SemTron Microtech Corporation

SMC7002ESN

Single N-Channel MOSFET

■DESCRIPTION

SMC7002E is the N-Channel enhancement mode power field effect transistors are using trench 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.

■FEATURES

V_{DS}=60V, I_D=0.4A

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

◆Fast switch
◆ESD Protection

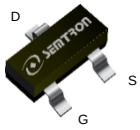
■PART NUMBER INFORMATION

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

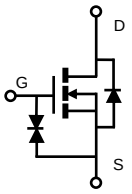
a : Company name.
b : Product Serial number.
c : ESD Protection
d : Package code SN: SOT-23
e : Handling code TR: Tape&Reel
f : Green produce code G: *RoHS Compliant*

■APPLICATIONS

◆Hend-Held Instruments
◆Analog Switching Application.



SOT-23



■ABSOLUTE MAXIMUM RATINGS (T_A = 25°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 [A]	T_A=25°C	0.4	A
		T_A=70°C	0.33	A
I_{DM}	Pulsed Drain Current [B]		1.2	A
P_D	Power Dissipation [A]	T_A=25°C	0.83	W
		T_A=70°C	0.53	W
T_J	Operation Junction Temperature		-55/150	°C
T_{STG}	Storage Temperature Range		-55/150	°C

■THERMAL RESISTANCE

Symbol	Parameter		Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient [a]	t≦10s		150	°C/W

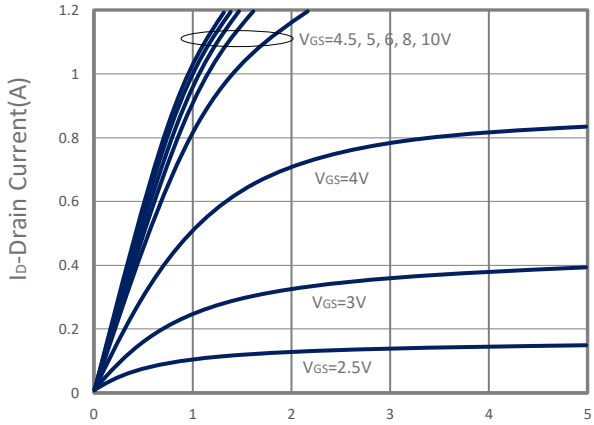
■ELECTRICAL CHARACTERISTICS(T_A = 25°C Unless otherwise noted)

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	1	1.6	2.5	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS}=±20V			±10	μA
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=85°C			10	
$R_{DS(ON)}$	Drain-source On-Resistance [D]	V_{GS}=10V ,I_D=0.4A V_{GS}=4.5V, I_D=0.2A		1.2 1.8	1.6 3	Ω
Diode Characteristics						
V_{SD}	Diode Forward Voltage [D]	I_S=0.2A, V_{GS}=0V			1	V
I_S	Diode Continuous Forward Current [A]				0.4	A
Dynamic and Switching Parameters [E]						
Q_g	Total Gate Charge	V_{DS}=30V, V_{GS}=10V, I_D=0.2A		1.1		nC
Q_{gs}	Gate-Source Charge			0.1		
Q_{gd}	Gate-Drain Charge			0.2		
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz		27		pF
C_{oss}	Output Capacitance			5.8		
C_{rss}	Reverse Transfer Capacitance			3		
$t_{d(on)}$	Turn-On Time	V_{DD}=30V, V_{GEN}=10V, R_G=10Ω, I_D=0.2A		2.95	6	nS
t_r				4	8	
$t_{d(off)}$	Turn-Off Time			11	21	
t_f				8	15	

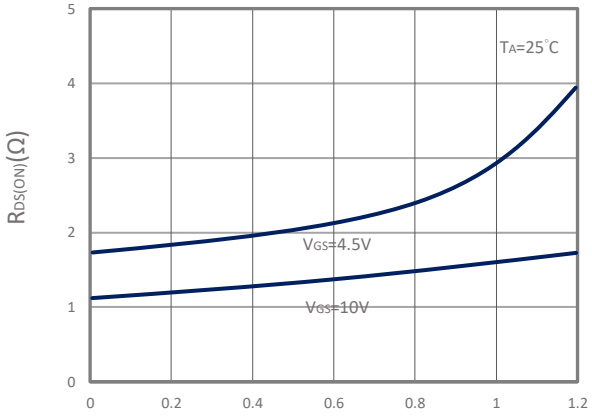
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

A. Surface mounted on FR4 board using 1 in sq pad size
B. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}$=150°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.

