

Features

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

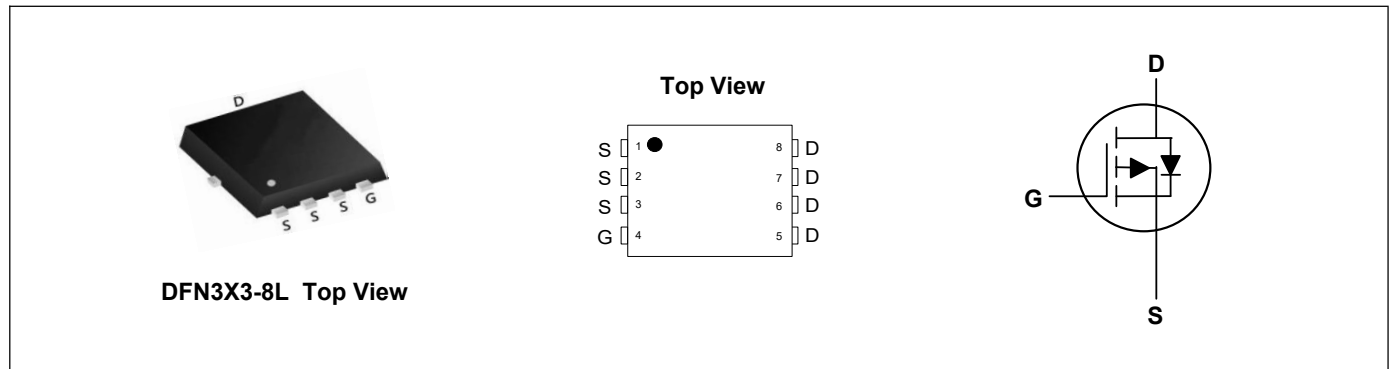
Product Summary



V_{DS}	-20	V
I_D	-48	A
$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)	9	m Ω
$R_{DS(ON)}$ (at $V_{GS}=-2.5V$)	11.5	m Ω

Applications

- High Frequency Point-of-Load, Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch, LED applications



Absolute Maximum Ratings ($T_C=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	-20	V
Gate-Source Voltage	V_{GS}	± 8	V
Continuous Drain Current, $V_{GS} @ -4.5V^1$	$I_D @ T_C=25^\circ\text{C}$	-48	A
Continuous Drain Current, $V_{GS} @ -4.5V^1$	$I_D @ T_C=70^\circ\text{C}$	-38	A
Pulsed Drain Current ²	I_{DM}	-100	A
Total Power Dissipation ³	$P_D @ T_C=25^\circ\text{C}$	29	W
Total Power Dissipation ³	$P_D @ T_C=70^\circ\text{C}$	19	W
Storage Temperature Range	T_{STG}	-55 to 150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ	Max	Unit
Thermal Resistance Junction-Ambient ¹ ($t \leq 10s$)	$R_{\theta JA}$	---	40	$^\circ\text{C/W}$
Thermal Resistance Junction-Ambient ¹		---	75	$^\circ\text{C/W}$
Thermal Resistance Junction-Case ¹	$R_{\theta JC}$	---	4.2	$^\circ\text{C/W}$

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
BV _{DSS} Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =-1mA	---	-0.012	---	V/°C
Static Drain-Source On-Resistance ²	R _{DS(ON)}	V _{GS} =-4.5V, I _D =-10A	---	---	9	mΩ
		V _{GS} =-2.5V, I _D =-8A	---	---	11.5	mΩ
		V _{GS} =-1.8V, I _D =-6A	---	---	15	mΩ
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =-250uA	-0.3	---	-1.0	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		---	2.94	---	mV/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =-20V, V _{GS} =0V, T _J =25°C	---	---	1	uA
Gate-Source Leakage Current	I _{GSS}	V _{GS} =±8V, V _{DS} =0V	---	---	±100	nA
Forward Transconductance	g _{fs}	V _{DS} =-5V, I _D =-10A	---	43	---	S
Total Gate Charge (-4.5V)	Q _g	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-10A	---	63	---	nC
Gate-Source Charge	Q _{gs}		---	9.1	---	
Gate-Drain Charge	Q _{gd}		---	13	---	
Turn-On Delay Time	T _{d(on)}	V _{DD} =-10V, V _{GS} =-4.5V, R _G =3.3Ω, I _D =-10A	---	15.8	---	ns
Rise Time	T _r		---	76.8	---	
Turn-Off Delay Time	T _{d(off)}		---	193	---	
Fall Time	T _f		---	186.4	---	
Input Capacitance	C _{iss}	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	5783	---	pF
Output Capacitance	C _{oss}		---	509	---	
Reverse Transfer Capacitance	C _{rss}		---	431	---	

