

## Single P-Channel MOSFET

### DESCRIPTION

The SMC3241PA uses trench MOSFET technology. Provides extremely low  $R_{DS(ON)}$ , Low resistance package and excellent fast switching performance. This device is ideal for efficient and fast switching applications.

### PART NUMBER INFORMATION

**SMC 3241 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

**$V_{DS}=-30V$ ,  $I_D=-32A$**

$R_{DS(ON)}=16m\Omega(Typ.)@V_{GS}=-10V$

$R_{DS(ON)}=24m\Omega(Typ.)@V_{GS}=-4.5V$

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

### APPLICATIONS

- ◆ Power Management
- ◆ DC/DC Converters



### 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	$T_C=25^\circ C$	-32
		$T_C=100^\circ C$	-20
$I_{DM}$	Pulsed Drain Current <sup>B</sup>	-128	A
$I_D$	Continuous Drain Current	$T_A=25^\circ C$	-12.5
		$T_A=70^\circ C$	-10
$P_D$	Power Dissipation <sup>A</sup>	$T_A=25^\circ C$	5
		$T_A=70^\circ C$	3.2
$I_{AS}$	Avalanche Current <sup>A</sup>	-25	A
EAS	Single Pulse Avalanche energy $L=0.1mH$ <sup>B</sup>	31.3	mJ
$P_D$	Power Dissipation <sup>C</sup>	$T_C=25^\circ C$	31.3
		$T_C=100^\circ C$	12.5
$T_J$	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>	$t \leq 10s$	25	$^\circ C/W$
	Thermal Resistance Junction to Ambient <sup>AC</sup>	Steady-State	60	
$R_{\theta JC}$	Thermal Resistance Junction to Case		4	

