SemTron Microtech Corporation

SMC3213M

Single P-Channel MOSFET

■DESCRIPTION

SMC3213 is the P-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. This device is suitable for use as a load switch or PWM applications.

■PART NUMBER INFORMATION

SMC 3213 M - TR G
a b c d e

a : Company name.
b : Product Serial number.
c : Package code M:SOP-8
d : Handling code TR:Tape&Reel
e : Green produce code G:*RoHS Compliant*

■FEATURES

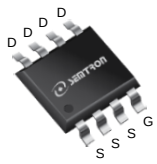
V_{DS} = -30V, I_D = -12A

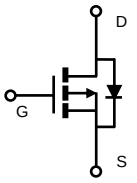
$R_{DS(ON)}$ =11mΩ(Typ.)@V_{GS} = -10V
$R_{DS(ON)}$ =15mΩ(Typ.)@V_{GS} = -4.5V

◆Fast switch
◆High power and current handling capability

■APPLICATIONS

◆Load Switch
◆LED Application
◆DC-DC Power Management





SOP-8

■ABSOLUTE MAXIMUM RATINGS (T_A = 25°C Unless otherwise noted)

Symbol	Parameter		Rating	Units
V_{DSS}	Drain-Source Voltage		-30	V
V_{GSS}	Gate-Source Voltage		±25	V
I_D	Continuous Drain Current	T_A=25°C	-12	A
		T_A=70°C	-9.7	A
I_{DM}	Pulsed Drain Current [A]		-48	A
I_{AS}	Avalanche Current [A F]		-30	A
E_{AS}	Single Pulse Avalanche energy L=0.1mH [A F]		45	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 [C]	t≦10s		40	°C/W
	Thermal Resistance Junction to Ambient [C]	Steady-State		75	
$R_{\theta JC}$	Thermal Resistance Junction to Case [C]			27	

Copyright © Semtron Microtech Corp.

■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	-30			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} =V_{GS},I_D =-250μA	-1	-1.6	-2.5	V
I_{GSS}	Gate Leakage Current	V_{DS} =0V,V_{GS}=±25V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} =-30V,V_{GS} =0V T_J=25°C			-1	μA
		V_{DS} =-24V,V_{GS} =0V T_J =75°C			-10	
$R_{DS(ON)}$	Drain-source On-Resistance [D]	V_{GS} =-10V,I_D=-12A V_{GS} =-4.5V,I_D=-8A		11 15	14 19	mΩ
G_{fs}	Forward Transconductance	V_{DS} =-10V,I_D=-10A		12.5		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage[B]	I_S=-1A,V_{GS}=0V		-0.7	-1	V
I_S	Continuous Source Current				-6	A
t_{rr}	Body Diode Revese Recovery Time	I_S=-10A, dI/dt=100A/μs		13.8		ns
Q_{rr}	Body Diode Revese Recovery Charge			12.3		nC
Dynamic and Switching Parameters						
Q_g	Total Gate Charge (10V)	V_{DS} =-15V,V_{GS} =-10V I_D =-10A		36	48.6	nC
Q_g	Total Gate Charge (4.5V)			18	24.3	
Q_{gs}	Gate-Source Charge			8.1	10.9	
Q_{gd}	Gate-Drain Charge			10.3	13.9	
C_{iss}	Input Capacitance	V_{DS} =-15V,V_{GS} =0V f =1MHz		2590	3626	pF
C_{oss}	Output Capacitance			283	396	
C_{rss}	Reverse Transfer Capacitance			172	241	
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		8.8	13	Ω
$t_{d(on)}$	Turn-On Time [E]	V_{DD}=-15V, V_{GEN}=-10V, R_G=3Ω, I_D=-1A		19.1		nS
t_r				4.8		
$t_{d(off)}$	Turn-Off Time [E]			58		
t_f				11.5		

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

A. The value of $R_{\theta JA}$ is measured with the device in a still air environment with maximum junction temperature $T_{J(MAX)}$= 150°C (initial temperature T_A=25°C).

B.The $T_{J(MAX)}$=150°C, using junction-to-ambient thermal resistance.

C.Surface−mounted on FR-4 board using 1 sq−in pad, 2 oz Cu, in a still air environment with T_A=25°C.

