

Single N-Channel MOSFET

DESCRIPTION

SMC6216SN is the N-Channel enhancement mode power field effect transistors, this advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance. These devices are well suited for high efficiency fast switching applications.

PART NUMBER INFORMATION

SMC 6216 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

$V_{DS}=60V$, $I_D=3.8A$

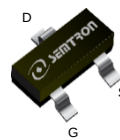
$R_{DS(ON)}=58m\Omega(Typ.)@V_{GS}=10V$

$R_{DS(ON)}=66m\Omega(Typ.)@V_{GS}=4.5V$

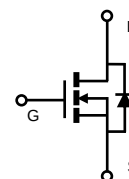
◆ Fast switching

APPLICATIONS

- ◆ Motor drive
- ◆ Power Management
- ◆ LED Lighting



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	$T_A=25^{\circ}C$	3.8
		$T_A=70^{\circ}C$	3
I_{DM}	Pulsed Drain Current ^B	15.2	A
I_{AS}	Avalanche Current ^B	5	A
E_{AS}	Single Pulse Avalanche energy $L=0.3mH$ ^B	3.75	mJ
P_D	Power Dissipation ^A	$T_A=25^{\circ}C$	1.6
		$T_A=70^{\circ}C$	1
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	$t \leq 10s$	80	$^{\circ}C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	130	

