

### DESCRIPTION

The SMC4923M uses trench MOSFET technology Provides extremely low  $R_{DS(ON)}$ , Low resistance package and excellent fast switching performance. This device is ideal for efficient and fast switching applications.

### PART NUMBER INFORMATION

**SMC** **4923** **M** - **TR** **G**  
a      b      c      d      e

a : Company name.  
b : Product Serial number.  
c : Package code            M:SOP-8  
d : Handling code            TR:Tape&Reel  
e : Green produce code    G:RoHS Compliant

### FEATURES

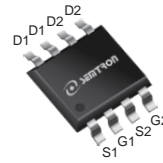
**$V_{DS}=-30V$ ,  $I_D=-9.2A$**

$R_{DS(ON)}=11m\Omega(Typ.)@V_{GS}=-20V$   
 $R_{DS(ON)}=12m\Omega(Typ.)@V_{GS}=-10V$   
 $R_{DS(ON)}=15m\Omega(Typ.)@V_{GS}=-4.5V$

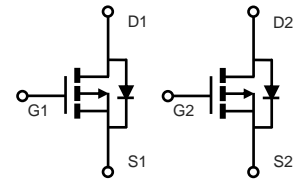
- ◆ Fast switch
- ◆ High power and current handling capability

### APPLICATIONS

- ◆ High Frequency Point-of-Load Synchronous
- ◆ DC-DC Power System
- ◆ Load Switch



SOP-8



### ABSOLUTE MAXIMUM RATINGS ( $T_A=25^{\circ}C$ Unless otherwise noted )

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-Source Voltage	-30	V
$V_{GSS}$	Gate-Source Voltage	$\pm 25$	V
$I_D$	Continuous Drain Current ( $V_{GS}=-10V$ )	$T_A=25^{\circ}C$	-9.2
		$T_A=70^{\circ}C$	-7.3
$I_{DM}$	Pulsed Drain Current <sup>B</sup>	-36.8	A
$I_{AS}$	Single Pulse Avalanche Current <sup>B</sup>	-30	A
$E_{AS}$	Single Pulse Avalanche energy $L=0.1mH$ <sup>B</sup>	45	mJ
$P_D$	Power Dissipation <sup>A</sup>	$T_A=25^{\circ}C$	2
		$T_A=70^{\circ}C$	1.3
$T_J$	Operation Junction Temperature	-55/150	$^{\circ}C$
$T_{STG}$	Storage Temperature Range	-55/150	$^{\circ}C$

### THERMAL RESISTANCE

Symbol	Parameter	Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient <sup>A</sup>	$t \leq 10s$	62	$^{\circ}C/W$
	Thermal Resistance Junction to Ambient <sup>AC</sup>	Steady-State	90	

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C Unless otherwise noted)

