

Single P-Channel MOSFET

DESCRIPTION

SMC2207E is the P-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 2207 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

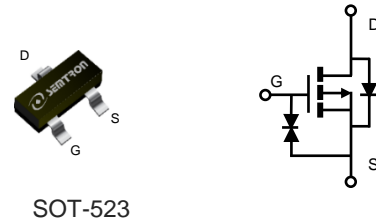
$V_{DS} = -20V$, $I_D = -0.6A$

- $R_{DS(ON)} = 450m\Omega(Typ.)@V_{GS} = -4.5V$
- $R_{DS(ON)} = 630m\Omega(Typ.)@V_{GS} = -2.5V$
- $R_{DS(ON)} = 850m\Omega(Typ.)@V_{GS} = -1.8V$
- $R_{DS(ON)} = 1060m\Omega(Typ.)@V_{GS} = -1.5V$
- $R_{DS(ON)} = 1700m\Omega(Typ.)@V_{GS} = -1.2V$

- ◆ Fast switch
- ◆ 1.2V Low gate drive applications
- ◆ Improved dv/dt capability

APPLICATIONS

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



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	± 8	V
I_D	Continuous Drain Current	$T_A = 25^\circ C$	-0.6
		$T_A = 70^\circ C$	-0.48
I_{DM}	Pulsed Drain Current ^A	-1.6	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	420	
$R_{\theta JC}$	Thermal Resistance Junction to Case ^C		-	

