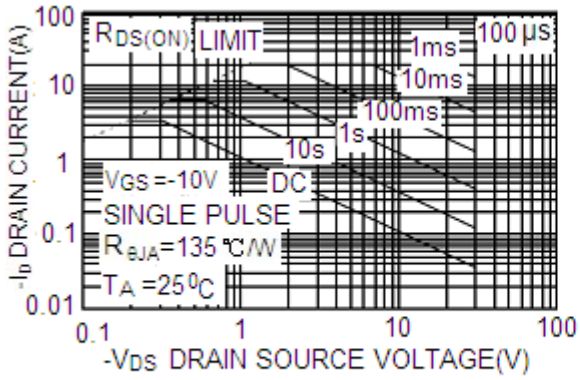


Fig.9 Maximum safe operating area

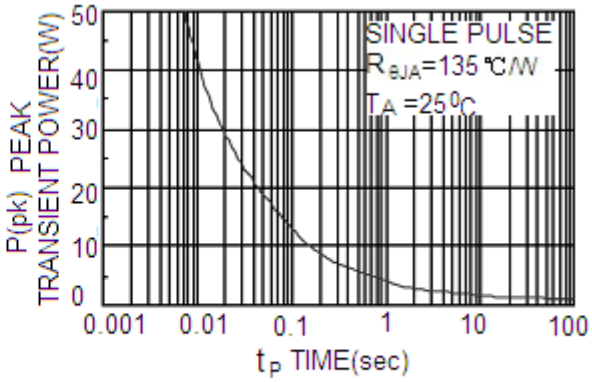


Fig.10 Single pulse maximum power dissipation

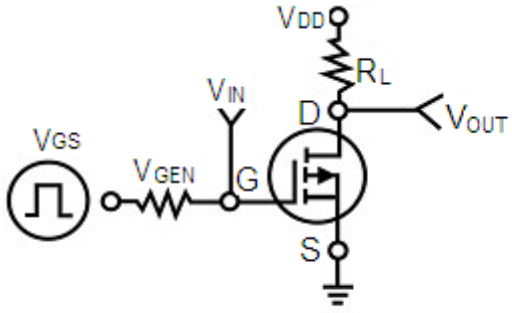


Fig.11 Switching test circuit

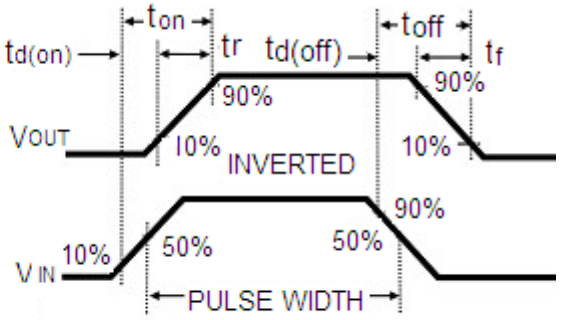


Fig.12 Switching waveforms

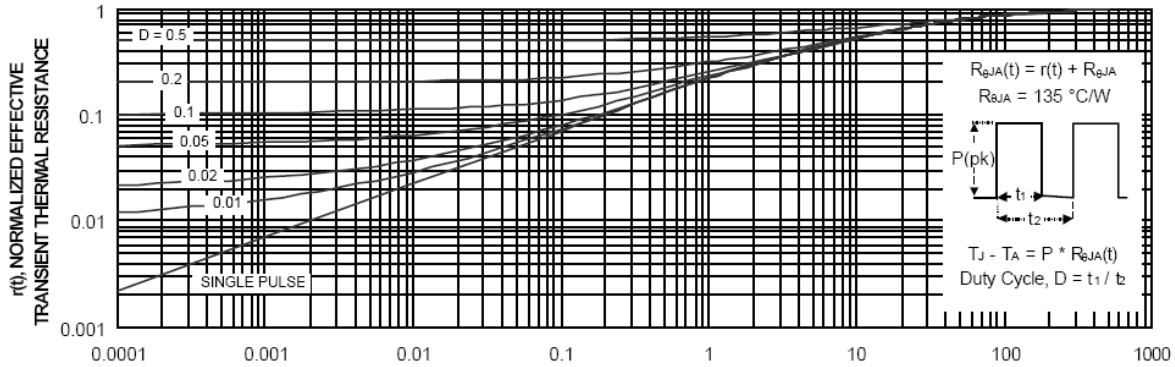
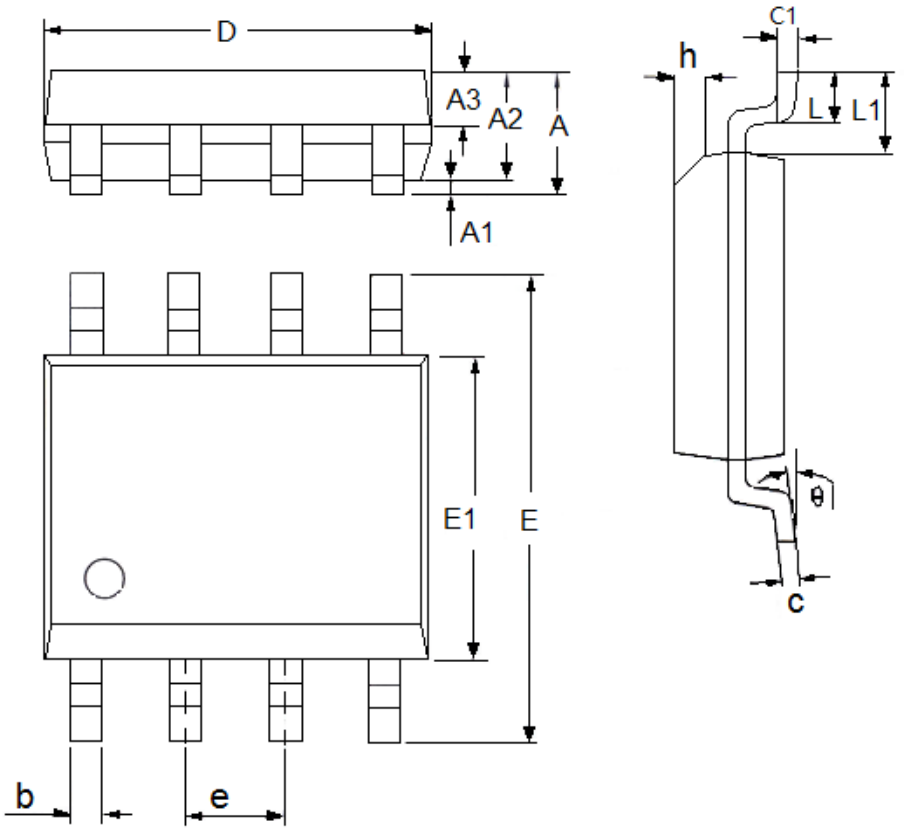


Figure 11. Transient Thermal Response Curve.

Thermal characterization performed using the conditions described in Note 1c.
Transient thermal response will change depending on the circuit board design.

Package Information

- **Package Type:SOP8**



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.3	1.8	0.0512	0.0709
A1	0.05	0.25	0.002	0.0098
A2	1.25	1.65	0.0492	0.065
A3	0.5	0.7	0.0197	0.0276
b	0.3	0.51	0.0118	0.0201
c	0.17	0.25	0.0067	0.0098
D	4.7	5.1	0.185	0.2008
E	5.8	6.2	0.2283	0.2441
E1	3.8	4	0.1496	0.1575
e	1.27(TYP)		0.05(TYP)	
h	0.25	0.5	0.0098	0.0197
L	0.4	1.27	0.0157	0.05
L1	1.04(TYP)		0.0409(TYP)	
θ	0	8°	0	8°
c1	0.25(TYP)		0.0098(TYP)	

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