

### DESCRIPTION

SMC2208E is the N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced trench technology devices are well suited for high efficiency fast switching applications, low in-line power loss needed in small outline surface mount package.

### PART NUMBER INFORMATION

**SMC 2208 E SD - TR G**  
 a      b      c      d      e      f

- a : Company name.
- b : Product Serial number.
- c : ESD
- d : Package code      SD: SOT-723
- e : Handling code      TR: Tape&Reel
- f : Green produce code      G: *RoHS Compliant*

### FEATURES

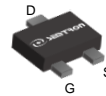
**$V_{DS} = 20V$ ,  $I_D = 0.83A$**

- $R_{DS(ON)}=200m\Omega(Typ.)@V_{GS}=4.5V$
- $R_{DS(ON)}=300m\Omega(Typ.)@V_{GS}=2.5V$
- $R_{DS(ON)}=500m\Omega(Typ.)@V_{GS}=1.8V$
- $R_{DS(ON)}=800m\Omega(Typ.)@V_{GS}=1.5V$

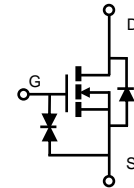
- ◆ Fast switch
- ◆ Low gate drive applications
- ◆ Low Input Capacitance

### APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Load Switch
- ◆ Battery Protection



SOT-723



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

Symbol	Parameter	Rating	Units	
$V_{DSS}$	Drain-Source Voltage	20	V	
$V_{GSS}$	Gate-Source Voltage	$\pm 8$	V	
$I_D$	Continuous Drain Current	$T_A=25^\circ C$	0.83	A
		$T_A=70^\circ C$	0.7	A
$I_{DM}$	Pulsed Drain Current <sup>A</sup>	1.8	A	
$P_D$	Power Dissipation <sup>B</sup>	$T_A=25^\circ C$	0.3	W
		$T_A=70^\circ C$	0.2	W
$T_J$	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>	$t \leq 10s$	280	$^\circ C/W$
	Thermal Resistance Junction to Ambient <sup>AC</sup>	Steady-State	400	

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ Unless otherwise noted)

