SemTron Microtech Corporation

SMC4861NA

Single P-Channel MOSFET

■DESCRIPTION

SMC4861 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.These devices are well suited for high efficiency load switching applications.

■PART NUMBER INFORMATION

SMC 4861 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*

■FEATURES

V_{DS} = -30V, I_D = -50A

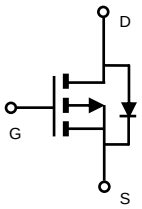
$R_{DS(ON)}$=7mΩ(Typ.)@V_{GS}=-10V
$R_{DS(ON)}$=10mΩ(Typ.)@V_{GS}=-4.5V

◆100% UIS tested
◆100% Rg tested

■APPLICATIONS

◆LED Application
◆Power Management
◆Load switch

DFN3.3X3.3A-8



■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	-50	A
		T_C=100°C	-36.8	A
I_{DM}	Pulsed Drain Current A		-200	A
I_D	Continuous Drain Current	T_A=25°C	-16.5	A
		T_A=70°C	-13.2	A
P_D	Power Dissipation B	T_A=25°C	3.6	W
		T_A=70°C	2.3	W
I_{AS}	Avalanche Current A		-40	A
E_{AS}	Single Pulse Avalanche energy L=0.1mH AF		80	mJ
P_D	Power Dissipation C	T_C=25°C	44.6	W
		T_C=100°C	18	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		35	°C/W
	Thermal Resistance Junction to Ambient BD	Steady-State		60	
$R_{\theta JC}$	Thermal Resistance Junction to Case			2.8	

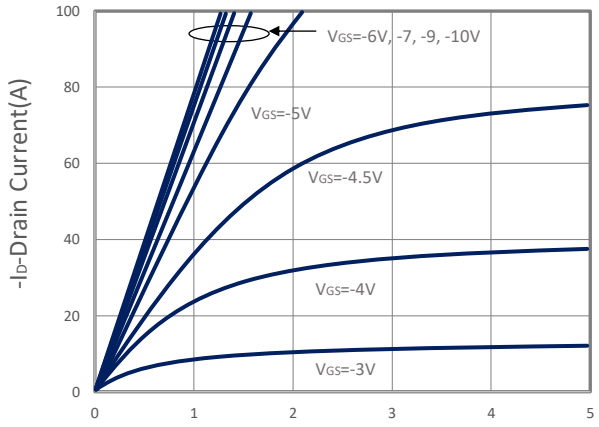
ELECTRICAL CHARACTERISTICS (T_A = 25°C Unless otherwise noted)

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	-1.5	-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=-16.5A V_{GS}=-4.5V, I_D=-10A		7 10	8.5 13	mΩ
G_{fs}	Forward Transconductance	V_{DS}=-10V, I_D=-10A		14.8		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage [E]	I_S=-1A, V_{GS}=0V		-0.7	-1	V
I_S	Continuous Source Current *				-50	A
t_{rr}	Reverse Recovery Time	I_S=-10A, dI/dt=100A/μs		21		ns
Q_{rr}	Reverse Recovery Charge			15.5		nC
Dynamic and Switching Parameters						
Q_g	Total Gate Charge (10V)	V_{DS}=-15V, V_{GS}=-10V, I_D=-10A		61	85	nC
Q_g	Total Gate Charge (4.5V)			30	42	
Q_{gs}	Gate-Source Charge			10.6	14.3	
Q_{gd}	Gate-Drain Charge			9	12.6	
C_{iss}	Input Capacitance	V_{DS}=-15V, V_{GS}=0V, f=1MHz		3376		pF
C_{oss}	Output Capacitance			369		
C_{rss}	Reverse Transfer Capacitance			224		
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		8.2		Ω
$t_{d(on)}$	Turn-On Time [E]	V_{DD}=-15V, V_{GEN}=-10V, R_G=3Ω, I_D=-1A		24	46	nS
t_r				11.6	22	
$t_{d(off)}$	Turn-Off Time [E]			78.8	150	
t_f				33.8	63	