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

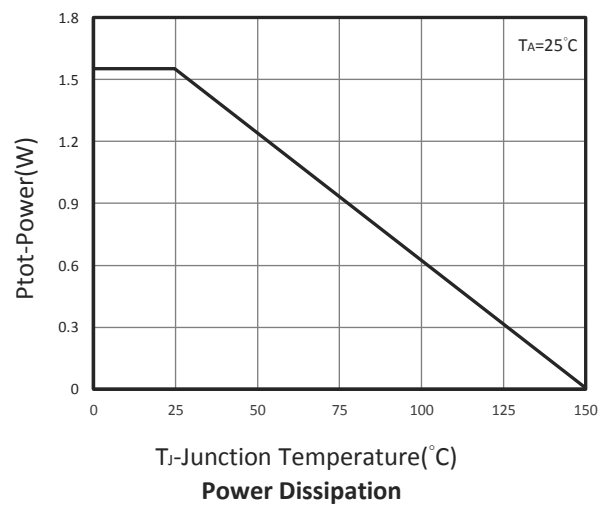
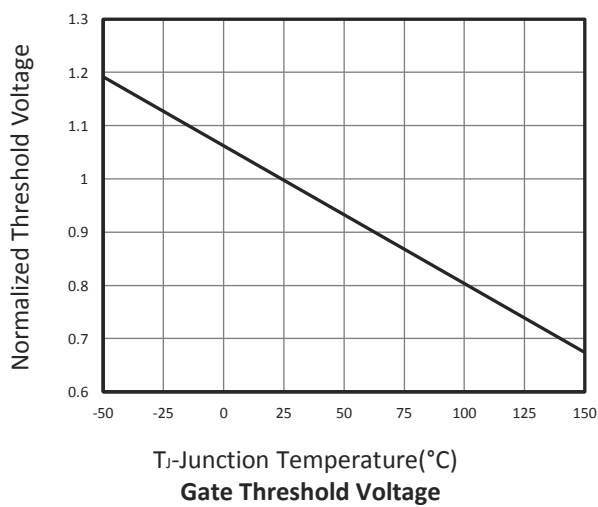
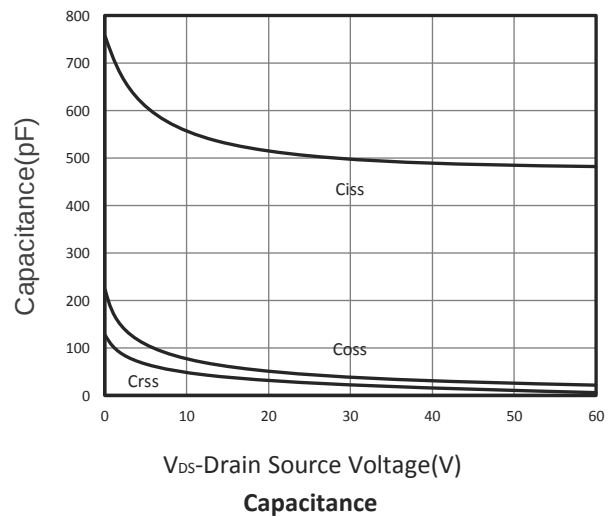
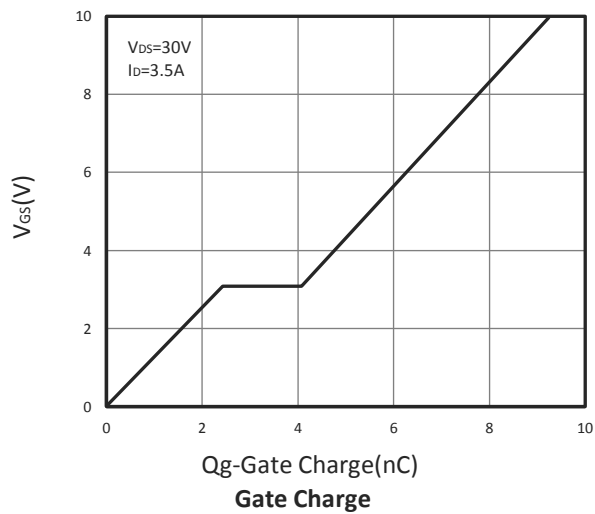
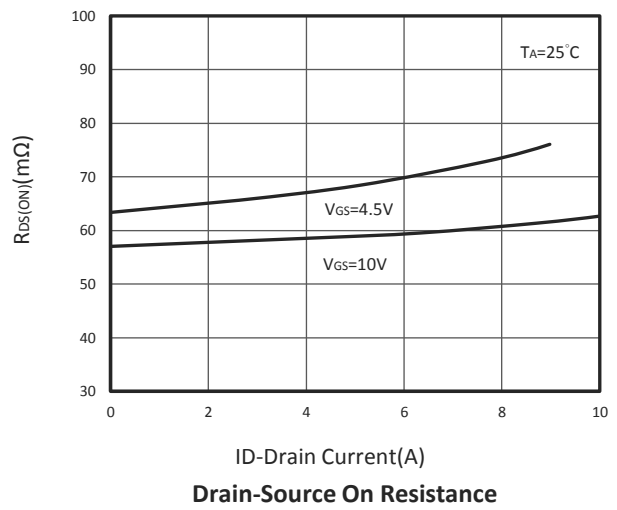
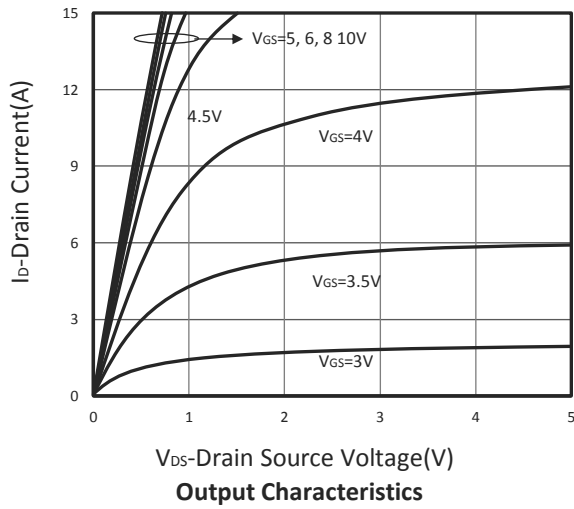
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	60			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.2	1.8	2.5	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =60V, V _{GS} =0V, T _J =25°C			1	μA
		V _{DS} =48V, V _{GS} =0V, T _J =75°C			10	
R _{DS(ON)}	Drain-source On-Resistance [Ⓟ]	V _{GS} =10V, I _D =3.8A V _{GS} =4.5V, I _D =3.1A		58 66	64 76	mΩ
G _{fs}	Forward Transconductance	V _{DS} =10V, I _D =3.5A		6.8		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage [Ⓟ]	I _S =1A, V _{GS} =0V			1	V
I _S	Diode Continuous Forward Current				1.9	A
t _{rr}	Revese Recovery Time	I _S =1A, dI/dt=100A/μs		22.8		ns
Q _{rr}	Revese Recovery Charge	T _J =25°C		13.6		nC
Dynamic and Switching Parameters [Ⓔ]						
Q _g	Total Gate Charge	V _{DS} =30V, V _{GS} =10V, I _D =3.5A		9.2	13.8	nC
Q _g	Total Gate Charge (4.5V)			4.5	6.8	
Q _{gs}	Gate-Source Charge			2.3	3.5	
Q _{gd}	Gate-Drain Charge			1.8	2.7	
C _{iss}	Input Capacitance	V _{DS} =30V, V _{GS} =0V, f=1MHz		495		pF
C _{oss}	Output Capacitance			43		
C _{rss}	Reverse Transfer Capacitance			15		
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		2		Ω
t _{d(on)}	Turn-On Time	V _{DD} =30V, V _{GEN} =10V R _G =3.3Ω, I _D =1A		3.1	9	nS
t _r				9.2	18	
t _{d(off)}	Turn-Off Time			17.5	35	
t _f				5.5	10	

