

Single N-Channel MOSFET

DESCRIPTION

SMC2302S used trench technology are well suited for high efficiency fast switching applications, this MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, this devices are well suited for applications in the small 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

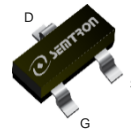
$V_{DS}=20V, I_D=5A$

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

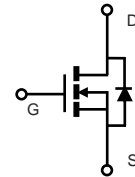
- ◆ Fast switch
- ◆ 1.8V Low gate drive applications
- ◆ Improved dv/dt capability
- ◆ High power and current handling capability

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 ^B	20	A
P_D	Power Dissipation ^A	$T_A=25^\circ C$	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 ^A	$t \leq 10s$	95	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	130	

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

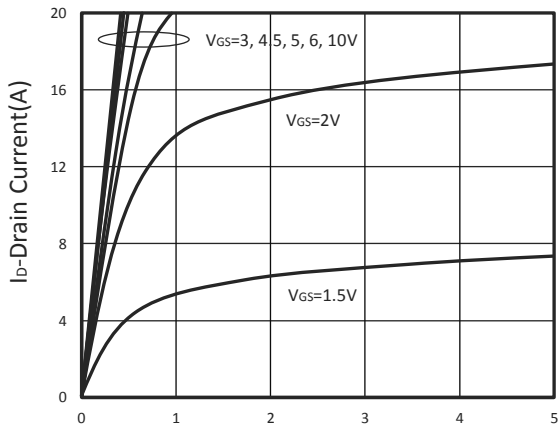
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.4	0.6	1	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±10V			±100	nA
I _{DSS}	Zero Gate 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 ^D	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 ^D	I _S =1A, V _{GS} =0V			1	V
I _S	Diode Continuous Forward Current				2.5	A
Dynamic and Switching Parameters ^E						
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.

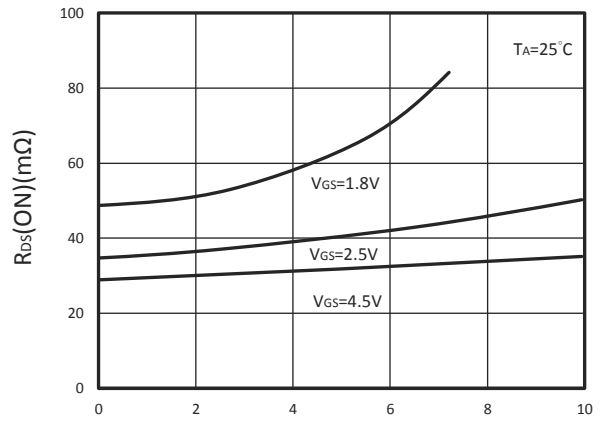
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150°C (initial temperature T_J=25°C).
- C. Using ≤ 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150°C.
- D. Pulse test width ≤300μs and duty cycle ≤ 2%.
- E. Guaranteed by design, not subject to production testing.

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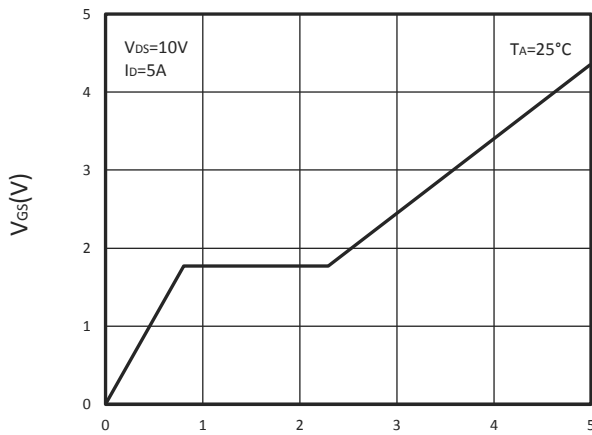
TYPICAL CHARACTERISTICS



