

Single N-Channel MOSFET

DESCRIPTION

SMC4812 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. These devices are well suited for high efficiency fast switching applications.

PART NUMBER INFORMATION

SMC 4812 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

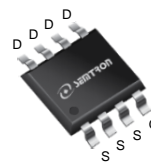
$V_{DS} = 30V, I_D = 9.8A$

$R_{DS(ON)} = 14m\Omega (Typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 22m\Omega (Typ.) @ V_{GS} = 4.5V$

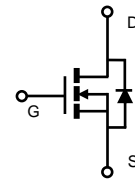
- ◆ Fast switch
- ◆ Improved dv/dt capability
- ◆ High power and current handling capability

APPLICATIONS

- ◆ LED Lighting
- ◆ Power Management
- ◆ Portable Equipment



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	$T_A = 25^\circ C$	9.8
		$T_A = 70^\circ C$	7.9
I_{DM}	Pulsed Drain Current ^A	39	A
P_D	Power Dissipation ^B	$T_A = 25^\circ C$	2.8
		$T_A = 70^\circ C$	1.8
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 ^B	$t \leq 10s$	45	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{BC}	Steady-State	70	
$R_{\theta JC}$	Thermal Resistance Junction to Case		27	

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

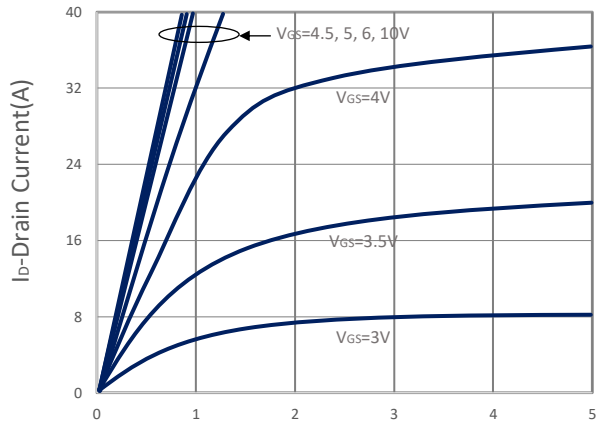
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250 μ A	1.0	1.5	2.5	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} = \pm 20V			\pm 100	nA
I _{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} =10V, I _D =9.8A V _{GS} =4.5V, I _D =6A		14 22	18 28	m Ω
G _{fs}	Forward Transconductance	V _{DS} =15V, I _D =6A		12		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^D	I _S =1A, V _{GS} =0V		0.7	1.0	V
I _S	Continuous Source Current				4.5	A
Dynamic and Switching Parameters						
Q _g	Total Gate Charge (10V)	V _{DS} =15V, V _{GS} =10V, I _D =6.5A		8.4	11.3	nC
Q _g	Total Gate Charge (4.5V)			4.2	5.7	
Q _{gs}	Gate-Source Charge			1.6	2.2	
Q _{gd}	Gate-Drain Charge			2	2.7	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V f=1MHz		420	588	pF
C _{oss}	Output Capacitance			62	87	
C _{rss}	Reverse Transfer Capacitance			50	70	
t _{d(on)}	Turn-On Time	V _{DD} =15V, V _{GEN} =10V, R _G =6 Ω , I _D =1A		5.3	10	nS
t _r				7.6	14	
t _{d(off)}	Turn-Off Time			15.8	30	
t _f				4.2	8	

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

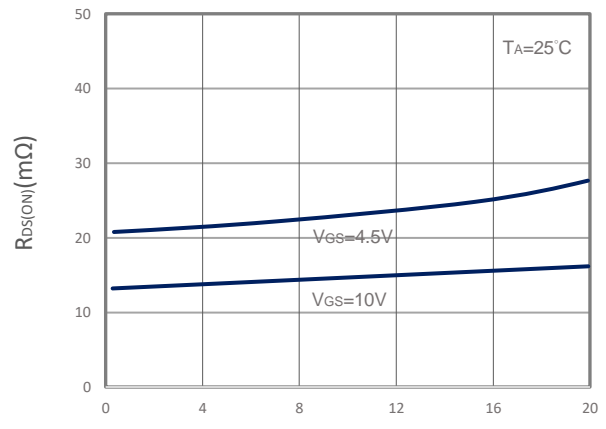
- Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C.
- Measure the value in a still air environment at T_A=25 $^\circ$ C, using an installation mounted on a 1 in2 FR-4 board, maximum junction temperature T_{J(MAX)}=150 $^\circ$ C.
- T_{J(MAX)}=150 $^\circ$ C, using junction-to-case thermal resistance (R_{θJC}) is more useful in additional heat sinking is used.
- The pulse test width is \leq 300 μ s and the duty cycle \leq 2%.