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	---	---	-10.7	A
Pulsed Source Current ^{2,4}	I _{SM}		---	---	-60	A
Diode Forward Voltage ²	V _{SD}	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V
Reverse Recovery Time	t _{rr}	I _F =-10A, di/dt=100A/μs, T _J =25°C	---	27	---	nS
Reverse Recovery Charge	Q _{rr}		---	17.8	---	nC

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

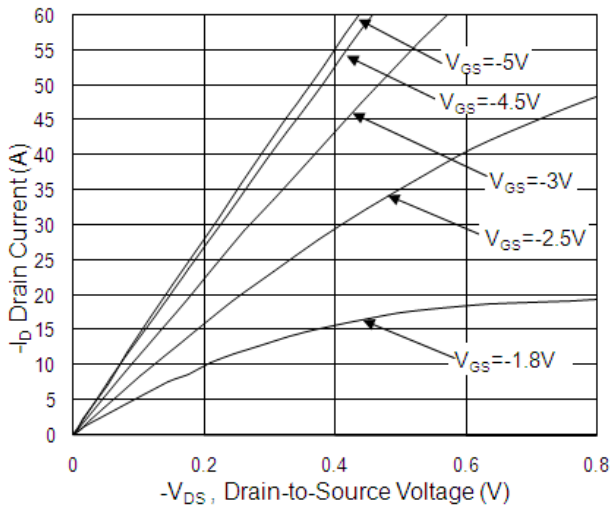


Fig.1 Typical Output Characteristics

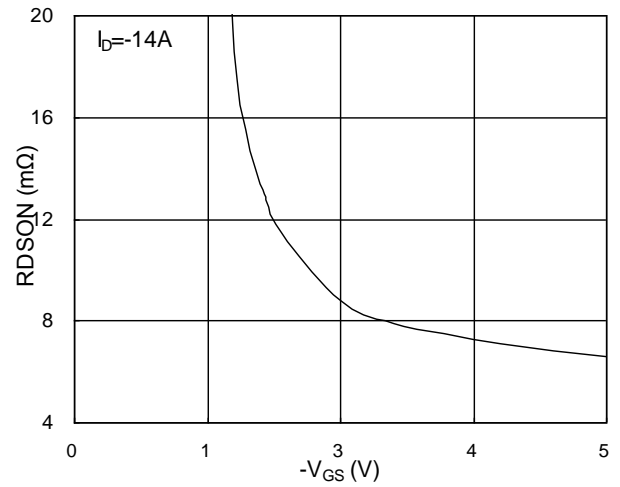


Fig.2 On-Resistance vs. G-S Voltage

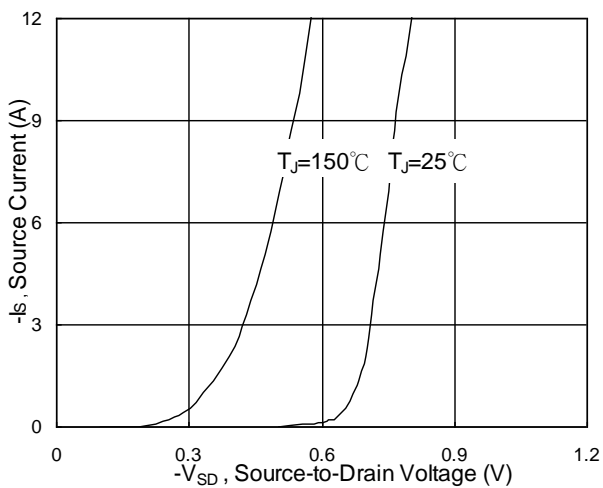


Fig.3 Forward Characteristics of Reverse

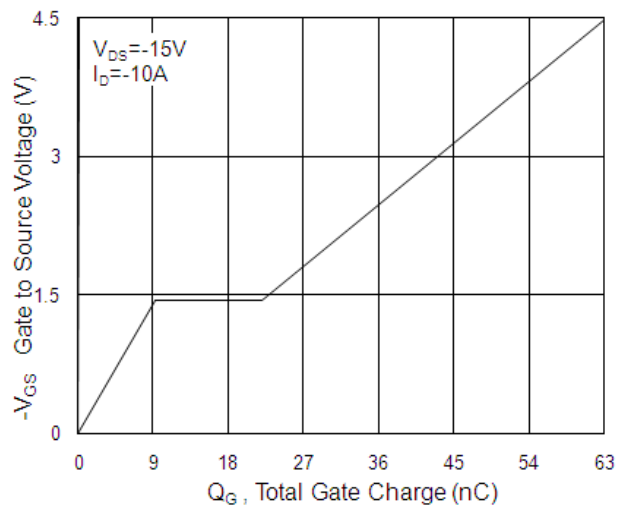


