SemTron Microtech Corporation

SMC6216J

Single N-Channel MOSFET

DESCRIPTION

SMC6216 is the N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior, fast switching performance, and withstand high energy pulse in the avalanche and commutation mode.

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 = 5.3A

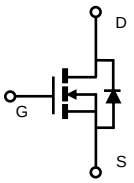
$R_{DS(ON)}$=58mΩ(Typ.)@V_{GS}=10V
$R_{DS(ON)}$=66mΩ(Typ.)@V_{GS}=4.5V

- 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°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°C	5.3	A
		T_A=70°C	4.3	A
I_{DM}	Pulsed Drain Current [A]		21	A
I_{AS}	Avalanche Current [A]		8	A
E_{AS}	Single Pulse Avalanche energy L=0.3mH [AD]		9.5	mJ
P_D	Power Dissipation [B]	T_A=25°C	3.1	W
		T_A=70°C	2	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 [B]	t≦10s		40	°C/W
	Thermal Resistance Junction to Ambient [Bc]	Steady-State		75	
$R_{\theta JC}$	Thermal Resistance Junction to Case			30	

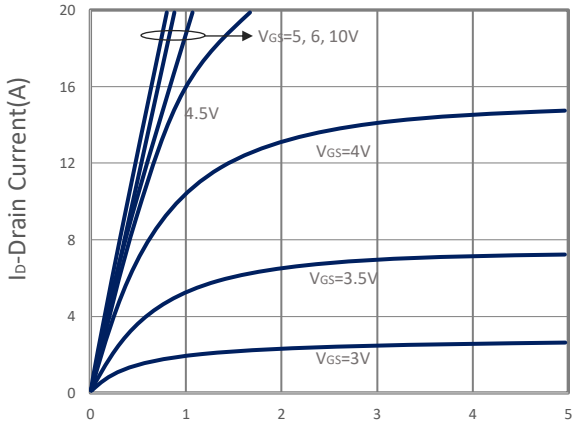
ELECTRICAL CHARACTERISTICS (T_A = 25°C Unless otherwise noted)

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 [E]	V_{GS}=10V, I_D=5.3A V_{GS}=4.5V, I_D=3.5A		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 [E]	I_S=1A, V_{GS}=0V			1	V
I_S	Continuous Source Current				3.5	A
t_{rr}	Revese Recovery Time	I_S=1A, dI/dt=100A/μs T_J=25°C		22.8		ns
Q_{rr}	Revese Recovery Charge			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		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	

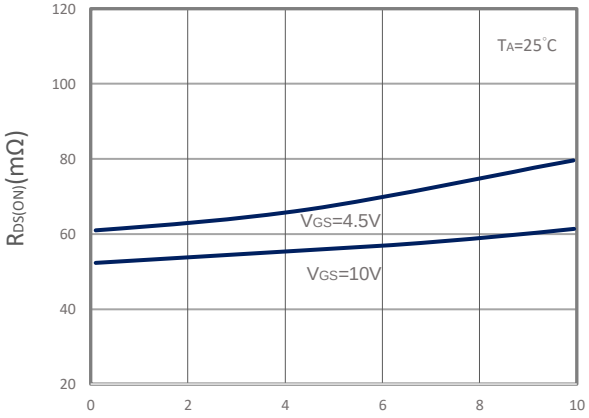
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

A. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}$=150°C.
B. The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature $T_{J(MAX)}$=150°C (initial temperature T_A=25°C).
C. $T_{J(MAX)}$=150°C,using junction-to-case thermal resistance ($R_{\theta JC}$) is more useful in additional heat sinking is used.
D. The EAS data shows Max, tested and pulse width limited by $T_{J(MAX)}$=150°C (initial temperature T_J=25°C).

