SemTron Microtech Corporation

SMC4207PA

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.

■FEATURES

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

$R_{DS(ON)}$=9.5mΩ(Typ.)@V_{GS}=-10V
$R_{DS(ON)}$=13mΩ(Typ.)@V_{GS}=-4.5V

◆Low Gate Charge
◆High switching speed

■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*

■APPLICATIONS

◆Power Applications
◆LED Lighting

DFN5X6A-8

■ABSOLUTE MAXIMUM RATINGS (T_A=25°C Unless otherwise noted)

Symbol	Parameter		Rating	Units
V_{DSS}	Drain-Source Voltage		-40	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C=25°C	-55	A
		T_C=100C	-35	A
I_{DM}	Pulsed Drain Current [B]		-220	A
I_D	Continuous Drain Current	T_A=25°C	-15.4	A
		T_A=70°C	-12.3	A
P_D	Power Dissipation [A]	T_A=25°C	5	W
		T_A=70°C	3.2	W
I_{AS}	Single Pulse Avalanche Current [B]		-30	A
E_{AS}	Single Pulse Avalanche energy L=0.1mH [B]		45	mJ
P_D	Power Dissipation [C]	T_C=25°C	62.5	W
		T_C=100°C	25	W
T_J	Operation Junction Temperature		-55/150	°C
T_{STG}	Storage Temperature Range		-55/150	°C

■THERMAL RESISTANCE

Symbol	Parameter		Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient [A]	t≦10s		25	°C/W
	Thermal Resistance Junction to Ambient [AC]	Steady-State		60	
$R_{\theta JC}$	Thermal Resistance Junction to Case			2	

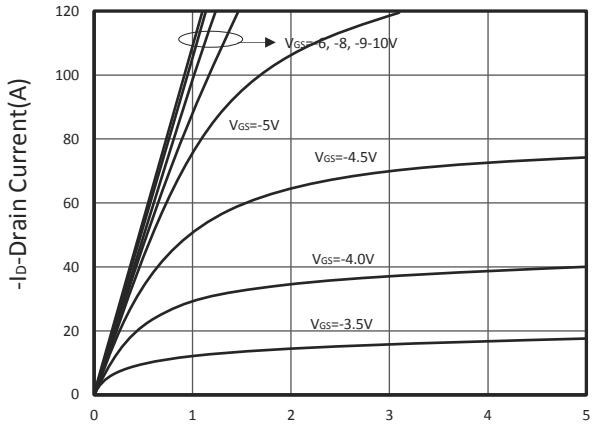
■ELECTRICAL CHARACTERISTICS(T_A=25°C Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-40			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-1	-1.6	-2.5	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS}=±20V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-40V, V_{GS}=0V, T_J=25°C			-1	μA
		V_{DS}=-32V, V_{GS}=0V, T_J=75°C			-10	
$R_{DS(ON)}$	Drain-source On-Resistance [D]	V_{GS}=-10V, I_D=-15.4A V_{GS}=-4.5V, I_D=-12A		9.5 13	12 17	mΩ
G_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-10A		38		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage [D]	I_S=-1A, V_{GS}=0V			-1	V
I_S	Diode Continuous Forward Current				-55	A
Dynamic and Switching Parameters [E]						
Q_g	Total Gate Charge	V_{DS}=-20V, V_{GS}=-10V I_D=-10A		47.1	63.5	nC
Q_g	Total Gate Charge (4.5V)			22		
Q_{gs}	Gate-Source Charge			8		
Q_{gd}	Gate-Drain Charge			9		
C_{iss}	Input Capacitance	V_{DS}=-20V, V_{GS}=0V, f=1MHz		2750		pF
C_{oss}	Output Capacitance			255		
C_{rss}	Reverse Transfer Capacitance			145		
$t_{d(on)}$	Turn-On Time	V_{DD}=-20V, V_{GEN}=-10V R_G=6Ω I_D=-1A		24	46	nS
t_r				12	23	
$t_{d(off)}$	Turn-Off Time			47	89	
t_f				28	53	

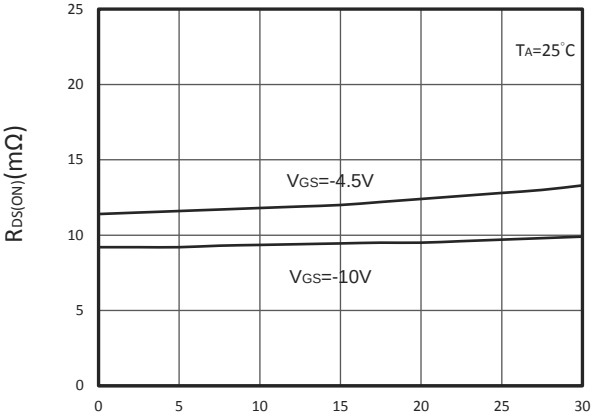
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

A. Surface mounted on FR4 board using 1 in^2 pad size.
B. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}$=150°C.
C. Using ≤ 10s junction-to-ambient thermal resistance is base on $T_{J(MAX)}$=150°C.
D. Pulse test width ≤300μs and duty cycle ≤ 2%.
E. Guaranteed by design, not subject to production testing.

