

Single N-Channel MOSFET

DESCRIPTION

SMC3232SN 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 are needed in small outline surface mount package.

PART NUMBER INFORMATION

SMC 3232 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

$V_{DS}=30V$, $I_D=5.5A$

$R_{DS(ON)}=22m\Omega(Typ.)@V_{GS}=10V$
 $R_{DS(ON)}=32m\Omega(Typ.)@V_{GS}=4.5V$

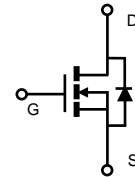
- ◆ Fast switch

APPLICATIONS

- ◆ Hand-Held Instruments
- ◆ Load Switch
- ◆ DC/DC Converter



SOT-23



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

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-Source Voltage	30	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ^A	$T_A=25^\circ C$	5.5
		$T_A=70^\circ C$	4.4
I_{DM}	Pulsed Drain Current ^B	22	A
I_{AS}	Avalanche Current ^B	8	A
E_{AS}	Single Pulse Avalanche energy $L=0.1mH$ ^B	3.2	mJ
P_D	Power Dissipation ^A	$T_A=25^\circ C$	1.3
		$T_A=70^\circ C$	0.84
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	$t \leq 10s$	95	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	130	

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

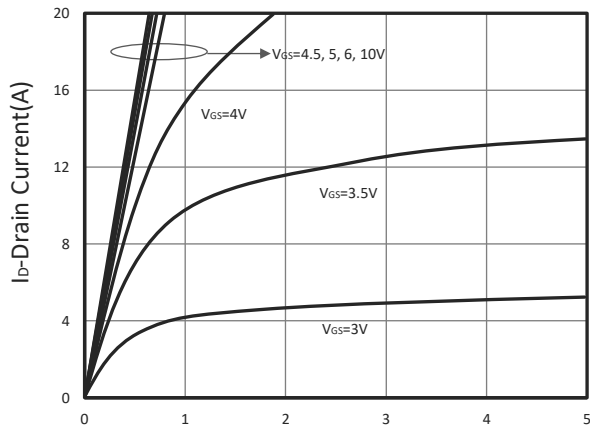
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μ A	1	1.5	2	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} = \pm 20V			\pm 100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V, T _J =25 $^\circ$ C			1	μ A
		V _{DS} =24V, V _{GS} =0V, T _J =75 $^\circ$ C			10	
R _{DS(ON)}	Drain-source On-Resistance ^D	V _{GS} =10V, I _D =5.5A V _{GS} =4.5V, I _D =4.5A		22 32	26 42	m Ω
G _{fs}	Forward Transconductance	V _{DS} =10V, I _D =3A		6.8		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^D	I _S =1A, V _{GS} =0V			1	V
I _S	Diode Continuous Forward Current				2.8	A
Dynamic and Switching Parameters^E						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _D =5A		7.6	10.6	nC
Q _g	Total Gate Charge(4.5V)			3.7	5.2	
Q _{gs}	Gate-Source Charge			1.5	2.1	
Q _{gd}	Gate-Drain Charge			1.6	2.2	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz		320		pF
C _{oss}	Output Capacitance			55		
C _{rss}	Reverse Transfer Capacitance			42		
t _{d(on)}	Turn-On Time	V _{DD} =15, V _{GEN} =10V R _G =6 Ω , I _D =1A		2.65	5	nS
t _r				8.5	16	
t _{d(off)}	Turn-Off Time			18.2	35	
t _f				5	10	

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

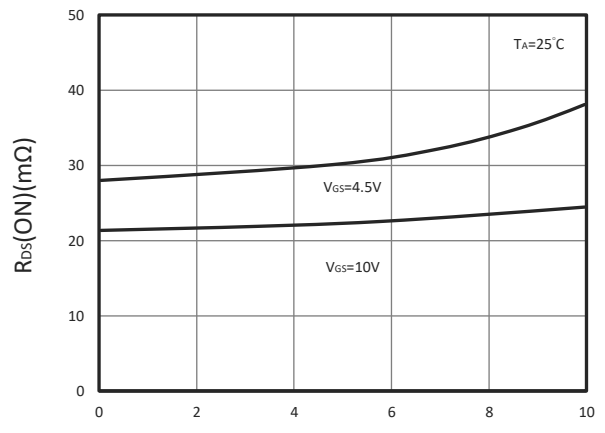
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C.
- C. Using \leq 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150 $^\circ$ C.
- D. Pulse test width \leq 300 μ s and duty cycle \leq 2%.
- E.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

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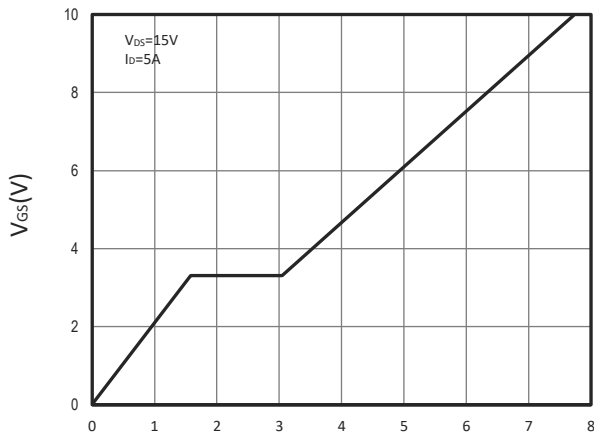
TYPICAL CHARACTERISTICS