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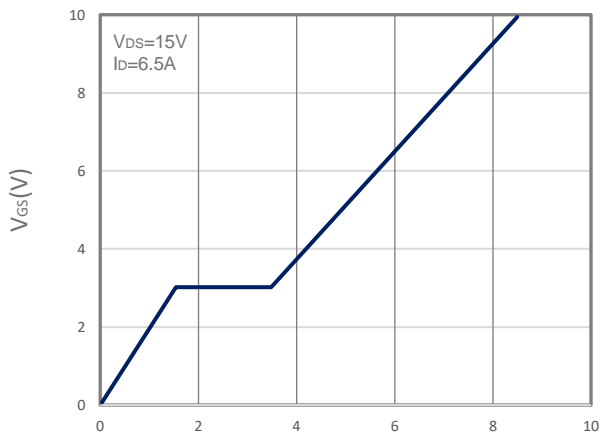
TYPICAL CHARACTERISTICS



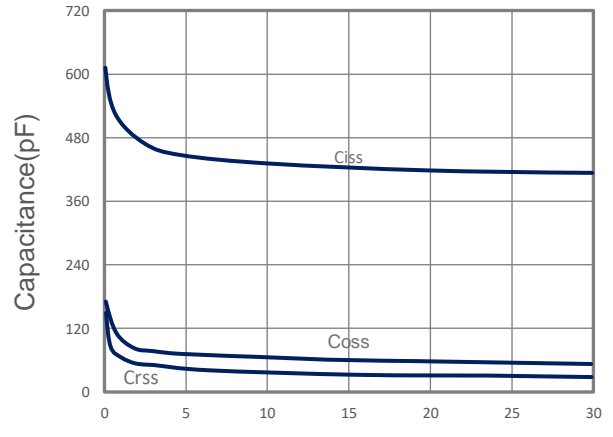
VDS-Drain Source Voltage(V)
Output Characteristics



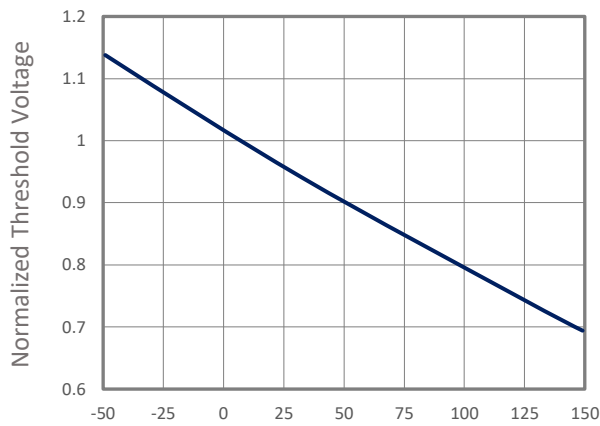
Id-Drain Current(A)
Drain-Source On Resistance



