SMC4870NA

Single N-Channel MOSFET

■DESCRIPTION

The SMC4870NA uses trench MOSFET technology Provides extremely low $R_{DS(ON)}$, Low resistance package and excellent fast switching performance. This device is ideal for efficient and fast switching applications.

■FEATURES

V_{DS}=30V, I_D=35A

$R_{DS(ON)}$=9mΩ(Typ.)@V_{GS}=10V
$R_{DS(ON}$ =12mΩ(Typ.)@V_{GS}=4.5V

◆100% EAS Guarantee

■PART NUMBER INFORMATION

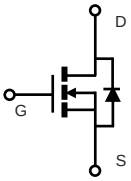
SMC 4870 NA - TR G
a b c d e

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*

■APPLICATIONS

◆Power Management
◆DC/DC Converters
◆Battery Powered Systems

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	35	A
		T_C=100°C	22	A
I_{DM}	Pulsed Drain Current [B]		140	A
I_D	Continuous Drain Current	T_A=25°C	15	A
		T_A=70°C	12	A
P_D	Power Dissipation [A]	T_A=25°C	3.6	W
		T_A=70°C	2.3	W
I_{AS}	Avalanche Current [A]		16	A
E_{AS}	Single Pulse Avalanche energy L=0.3mH [B]		38.4	mJ
P_D	Power Dissipation [C]	T_C=25°C	20.8	W
		T_C=100°C	8.3	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		35	°C/W
	Thermal Resistance Junction to Ambient [AC]	Steady-State		65	
$R_{\theta JC}$	Thermal Resistance Junction to Case			6	

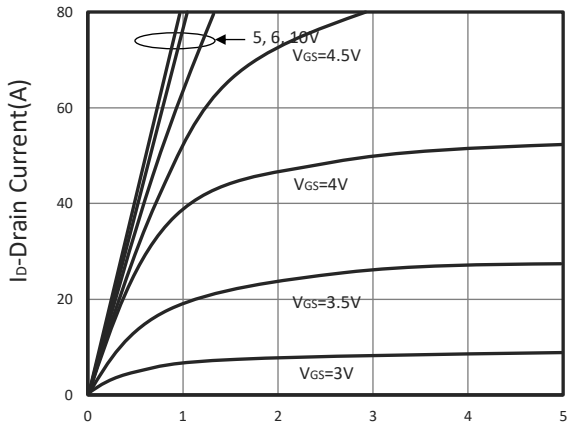
■ELECTRICAL CHARACTERISTICS(T_A = 25°C Unless otherwise noted)

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	1.6	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 [D]	V_{GS}=10V, I_D=15A V_{GS}=4.5V, I_D=10A		9 12	11 16	mΩ
G_{fs}	Forward Transconductance	V_{DS}=10V, I_D=-10A		20		S
Diode Characteristics						
V_{SD}	Diode Forward Voltage [E]	I_S=1A,V_{GS}=0V			1	V
I_S	Diode Continuous Forward Current				35	A
t_{rr}	Reverse Recovery Time	IS=10A, dl/dt=100A/μs		16.8		ns
Q_{rr}	Reverse Recovery Charge			9.5		nC
Dynamic and Switching Parameters [E]						
Q_g	Total Gate Charge	V_{DS}=15V,V_{GS}=10V, I_D=10A		16	22.4	nC
Q_g	Total Gate Charge (4.5V)			7.9	10.9	
Q_{gs}	Gate-Source Charge			2.6	3.6	
Q_{gd}	Gate-Drain Charge			3.2	4.5	
C_{iss}	Input Capacitance	V_{DS}=15V, V_{GS}=0V, f=1MHz		702		pF
C_{oss}	Output Capacitance			93		
C_{rss}	Reverse Transfer Capacitance			68		
R_g	Gate Resistance	V_{GS}=0V, V_{DS}=0V, F=1MHz		2.7		Ω
$t_{d(on)}$	Turn-On Time	V_{DD}=15V, V_{GS}=10V R_G=6Ω, I_D=1A		8	15	nS
t_r				10	19	
$t_{d(off)}$	Turn-Off Time			22	42	
t_f				6.6	13	

