

## Single P-Channel MOSFET

### DESCRIPTION

SMC9435 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. These devices are well suited for high efficiency fast switching applications.

### PART NUMBER INFORMATION

**SMC 9435 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

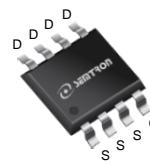
**$V_{DS} = -30V$ ,  $I_D = -6.6A$**

$R_{DS(ON)} = 38m\Omega (Typ.) @ V_{GS} = -10V$   
 $R_{DS(ON)} = 50m\Omega (Typ.) @ V_{GS} = -4.5V$

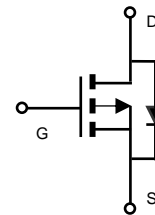
- ◆ Fast switch
- ◆ Low gate charge
- ◆ High power and current handling capability

### APPLICATIONS

- ◆ LED Application
- ◆ Portable Equipment
- ◆ 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	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_A = 25^\circ C$	-6.6
		$T_A = 70^\circ C$	-5.3
$I_{DM}$	Pulsed Drain Current <sup>A</sup>	-26.4	A
$I_{AS}$	Avalanche Current <sup>A</sup>	-15	A
$E_{AS}$	Single Pulse Avalanche energy $L=0.3mH$ <sup>AF</sup>	33	mJ
$P_D$	Power Dissipation <sup>B</sup>	$T_A = 25^\circ C$	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 <sup>B</sup>	$t \leq 10s$	40	$^\circ C/W$
	Thermal Resistance Junction to Ambient <sup>BD</sup>	Steady-State	80	
$R_{\theta JC}$	Thermal Resistance Junction to Case		40	