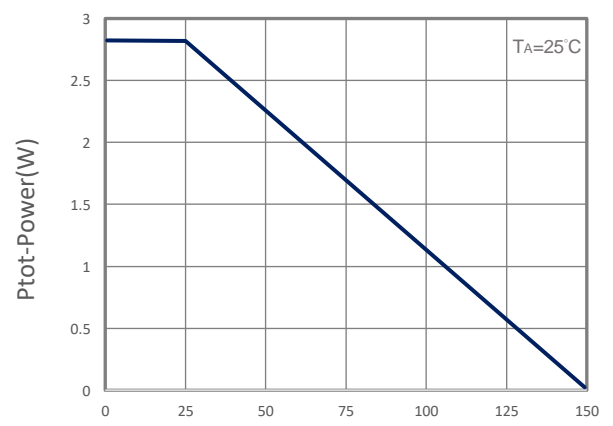
Qg-Gate Charge(nC)
Gate Charge



VDS-Drain Source Voltage(V)
Capacitance

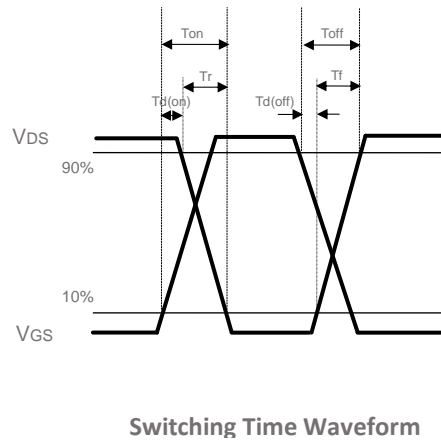
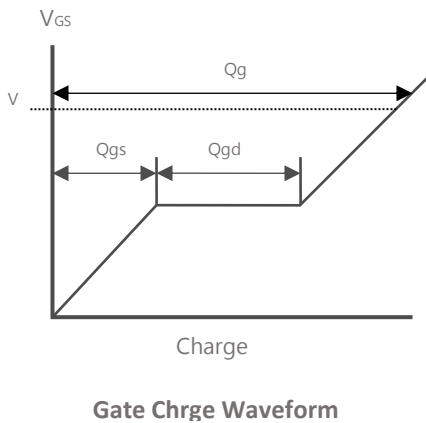
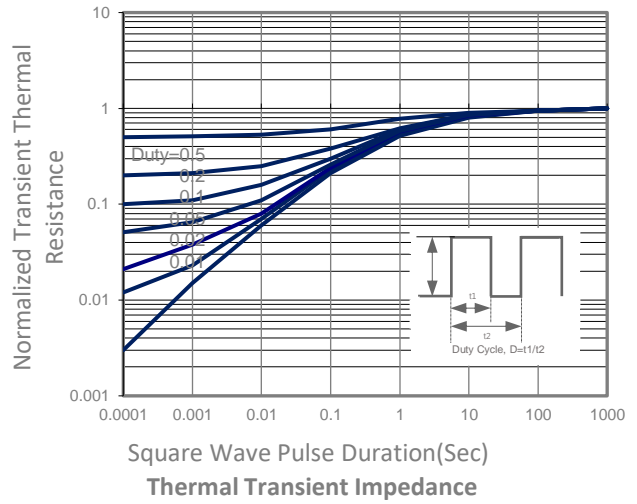
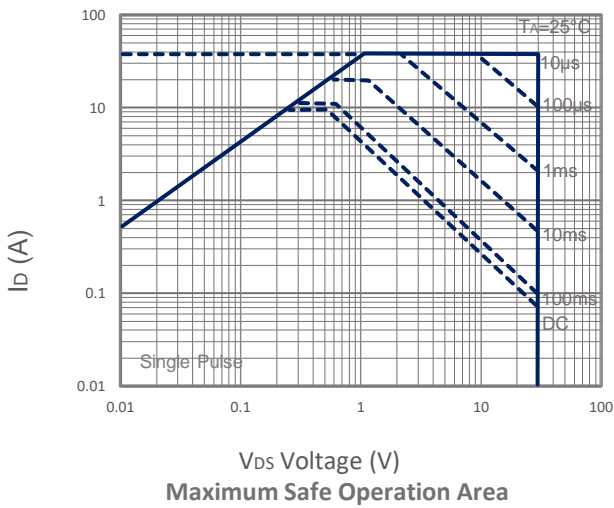
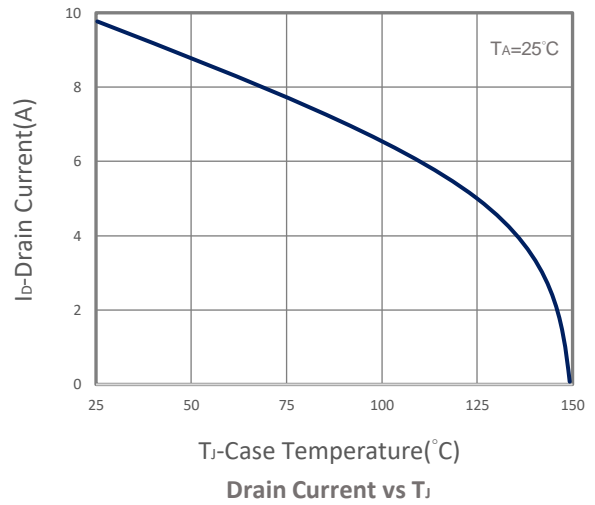
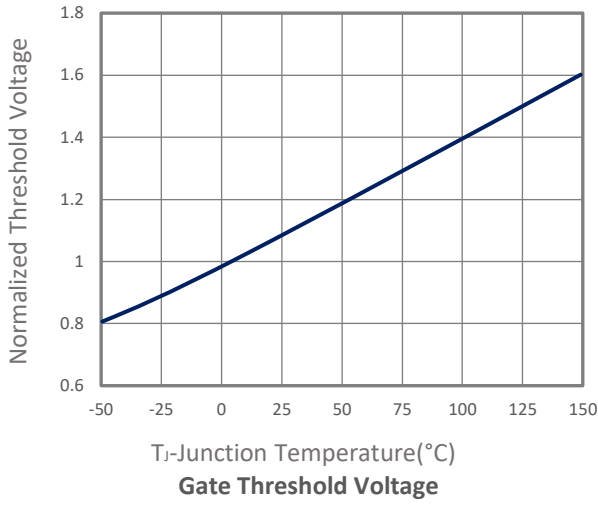


