

Single N-Channel MOSFET

DESCRIPTION

SMC2302 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 are needed in small outline surface mount package.

PART NUMBER INFORMATION

SMC 2302 S - TR G
 a b c d e

- a : Company name.
- b : Product Serial number.
- c : Package code S: SOT-23
- d : Handling code TR: Tape&Reel
- e : Green produce code G: *RoHS Compliant*

FEATURES

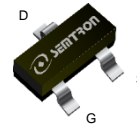
$V_{DS} = 20V, I_D = 5A$

$R_{DS(ON)} = 30m\Omega (Typ.) @ V_{GS} = 4.5V$
 $R_{DS(ON)} = 38m\Omega (Typ.) @ V_{GS} = 2.5V$
 $R_{DS(ON)} = 50m\Omega (Typ.) @ V_{GS} = 1.8V$

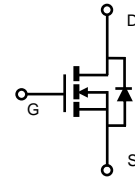
- ◆ Fast switch
- ◆ 1.8V Low gate drive applications
- ◆ Improved dv/dt capability
- ◆ High power and current handling capability

APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Load Switch



SOT-23



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	± 10	V
I_D	Continuous Drain Current	$T_A = 25^\circ C$	5
		$T_A = 70^\circ C$	4
I_{DM}	Pulsed Drain Current ^A	20	A
P_D	Power Dissipation ^B	$T_A = 25^\circ C$	1.3
		$T_A = 70^\circ C$	0.8
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 ^B	$t \leq 10s$	95	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{BC}	Steady-State	130	