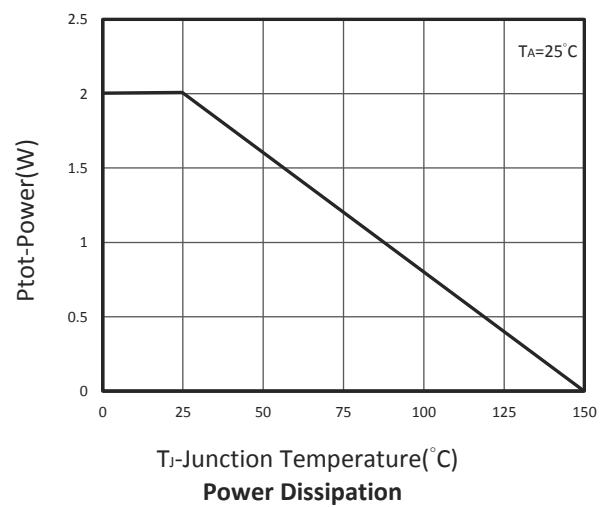
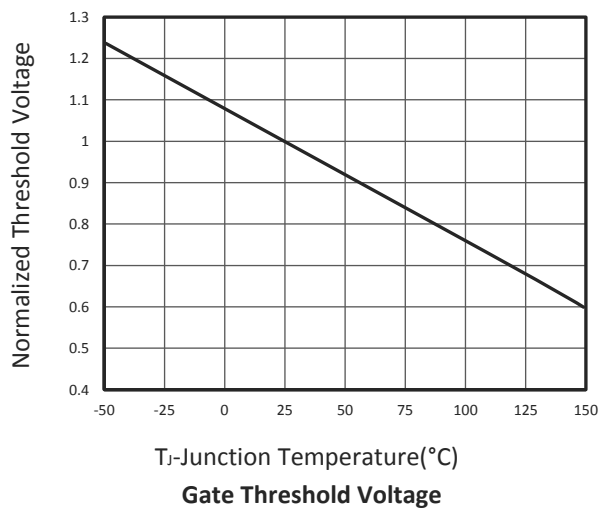
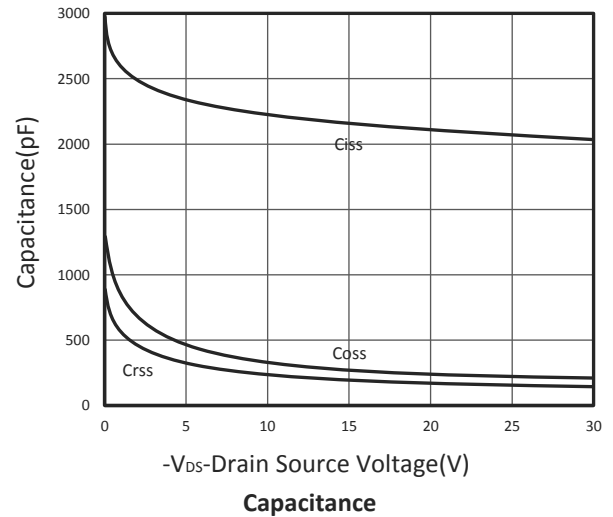
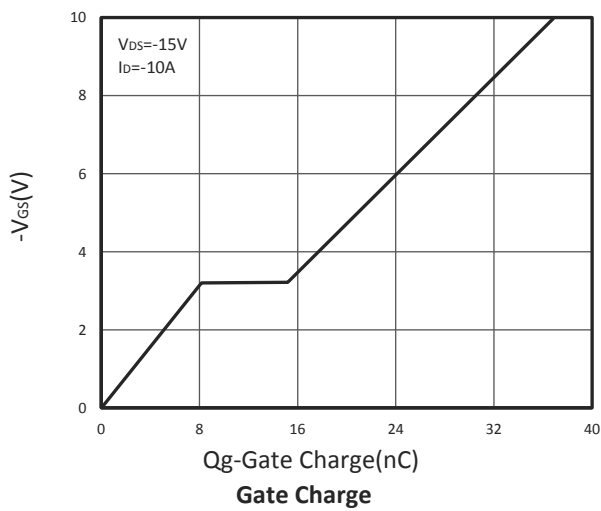
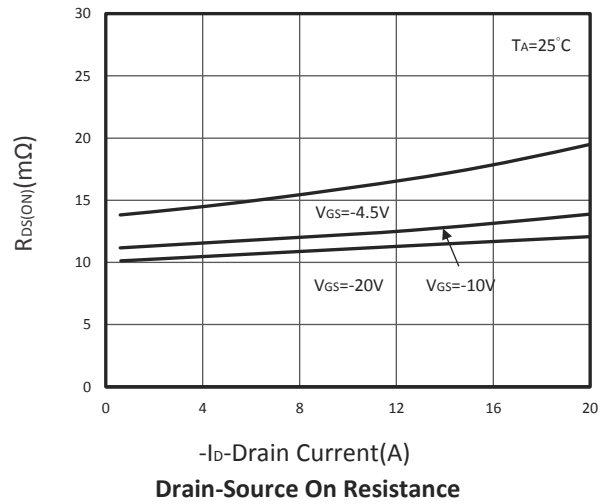
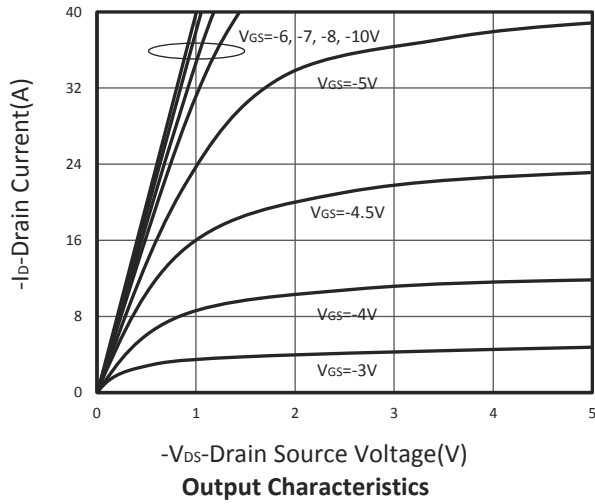
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
B <sub>VDS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-30			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1	-1.6	-2.5	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±25V			±100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C			-1	μA
		V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =75°C			-10	
R <sub>DS(ON)</sub>	Drain-source On-Resistance <sup>D</sup>	V <sub>GS</sub> =-20V, I <sub>D</sub> =-9.2A		11	13	mΩ
		V <sub>GS</sub> =-10V, I <sub>D</sub> =-9.2A		12	15	
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-6A		15	19	
G <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-10A		12.5		S
<b>Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage <sup>D</sup>	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V			-1	V
I <sub>S</sub>	Diode Continuous Forward Current				-9	A
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =-10A, dI/dt=100A/μs		13.8		ns
Q <sub>rr</sub>	Reverse Recovery Charge			11.6		nC
<b>Dynamic and Switching Parameters<sup>E</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V I <sub>D</sub> =-10A		36	48.6	nC
Q <sub>g</sub>	Total Gate Charge (4.5V)			18	24.3	
Q <sub>gs</sub>	Gate-Source Charge			8.1	10.9	
Q <sub>gd</sub>	Gate-Drain Charge			6.8	9.2	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz		2150		pF
C <sub>oss</sub>	Output Capacitance			298		
C <sub>rss</sub>	Reverse Transfer Capacitance			135		
R <sub>g</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz		8.8		Ω
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =-15V, V <sub>GEN</sub> =-10V R <sub>G</sub> =3.3Ω, I <sub>D</sub> =-1A		7.7	15	nS
t <sub>r</sub>				57.8	129	
t <sub>d(off)</sub>	Turn-Off Time			57.5	109	
t <sub>f</sub>				21.3	40	