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

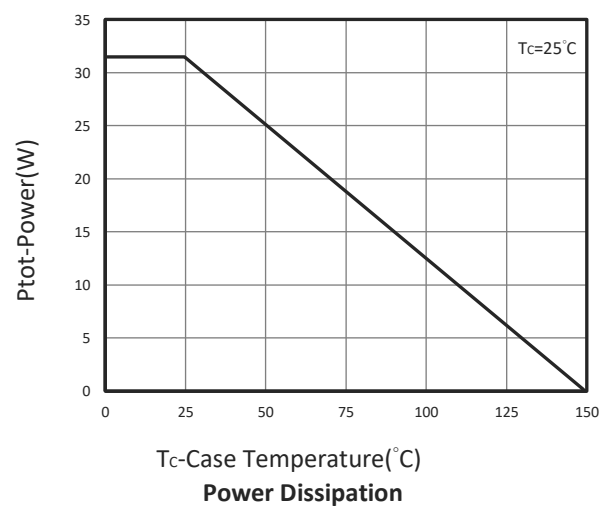
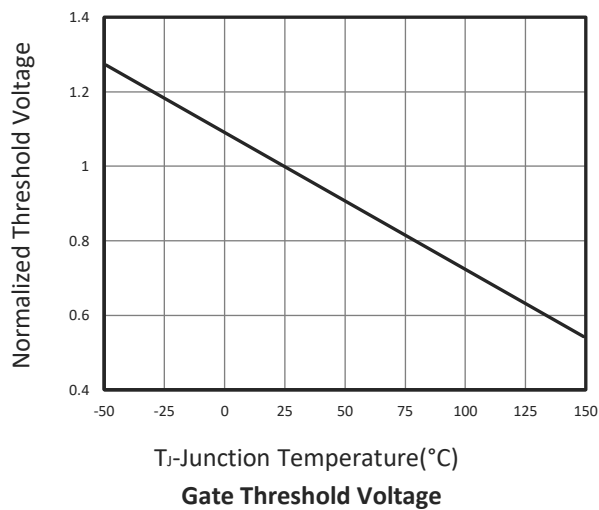
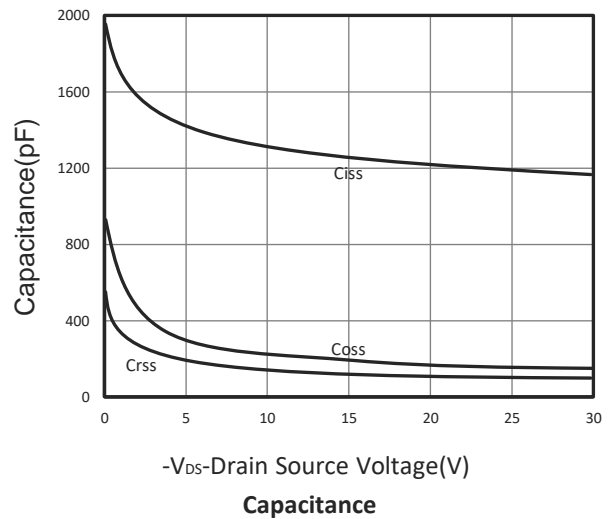
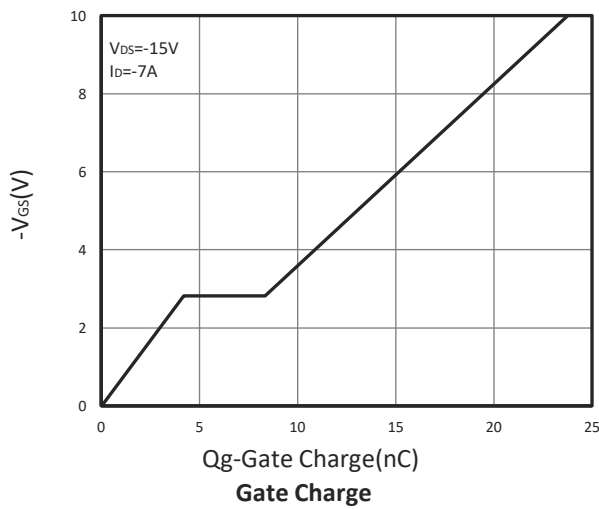
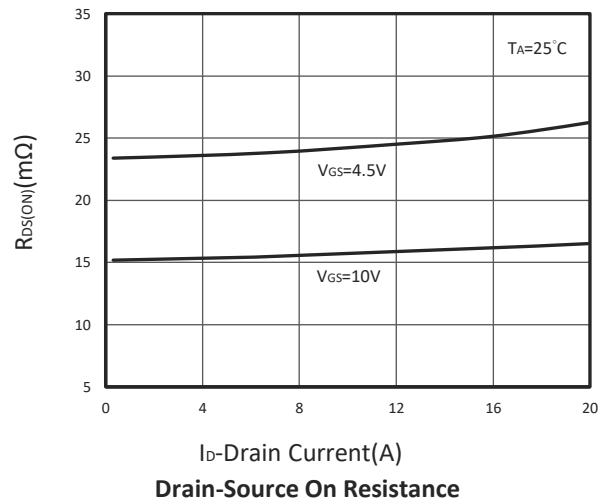
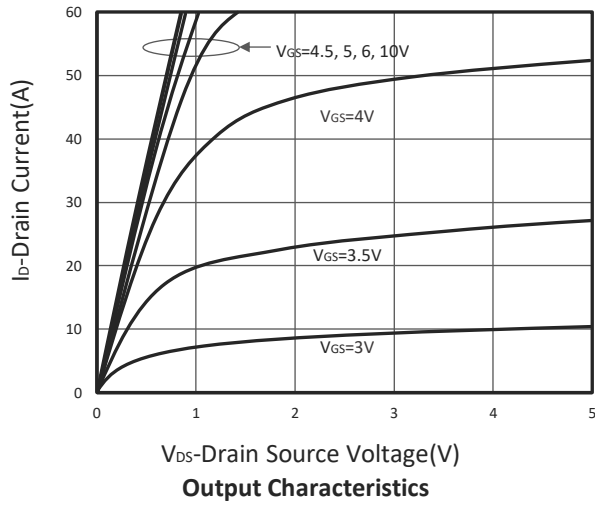
Symbol	Parameter	Condition	Min	Typ	Max	Unit
<b>Static Parameters</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	-30			V
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1.0	-1.6	-2.5	V
$I_{GSS}$	Gate Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	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>Ⓓ</sup>	$V_{GS}=-10V, I_D=-12.5A$ $V_{GS}=-4.5V, I_D=-8A$		16 24	20 29	$m\Omega$
$G_{fs}$	Forward Transconductance	$V_{DS}=-10V, I_D=-7A$		12.5		S
<b>Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage <sup>Ⓓ</sup>	$I_S=-1A, V_{GS}=0V$			-1	V
$I_S$	Diode Continuous Forward Current				-32	A
$t_{rr}$	Reverse Recovery Time	$I_S=-7A, dI/dt=100A/\mu s$		11		ns
$Q_{rr}$	Reverse Recovery Charge			5.8		nC
<b>Dynamic and Switching Parameters<sup>Ⓔ</sup></b>						
$Q_g$	Total Gate Charge	$V_{DS}=-15V, V_{GS}=-10V, I_D=-7A$		23.6	33	nC
$Q_g$	Total Gate Charge (4.5V)			11.5	16.1	
$Q_{gs}$	Gate-Source Charge			4.2	5.9	
$Q_{gd}$	Gate-Drain Charge			4.4	6.2	
$C_{iss}$	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1\text{MHz}$		1280		pF
$C_{oss}$	Output Capacitance			175		
$C_{rss}$	Reverse Transfer Capacitance			125		
$t_{d(on)}$	Turn-On Time	$V_{DD}=-15V, V_{GEN}=-10V$ $R_G=3.3\Omega, I_D=-1A$		6.1	12	ns
$t_r$				14	27	
$t_{d(off)}$	Turn-Off Time			34	65	
$t_f$				13.2	25	

