

Single P-Channel MOSFET

DESCRIPTION

SMC2301 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 are needed in small outline surface mount package.

PART NUMBER INFORMATION

SMC 2301 SN - TR G
 a b c d e

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

FEATURES

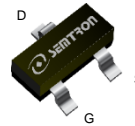
$V_{DS} = -20V$, $I_D = -3.2A$

$R_{DS(ON)} = 75m\Omega(Typ.)@V_{GS} = -4.5V$
 $R_{DS(ON)} = 105m\Omega(Typ.)@V_{GS} = -2.5V$
 $R_{DS(ON)} = 140m\Omega(Typ.)@V_{GS} = -1.8V$

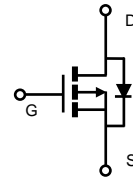
- ◆ Fast switch
- ◆ 1.8V Low gate drive applications
- ◆ Improved dv/dt capability
- ◆ High power and current handling capability

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	± 12	V	
I_D	Continuous Drain Current	$T_A = 25^\circ C$	-3.2	A
		$T_A = 70^\circ C$	-2.6	A
I_{DM}	Pulsed Drain Current ^A	12.8	A	
P_D	Power Dissipation ^B	$T_A = 25^\circ C$	1.3	W
		$T_A = 70^\circ C$	0.8	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 ^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)

