SemTron Microtech Corporation

SMC4239M

Single P-Channel MOSFET

■DESCRIPTION

SMC4239M 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.These devices are well suited for high efficiency fast switching applications.

■FEATURES

V_{DS}=-40V, I_D=-11A

$R_{DS(ON)}$=12.5mΩ(Typ.)@V_{GS}=-10V
$R_{DS(ON)}$=16mΩ(Typ.)@V_{GS}=-4.5V

◆100% EAS Guarantee
◆High power and current handling capability

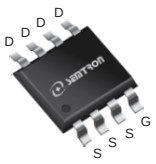
■APPLICATIONS

◆Load Switch
◆Power Management
◆Motor Drives

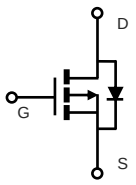
■PART NUMBER INFORMATION

SMC	4239	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*



SOP-8



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

Symbol	Parameter		Rating	Units
V_{DSS}	Drain-Source Voltage		-40	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_A=25°C	-11	A
		T_A=70°C	-8.8	A
I_{DM}	Pulsed Drain Current [B]		-44	A
I_{AS}	Avalanche Current [B]		-30	A
E_{AS}	Single Pulse Avalanche energy L=0.1mH [B]		45	mJ
P_D	Power Dissipation [A]	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 [A]	t≦10s		40	°C/W
	Thermal Resistance Junction to Ambient [AC]	Steady-State		70	

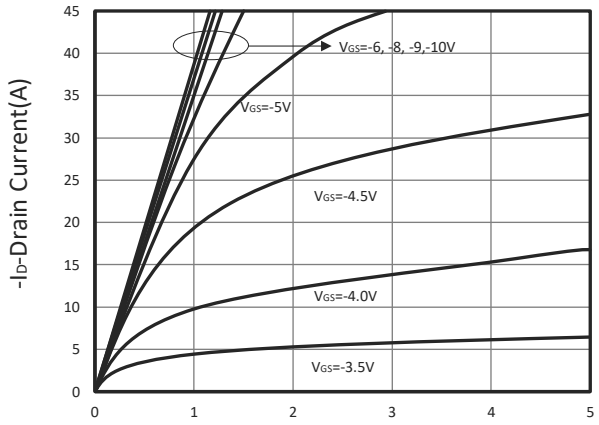
ELECTRICAL CHARACTERISTICS (T_A = 25°C Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-40			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}=±20V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-40V, V_{GS}=0V, T_J=25°C			-1	μA
		V_{DS}=-32V, V_{GS}=0V, T_J=75°C			-10	
$R_{DS(ON)}$	Drain-source On-Resistance [D]	V_{GS}=-10V, I_D=-11A V_{GS}=-4.5V, I_D=-8A		12.5 16	15 20	mΩ
G_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-11A		30		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage [D]	I_S=-1A, V_{GS}=0V			-1	V
I_S	Continuous Source Current				-5.5	A
t_{rr}	Reverse Recovery Time	I_S=-11A, dI/dt=100A/μs		28		ns
Q_{rr}	Reverse Recovery Charge			21		nC
Dynamic and Switching Parameters [E]						
Q_g	Total Gate Charge	V_{DS}=-20V, V_{GS}=-10V I_D=-11A		40.6	54.8	nC
Q_g	Total Gate Charge (4.5V)			19.8	26.7	
Q_{gs}	Gate-Source Charge			6.8	9.2	
Q_{gd}	Gate-Drain Charge			7.8	10.5	
C_{iss}	Input Capacitance	V_{DS}=-20V, V_{GS}=0V, f=1MHz		2050		pF
C_{oss}	Output Capacitance			175		
C_{rss}	Reverse Transfer Capacitance			126		
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		8.5		Ω
$t_{d(on)}$	Turn-On Time	V_{DD}=-20V, V_{GEN}=-10V R_G=6Ω I_D=-1A		17.3		nS
t_r				13		
$t_{d(off)}$	Turn-Off Time			70		
t_f				32		

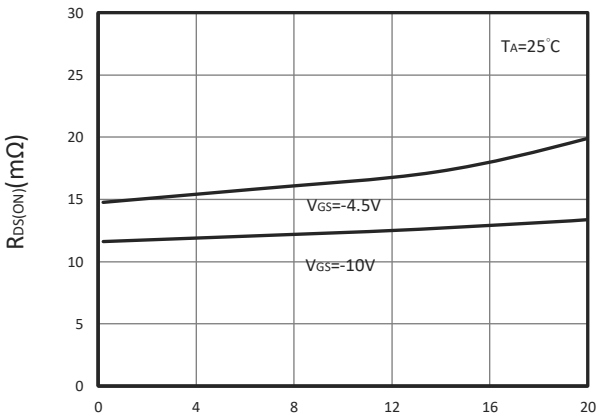
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

A. Surface mounted on FR4 board using 1 in^2 pad size.
B. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}$=150°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.