D. The data tested by pulsed , pulse width ≦ 300uS , duty cycle ≦ 2%

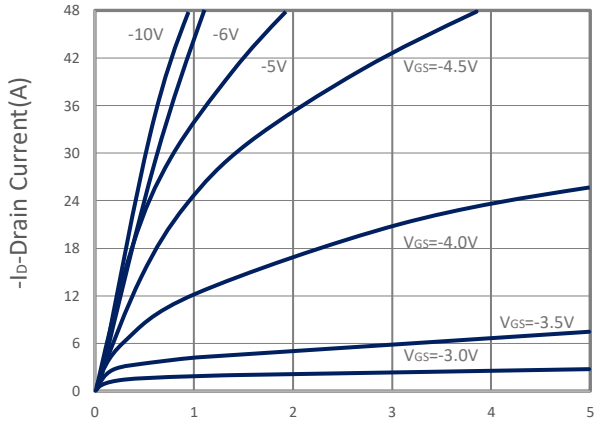
E. Pulsed width limited by maximum junction temperature.

F. The E_{AS} data shows Max.

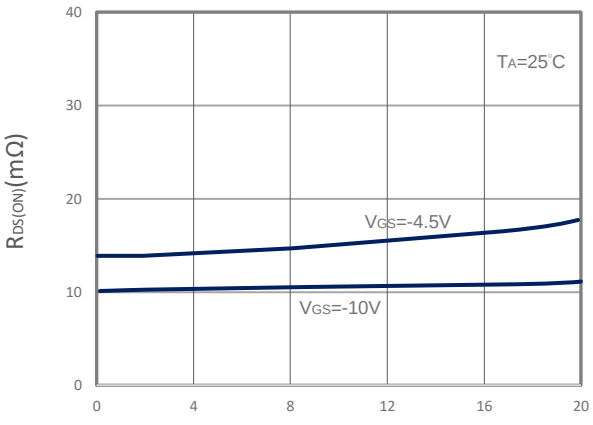
The products and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this datasheet is up to date We assume no responsibility for any infringement of patents, patent rights, or other rights arising from the use of any information and circuitry in this datasheet.

Copyright © Semtron Microtech Corp.