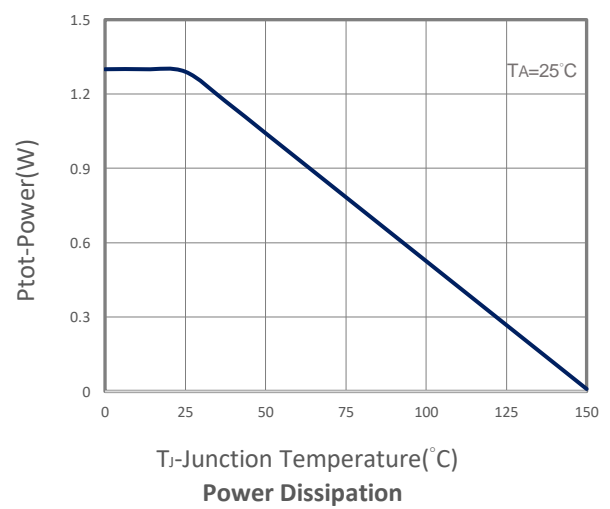
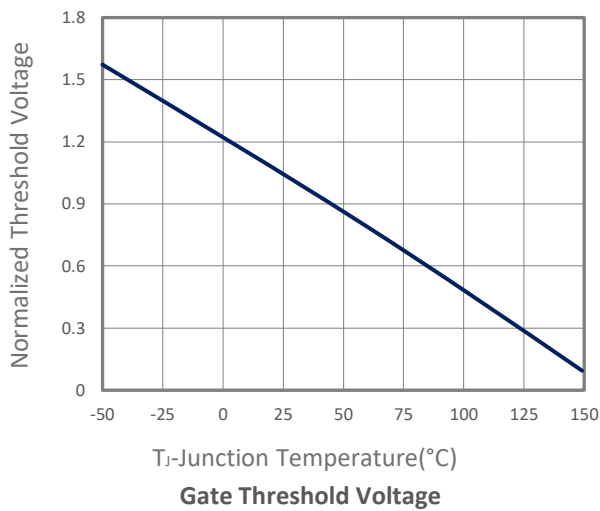
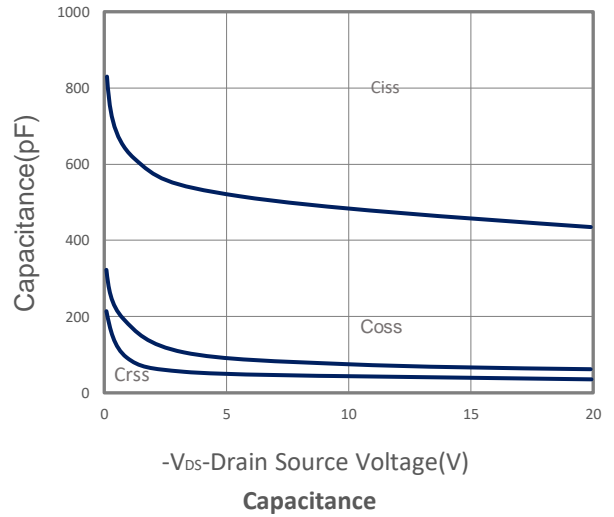
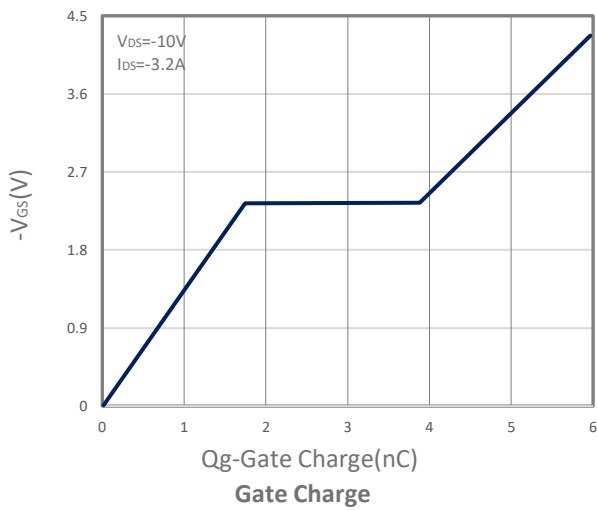
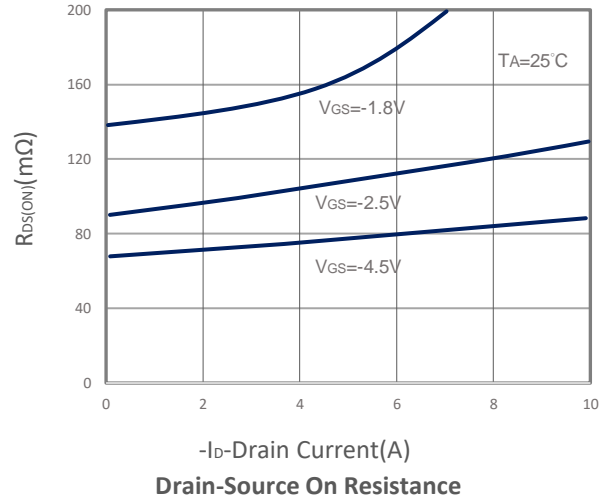
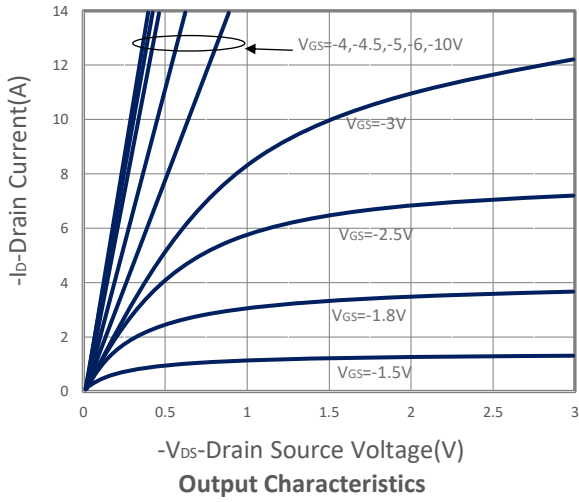
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250 μ A	-20			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250 μ A	-0.4	-0.7	-1	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} = \pm 12V			\pm 100	nA
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	V _{GS} =-4.5V, I _D =-3.2A		75	85	m Ω
		V _{GS} =-2.5V, I _D =-2.6A		105	130	
		V _{GS} =-1.8V, I _D =-2A		140	180	
G _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-3A		5		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.7	-1	V
I _S	Continuous Source Current				-1.6	A
Dynamic and Switching Parameters						
Q _g	Total Gate Charge	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-3.2A		6.8	9.2	nC
Q _{gs}	Gate-Source Charge			2.1	2.8	
Q _{gd}	Gate-Drain Charge			1.8	2.4	
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, f=1MHz		521	729	pF
C _{oss}	Output Capacitance			81	113	
C _{rss}	Reverse Transfer Capacitance			56	78	
t _{d(on)}	Turn-On Time	V _{DD} =-10V, V _{GEN} =-4.5V, R _G =3 Ω , I _D =-1A		4.8		nS
t _r				16		
t _{d(off)}	Turn-Off Time			20		
t _f				9		

