

## N-Channel MOSFET MEM2306

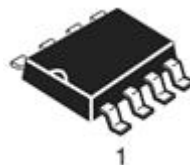
### General Description

**MEM2306SG Series** Dual N-channel enhancement mode field-effect transistor produced with high cell density DMOS trench technology, which is especially used to minimize on-state resistance.

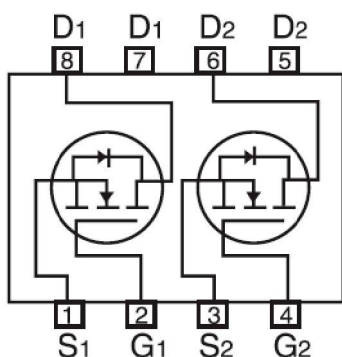
This device particularly suits low voltage applications, and low power dissipation.

### Features

- 20V/5A,  
 $R_{DS(ON)}=29m\Omega@V_{GS}=3.85V,I_D=5A$
- High Density Cell Design For Ultra Low On-Resistance
- surface mount package: SOP8



### Pin Configuration



### Typical Application

- Battery management
- power management
- Portable equipment
- Low power DC to DC converter.
- Load switch
- LCD adapter

### Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit	
Drain-Source Voltage	$V_{DSS}$	20	V	
Gate-Source Voltage	$V_{GSS}$	$\pm 12$	V	
Drain Current	$I_D$	5	A	
Pulsed Drain Current <sup>1,2</sup>		$I_{DM}$	30	A
Total Power Dissipation	$T_A=25^\circ C$	$P_d$	1	W
	$T_A=70^\circ C$		1.3	
Operating Temperature Range	$T_{Opr}$	150	$^\circ C$	
Storage Temperature Range	$T_{stg}$	-65/150		

## Thermal Characteristics

Parameter		Symbol	Ratings	Unit
Thermal Resistance, Junction-to-Ambient <sup>3</sup>	Steady-State	R $\theta$ JA	62.5	$^{\circ}$ C/W

## Electrical Characteristics

### MEM2306SG

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250 $\mu$ A	20	23		V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250 $\mu$ A	0.5	0.72	1	V
Gate-Body Leakage	I <sub>GSS</sub>	V <sub>DS</sub> =0V, V <sub>GS</sub> =12V		5	100	nA
		V <sub>DS</sub> =0V, V <sub>GS</sub> =-12V		-7	-100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =16V V <sub>GS</sub> =0V		1.8	1000	nA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A			23	m $\Omega$
		V <sub>GS</sub> =3.85V, I <sub>D</sub> =5A			25	m $\Omega$
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =4A			35	m $\Omega$
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 6A	6	20		S
Source-drain (diode forward) voltage	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =1.5A		0.8	1	V
<b>Dynamic Characteristics</b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 8 V, V <sub>GS</sub> = 0 V, f = 1 MHz		1120	1500	pF
Output Capacitance	C <sub>oss</sub>			480	630	
Reverse Transfer Capacitance	C <sub>rss</sub>			110	160	
<b>Switching Characteristics</b>						
Turn-On Delay Time	td(on)	V <sub>DD</sub> = 10 V, RL = 10 $\Omega$ I <sub>D</sub> = 1 A, V <sub>GEN</sub> = 4.5 V, Rg = 6 $\Omega$		25	60	ns
Rise Time	tr			60	140	
Turn-Off Delay Time	td(off)			60	140	
Fall-Time	tf			50	60	
Total Gate Charge	Qg	V <sub>DS</sub> = 10 V, V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 6 A		47	60	nC
Gate-Source Charge	Qgs			6		
Gate-Drain Charge	Qgd			8		

Typical Performance Characteristics:

