

Single N-Channel MOSFET

DESCRIPTION

SMC7002 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 7002 E SN - TR G
 a b c d e f

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

FEATURES

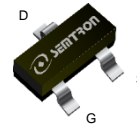
$V_{DS} = 60V, I_D = 0.46A$

$R_{DS(ON)} = 1.2\Omega (Typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 1.8\Omega (Typ.) @ V_{GS} = 4.5V$

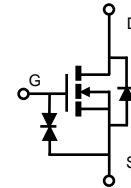
- ◆ Fast switch
- ◆ ESD Protection Diode Embedded

APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Analog Switching Application.



SOT-23



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

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-Source Voltage	60	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_A = 25^\circ C$	0.46
		$T_A = 70^\circ C$	0.39
I_{DM}	Pulsed Drain Current ^A	1.2	A
P_D	Power Dissipation ^B	$T_A = 25^\circ C$	0.7
		$T_A = 70^\circ C$	0.4
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		350	$^\circ C/W$
		Steady-State		

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	60			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.5	0.7	1	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V T _J =25°C			1	μA
		V _{DS} =48V, V _{GS} =0V T _J =125°C			10	
R _{DS(ON)}	Drain-source On-Resistance ^D	V _{GS} =10V, I _D =0.46A V _{GS} =4.5V, I _D =0.3A		1.2 1.8	1.6 3	Ω
G _{fs}	Forward Transconductance	V _{DS} =10V, I _D =0.1A		0.25		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^B	I _S =1A, V _{GS} =0V		0.7	1	V
I _S	Continuous Source Current				0.2	A
Dynamic and Switching Parameters						
Q _g	Total Gate Charge	V _{DS} =30V, V _{GS} =10V I _D =0.2A		1.2	1.7	nC
Q _{gs}	Gate-Source Charge			0.1	0.14	
Q _{gd}	Gate-Drain Charge			0.23	0.3	
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V f =1MHz		31	43	pF
C _{oss}	Output Capacitance			5.3	7	
C _{rss}	Reverse Transfer Capacitance			3.8	5	
t _{d(on)}	Turn-On Time ^E	V _{DD} =30V, V _{GEN} =10V, R _G =3Ω, I _D =0.2A		3	4.8	nS
t _r				6	9.8	
t _{d(off)}	Turn-Off Time ^E			12	19.2	
t _f				9	14.4	

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.