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

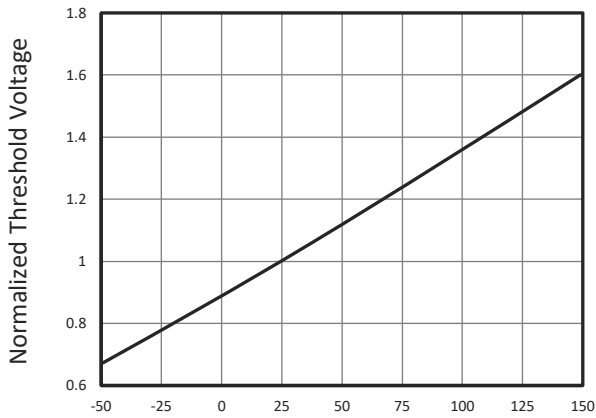
- A. Surface mounted on FR4 board using 1 in<sup>2</sup> pad size.
- B. Pulsed width limited by maximum junction temperature,  $T_{J(MAX)}=150^\circ\text{C}$ .
- C. Using  $\leq 10s$  junction-to-ambient thermal resistance is base on  $T_{J(MAX)}=150^\circ\text{C}$ .
- D. Pulse test width  $\leq 300\mu s$  and duty cycle  $\leq 2\%$ .
- E. 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.

