

## Single N-Channel MOSFET

### DESCRIPTION

SMC3206PA is the N-Channel enhancement mode power field effect transistors, provide superior fast switching performance and withstand high energy pulse in the avalanche and commutation mode.

### PART NUMBER INFORMATION

**SMC 3206 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

**$V_{DS}=30V, I_D=80A$**

$R_{DS(ON)}=2.7m\Omega(Typ.)@V_{GS}=10V$

$R_{DS(ON)}=3.4m\Omega(Typ.)@V_{GS}=4.5V$

- ◆ High power and current handling capability
- ◆ 100% EAS Guaranteed

### APPLICATIONS

- ◆ DC/DC Converter
- ◆ Power Management



### 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 *	$T_C=25^{\circ}C$	80
		$T_C=100^{\circ}C$	59
$I_{DM}$	Pulsed Drain Current <sup>B</sup>	280	A
$I_D$	Continuous Drain Current	$T_A=25^{\circ}C$	22
		$T_A=70^{\circ}C$	17.5
$P_D$	Power Dissipation <sup>A</sup>	$T_A=25^{\circ}C$	2.5
		$T_A=70^{\circ}C$	1.6
$I_{AS}$	Single Pulse Avalanche Current <sup>B</sup>	45	A
$E_{AS}$	Single Pulse Avalanche energy $L=0.1mH$ <sup>BE</sup>	101	mJ
$P_D$	Power Dissipation <sup>C</sup>	$T_C=25^{\circ}C$	46
		$T_C=100^{\circ}C$	18.5
$T_J$	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>	$t \leq 10s$	20	$^{\circ}C/W$
	Thermal Resistance Junction to Ambient <sup>AC</sup>	Steady-State	50	
$R_{\theta JC}$	Thermal Resistance Junction to Case		2.7	

