

DESCRIPTION

SMC3238DM 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 3238D 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

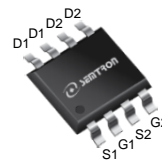
$V_{DS}=30V, I_D=12.7A$

- $R_{DS(ON)}=6m\Omega(Typ.)@V_{GS}=20V$
- $R_{DS(ON)}=6.5m\Omega(Typ.)@V_{GS}=10V$
- $R_{DS(ON)}=8m\Omega(Typ.)@V_{GS}=4.5V$

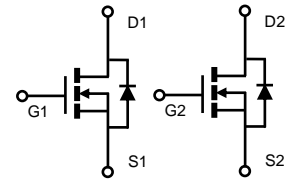
- ◆ 100% EAS Guaranteed
- ◆ Improved dv/dt capability
- ◆ High power and current handling capability

APPLICATIONS

- ◆ Power Management
- ◆ DC/DC Power System
- ◆ Load Switch



SOP-8



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

Symbol	Parameter	Rating	Units
V_{DSS}	Drain-Source Voltage	30	V
V_{GSS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current ($V_{GS}=10V$)	$T_A=25^\circ C$	12.7
		$T_A=70^\circ C$	10.2
I_{DM}	Pulsed Drain Current ^B	50.8	A
I_{AS}	Avalanche Current ^B	30	A
EAS	Single Pulse Avalanche energy $L=0.1mH$ ^B	45	mJ
P_D	Power Dissipation ^A	$T_A=25^\circ C$	2
		$T_A=70^\circ C$	1.3
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	$t \leq 10s$	62	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	90	
$R_{\theta JC}$	Thermal Resistance Junction to Case		40	

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise noted)

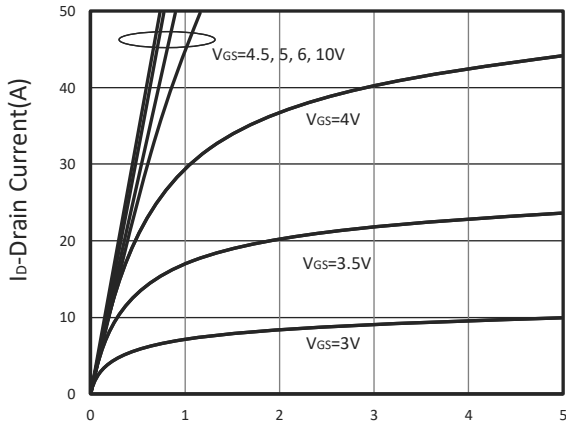
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μ A	1	1.6	2.5	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} = \pm 20V			\pm 100	nA
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V, T _J =25 $^\circ$ C			1	μ A
		V _{DS} =24V, V _{GS} =0V, T _J =75 $^\circ$ C			10	
R _{DS(ON)}	Drain-source On-Resistance ^D	V _{GS} =20V, I _D =20A		6	7.5	m Ω
		V _{GS} =10V, I _D =15A		6.5	7.8	
		V _{GS} =4.5V, I _D =10A		8	10	
G _{fs}	Forward Transconductance	V _{DS} =10V, I _D =10A		62		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^D	I _S =1A, V _{GS} =0V			1	V
I _S	Diode Continuous Forward Current				6	A
t _{rr}	Reverse Recovery Time	I _S =10A, dI/dt=100A/ μ s		25		ns
Q _{rr}	Reverse Recovery Charge			12		nC
Dynamic and Switching Parameters^E						
Q _g	Total Gate Charge	V _{DS} =15V, V _{GS} =10V, I _D =10A		19.7	27.6	nC
Q _g	Total Gate Charge (4.5V)			9.6	12	
Q _{gs}	Gate-Source Charge			5	6.3	
Q _{gd}	Gate-Drain Charge			3.8	5.1	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz		1750		pF
C _{oss}	Output Capacitance			267		
C _{rss}	Reverse Transfer Capacitance			168		
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		2.2		Ω
t _{d(on)}	Turn-On Time	V _{DD} =15V, V _{GEN} =10V R _G =6 Ω , I _D =1A		9	17	nS
t _r				6	12	
t _{d(off)}	Turn-Off Time			28	53	
t _f				7	13	

