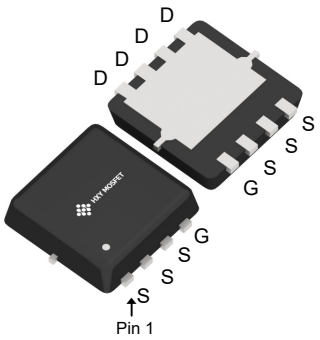
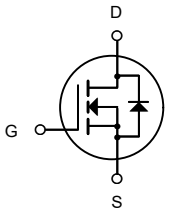
Description

The NVTFS5C680NL 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



N-Channel MOSFET

General Features

V_{DS} = 60V I_D = 20A

$R_{DS(ON)}$ < 30mΩ @ V_{GS}=10V

Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
NVTFS5C680NL	DFN3X3-8L	HXY MOSFET	5000

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	60	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	20	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	14	A
IDM	Pulsed Drain Current[2]	90	A
EAS	Single Pulse Avalanche Energy[3]	42	mJ
P_D@T_C=25℃	Total Power Dissipation[4]	33	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-ambient [1]	62	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case[1]	3.79	℃/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	60	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{GS}=0V, V_{DS}=60V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0A	---	---	±100	nA
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	1.2	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance[3]	V_{GS}=10V,I_D=20A	---	24	30	mΩ
		V_{GS}=4.5V,I_D=20A	---	31	40	
C_{iss}	Input Capacitance	V_{DS}=30V, V_{GS}=0V, f=1MHz	---	1060	---	pF
C_{oss}	Output Capacitance		---	64	---	
C_{rss}	Reverse Transfer Capacitance		---	54	---	
$t_{d(on)}$	Turn-On Delay Time	V_{DD}=30V , V_{GS}=10V , I_D=20A,R_G = 3Ω	---	8.4	---	ns
t_r	Rise Time		---	8.5	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	36	---	ns
t_f	Fall Time		---	5	---	ns
Q_g	Total Gate Charge	V_{DS}=30V , V_{GS}=10V , I_D=20A	---	26	---	nC
Q_{gs}	Gate-Source Charge		---	5.7	---	nC
Q_{gd}	Gate-Drain “Miller” Charge		---	5.2	---	nC
I_S	Continuous Source Current	VG=VD=0V	---	---	20	A
I_{SM}	Pulsed Source Current	VG=VD=0V	---	---	90	A
V_{SD}	Forward on voltage	I_S=20A,V_{GS}=0V	---	---	1.2	V
Trr	Body Diode Reverse Recovery Time	IF=20A, dI/dt=100A/μs	---	18	---	nS
Qrr	Body Diode Reverse Recovery Charge		---	13	---	nC

Notes:

1) L=0.5mH, VDD=30V, Start TJ=25℃.

2) Limited by maximum junction temperature.

3) