

60V N-Channel Enhancement Mode MOSFET

DESCRIPTION

The SMC7002 is the N-Channel enhancement mode power field effect transistor is using trench DMOS technology.

This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications. This device is suitable for use as a load switch or other general applications.

SMC7002S-TRG ROHS Compliant This is Halogen Free

FEATURE

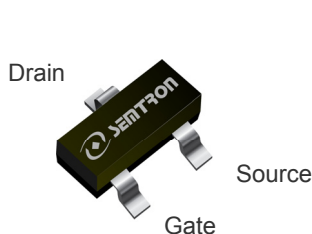
- ◆ 60V/0.5A, $R_{DS(ON)} = 1.2\Omega (typ.) @ V_{GS} = 10V$
- ◆ 60V/0.2A, $R_{DS(ON)} = 1.8\Omega (typ.) @ V_{GS} = 4.5V$
- ◆ Fast switching
- ◆ 100%EAS Guaranteed
- ◆ Improved dv/dt capability
- ◆ ESD Protection Diode Embedded

APPLICATIONS

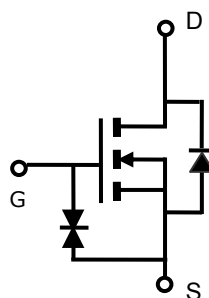
- ◆ LED Lighting
- ◆ Moto Drive
- ◆ Load Switch



PIN CONFIGURATION



SOT-23
Top View



PART NUMBER INFORMATION

SMC 7002 S - TR G a b c d e	a : Company name. b : Product Serial number. c : Package code. d : Handling code e : Green product code
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ORDERING INFORMATION

Part Number	Package Code	Handling Code	Shipping
SMC7002S-TRG	S : SOT-23	TR : Tape&Reel	3K/Reel

※ Year Code : 0 ~ 9, 2010 : 0

※ Week Code : A(1~2) ~ Z(53~54)

※ SOT-23 : Only available in tape and reel packaging.

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

Symbol	Parameter		Typical	Unit
V _{DSS}	Drain-Source Voltage		60	V
V _{GSS}	Gate-Source Voltage		±20	V
I _D	Continuous Drain Current (T _C =25°C) ^A	V _{GS} =4.5V	0.3	A
	Continuous Drain Current (T _C =100°C) ^A		0.2	A
I _{DM}	Pulsed Drain Current ^B		1.0	A
P _D	Power Dissipation	T _A =25°C	0.35	W
		T _A =70°C	0.25	
T _J	Operation Junction Temperature		-55 to150	°C
T _{STG}	Storage Temperature Range		-55 to150	°C

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

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

THERMAL DATA

Symbol	Parameter		Typ	Max	Unit
$R_{\theta JA}$	Thermal Resistance-Junction to Ambient ^A	Steady-State	-	357	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.6	2.5	V
I_{GSS}	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$			± 10	μA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V$ $T_J=25^\circ\text{C}$			1	μA
		$V_{DS}=48V, V_{GS}=0V$ $T_J=125^\circ\text{C}$			100	
$R_{DS(ON)}$	Drain-source On-Resistance ^B	$V_{GS}=10V, I_D=0.5A$ $V_{GS}=4.5V, I_D=0.2A$		1.2 1.8	1.6 3.0	Ω
G_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=0.1A$		250		mS
Source-Drain Diode						
V_{SD}	Diode Forward Voltage	$I_S=1.0A, V_{GS}=0V$		0.7	1.0	V
I_S	Continuous Source Current ^{AD}	$V_G=V_D=0V$, Force Current			0.3	A
Dynamic Parameters						
Q_g	Total Gate Charge	$V_{DS}=30V$		1.1	2.0	nC
Q_{gs}	Gate-Source Charge	$V_{GS}=10V$		0.1	0.2	
Q_{gd}	Gate-Drain Charge	$I_D=0.20A$		0.23	0.5	
C_{iss}	Input Capacitance	$V_{DS}=10V$		30.6	45	pF
C_{oss}	Output Capacitance	$V_{GS}=0V$		5.5	10	
C_{rss}	Reverse Transfer Capacitance	$f=1\text{MHz}$		4.0	8.0	
$t_{d(on)}$	Turn-On Time	$V_{DD}=30V$ $I_D=0.2A$		3.0	6.0	nS
t_r				5.0	10	
$t_{d(off)}$	Turn-Off Time	$V_{GEN}=10V$ $R_G=6\Omega$		14	27	
t_f				9.0	17	

