

Description

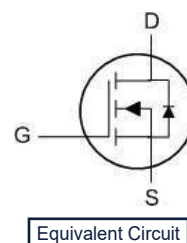
The 50N03D is the high cell density trench N-ch MOSFETs, which provide excellent RDSON and gate charge for most of the synchronous buck converter applications.

General Features

- SuperLowGateCharge
- ExcellentCdV/dteffectdecline
- AdvancedhighcelldensityTrench technology

Applications

- Load switch
- PWM



Ordering information

Product ID	Pack	Naming rule	Marking	Qty(PCS)
50N03D	PDFN3333-8L	50N03D 产品名称 product name	50N03	5000

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

Symbol	Parameter	Rating	Units
V _{DSS}	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	SinglePulseAvalancheEnergy ³	39	mJ
I _{AS}	AvalancheCurrent	50	A
P _D @T _A =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
R _{θJA}	Thermal Resistance Junction-Ambient ¹	75	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	4.32	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
On/Off States						
B _{VDS}	Drain-Source Breakdown Voltage	V _{GS} =0V,I _D =250uA	30	---	---	V
△B _{VDS} / △T _J	B _{VDS} 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 =250uA	1.0	---	2.5	V
△V _{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
R _g	Gate Resistance	V _{DS} =0V,V _{GS} =0V,f=1MHz	---	1.7	---	Ω
SWITCHING CHARACTERISTICS						
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	---	
Dynamic characteristics						
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	---	
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
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.