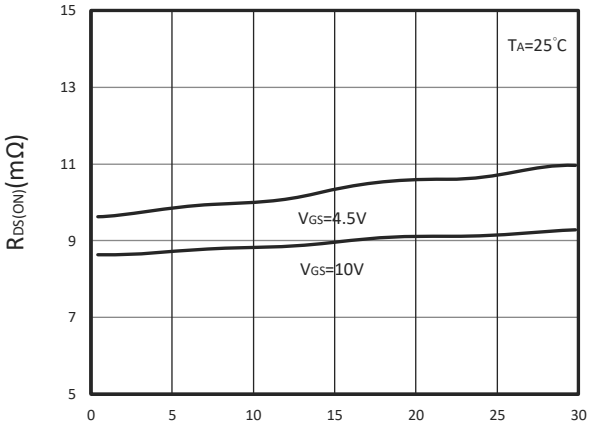
Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

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.

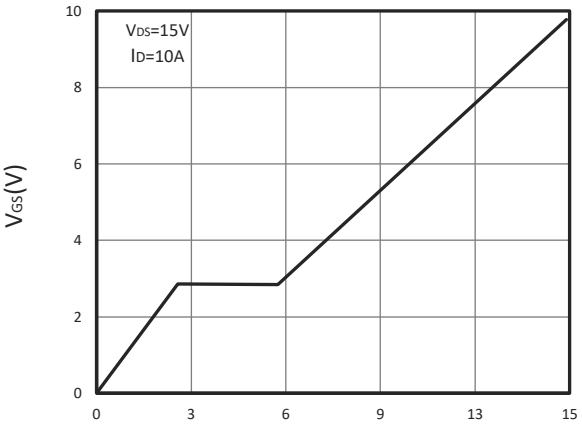
TYPICAL CHARACTERISTICS



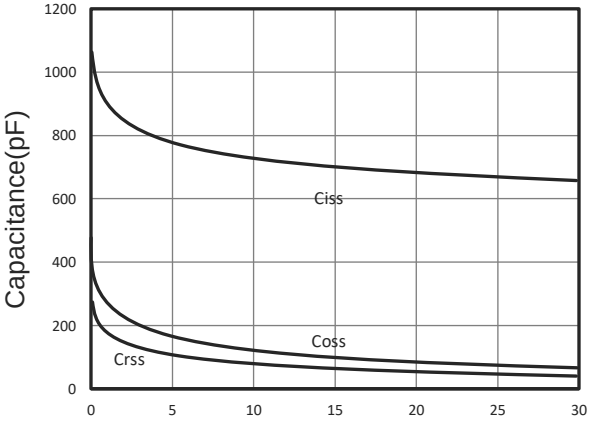
Output Characteristics



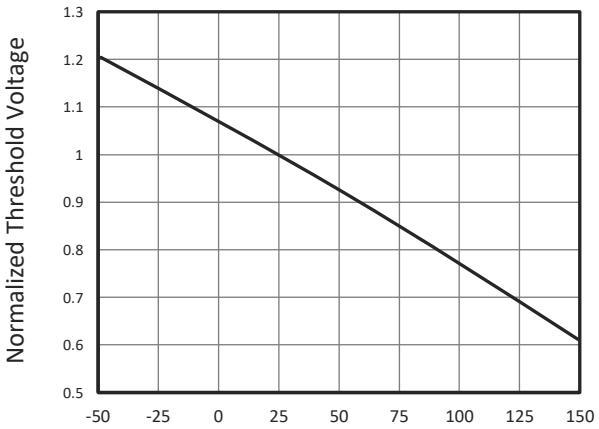
Drain-Source On Resistance