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

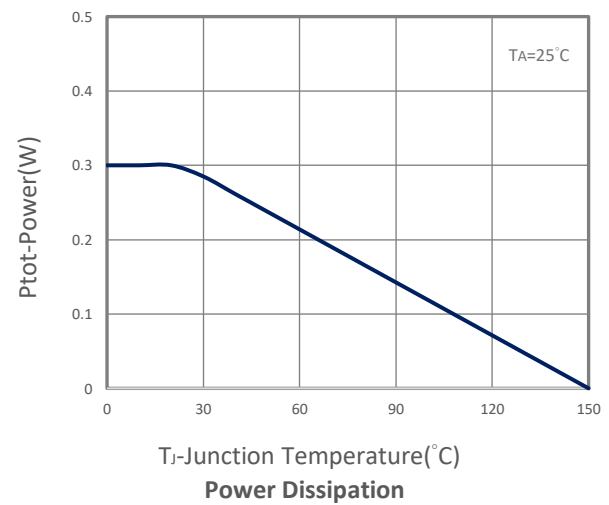
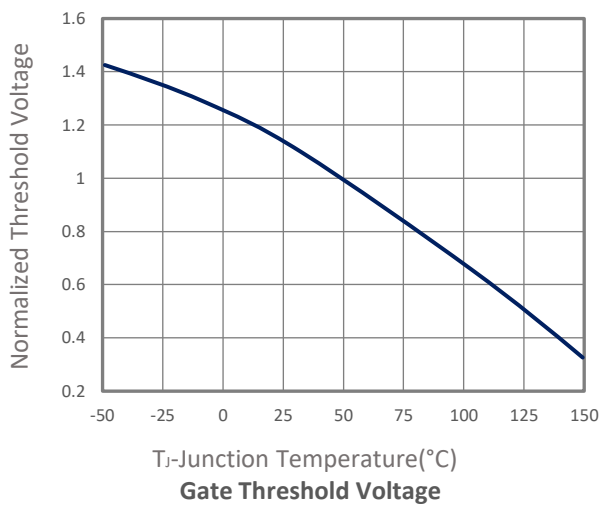
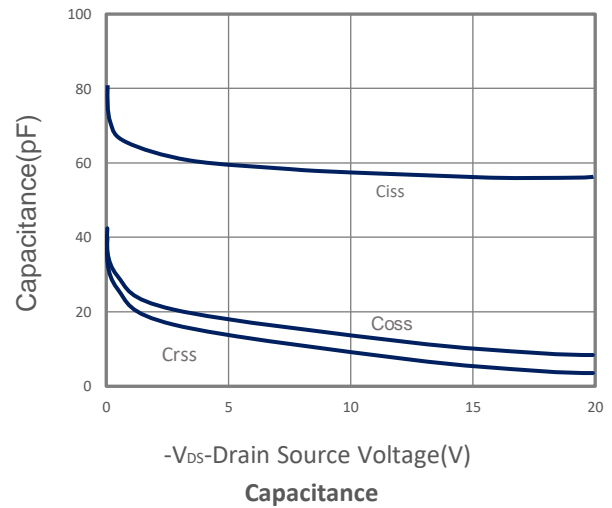
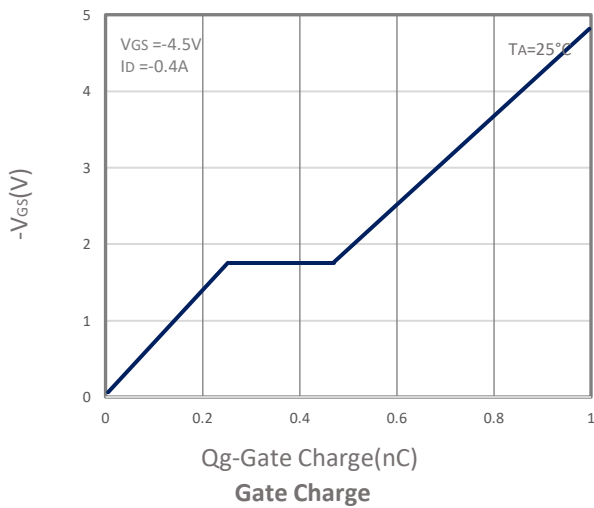
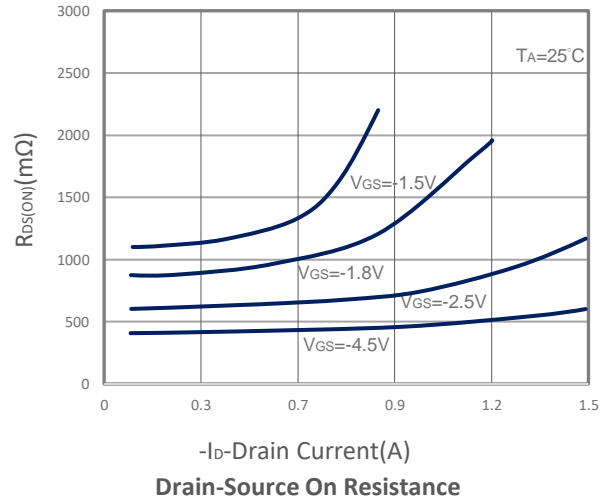
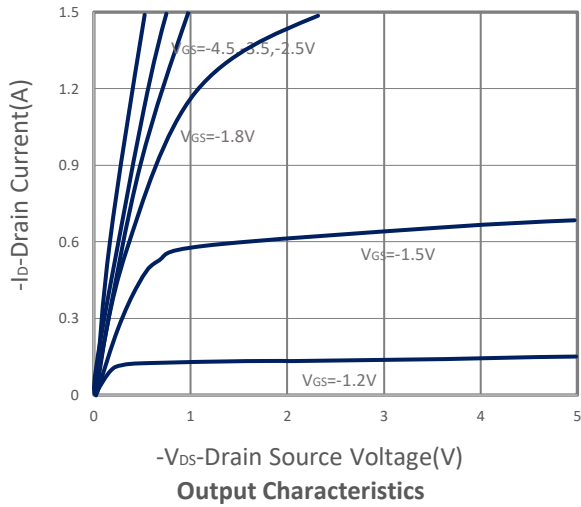
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage ^D	V _{GS} = 0V, I _D = -250μA	-20			V
V _{GS(th)}	Gate Threshold Voltage ^D	V _{DS} = V _{GS} , I _D = -250μA	-0.3	-0.6	-1	V
I _{GSS}	Gate Leakage Current	V _{DS} = 0V, V _{GS} = ±8V			±20	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = -20V, V _{GS} = 0V T _J = 25°C			-1	μA
		V _{DS} = -16V, V _{GS} = 0V T _J = 75°C			-10	
R _{DS(ON)}	Drain-source On-Resistance ^D	V _{GS} = -4.5V, I _D = -0.4A V _{GS} = -2.5V, I _D = -0.3A V _{GS} = -1.8V, I _D = -0.15A V _{GS} = -1.5V, I _D = -0.1A V _{GS} = -1.2V, I _D = -0.1A		450 630 850 1060 1700	580 840 1150 1600 2700	mΩ
Source-Drain Diode						
V _{SD}	Diode Forward Voltage ^B	I _S = -1A, V _{GS} = 0V			-1.0	V
I _S	Continuous Source Current				-0.4	A
Dynamic and Switching Parameters						
Q _g	Total Gate Charge	V _{DS} = -10V, V _{GS} = -4.5V I _D = -0.6A		1		nC
Q _{gs}	Gate-Source Charge			0.14		
Q _{gd}	Gate-Drain Charge			0.18		
C _{iss}	Input Capacitance	V _{DS} = -10V, V _{GS} = 0V f = 1MHz		60		pF
C _{oss}	Output Capacitance			18		
C _{rss}	Reverse Transfer Capacitance			15		
t _{d(on)}	Turn-On Time ^E	V _{DD} = -10V, V _{GEN} = -4.5V, R _G = 10Ω, I _D = -0.2A		6.2		nS
t _r				5.6		
t _{d(off)}	Turn-Off Time ^E			30		
t _f				18		