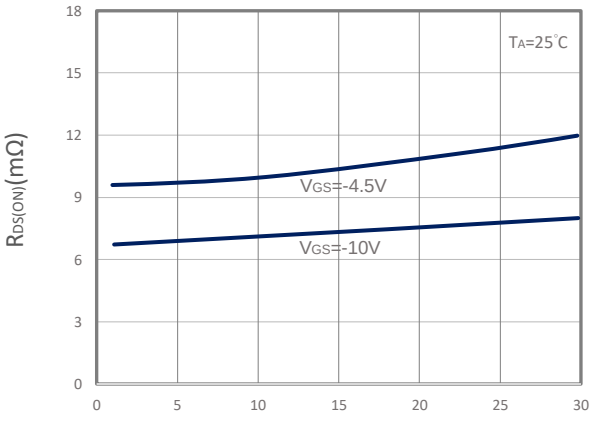
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

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.
*. The maximum rating current is limited by wire bonding.

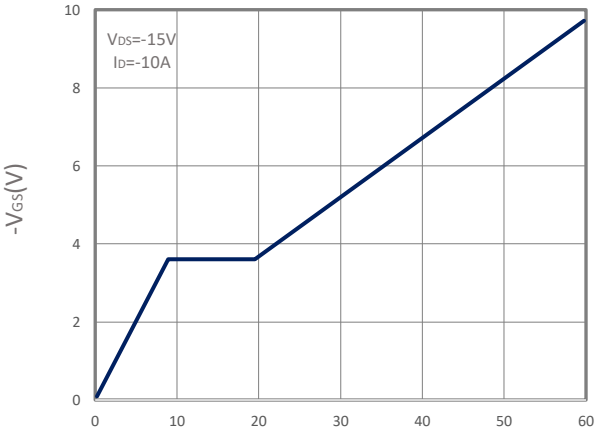
TYPICAL CHARACTERISTICS



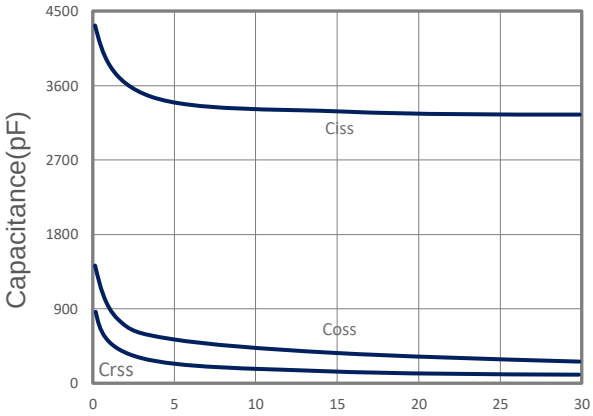
Output Characteristics



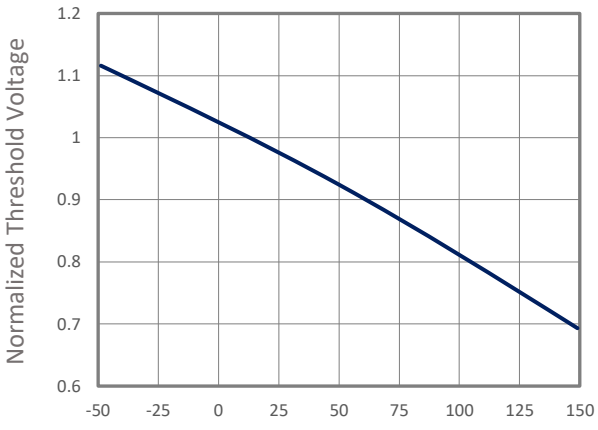
Drain-Source On Resistance