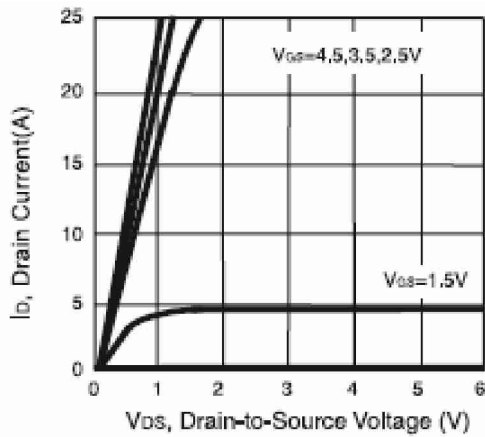


Figure 1. Output Characteristics

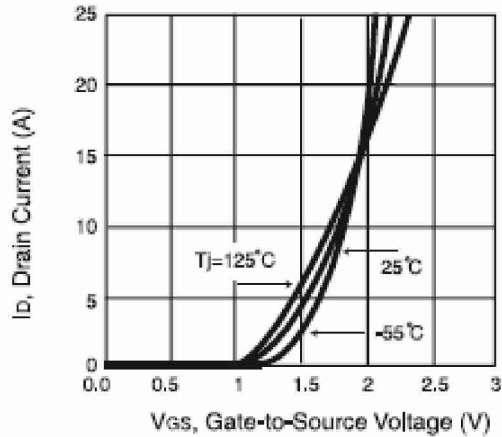


Figure 2. Transfer Characteristics

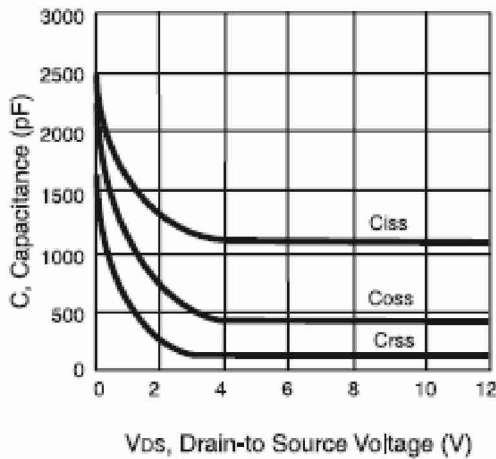


Figure 3. Capacitance

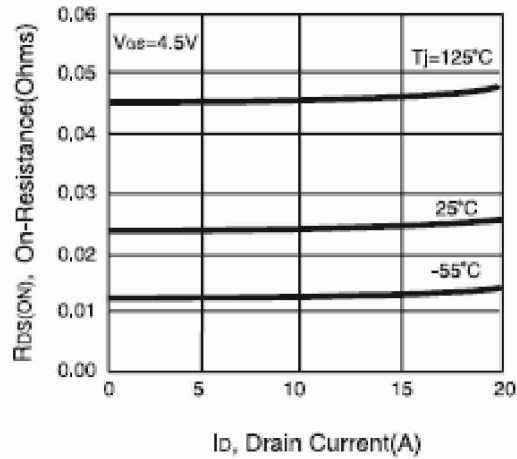


Figure 4. On-Resistance Variation with Drain Current and Temperature

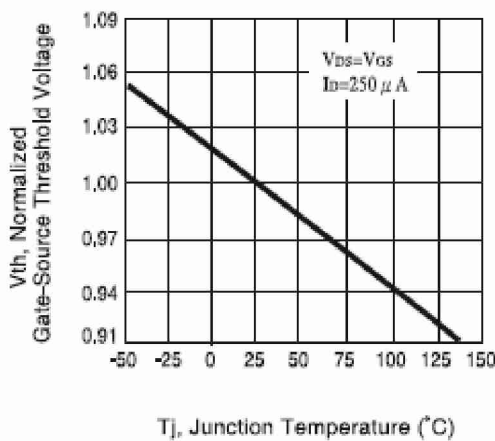


Figure 5. Gate Threshold Variation with Temperature

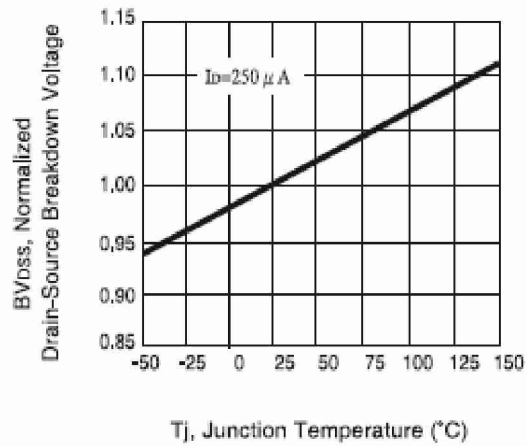
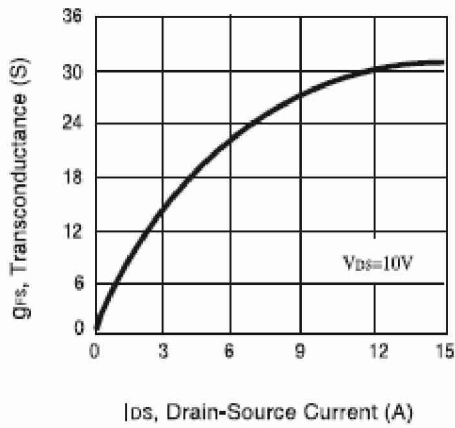
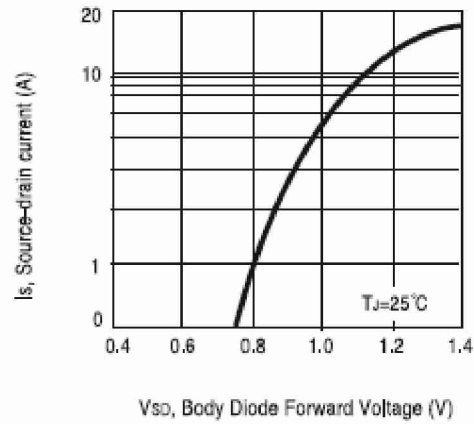


