

Single P-Channel MOSFET

DESCRIPTION

SMC4425 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.

PART NUMBER INFORMATION

SMC 4425 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

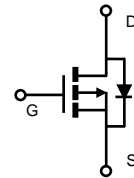
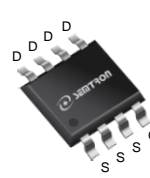
$V_{DS} = -30V$, $I_D = -14.7A$

- $R_{DS(ON)} = 8.5m\Omega(Typ.)@V_{GS} = -20V$
- $R_{DS(ON)} = 9.0m\Omega(Typ.)@V_{GS} = -10V$
- $R_{DS(ON)} = 10.5m\Omega(Typ.)@V_{GS} = -6V$
- $R_{DS(ON)} = 12.5m\Omega(Typ.)@V_{GS} = -4.5V$

- ◆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	$T_A=25^\circ C$	-14.7	A
		$T_A=70^\circ C$	-11.7	A
I_{DM}	Pulsed Drain Current ^A	-58.7	A	
I_{AS}	Avalanche Current ^{A F}	-30	A	
E_{AS}	Single Pulse Avalanche energy $L=0.1mH$ ^{A F}	45	mJ	
P_D	Power Dissipation ^B	$T_A=25^\circ C$	3.6	W
		$T_A=70^\circ C$	2.3	W
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	$t \leq 10s$	35	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^C	Steady-State	68	
$R_{\theta JC}$	Thermal Resistance Junction to Case ^C		20	

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 = -250μA	-30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-1	-1.7	-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} = -30V, V _{GS} = 0V T _J = 25°C			-1	μA
		V _{DS} = -24V, V _{GS} = 0V T _J = 75°C			-10	
R _{DS(ON)}	Drain-source On-Resistance ^D	V _{GS} = -20V, I _D = -14.7A V _{GS} = -10V, I _D = -12A V _{GS} = -6V, I _D = -10A V _{GS} = -4.5V, I _D = -7A		8.5 9 10.5 12.5	10 10.5 12 14	mΩ
G _{fs}	Forward Transconductance	V _{DS} = -10V, I _D = -11.7A		18		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^B	I _S = -1A, V _{GS} = 0V		-0.7	-1	V
I _S	Continuous Source Current				-4	A
t _{rr}	Body Diode Reverse Recovery Time	V _{DD} = -15V, T _J = 25°C		20		ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _S = -10A, dI/dt = 100A/μs		13.6		nC
Dynamic and Switching Parameters						
Q _g	Total Gate Charge (10V)	V _{DS} = -15V, V _{GS} = -10V I _D = -10A		77	88	nC
Q _g	Total Gate Charge (4.5V)			38	48	
Q _{gs}	Gate-Source Charge			12	14.5	
Q _{gd}	Gate-Drain Charge			14.3	19.5	
C _{iss}	Input Capacitance	V _{DS} = -15V, V _{GS} = 0V f = 1MHz		3610	4620	pF
C _{oss}	Output Capacitance			436	521	
C _{rss}	Reverse Transfer Capacitance			299	365	
R _g	Gate Resistance	V _{GS} = 0V, V _{DS} = 0V, F = 1MHz		9.2	13	Ω
t _{d(on)}	Turn-On Time ^E	V _{DD} = -15V, V _{GEN} = -10V, R _G = 3Ω, I _D = -1A		27		nS
t _r				11.5		
t _{d(off)}	Turn-Off Time ^E			81		
t _f				35.7		

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°C (initial temperature T_A = 25°C).

B. The T_{J(MAX)} = 150°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°C.

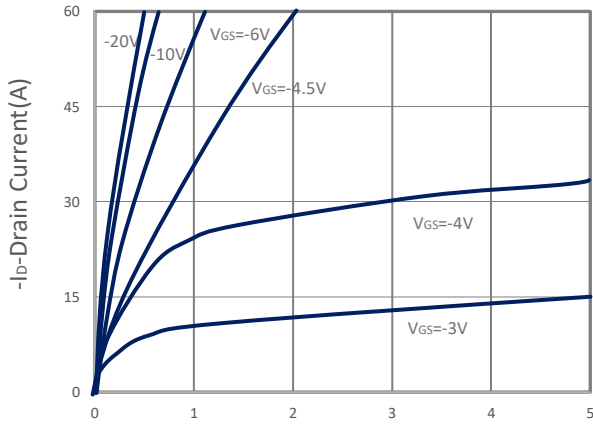
D. The data tested by pulsed, pulse width ≤ 300μs, duty cycle ≤ 2%