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

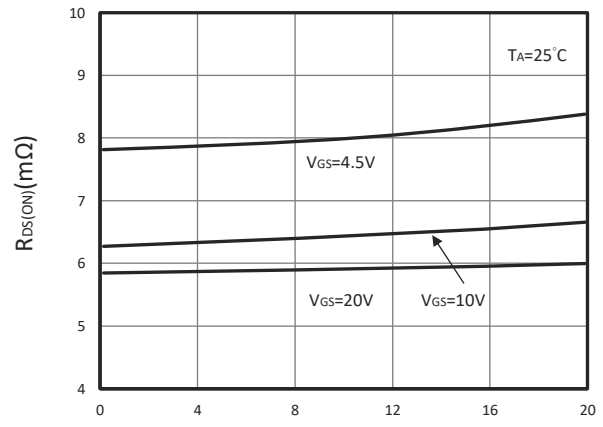
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C.
- C. Using \leq 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150 $^\circ$ C.
- D. Pulse test width \leq 300 μ s and duty cycle \leq 2%.
- E.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

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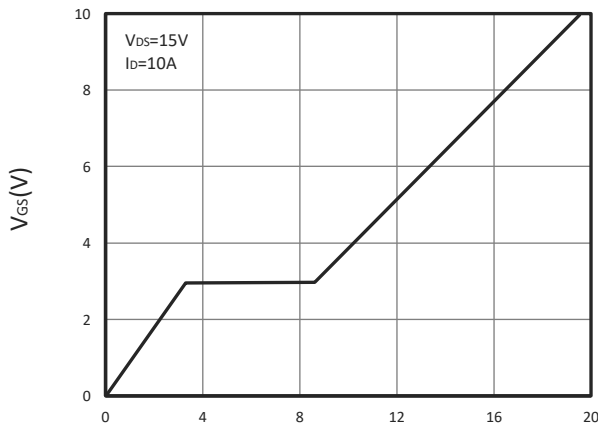
TYPICAL CHARACTERISTICS



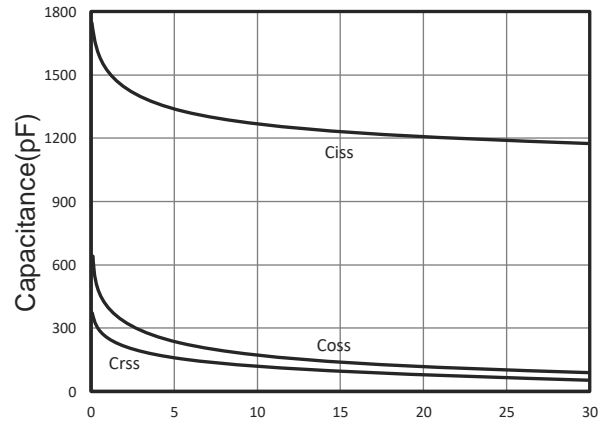
V_{DS}-Drain Source Voltage (V)
Output Characteristics



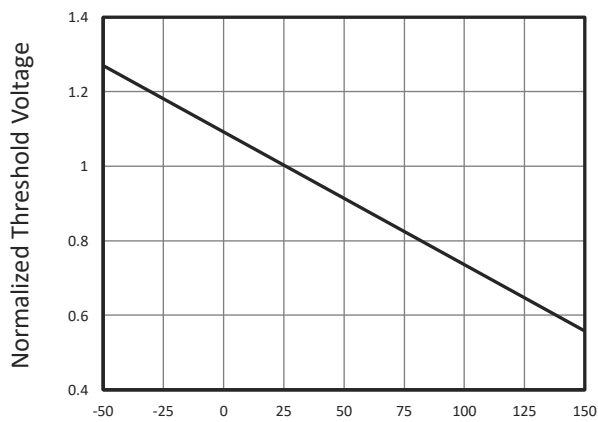
V_{GS}-Drain Source Voltage (V)
Drain-Source On Resistance



