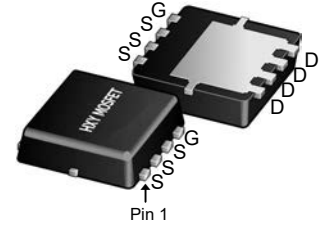




Description

The SI7615CDN-T1-GE3 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



DFN3X3-8L

General Features

$V_{DS} = -20V$ $I_D = -48A$

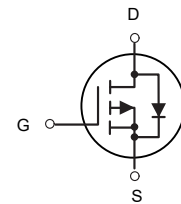
$R_{DS(ON)} < 10m\Omega$ @ $V_{GS} = -4.5V$

Application

Battery protection

Load switch

Uninterruptible power supply



P-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SI7615CDN-T1-GE3	DFN3X3-8L	HXY MOSFET	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 8	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-48	A
$I_D@T_C=70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-35	A
I_{DM}	Pulsed Drain Current ²	-100	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ³	29	W
$P_D@T_C=70^\circ C$	Total Power Dissipation ³	19	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	75	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹ (t ≤ 10s)	40	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	4.2	°C/W



Electrical Characteristics (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-20	-24	---	V
∂BV _{DSS} /∂T _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.012	---	V/°C
R _{DS(ON)}	Static Drain-Source On-Resistance ²	V _{GS} =-4.5V, I _D =-10A	---	7.5	10	mΩ
		V _{GS} =-2.5V, I _D =-8A	---	8.7	11.5	
		V _{GS} =-1.8V, I _D =-6A	---	13	15	
V _{GS(th)}	Gate Threshold Voltage		-0.3	0.6	-1.0	V
∂V _{GS(th)}	V _{GS(th)} Temperature Coefficient	V _{GS} =V _{DS} , I _D =-250uA	---	2.94	---	mV/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-20V, V _{GS} =0V, T _J =25°C	---	---	1	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±8V, V _{DS} =0V	---	---	±100	nA
g _{fs}	Forward Transconductance	V _{DS} =-5V, I _D =-10A	---	43	---	S
Q _g	Total Gate Charge (-4.5V)		---	63	---	nC
Q _{gs}	Gate-Source Charge	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-10A	---	9.1	---	
Q _{gd}	Gate-Drain Charge		---	13	---	
T _{d(on)}	Turn-On Delay Time		---	15.8	---	ns
T _r	Rise Time	V _{DD} =-10V, V _{GS} =-4.5V,	---	76.8	---	
T _{d(off)}	Turn-Off Delay Time	R _G =3.3, I _D =-10A	---	193	---	
T _f	Fall Time		---	186.4	---	
C _{iss}	Input Capacitance		---	5783	---	pF
C _{oss}	Output Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	509	---	
C _{rss}	Reverse Transfer Capacitance		---	431	---	
I _S	Continuous Source Current ^{1,4}	V _G =V _D =0V, Force Current	---	---	-10.7	A
I _{SM}	Pulsed Source Current ^{2,4}		---	---	-60	A
V _{SD}	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V
t _{rr}	Reverse Recovery Time	I _F =-10A, dI/dt=100A/μs,	---	27	---	nS
Q _{rr}	Reverse Recovery Charge	T _J =25°C	---	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

