

Single P-Channel MOSFET

DESCRIPTION

SMC4427 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 4427 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

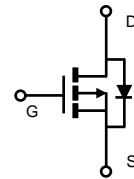
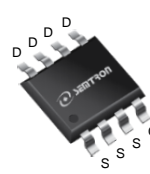
$V_{DS} = -30V$, $I_D = -15A$

$R_{DS(ON)} = 7.5m\Omega(Typ.) @ V_{GS} = -10V$
 $R_{DS(ON)} = 11.5m\Omega(Typ.) @ V_{GS} = -4.5V$

- ◆ 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	± 20	V
I_D	Continuous Drain Current	$T_A = 25^\circ C$	-15
		$T_A = 70^\circ C$	-12
I_{DM}	Pulsed Drain Current ^A	-60	A
I_{AS}	Avalanche Current ^A	-30	A
E_{AS}	Single Pulse Avalanche energy $L=0.1mH$ ^{AF}	45	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 ^B	$t \leq 10s$	40	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{BD}	Steady-State	75	
$R_{\theta JC}$	Thermal Resistance Junction to Case		25	

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

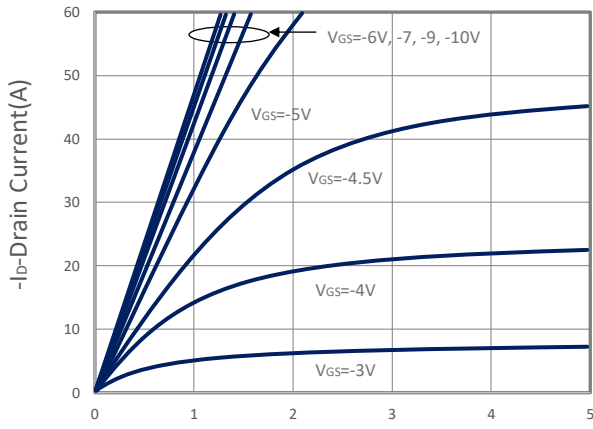
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-30			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.6	-2.5	V
I_{GSS}	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$			± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-30V, V_{GS}=0V, T_J=25^\circ\text{C}$			-1	μA
		$V_{DS}=-24V, V_{GS}=0V, T_J=75^\circ\text{C}$			-10	
$R_{DS(ON)}$	Drain-source On-Resistance ^E	$V_{GS}=-10V, I_D=-15A$ $V_{GS}=-4.5V, I_D=-10A$		7.5 11.5	9 14	m Ω
G_{fs}	Forward Transconductance	$V_{DS}=-10V, I_D=-10A$		14.6		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage ^E	$I_S=-1A, V_{GS}=0V$		-0.7	-1	V
I_S	Continuous Source Current				-7.5	A
t_{rr}	Reverse Recovery Time	$I_S=-10A, dI/dt=100A/\mu s$		21		ns
Q_{rr}	Reverse Recovery Charge			15.5		nC
Dynamic and Switching Parameters						
Q_g	Total Gate Charge (10V)	$V_{DS}=-15V, V_{GS}=-10V, I_D=-10A$		61	85	nC
Q_g	Total Gate Charge (4.5V)			30	42	
Q_{gs}	Gate-Source Charge			10.6	14.3	
Q_{gd}	Gate-Drain Charge			9	12.2	
C_{iss}	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1\text{MHz}$		3376		pF
C_{oss}	Output Capacitance			369		
C_{rss}	Reverse Transfer Capacitance			224		
R_g	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$		8.2		Ω
$t_{d(on)}$	Turn-On Time	$V_{DD}=-15V, V_{GEN}=-10V, R_G=3\Omega, I_D=-1A$		24	46	nS
t_r				11.6	22	
$t_{d(off)}$	Turn-Off Time			78.8	150	
t_f				33.8	63	