E. Pulsed width limited by maximum junction temperature.

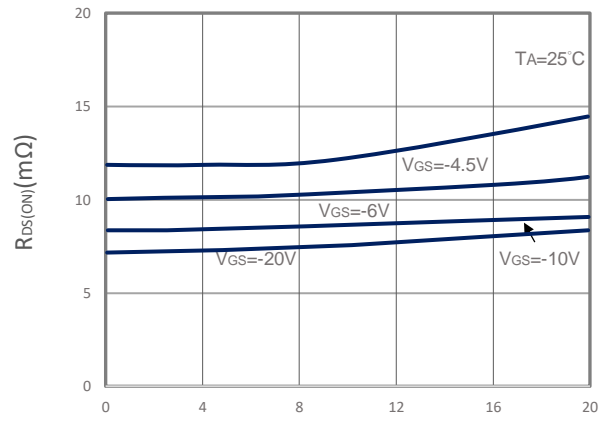
F. The E_{AS} data shows Max.

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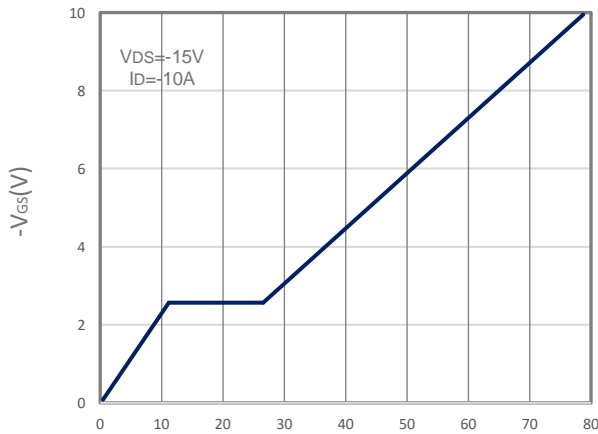
TYPICAL CHARACTERISTICS



