

Single N-Channel MOSFET

DESCRIPTION

SMC4234 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 4234 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

$V_{DS} = 20V$, $I_D = 48A$

- $R_{DS(ON)} = 2.7m\Omega(Typ.)@V_{GS}=10V$
- $R_{DS(ON)} = 3.3m\Omega(Typ.)@V_{GS}=4.5V$
- $R_{DS(ON)} = 4.2m\Omega(Typ.)@V_{GS}=2.5V$
- $R_{DS(ON)} = 6.6m\Omega(Typ.)@V_{GS}=1.8V$

◆ 100% UIS and Rg tested

APPLICATIONS

- ◆ Power Management
- ◆ POL Applications
- ◆ Battery Powered Systems



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ 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 * ($V_{GS}=4.5V$)	$T_C=25^\circ C$	48
		$T_C=100^\circ C$	36
I_{DM}	Pulsed Drain Current ^A	192	A
I_D	Continuous Drain Current ($V_{GS}=-4.5V$)	$T_A=25^\circ C$	23
		$T_A=70^\circ C$	18.5
P_D	Power Dissipation ^B	$T_A=25^\circ C$	3.6
		$T_A=70^\circ C$	2.3
I_{AS}	Avalanche Current ^A	35	A
E_{AS}	Single Pulse Avalanche energy $L=0.1mH$ ^{AF}	61	mJ
P_D	Power Dissipation ^C	$T_C=25^\circ C$	31
		$T_C=100^\circ C$	12.5
T_J	Operation Junction Temperature	-55/150	$^\circ C$
T_{STG}	Storage Temperature Range	-55/150	$^\circ C$

THERMAL RESISTANCE

Symbol	Parameter	Typ	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient ^B	$t \leq 10s$	35	$^\circ C/W$
	Thermal Resistance Junction to Ambient ^{BD}	Steady-State	60	
$R_{\theta JC}$	Thermal Resistance Junction to Case		4	

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

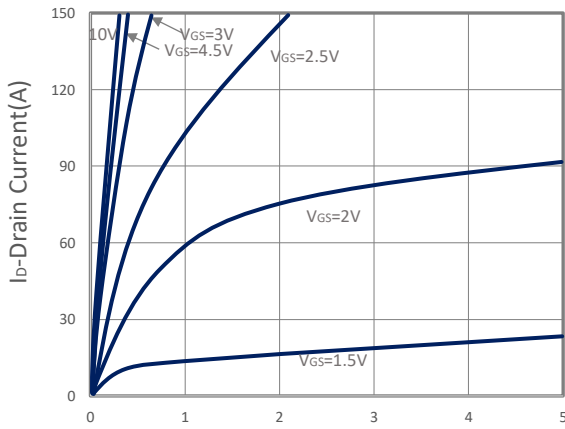
Symbol	Parameter	Condition	Min	Typ	Max	Unit
Static Parameters						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20			V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	0.4	0.6	1	V
I _{GSS}	Gate Leakage Current	V _{DS} =0V, V _{GS} =±12V			±100	nA
I _{DSS}	Zero Gate 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 ^E	V _{GS} =10V, I _D =20A		2.7	3.5	mΩ
		V _{GS} =4.5V, I _D =20A		3.3	4.5	
		V _{GS} =2.5V, I _D =10A		4.2	5.5	
		V _{GS} =1.8V, I _D =5A		6.6	8.8	
G _{fs}	Forward Transconductance	V _{DS} =5V, I _D =10A		33		S
Diode Characteristics						
V _{SD}	Diode Forward Voltage ^E	I _S =1A, V _{GS} =0V		0.7	1	V
I _S	Continuous Source Current [*]				48	A
t _{rr}	Reverse Recovery Time	I _S =10A, dI/dt=100A/μs		19		ns
Q _{rr}	Reverse Recovery Charge			9.2		nC
Dynamic and Switching Parameters						
Q _g	Total Gate Charge	V _{DS} =10V, V _{GS} =4.5V, I _D =20A		30	42	
Q _{gs}	Gate-Source Charge			5.1	7.1	
Q _{gd}	Gate-Drain Charge			10	14	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, f=1MHz		3520		pF
C _{oss}	Output Capacitance			572		
C _{rss}	Reverse Transfer Capacitance			425		
R _g	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		2.1	3.2	Ω
t _{d(on)}	Turn-On Time ^E	V _{DD} =10V, V _{GS} =4.5V, R _G =3Ω, I _D =1A		12.7	24	nS
t _r				15.2	29	
t _{d(off)}	Turn-Off Time ^E			85	162	
t _f				37	70	