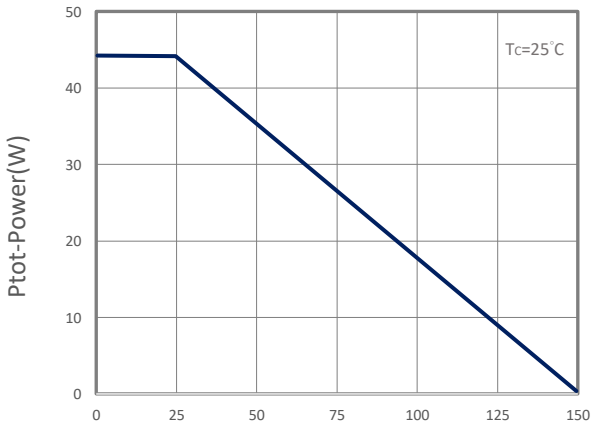
Gate Charge



Capacitance

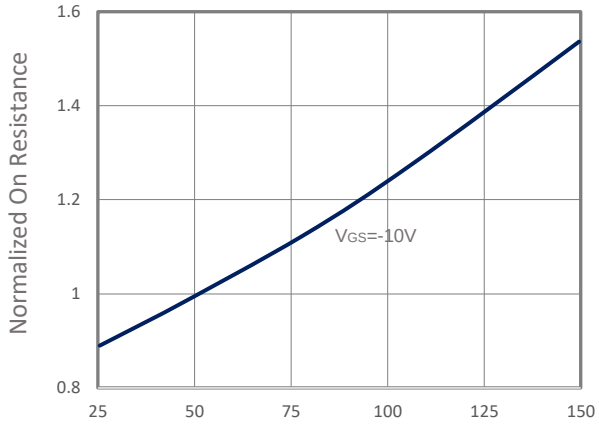


Gate Threshold Voltage

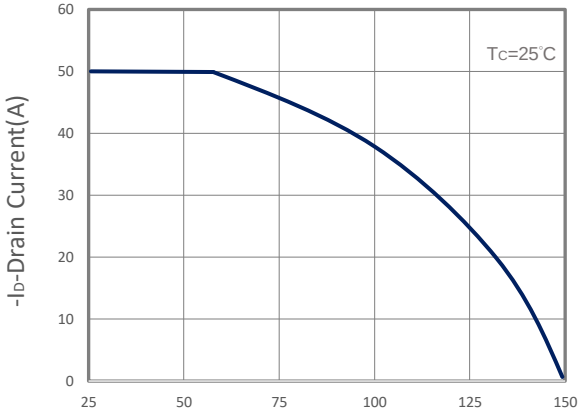


Power Dissipation

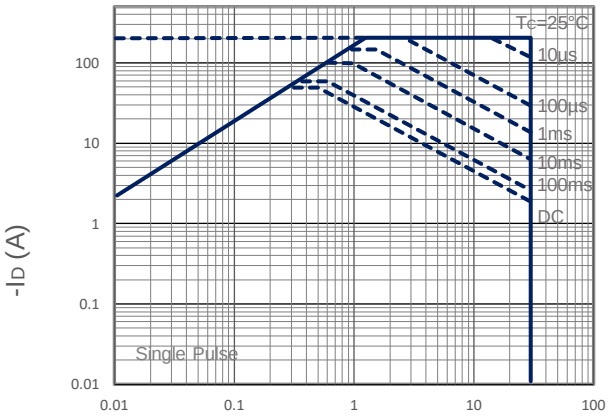
TYPICAL CHARACTERISTICS



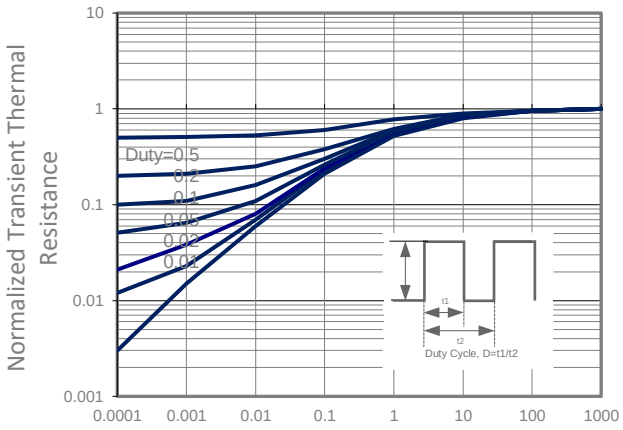
RDS(ON) vs Junction Temperature



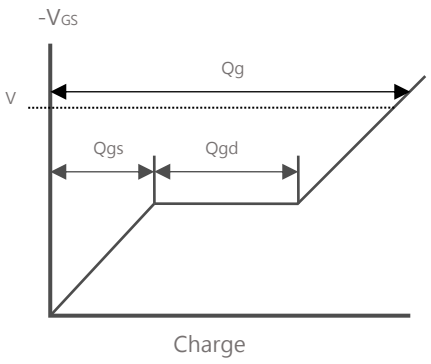