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

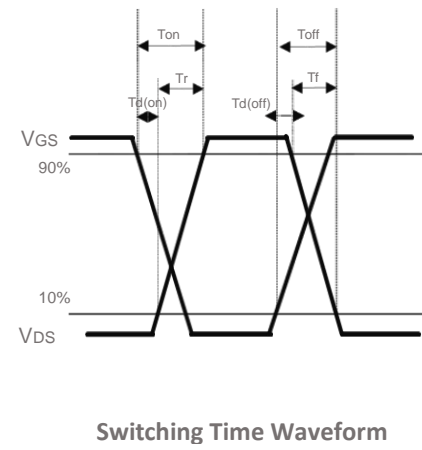
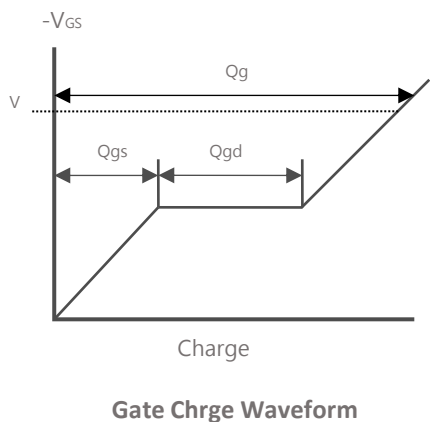
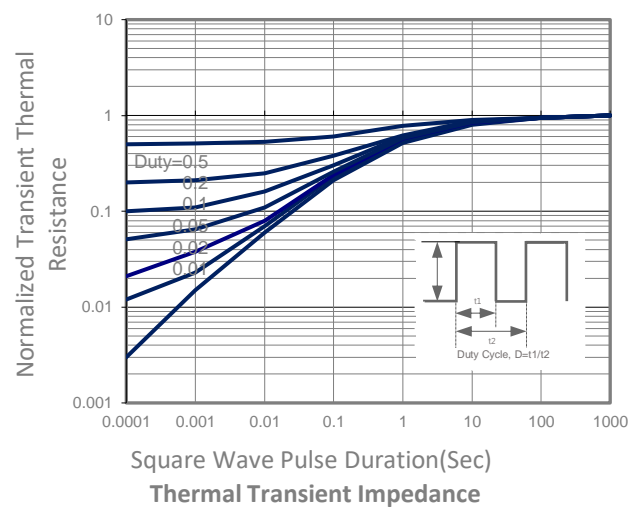
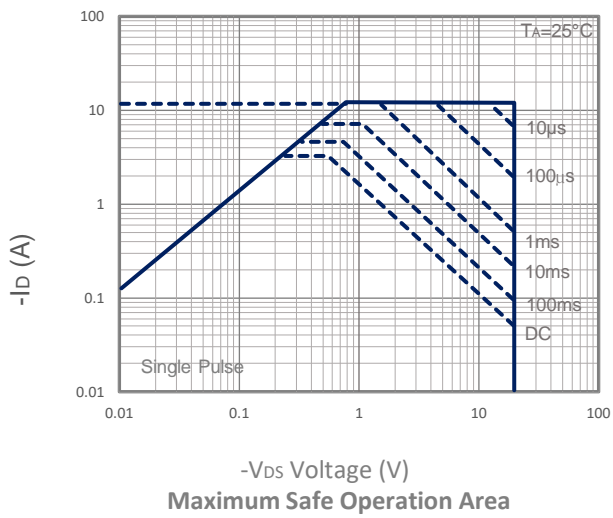
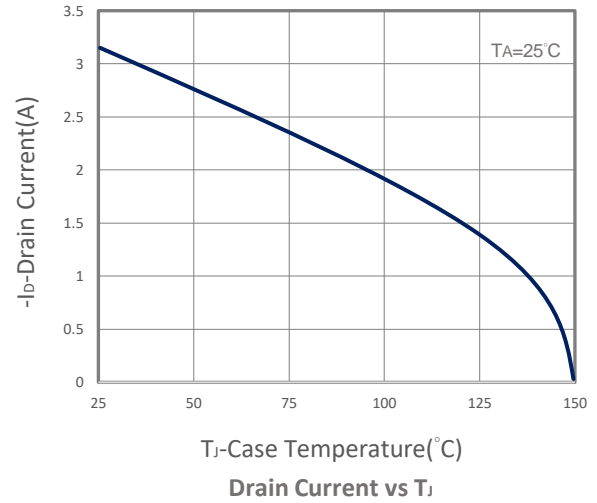
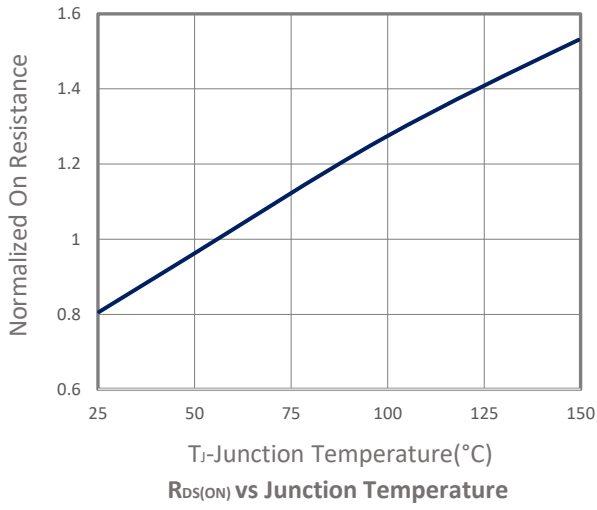
- A. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C.
- B. The value of R θ _{JA} is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature T_{J(MAX)}=150 $^\circ$ C (initial temperature T_A=25 $^\circ$ C).
- C.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

