30V P-Channel MOSFET

Features

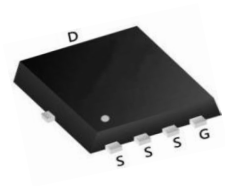
- Advanced high cell density Trench technology
- Super Low Gate Charge
- Excellent CdV/dt effect decline
- Green Device Available

Product Summary

V_{DS}	-30	V
I_D	-42	A
$R_{DS(ON)}$ (at V_{GS}=-10V)	14	mΩ
$R_{DS(ON)}$ (at V_{GS}=-4.5V)	22	mΩ

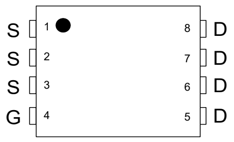
Applications

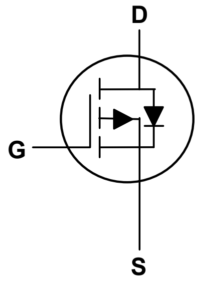
- High Frequency Point-of-Load,Synchronous Buck Converter for MB/NB/UMPC/VGA
- Networking DC-DC Power System
- Load Switch，LED applications



DFN3X3-8L Top View

Top View





Absolute Maximum Ratings(T_C=25℃, unless otherwise noted)

Parameter	Symbol	Rating		Units
		10S	Steady State	
Drain-Source Voltage	V_{DS}	-30		V
Gate-Source Voltage	V_{GS}	±20		V
Continuous Drain Current, VGS @ -10V[1]	I_D@T_C=25℃	-42		A
Continuous Drain Current, VGS @ -10V[1]	I_D@T_C=100℃	-27		A
Continuous Drain Current, VGS @ -10V[1]	I_D@T_A=25℃	-14.3	-9	A
Continuous Drain Current, VGS @ -10V[1]	I_D@T_A=70℃	-11.4	-7.2	A
Pulsed Drain Current[2]	I_{DM}	-130		A
Single Pulse Avalanche Energy[3]	EAS	125		mJ
Avalanche Current	I_{AS}	-50		A
Total Power Dissipation[4]	P_D@T_C=25℃	37		W
Total Power Dissipation[4]	P_D@T_A=25℃	4.2	1.67	W
Storage Temperature Range	T_{STG}	-55 to 150		℃
Operating Junction Temperature Range	T_J	-55 to 150		℃

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient[1](t ≤10s)	$R_{\theta JA}$	---	30	℃/W
Thermal Resistance Junction-Ambient[1]		---	75	℃/W
Thermal Resistance Junction-Case[1]	$R_{\theta JC}$	---	3.36	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V , I_D=-250uA	-30	---	---	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25℃ , I_D=-1mA	---	-0.023	---	V/℃
Static Drain-Source On-Resistance[2]	$R_{DS(ON)}$	V_{GS}=-10V , I_D=-30A	---	---	14	mΩ
		V_{GS}=-4.5V , I_D=-15A	---	---	22	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =-250uA	-1.2	---	-2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		---	4.6	---	mV/℃
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-24V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-24V , V_{GS}=0V , T_J=55℃	---	---	-5	uA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Forward Transconductance	gfs	V_{DS}=-5V , I_D=-30A	---	30	---	S
Gate Resistance	R_g	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	9	---	Ω
Total Gate Charge (-4.5V)	Q_g	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-15A	---	22	---	nC
Gate-Source Charge	Q_{gs}		---	8.7	---	
Gate-Drain Charge	Q_{gd}		---	7.2	---	
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=-15V , V_{GS}=-10V , R_G=3.3Ω, I_D=-15A	---	8	---	ns
Rise Time	T_r		---	73.7	---	
Turn-Off Delay Time	$T_{d(off)}$		---	61.8	---	
Fall Time	T_f		---	24.4	---	
Input Capacitance	C_{iss}	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	2215	---	pF
Output Capacitance	C_{oss}		---	310	---	
Reverse Transfer Capacitance	C_{rss}		---	237	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current[1,5]	I_S	V_G=V_D=0V , Force Current	---	---	-42	A
Pulsed Source Current[2,5]	I_{SM}		---	---	-130	A
Diode Forward Voltage[2]	V_{SD}	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1	V
Reverse Recovery Time	t_{rr}	I_F=-15A , di/dt=100A/μs，T_J=25℃	---	19	---	nS
Reverse Recovery Charge	Q_{rr}		---	9	---	nC