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

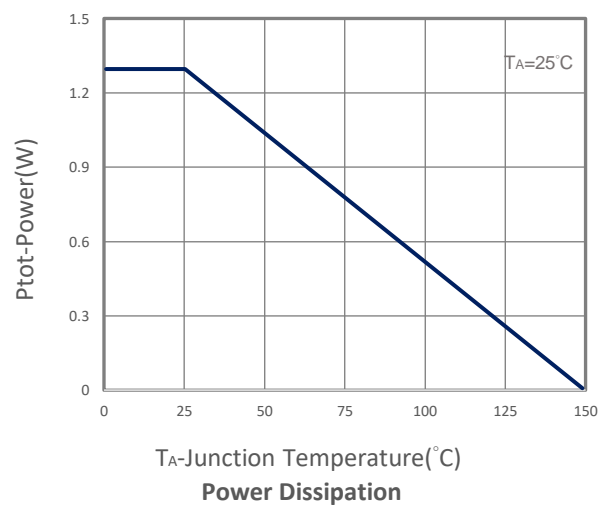
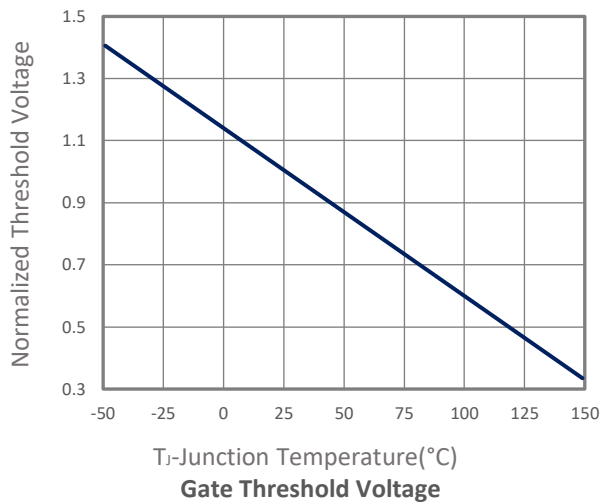
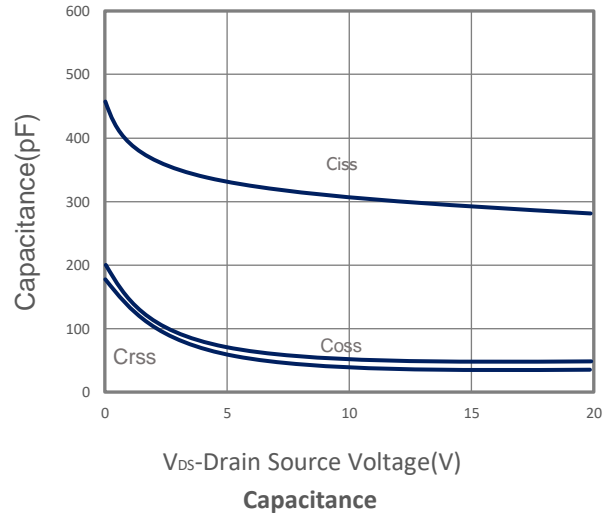
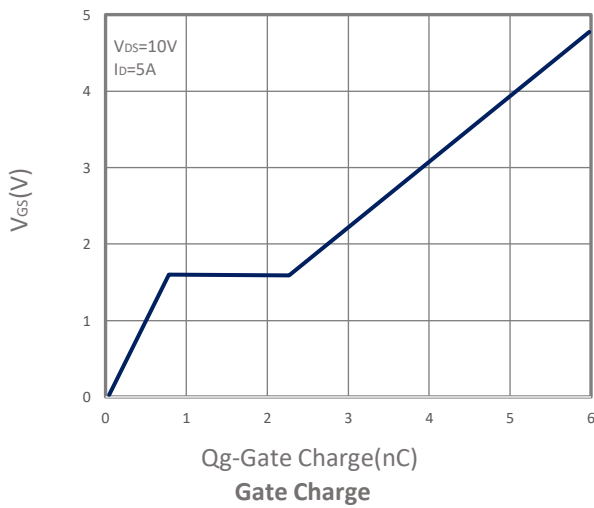
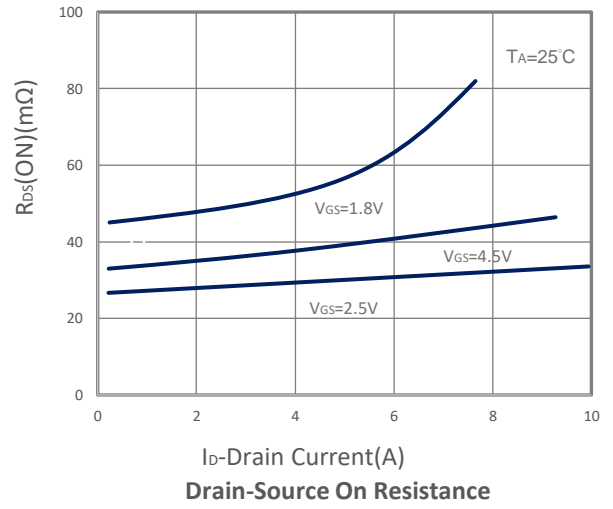
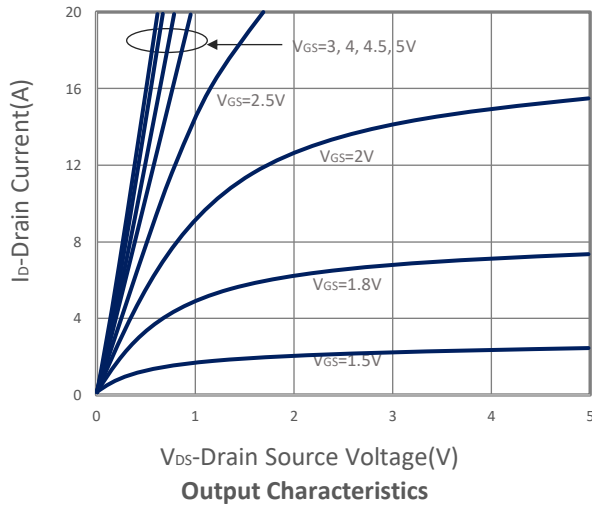
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.4	0.6	1	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±10V			±100	nA
I _{DSS}	Zero Gate 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	V _{GS} =4.5V, I _D =5A		30	35	mΩ
		V _{GS} =2.5V, I _D =3A		38	45	
		V _{GS} =1.8V, I _D =2A		50	60	
G _{fs}	Forward Transconductance	V _{DS} =5V, I _D =4A		4		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage	I _S =1A, V _{GS} =0V		0.6	1	V
I _S	Continuous Source Current				2.5	A
Dynamic and Switching Parameters						
Q _g	Total Gate Charge	V _{DS} =10V, V _{GS} =4.5V, I _D =5A		5.7	8	nC
Q _{gs}	Gate-Source Charge			0.8	1.1	
Q _{gd}	Gate-Drain Charge			1.5	2.1	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHz		305		pF
C _{oss}	Output Capacitance			52		
C _{rss}	Reverse Transfer Capacitance			43		
t _{d(on)}	Turn-On Time	V _{DD} =10V, V _{GEN} =4.5V R _G =6Ω, I _D =1A		3	6	nS
t _r				7.8	15	
t _{d(off)}	Turn-Off Time			12	23	
t _f				5.4	10	