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

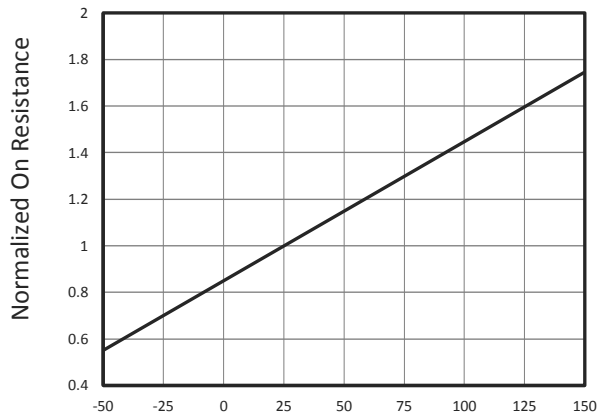
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150°C (initial temperature T_J=25°C).
- C. Using ≤ 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150°C.
- D. Pulse test width ≤300μs and duty cycle ≤ 2%.
- E. Guaranteed by design, not subject to production testing.

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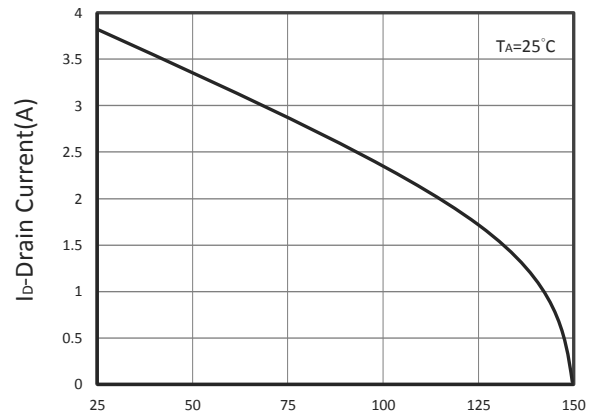
TYPICAL CHARACTERISTICS