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

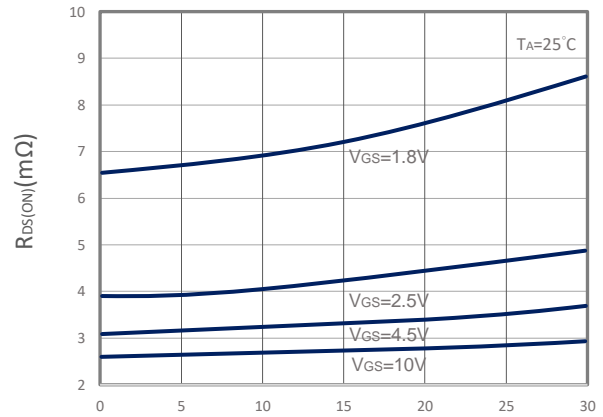
- A. Pulsed width limited by maximum junction temperature, T_{J(MAX)}=150°C.
- B. Measure the value in a still air environment at T_A=25°C, using an installation mounted on a 1 in2 FR-4 board, maximum junction temperature T_{J(MAX)}=150°C.
- C. Using junction-to-case thermal resistance, dissipation limit 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.

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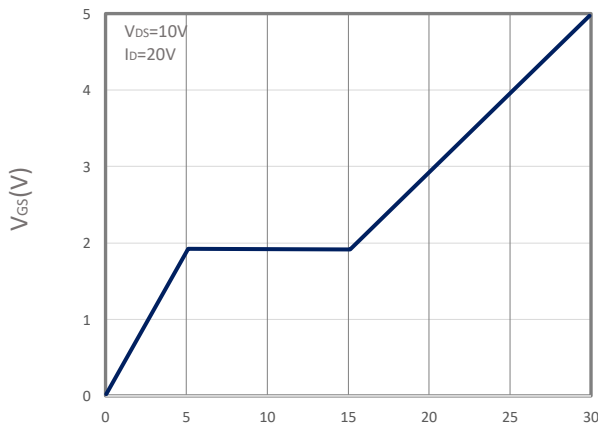
TYPICAL CHARACTERISTICS