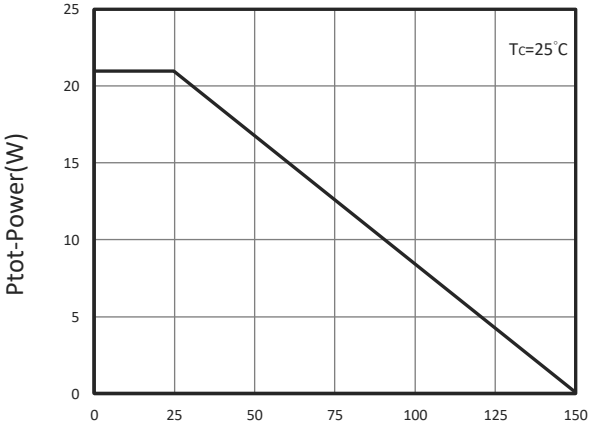
Gate Charge



Capacitance

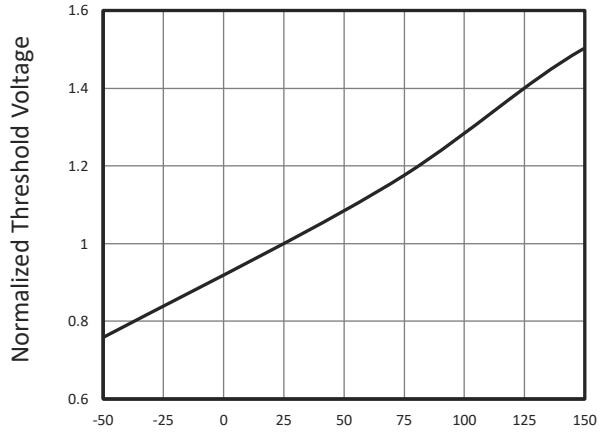


Gate Threshold Voltage



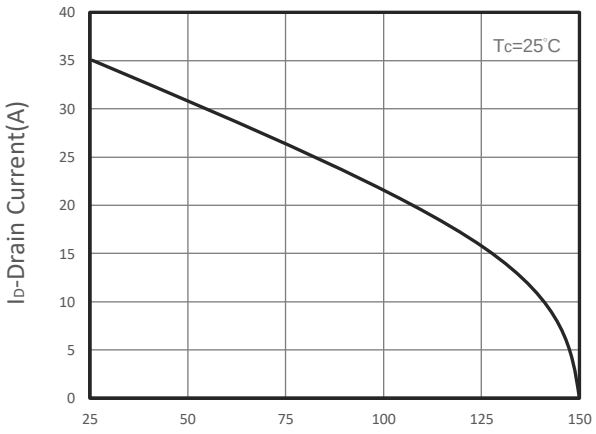
Power Dissipation

TYPICAL CHARACTERISTICS



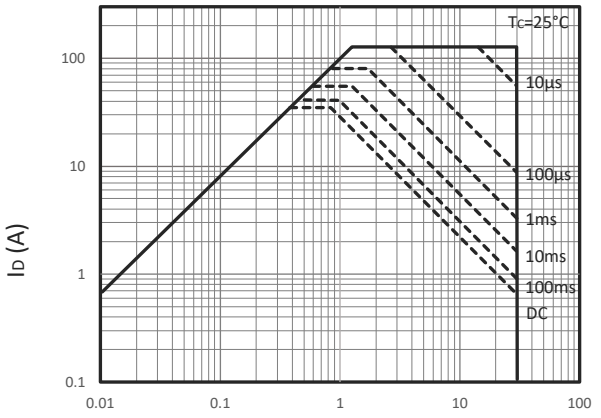
T_J-Junction Temperature(°C)

Gate Threshold Voltage



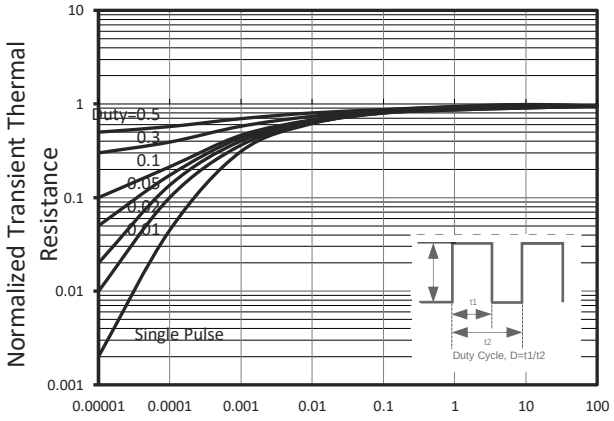
T_C-Case Temperature(°C)

