

Single P-Channel MOSFET

DESCRIPTION

SMC4407M 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 4407 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

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

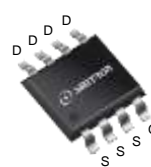
$R_{DS(ON)}=11m\Omega(Typ.)@V_{GS}=-10V$

$R_{DS(ON)}=15m\Omega(Typ.)@V_{GS}=-4.5V$

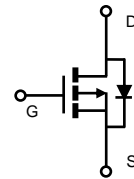
- ◆Fast switch
- ◆High power and current handling capability

APPLICATIONS

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



SOP-8



ABSOLUTE MAXIMUM RATINGS ($T_A=25^{\circ}C$ 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	$T_A=25^{\circ}C$	-12
		$T_A=70^{\circ}C$	-9.6
I_{DM}	Pulsed Drain Current ^B	-48	A
I_{AS}	Single Pulse Avalanche Current ^B	-30	A
E_{AS}	Single Pulse Avalanche energy $L=0.1mH$ ^B	45	mJ
P_D	Power Dissipation ^A	$T_A=25^{\circ}C$	3.1
		$T_A=70^{\circ}C$	2
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	$t \leq 10s$	35	$^{\circ}C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	70	

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

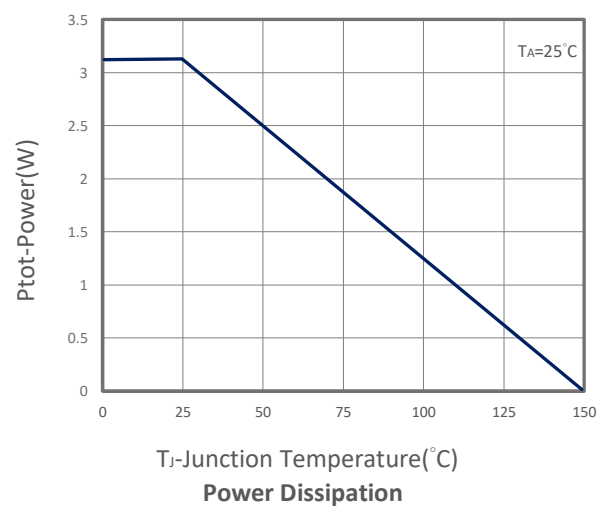
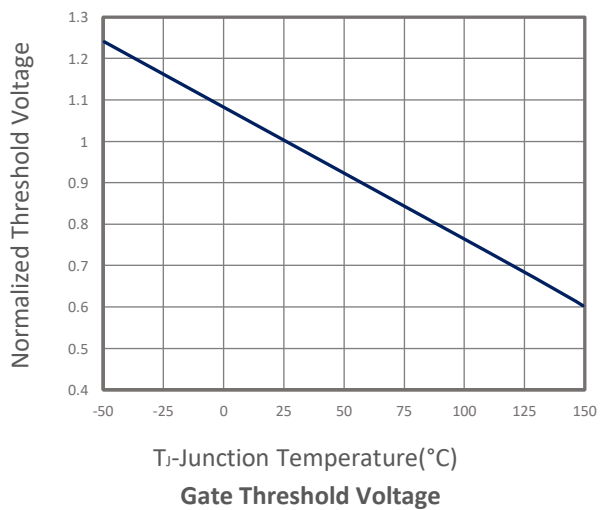
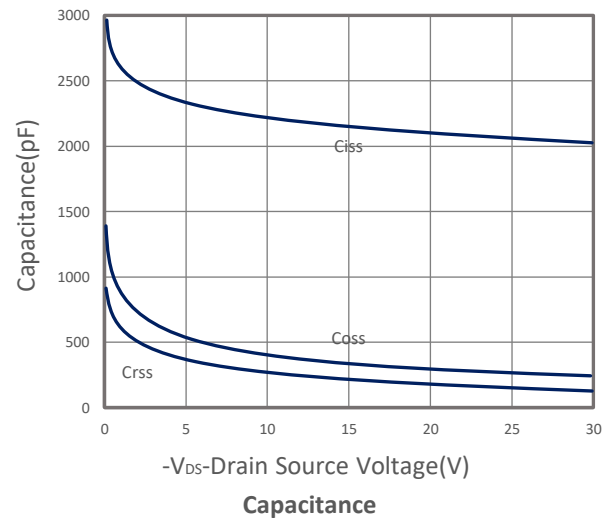
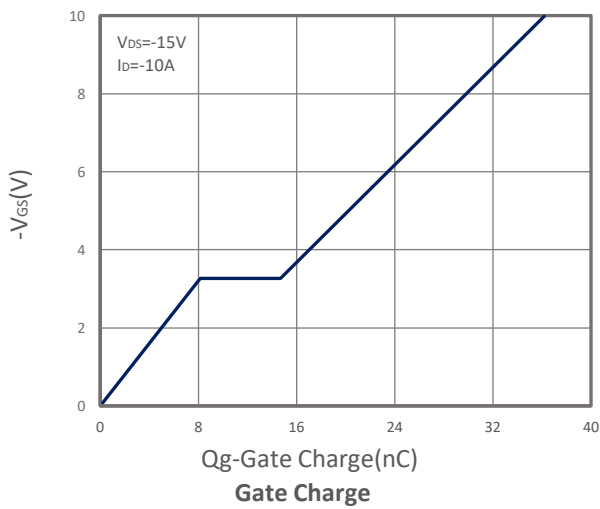