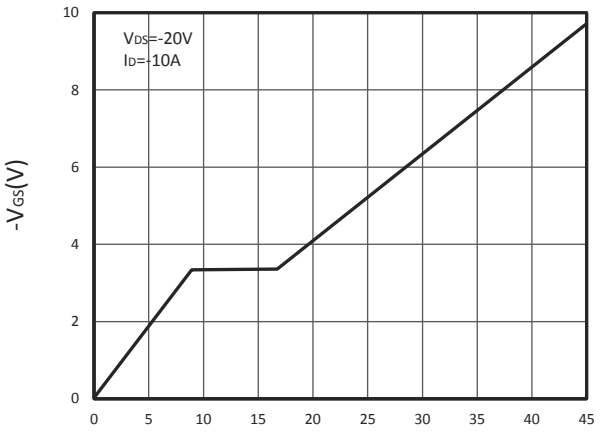
TYPICAL CHARACTERISTICS



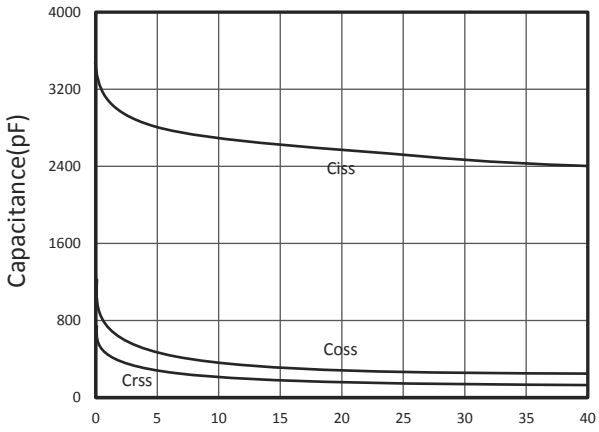
Output Characteristics



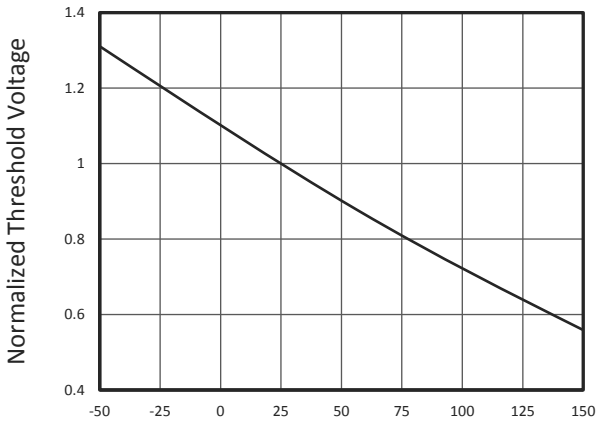
Drain-Source On Resistance



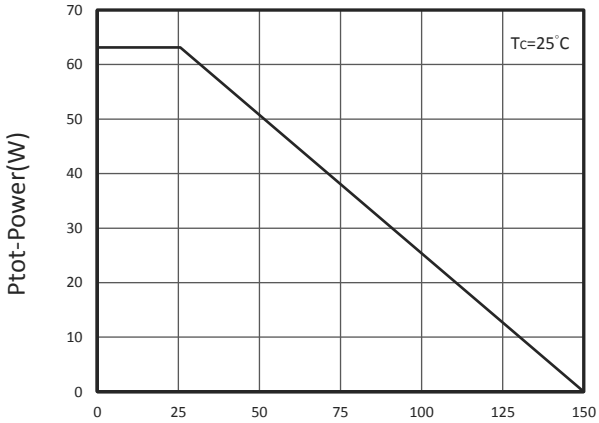
Gate Charge



Capacitance

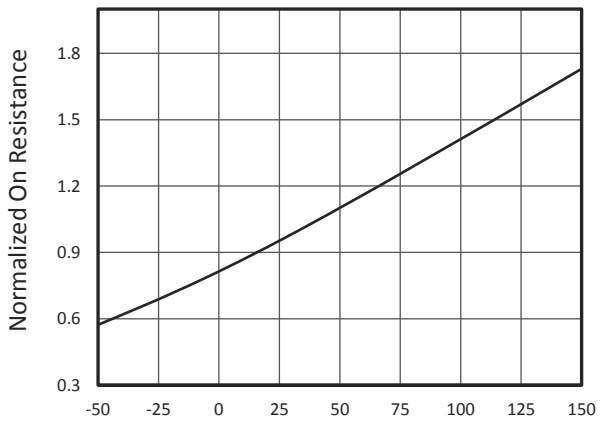


Gate Threshold Voltage

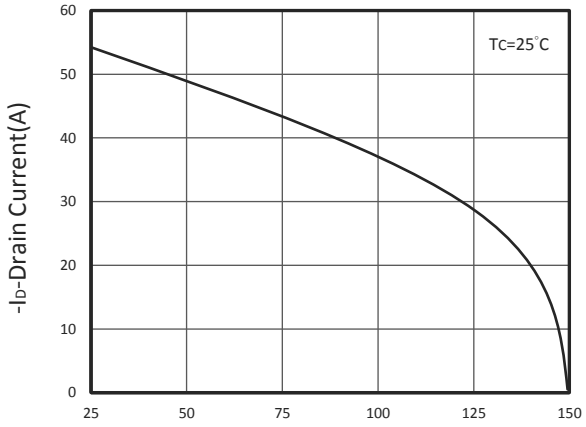


Power Dissipation

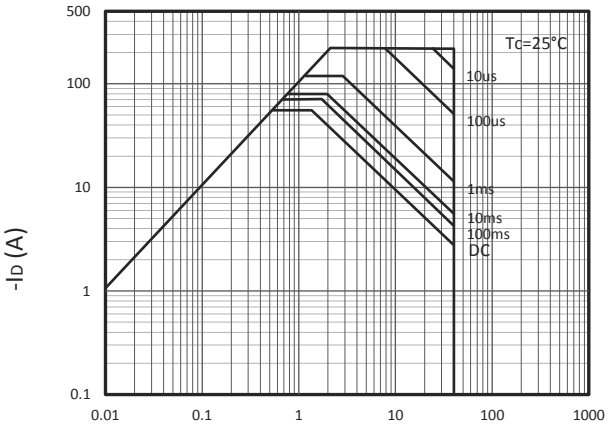