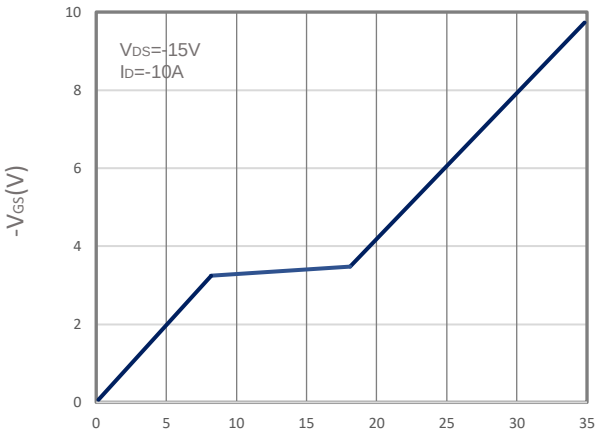
■ TYPICAL CHARACTERISTICS



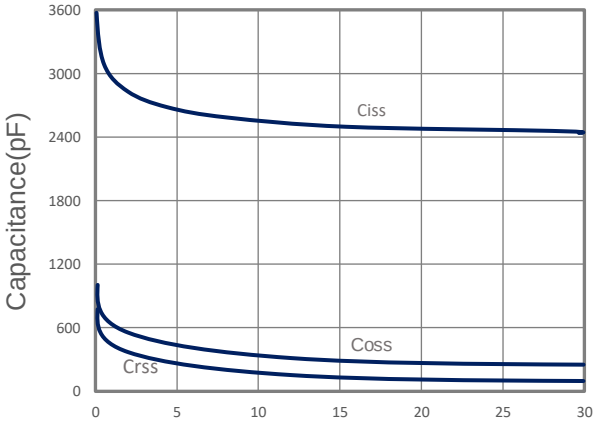
Output Characteristics



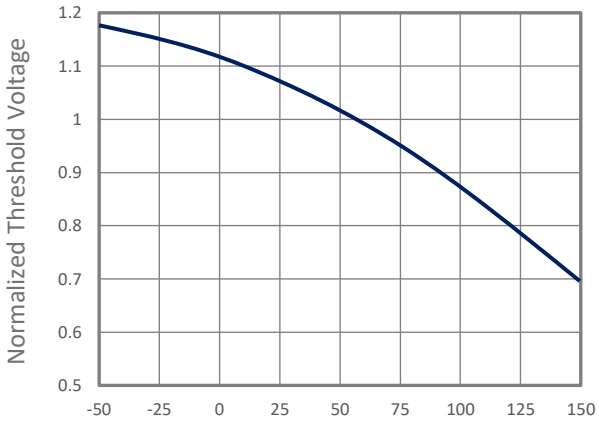
Drain-Source On Resistance



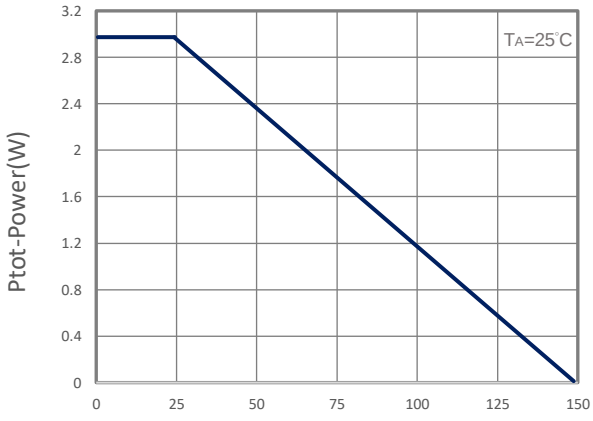
Gate Charge



Capacitance



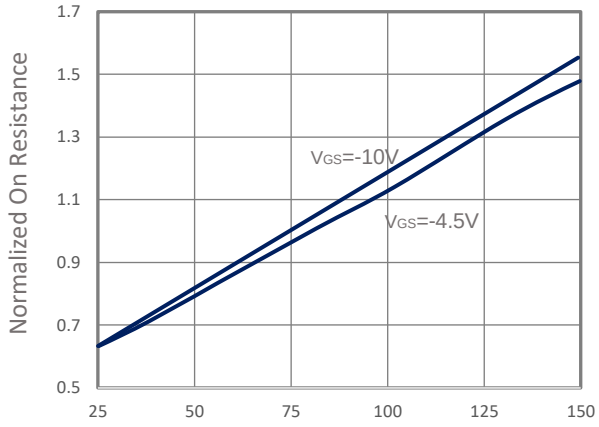
Gate Threshold Voltage



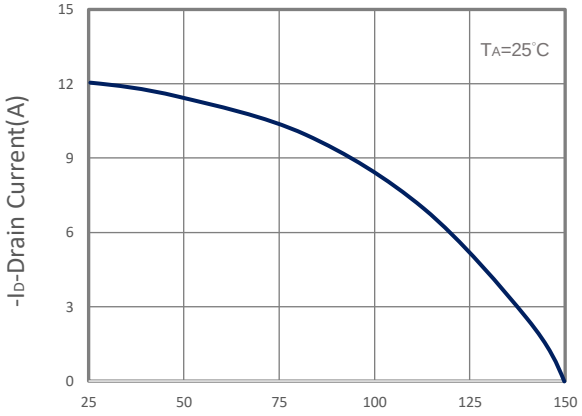
Power Dissipation

Copyright © Semtron Microtech Corp.