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

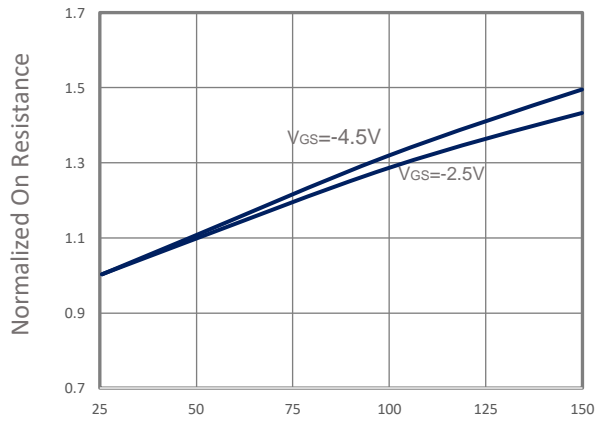
- A. The value of R_{θJA} is measured with the device in a still air environment with maximum junction temperature T_{J(MAX)} = 150°C (initial temperature T_A = 25°C).
- B. The T_{J(MAX)} = 150°C, using junction-to-ambient thermal resistance.
- C. Surface-mounted on FR-4 board using 1 sq-in pad, 2 oz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

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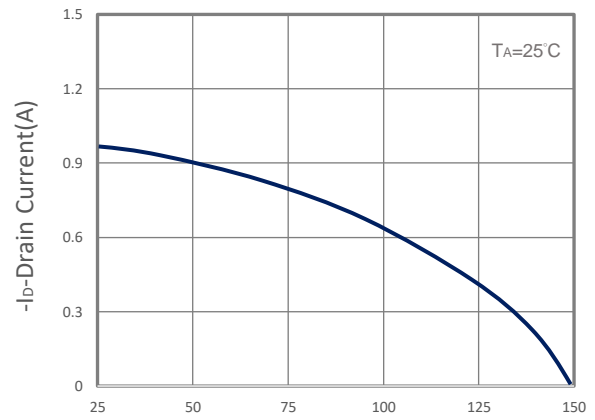
TYPICAL CHARACTERISTICS



