

Single N-Channel MOSFET

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 SC - TR G
 a b c d e f

- a : Company name.
- b : Product Serial number.
- c : ESD
- d : Package code SC: SOT-523
- e : Handling code TR: Tape&Reel
- f : Green produce code G: *RoHS Compliant*

FEATURES

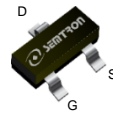
$V_{DS} = 20V, I_D = 0.8A$

- $R_{DS(ON)} = 210m\Omega(Typ.) @ V_{GS} = 4.5V$
- $R_{DS(ON)} = 245m\Omega(Typ.) @ V_{GS} = 2.5V$
- $R_{DS(ON)} = 310m\Omega(Typ.) @ V_{GS} = 1.8V$
- $R_{DS(ON)} = 380m\Omega(Typ.) @ V_{GS} = 1.5V$
- $R_{DS(ON)} = 615m\Omega(Typ.) @ V_{GS} = 1.2V$

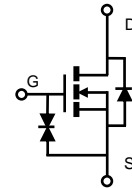
- ◆ Fast switch
- ◆ Low gate drive applications
- ◆ Low Input Capacitance

APPLICATIONS

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



SOT-523



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 8	V
I_D	Continuous Drain Current	$T_A = 25^\circ C$	0.8
		$T_A = 70^\circ C$	0.7
I_{DM}	Pulsed Drain Current ^A	3.2	A
P_D	Power Dissipation ^B	$T_A = 25^\circ C$	0.3
		$T_A = 70^\circ C$	0.2
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 ^C	$t \leq 10s$	-	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^C	Steady-State	416	
$R_{\theta JC}$	Thermal Resistance Junction to Case ^C		-	

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

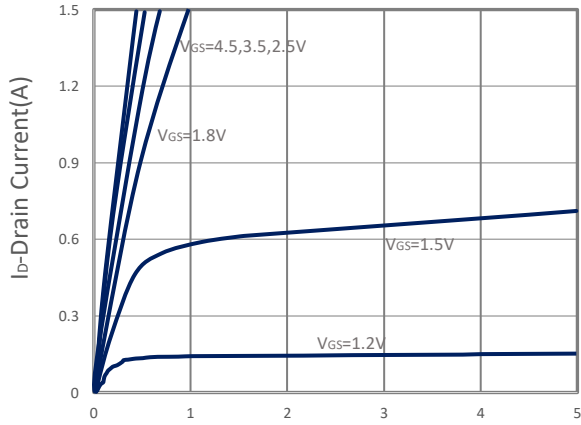
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250 μ A	20			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μ A	0.3	0.5	1	V
I _{GSS}	Gate Leakage Current	V _{DS} = 0V, V _{GS} = \pm 8V			\pm 20	μ A
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 20V, V _{GS} = 0V T _J = 25 $^\circ$ C			1	μ A
		V _{DS} = 16V, V _{GS} = 0V T _J = 75 $^\circ$ C			10	
R _{DS(ON)}	Drain-source On-Resistance ^D	V _{GS} = 4.5V, I _D = 0.6A V _{GS} = 2.5V, I _D = 0.5A V _{GS} = 1.8V, I _D = 0.3A V _{GS} = 1.5V, I _D = 0.2A V _{GS} = 1.2V, I _D = 0.1A		210 245 310 380 615	300 380 500 600 1000	m Ω
Source-Drain Diode						
V _{SD}	Diode Forward Voltage ^B	I _S = 1A, V _{GS} = 0V			1.0	V
I _S	Continuous Source Current				0.8	A
Dynamic and Switching Parameters						
Q _g	Total Gate Charge	V _{DS} = 10V, V _{GS} = 4.5V I _D = 0.8A		1	1.3	nC
Q _{gs}	Gate-Source Charge			0.14	0.17	
Q _{gd}	Gate-Drain Charge			0.2	0.27	
C _{iss}	Input Capacitance	V _{DS} = 10V, V _{GS} = 0V f = 1MHz		39	46	pF
C _{oss}	Output Capacitance			14	18	
C _{rss}	Reverse Transfer Capacitance			6	7.8	
t _{d(on)}	Turn-On Time ^E	V _{DD} = 10V, V _{GEN} = 4.5V, R _G = 10 Ω , I _D = 0.5A		5		nS
t _r				3.5		
t _{d(off)}	Turn-Off Time ^E			14		
t _f				6		