TJ-Junction Temperature(°C)
Gate Threshold Voltage

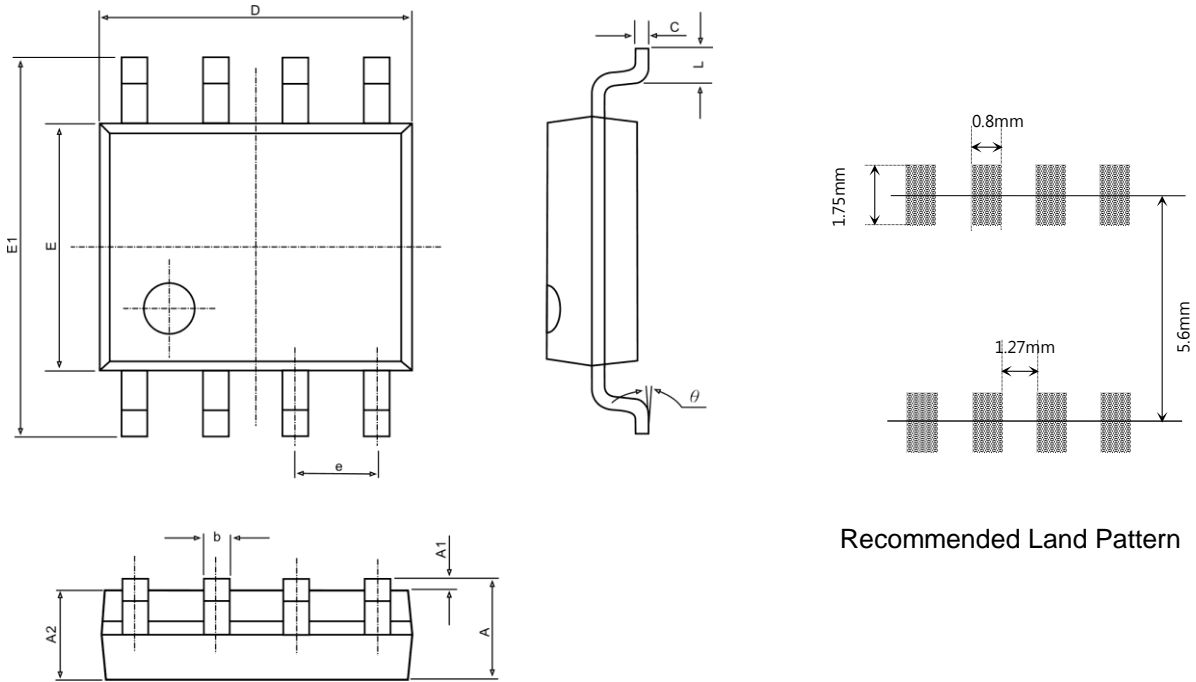


TJ-Junction Temperature(°C)
Power Dissipation

TYPICAL CHARACTERISTICS



■ 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°