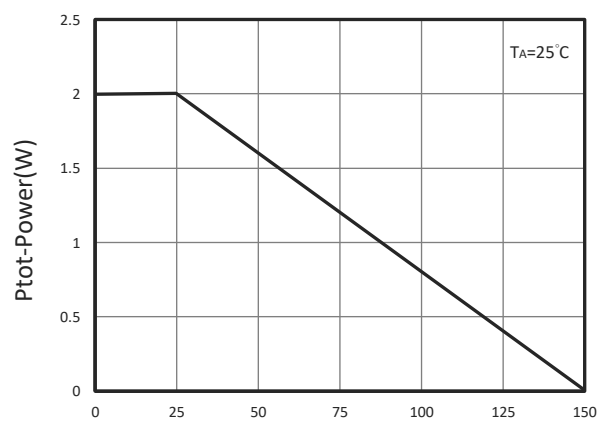
Q_G-Gate Charge (nC)
Gate Charge



V_{DS}-Drain Source Voltage (V)
Capacitance

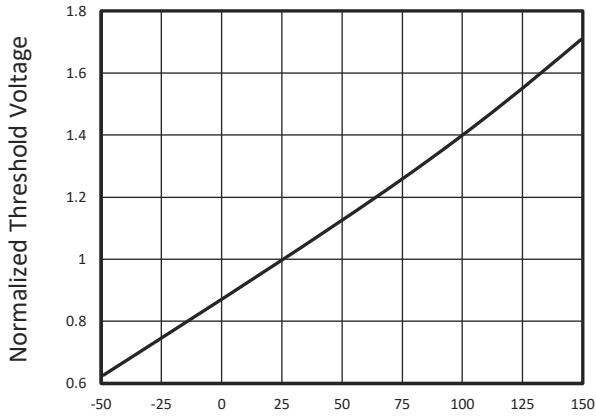


T_J-Junction Temperature (°C)
Gate Threshold Voltage

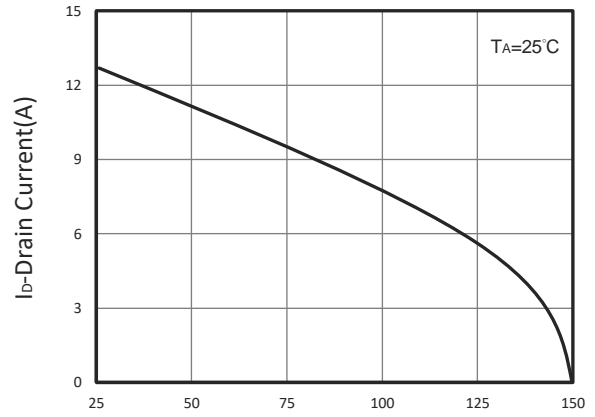


T_J-Junction Temperature (°C)
Power Dissipation

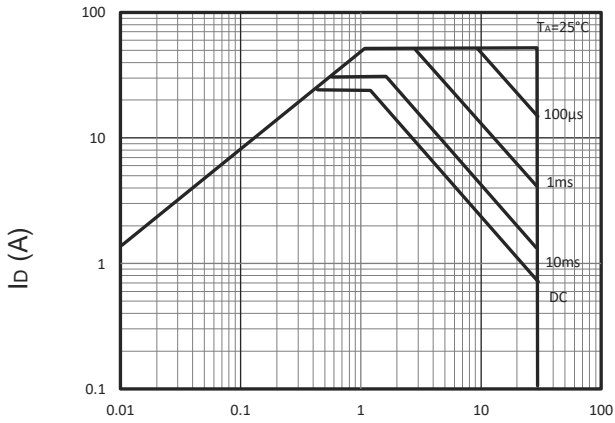
TYPICAL CHARACTERISTICS



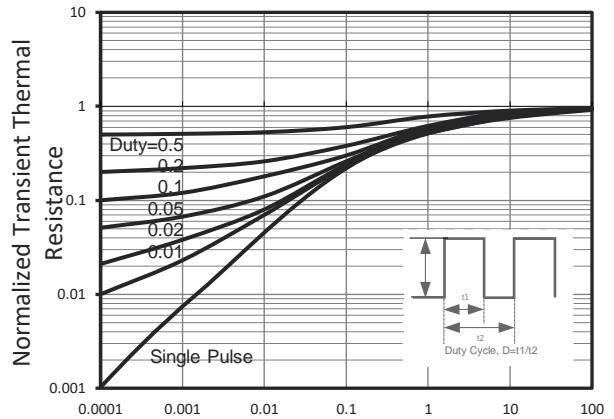
T_J-Junction Temperature(°C)
Gate Threshold Voltage