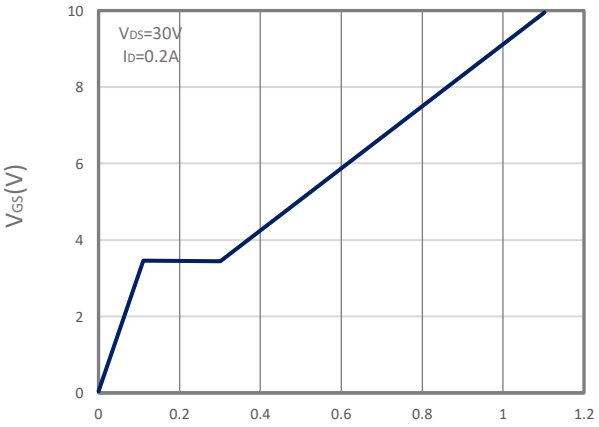
TYPICAL CHARACTERISTICS



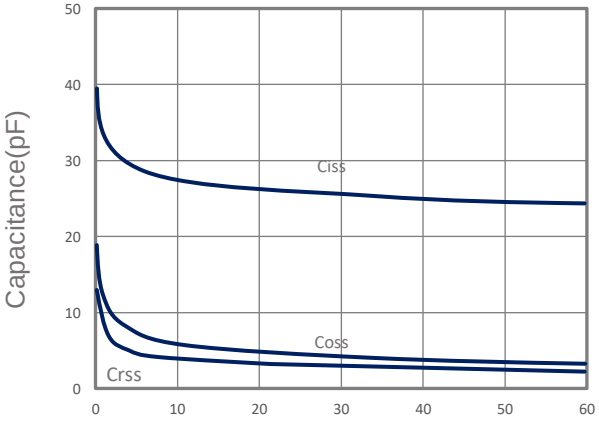
Output Characteristics



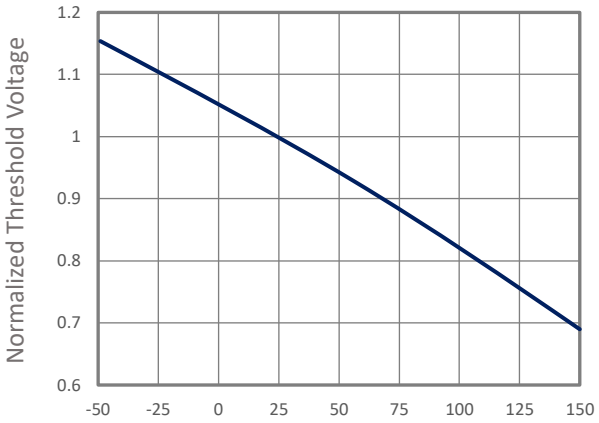
Drain-Source On Resistance



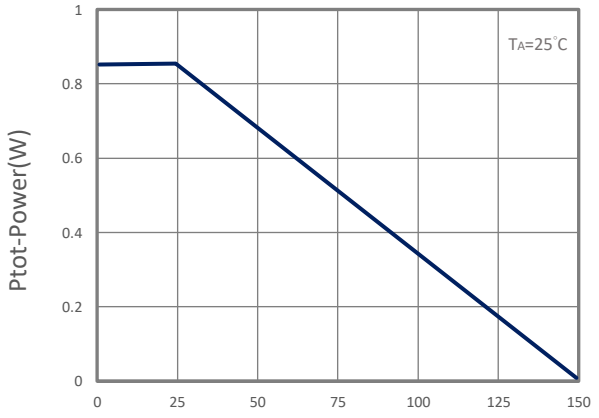
Gate Charge



Capacitance

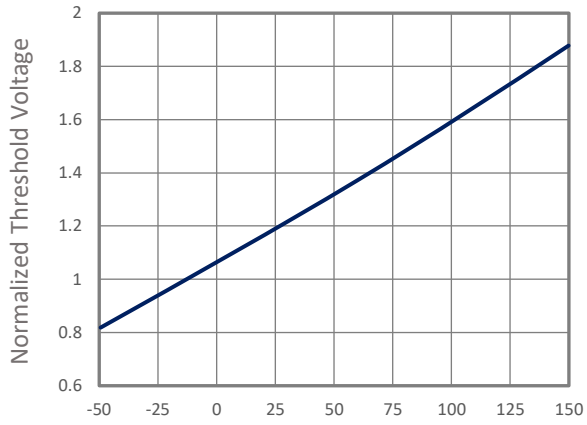


Gate Threshold Voltage

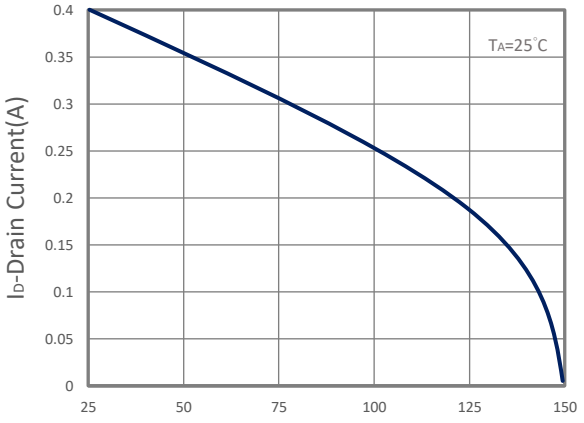


Power Dissipation

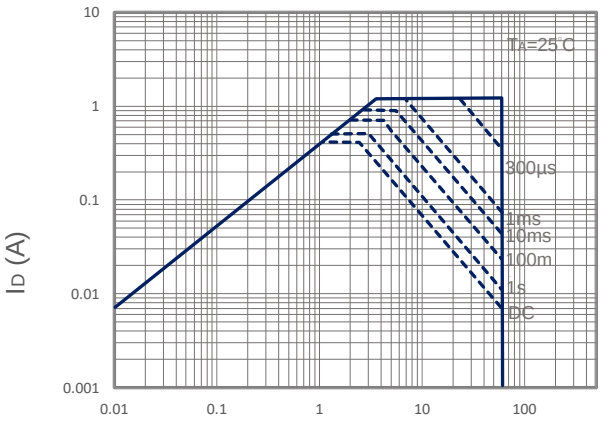