Note:

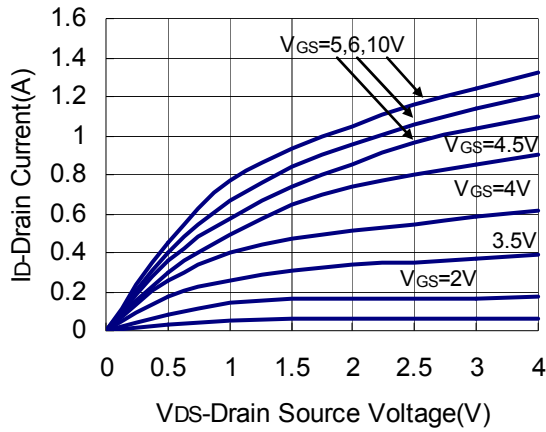
- The value of $R_{\theta JA}$ is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$.
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- The EAS data shows Max. rating. The test condition is $V_{DD}=48V, V_{GS}=-10V, L=0.1mH$.
- The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

The products and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this datasheet is up to date

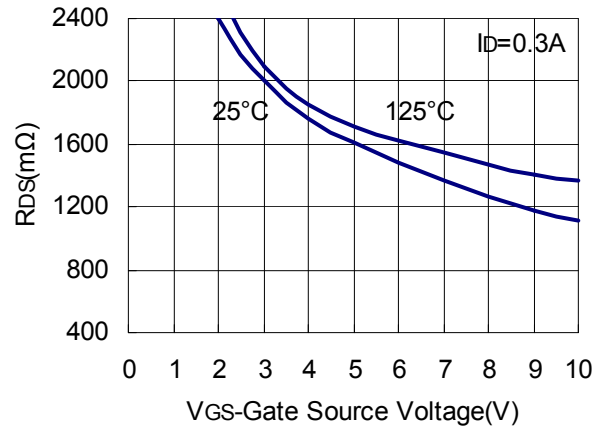
We assume no responsibility for any infringement of patents, patent rights, or other rights arising from the use of any information and circuitry in this datasheet.