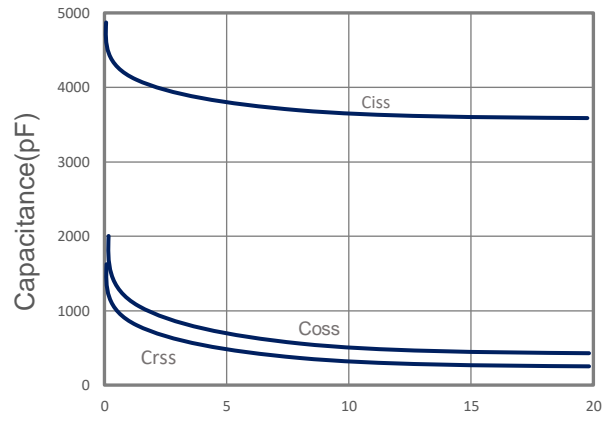
Output Characteristics



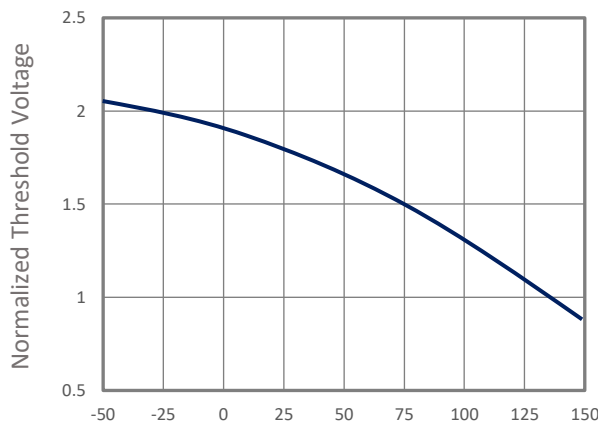
Drain-Source On Resistance



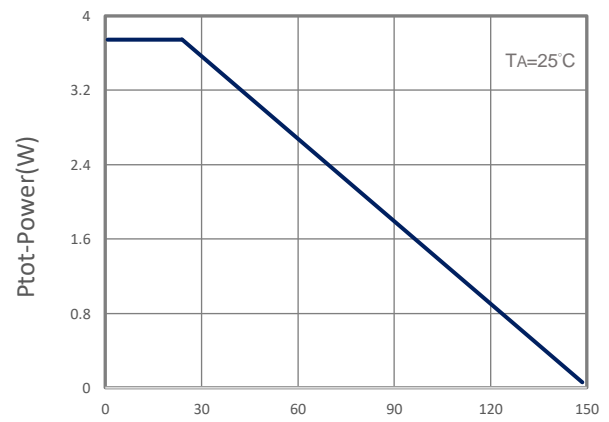
Gate Charge



Capacitance

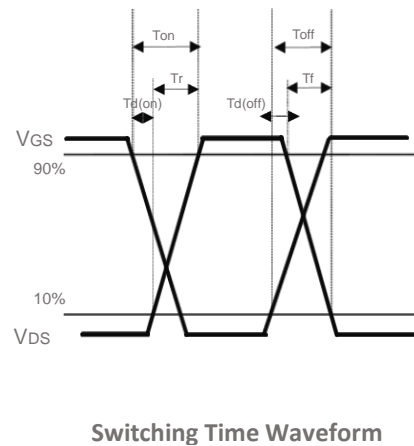
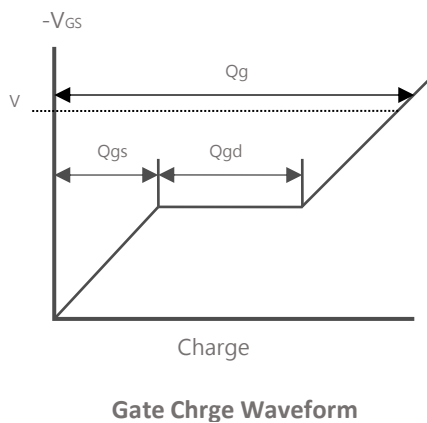
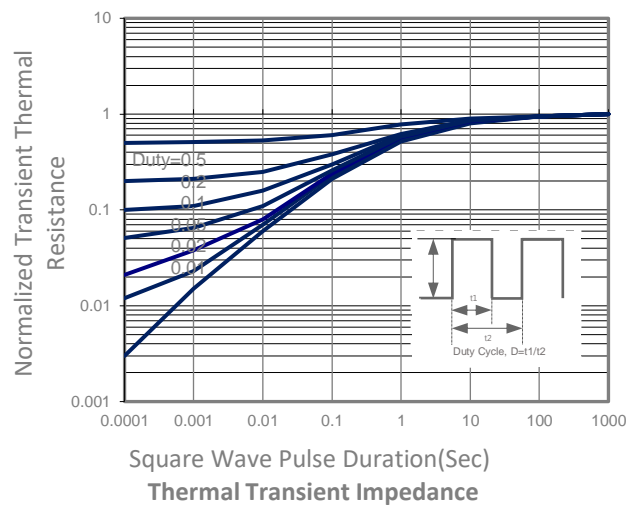
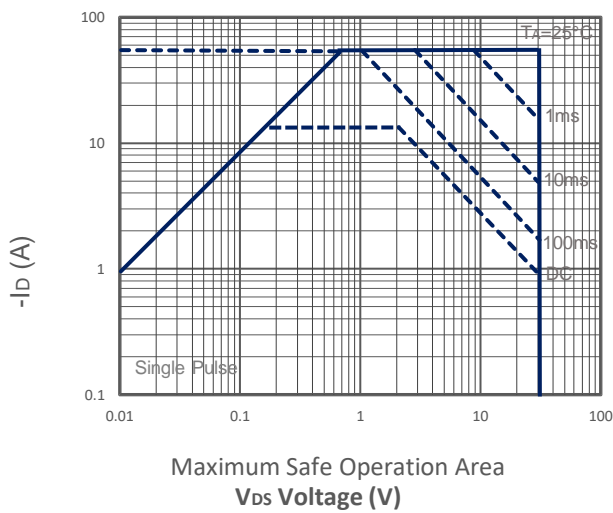
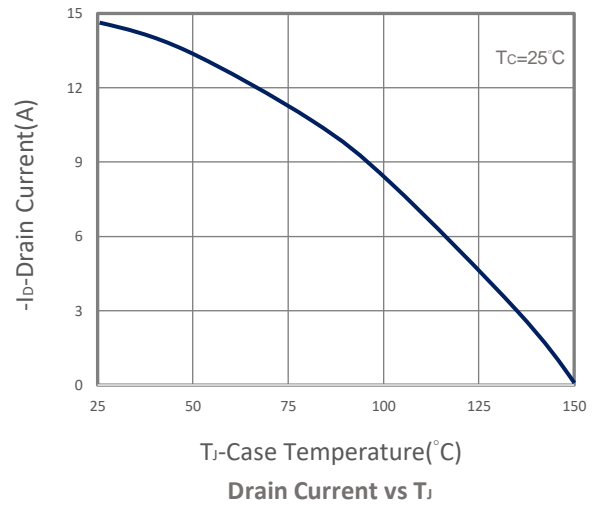
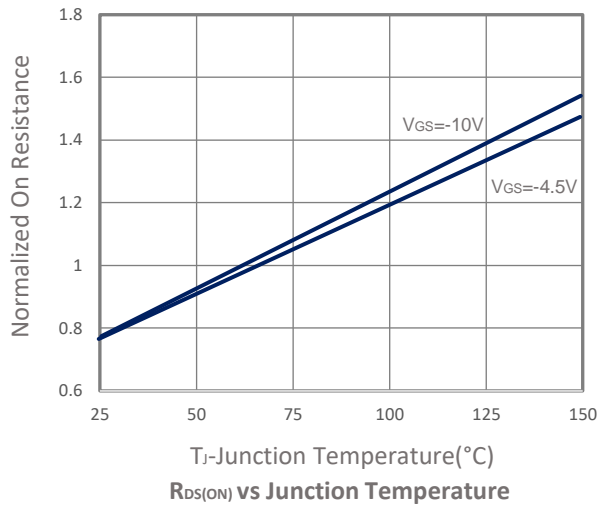


