SemTron Microtech Corporation

SMC4233NA

Single P-Channel MOSFET

DESCRIPTION

SMC4233NA 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, and withstand high energy pulse in the avalanche and commutation mode.

FEATURES

V_{DS}=-20V, I_D=-46A

$R_{DS(ON)}$=6.5mΩ(Typ.)@V_{GS}=-10V
$R_{DS(ON)}$=7.6mΩ(Typ.)@V_{GS}=-4.5V
$R_{DS(ON)}$=9.8mΩ(Typ.)@V_{GS}=-2.5V
$R_{DS(ON)}$=12.6mΩ(Typ.)@V_{GS}=-1.8V

APPLICATIONS

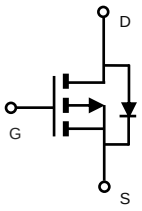
◆Portable Equipment
◆Power Management
◆Load Switching

PART NUMBER INFORMATION

SMC 4233 NA - TR G
a b c d e

a : Company name.
b : Product Serial number.
c : Package code NA:DFN3.3X3.3A-8
d : Handling code TR:Tape&Reel
e : Green produce code G:*RoHS Compliant*

DFN3.3X3.3A-8



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

Symbol	Parameter		Rating	Units
V_{DSS}	Drain-Source Voltage		-20	V
V_{GSS}	Gate-Source Voltage		±12	V
I_D	Continuous Drain Current (V_{GS}=-4.5V)	T_C=25°C	-46	A
		T_C=100°C	-29	A
I_{DM}	Pulsed Drain Current [B]		-120	A
I_D	Continuous Drain Current (V_{GS}=-4.5V)	T_A=25°C	-14	A
		T_A=70°C	-11.2	A
P_D	Power Dissipation [A]	T_A=25°C	3.1	W
		T_A=70°C	2	W
I_{AS}	Avalanche Current [A]		-35	A
E_{AS}	Single Pulse Avalanche energy L=0.1mH [B]		61	mJ
P_D	Power Dissipation [C]	T_C=25°C	29	W
		T_C=100°C	11.6	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		40	°C/W
	Thermal Resistance Junction to Ambient [AC]	Steady-State		65	
$R_{\theta JC}$	Thermal Resistance Junction to Case			4.3	

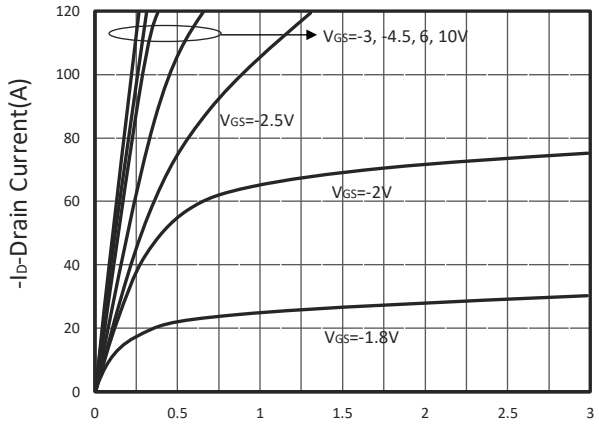
■ELECTRICAL CHARACTERISTICS(T_A = 25°C Unless otherwise noted)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=-250μA	-20			V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D=-250μA	-0.4	-0.5	-1	V
I_{GSS}	Gate Leakage Current	V_{DS}=0V, V_{GS}=±12V			±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS}=-20V, V_{GS}=0V, T_J=25°C			-1	μA
		V_{DS}=-16V, V_{GS}=0V, T_J=75°C			-10	
$R_{DS(ON)}$	Drain-source On-Resistance [D]	V_{GS}=-10V, I_D=-14A V_{GS}=-4.5V, I_D=-14A V_{GS}=-2.5V, I_D=-10A V_{GS}=-1.8V, I_D=-5A		6.5 7.6 9.8 12.6	7.8 9.2 12.5 16	mΩ
G_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-10A		25		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage [D]	I_S=-1A,V_{GS}=0V			-1	V
I_S	Diode Continuous Forward Current				-30	A
t_{rr}	Reverse Recovery Time	I_S=-10A, dI/dt=100A/μs		16.2		ns
Q_{rr}	Reverse Recovery Charge			7.2		nC
Dynamic and Switching Parameters [E]						
Q_g	Total Gate Charge	V_{DS}=-10V, V_{GS}=-4.5V I_D=-10A		53	71	
Q_{gs}	Gate-Source Charge			10	14	
Q_{gd}	Gate-Drain Charge			12	16.1	
C_{iss}	Input Capacitance	V_{DS}=-10V, V_{GS}=0V, f =1MHz		3760		pF
C_{oss}	Output Capacitance			432		
C_{rss}	Reverse Transfer Capacitance			298		
$t_{d(on)}$	Turn-On Time	V_{DD}=-10V, V_{GEN}=-4.5V R_G=3.3Ω, I_D=-14A		19.8	38	nS
t_r				36.8	70	
$t_{d(off)}$	Turn-Off Time			143	271	
t_f				73.8	140	