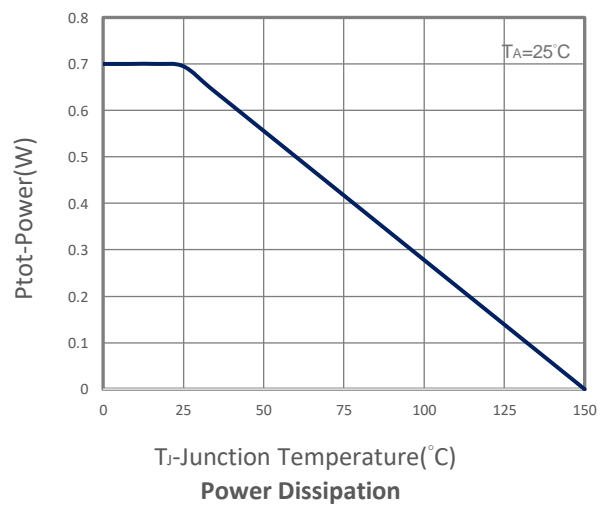
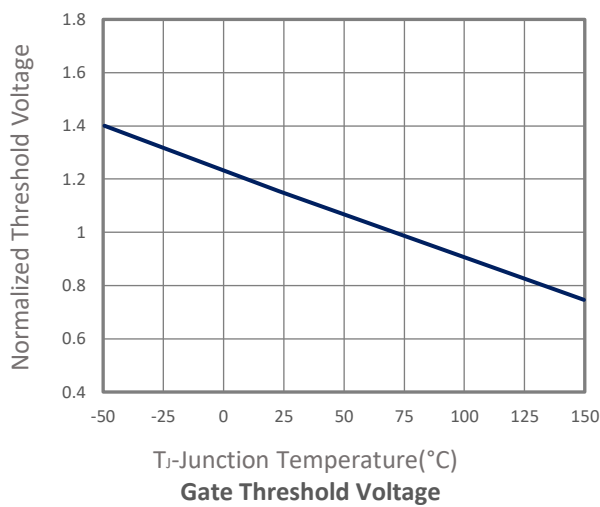
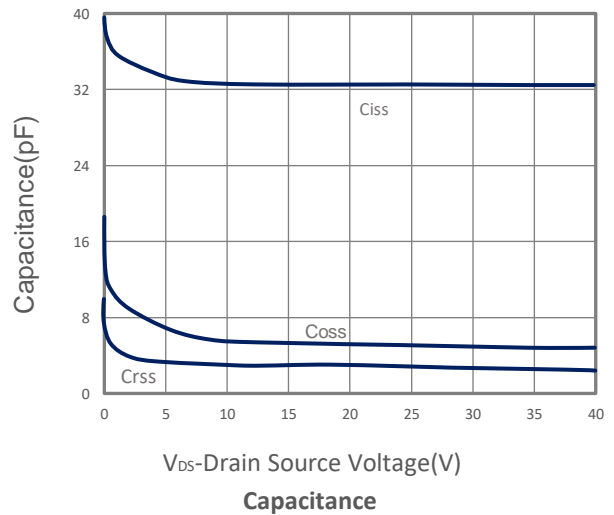
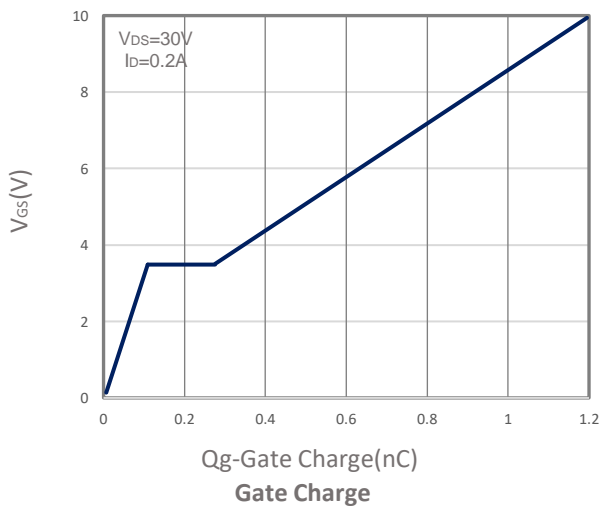
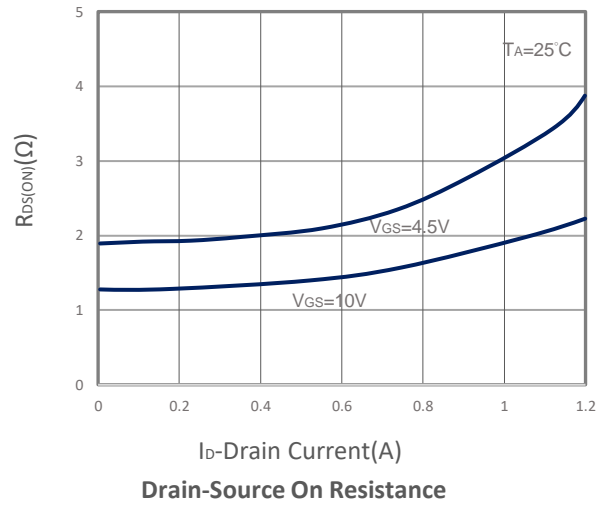
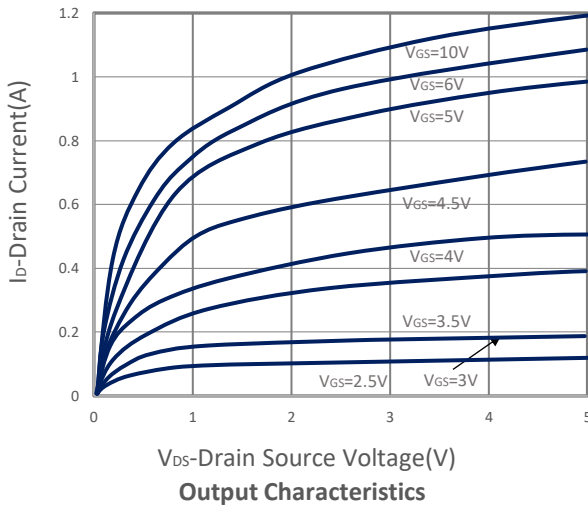
C. Surface-mounted on FR-4 board using 1 sq-in pad, 2 oz Cu, in a still air environment with T_A=25°C.

D. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%

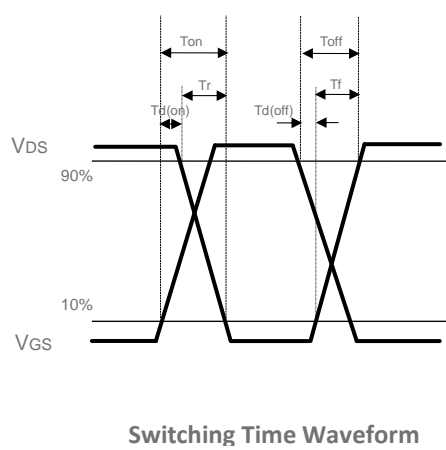
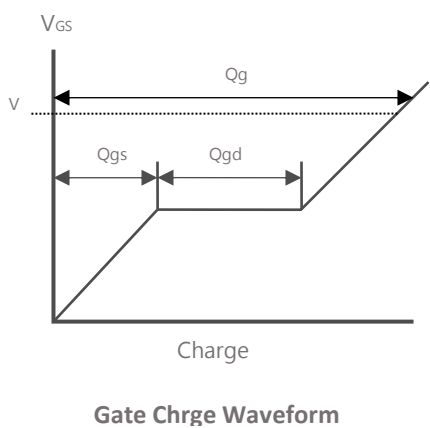
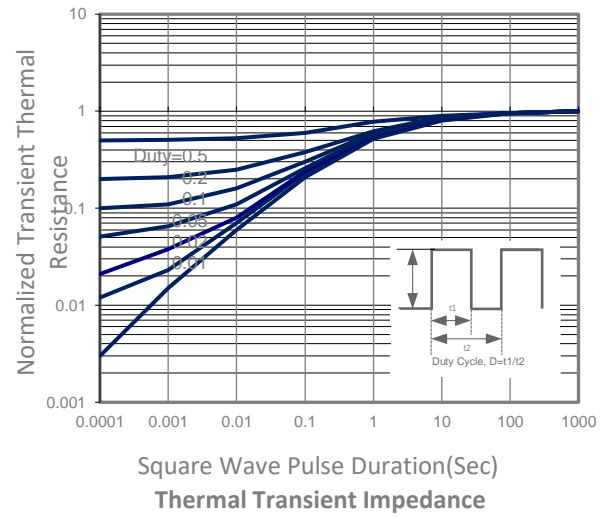
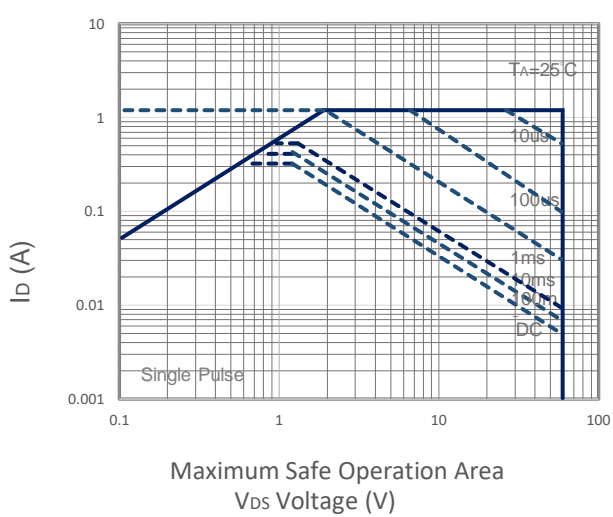
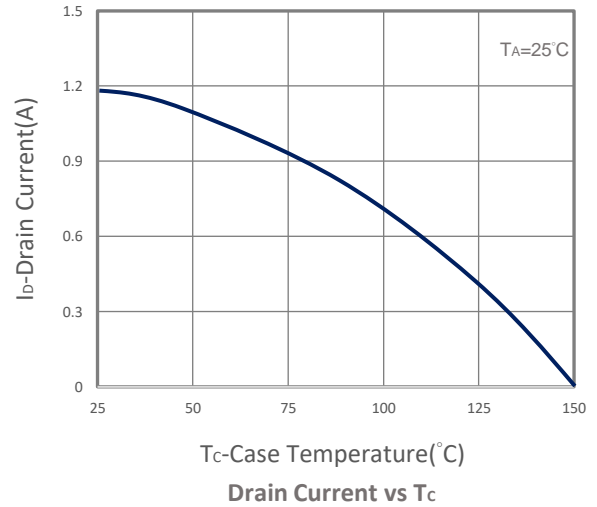
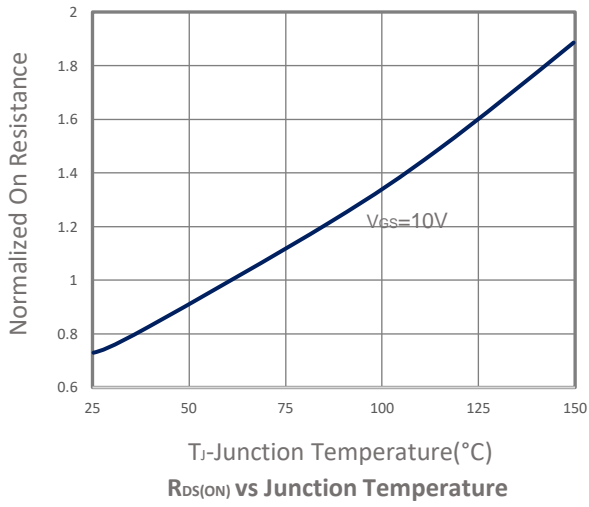
E. Pulsed width limited by maximum junction temperature.

