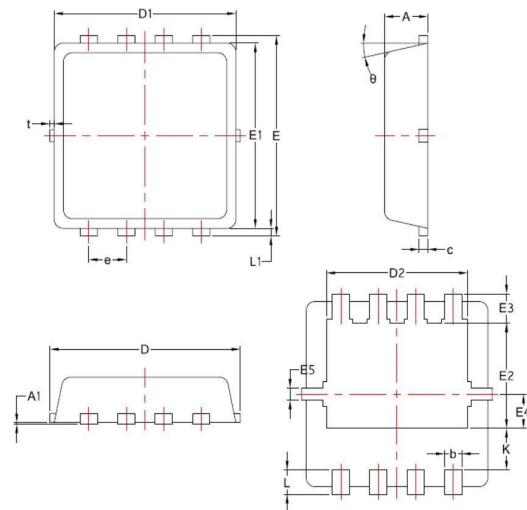
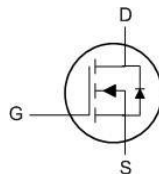
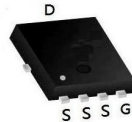


Description

The 50N03DF is the high cell density
trenched N-ch MOSFETs, which provide
excellent R_{DS(on)} and gate charge for most of
the synchronous buck converter applications.
The 50N03DF meet the RoHS and Green

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


PDFN3X3
Dimensions In Millimeters

Symbol	MIN.	MAX.	Symbol	MIN.	MAX.
A	0.7	0.85	E3	0.28	0.68
A1	/	0.05	E4	0.37	0.77
b	0.20	0.40	E5	0.10	0.30
c	0.10	0.25	e	0.60	0.70
D	3.15	3.45	K	0.59	0.89
D1	3.00	3.25	L	0.30	0.50
D2	2.40	2.65	L1	0.06	0.20
E	3.00	3.20	T	0	0.13
E1	2.90	3.20	θ	/	12°
E2	1.54	1.94			

Product Summary

BVDSS	R _{DS(on)}	I _D
30V	7.0mΩ	50A

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	50	A
I _D @T _C =100°C	Continuous Drain Current, V _{GS} @ 10V ¹	30	A
I _{DM}	Pulsed Drain Current ²	120	A
EAS	Single Pulse Avalanche Energy ³	39	mJ
I _{AS}	Avalanche Current	50	A
P _D @T _C =25°C	Total Power Dissipation ⁴	18	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

50N03DF

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 =250μA	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	---	7	8.5	mΩ
		V _{GS} =4.5V, I _D =10A	---	10	14	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250μA	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	μA
		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
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	---	1200	---	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	---	---	50	A
I _{SM}	Pulsed Source Current ^{2,6}		---	---	120	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1.2	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.

RATING AND CHARACTERISTIC CURVES (50N03DF)