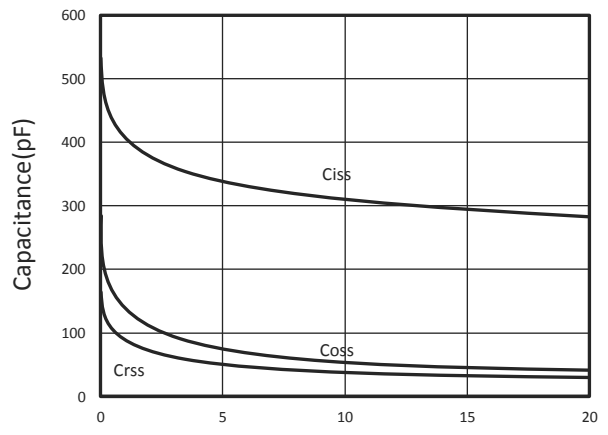
Output Characteristics



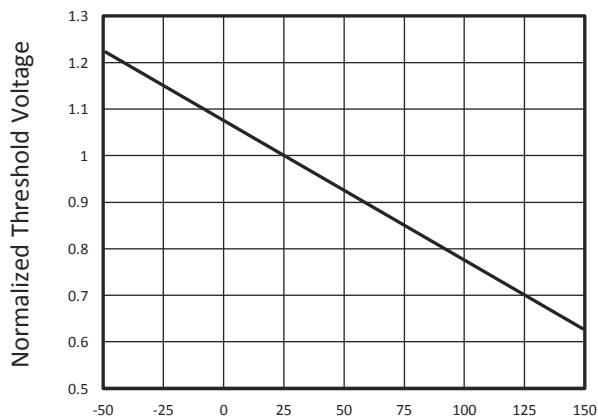
Drain-Source On Resistance



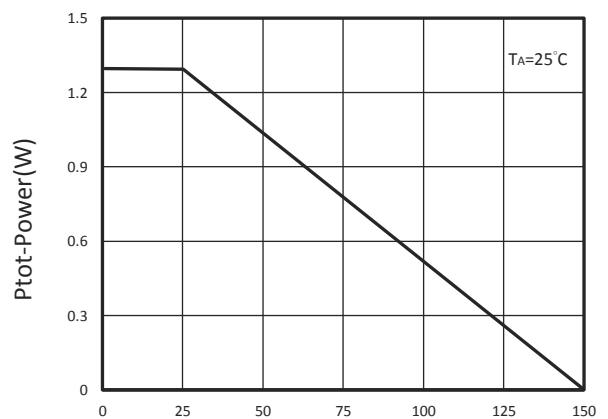
Gate Charge



Capacitance

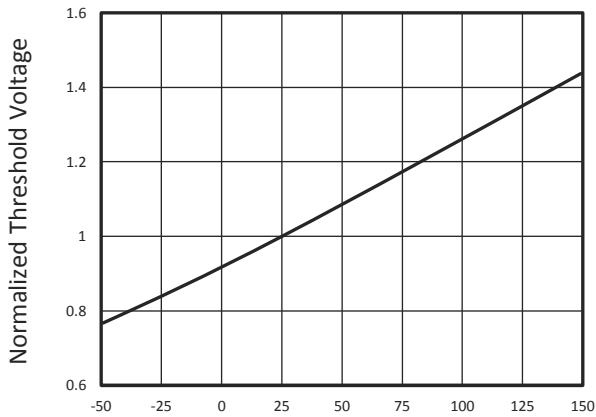


Gate Threshold Voltage

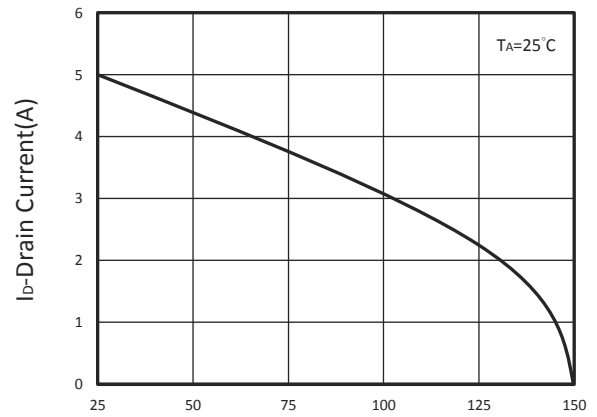


Power Dissipation

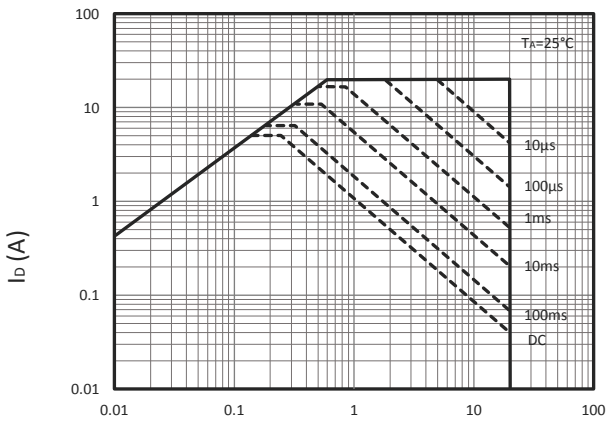
TYPICAL CHARACTERISTICS



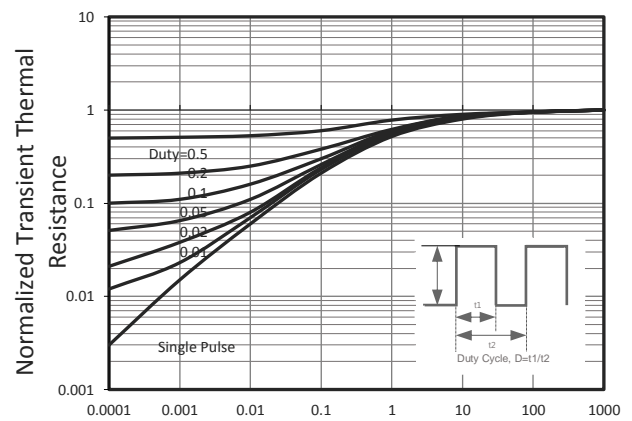
T_J-Junction Temperature(°C)
Gate Threshold Voltage



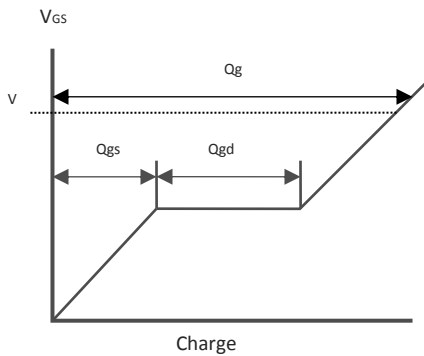
