

Single N-Channel MOSFET

DESCRIPTION

SMC6216J 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 J - TR G

a b c d e

- a : Company name.
- b : Product Serial number.
- c : Package code J:SOT-223
- d : Handling code TR:Tape&Reel
- e : Green produce code G:RoHS Compliant

FEATURES

$V_{DS}=60V, I_D=6.3A$

$R_{DS(ON)}=52m\Omega(Typ.)@V_{GS}=10V$

$R_{DS(ON)}=59m\Omega(Typ.)@V_{GS}=4.5V$

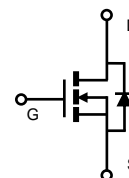
- ◆ 100% EAS Guaranteed
- ◆ Improved dv/dt capability
- ◆ Fast switching

APPLICATIONS

- ◆ LED applications
- ◆ Transformer Driving Switch
- ◆ Motor drive
- ◆ Power Management



SOT-223



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_A=25^\circ C$	6.3
		$T_A=70^\circ C$	5
I_{DM}	Pulsed Drain Current ^B	25.2	A
I_{AS}	Avalanche Current ^B	8	A
EAS	Single Pulse Avalanche energy L=0.3mH ^B	9.6	mJ
P_D	Power Dissipation ^A	$T_A=25^\circ C$	4.2
		$T_A=70^\circ C$	2.7
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	$t \leq 10s$	30	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	70	
$R_{\theta JC}$	Thermal Resistance Junction to Case		30	

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

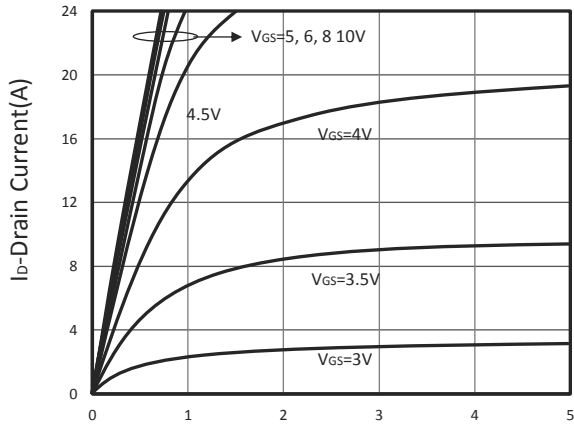
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	60			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.2	1.8	2.5	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±20V			±100	nA
I _{DSS}	Zero 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 ^D	V _{GS} =10V, I _D =6.3A V _{GS} =4.5V, I _D =3.5A		52 59	60 70	mΩ
G _{fs}	Forward Transconductance	V _{DS} =10V, I _D =3.5A		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				3.1	A
t _{rr}	Reverse Recovery Time	I _S =1A, di/dt=100A/μs		22.8		ns
Q _{rr}	Reverse Recovery Charge	T _J =25°C		13.6		nC
Dynamic and Switching Parameters^E						
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		1.95		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.

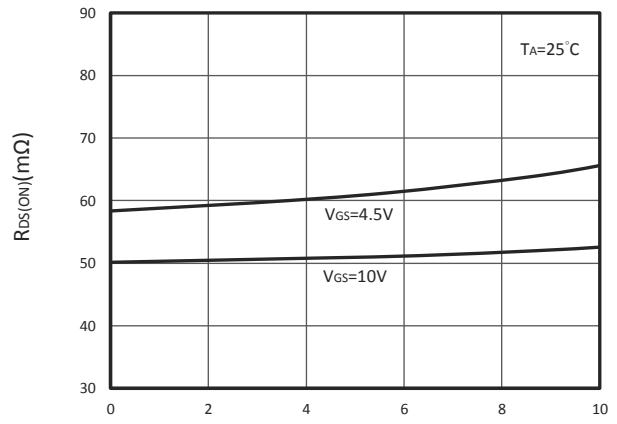
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150°C (initial temperature T_J=25°C).
- C. Using ≤ 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150°C.
- D. Pulse test width ≤300μs and duty cycle ≤ 2%.
-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

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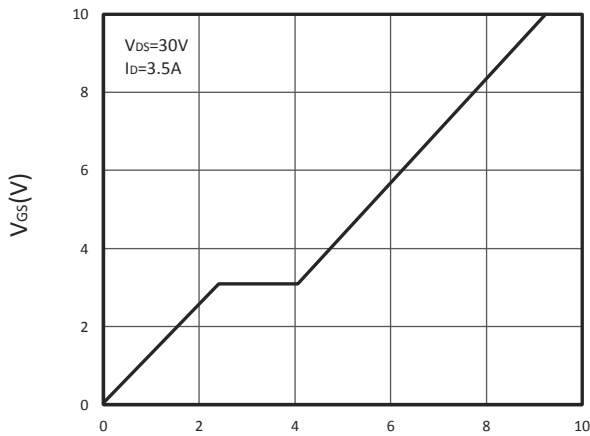
TYPICAL CHARACTERISTICS



