

DESCRIPTION

SMC7002KE 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 **7002K** **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

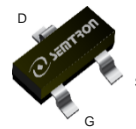
$V_{DS}=60V$, $I_D=0.45A$

$R_{DS(ON)}=1.8\Omega(Typ.)@V_{GS}=10V$
 $R_{DS(ON)}=2.3\Omega(Typ.)@V_{GS}=4.5V$

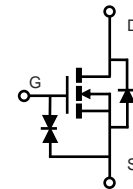
- ◆ High Speed Switching
- ◆ ESD Protection $>\pm 2KV$ HBM

APPLICATIONS

- ◆ Portable appliances
- ◆ 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	$T_A=25^\circ C$	0.45	A
		$T_A=70^\circ C$	0.36	A
I_{DM}	Pulsed Drain Current ^B	1.8	A	
P_D	Power Dissipation ^A	$T_A=25^\circ C$	0.83	W
		$T_A=70^\circ C$	0.53	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 ^A	$t \leq 10s$	150	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	300	$^\circ C/W$

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

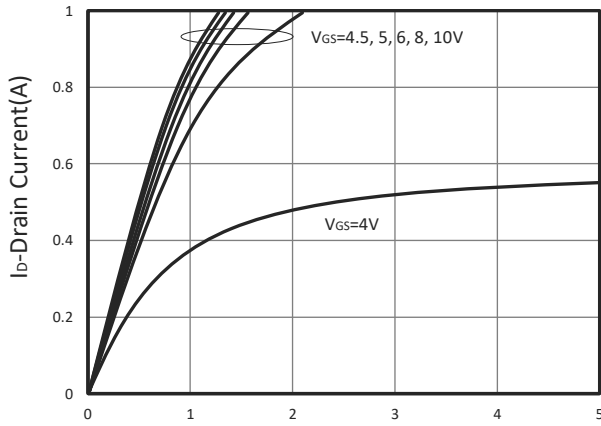
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	60			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μ A	1	1.6	2.5	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} = \pm 20V			\pm 10	μ A
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V, T _J =25 $^\circ$ C			1	μ A
		V _{DS} =48V, V _{GS} =0V, T _J =85 $^\circ$ C			30	
R _{DS(ON)}	Drain-source On-Resistance ^D	V _{GS} =10V, I _D =0.45A		1.8	2.2	Ω
		V _{GS} =4.5V, I _D =0.3A		2.3	3	
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^D	I _S =0.2A, V _{GS} =0V			1	V
I _S	Diode Continuous Forward Current				0.23	A
t _{rr}	Reverse Recovery Time	I _S =0.4A, dI/dt=100A/ μ s		40		ns
Q _{rr}	Reverse Recovery Charge			39		nC
Dynamic and Switching Parameters ^E						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V I _D =0.4A		0.65		nC
Q _{gs}	Gate-Source Charge			0.1		
Q _{gd}	Gate-Drain Charge			0.21		
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz		31		pF
C _{oss}	Output Capacitance			4.2		
C _{rss}	Reverse Transfer Capacitance			3		
t _{d(on)}	Turn-On Time	V _{DD} =30V, V _{GS} =10V, R _G =25 Ω , I _D =0.4		3.8	7	nS
t _r				3.6	6.8	
t _{d(off)}	Turn-Off Time			16	30	
t _f				10	19	

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

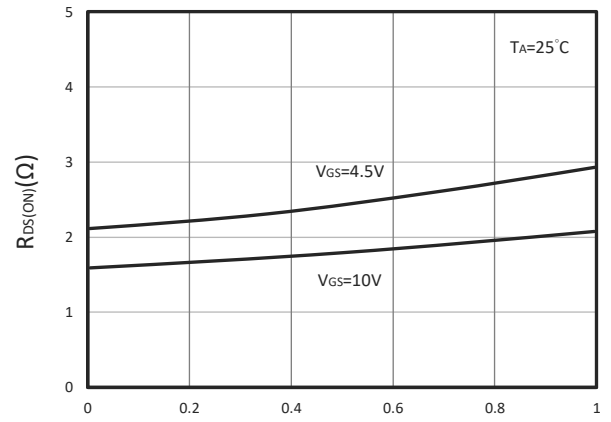
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C.
- C. Using \leq 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150 $^\circ$ C.
- D. Pulse test width \leq 300 μ s and duty cycle \leq 2%.
- E.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

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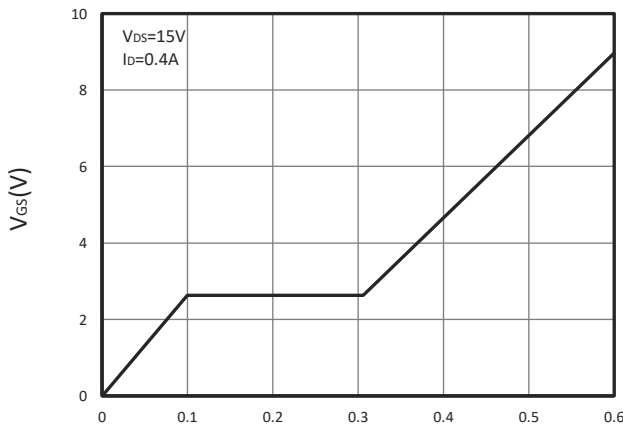
TYPICAL CHARACTERISTICS