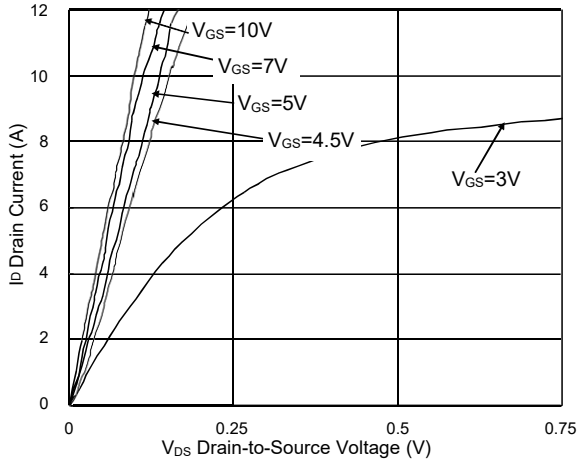


Fig.1 Typical Output Characteristics

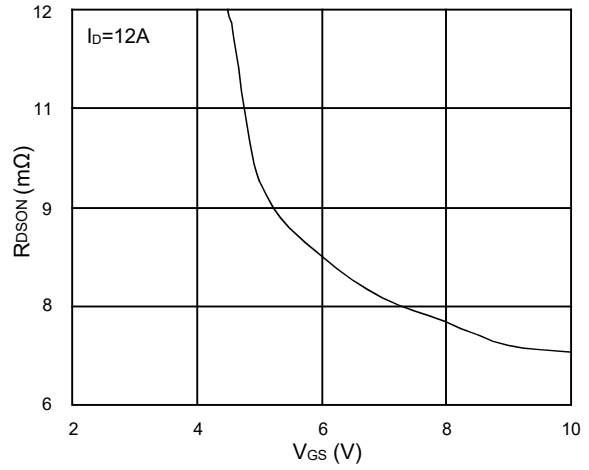


Fig.2 On-Resistance vs. G-S Voltage

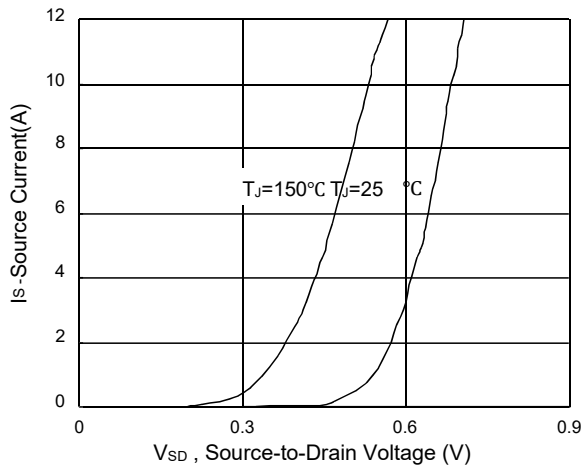


Fig.3 Forward Characteristics of Reverse

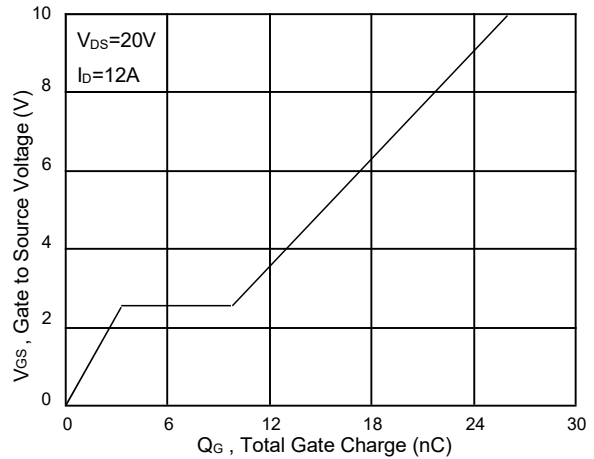


Fig.4 Gate-Charge Characteristics

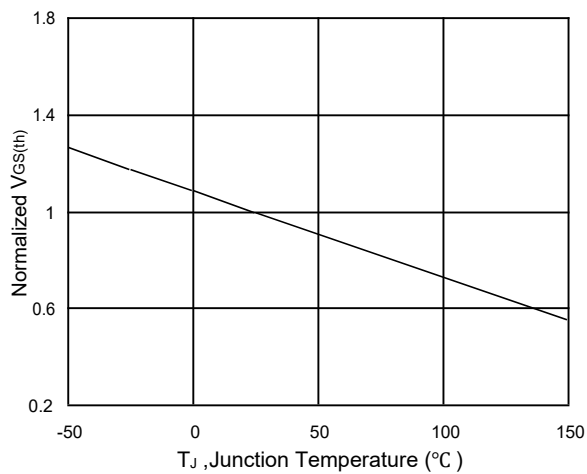


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

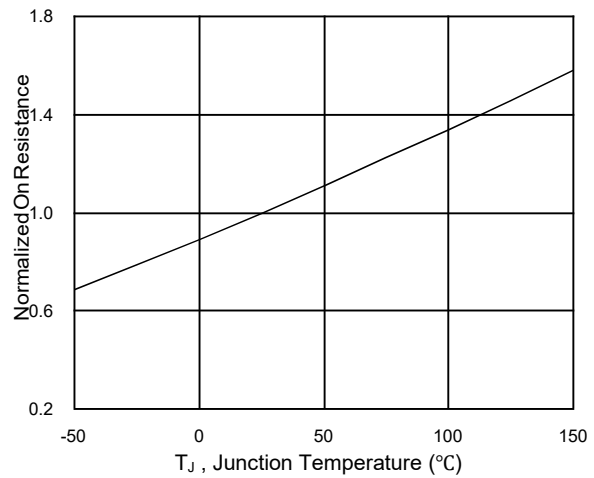


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

RATING AND CHARACTERISTIC CURVES (50N03DF)