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

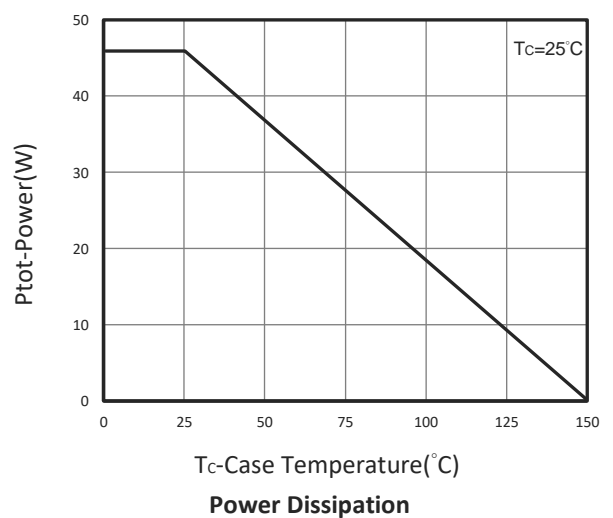
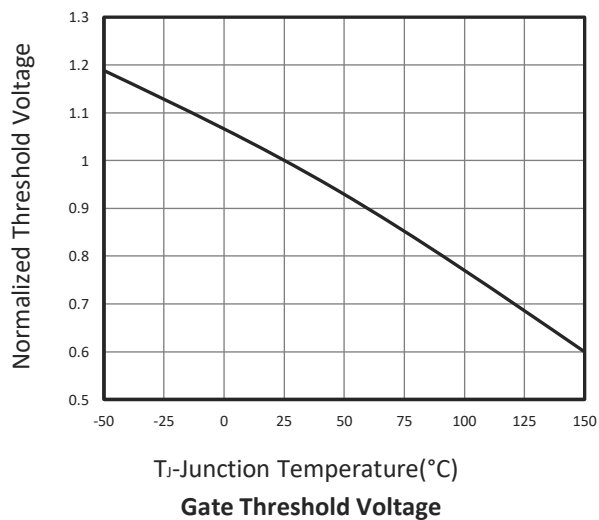
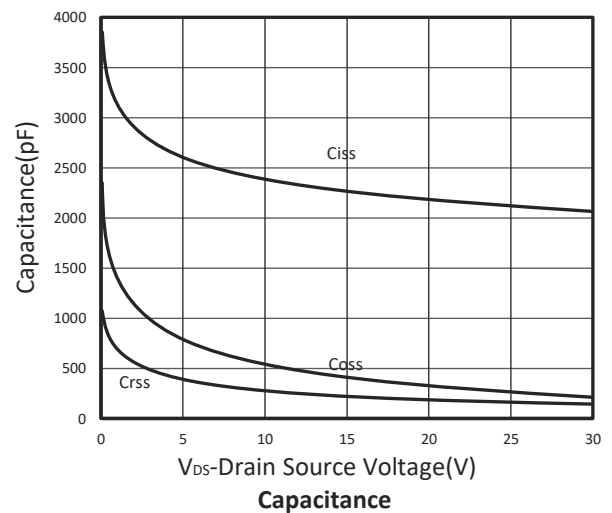
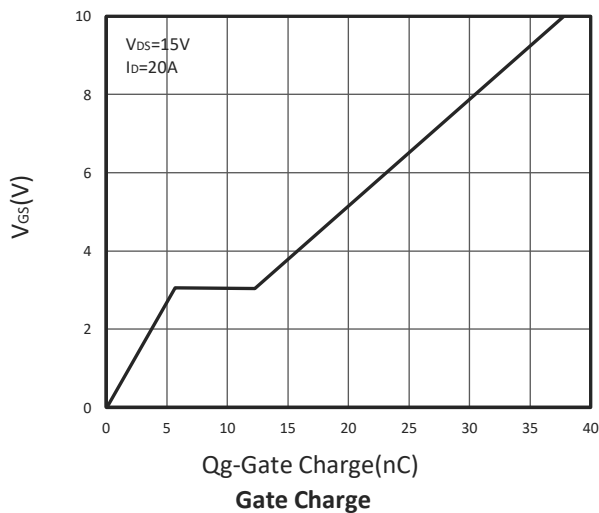
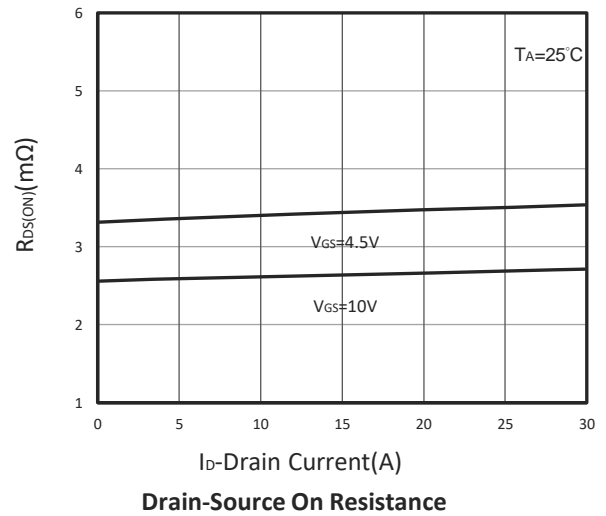
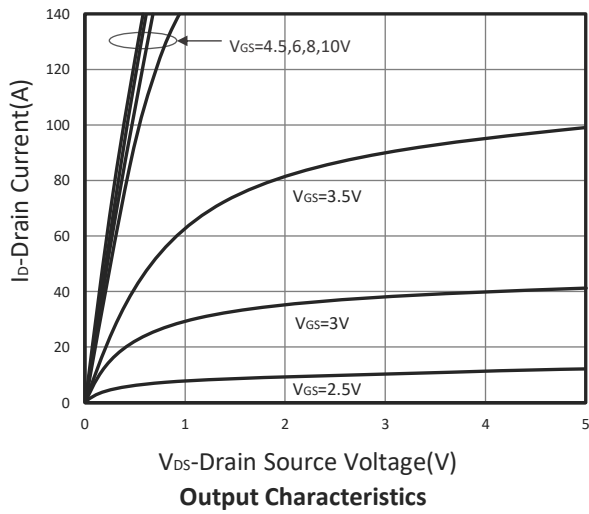
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.5	V
$I_{GSS}$	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^{\circ}\text{C}$			-1	$\mu A$
		$V_{DS}=24V, V_{GS}=0V, T_J=75^{\circ}\text{C}$			-10	
$R_{DS(ON)}$	Drain-source On-Resistance <sup>D</sup>	$V_{GS}=10V, I_D=20A$		2.7	3.2	m $\Omega$
		$V_{GS}=4.5V, I_D=15A$		3.4	4.2	
$G_{fs}$	Forward Transconductance	$V_{DS}=5V, I_D=20A$		72		S
<b>Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage <sup>D</sup>	$I_S=1A, V_{GS}=0V$			1	V
$I_S$	Diode Continuous Forward Current				80	A
$t_{rr}$	Reverse Recovery Time	$I_S=20A, di/dt=100A/\mu s$		34		ns
$Q_{rr}$	Reverse Recovery Charge			25		nC
<b>Dynamic and Switching Parameters <sup>F</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS}=15V, V_{GS}=10V, I_D=20A$		37.5	52.5	nC
$Q_g$	Total Gate Charge (4.5V)			17.5	24.5	
$Q_{gs}$	Gate-Source Charge			5.4	7.6	
$Q_{gd}$	Gate-Drain Charge			6.7	9.4	
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$		2250		pF
$C_{oss}$	Output Capacitance			315		
$C_{rss}$	Reverse Transfer Capacitance			168		
$R_g$	Gate Resistance	$V_{GS}=0V, V_{DS}=0V, f=1\text{MHz}$		2		$\Omega$
$t_{d(on)}$	Turn-On Time	$V_{DD}=15V, V_{GS}=10V, R_G=3\Omega, I_D=1A$		8		nS
$t_r$				5		
$t_{d(off)}$	Turn-Off Time			23		
$t_f$				9		

