SemTron Microtech Corporation

SMC3206PA

Single N-Channel MOSFET

■DESCRIPTION

SMC3206PA is the N-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 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

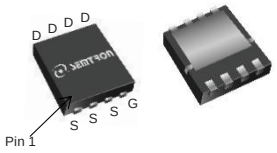
V_{DS} = 30V, I_D = 90A

$R_{DS(ON)}$=2.9mΩ(Typ.)@V_{GS}= 10V
$R_{DS(ON)}$=4.1mΩ(Typ.)@V_{GS}= 4.5V

◆100% UIS and Rg tested
◆High power and current handling capability

■APPLICATIONS

◆POL Applications
◆DC/DC Converters



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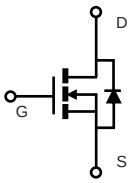


■ABSOLUTE MAXIMUM RATINGS *(T_A = 25°C Unless otherwise noted)*

Symbol	Parameter		Rating	Units
V_{DSS}	Drain-Source Voltage		30	V
V_{GSS}	Gate-Source Voltage		±20	V
I_D	Continuous Drain Current	T_C=25°C	90	A
		T_C=100C	57.5	A
I_{DM}	Pulsed Drain Current [A]		200	A
I_D	Continuous Drain Current	T_A=25°C	33	A
		T_A=70°C	26.5	A
P_D	Power Dissipation [B]	T_A=25°C	6.3	W
		T_A=70°C	4	W
I_{AS}	Avalanche Current [A]		35	A
E_{AS}	Single Pulse Avalanche energy L=0.1mH [AF]		61	mJ
P_D	Power Dissipation [C]	T_C=25°C	46	W
		T_C=100°C	18.2	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 [B]	t≦10s		20	°C/W
	Thermal Resistance Junction to Ambient [BD]	Steady-State		50	
$R_{\theta JC}$	Thermal Resistance Junction to Case			2.7	

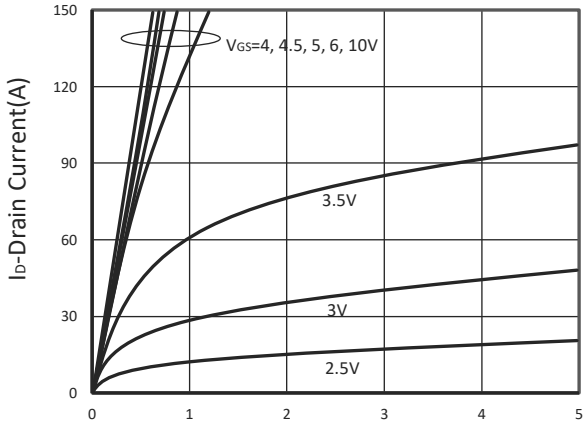
ELECTRICAL CHARACTERISTICS (T_A = 25°C Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	30			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=250μA	1.0	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}=30V, V_{GS}=0V, T_J=25°C			1	μA
		V_{DS}=24V, V_{GS}=0V, T_J=75°C			10	
$R_{DS(ON)}$	Drain-source On-Resistance [E]	V_{GS}=10V, I_D=20A V_{GS}=4.5V, I_D=15A		2.9 4.1	3.5 5.3	mΩ
G_{fs}	Forward Transconductance	V_{DS}=10V, I_D=10A		30		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage [E]	I_S=1A, V_{GS}=0V			1	V
I_S	Diode Continuous Forward Current [*]				90	A
T_{rr}	Reverse Recovery Time	I_S=20A, dI/dt=100A/μs		34		ns
Q_{rr}	Reverse Recovery Charge			25		nC
Dynamic and Switching Parameters						
Q_g	Total Gate Charge	V_{DS}=15V, V_{GS}=10V, I_D=20A		47.4	66.3	nC
Q_g	Total Gate Charge (4.5V)			23	32.2	
Q_{gs}	Gate-Source Charge			4	5.6	
Q_{gd}	Gate-Drain Charge			5.3	7.4	
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz		2250		pF
C_{oss}	Output Capacitance			530		
C_{rss}	Reverse Transfer Capacitance			120		
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		2		Ω
$t_{d(on)}$	Turn-On Time [E]	V_{DD}=15V, V_{GEN}=10V R_G=3Ω, I_D=10A		12	22	ns
t_r				16	30	
$t_{d(off)}$	Turn-Off Time [E]			27	51	
t_f				11	21	