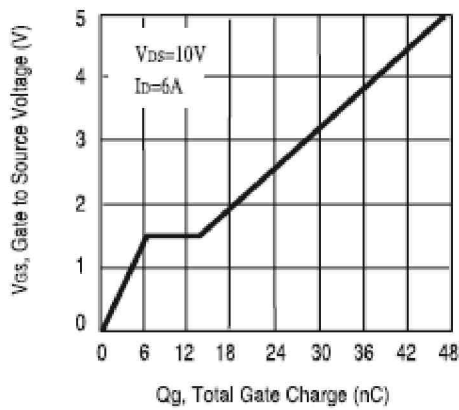
Figure 6. Breakdown Voltage Variation with Temperature



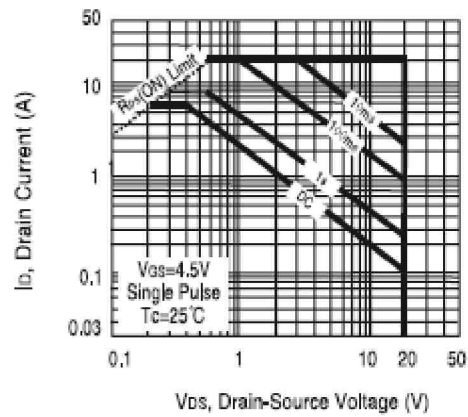
**Figure 7. Transconductance Variation with Drain Current**



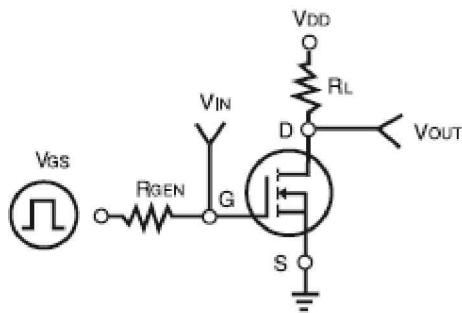
**Figure 8. Body Diode Forward Voltage Variation with Source Current**



