

Single N-Channel MOSFET

DESCRIPTION

SMC4420 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 4420 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

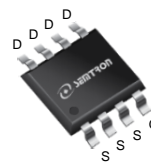
$V_{DS} = 30V, I_D = 12.5A$

$R_{DS(ON)} = 9m\Omega(Typ.) @ V_{GS} = 10V$
 $R_{DS(ON)} = 11m\Omega(Typ.) @ V_{GS} = 4.5V$

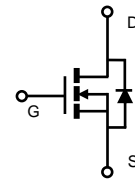
- ◆ Fast switch
- ◆ Improved dv/dt capability
- ◆ High power and current handling capability

APPLICATIONS

- ◆ Power Management
- ◆ Portable Equipment



SOP-8



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Continuous Drain Current	$T_A = 25^\circ C$	12.5
		$T_A = 70^\circ C$	10
I_{DM}	Pulsed Drain Current ^A	50	A
I_{AS}	Avalanche Current ^{A F}	20	A
E_{AS}	Single Pulse Avalanche energy $L=0.1mH$ ^{A F}	20	mJ
P_D	Power Dissipation ^B	$T_A = 25^\circ C$	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 ^C	$t \leq 10s$	40	$^\circ C/W$
			75	
$R_{\theta JC}$	Thermal Resistance Junction to Case ^C		25	

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	1.6	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} = 10V, I _D = 12.5A V _{GS} = 4.5V, I _D = 8A		9 11	12 15	m Ω
G _{fs}	Forward Transconductance	V _{DS} = 10V, I _D = 10A		13		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^B	I _S = 1A, V _{GS} = 0V		0.7	1.0	V
I _S	Continuous Source Current				6.3	A
t _{rr}	Body Diode Reverse Recovery Time	I _S = -10A, dI/dt = 100A/ μ s		18		ns
Q _{rr}	Body Diode Reverse Recovery Charge			10.6		nC
Dynamic and Switching Parameters						
Q _g	Total Gate Charge (10V)	V _{DS} = 15V, V _{GS} = 10V I _D = 10A		14	19.6	nC
Q _g	Total Gate Charge (4.5V)			7	9.8	
Q _{gs}	Gate-Source Charge			3.8	5.3	
Q _{gd}	Gate-Drain Charge			2.2	3.1	
C _{iss}	Input Capacitance	V _{DS} = 15V, V _{GS} = 0V f = 1MHz		702	983	pF
C _{oss}	Output Capacitance			210	294	
C _{rss}	Reverse Transfer Capacitance			72	101	
R _g	Gate Resistance	V _{GS} = 0V, V _{DS} = 0V, F = 1MHz		2.4	3.4	Ω
t _{d(on)}	Turn-On Time ^E	V _{DD} = 15V, V _{GEN} = 10V, R _G = 3 Ω , I _D = 1A		12		nS
t _r				4.6		
t _{d(off)}	Turn-Off Time ^E			26		
t _f				7.8		

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

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

B. The T_{J(MAX)} = 150 $^\circ$ 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 $^\circ$ C.

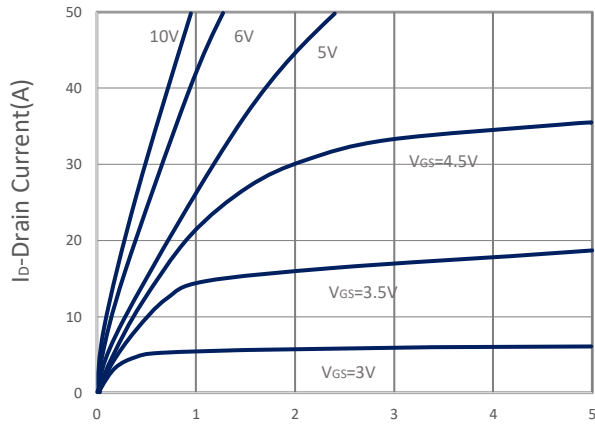
D. The data tested by pulsed, pulse width \leq 300 μ s, duty cycle \leq 2%.