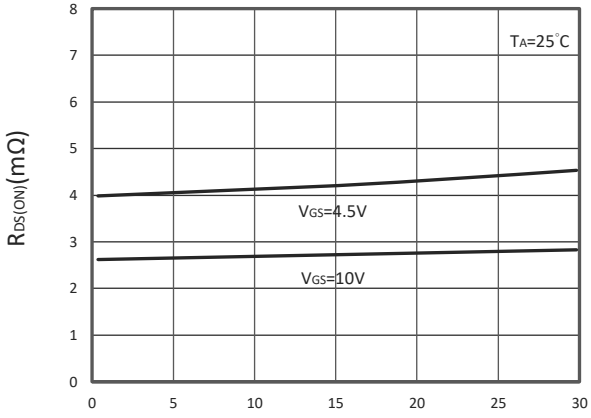
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

A. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}$=150°C.
B. Measure the value in a still air environment at T_A=25°C, using an installation mounted on a 1 in2 FR-4 board, maximum junction temperature $T_{J(MAX)}$=150°C.
C. Using junction-to-case thermal resistance, dissipation limit in the case of additional heat.
D. $T_{J(MAX)}$=150°C,using junction-to-case thermal resistance ($R_{θJC}$) is more useful in additional heat sinking is used.
E. The pulse test width is ≤300μs and the duty cycle ≦ 2%.
F. The EAS data shows Maximum, tested and pulse width limited by maximum.