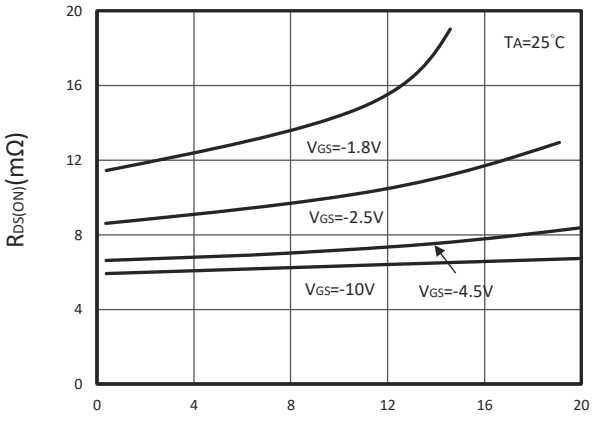
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

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.

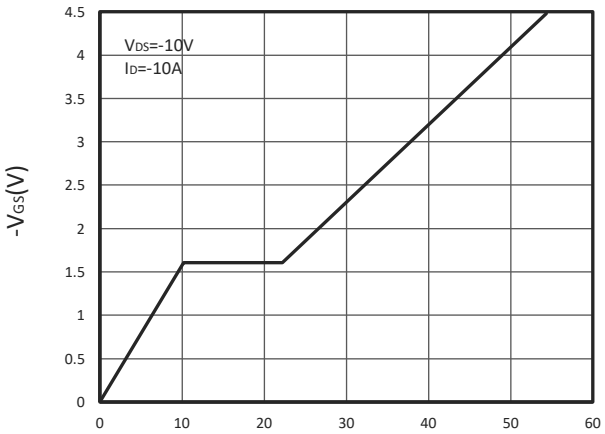
TYPICAL CHARACTERISTICS



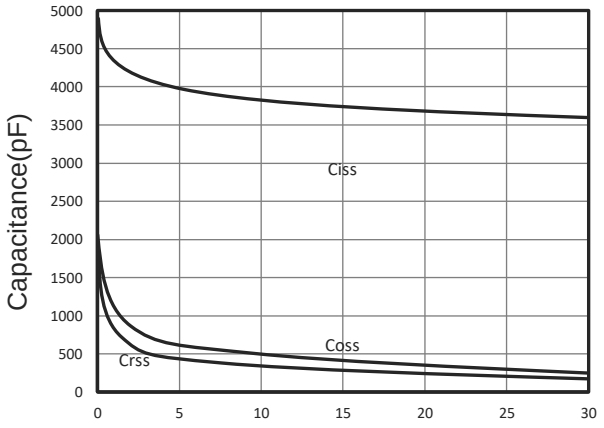
Output Characteristics



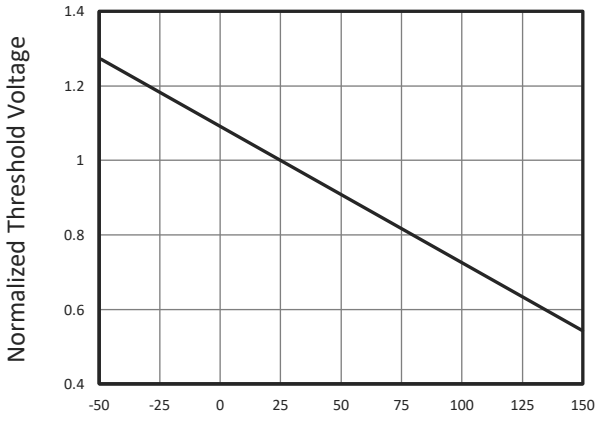
Drain-Source On Resistance



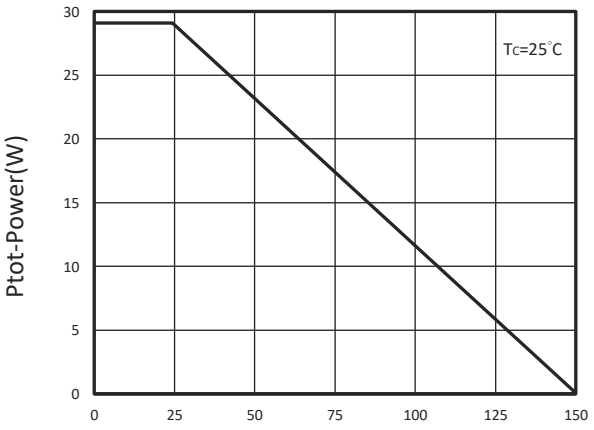