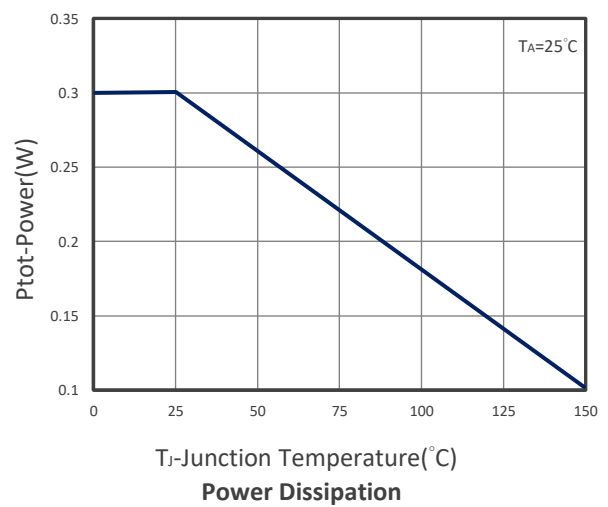
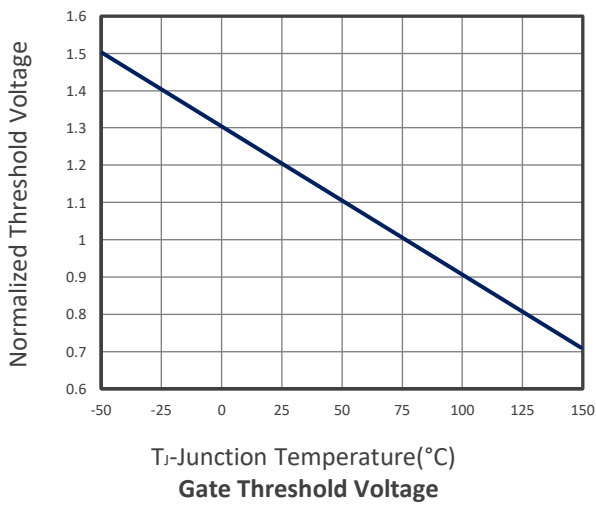
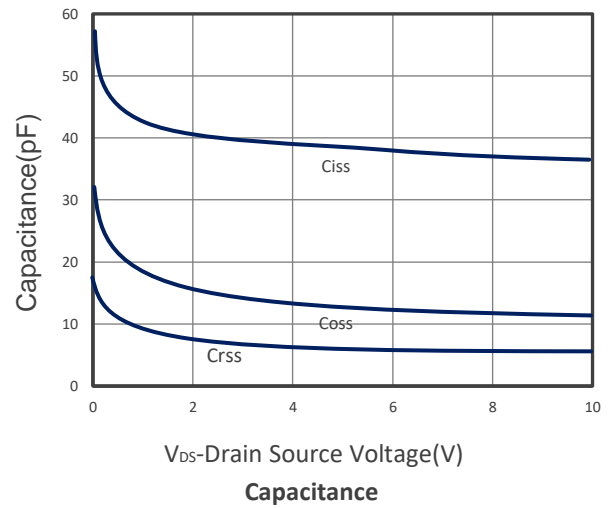
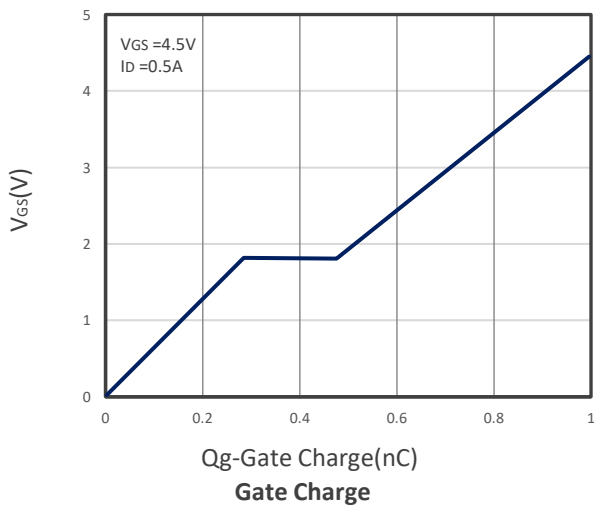
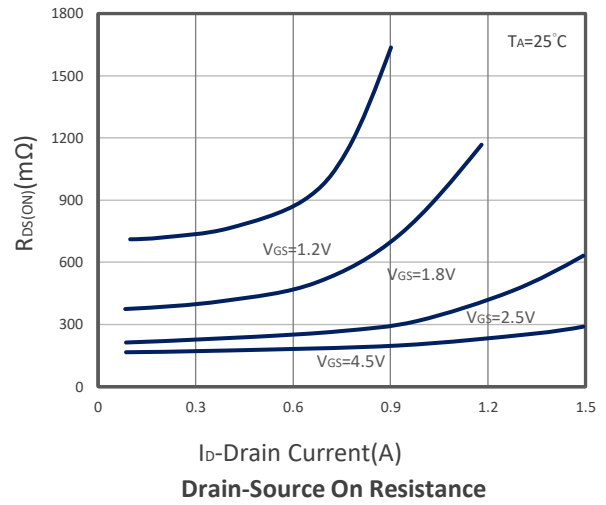
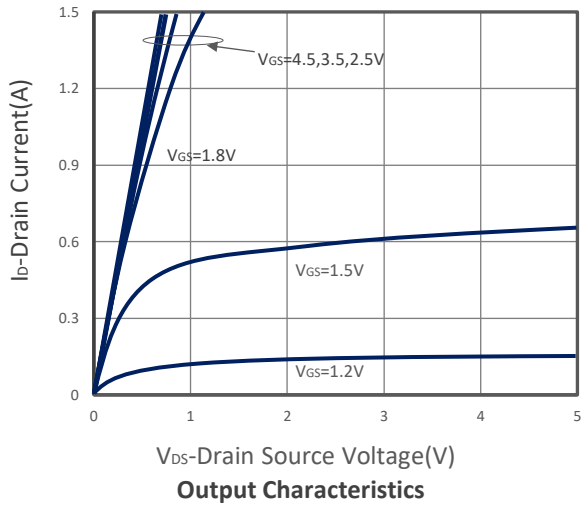
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	0.3	0.5	0.85	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> =±8V			±20	μA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V T <sub>J</sub> =25°C			1	μA
		V <sub>DS</sub> =16V, 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> =4.5V, I <sub>D</sub> =0.5A V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.4A V <sub>GS</sub> =1.8V, I <sub>D</sub> =0.2A V <sub>GS</sub> =1.5V, I <sub>D</sub> =0.1A		200 300 500 800	300 450 700 1200	mΩ
<b>Source-Drain Diode</b>						
V <sub>SD</sub>	Diode Forward Voltage <sup>D</sup>	I <sub>S</sub> =1A, V <sub>GS</sub> =0V			1.0	V
I <sub>S</sub>	Continuous Source Current				0.83	A
<b>Dynamic and Switching Parameters<sup>E</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V I <sub>D</sub> =0.8A		1	1.3	nC
Q <sub>gs</sub>	Gate-Source Charge		0.26	0.33		
Q <sub>gd</sub>	Gate-Drain Charge		0.2	0.27		
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V f=1MHz		39	46	pF
C <sub>oss</sub>	Output Capacitance		14	18		
C <sub>rss</sub>	Reverse Transfer Capacitance		6	7.8		
t <sub>d(on)</sub>	Turn-On Time <sup>E</sup>	V <sub>DD</sub> =10V, V <sub>GEN</sub> =4.5V, R <sub>G</sub> =10Ω, I <sub>D</sub> =0.5A		5		nS
t <sub>r</sub>			3.5			
t <sub>d(off)</sub>	Turn-Off Time <sup>E</sup>		14			
t <sub>f</sub>			6			