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

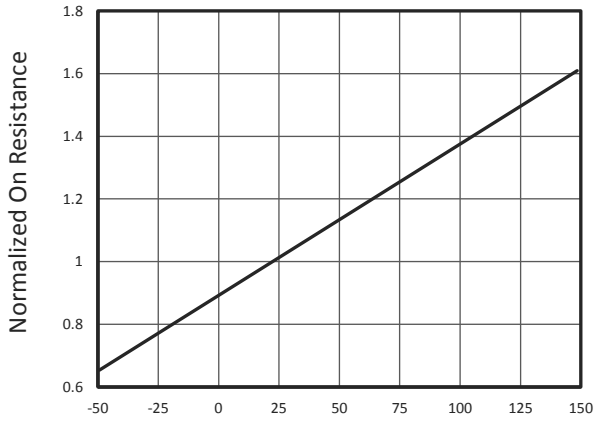
- A. Surface mounted on FR4 board using 1 in<sup>2</sup> pad size.
- B. Pulsed width limited by maximum junction temperature, T<sub>J(MAX)</sub>=150°C (initial temperature T<sub>J</sub>=25°C).
- C. Using ≤ 10s junction-to-ambient thermal resistance is base on T<sub>J(MAX)</sub>=150°C.
- D. Pulse test width ≤ 300μs and duty cycle ≤ 2%.
- E. Guaranteed by design, not subject to production testing.

The products and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this datasheet is up to date. We assume no responsibility for any infringement of patents, patent rights, or other rights arising from the use of any information and circuitry in this datasheet.