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

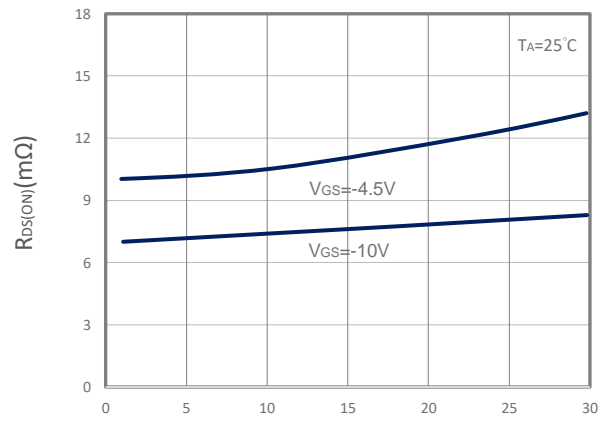
- Pulsed width limited by maximum junction temperature, $T_{J(MAX)}=150^\circ\text{C}$.
- The value of $R_{\theta JA}$ is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature $T_{J(MAX)}=150^\circ\text{C}$ (initial temperature $T_A=25^\circ\text{C}$).
- $T_{J(MAX)}=150^\circ\text{C}$, using junction-to-ambient thermal resistance, $t \leq 10\text{sec}$.
- $T_{J(MAX)}=150^\circ\text{C}$, using junction-to-case thermal resistance ($R_{\theta JC}$) is more useful in additional heat sinking is used.
- The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
- The EAS data shows Max, tested and pulse width limited by $T_{J(MAX)}=150^\circ\text{C}$ (initial temperature $T_J=25^\circ\text{C}$).

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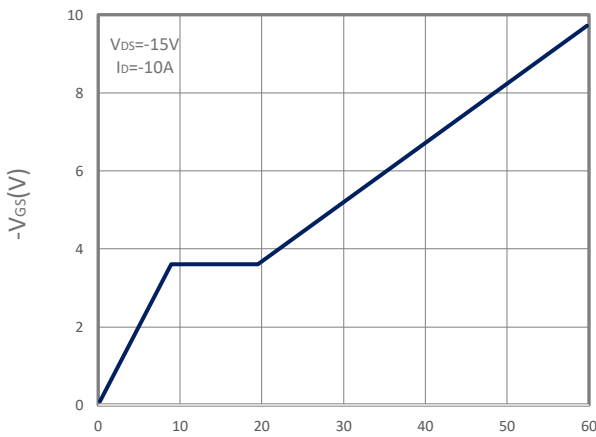
TYPICAL CHARACTERISTICS