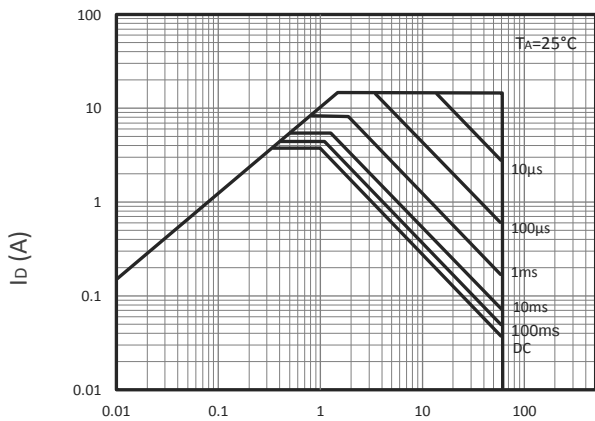
TYPICAL CHARACTERISTICS



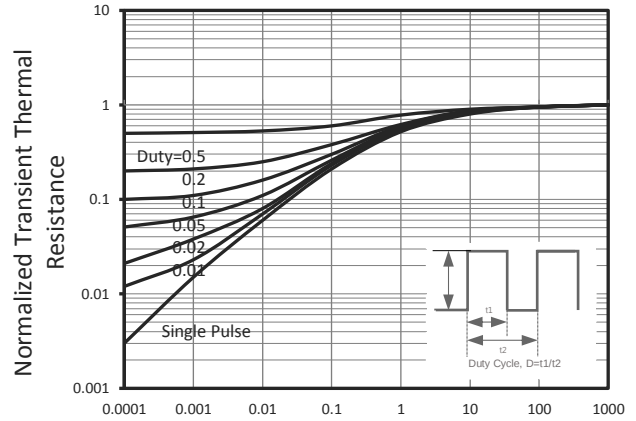
T_J-Junction Temperature(°C)
Drain-Source On Resistance



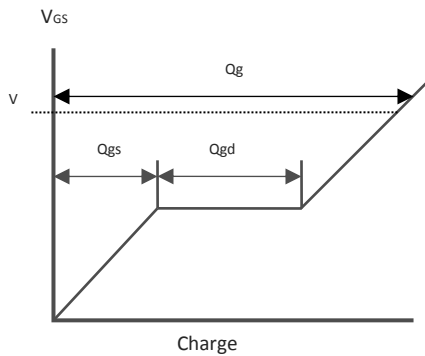
T_J-Junction Temperature(°C)
Drain Current vs T_J



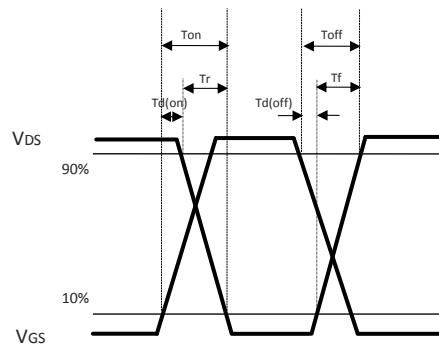
V_{DS} Voltage (V)
Maximum Safe Operation Area



Square Wave Pulse Duration(Sec)
Thermal Transient Impedance

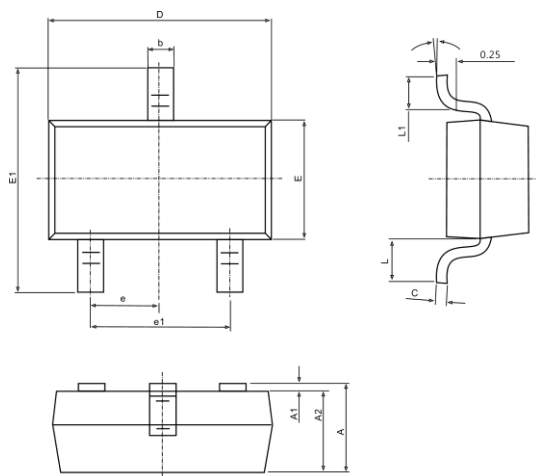


Gate Chrg Waveform

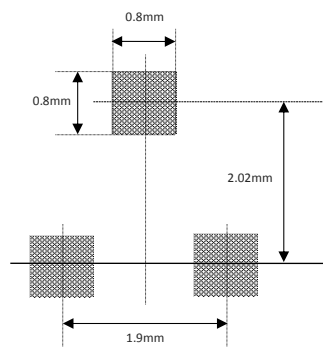


Switching Time Waveform

■ SOT-23 PACKAGE DIMENSIONS



Recommended Land Pattern



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.940	1.120	0.037	0.044
A1	0.040	0.120	0.002	0.005
A2	0.900	1.000	0.035	0.039
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.004	0.004
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	0.500	0.600	0.020	0.024
L	0.550 BSC		0.022 BSC.	
L1	0.300	0.500	0.012	0.020
θ	1°	7°	1°	7°