Fig.4 Gate-charge Characteristics

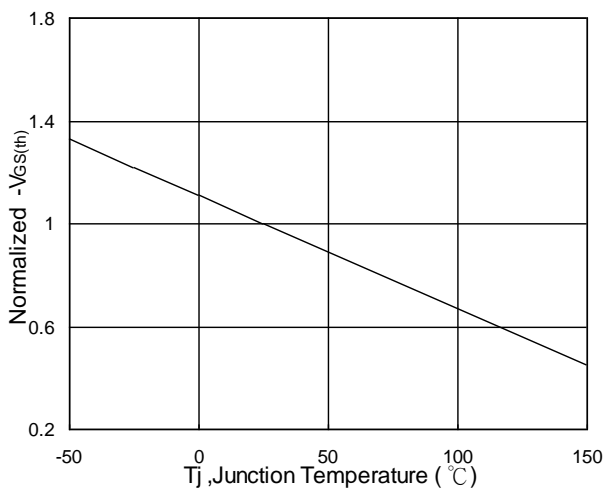


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

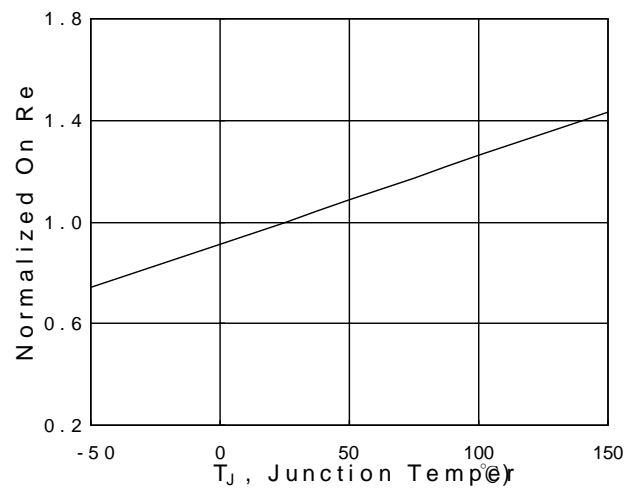


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

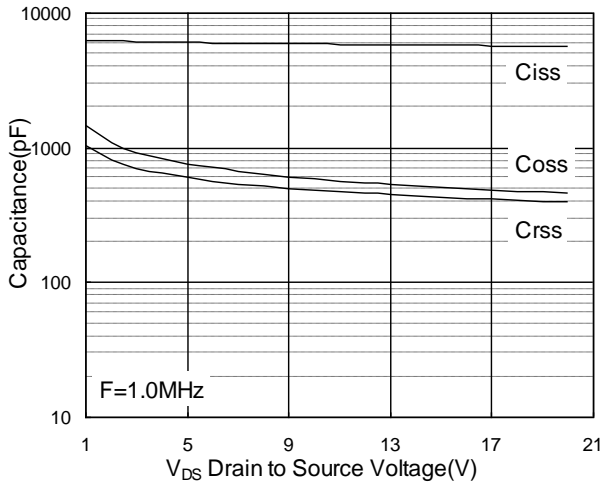


Fig.7 Capacitance

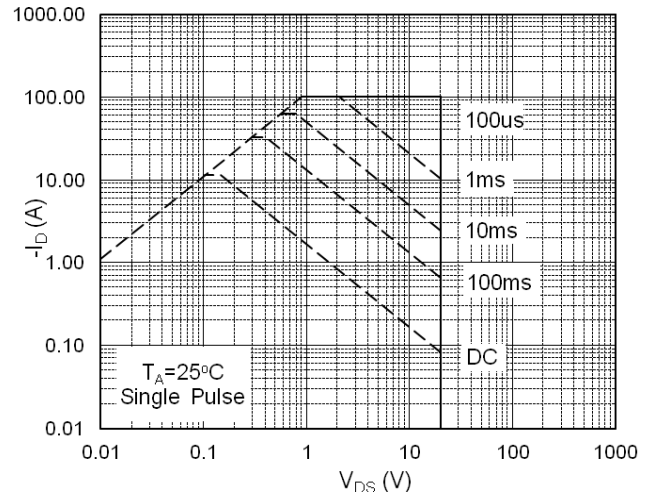


Fig.8 Safe Operating Area