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

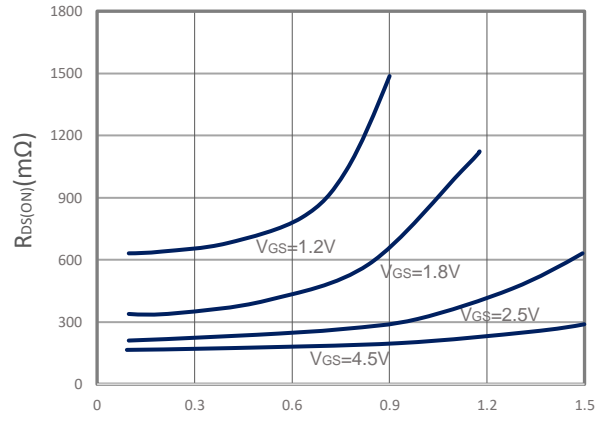
- A. The value of R θ JA is measured with the device in a still air environment with maximum junction temperature T_{J(MAX)} = 150 $^\circ$ C (initial temperature T_A = 25 $^\circ$ C)..
- B. The T_{J(MAX)} = 150 $^\circ$ C, using junction-to-ambient thermal resistance.
- C. Surface-mounted on FR-4 board using 1 sq-in pad, 2 oz Cu, in a still air environment with T_A = 25 $^\circ$ C.
- D. The data tested by pulsed, pulse width \leq 300 μ s, duty cycle \leq 2%
- E. Pulsed width limited by maximum junction temperature.

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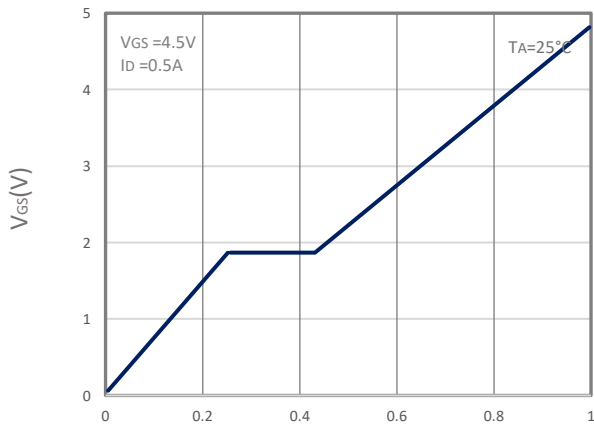
TYPICAL CHARACTERISTICS



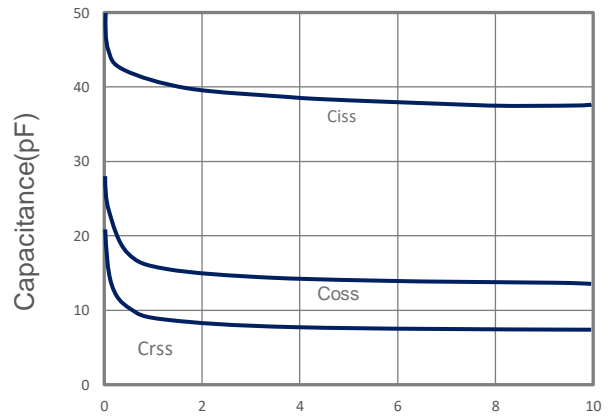
VDs-Drain Source Voltage(V)
Output Characteristics



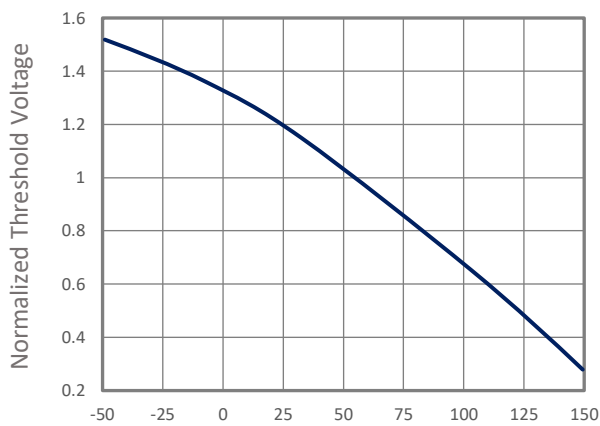
ID-Drain Current(A)
Drain-Source On Resistance