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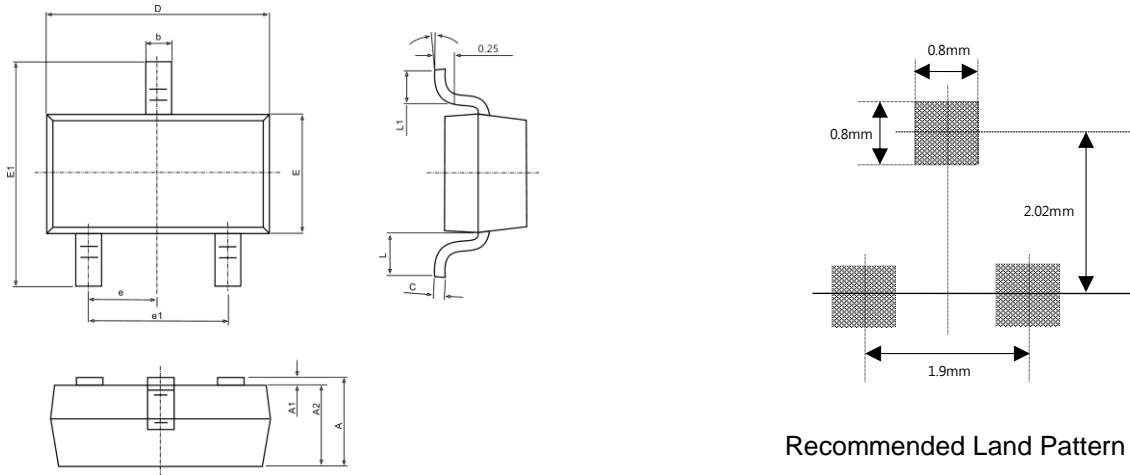
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



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°