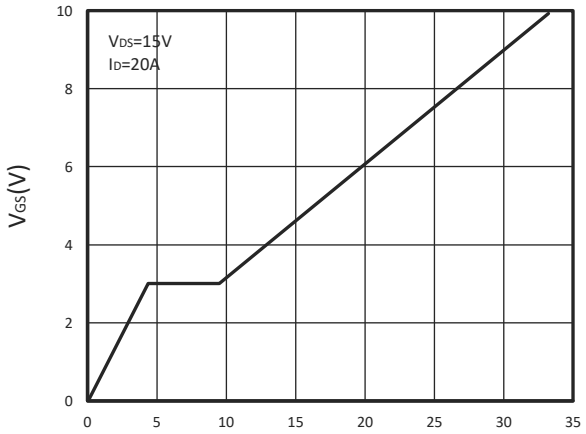
TYPICAL CHARACTERISTICS



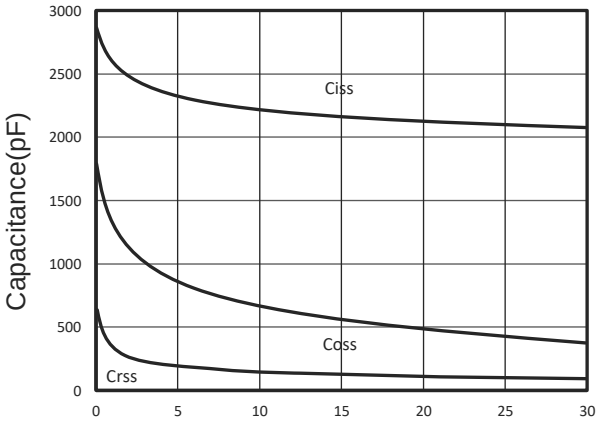
Output Characteristics



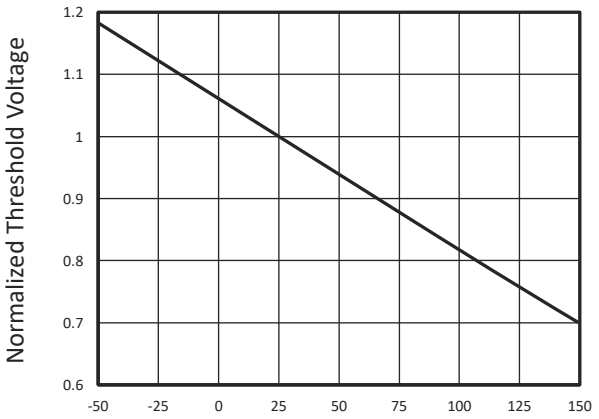
Drain-Source On Resistance



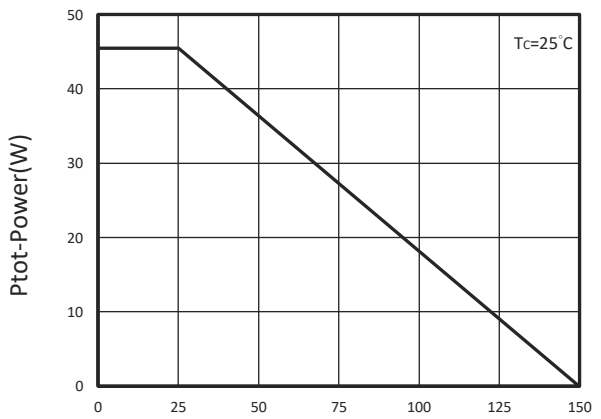
Gate Charge



Capacitance

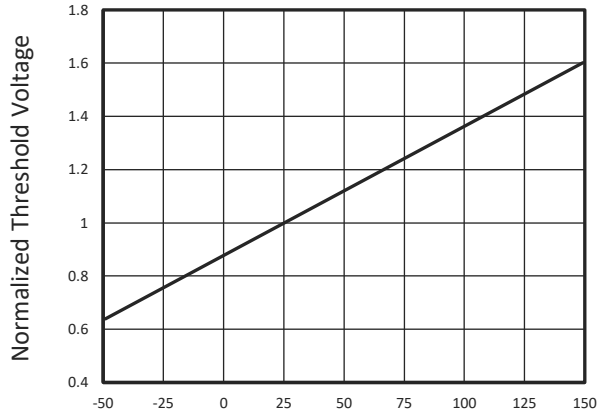


Gate Threshold Voltage



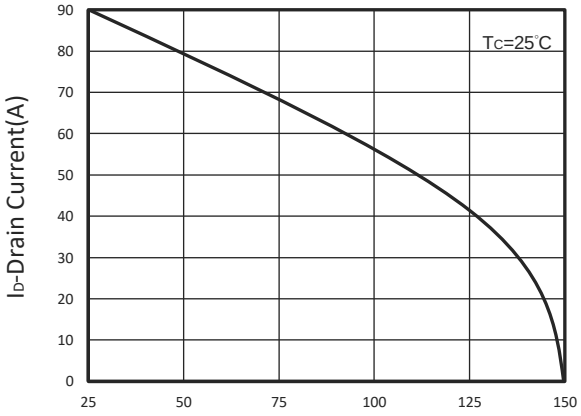
Power Dissipation

TYPICAL CHARACTERISTICS



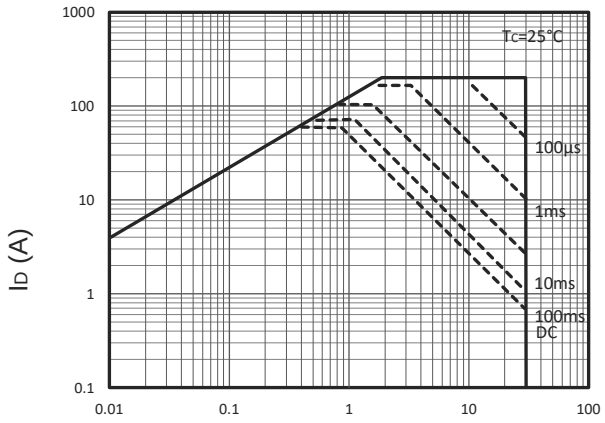
T_J-Junction Temperature(°C)