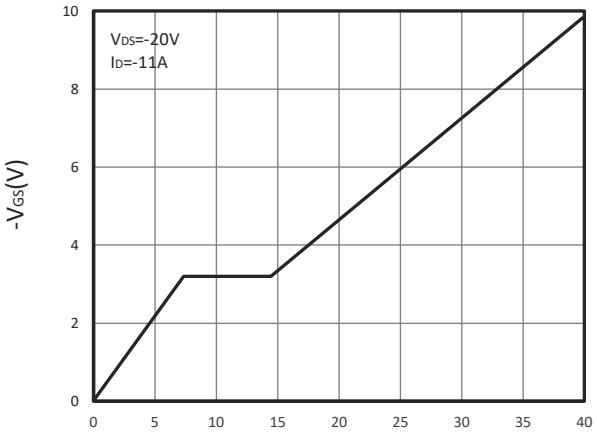
TYPICAL CHARACTERISTICS



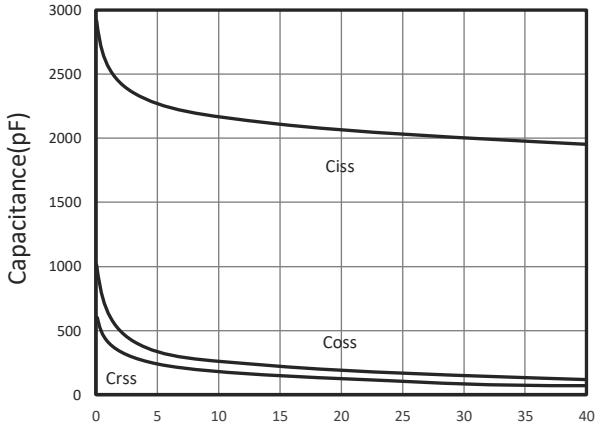
Output Characteristics



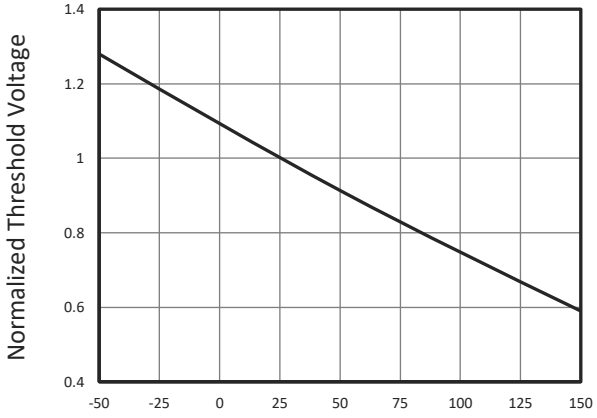
Drain-Source On Resistance



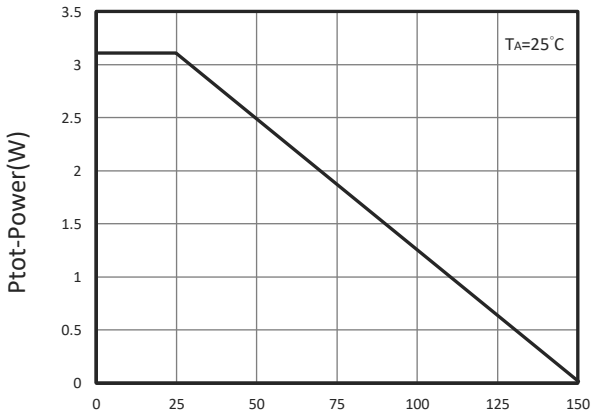
Gate Charge



Capacitance

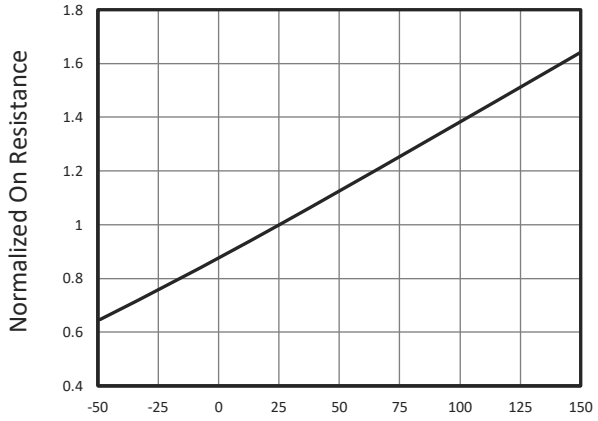


Gate Threshold Voltage



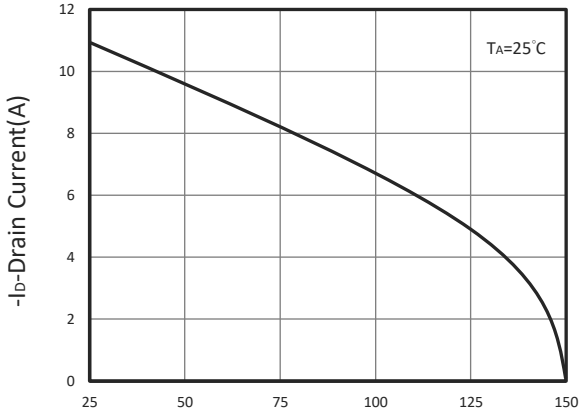
Power Dissipation

TYPICAL CHARACTERISTICS



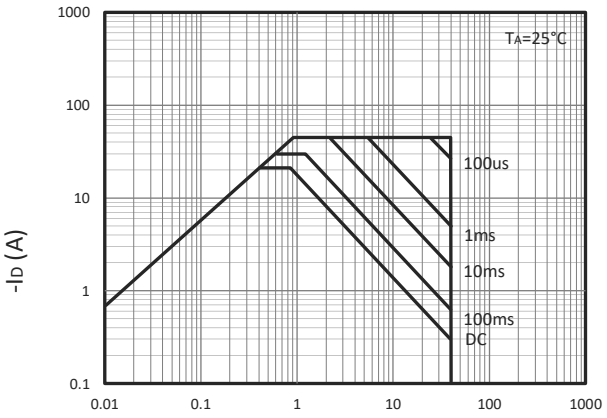
T_J-Junction Temperature(°C)

$R_{DS(ON)}$ vs Junction Temperature



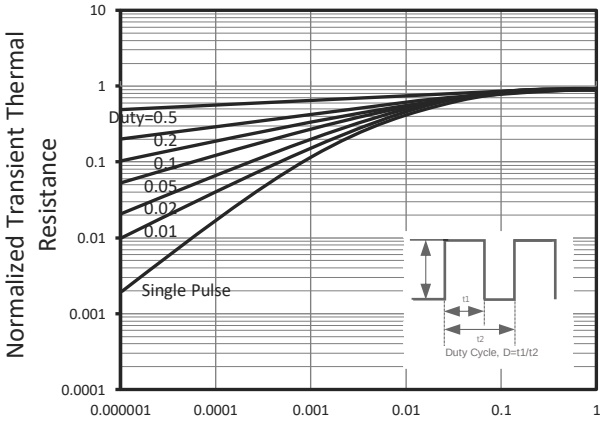