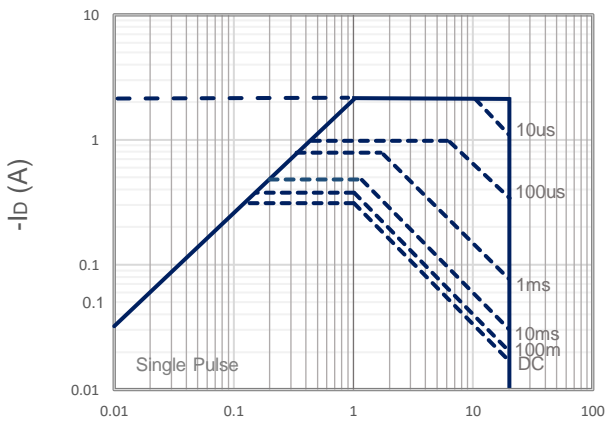
TYPICAL CHARACTERISTICS



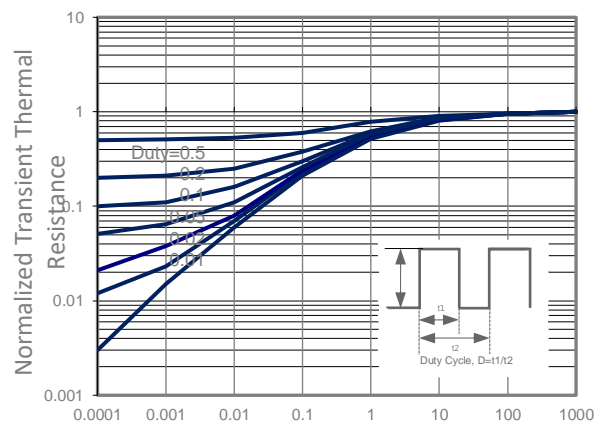
T_J-Junction Temperature(°C)
R_{DS(ON)} vs Junction Temperature



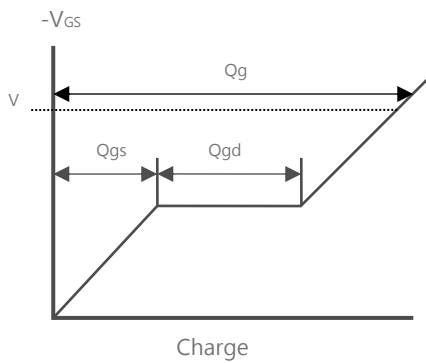
T_J-Case Temperature(°C)
Drain Current vs T_J



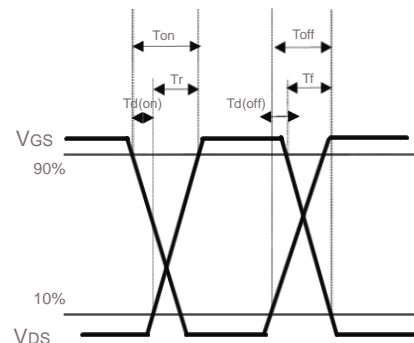
Maximum Safe Operation Area
-V_{DS} Voltage (V)



Square Wave Pulse Duration(Sec)
Thermal Transient Impedance

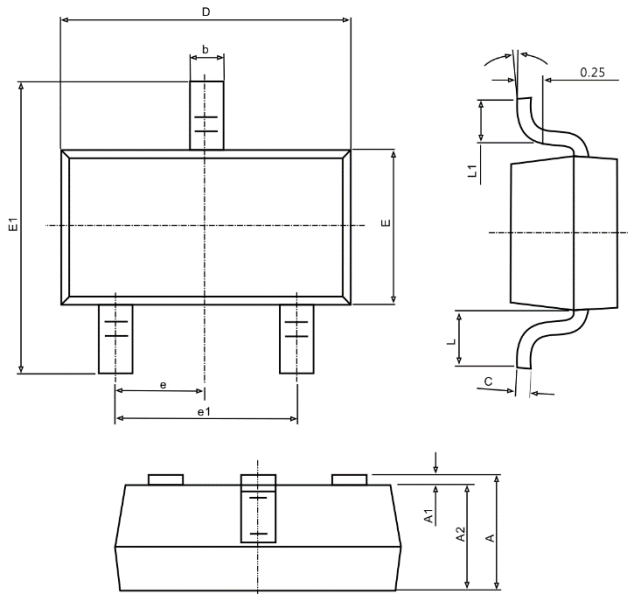


Gate Charge Waveform

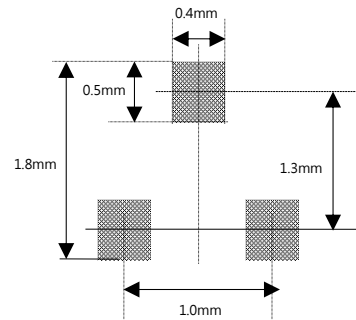


Switching Time Waveform

■ 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°