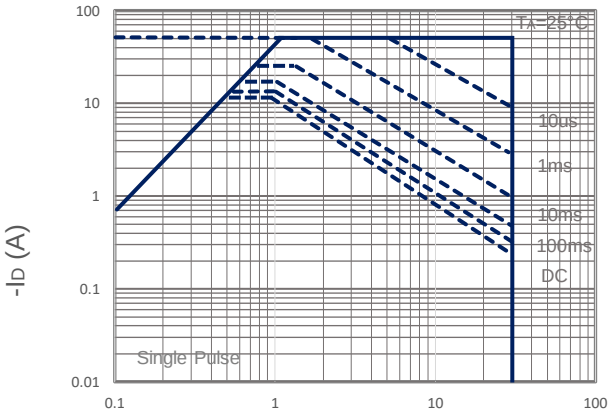
TYPICAL CHARACTERISTICS

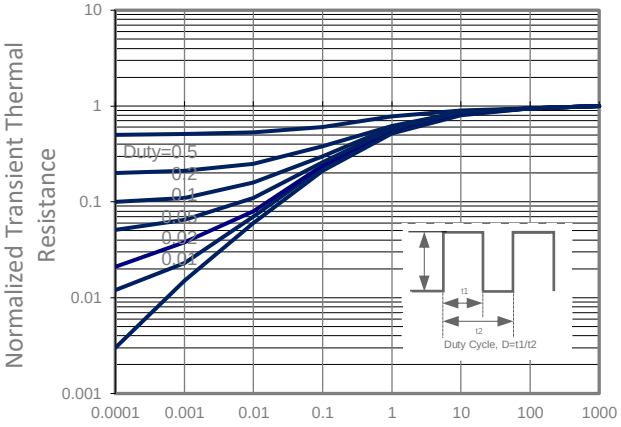


RDS(ON) vs Junction Temperature

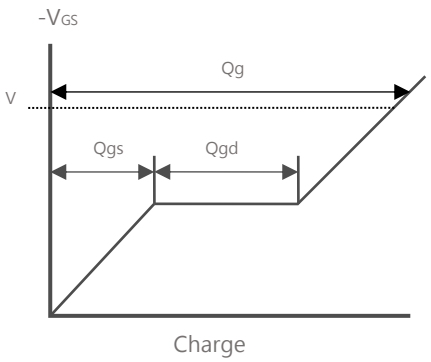


Drain Current vs TJ

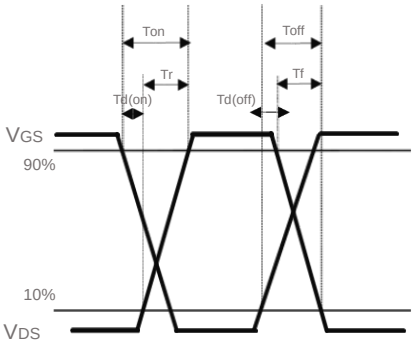




Thermal Transient Impedance



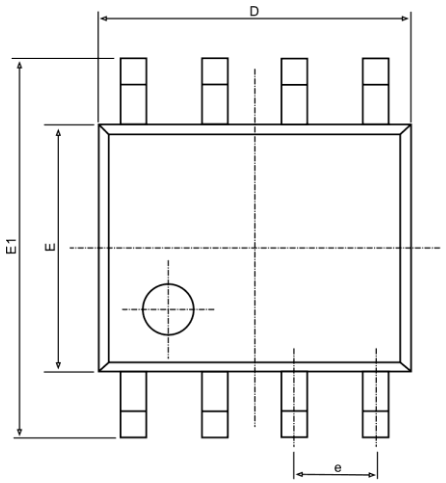
Gate Chrge Waveform

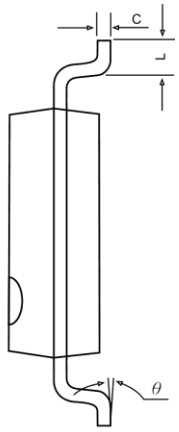


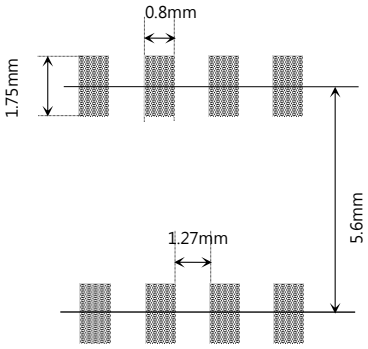
Switching Time Waveform

Copyright © Semtron Microtech Corp.

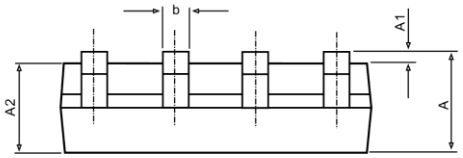
■SOP-8 PACKAGE DIMENSIONS







Recommended Land Pattern



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.040.	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.130	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270BSC.		0.050BSC.	
L	0.400	1.270	0.016	0.005
Θ	0°	8°	0°	8°

Copyright © Semtron Microtech Corp.