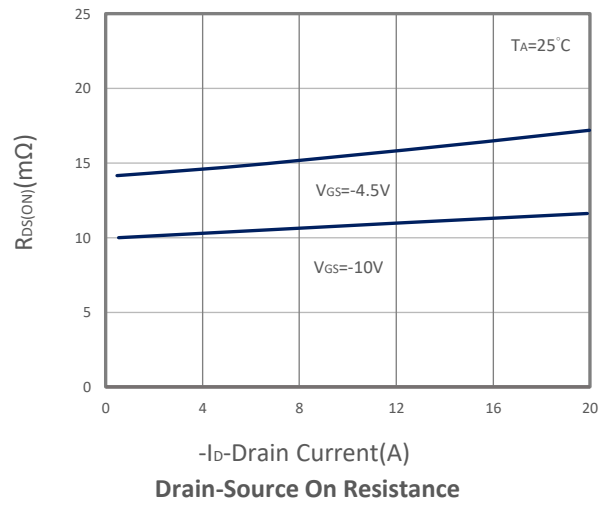
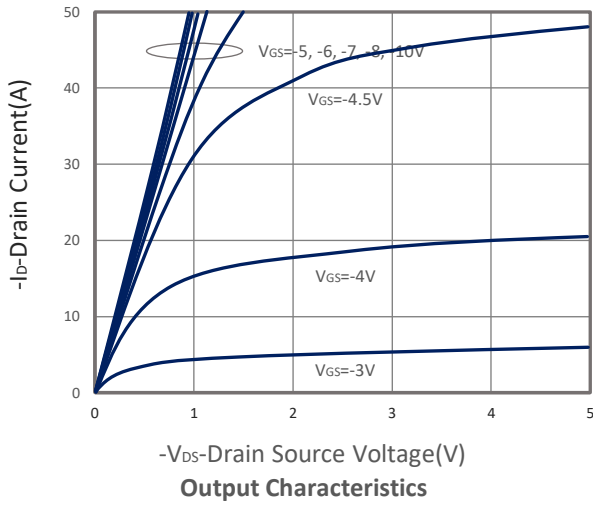
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250 μ A	-30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250 μ A	-1	-1.6	-2.5	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} = \pm 25V			\pm 100	nA
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 =-12A V _{GS} =-4.5V, I _D =-8A		11 15	14 19	m Ω
G _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-10A		12.5		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^D	I _S =-1A, V _{GS} =0V			-1	V
I _S	Diode Continuous Forward Current				-12	A
t _{rr}	Reverse Recovery Time	I _S =-10A, dI/dt=100A/ μ s		13.8		ns
Q _{rr}	Reverse Recovery Charge				12.3	
Dynamic and Switching Parameters ^E						
Q _g	Total Gate Charge	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			6.8	9.2	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz		2150		pF
C _{oss}	Output Capacitance			298		
C _{rss}	Reverse Transfer Capacitance			135		
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		8.8		Ω
t _{d(on)}	Turn-On Time	V _{DD} =-15V, V _{GEN} =-10V R _G =3.3 Ω , I _D =-1A		7.7	15	nS
t _r				57.8	129	
t _{d(off)}	Turn-Off Time			57.5	109	
t _f				21.3	40	