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

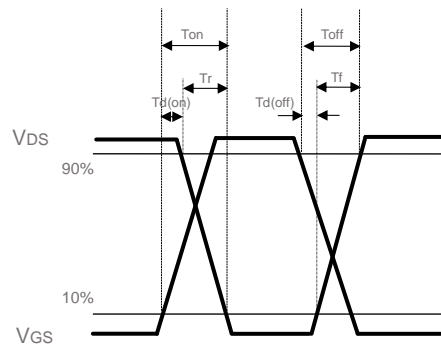
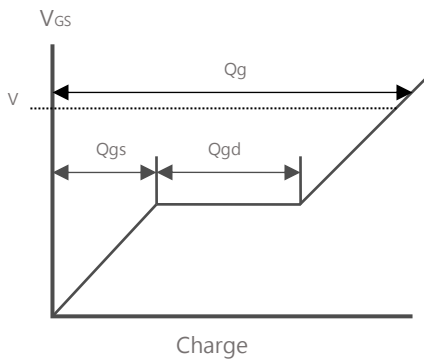
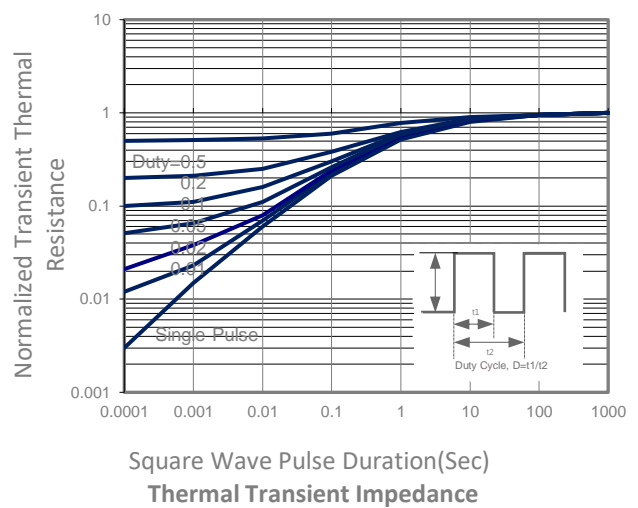
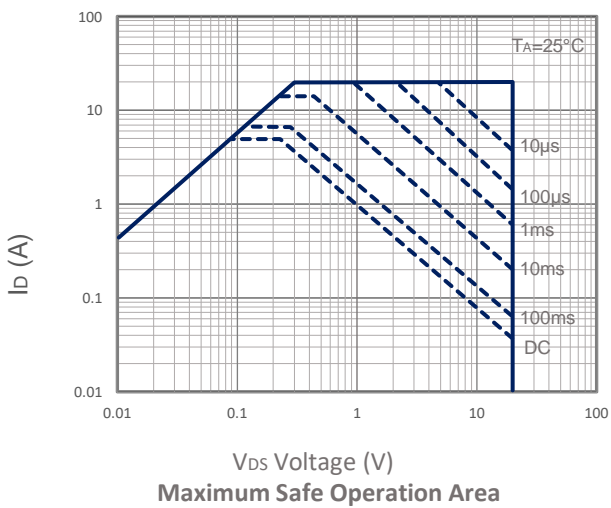
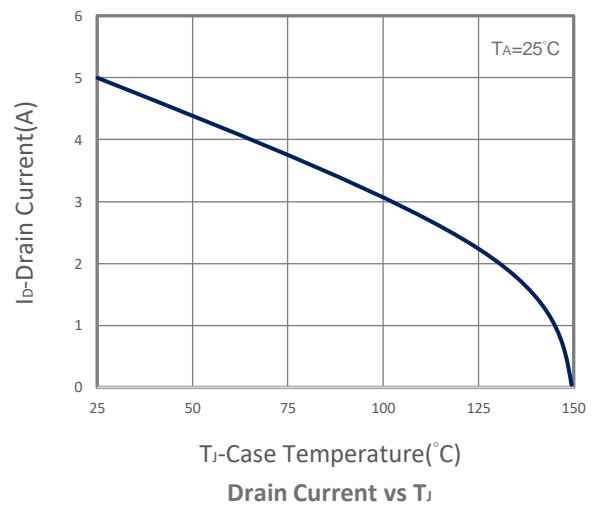
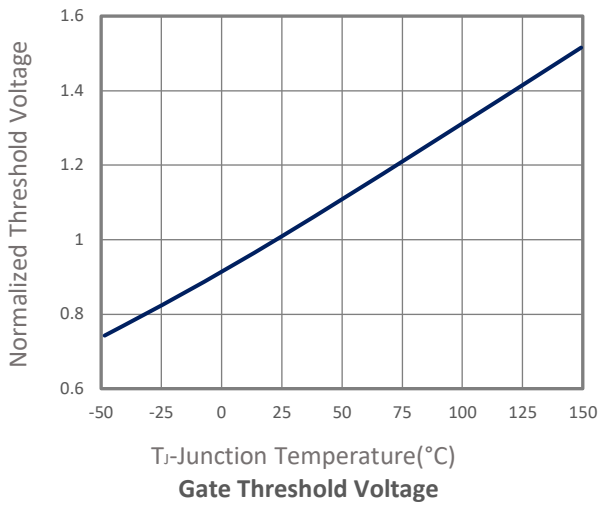
- A. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150°C.
- B. The value of R_{θJA} is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature T_{J(MAX)}=150°C (initial temperature T_A=25°C).
- C. T_{J(MAX)}=150°C, using junction-to-case thermal resistance (R_{θJC}) is more useful in additional heat sinking is used.