E. Pulsed width limited by maximum junction temperature.

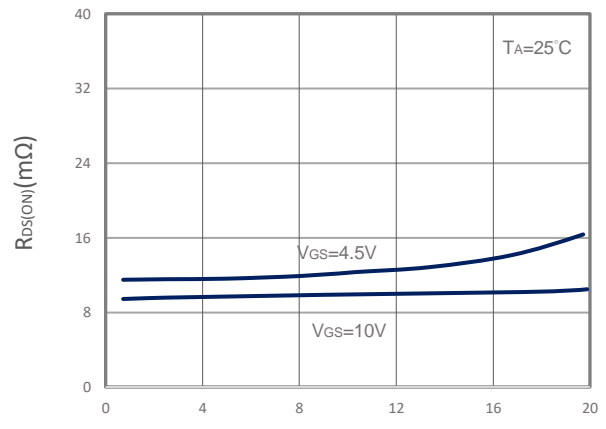
F. The EAS data shows Max.

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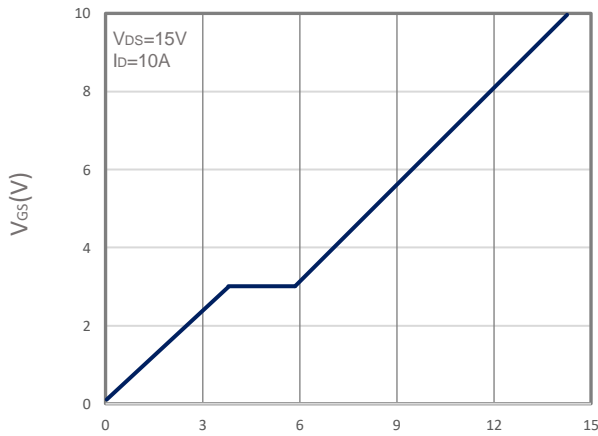
TYPICAL CHARACTERISTICS



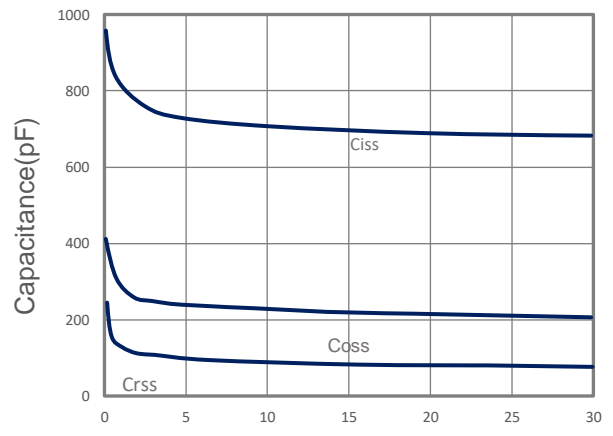
VDs-Drain Source Voltage(V)
Output Characteristics



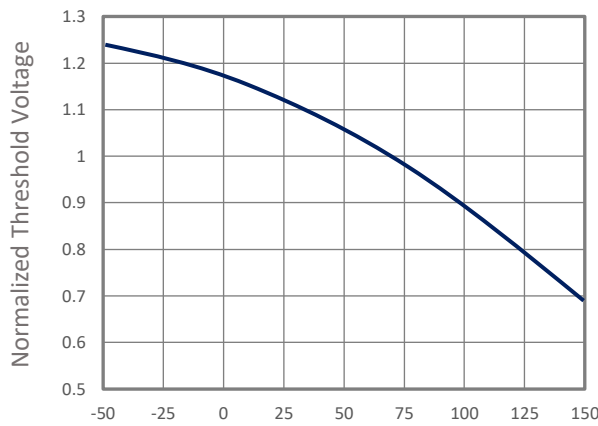
Id-Drain Current(A)
Drain-Source On Resistance



