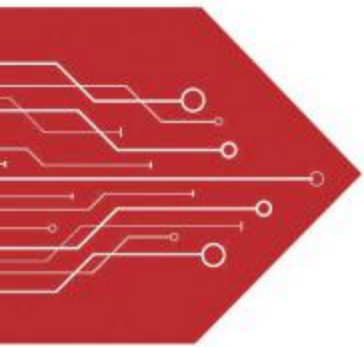


MSKSEMI

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT

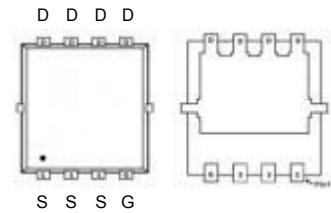


PLED

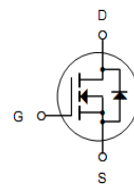
Product data sheet

Description

The MSK50N03DF is the high cell density
trenched N-ch MOSFETs, which provide
excellent RDSON and gate charge for most of
the synchronous buck converter applications.
The MSK50N03DF meet the RoHS and Green



DFN3X3-8L



N-Channel MOSFET

Product Summary

BVDSS	RDSON	ID
30V	9.5mΩ	46A

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	30	V
V _{GS}	Gate-Source Voltage	±20	V
I _D @T _C =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	46	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	29	A
I _D @T _A =25°C	Continuous Drain Current, V _{GS} @ 10V ¹	11	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ 10V ¹	9	A
I _{DM}	Pulsed Drain Current ²	92	A
EAS	Single Pulse Avalanche Energy ³	57.8	mJ
I _{AS}	Avalanche Current	34	A
P _D @T _C =25°C	Total Power Dissipation ⁴	29	W
P _D @T _A =25°C	Total Power Dissipation ⁴	1.67	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Data

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction-ambient ¹	---	75	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	---	4.32	°C/W

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	30	---	---	V
ΔBV _{DSS} /ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C , I _D =1mA	---	0.027	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =10V , I _D =12A	---	8	9.5	mΩ
		V _{GS} =4.5V , I _D =10A	---	12	15	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	---	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-5.8	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =24V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =24V , V _{GS} =0V , T _J =55°C	---	---	5	
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±20V , V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =5V , I _D =15A	---	9.8	---	S
R _g	Gate Resistance	V _{DS} =0V , V _{GS} =0V , f=1MHz	---	1.7	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =20V , V _{GS} =4.5V , I _D =12A	---	12.8	---	nC
Q _{gs}	Gate-Source Charge		---	3.3	---	
Q _{gd}	Gate-Drain Charge		---	6.5	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =12V , V _{GS} =10V , R _G =3.3Ω I _D =5A	---	4.5	---	ns
T _r	Rise Time		---	10.8	---	
T _{d(off)}	Turn-Off Delay Time		---	25.5	---	
T _f	Fall Time		---	9.6	---	
C _{iss}	Input Capacitance	V _{DS} =15V , V _{GS} =0V , f=1MHz	---	1317	---	pF
C _{oss}	Output Capacitance		---	163	---	
C _{rss}	Reverse Transfer Capacitance		---	131	---	