T_J-Junction Temperature(°C)
Drain Current vs T_J



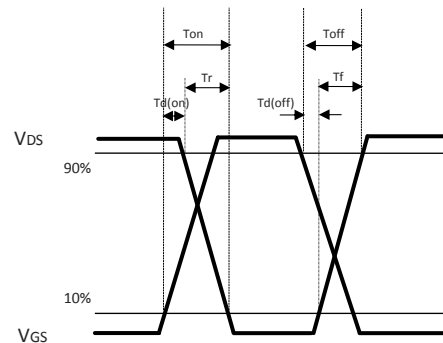
V_{DS} Voltage (V)
Maximum Safe Operation Area



Square Wave Pulse Duration(Sec)
Thermal Transient Impedance

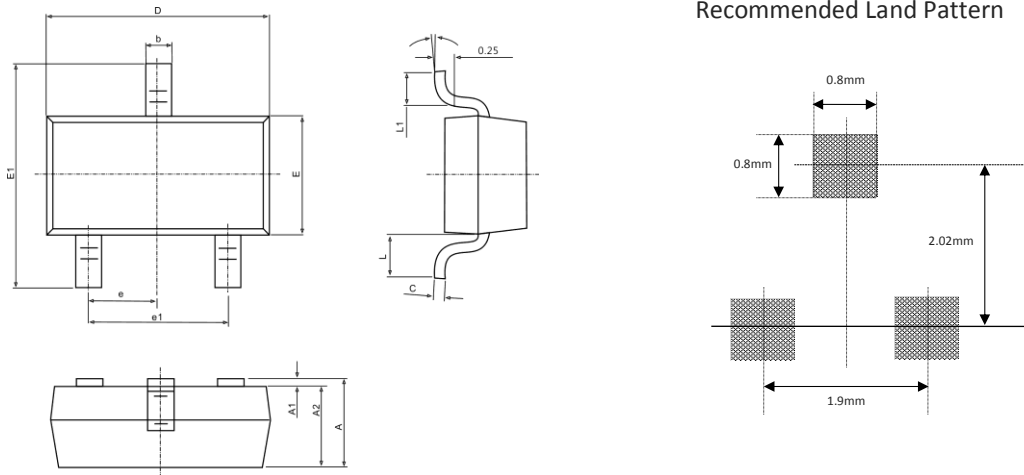


Gate Chrg Waveform



Switching Time Waveform

■ SOT-23 PACKAGE DIMENSIONS



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 BSC.		0.037 BSC	
e1	1.800	2.000	0.071	0.079
L	0.550 BSC		0.022 BSC	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°