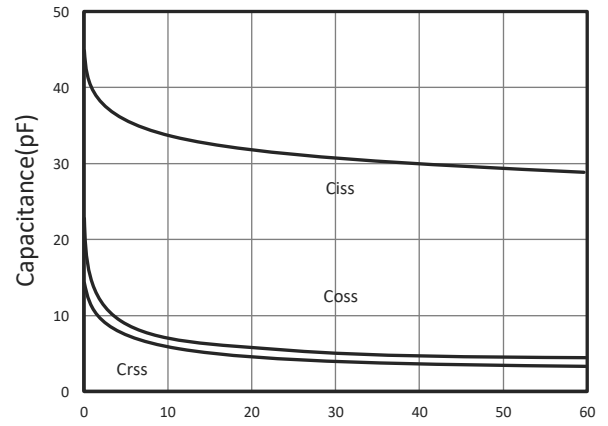
V_{GS}-Drain Source Voltage(V)
Output Characteristics



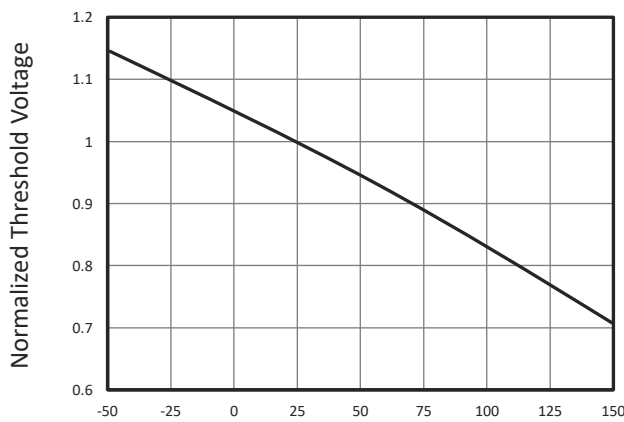
TA=25°C
Drain-Source On Resistance



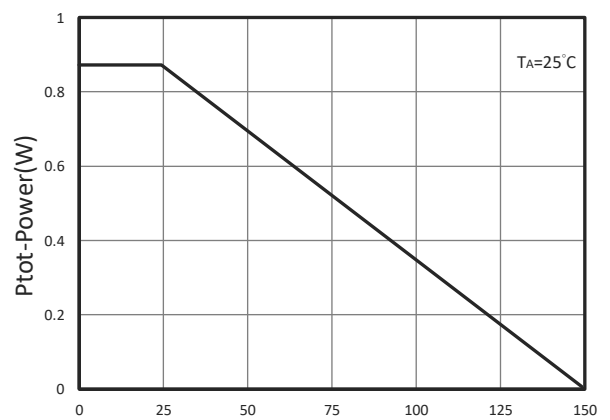
V_{GS}=15V
I_D=0.4A
Gate Charge



Capacitance

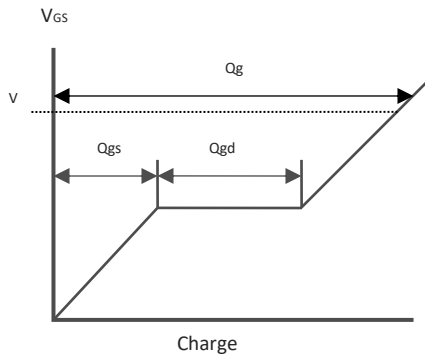
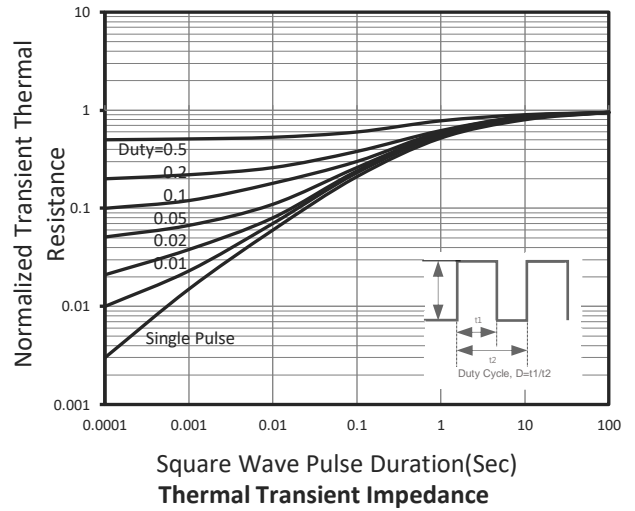
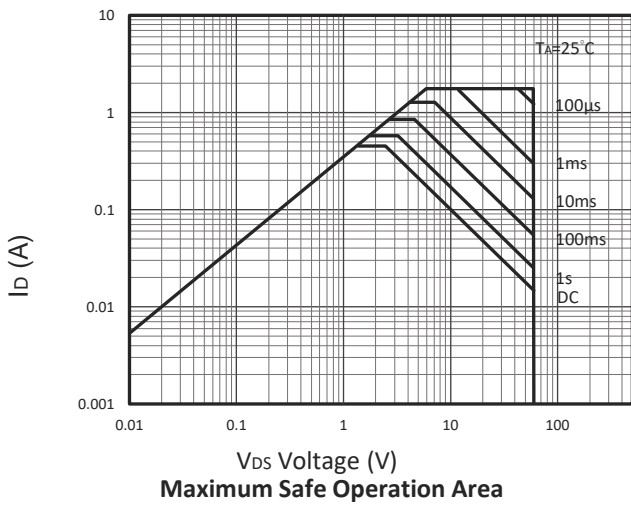
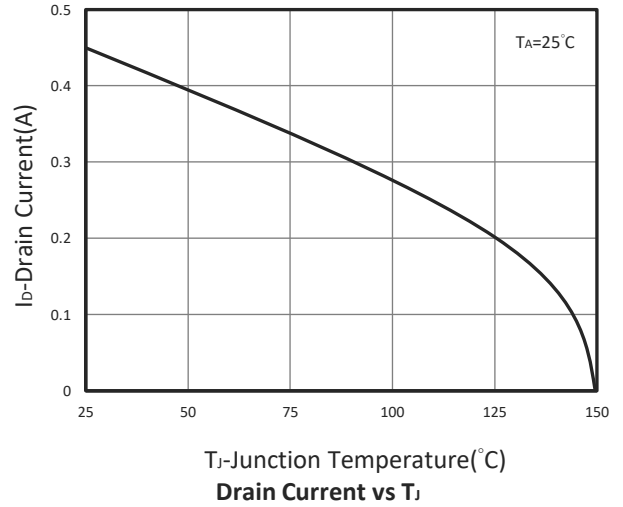
