

## Single P-Channel MOSFET

### DESCRIPTION

SMC4207PA 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 4207 PA - TR G**  
 a      b      c      d      e

- a : Company name.
- b : Product Serial number.
- c : Package code      PA:DFN5X6A-8
- d : Handling code      TR:Tape&Reel
- e : Green produce code      G:RoHS Compliant

### FEATURES

**$V_{DS}=-40V$ ,  $I_D=-55A$**

$R_{DS(ON)}=9.5m\Omega(Typ.)@V_{GS}=-10V$

$R_{DS(ON)}=13m\Omega(Typ.)@V_{GS}=-4.5V$

- ◆ Low Gate Charge
- ◆ High switching speed

### APPLICATIONS

- ◆ Power Applications
- ◆ LED Lighting



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

Symbol	Parameter	Rating	Units
$V_{DSS}$	Drain-Source Voltage	-40	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C=25^{\circ}C$	-55
		$T_C=100^{\circ}C$	-35
$I_{DM}$	Pulsed Drain Current <sup>B</sup>	-220	A
$I_D$	Continuous Drain Current	$T_A=25^{\circ}C$	-15.4
		$T_A=70^{\circ}C$	-12.3
$P_D$	Power Dissipation <sup>A</sup>	$T_A=25^{\circ}C$	5
		$T_A=70^{\circ}C$	3.2
$I_{AS}$	Single Pulse Avalanche Current <sup>B</sup>	-30	A
$E_{AS}$	Single Pulse Avalanche energy $L=0.1mH$ <sup>B</sup>	45	mJ
$P_D$	Power Dissipation <sup>C</sup>	$T_C=25^{\circ}C$	62.5
		$T_C=100^{\circ}C$	25
$T_J$	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>A</sup>	$t \leq 10s$	25	$^{\circ}C/W$
	Thermal Resistance Junction to Ambient <sup>AC</sup>	Steady-State	60	
$R_{\theta JC}$	Thermal Resistance Junction to Case		2	