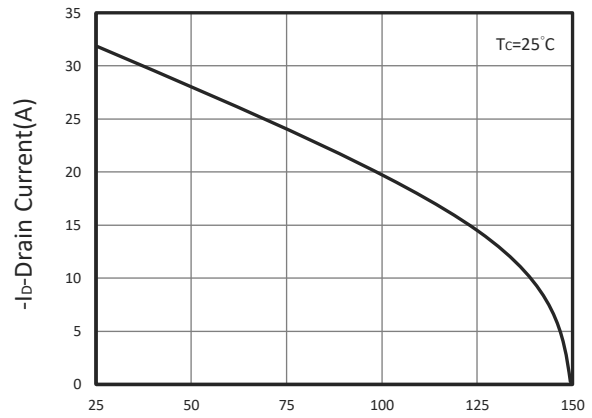
## TYPICAL CHARACTERISTICS



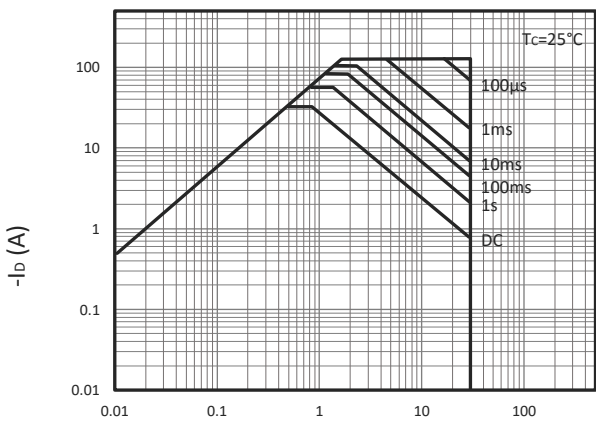
## TYPICAL CHARACTERISTICS



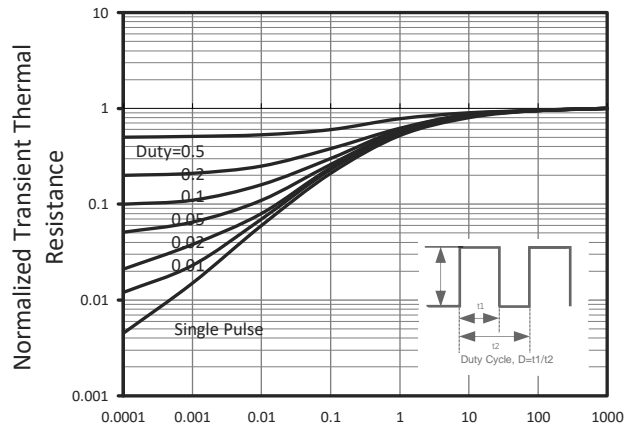
T<sub>J</sub>-Junction Temperature(°C)  
Gate Threshold Voltage



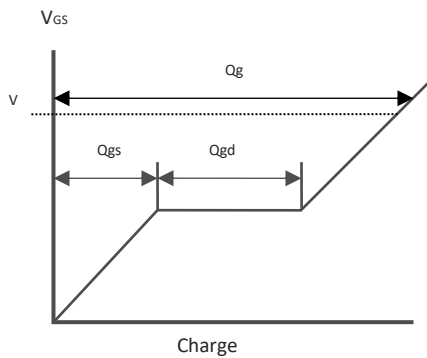
T<sub>C</sub>-Case Temperature(°C)  
Drain Current vs T<sub>C</sub>



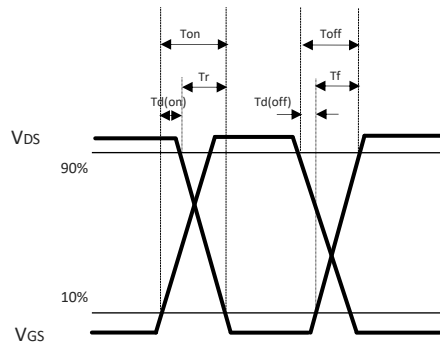
-V<sub>DS</sub> Voltage (V)  
Maximum Safe Operation Area



Square Wave Pulse Duration(Sec)  
Thermal Transient Impedance

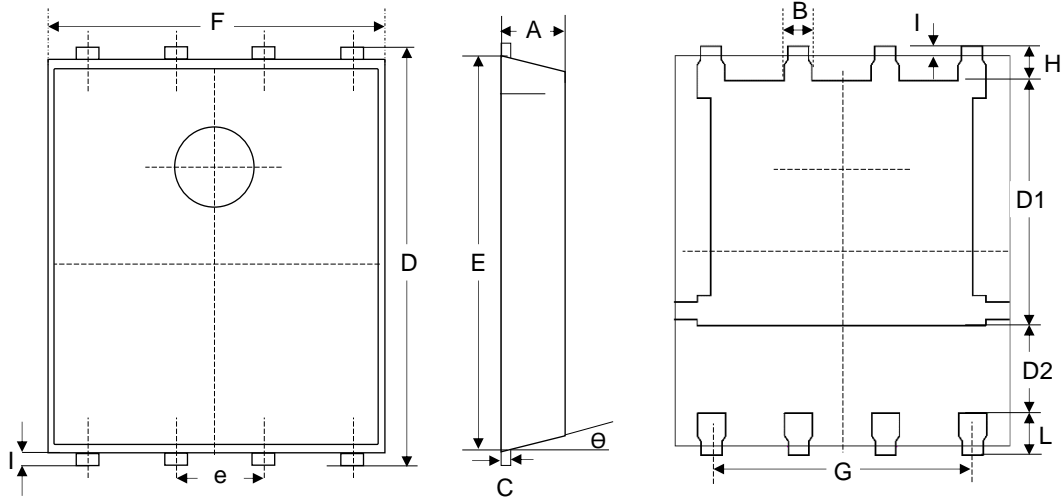


Gate Charge Waveform



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