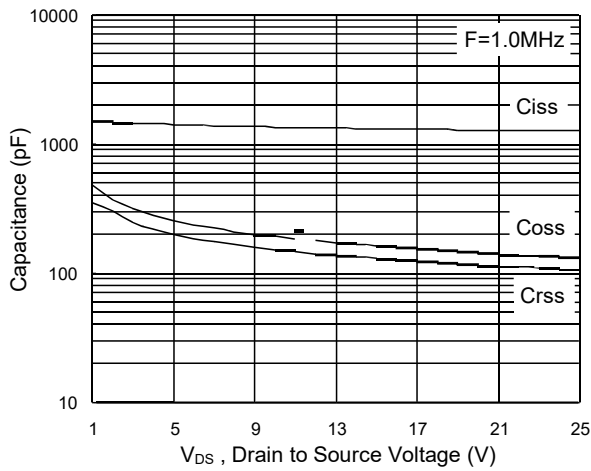


Fig.7 Capacitance

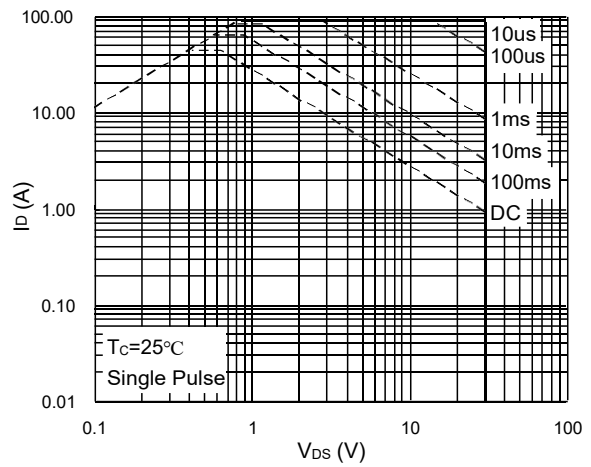


Fig.8 Safe Operating Area

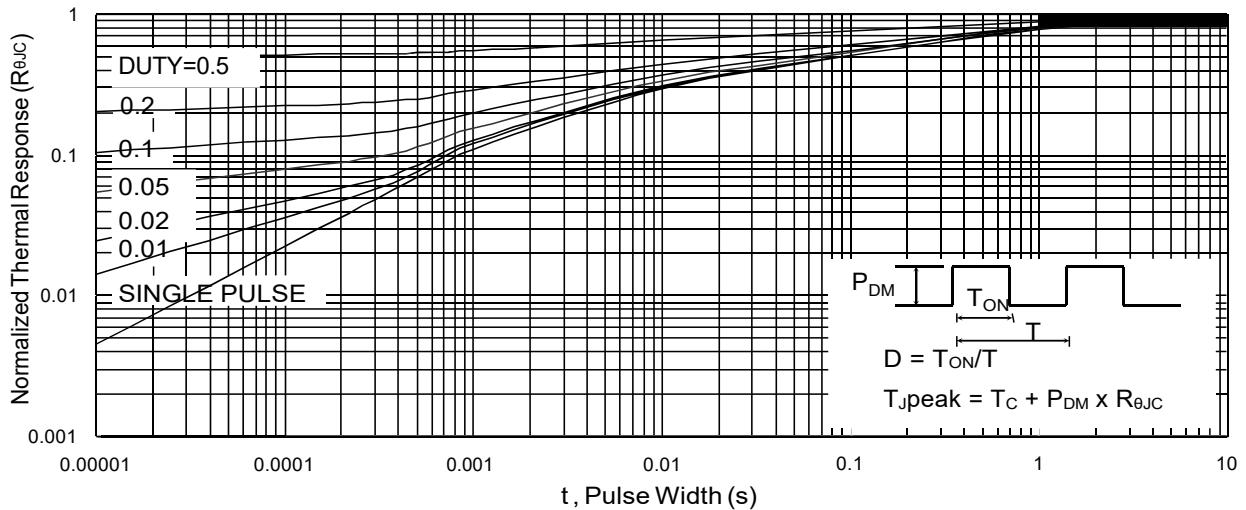


Fig.9 Normalized Maximum Transient Thermal Impedance

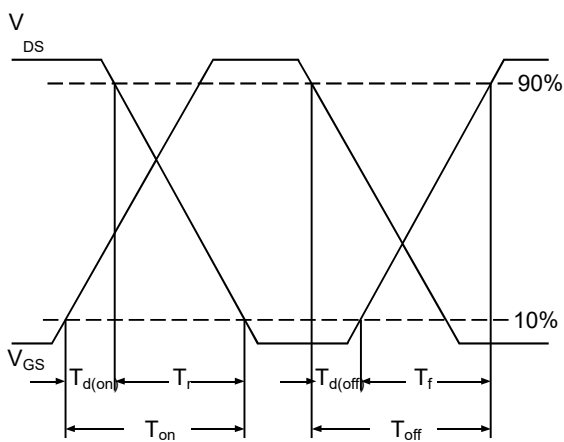


Fig.10 Switching Time Waveform

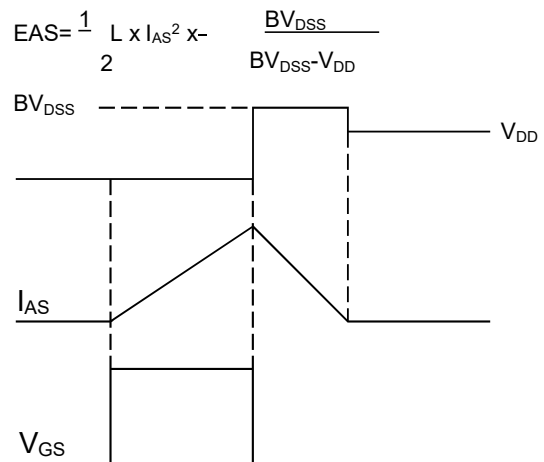


Fig.11 Unclamped Inductive Switching Waveform

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