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

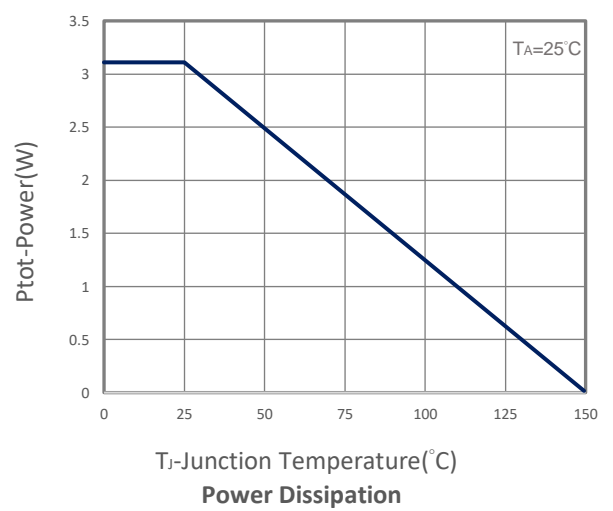
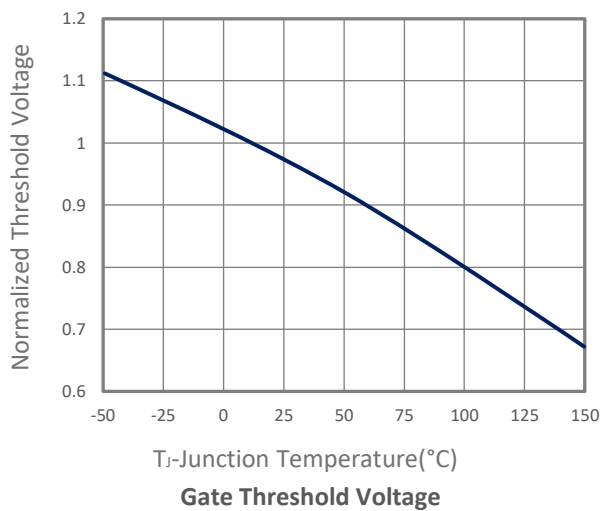
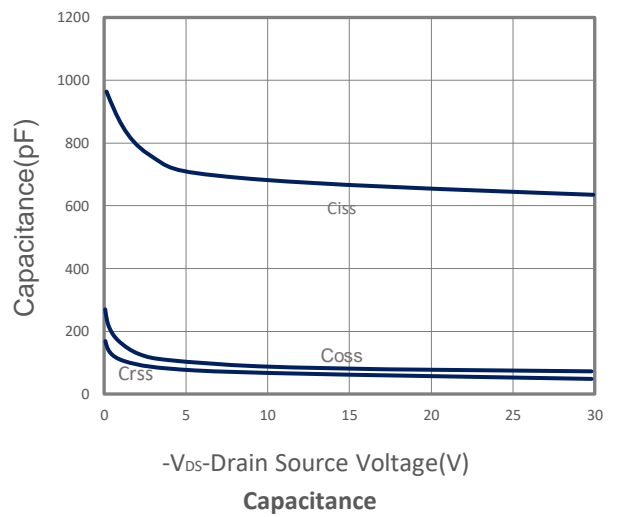
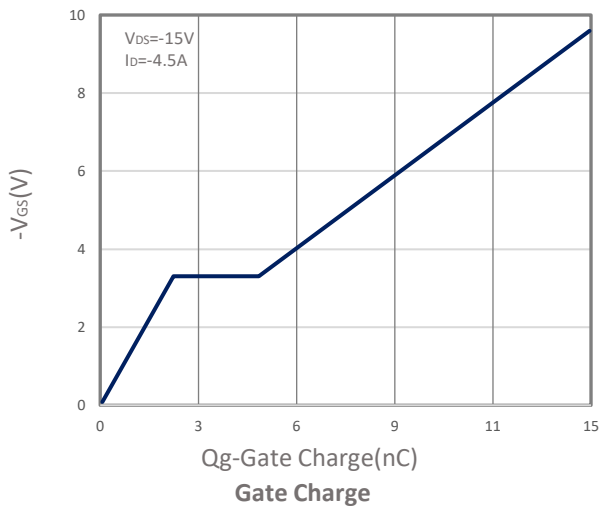
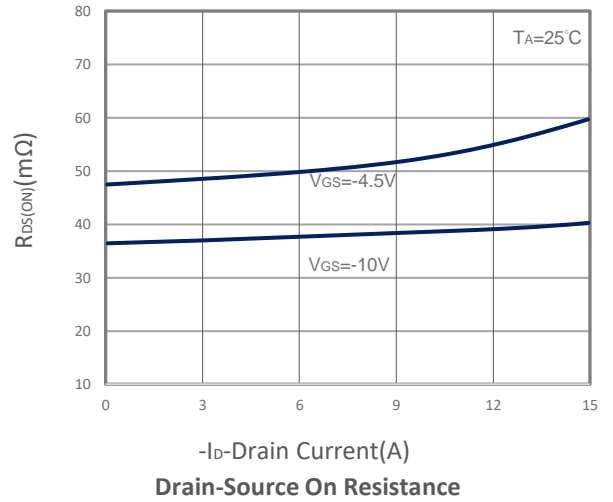
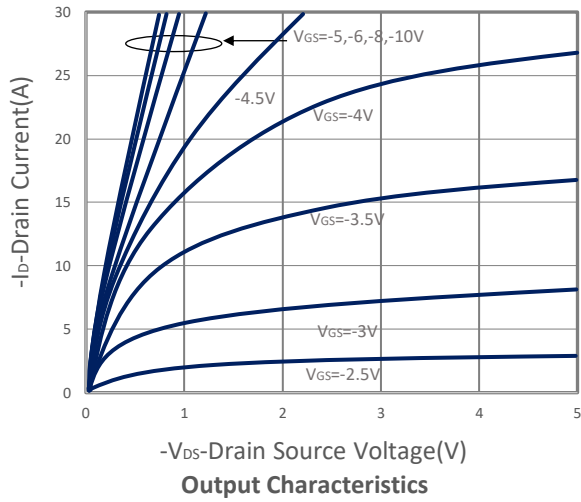
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250 $\mu$ A	-20			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250 $\mu$ A	-1	-1.5	-2.5	V
I <sub>GSS</sub>	Gate Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = $\pm$ 20V			$\pm$ 100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25 $^\circ$ C			-1	$\mu$ A
		V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =75 $^\circ$ C			-10	
R <sub>DS(ON)</sub>	Drain-source On-Resistance <sup>E</sup>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-6.6A V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-5.3A		38 50	45 60	m $\Omega$
G <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-6.6A		22		S
<b>Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage <sup>E</sup>	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V		-0.7	-1	V
I <sub>S</sub>	Continuous Source Current				-3.3	A
<b>Dynamic and Switching Parameters</b>						
Q <sub>g</sub>	Total Gate Charge (10V)	V <sub>DS</sub> =-15V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-4.5A		15.8	22.1	nC
Q <sub>g</sub>	Total Gate Charge (4.5V)			7.7	10.8	
Q <sub>gs</sub>	Gate-Source Charge			2.3	3.2	
Q <sub>gd</sub>	Gate-Drain Charge			2.6	3.6	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz		645		pF
C <sub>oss</sub>	Output Capacitance			63		
C <sub>rss</sub>	Reverse Transfer Capacitance			52		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =-15V, V <sub>GEN</sub> =-10V, R <sub>G</sub> =3.3 $\Omega$ , I <sub>D</sub> =-1A		6	11	nS
t <sub>r</sub>				12	23	
t <sub>d(off)</sub>	Turn-Off Time			25.5	48	
t <sub>f</sub>				7	13	

