

Features

- Advanced Trench technology
- High-speed switching
- Excellent CdV/dt effect decline
- ESD Protected Embedded
- Green Device Available

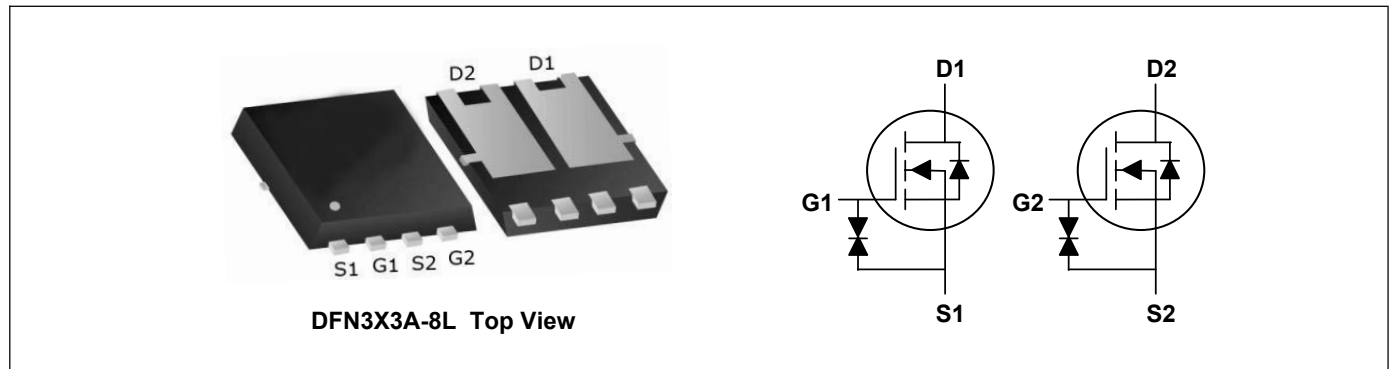
Product Summary



V_{DS}	20	V
I_D	12	A
$R_{DS(ON)}$ (at $V_{GS}=4.5V$)	9.5	m Ω
$R_{DS(ON)}$ (at $V_{GS}=2.5V$)	15	m Ω

Applications

- High Frequency Point-of-Load, Synchronous Buck Converter
- POL Applications
- Li-Battery Protection



Absolute Maximum Ratings ($T_A=25^\circ C$, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current, V_{GS} @ 4.5V ¹	$I_D@T_C=25^\circ C$	12	A
Continuous Drain Current, V_{GS} @ 4.5V ¹	$I_D@T_C=70^\circ C$	9.6	A
Pulsed Drain Current ²	I_{DM}	72	A
Total Power Dissipation ³	$P_D@T_A=25^\circ C$	1.32	W
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ C$
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ C$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	$R_{\theta JA}$	---	55	$^\circ C/W$
Thermal Resistance Junction-Ambient ¹ (Steady State)		---	95	$^\circ C/W$

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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V, I _D =250uA	20	---	---	V
Static Drain-Source On-Resistance ²	R _{DS(ON)}	V _{GS} =4.5V, I _D =3A	---	8.0	9.5	mΩ
		V _{GS} =4.0V, I _D =3A	---	8.5	9.8	mΩ
		V _{GS} =3.1V, I _D =3A	---	10.5	12.5	mΩ
		V _{GS} =2.5V, I _D =3A	---	12	15	mΩ
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =250uA	0.5	---	1.5	V
Drain-Source Leakage Current	I _{DSS}	V _{DS} =16V, V _{GS} =0V, T _J =25°C	---	---	1	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±12V, V _{DS} =0V	---	---	±5	uA
Forward Transconductance	g _{fs}	V _{DS} =5V, I _D =6A	---	28	---	S
Total Gate Charge	Q _g	V _{DS} =15V, V _{GS} =4.5V, I _D =10A	---	13.5	---	nC
Gate-Source Charge	Q _{gs}		---	2.2	---	
Gate-Drain Charge	Q _{gd}		---	7.2	---	
Turn-On Delay Time	T _{d(on)}	V _{DD} =15V, V _{GS} =4.5V, R _G =6Ω, I _D =6A	---	22	---	ns
Rise Time	T _r		---	85	---	
Turn-Off Delay Time	T _{d(off)}		---	125	---	
Fall Time	T _f		---	46	---	
Input Capacitance	C _{iss}	V _{DS} =10V, V _{GS} =0V, f=1MHz	---	775	---	pF
Output Capacitance	C _{oss}		---	255	---	
Reverse Transfer Capacitance	C _{rss}		---	230	---	