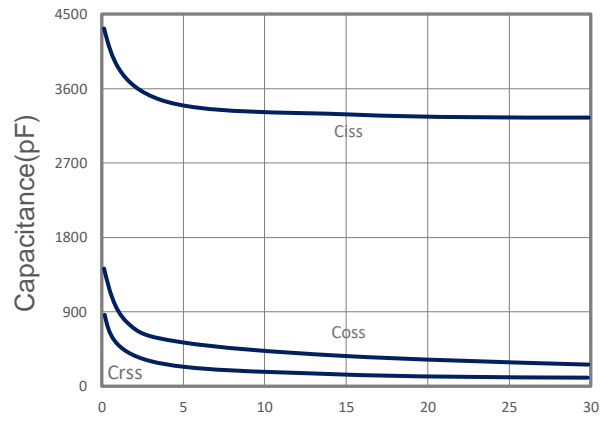
Output Characteristics



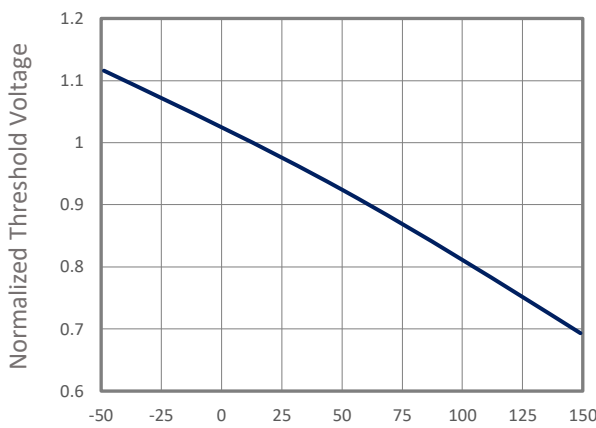
Drain-Source On Resistance



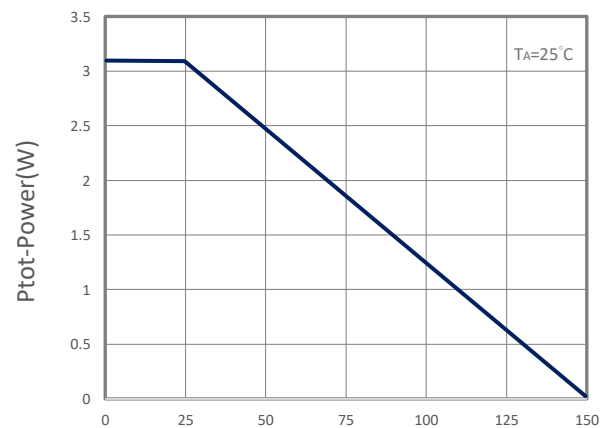
Gate Charge



Capacitance

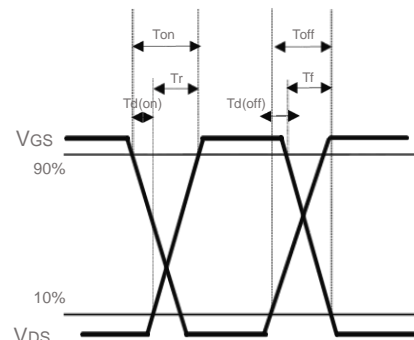
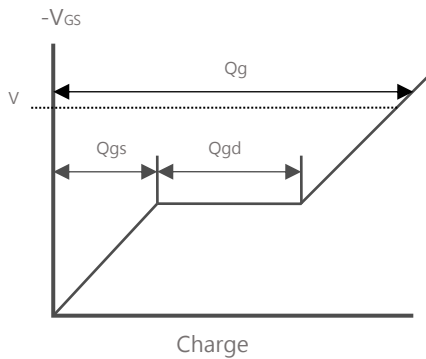
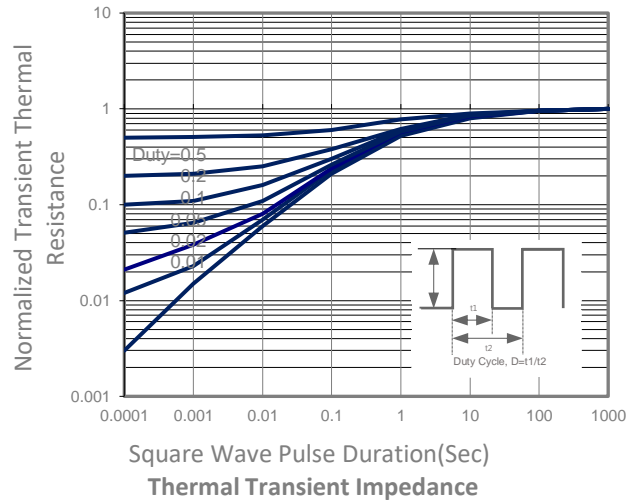
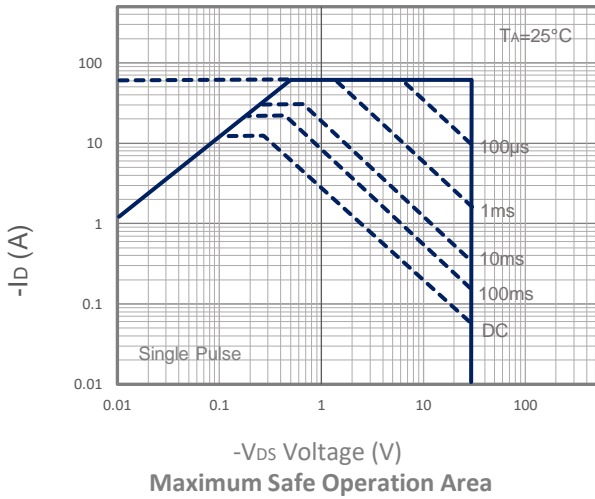
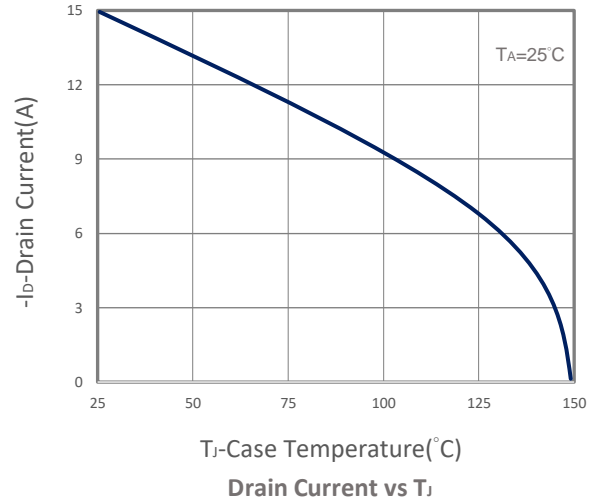
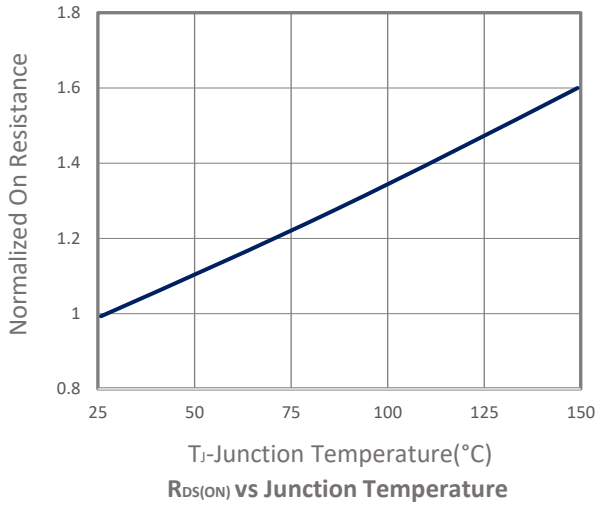