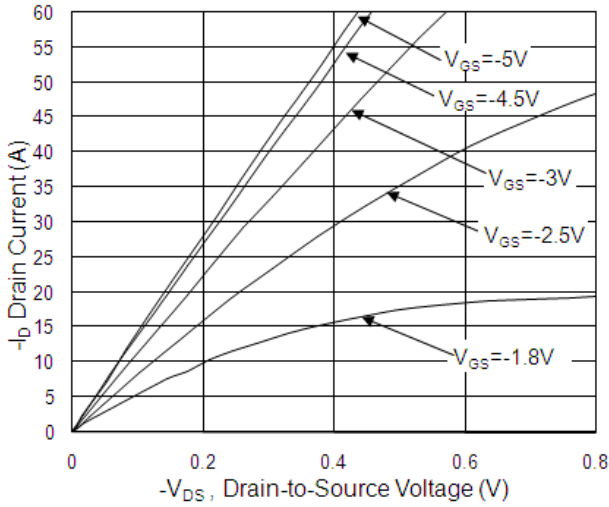


Fig.1 Typical Output Characteristics

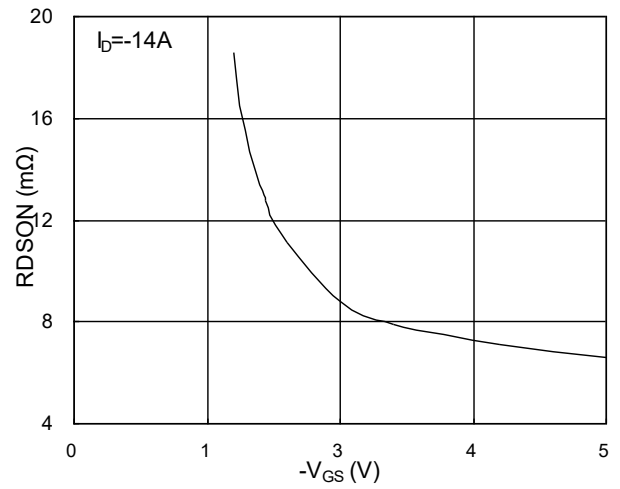


Fig.2 On-Resistance vs. G-S Voltage

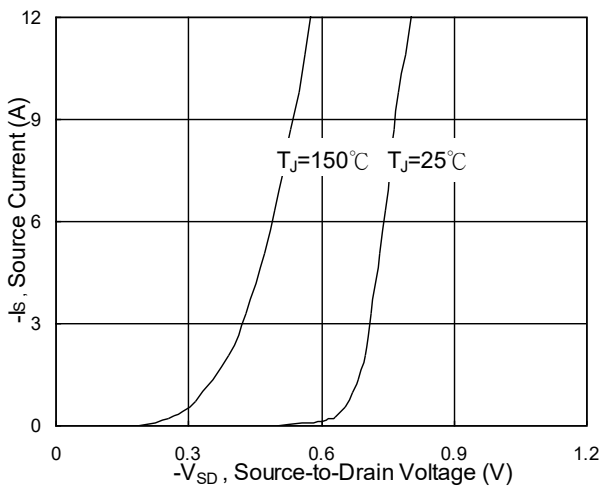


Fig.3 Forward Characteristics of Reverse

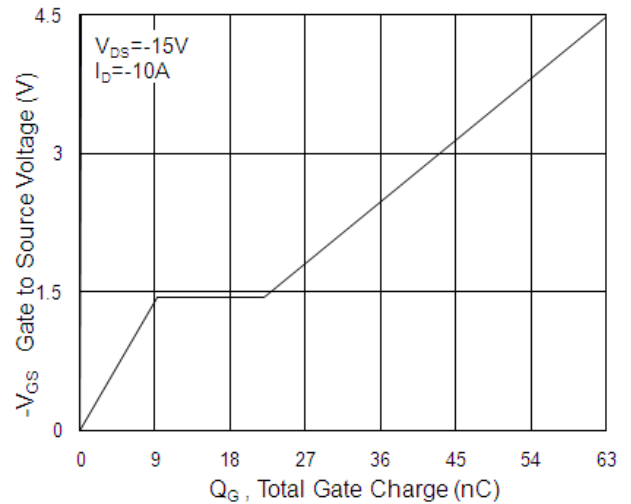


Fig.4 Gate-charge Characteristics

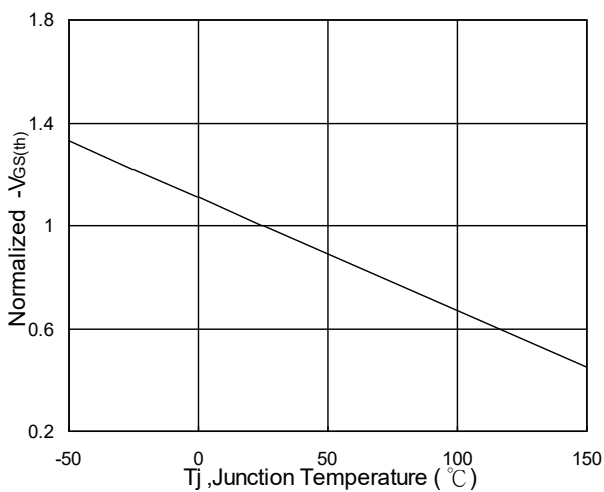


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