TYPICAL CHARACTERISTICS



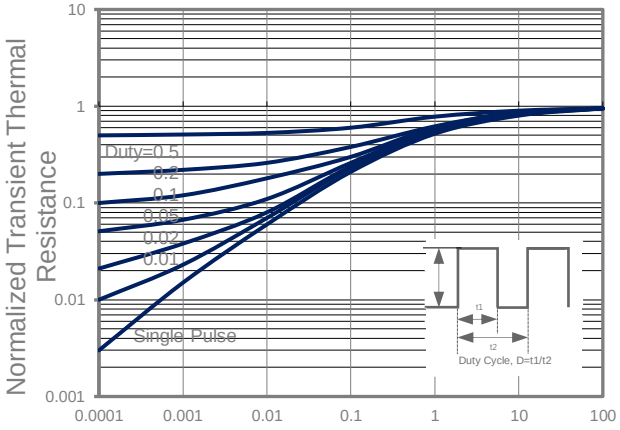
Gate Threshold Voltage



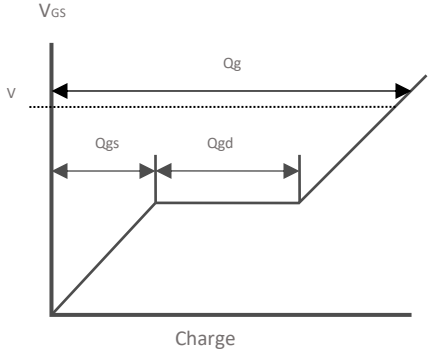
Drain Current vs TJ



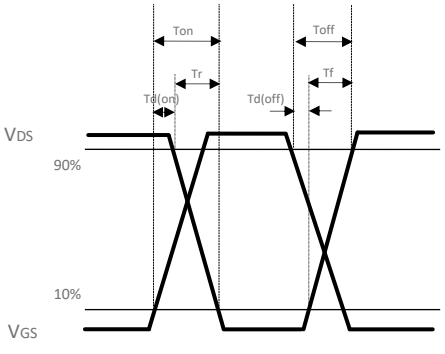
Maximum Safe Operation Area



Thermal Transient Impedance

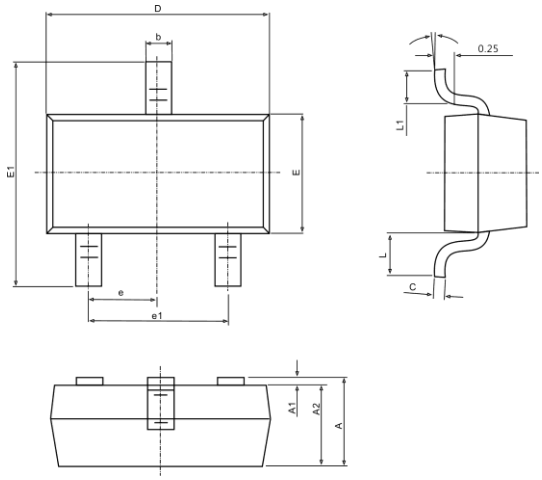


Gate Chrge Waveform

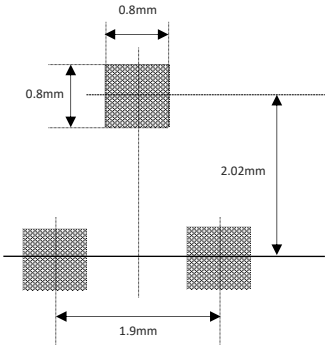


Switching Time Waveform

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°