Drain-Source Diode Characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Continuous Source Current ^{1,4}	I _S	V _G =V _D =0V, Force Current	---	---	12	A
Pulsed Source Current ^{2,4}	I _{SM}		---	---	72	A
Diode Forward Voltage ²	V _{SD}	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 power dissipation is limited by 150°C junction temperature
- 4.The data is theoretically the same as I_D and I_{DM}, in real applications, should be limited by total power dissipation.

Typical Characteristics

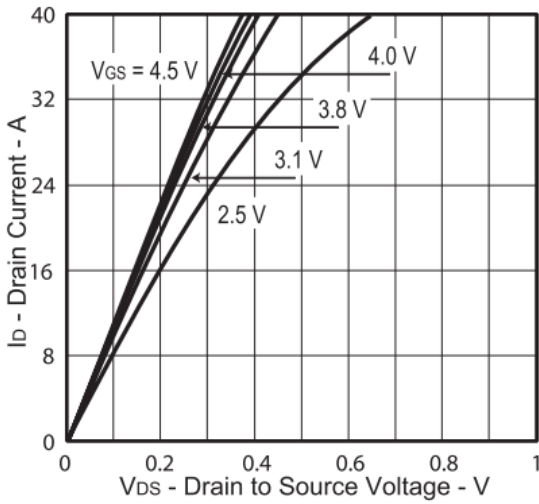


Fig.1 Typical Output Characteristics

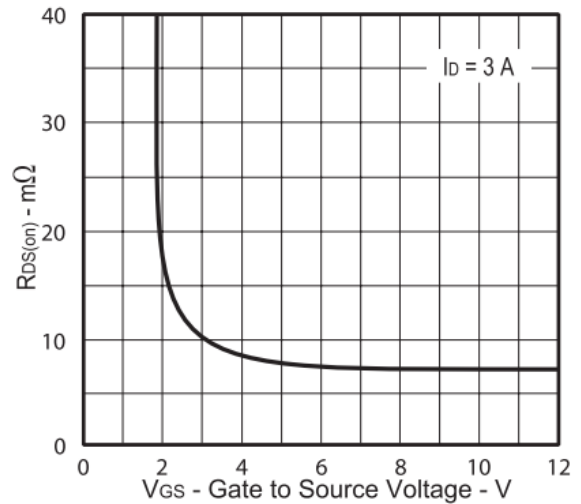


Fig.2 On-Resistance vs. Gate-Source

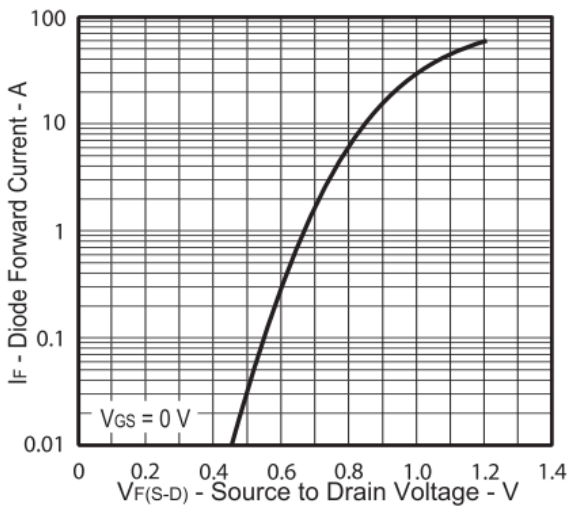


Fig.3 Forward Characteristics Of Reverse

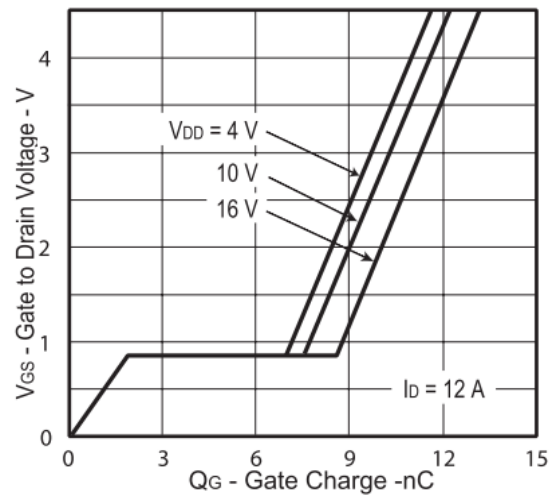


Fig.4 Gate-Charge Characteristics

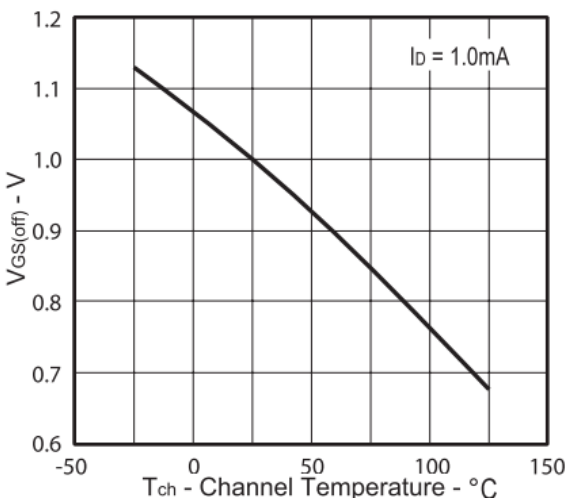