Note:

1.The data tested by surface mounted on a 1 inch^2 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}=-50A

4.The power dissipation is limited by 150℃ 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

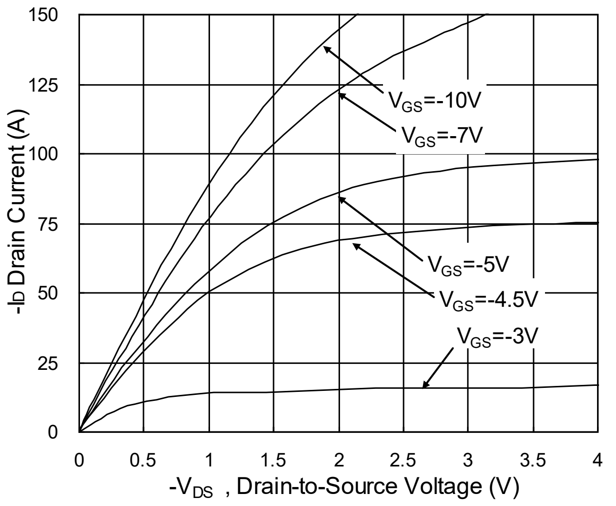


Fig.1 Typical Output Characteristics

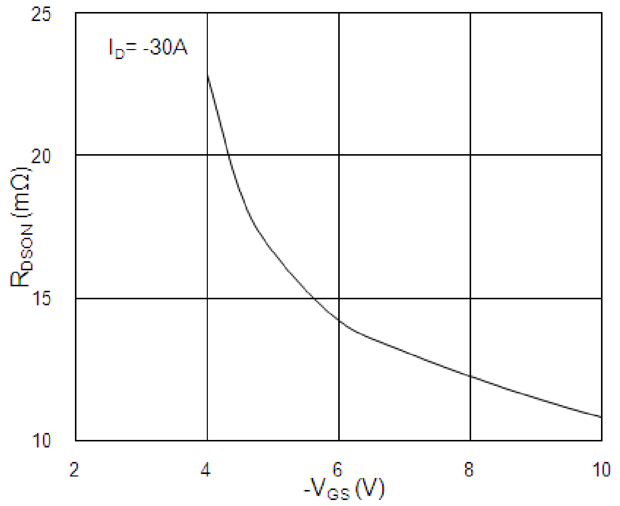


Fig.2 On-Resistance vs. G-S Voltage