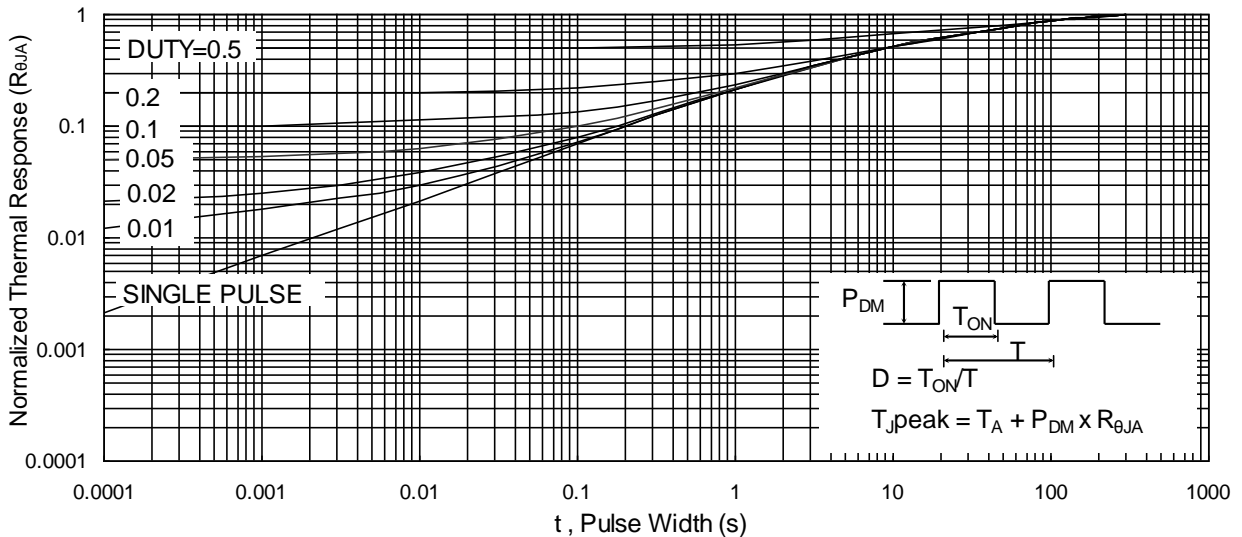


Fig.9 Normalized Maximum Transient Thermal Impedance

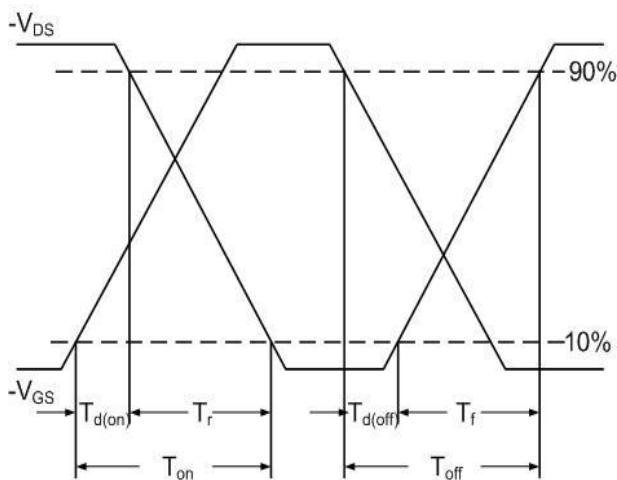


Fig.10 Switching Time Waveform

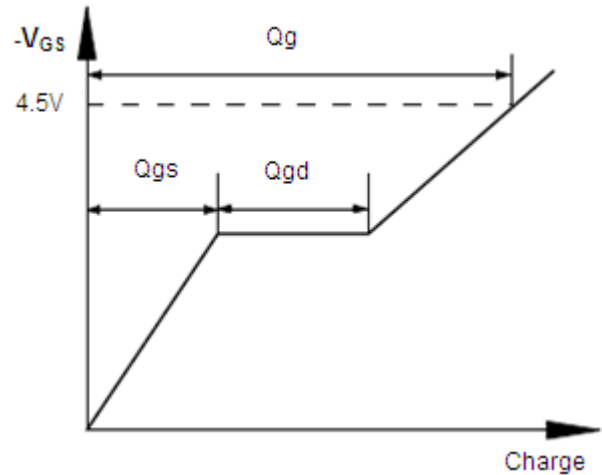
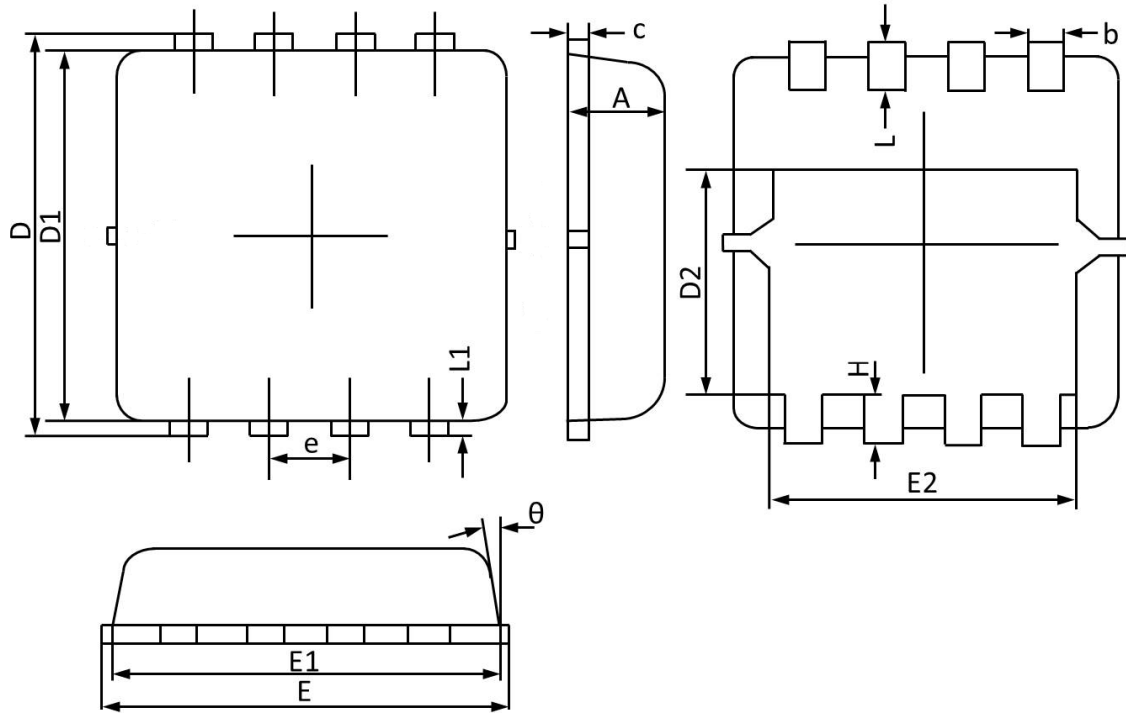


Fig.11 Gate Charge Waveform

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	theta	0°		14°