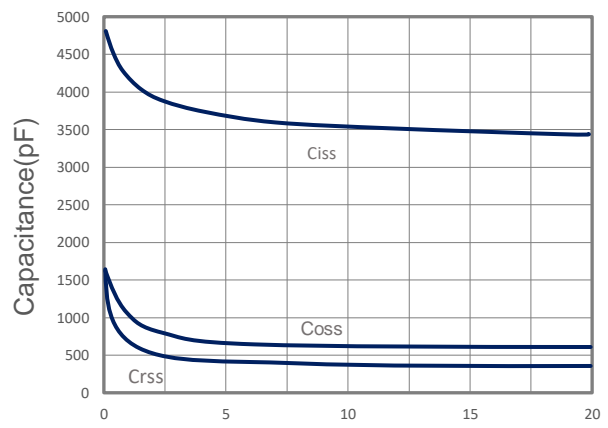
Output Characteristics



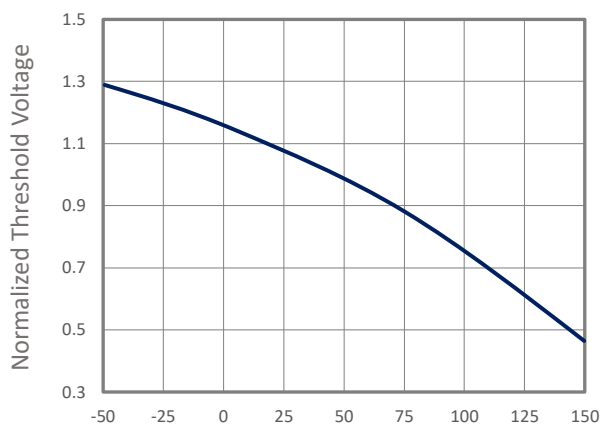
Drain-Source On Resistance



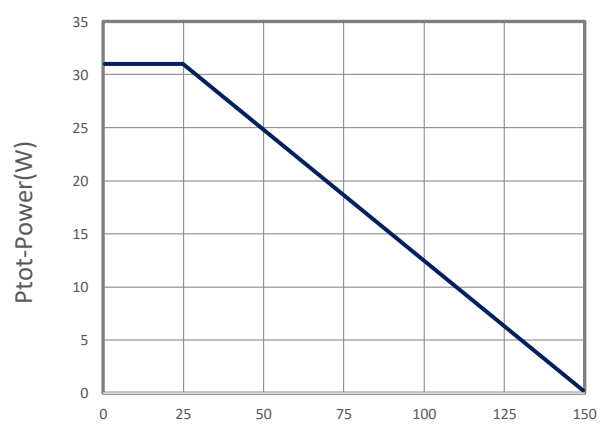
Gate Charge



Capacitance

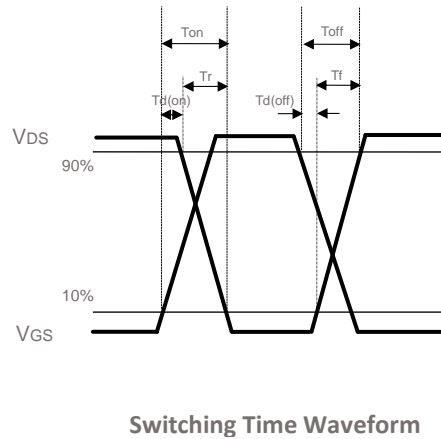
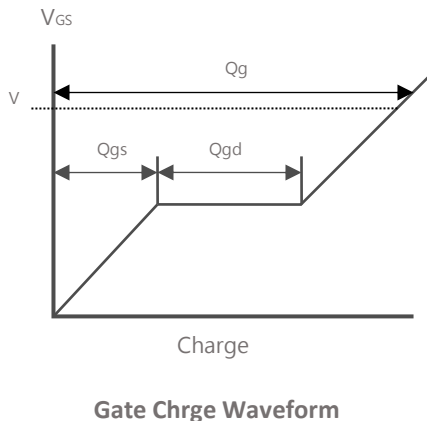
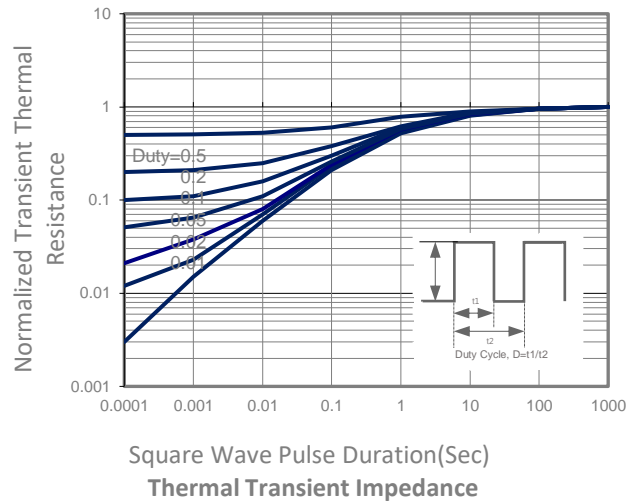
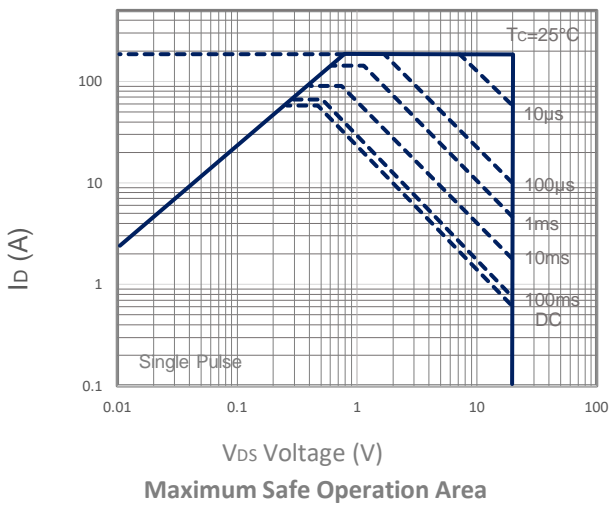
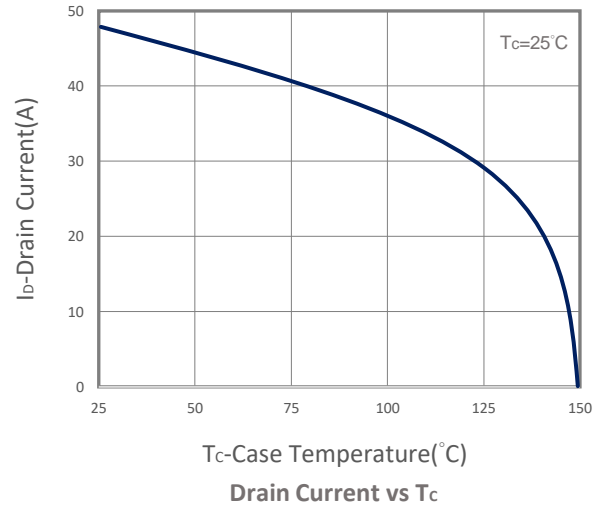
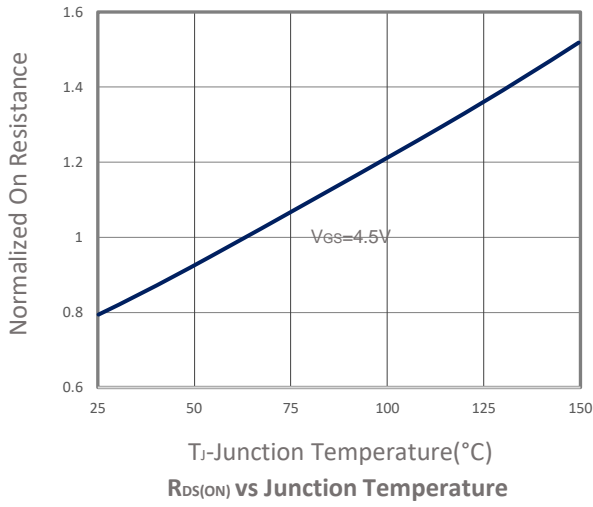