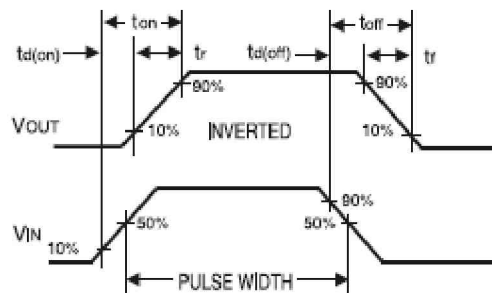
**Figure 9. Gate Charge**



**Figure 10. Maximum Safe Operating Area**



**Figure 11. Switching Test Circuit**



**Figure 12. Switching Waveforms**

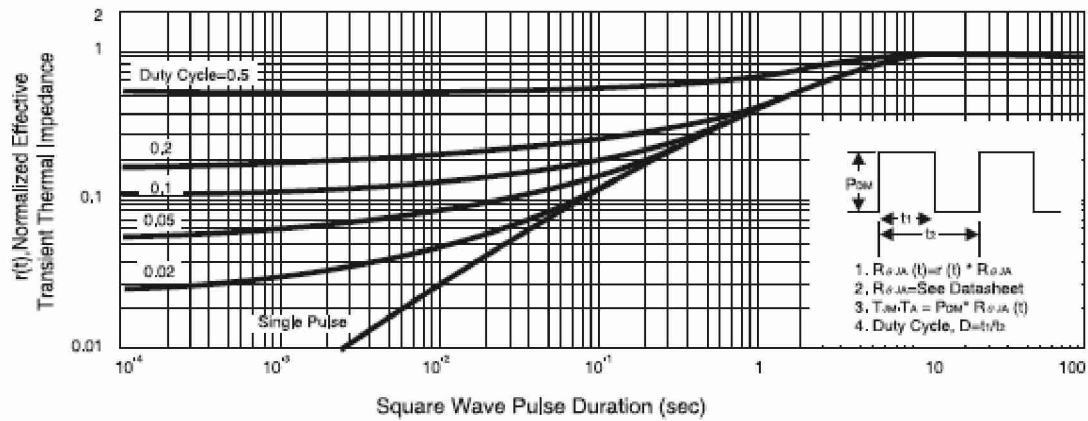
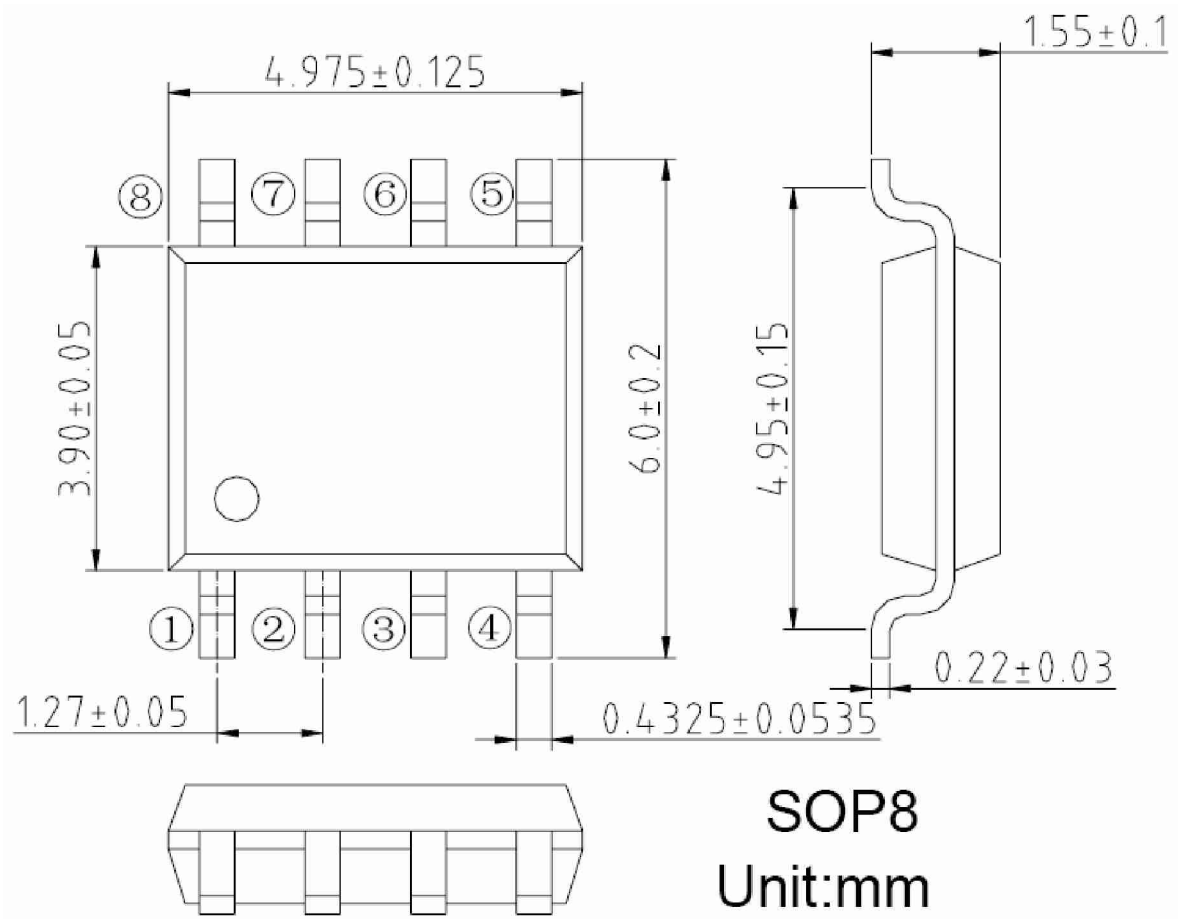


Figure 13. Normalized Thermal Transient Impedance Curve

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 corrosion damage that may ensue.