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

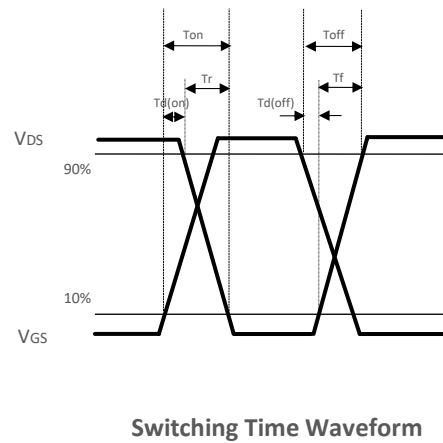
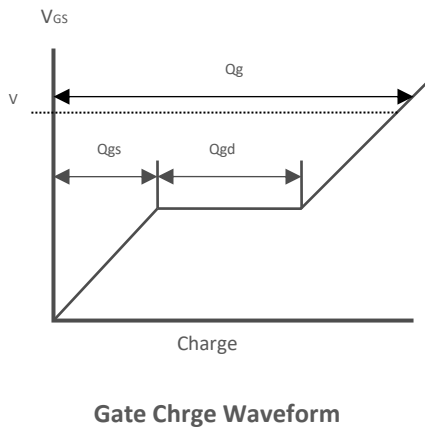
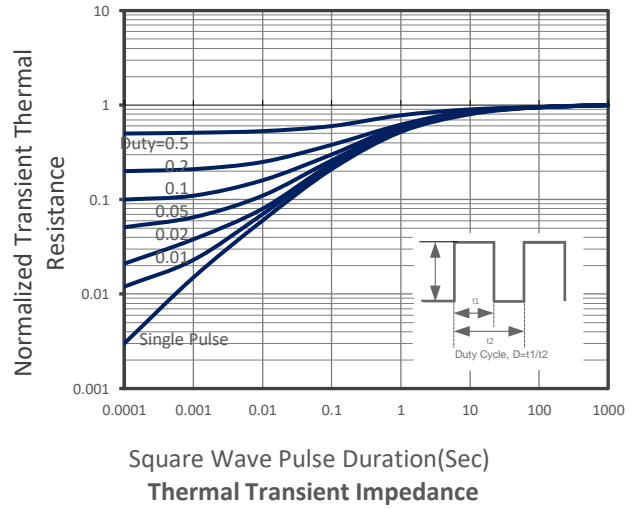
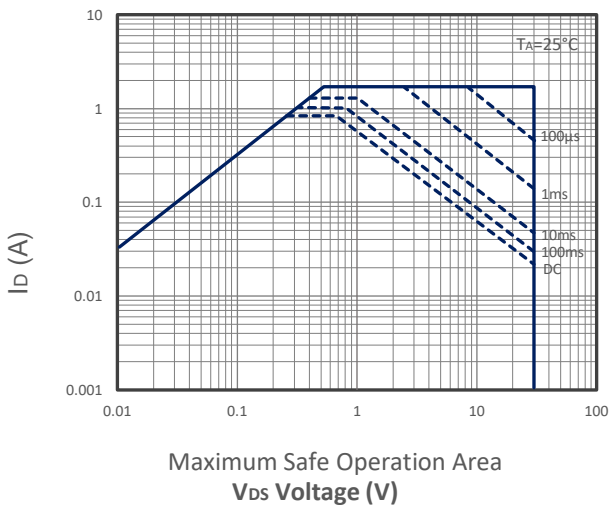
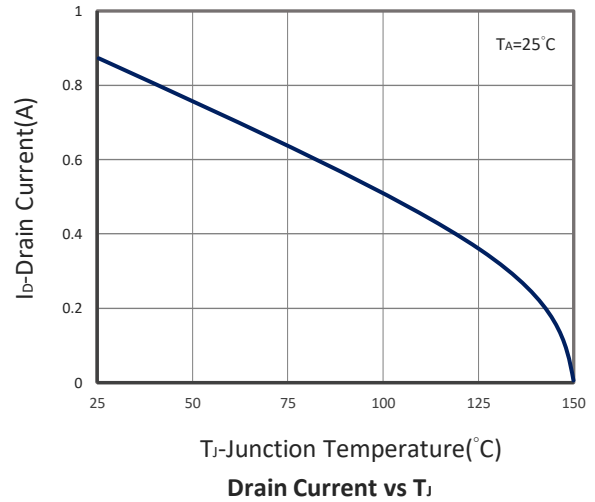
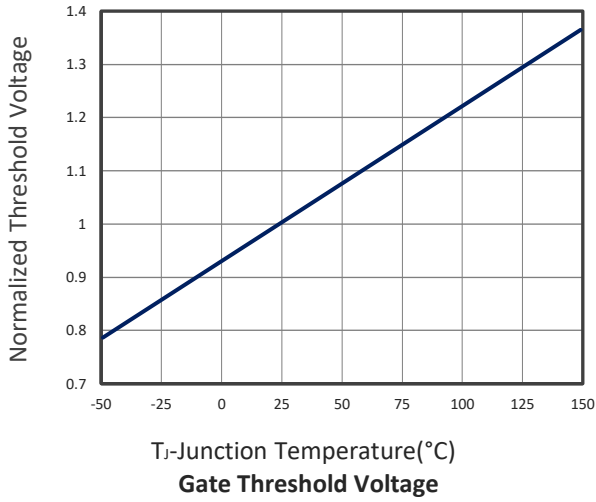
- A. Device mounted on 1n<sup>2</sup> FR-4 PCB with surface 2oz. Copper.
- B. Pulsed width limited by maximum junction temperature, T<sub>J(MAX)</sub>=150°C.
- C. Using ≤ 10s junction-to-ambient thermal resistance is base on T<sub>J(MAX)</sub>=150°C.
- D. Pulse test width ≤ 300μs and duty cycle ≤ 2%.
- E. Guaranteed by design, not subject to production testing.