Drain Current vs T_C



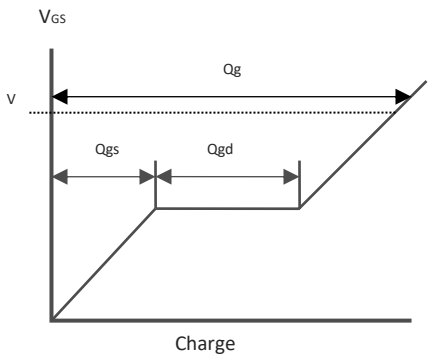
V_{DS} Voltage (V)

Maximum Safe Operation Area

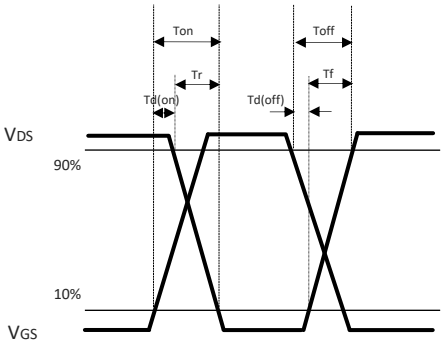


Square Wave Pulse Duration(Sec)

Thermal Transient Impedance

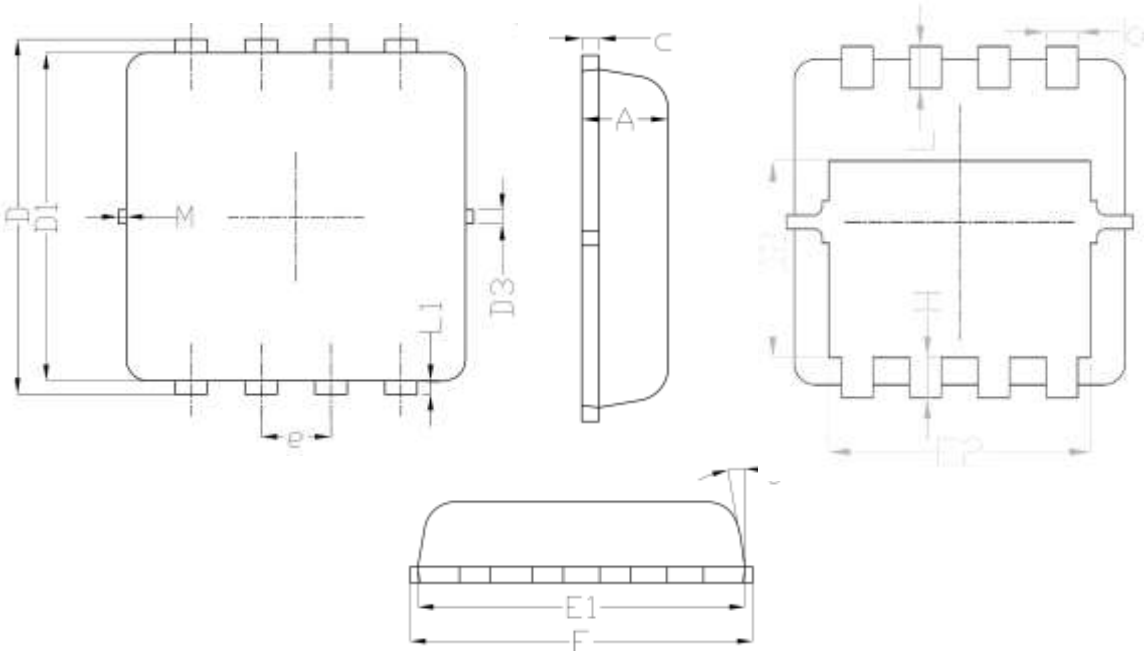


Gate Chrge Waveform



Switching Time Waveform

■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