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

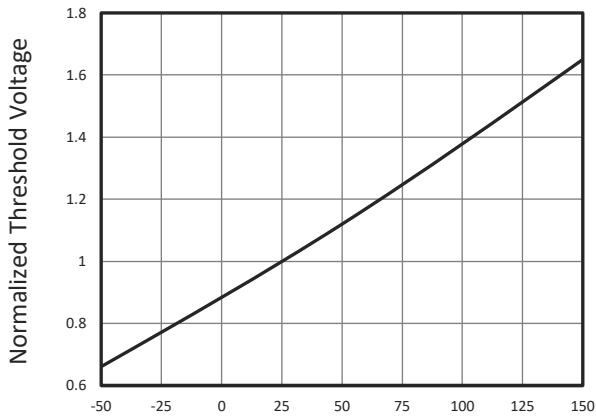
- A. Surface mounted on FR4 board using 1 in<sup>2</sup> pad size.
- B. Pulsed width limited by maximum junction temperature,  $T_{J(MAX)}=150^{\circ}\text{C}$  (initial temperature  $T_J=25^{\circ}\text{C}$ ).
- C. Using  $\leq 10s$  junction-to-ambient thermal resistance is base on  $T_{J(MAX)}=150^{\circ}\text{C}$ .
- D. Pulse test width  $\leq 300\mu s$  and duty cycle  $\leq 2\%$ .
- E. The EAS data shows maximum, The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=45A$
- F. Guaranteed by design, not subject to production testing.
- \* . The maximum rating current is limited by bonding wire.

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.