Gate Threshold Voltage



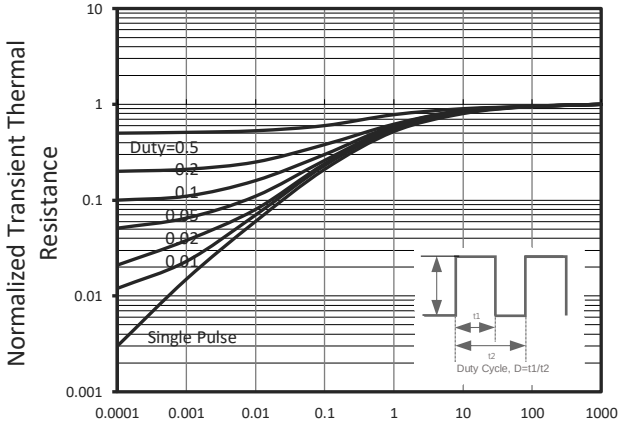
T_C-Case Temperature(°C)

Drain Current vs T_C



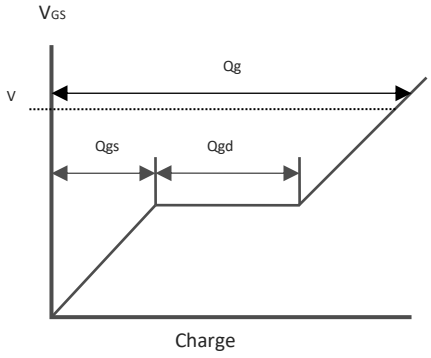
V_{DS} Voltage (V)

Maximum Safe Operation Area

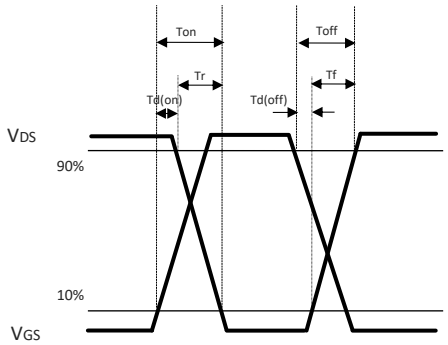


Square Wave Pulse Duration(Sec)

Thermal Transient Impedance

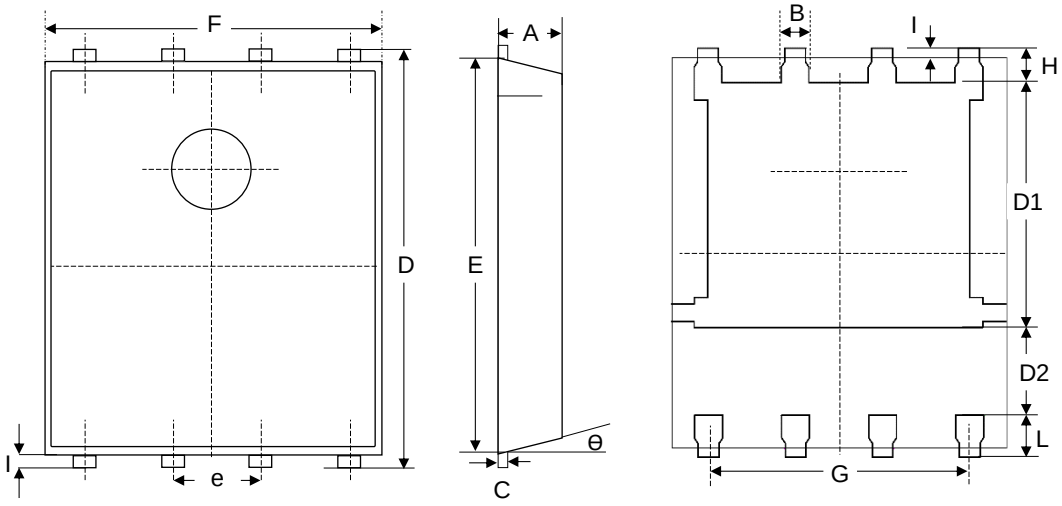


Gate Chrge Waveform



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°