Typical Characteristics

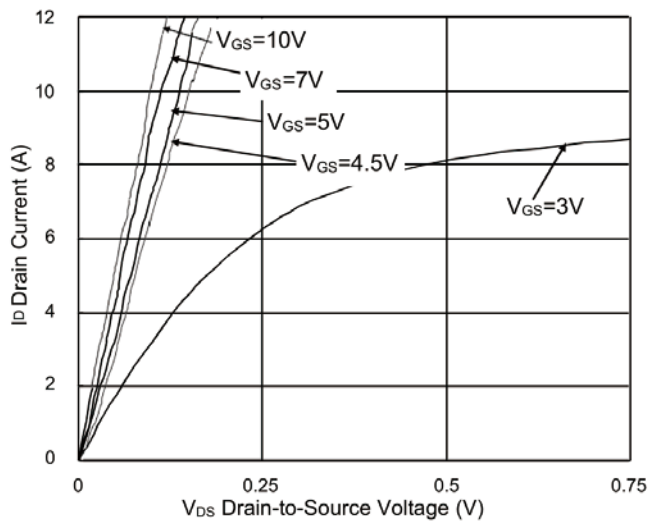


Fig.1 Typical Output Characteristics

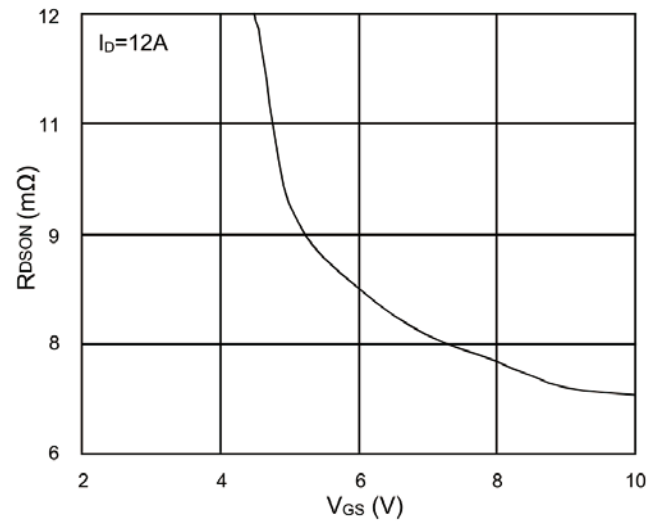


Fig.2 On-Resistance vs. G-S Voltage

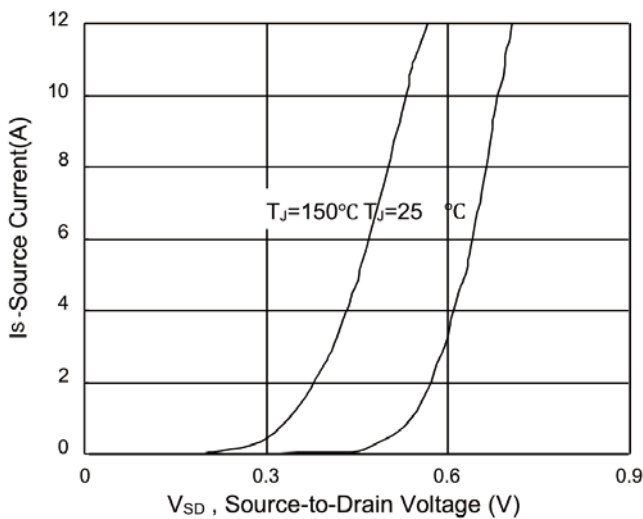


Fig.3 Source Drain Forward Characteristics

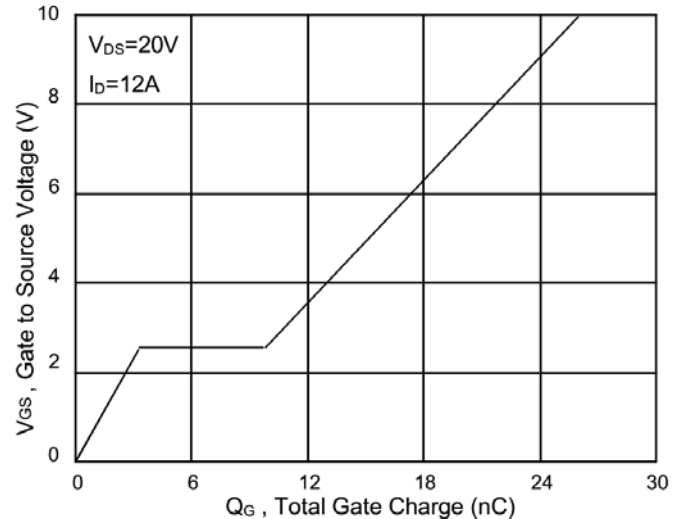


Fig.4 Gate-Charge Characteristics

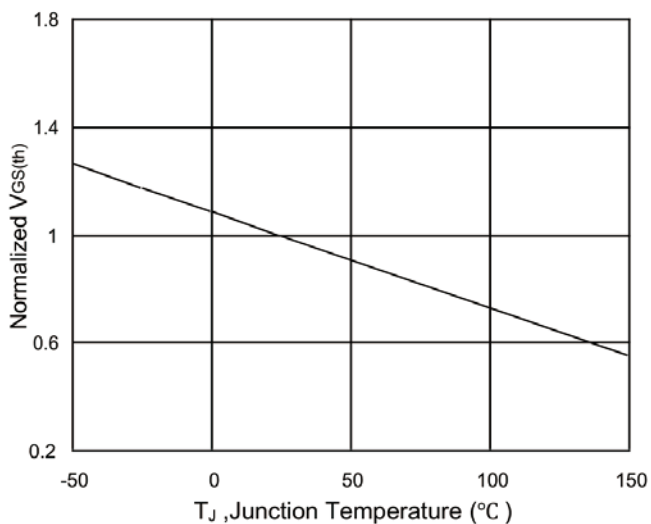