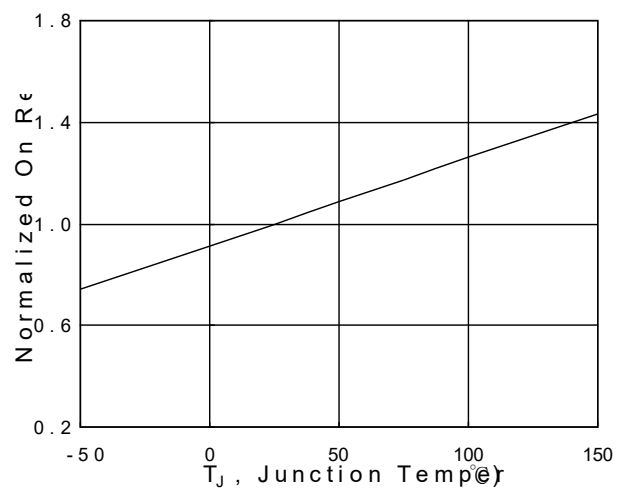


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

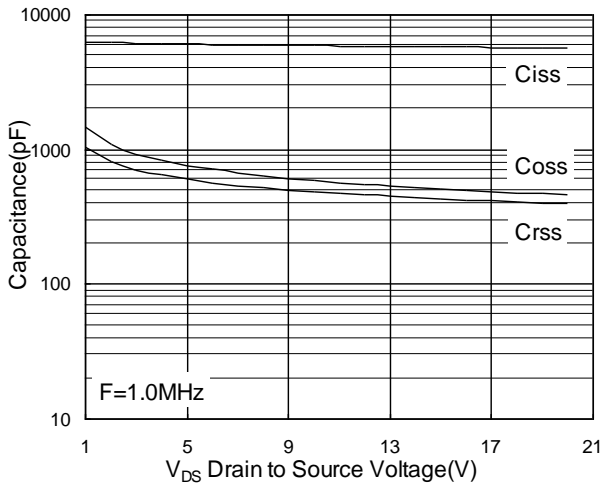


Fig.7 Capacitance

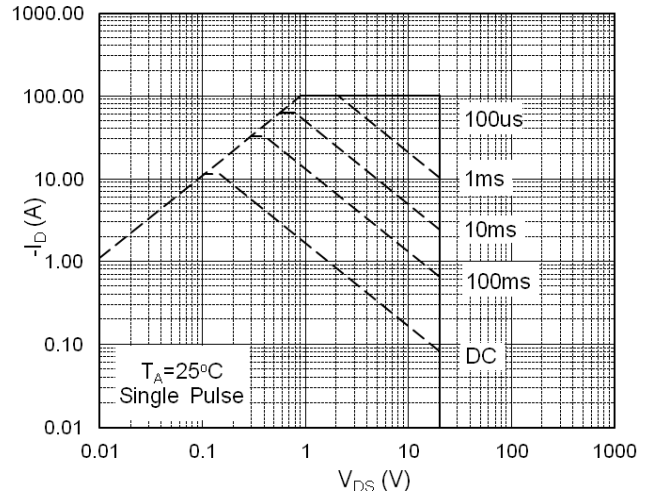


Fig.8 Safe Operating Area

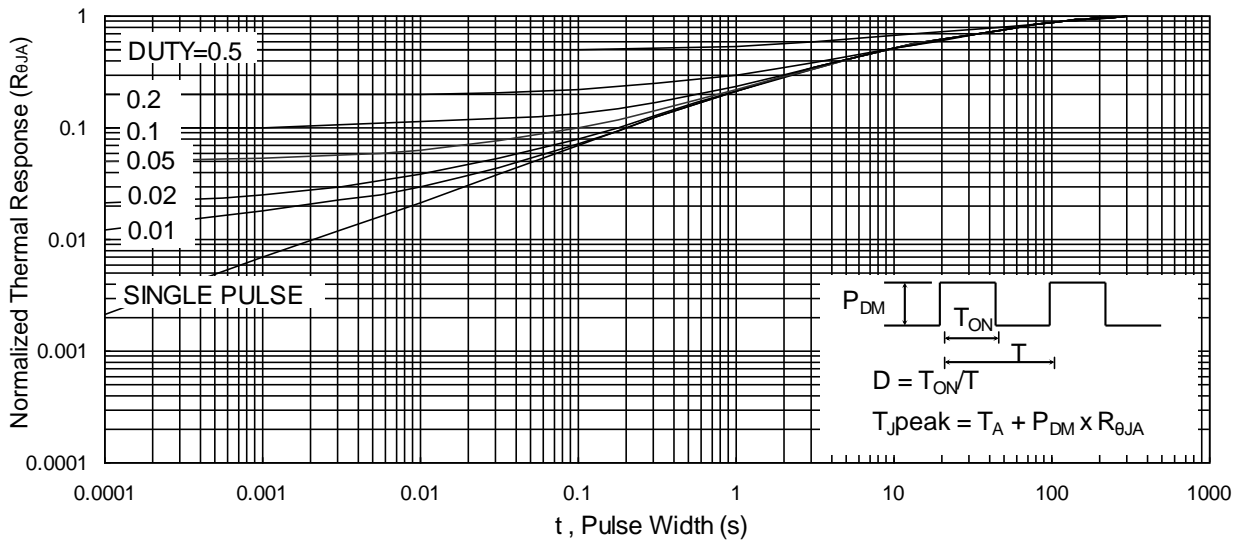


Fig.9 Normalized Maximum Transient Thermal Impedance

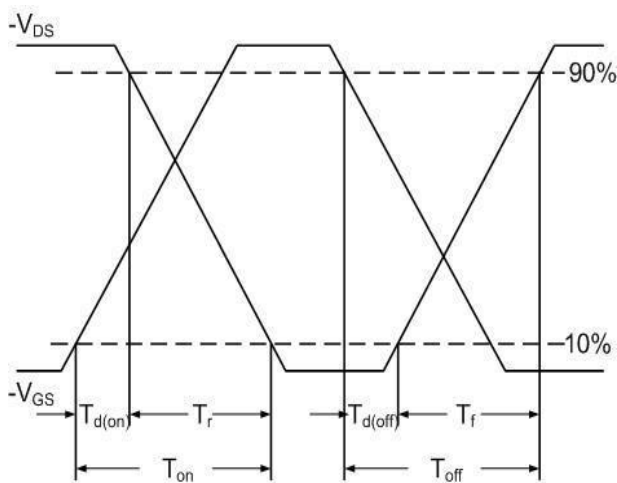