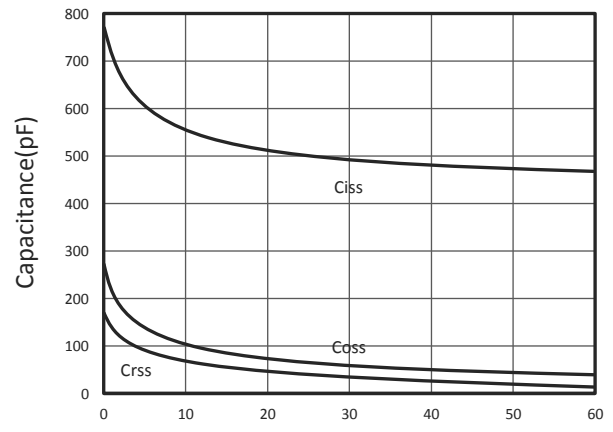
Output Characteristics



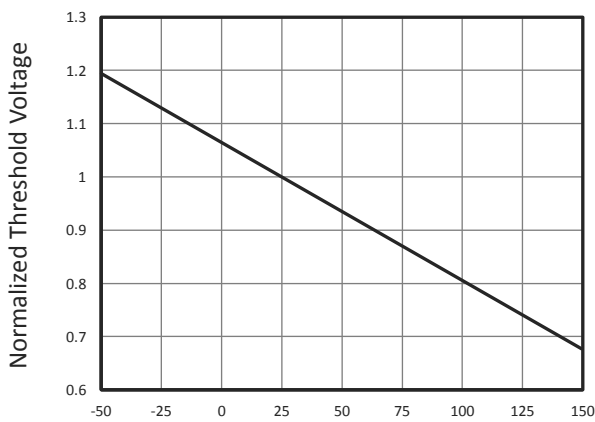
Drain-Source On Resistance



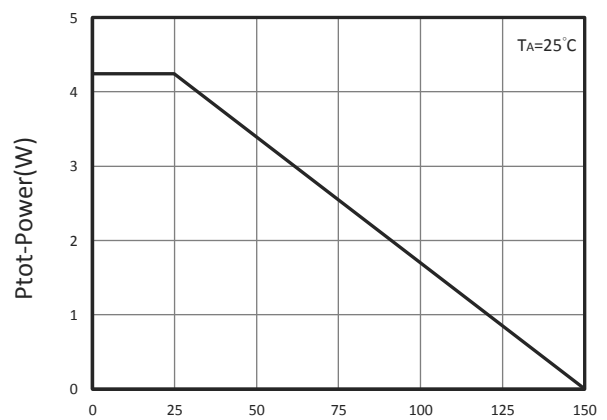
Gate Charge



Capacitance

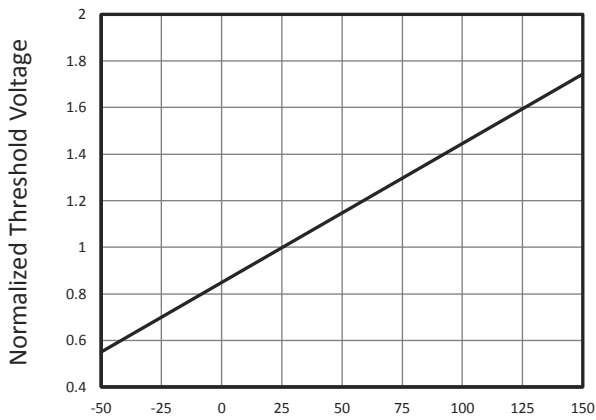


Gate Threshold Voltage

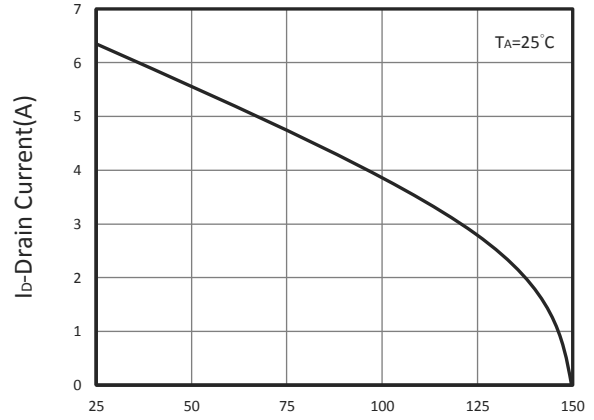


Power Dissipation

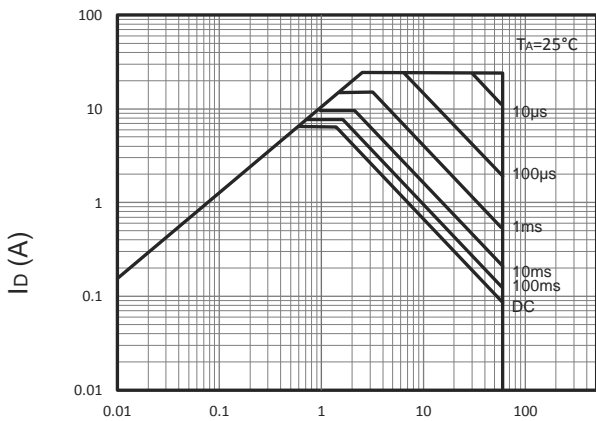
TYPICAL CHARACTERISTICS



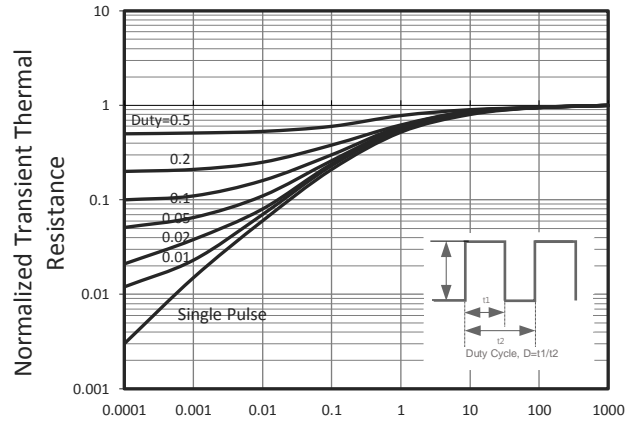
T_J-Junction Temperature(°C)
Drain-Source On Resistance



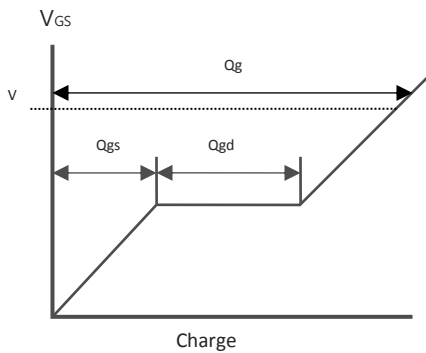
T_J-Junction Temperature(°C)
Drain Current vs T_J



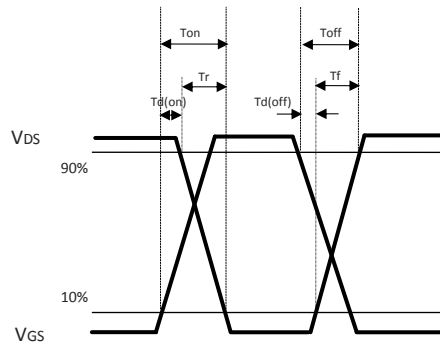