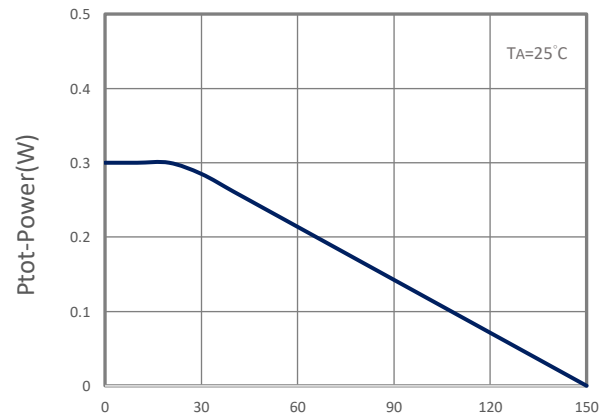
Qg-Gate Charge(nC)
Gate Charge



VDS-Drain Source Voltage(V)
Capacitance

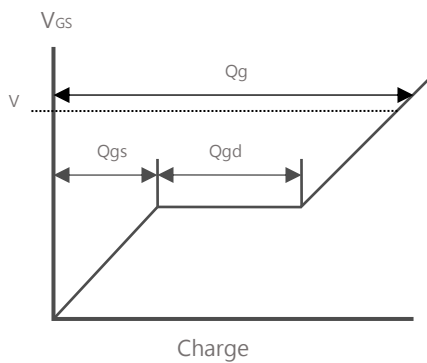
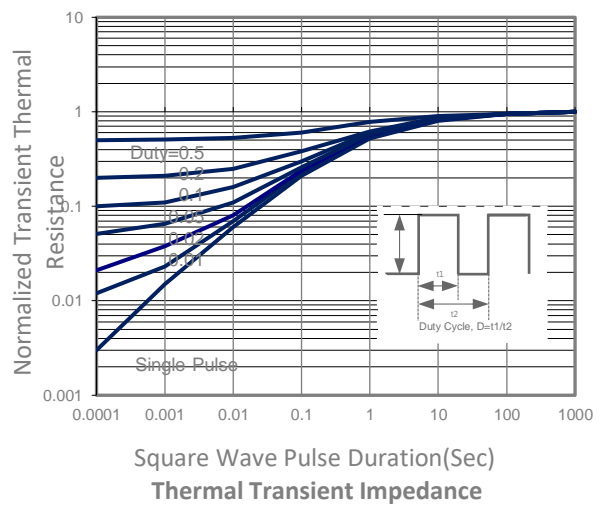
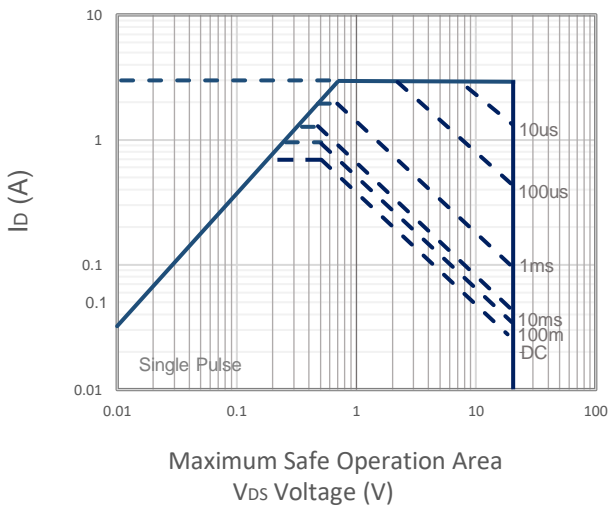
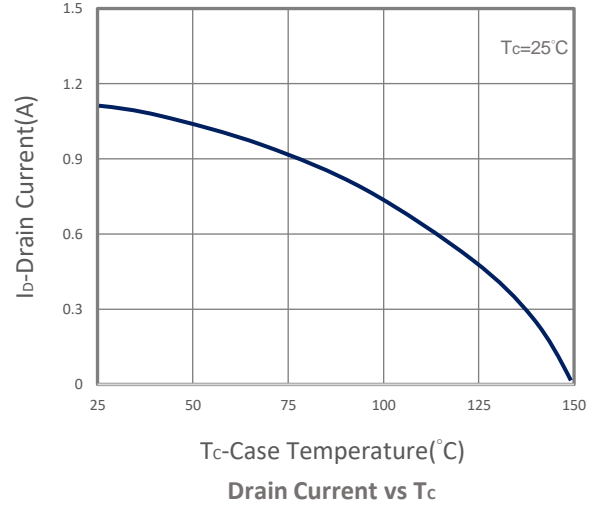
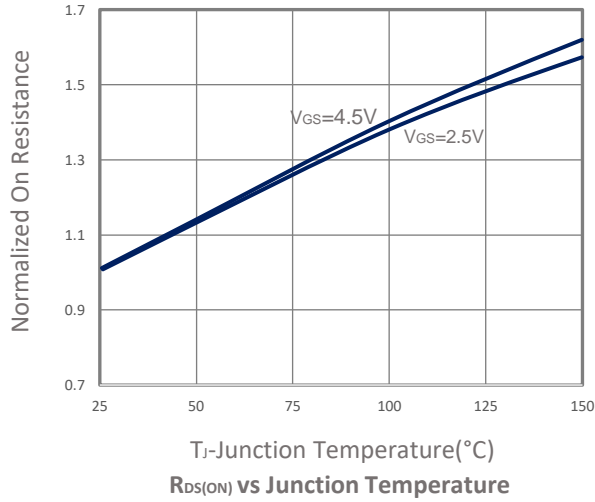