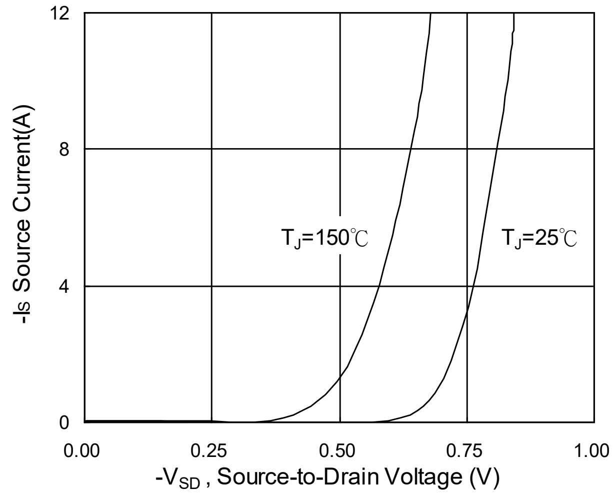


Fig.3 Forward Characteristics of Reverse

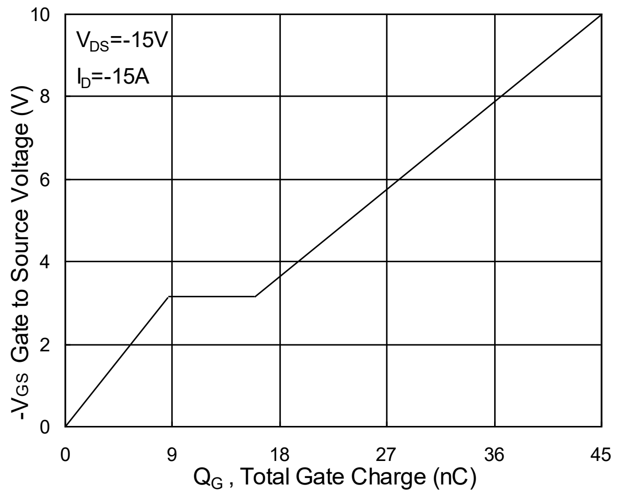


Fig.4 Gate-Charge Characteristics

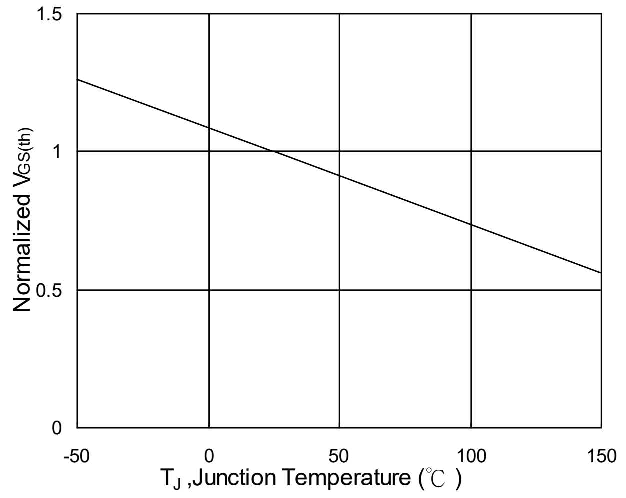


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

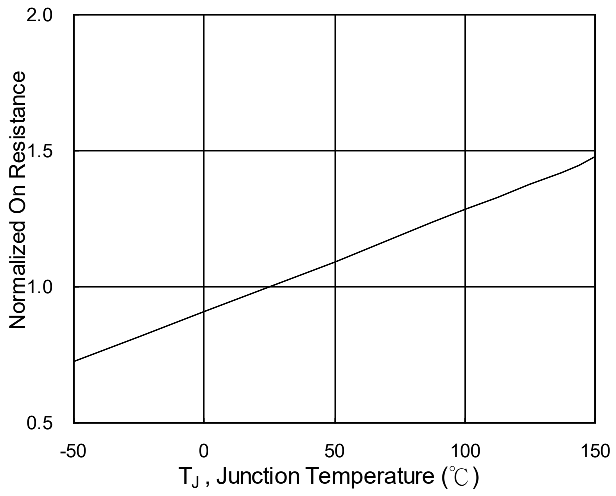


Fig.6 Normalized R_{DSON} vs. T_J

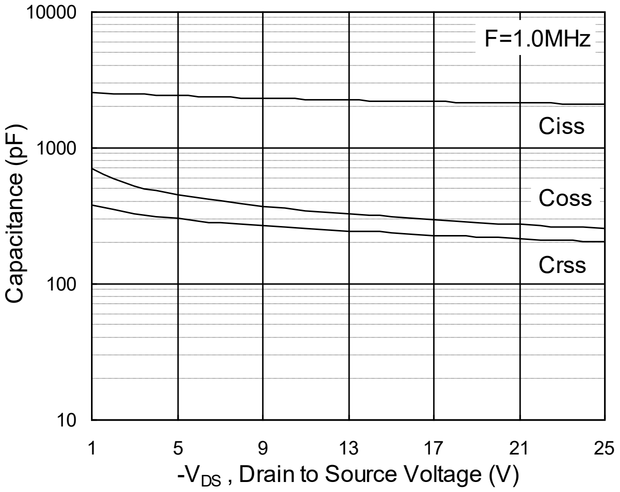


Fig.7 Capacitance

