

Single P-Channel MOSFET

DESCRIPTION

SMC4861NA 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

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

$R_{DS(ON)} = 7m\Omega (Typ.) @ V_{GS} = -10V$

$R_{DS(ON)} = 10m\Omega (Typ.) @ V_{GS} = -4.5V$

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

APPLICATIONS

- ◆ Load Switch
- ◆ DC-DC Power Management



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		±25	V
I _D	Continuous Drain Current *	T _C =25°C	-50	A
		T _C =100°C	-34.4	A
I _{DM}	Pulsed Drain Current ^B		-200	A
I _D	Continuous Drain Current	T _A =25°C	-17.5	A
		T _A =70°C	-14	A
P _D	Power Dissipation ^A	T _A =25°C	4.2	W
		T _A =70°C	2.7	W
I _{AS}	Single Pulse Avalanche Current ^B		-40	A
E _{AS}	Single Pulse Avalanche energy L=0.1mH ^B		80	mJ
P _D	Power Dissipation ^C	T _C =25°C	40	W
		T _C =100°C	16	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	$t \leq 10s$	35	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{AC}	Steady-State	60	
$R_{\theta JC}$	Thermal Resistance Junction to Case		3.1	

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

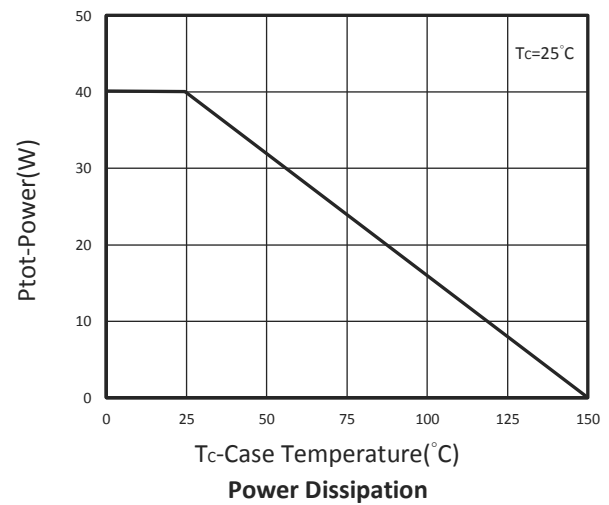
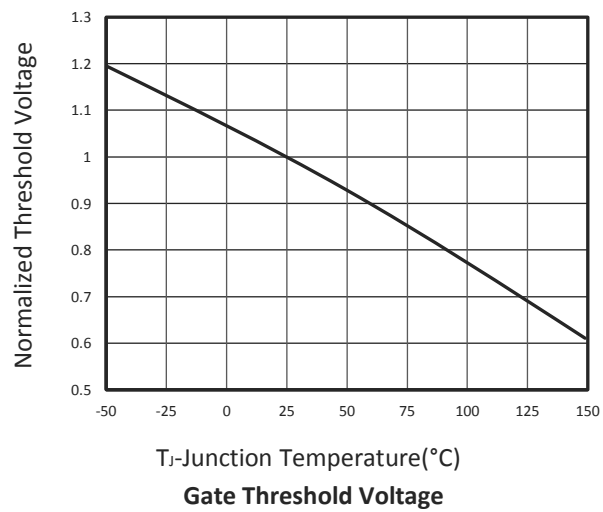
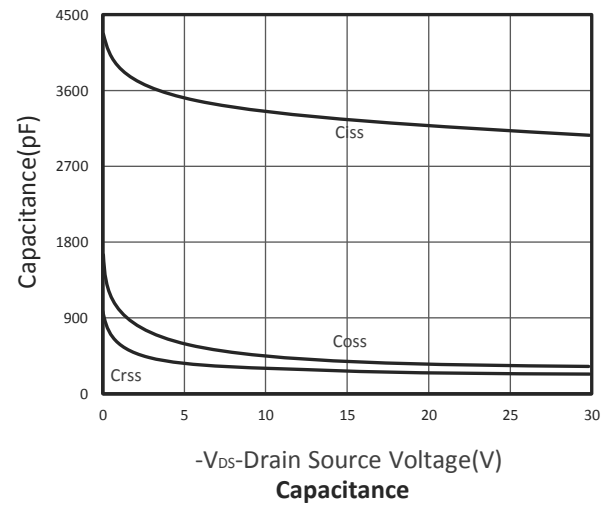
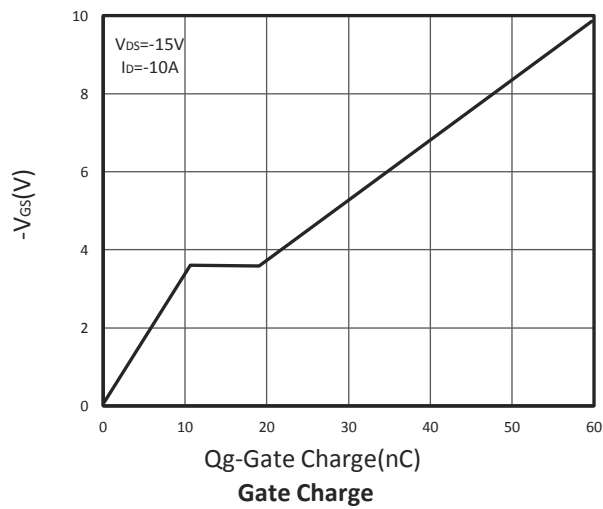
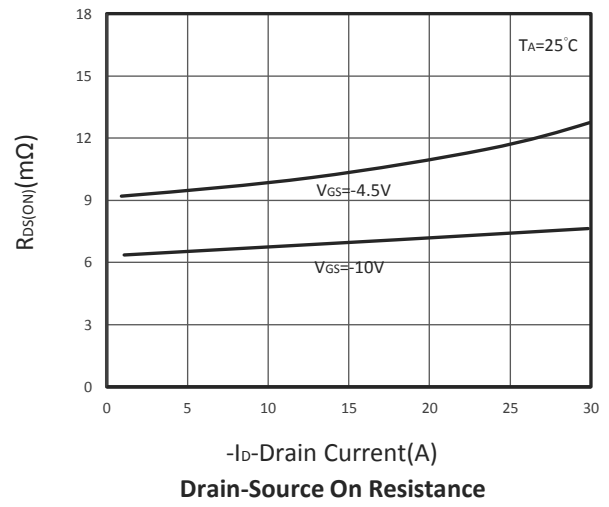
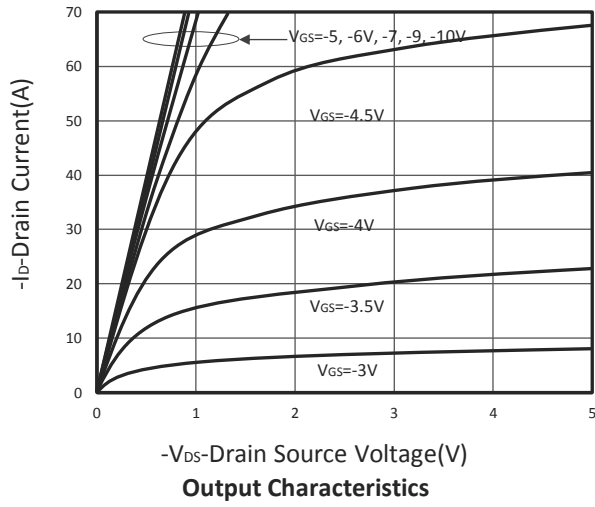
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250μA	-30			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =-250μA	-1	-1.6	-2.5	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±25V			±100	nA
I _{DSS}	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 °	V _{GS} =-10V, I _D =-17.5A 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 °	I _S =-1A, V _{GS} =0V			-1	V
I _S	Diode Continuous Forward 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	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		3230		pF
C _{oss}	Output Capacitance			369		
C _{rss}	Reverse Transfer Capacitance			265		
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		8.3		Ω
t _{d(on)}	Turn-On Time	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			78.8	150	
t _f				33.4	63	