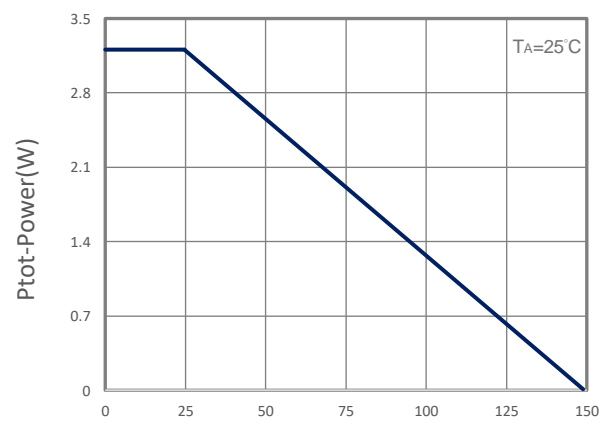
Qg-Gate Charge(nC)
Gate Charge



VDS-Drain Source Voltage(V)
Capacitance

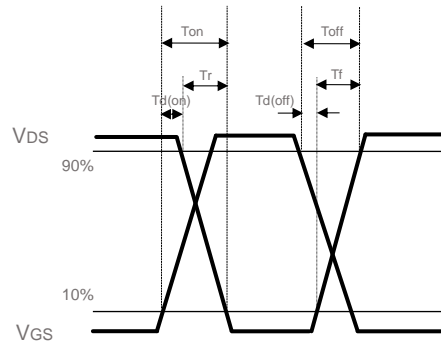
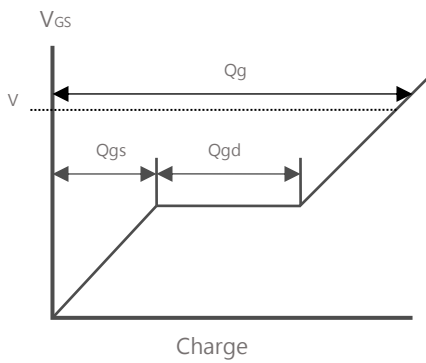
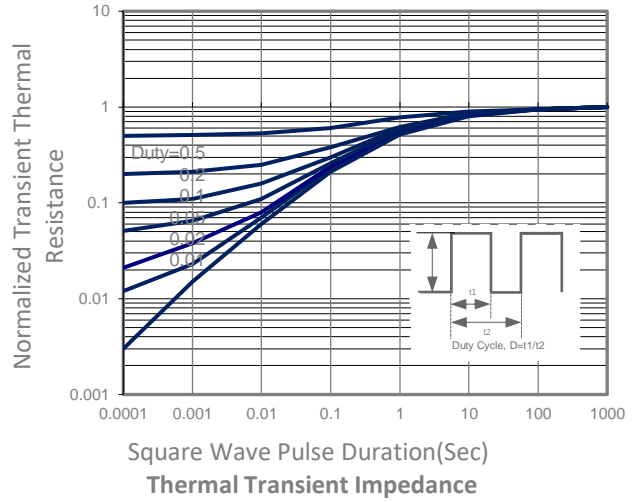
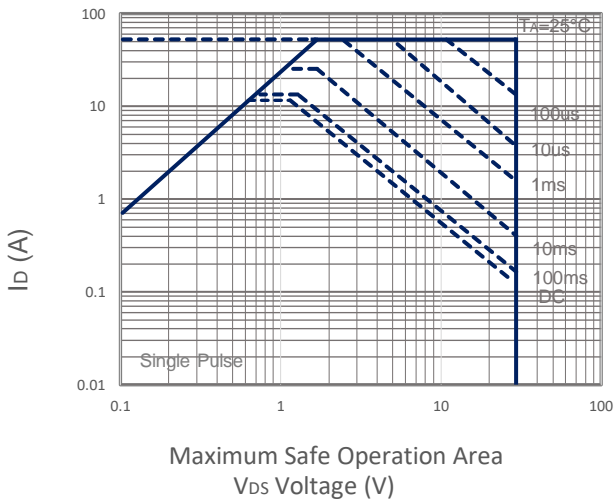
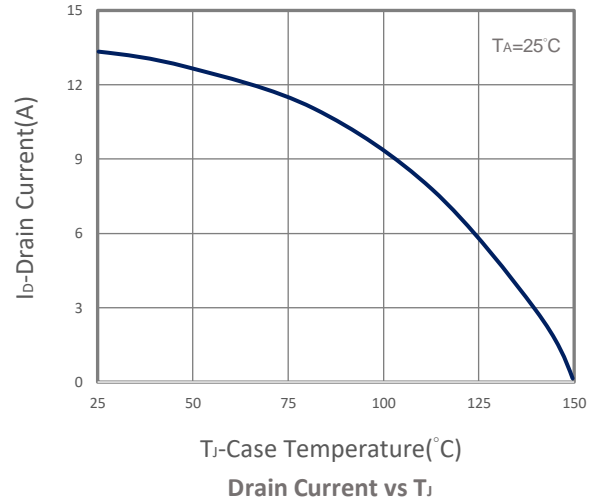
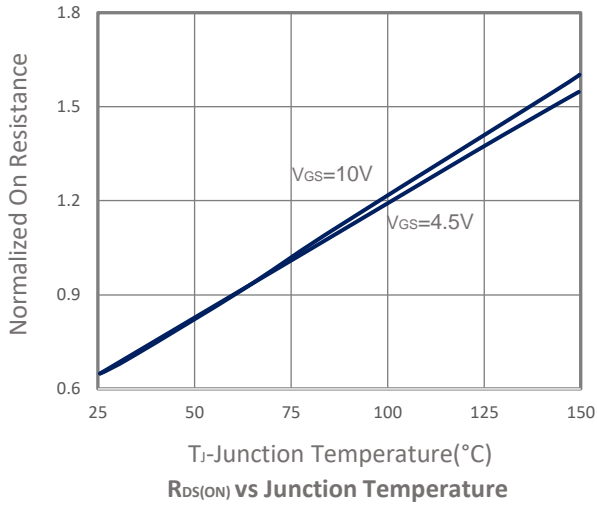