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

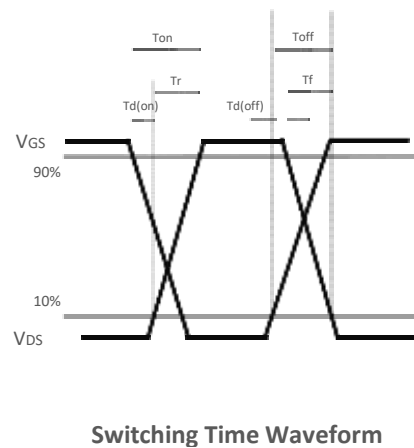
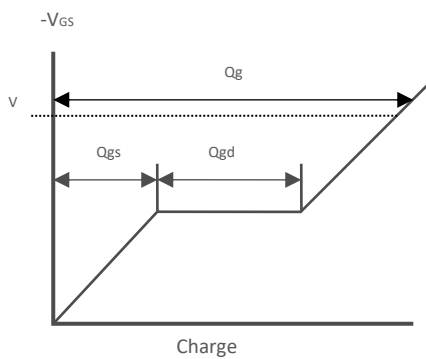
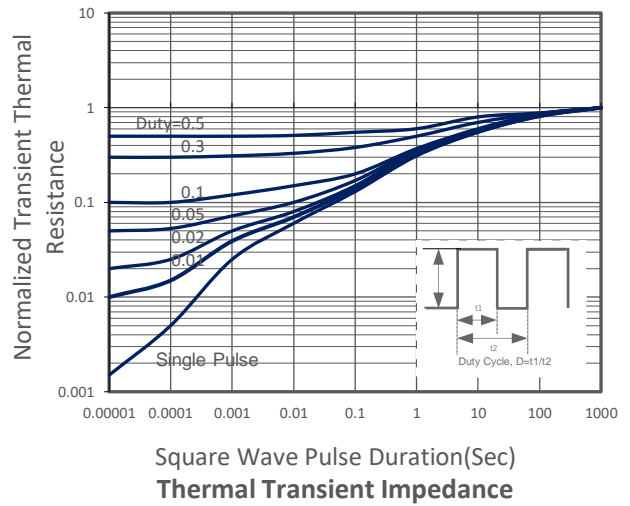
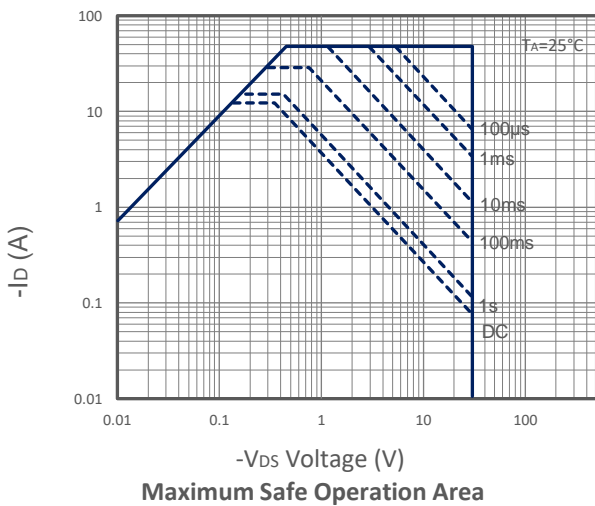
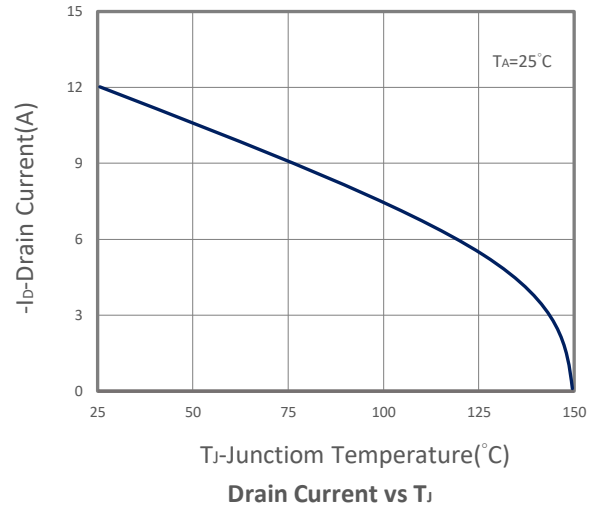
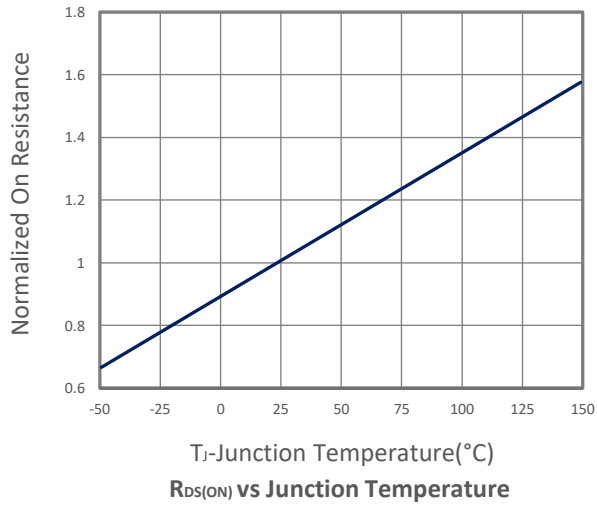
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150 $^\circ$ C (initial temperature T_J=25 $^\circ$ C).
- C. Using \leq 10s junction-to-ambient thermal resistance is base on T_{J(MAX)}=150 $^\circ$ C.
- D. Pulse test width \leq 300 μ s and duty cycle \leq 2%.
- E. Guaranteed by design, not subject to production testing.