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

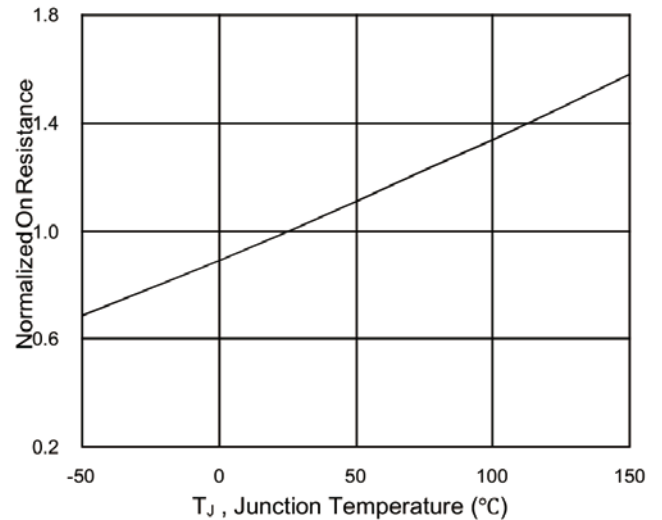


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

Typical Characteristics

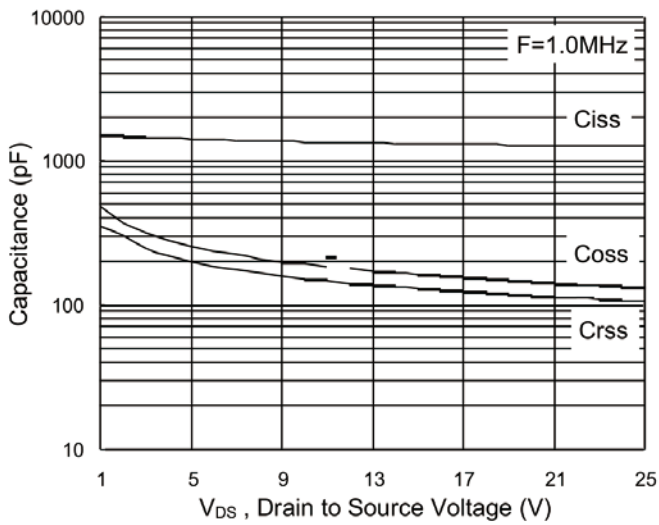


Fig.7 Capacitance

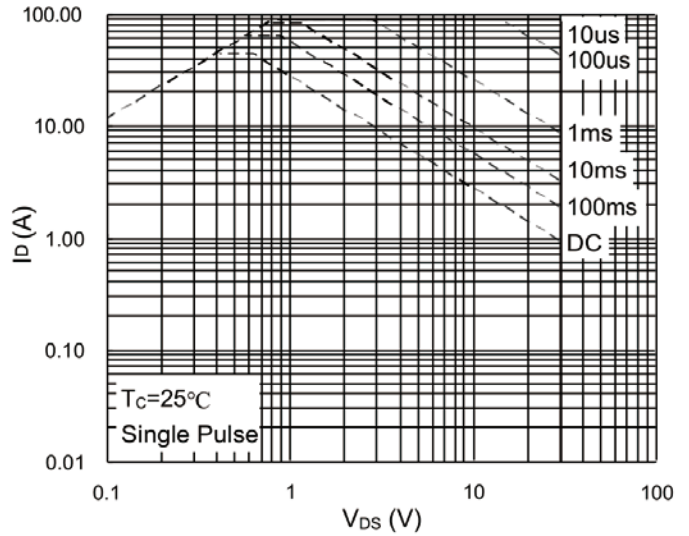


Fig.8 Safe Operating Area

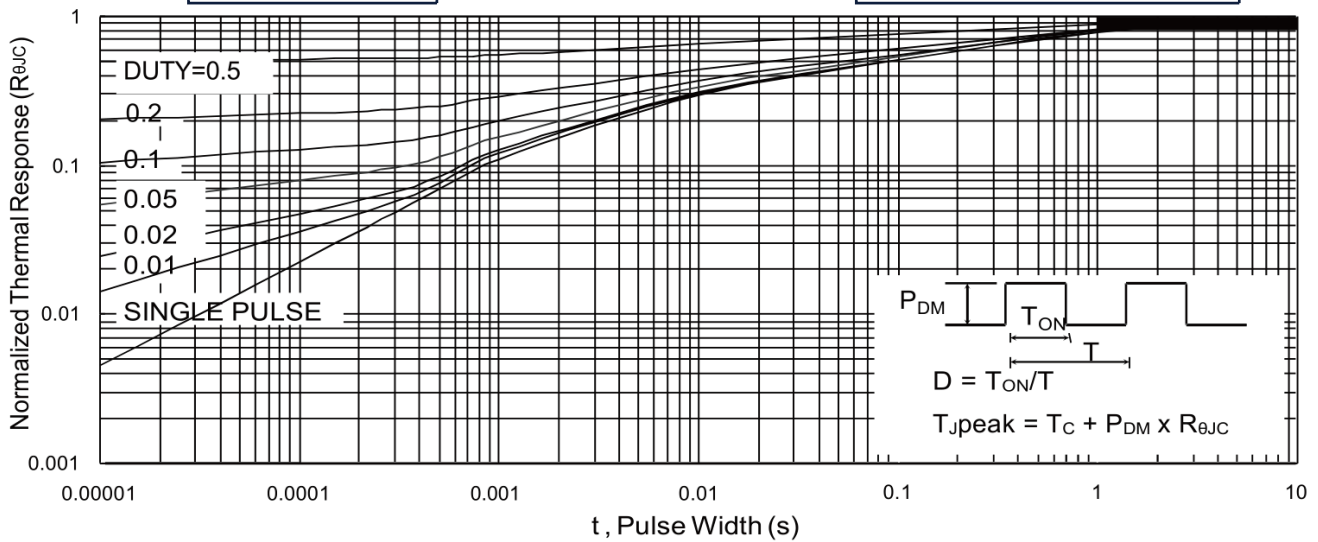


Fig.9 Normalized Maximum Transient Thermal Impedance

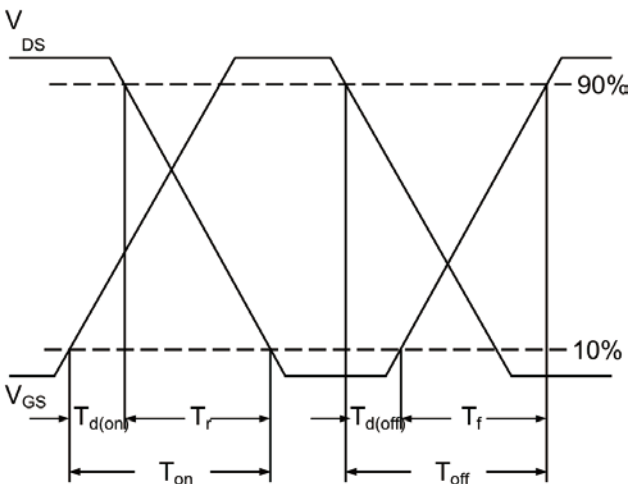