Gate Threshold Voltage

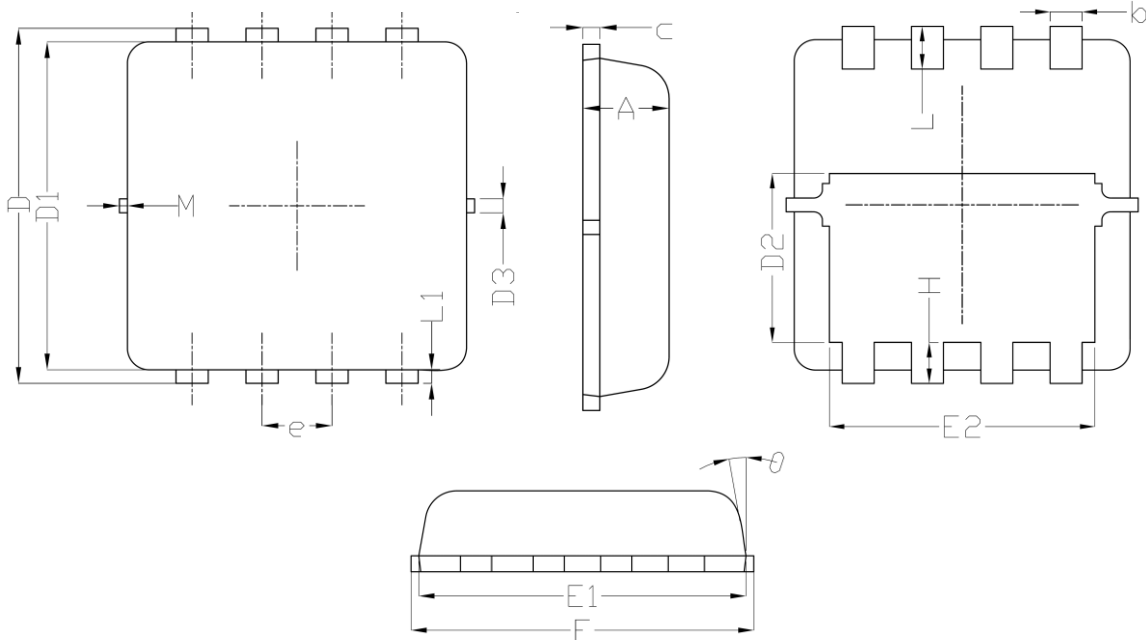


Power Dissipation

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	3.300	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