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

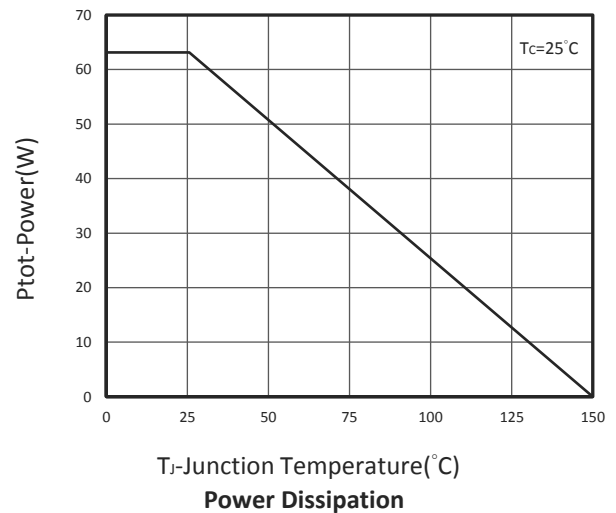
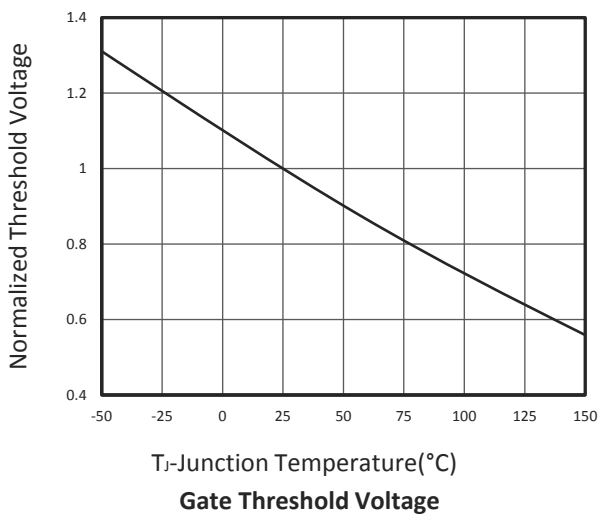
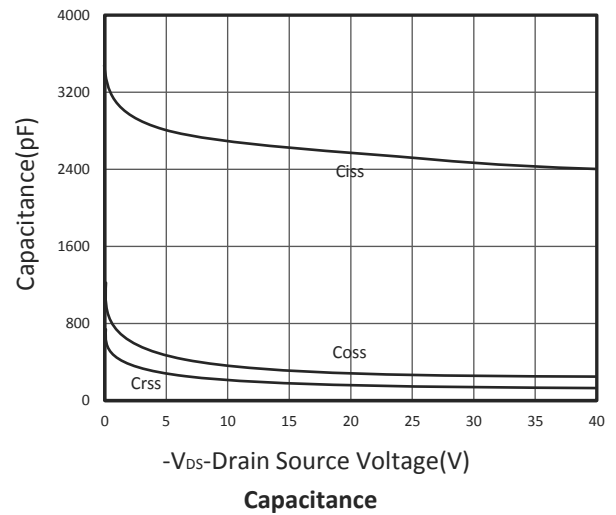
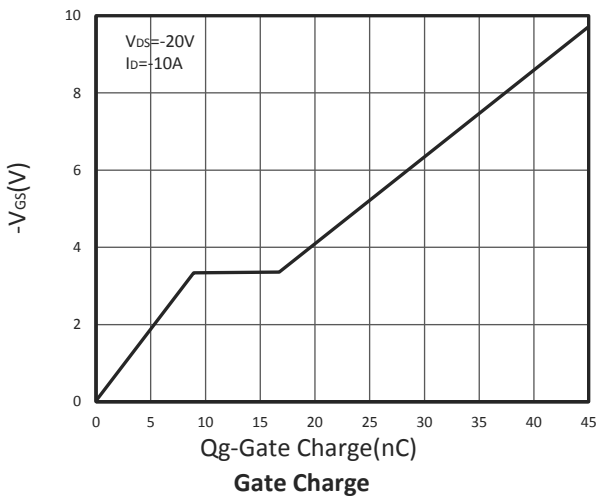
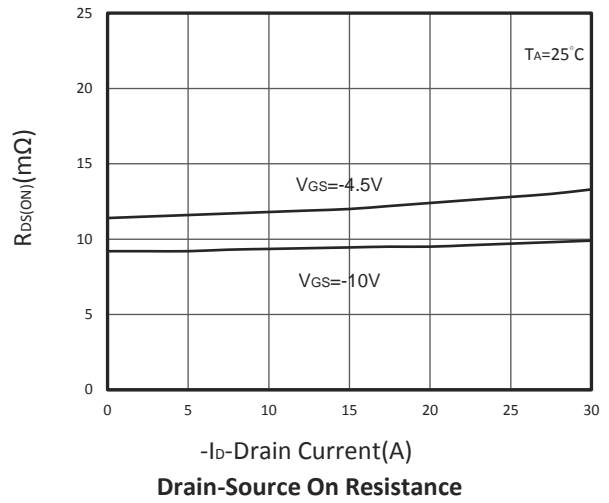
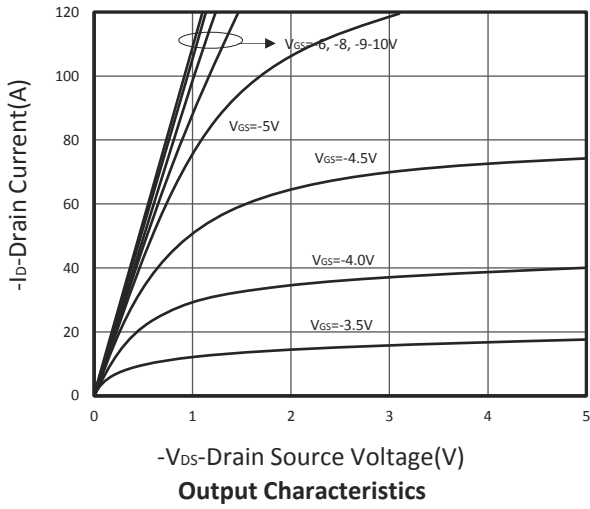
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =-250 $\mu$ A	-40			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250 $\mu$ A	-1	-1.6	-2.5	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> =-40V, V <sub>GS</sub> =0V, T <sub>J</sub> =25 $^\circ$ C			-1	$\mu$ A
		V <sub>DS</sub> =-32V, V <sub>GS</sub> =0V, T <sub>J</sub> =75 $^\circ$ C			-10	
R <sub>DS(ON)</sub>	Drain-source On-Resistance <sup>D</sup>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-15.4A V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-12A		9.5 13	12 17	m $\Omega$
G <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-10A		38		S
<b>Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage <sup>D</sup>	I <sub>S</sub> =-1A, V <sub>GS</sub> =0V			-1	V
I <sub>S</sub>	Diode Continuous Forward Current				-55	A
<b>Dynamic and Switching Parameters<sup>E</sup></b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-20V, V <sub>GS</sub> =-10V I <sub>D</sub> =-10A		47.1	63.5	nC
Q <sub>g</sub>	Total Gate Charge (4.5V)			22		
Q <sub>gs</sub>	Gate-Source Charge			8		
Q <sub>gd</sub>	Gate-Drain Charge			9		
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V, f=1MHz		2750		pF
C <sub>oss</sub>	Output Capacitance			255		
C <sub>rss</sub>	Reverse Transfer Capacitance			145		
t <sub>d(on)</sub>	Turn-On Time	V <sub>DD</sub> =-20V, V <sub>GEN</sub> =-10V R <sub>G</sub> =6 $\Omega$ I <sub>D</sub> =-1A		24	46	nS
t <sub>r</sub>				12	23	
t <sub>d(off)</sub>	Turn-Off Time			47	89	
t <sub>f</sub>				28	53	