TYPICAL CHARACTERISTICS



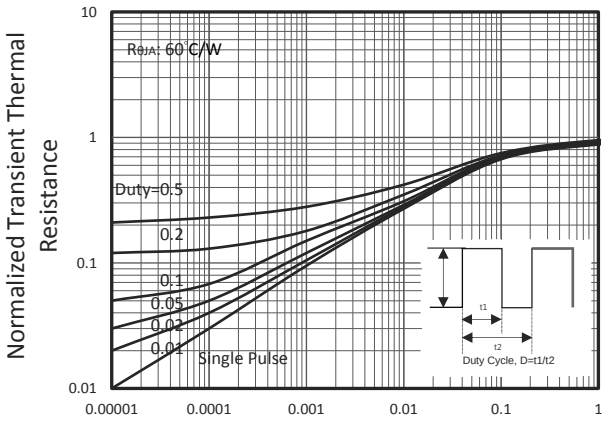
RDS(ON) vs Junction Temperature



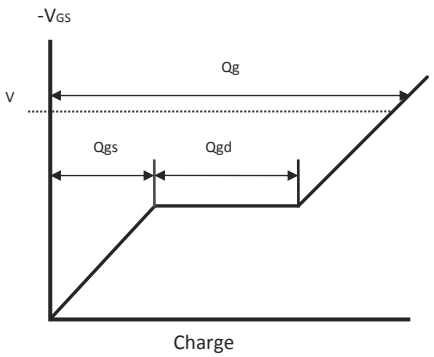
Drain Current vs TC



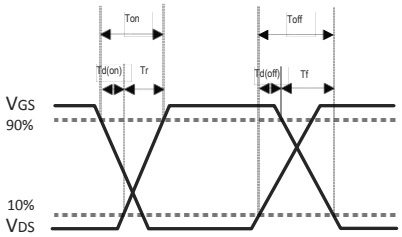
Maximum Safe Operation Area



Thermal Transient Impedance

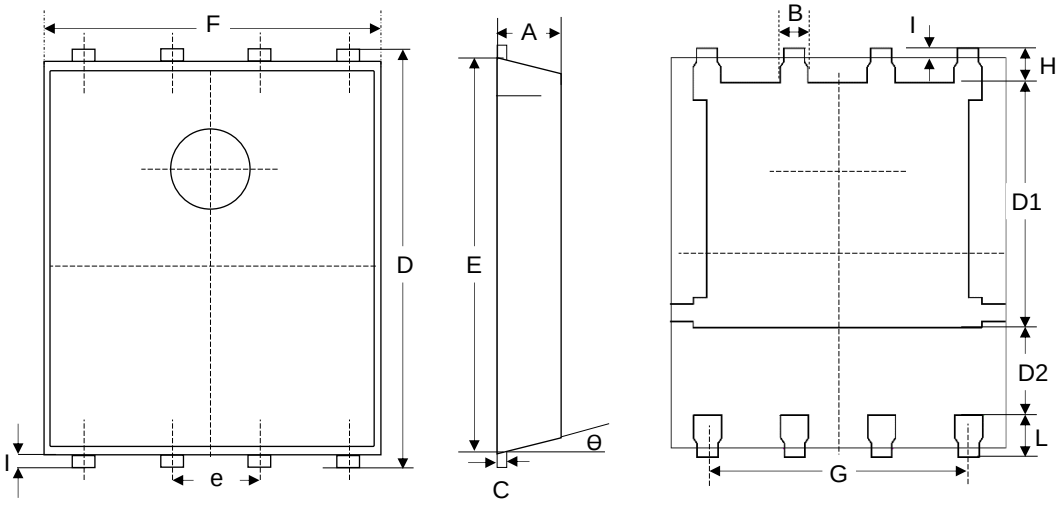


Gate Chrge Waveform



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
θ	0°	12°	0°	12°

Recommended Land Pattern