Fig.5 $V_{GS(th)}$ vs. T_{CH}

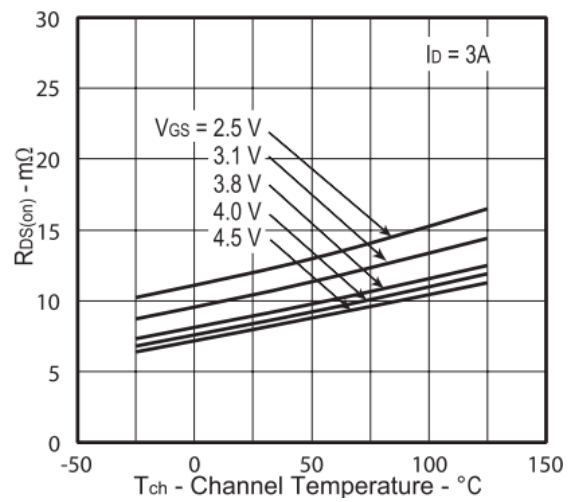


Fig.6 $R_{DS(on)}$ vs. T_{CH}

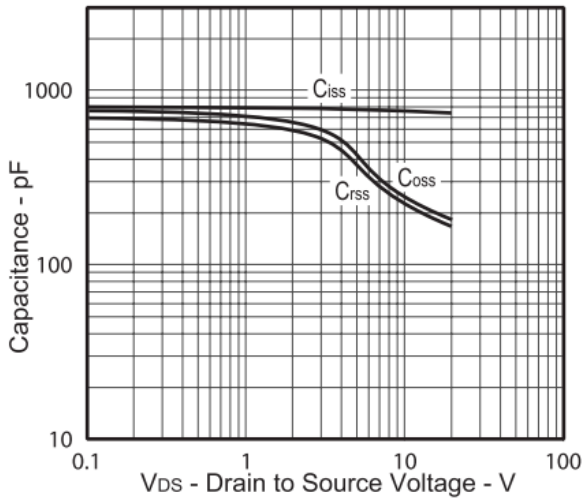


Fig.7 Capacitance

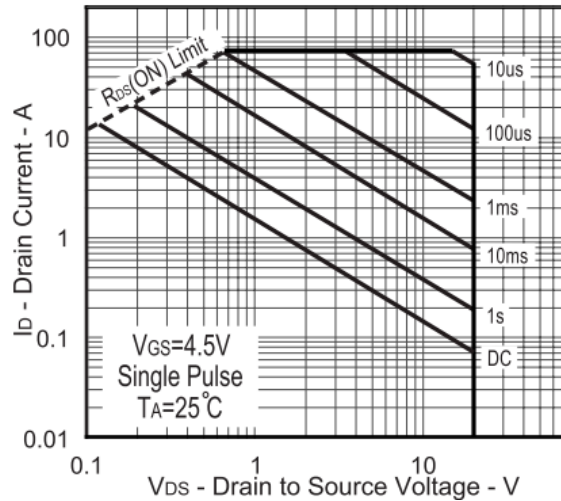


Fig.8 Safe Operating Area

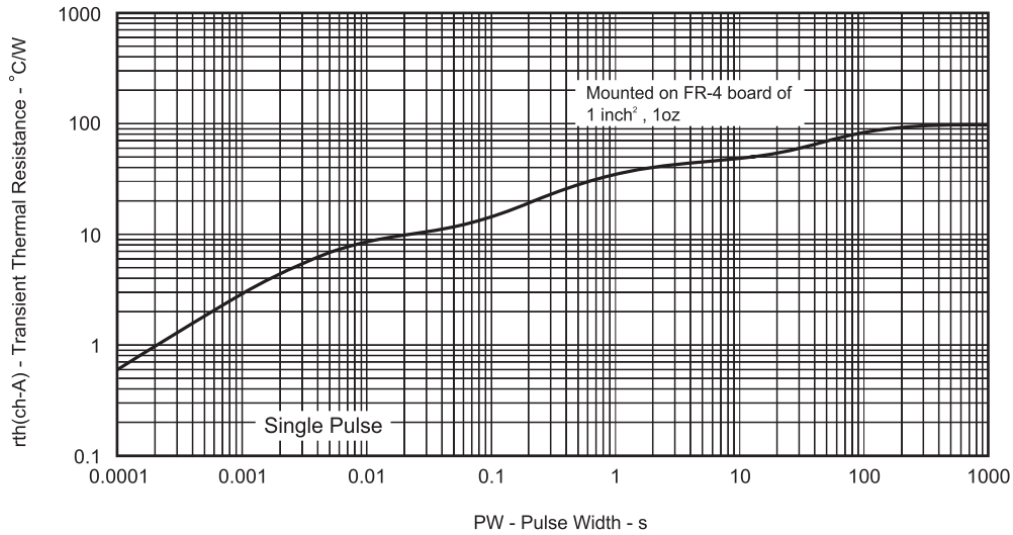


Fig.9 Normalized Maximum Transient Thermal Impedance

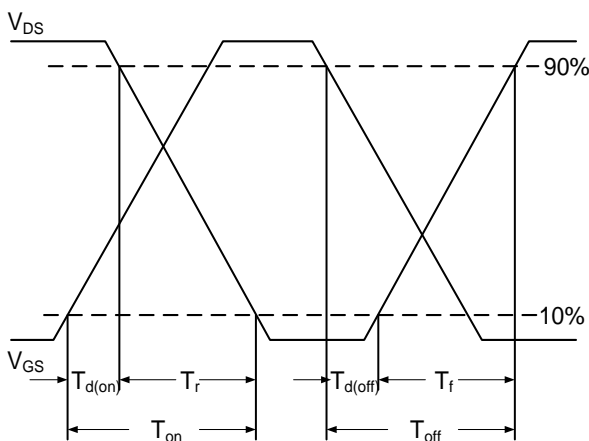


Fig.10 Switching Time Waveform