Fig.10 Switching Time Waveform

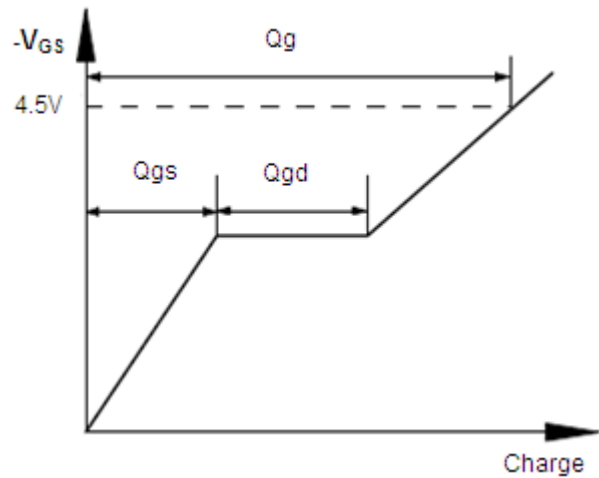
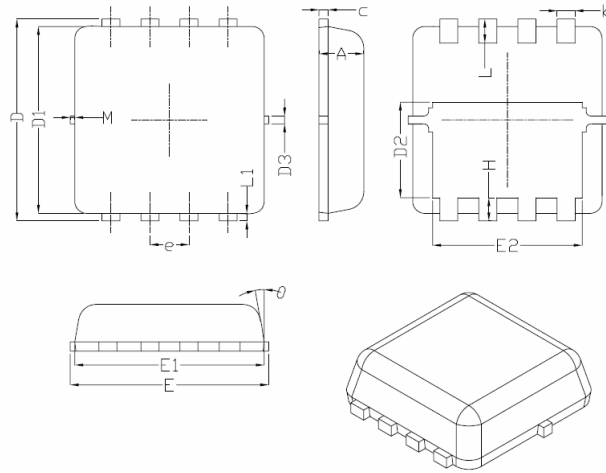


Fig.11 Gate Charge Waveform



DFN3X3-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Nom.	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	1.48	1.58	1.68
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	-
M	*	*	0.15
θ		10°	12°



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