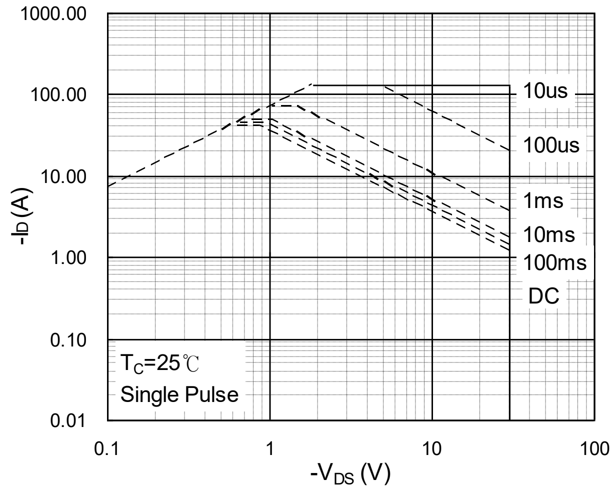


Fig.8 Safe Operating Area

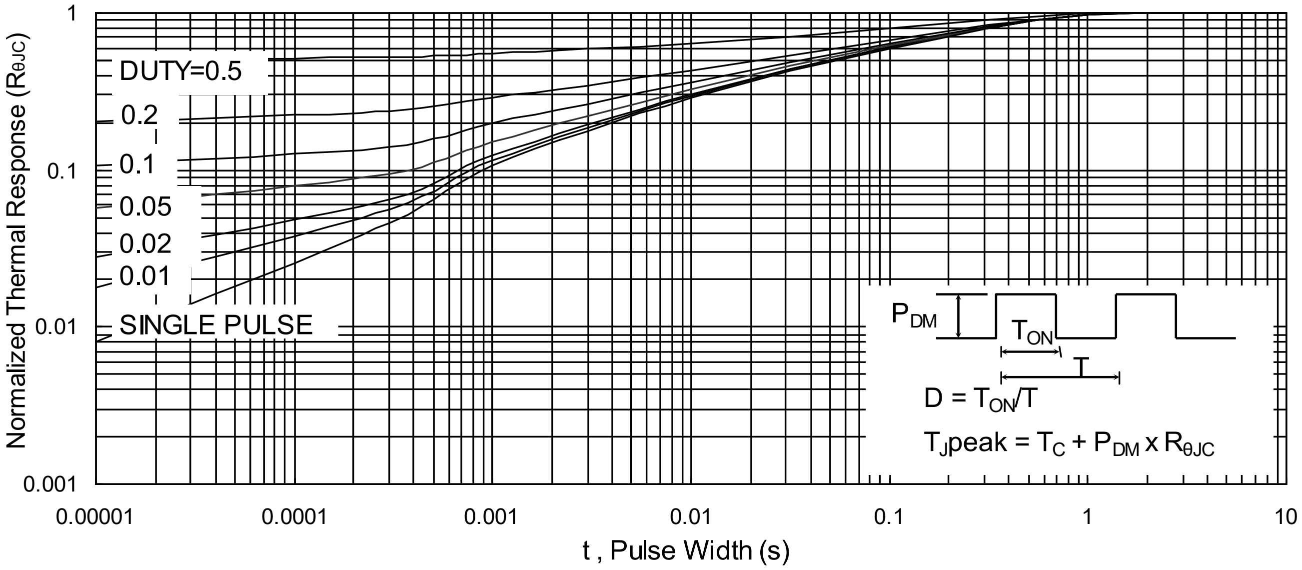


Fig.9 Normalized Maximum Transient Thermal Impedance

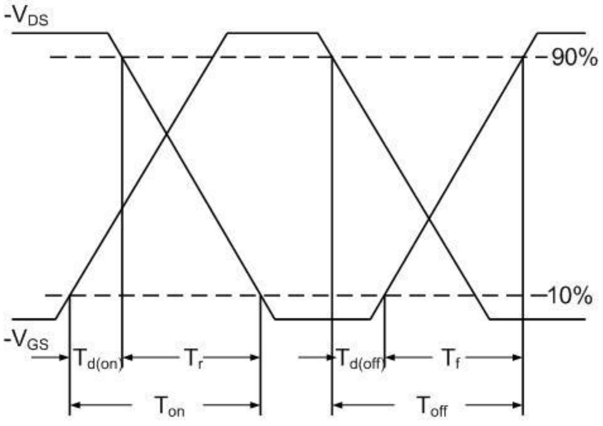


Fig.10 Switching Time Waveform

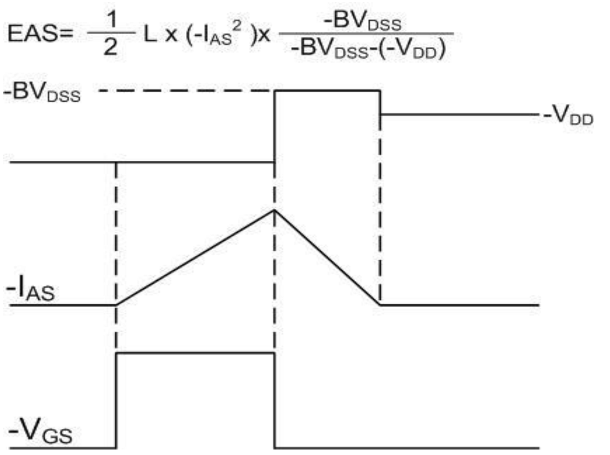
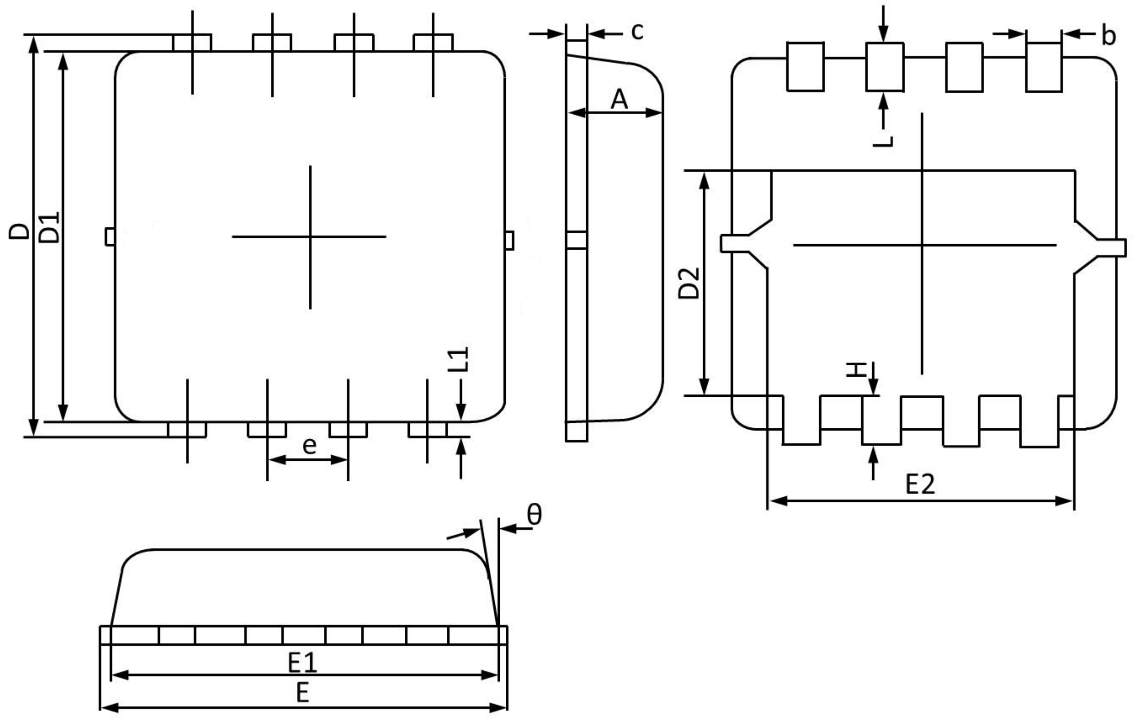


Fig.11 Unclamped Inductive Switching Waveform

DFN3X3-8L Package Outline Dimensions



Symbol	**Dimensions** (unit:mm)			Symbol	**Dimensions** (unit:mm)		
	Min	**Typ**	**Max**		**Min**	**Typ**	**Max**
A	0.70	0.75	0.85	**E1**	2.90	3.10	3.25
b	0.24	0.30	0.35	**E2**	2.35	2.50	2.60
c	0.10	0.17	0.25	**e**	0.65 BSC		
D	3.10	3.30	3.45	**H**	0.30	0.40	0.50
D1	2.90	3.05	3.20	**L**	0.30	0.40	0.50
D2	1.45	1.70	1.95	**L1**	--	0.13	--
E	3.05	3.25	3.40	**θ**	0°		14°