T_C-Case Temperature(°C)

Drain Current vs T_C



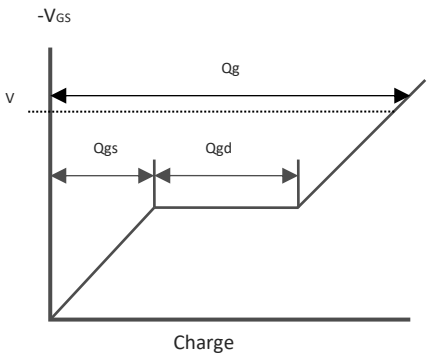
-V_{DS} Voltage (V)

Maximum Safe Operation Area

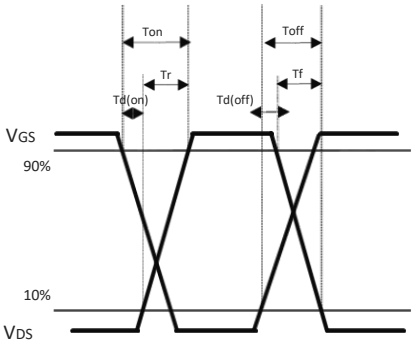


Square Wave Pulse Duration(Sec)

Thermal Transient Impedance

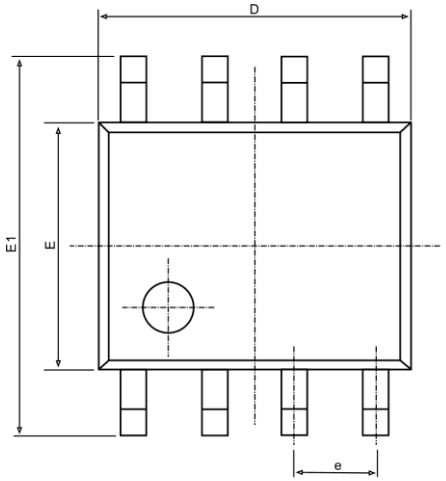


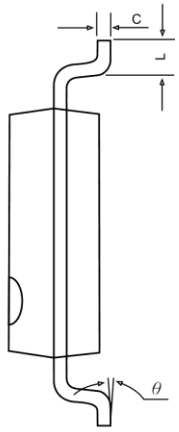
Gate Chrge Waveform

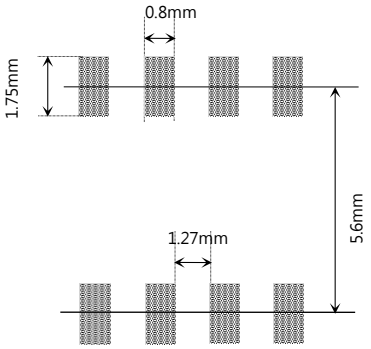


Switching Time Waveform

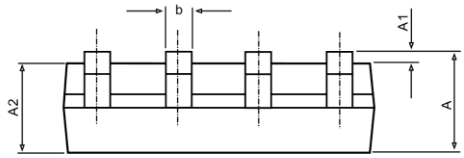
■SOP-8 PACKAGE DIMENSIONS







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°