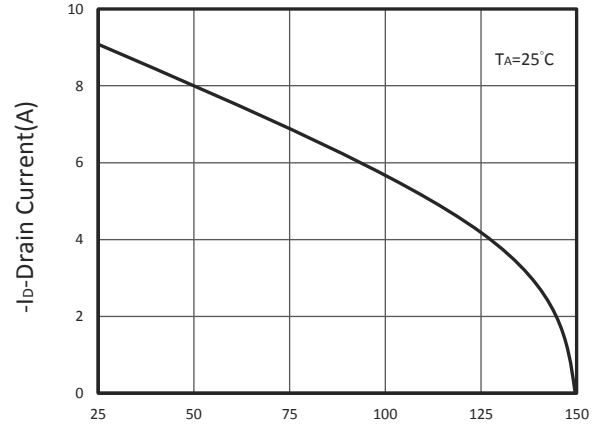
## TYPICAL CHARACTERISTICS



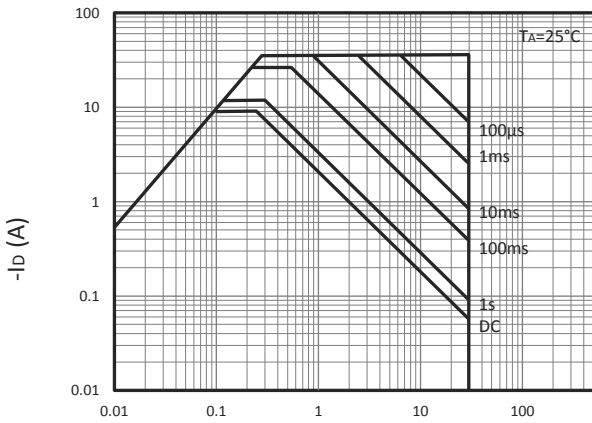
## TYPICAL CHARACTERISTICS



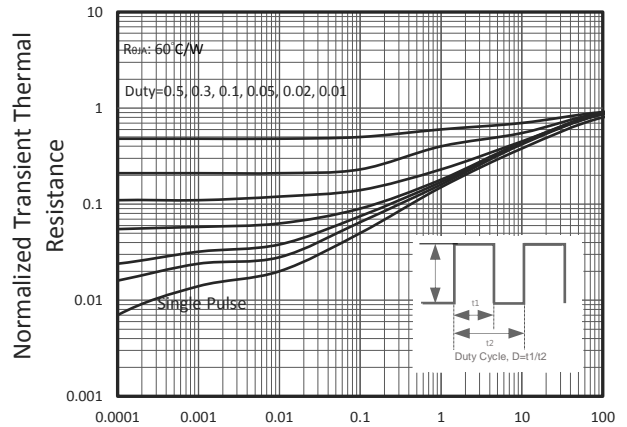
**$R_{DS(ON)}$  vs Junction Temperature**



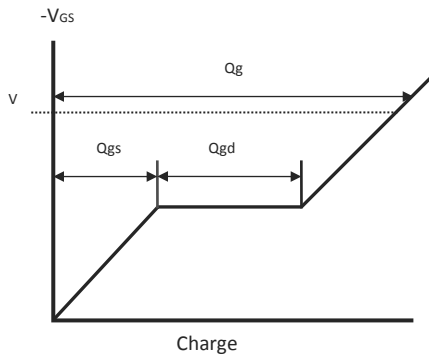
**Drain Current vs  $T_J$**



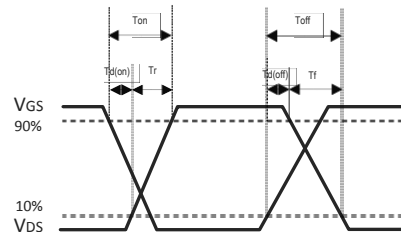
**Maximum Safe Operation Area**



**Thermal Transient Impedance**

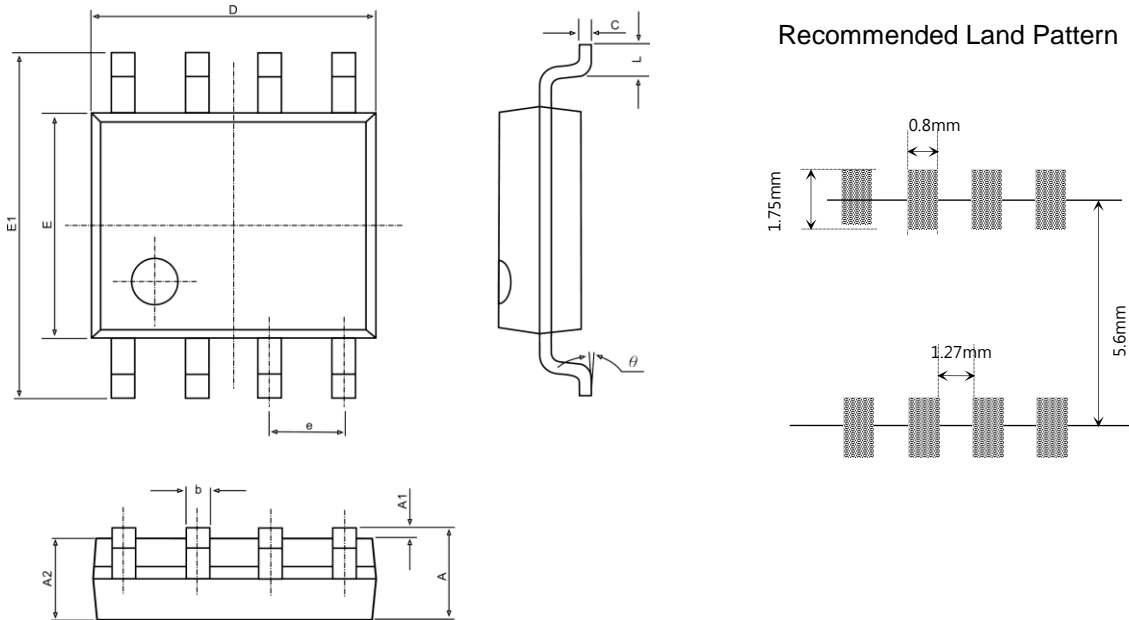


**Gate Charge Waveform**



**Switching Time Waveform**

## ■ SOP-8 PACKAGE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.300	1.500	0.051	0.059
b	0.390	0.490	0.015	0.019
c	0.200	0.250	0.008	0.010
D	4.800	5.100	0.189	0.201
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 BSC		0.050 BSC	
L	0.500	0.800	0.020	0.031
θ	0°	8°	0°	8°