Gate Threshold Voltage

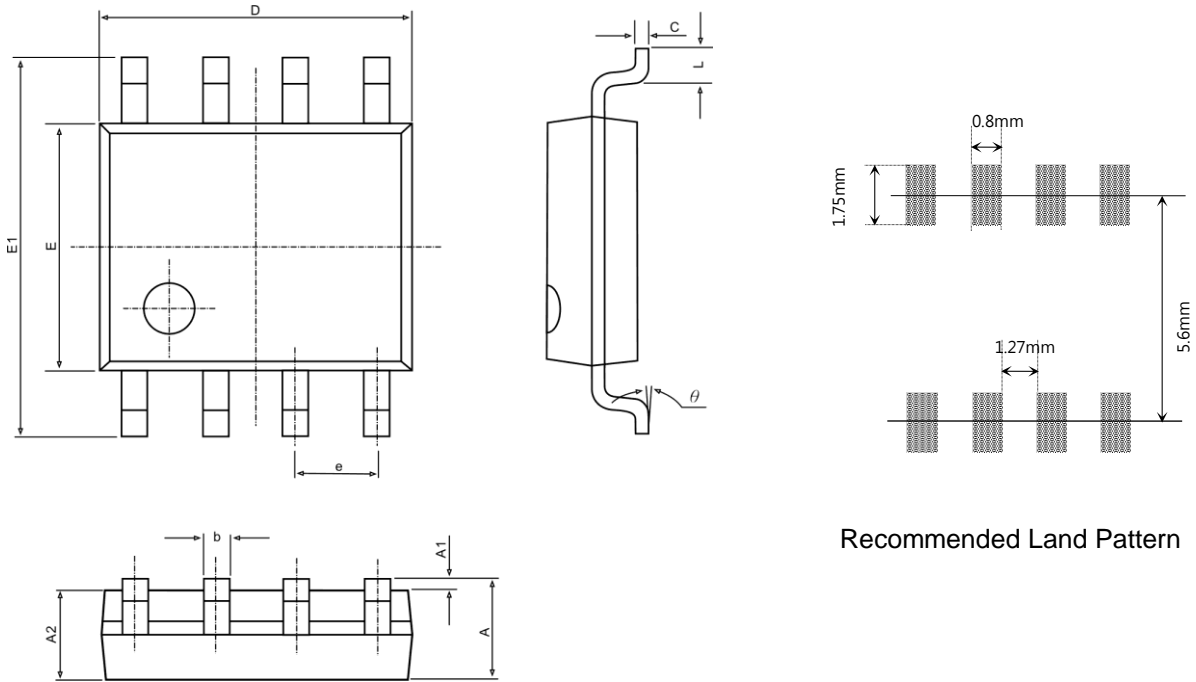


Power Dissipation

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°