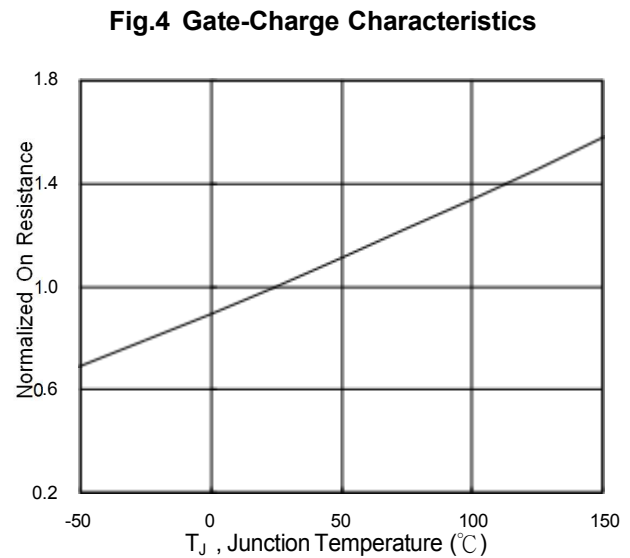
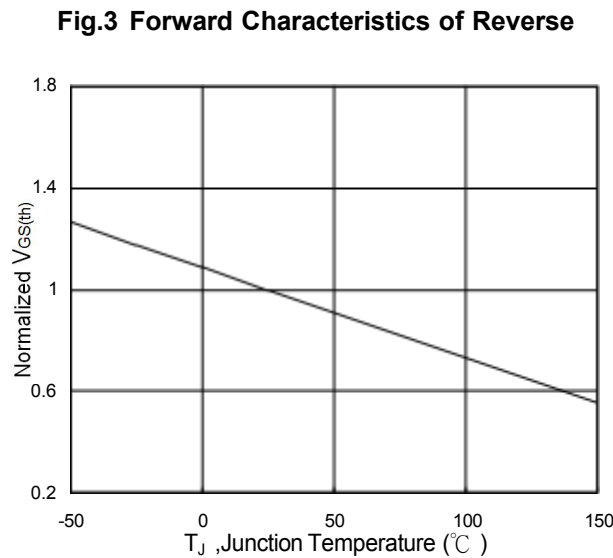
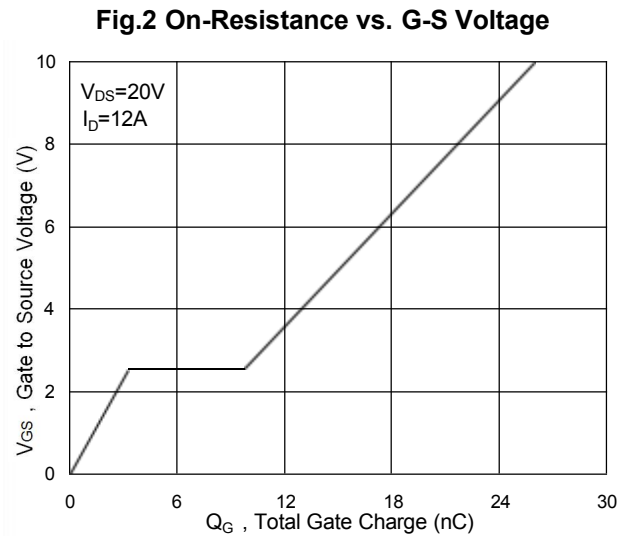
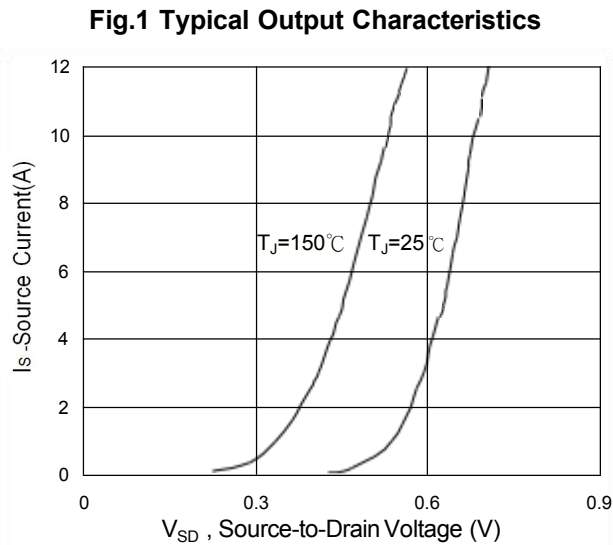
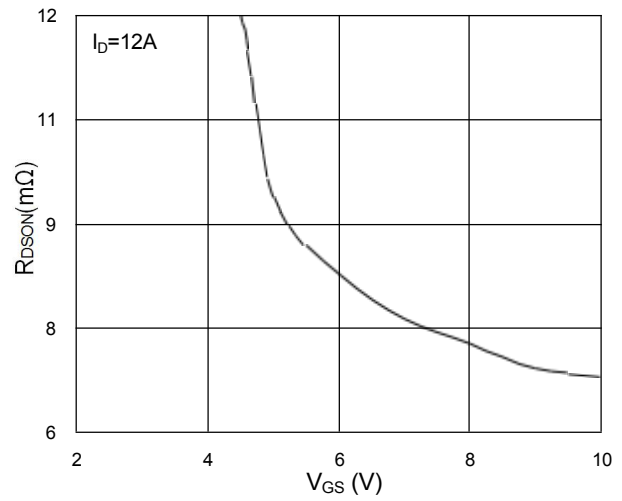
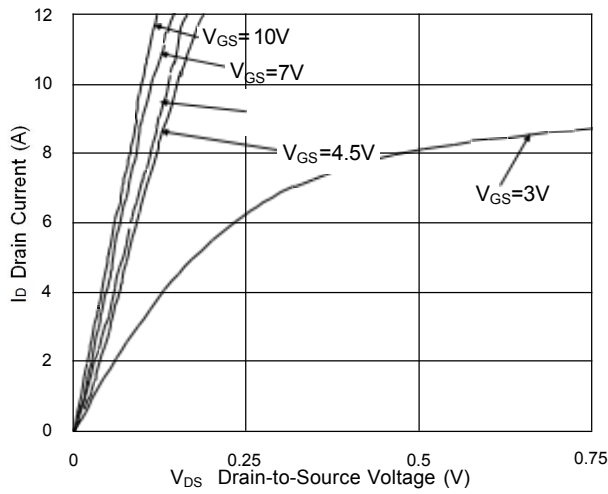
Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current ^{1,6}	V _G =V _D =0V , Force Current	---	---	46	A
I _{SM}	Pulsed Source Current ^{2,6}		---	---	92	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1	V