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

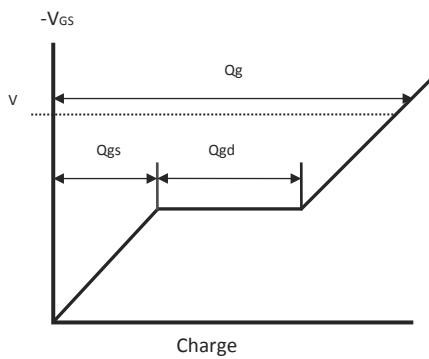
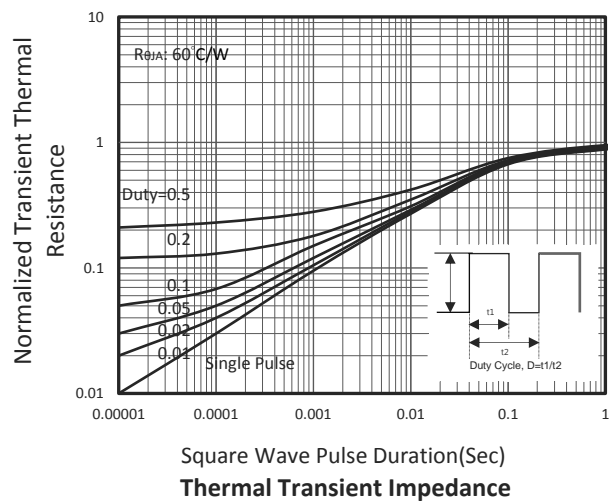
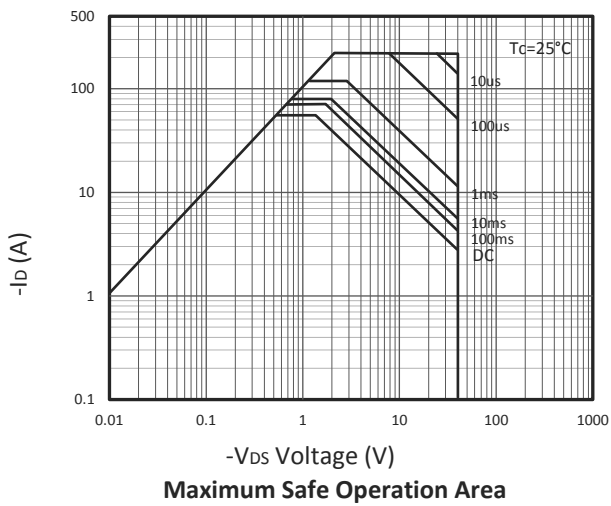
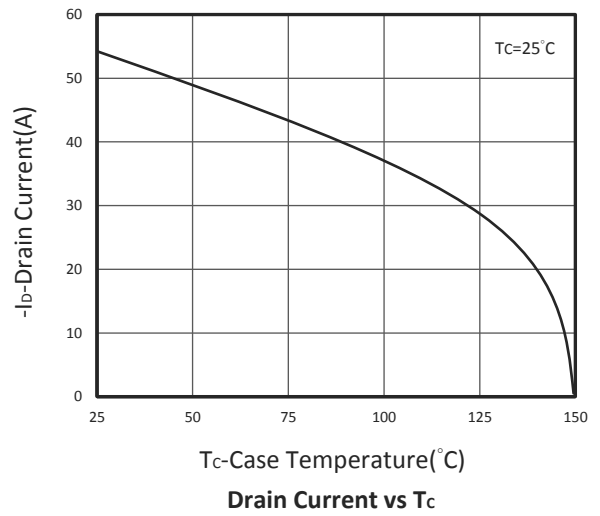
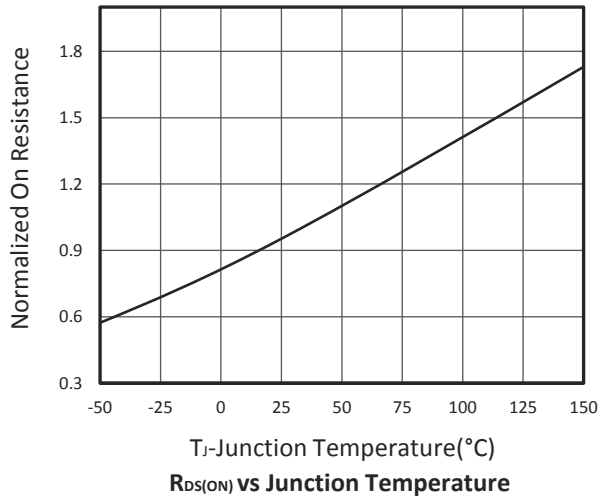
- A. Surface mounted on FR4 board using 1 in<sup>2</sup> pad size.
- B. Pulsed width limited by maximum junction temperature, T<sub>J(MAX)</sub>=150 $^\circ$ C.
- C. Using  $\leq$  10s junction-to-ambient thermal resistance is base on T<sub>J(MAX)</sub>=150 $^\circ$ C.
- D. Pulse test width  $\leq$ 300 $\mu$ s and duty cycle  $\leq$  2%.
- E. Guaranteed by design, not subject to production testing.

The products and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this datasheet is up to date. We assume no responsibility for any infringement of patents, patent rights, or other rights arising from the use of any information and circuitry in this datasheet.

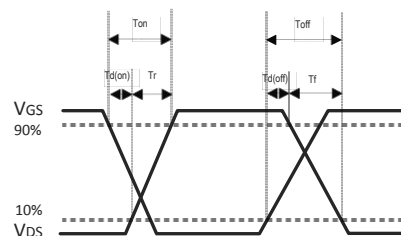
## TYPICAL CHARACTERISTICS



## TYPICAL CHARACTERISTICS

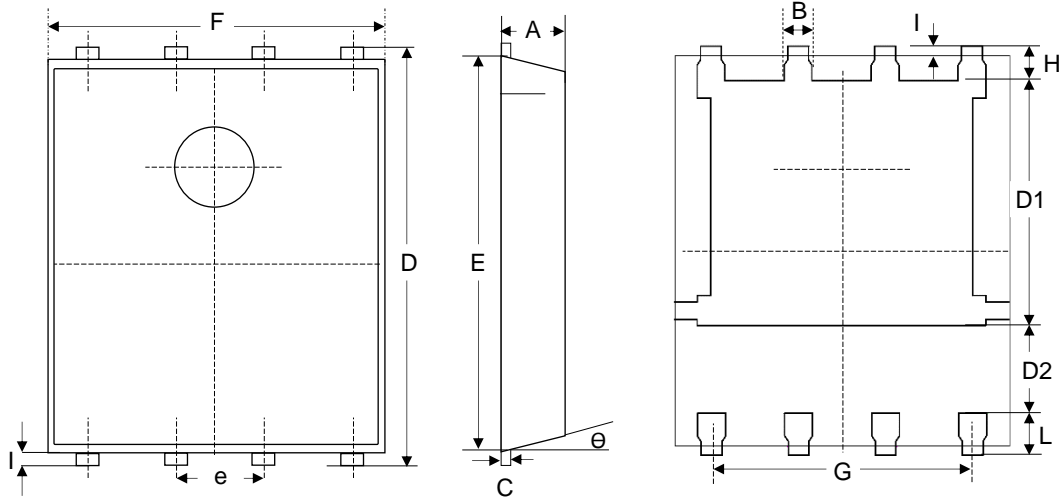


**Gate Charge Waveform**



**Switching Time Waveform**

## DFN5X6A PACKAGE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.100	0.035	0.043
B	0.330	0.510	0.013	0.020
C	0.200	0.300	0.008	0.012
D	5.900	6.100	0.232	0.240
D1	3.380	3.780	0.133	0.149
D2	1.100		0.043	
E	5.700	5.800	0.224	0.228
e	1.270BSC.		1.270BSC.	
F	4.800	5.000	0.189	0.197
G	0.361	0.396	0.014	0.016
H	0.410	0.610	0.016	0.024
I	0.060	0.200	0.002	0.008
L	0.510	0.710	0.020	0.028
$\theta$	0°	12°	0°	12°

### Recommended Land Pattern