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

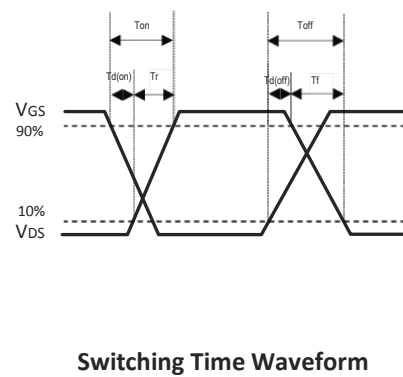
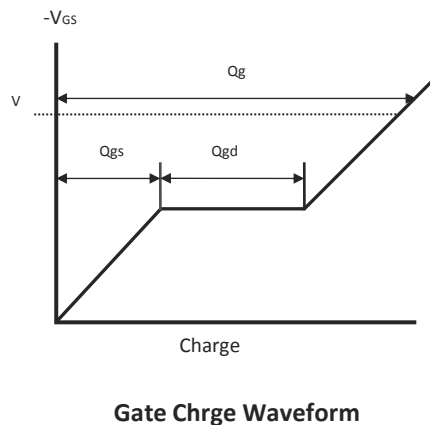
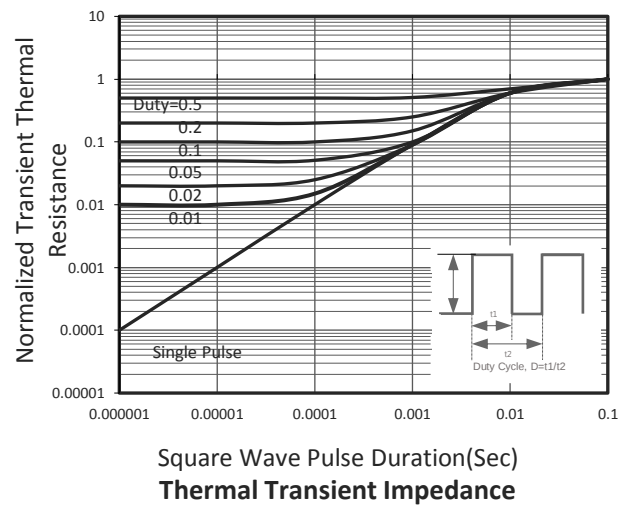
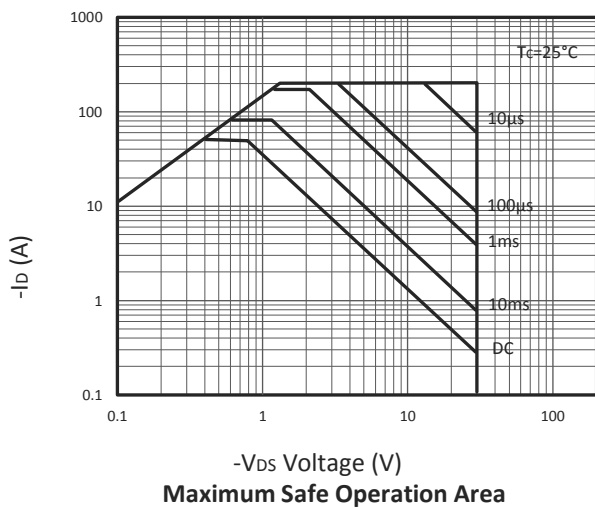
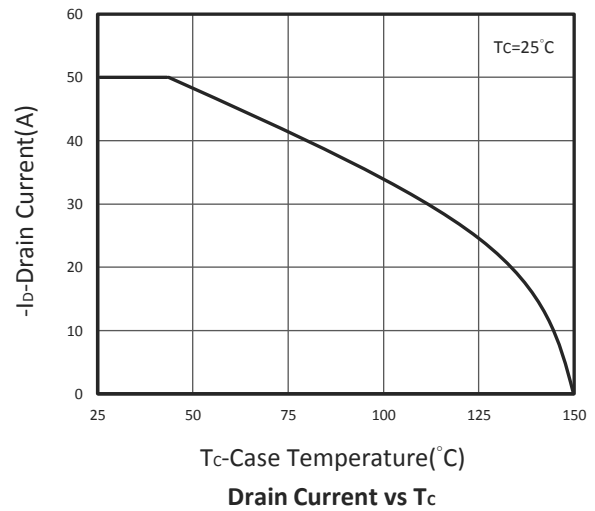
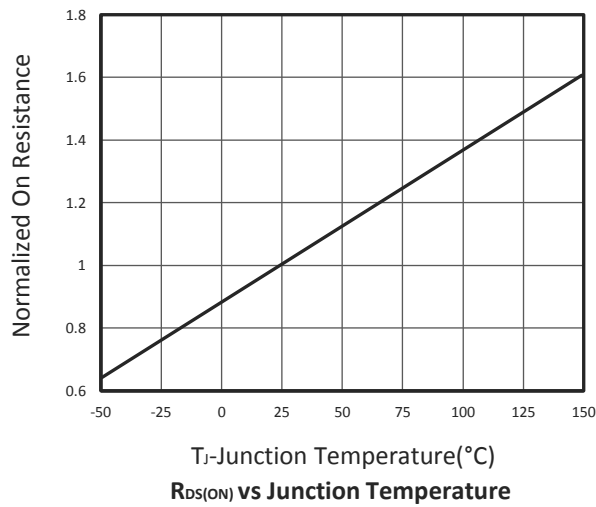
- A. Surface mounted on FR4 board using 1 in² pad size.
- B. Pulsed width limited by maximum junction temperature, $T_{J(MAX)}=150^{\circ}\text{C}$ (initial temperature $T_J=25^{\circ}\text{C}$).
- C. Using $\leq 10\text{s}$ junction-to-ambient thermal resistance is base on $T_{J(MAX)}=150^{\circ}\text{C}$.
- D. Pulse test width $\leq 300\mu s$ and duty cycle $\leq 2\%$.
- E. Guaranteed by design, not subject to production testing.
- *. The maximum rating current 50A limited by package.

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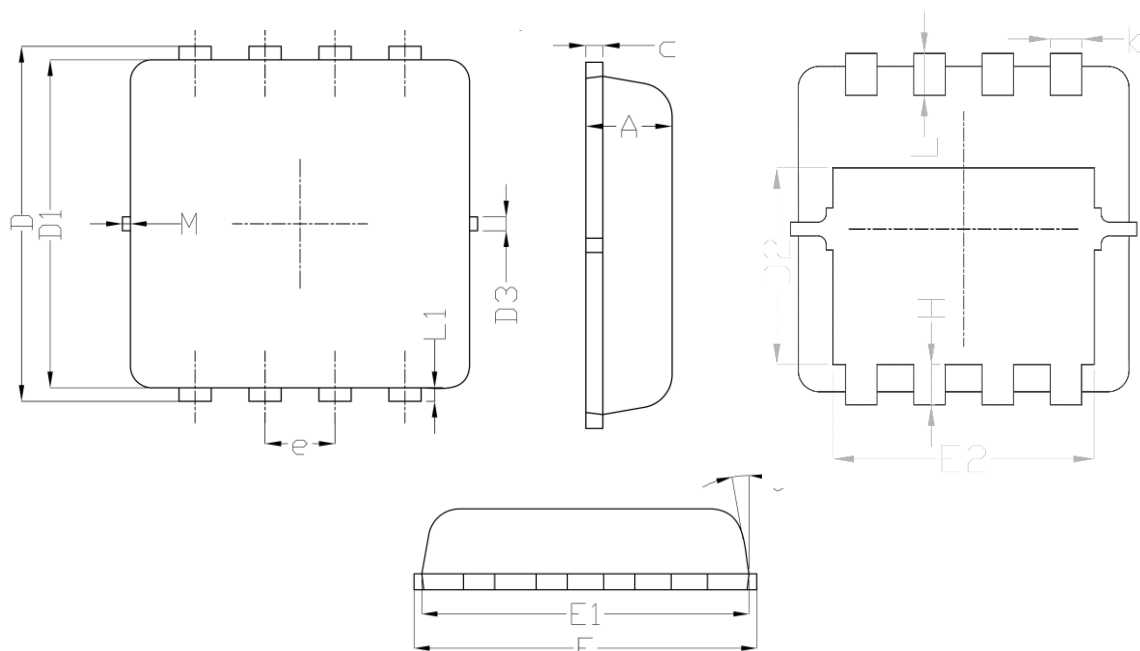
TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



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