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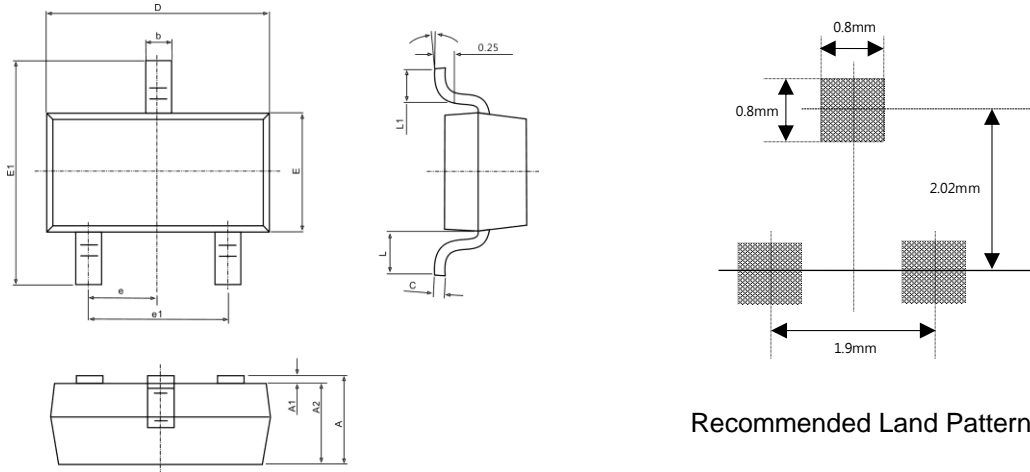
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



SOT-23 PACKAGE DIMENSIONS



Recommended Land Pattern

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°