Gate Charge



Capacitance

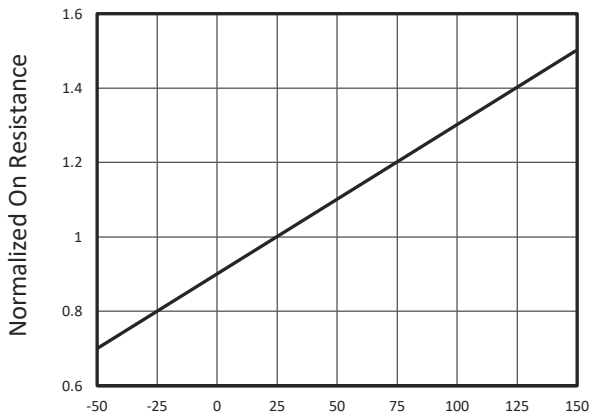


Gate Threshold Voltage



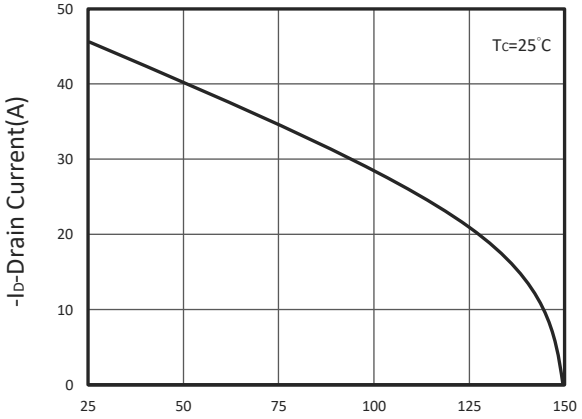
Power Dissipation

TYPICAL CHARACTERISTICS



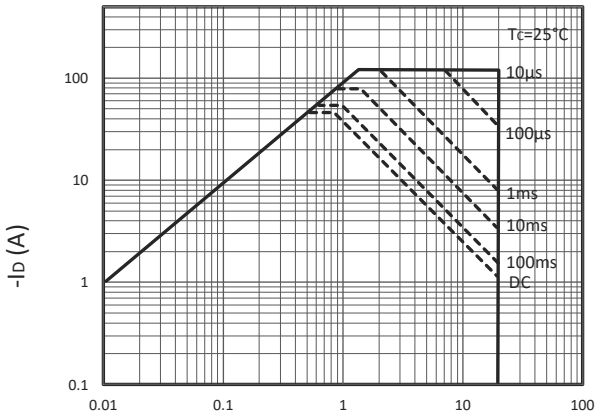
T_J-Junction Temperature(°C)

$R_{DS(ON)}$ vs Junction Temperature



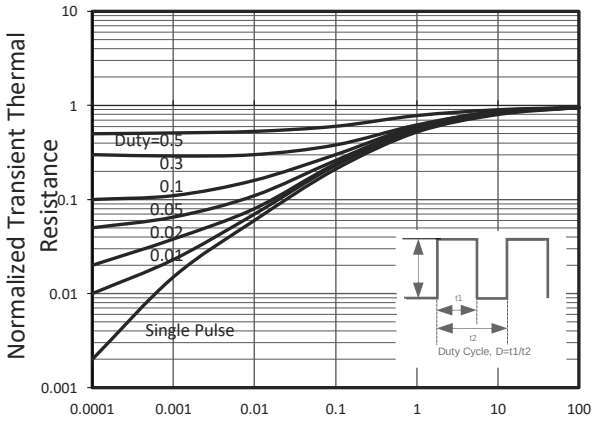
T_C-Case Temperature(°C)