V_{DS} Voltage (V)
Maximum Safe Operation Area



Square Wave Pulse Duration(Sec)
Thermal Transient Impedance

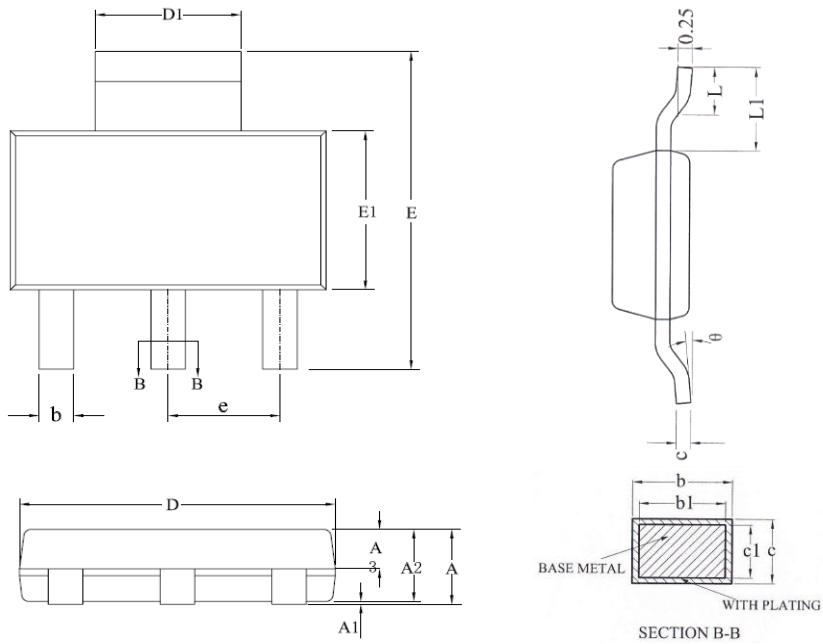


Gate Chrg Waveform



Switching Time Waveform

■ SOT-223 PACKAGE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
A3	0.800	1.000	0.031	0.039
b	0.660	0.820	0.026	0.032
b1	0.680	0.740	0.027	0.029
c	0.300	0.350	0.012	0.014
c1	0.290	0.310	0.011	0.012
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	6.830	7.070	0.269	0.278
E1	3.300	3.700	0.130	0.146
e	2.300 BSC.		0.091 BSC.	
L	0.900	1.150	0.035	0.045
L1	1.75 BSC.		0.069 BSC.	
θ	0°	10°	0°	10°