Gate Threshold Voltage

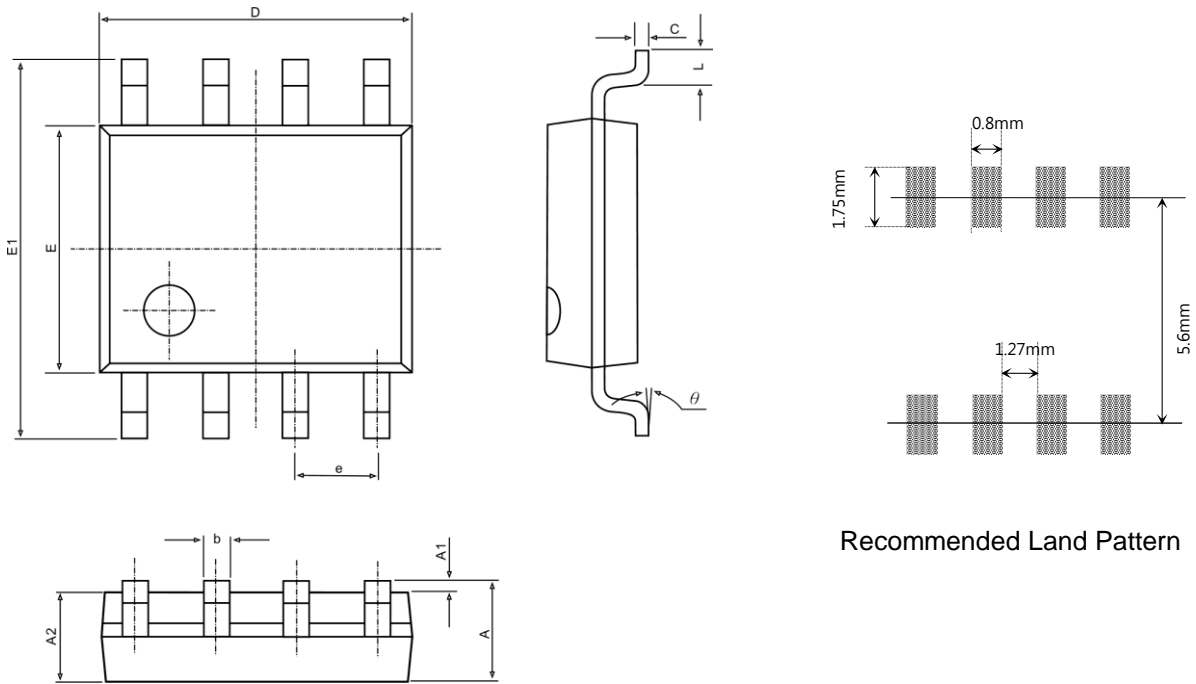


Power Dissipation

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°