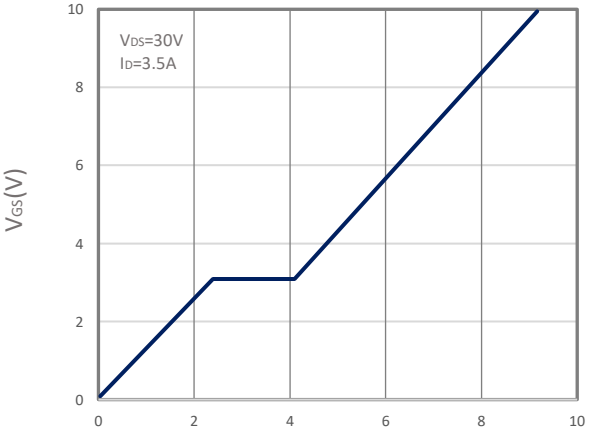
TYPICAL CHARACTERISTICS



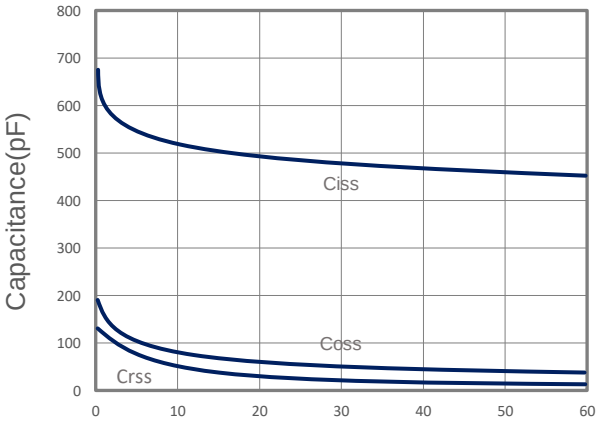
Output Characteristics



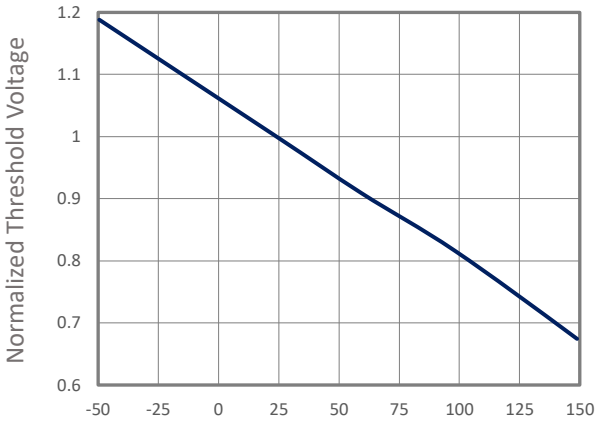
Drain-Source On Resistance



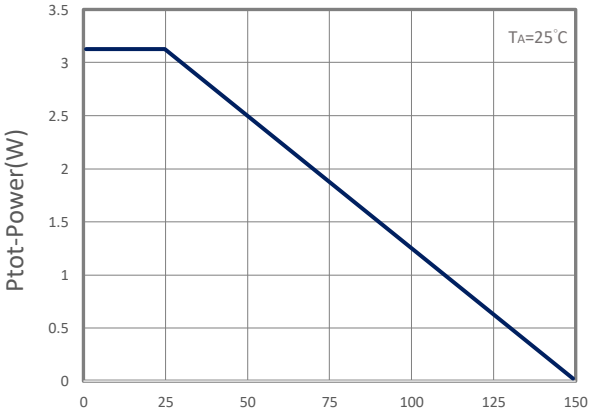
Gate Charge



Capacitance

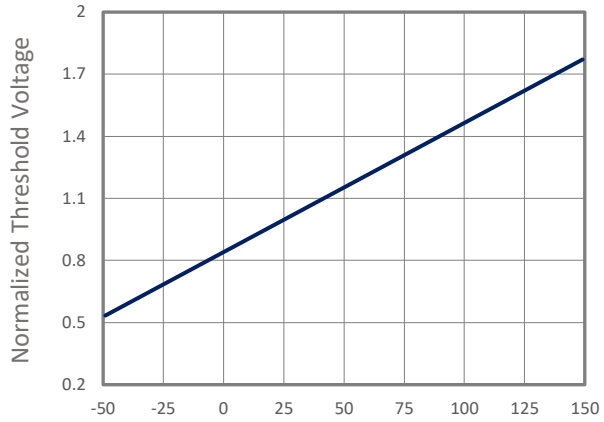


Gate Threshold Voltage

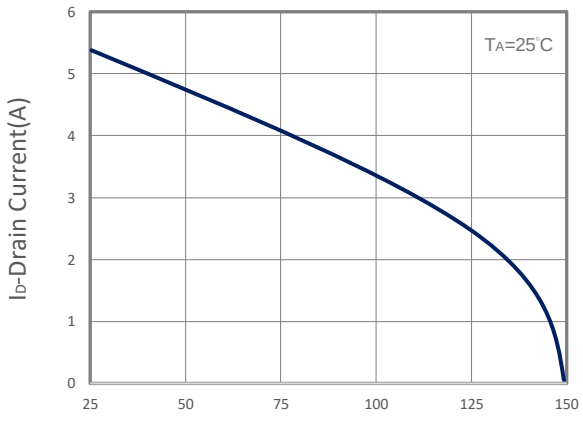


Power Dissipation

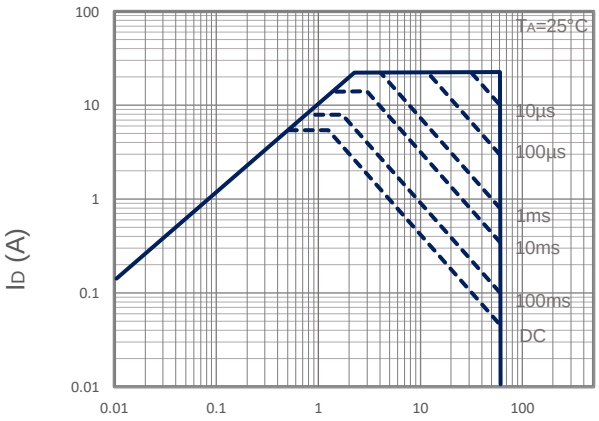