TYPICAL CHARACTERISTICS

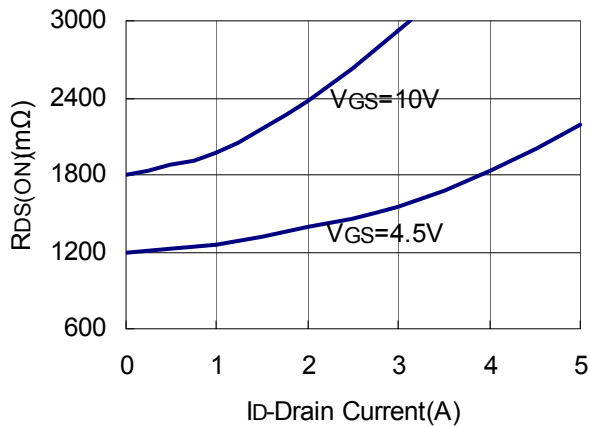
Output Characteristics



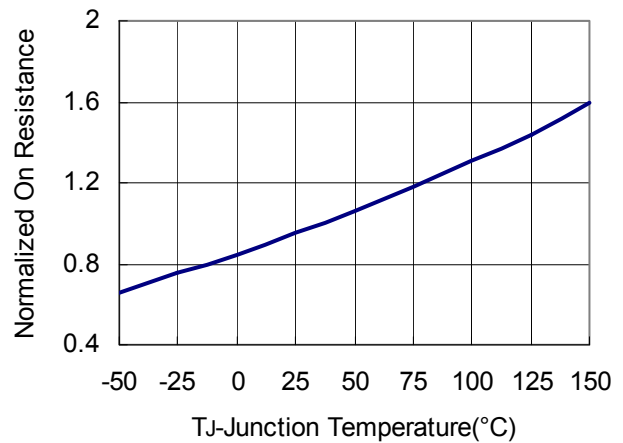
Drain-Source On Resistance



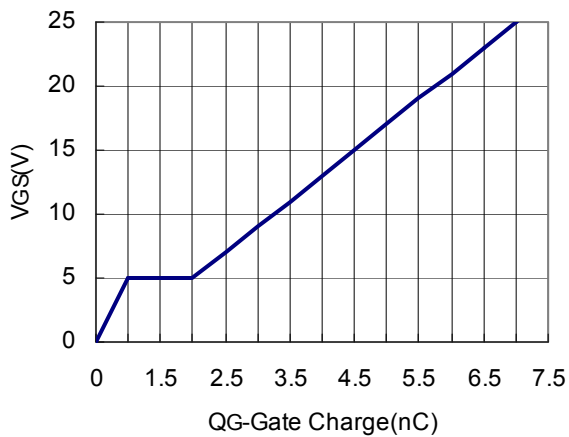
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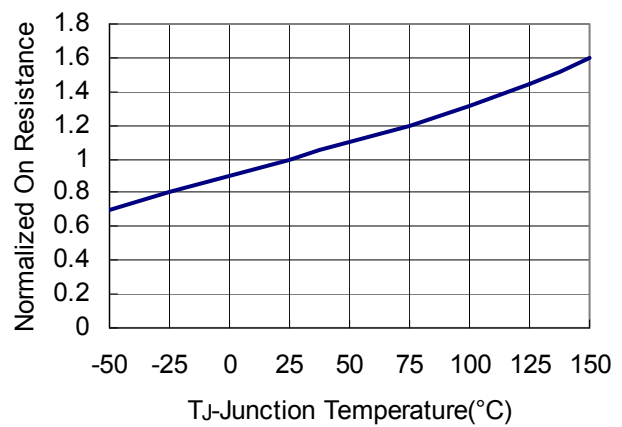
Drain Source On Resistance