Drain Current vs T_C



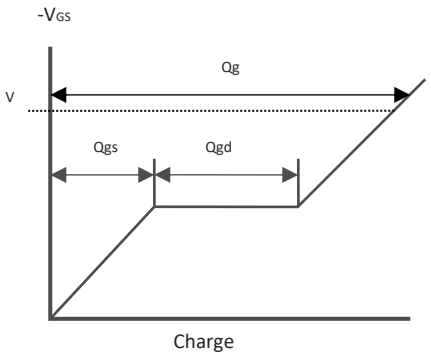
$-V_{DS}$ Voltage (V)

Maximum Safe Operation Area

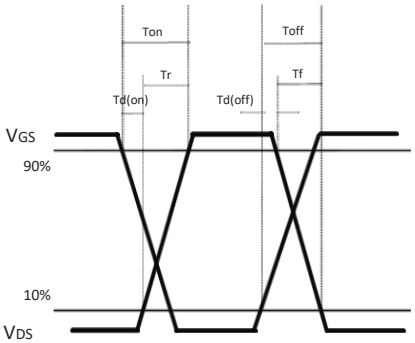


Square Wave Pulse Duration(sec)

Thermal Transient Impedance

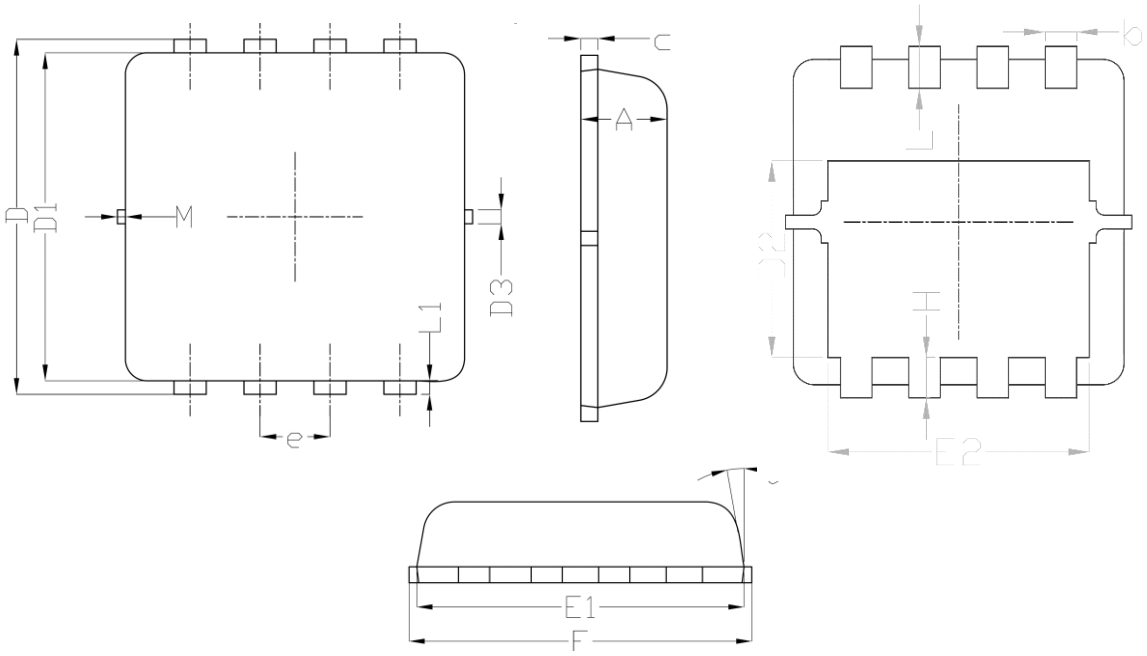


Gate Chrge Waveform



Switching Time Waveform

■DFN3.3X3.3A-8 PACKAGE DIMENSIONS



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.700	0.800	0.028	0.031
b	0.250	0.350	0.010	0.014
c	0.100	0.250	0.004	0.010
D	3.250	3.450	0.128	0.136
D1	3.000	3.200	0.118	0.126
D2	1.780	1.980	0.070	0.078
D3	-	0.130	-	0.005
E	3.200	3.400	0.126	0.134
E1	3.000	3.200	0.118	0.126
E2	2.390	2.590	0.094	0.102
e	0.65BSC.		0.026BSC.	
H	0.300	0.500	0.012	0.020
L	0.300	0.500	0.012	0.020
L1	-	0.130	-	0.005
M	-	0.150	-	0.006
Θ	0°	12°	0°	12°

Recommended Land Pattern