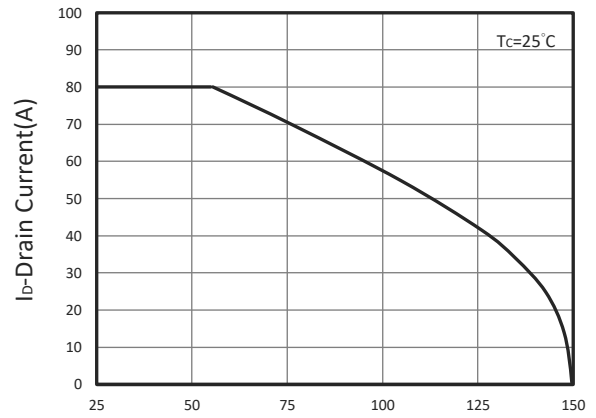
## TYPICAL CHARACTERISTICS



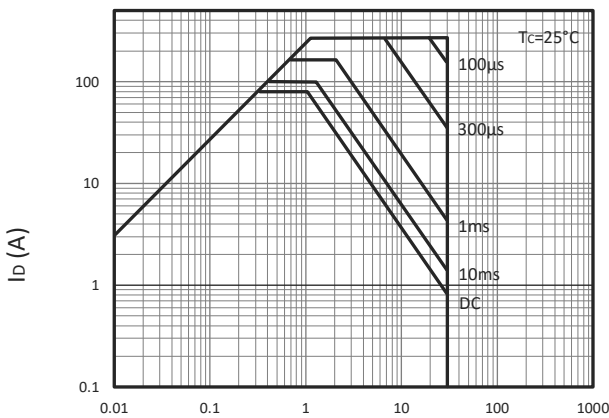
## TYPICAL CHARACTERISTICS



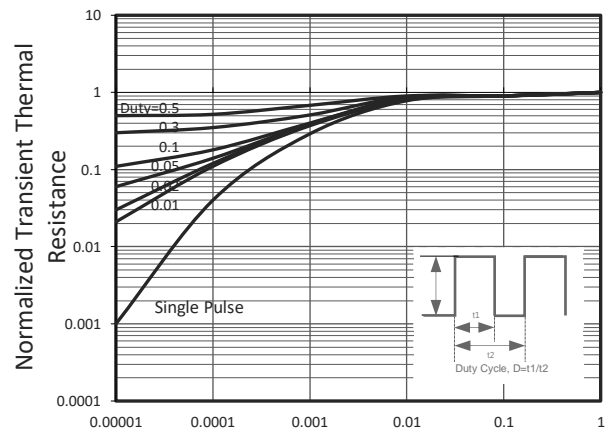
T<sub>j</sub>-Junction Temperature(°C)  
Gate Threshold Voltage



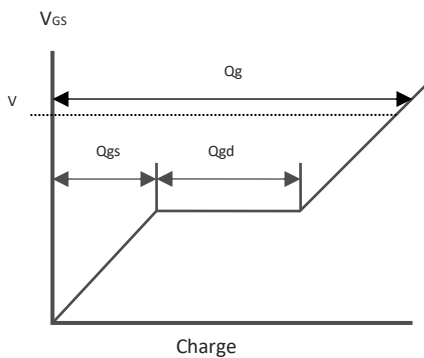
T<sub>c</sub>-Case Temperature(°C)  
Drain Current vs T<sub>c</sub>



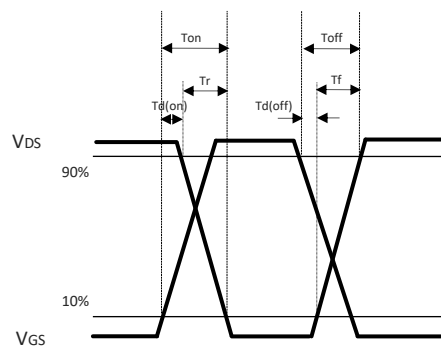
V<sub>ds</sub> Voltage (V)  
Maximum Safe Operation Area



Square Wave Pulse Duration(Sec)  
Thermal Transient Impedance

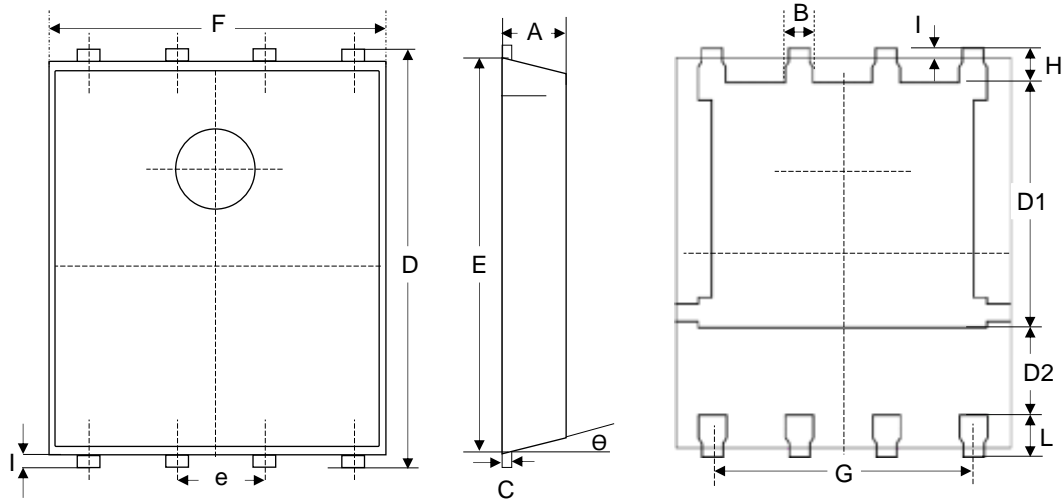


Gate Charge Waveform



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