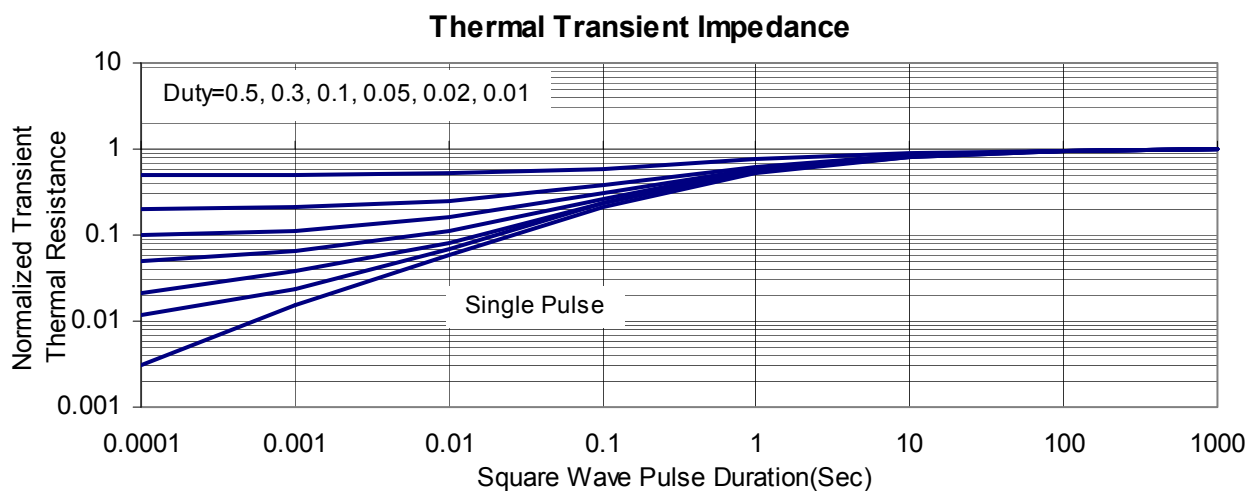
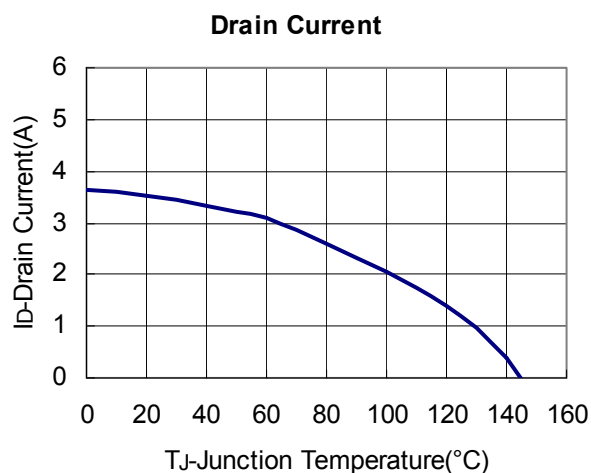
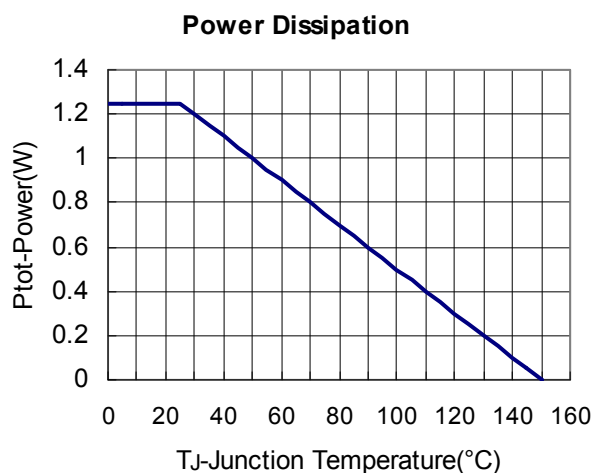
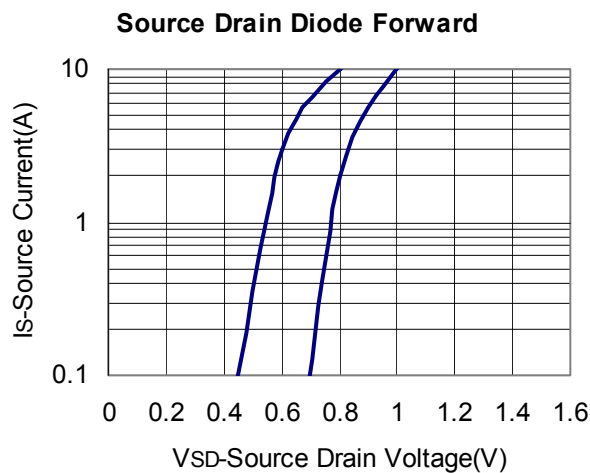
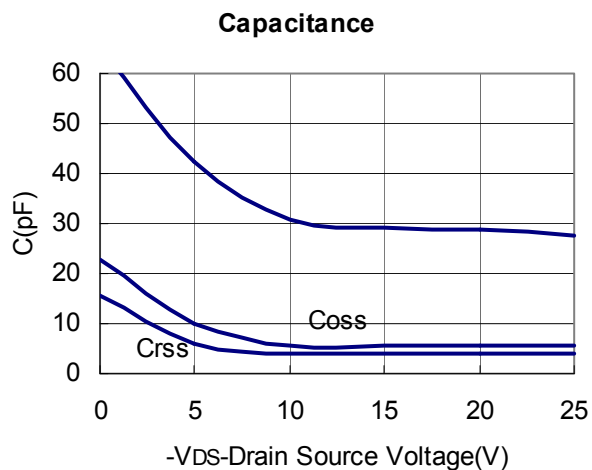
Gate Charge



Drain Source On Resistance



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
L1	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