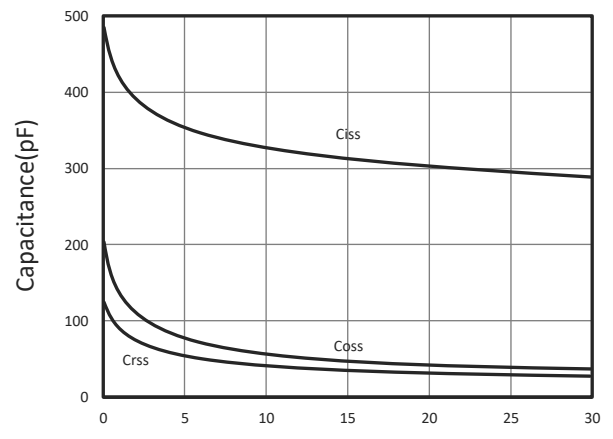
Output Characteristics



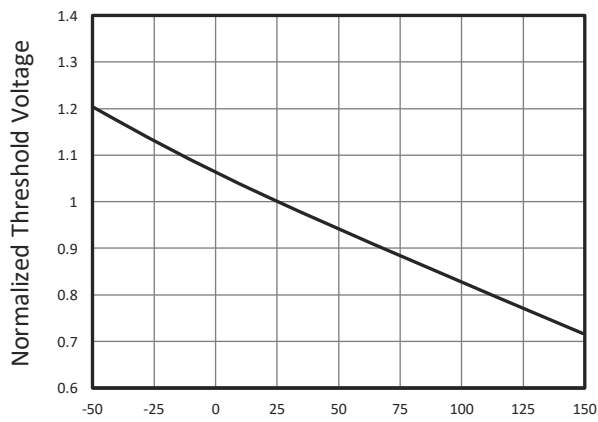
Drain-Source On Resistance



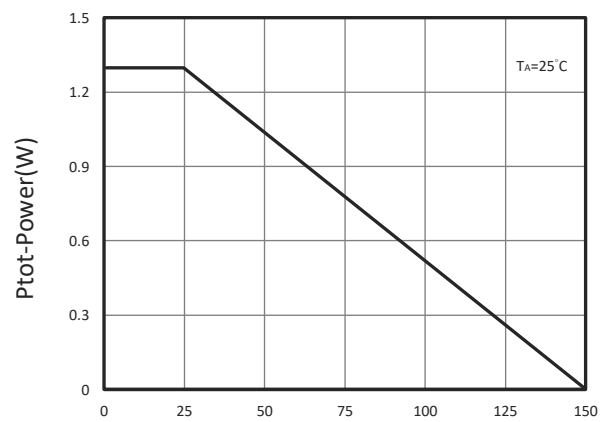
Gate Charge



Capacitance

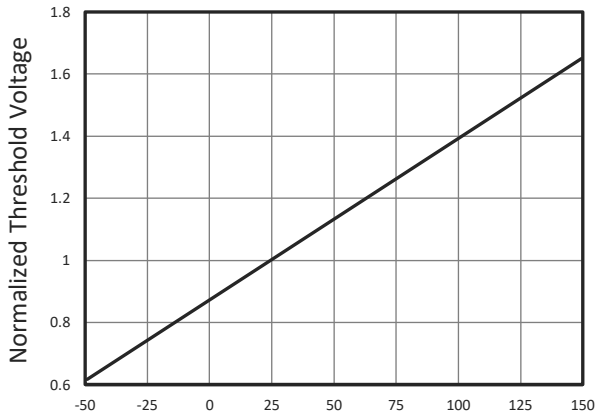


Gate Threshold Voltage

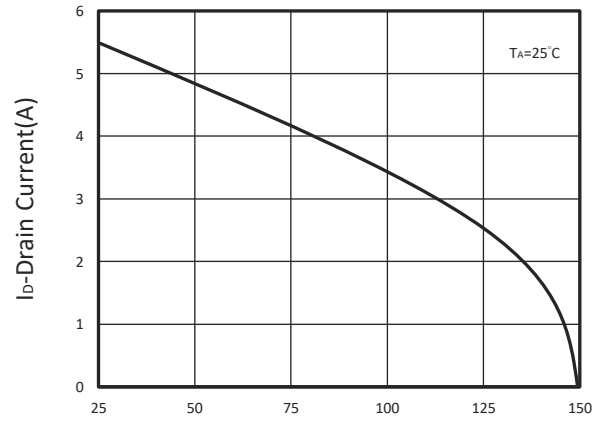


Power Dissipation

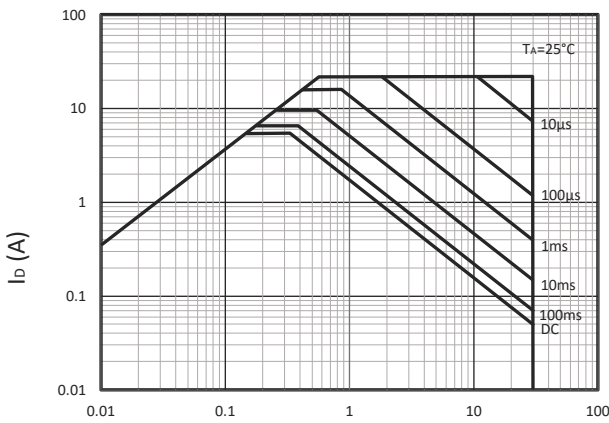
TYPICAL CHARACTERISTICS



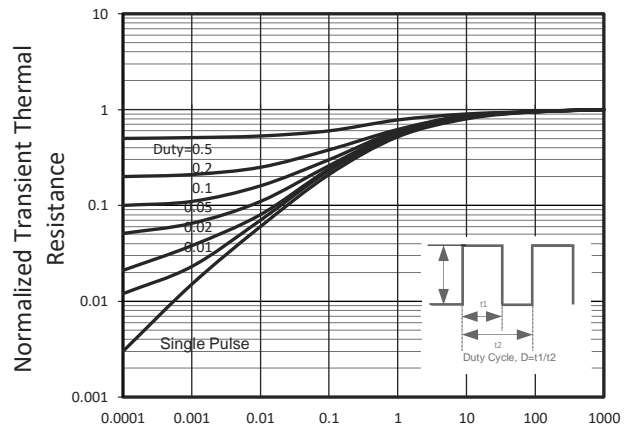