TJ-Junction Temperature(°C)
Gate Threshold Voltage

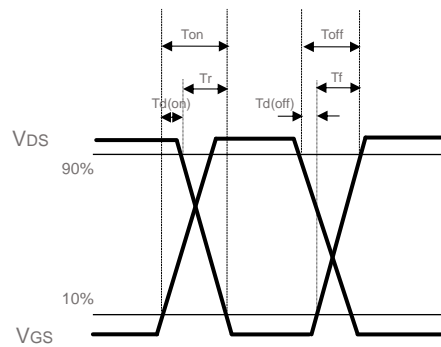


TA-Junction Temperature(°C)
Power Dissipation

TYPICAL CHARACTERISTICS

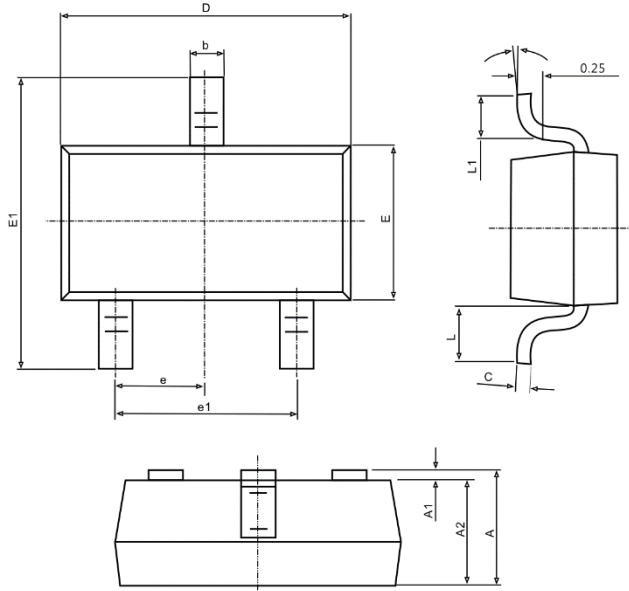


Gate Charge Waveform

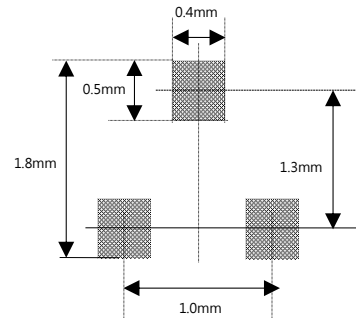


Switching Time Waveform

SOT-523 PACKAGE DIMENSIONS



Recommended Land Pattern



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.900	0.028	0.035
A1	0.000	0.100	0.000	0.004
A2	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.014
c	0.100	0.200	0.004	0.008
D	1.500	1.750	0.059	0.069
E	0.700	0.900	0.028	0.035
E1	1.400	1.750	0.055	0.069
e	0.500 TYP.		0.020 TYP..	
e1	0.900	1.100	0.035	0.043
L	0.300	0.460	0.012	0.018
L1	0.260	0.460	0.010	0.018
Θ	0°	8°	0°	8°