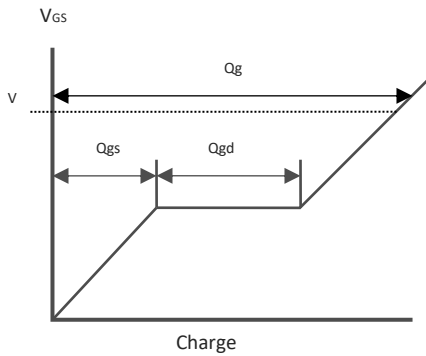
T_J-Junction Temperature(°C)
Drain Current vs T_J



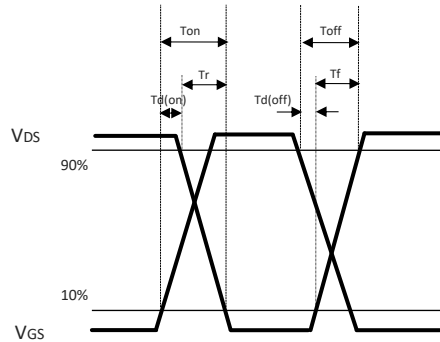
V_{DS} Voltage (V)
Maximum Safe Operation Area



Square Wave Pulse Duration(Sec)
Thermal Transient Impedance

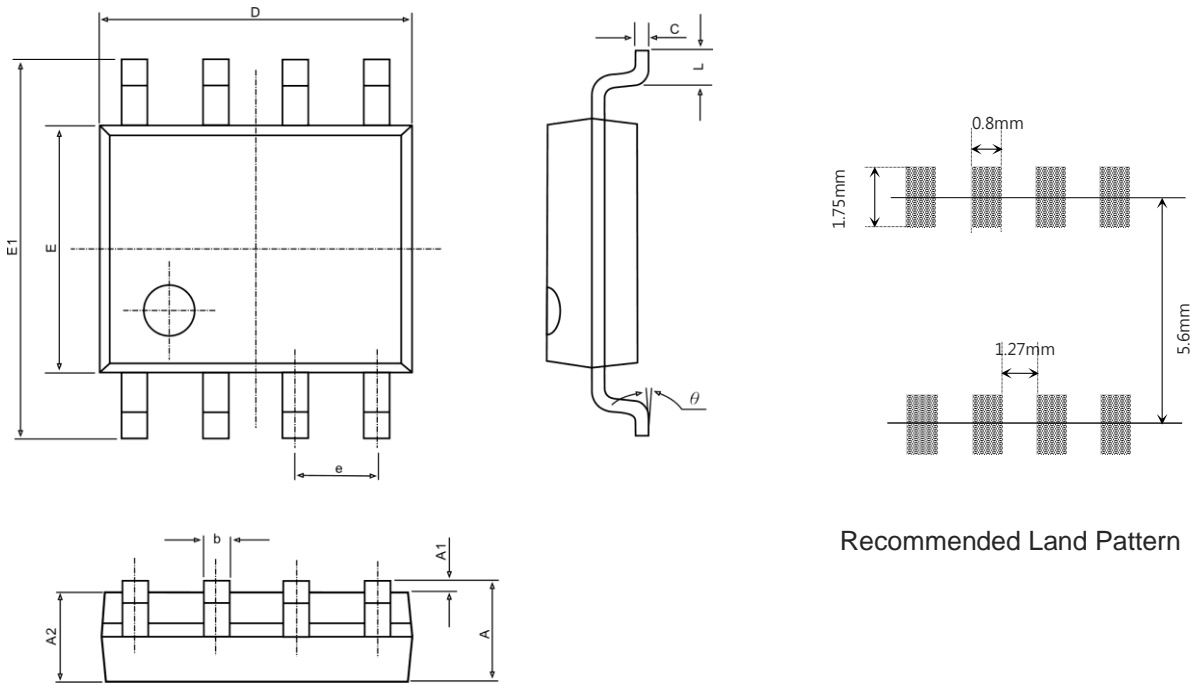


Gate Charge Waveform



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°