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The EAS data shows Max. rating . The test condition is V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=34A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics



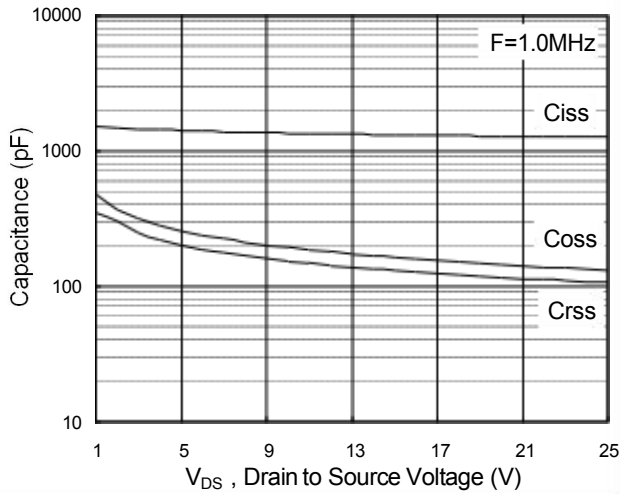


Fig.7 Capacitance

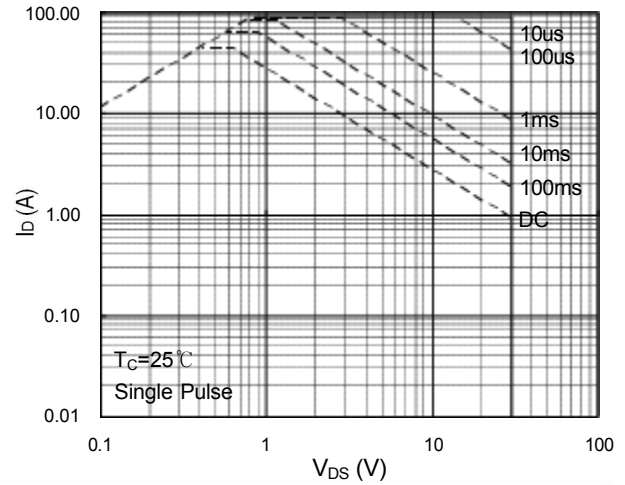


Fig.8 Safe Operating Area

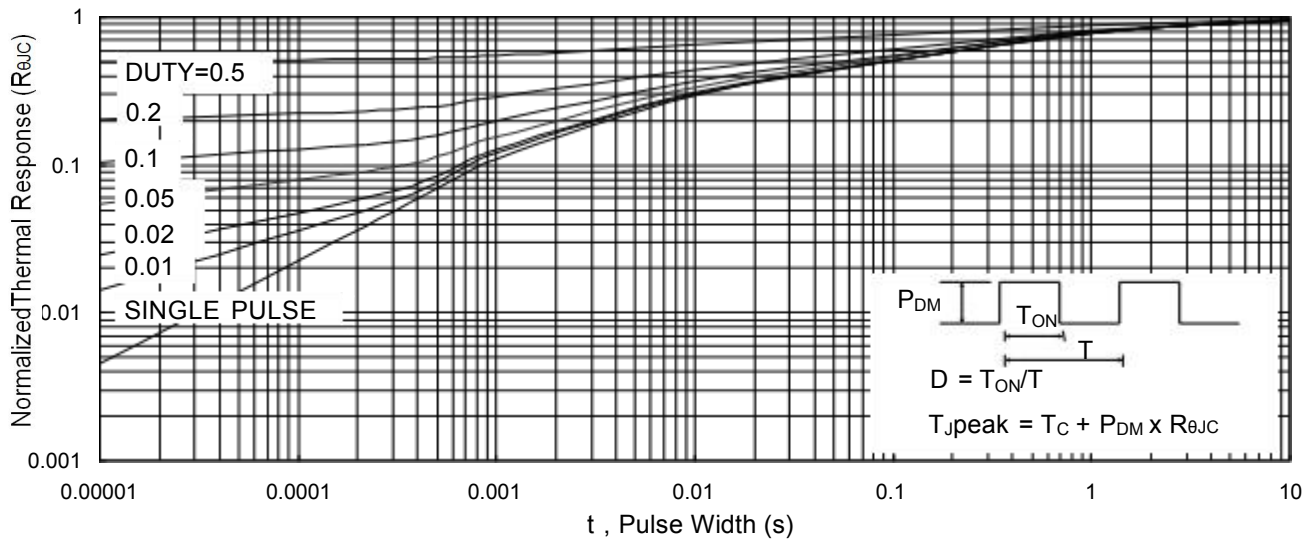


Fig.9 Normalized Maximum Transient Thermal Impedance

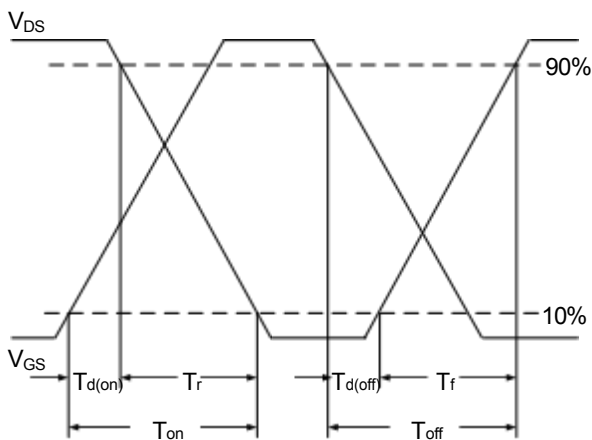


Fig.10 Switching Time Waveform

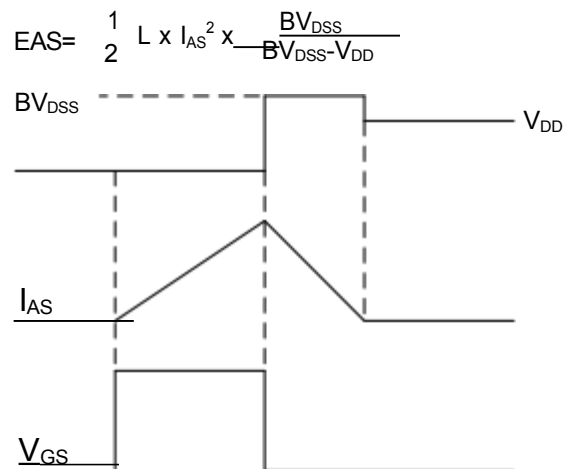
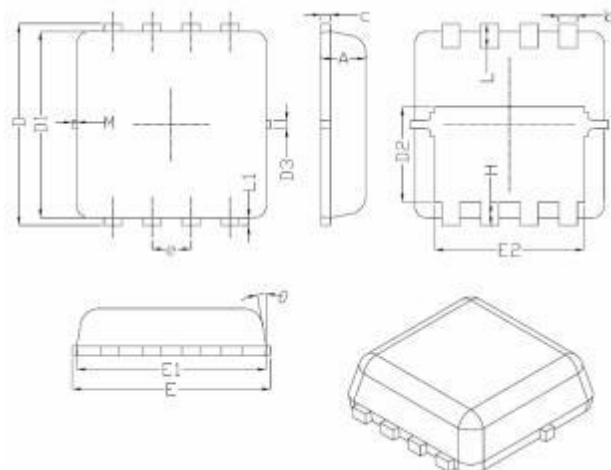


Fig.11 Unclamped Inductive Switching Waveform

DFN3X3-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
θ		10°	12°

REEL SPECIFICATION

Product ID	Pack	Qty(PCS)
MSK50N03DF	DFN3X3-8L	5000

Attention

- Any and all MSKSEMI Semiconductor products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your MSKSEMI Semiconductor representative nearest you before using any MSKSEMI Semiconductor products described or contained herein in such applications.
- MSKSEMI Semiconductor assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specificationsof any andall MSKSEMI Semiconductor products described orcontained herein.
- Specifications of any and all MSKSEMI Semiconductor products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer'sproducts orequipment.
- MSKSEMI Semiconductor strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with someprobability. It is possiblethat these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits anderror prevention circuitsforsafedesign, redundant design, and structural design.
- In the event that any or all MSKSEMI Semiconductor products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from theauthorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of MSKSEMI Semiconductor.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. MSKSEMI Semiconductor believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringementsof intellectual property rights or other rightsof third parties.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. Whendesigning equipment, referto the "Delivery Specification" for the MSKSEMI Semiconductor productthat you intend to use.