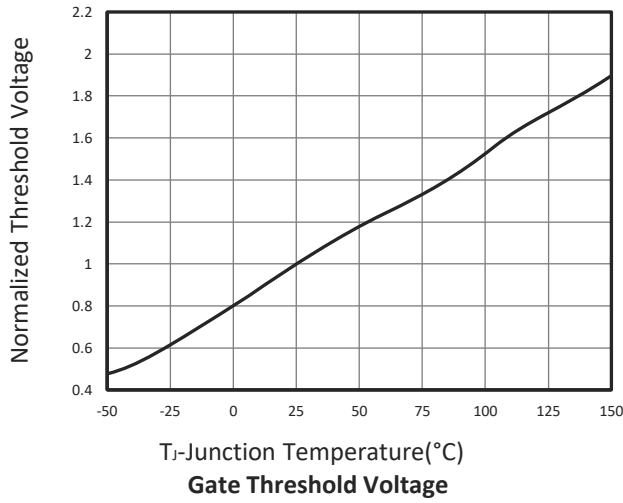


Gate Threshold Voltage

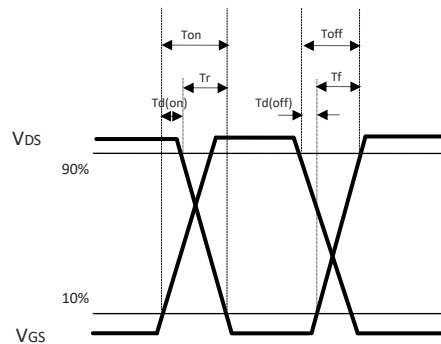


TA=25°C
Power Dissipation

TYPICAL CHARACTERISTICS

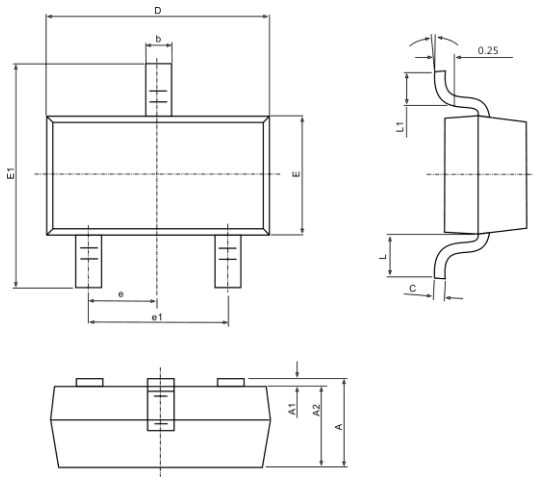


Gate Charge Waveform

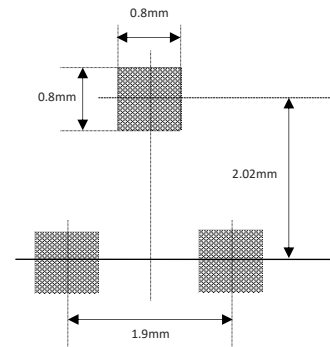


Switching Time Waveform

■ SOT-23 PACKAGE DIMENSIONS



Recommended Land Pattern



1.

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°