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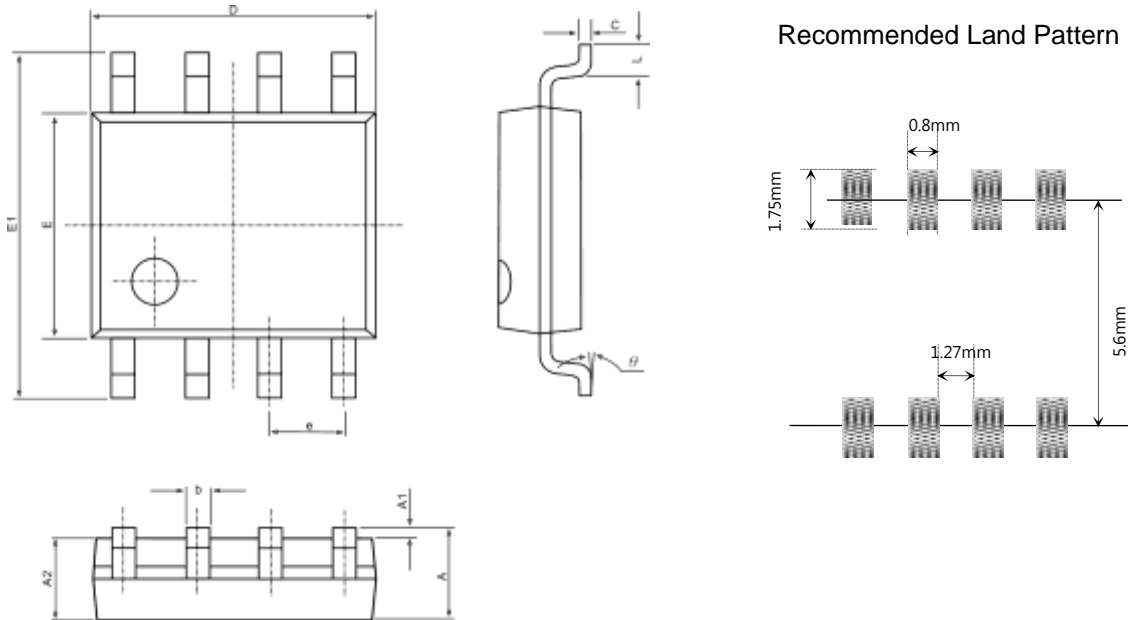
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



■ SOP-8 PACKAGE DIMENSIONS



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	0.004	0.010
A2	1.300	1.500	0.051	0.059
b	0.390	0.490	0.015	0.019
c	0.200	0.250	0.008	0.010
D	4.800	5.100	0.189	0.201
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 BSC		0.050 BSC	
L	0.500	0.800	0.020	0.031
θ	0°	8°	0°	8°