TYPICAL CHARACTERISTICS



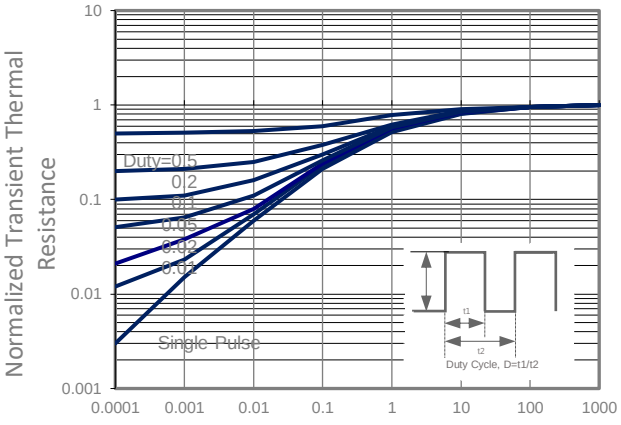
Gate Threshold Voltage



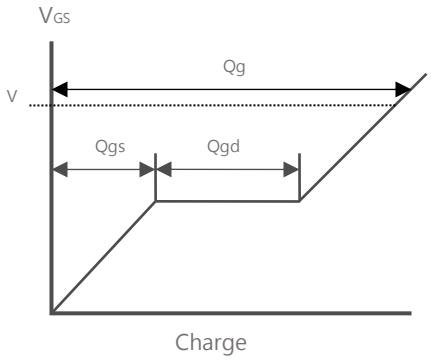
Drain Current vs TJ



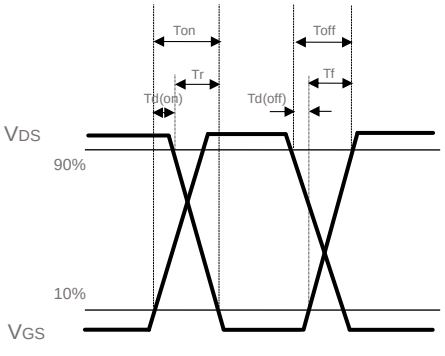
Maximum Safe Operation Area



Thermal Transient Impedance

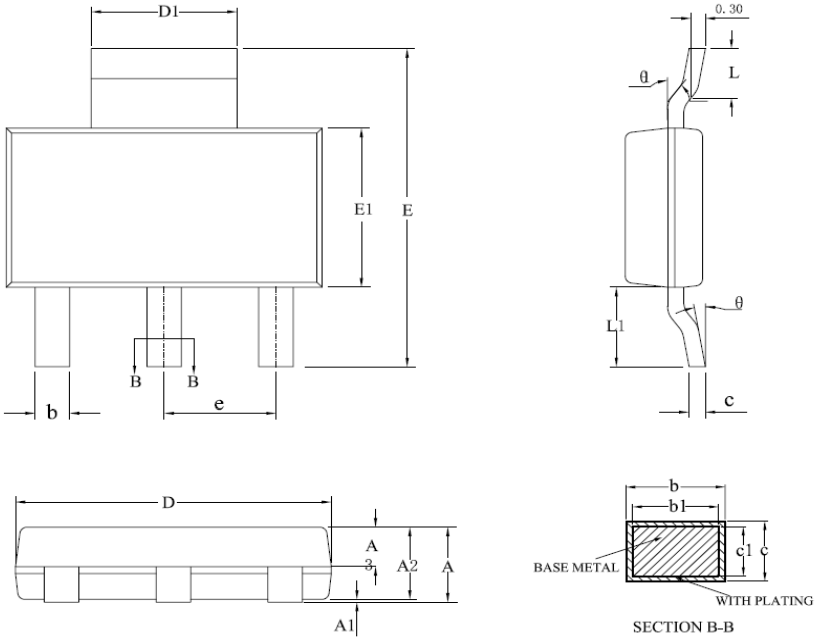


Gate Chrge Waveform



Switching Time Waveform

■SOT-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°