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

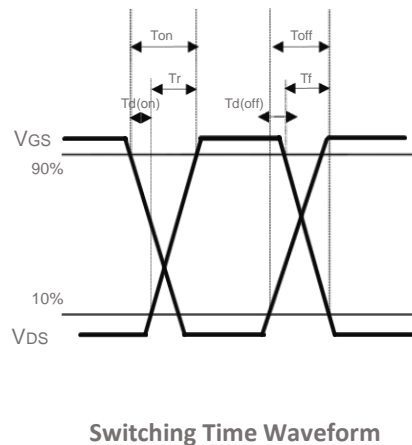
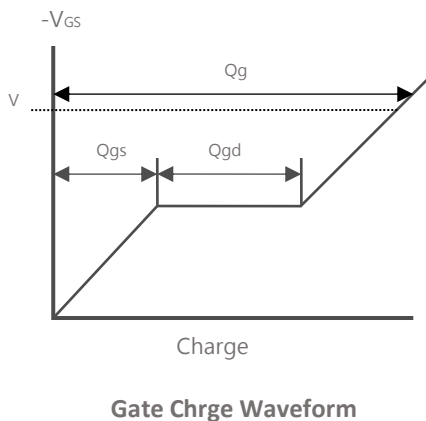
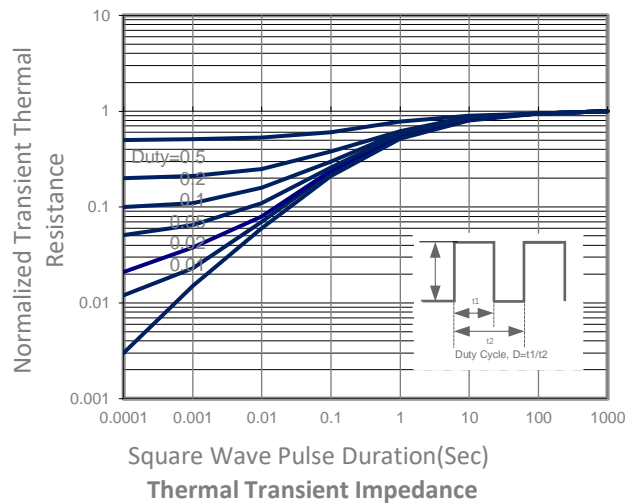
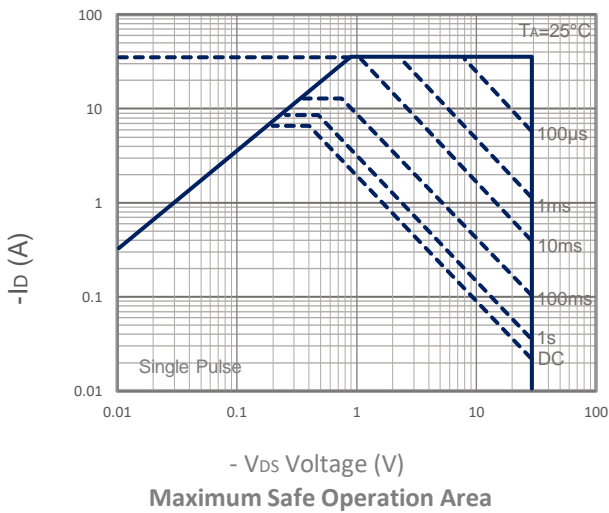
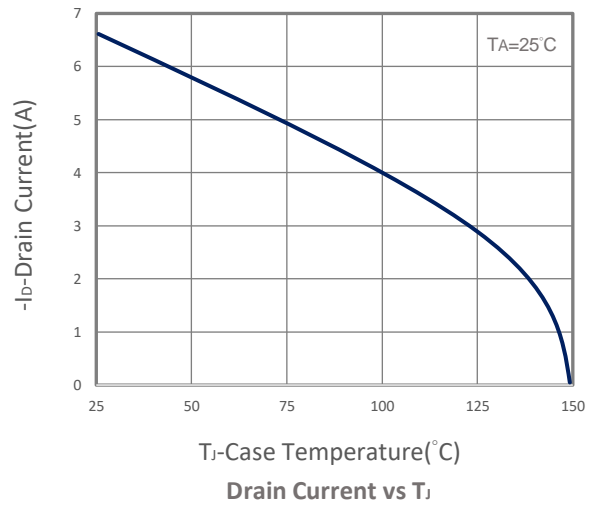
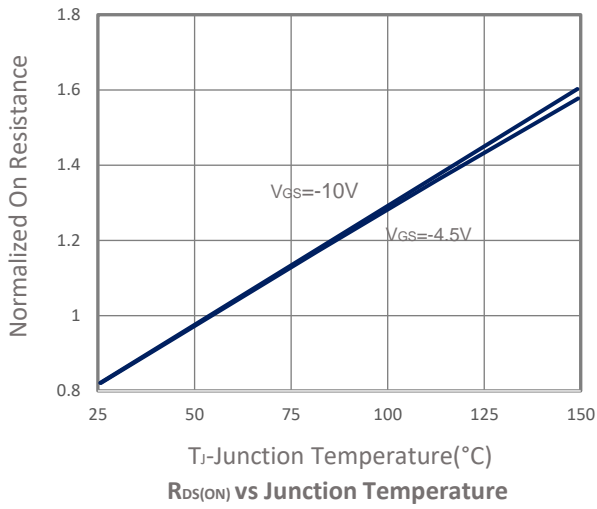
- Pulsed width limited by maximum junction temperature, T<sub>J(MAX)</sub>=150 $^\circ$ C.
- The value of R <sub>$\theta$ JA</sub> is measured with the device mounted on 1in2 FR-4 board in a still air environment with maximum junction temperature T<sub>J(MAX)</sub>=150 $^\circ$ C (initial temperature T<sub>A</sub>=25 $^\circ$ C).
- T<sub>J(MAX)</sub>=150 $^\circ$ C, using junction-to-ambient thermal resistance, t  $\leq$  10sec.
- T<sub>J(MAX)</sub>=150 $^\circ$ C, using junction-to-case thermal resistance (R <sub>$\theta$ JC</sub>) 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<sub>J(MAX)</sub>=150 $^\circ$ C (initial temperature T<sub>J</sub>=25 $^\circ$ C).