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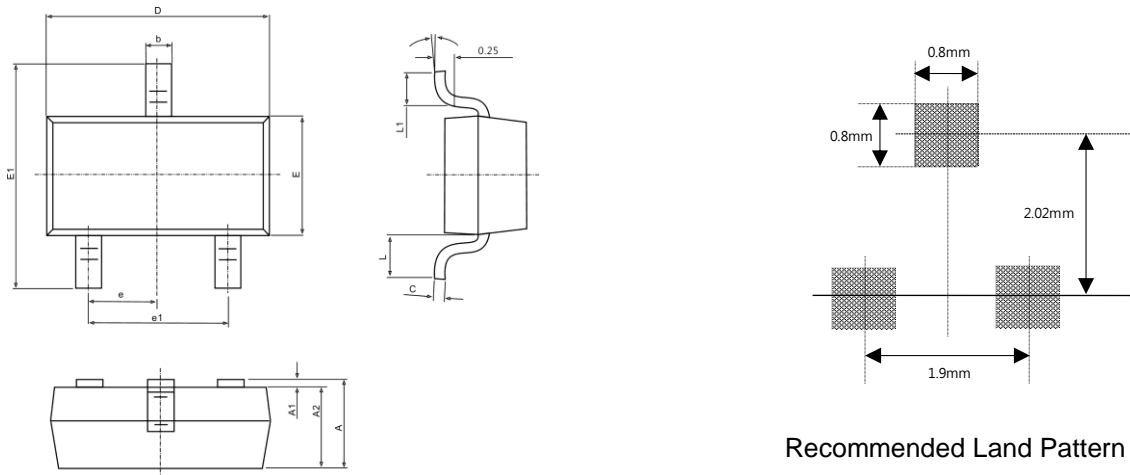
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



■ 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 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°