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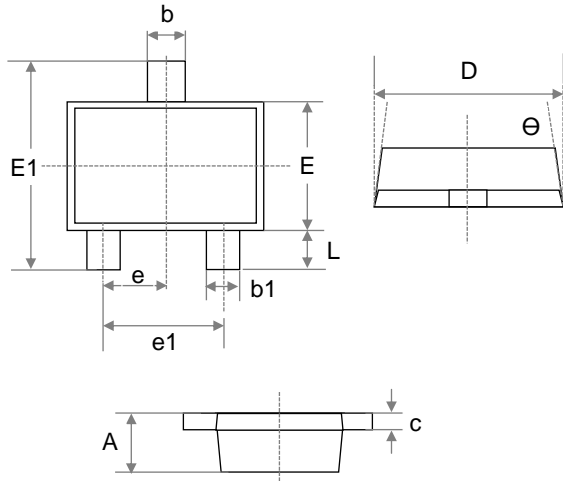
## TYPICAL CHARACTERISTICS



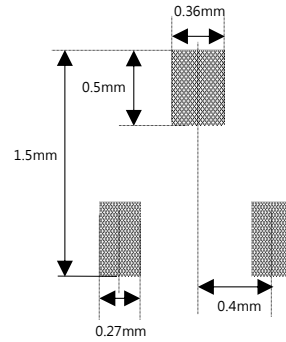
## TYPICAL CHARACTERISTICS



## ■ SOT-723 PACKAGE DIMENSIONS



Recommended Land Pattern



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.370	0.390	0.015	0.015
b	0.220	0.270	0.009	0.011
b1	0.170	0.220	0.007	0.009
c	0.009	0.011	0.003	0.004
D	1.150	1.250	0.045	0.049
E	0.750	0.850	0.030	0.033
E1	1.150	1.250	0.045	0.049
e	0.400 BSC.		0.016 BSC.	
e1	0.800 BSC.		0.032 BSC.	
L	0.150	0.250	0.006	0.010
Θ	7°	11°	7°	11°