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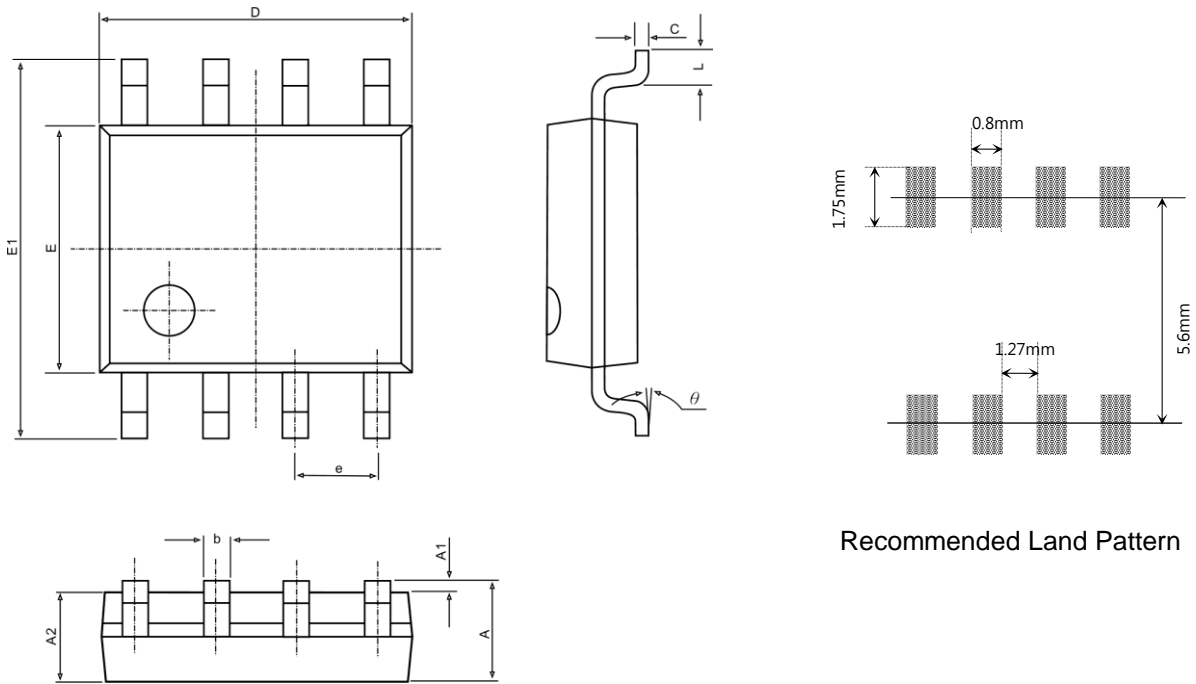
**TYPICAL CHARACTERISTICS**



## 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°