T_J-Junction Temperature(°C)
Gate Threshold Voltage



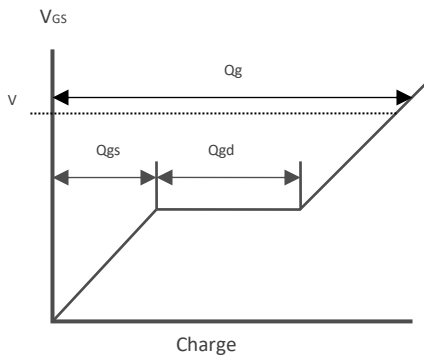
T_J-Junction Temperature(°C)
Drain Current vs T_J



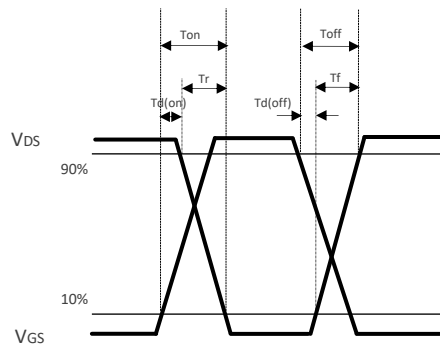
V_{DS} Voltage (V)
Maximum Safe Operation Area



Square Wave Pulse Duration(Sec)
Thermal Transient Impedance

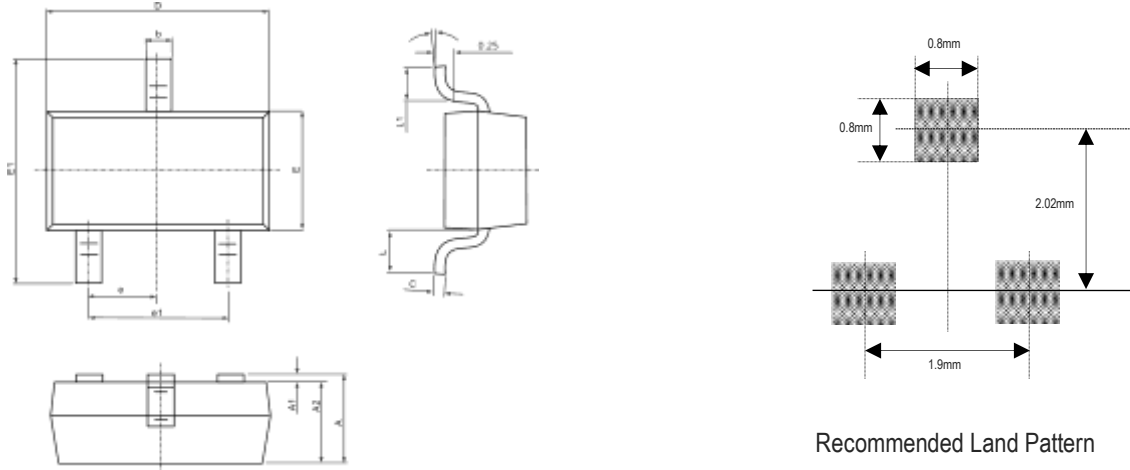


Gate Chrg Waveform



Switching Time Waveform

■ 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°