Fig.10 Switching Time Waveform

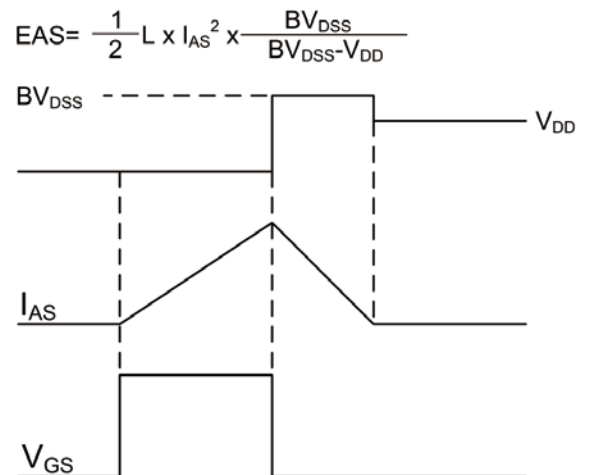
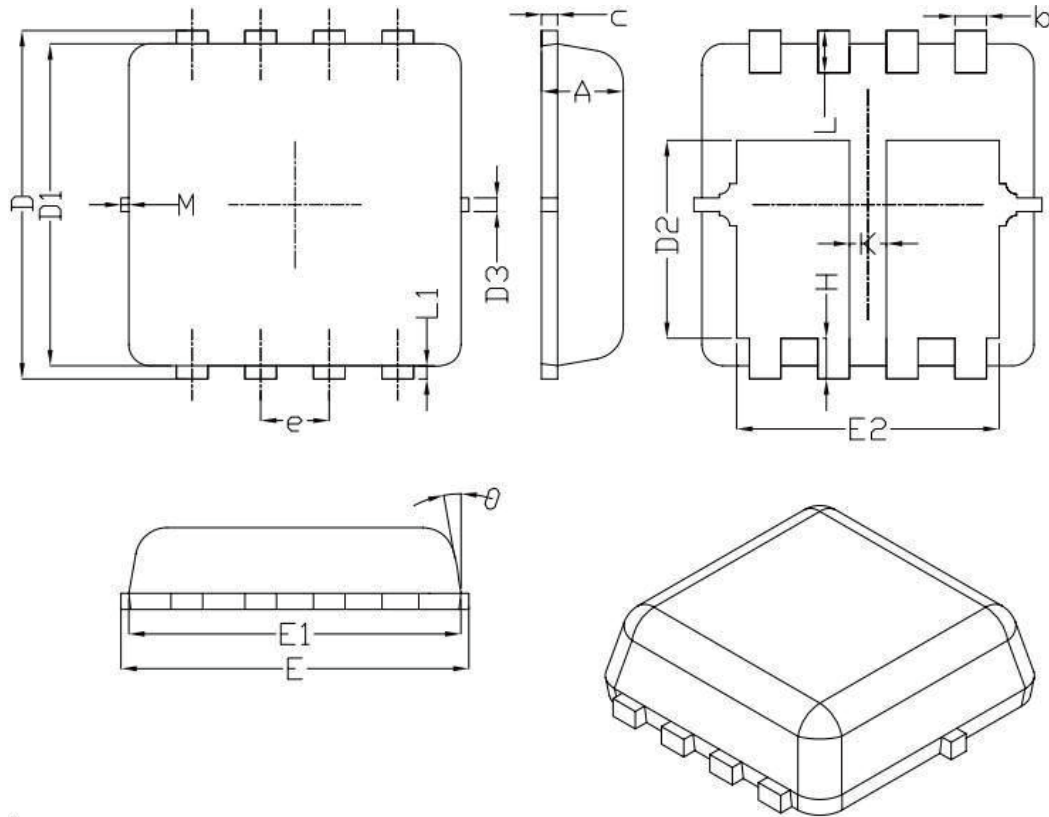


Fig.11 Unclamped Inductive Waveform

PDFN3333-8L Package Outline Dimensions



Symbol	Dimensions in Millimeters		
	mm		
	Min	Typ	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	1.78	1.88	1.98
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	--
K	0.30	--	0°
θ	--	10°	12°
M	*	*	0.15