Drain Current vs TC



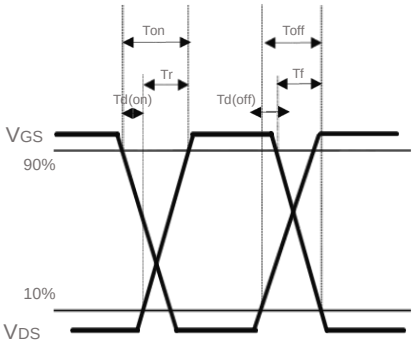
Maximum Safe Operation Area



Thermal Transient Impedance

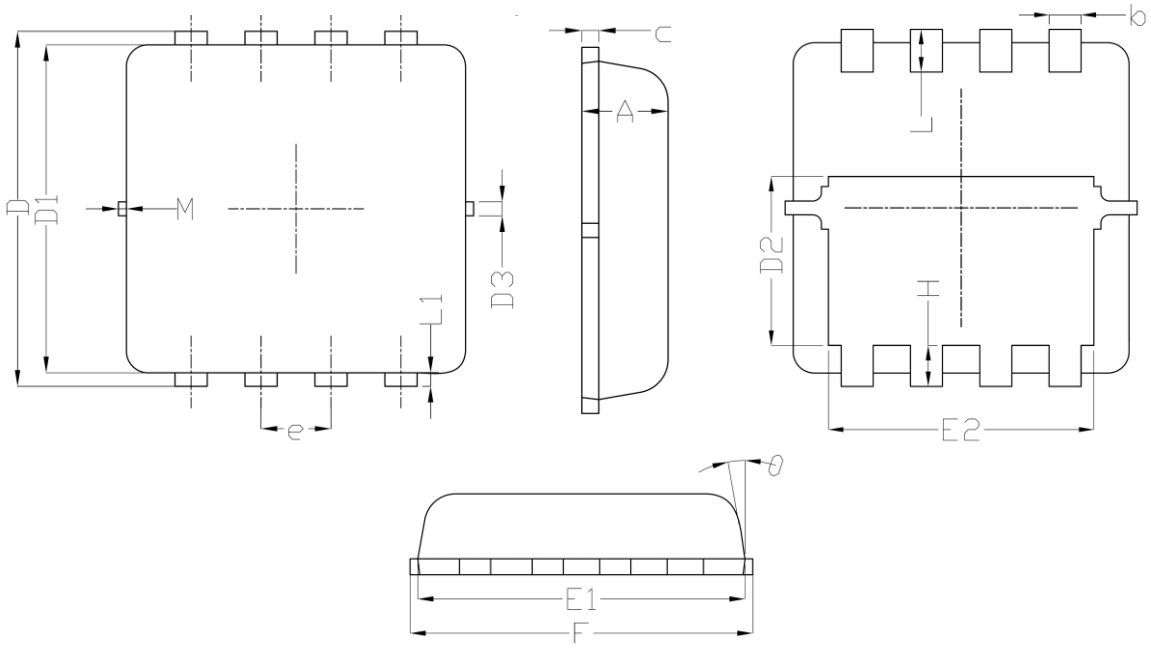


Gate Chrge Waveform



Switching Time Waveform

■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	3.300	3.400	0.130	0.134
D1	3.250	3.450	0.128	0.136
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°	15°

Recommended Land Pattern