TJ-Junction Temperature(°C)
Gate Threshold Voltage

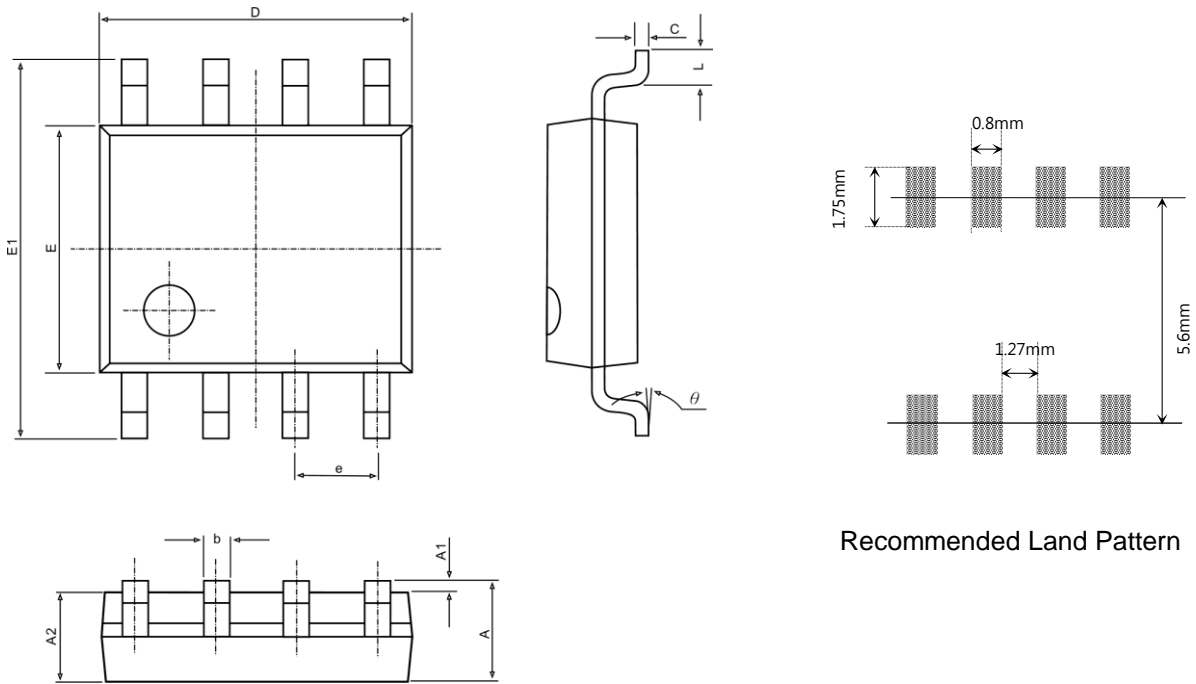


TJ-Junction Temperature(°C)
Power Dissipation

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°