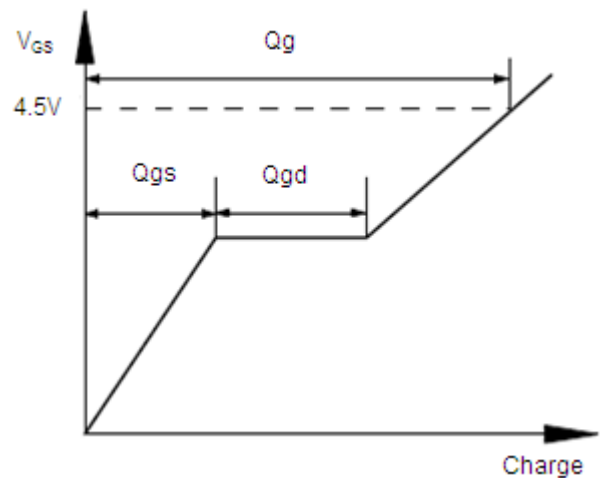
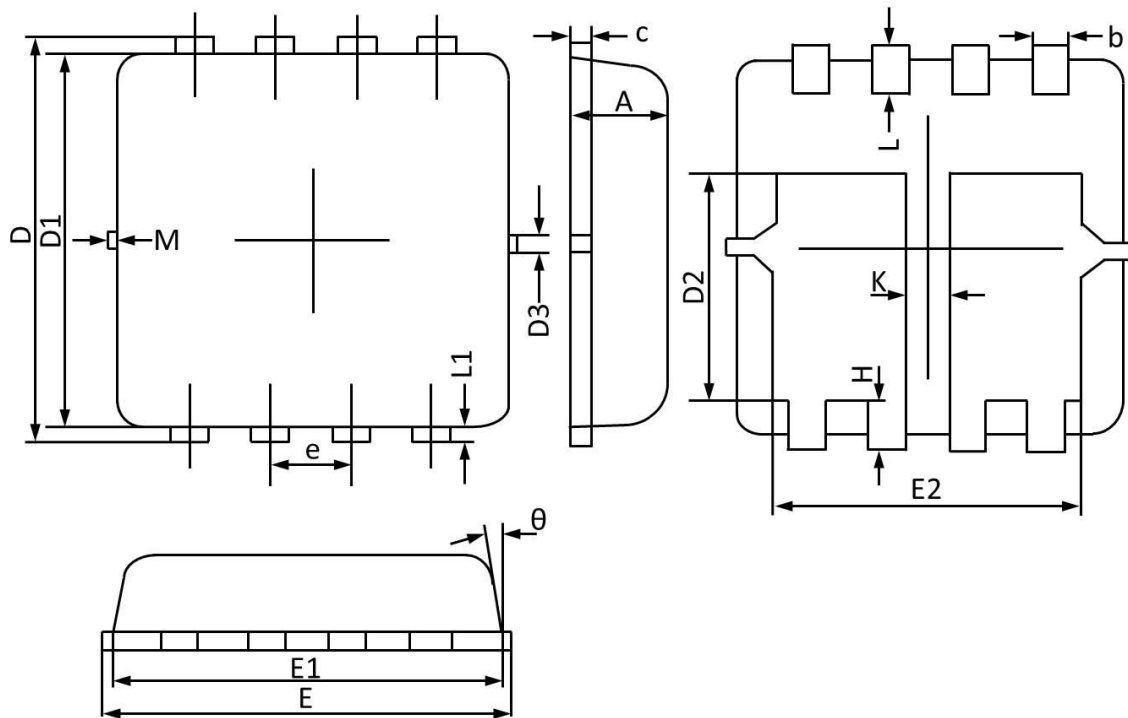


Fig.11 Gate Charge Waveform

DFN3X3A-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	E2	2.35	2.50	2.60
b	0.25	0.30	0.35	e	0.65 BSC		
c	0.10	0.17	0.25	H	0.30	0.40	0.50
D	3.10	3.30	3.45	L	0.30	0.40	0.50
D1	2.90	3.05	3.20	L1	0.13 REF		
D2	1.45	1.70	1.95	K	0.30 REF		
D3	0.13 REF			theta	0°		12°
E	3.05	3.25	3.40	M	0.15 REF		
E1	2.90	3.10	3.25				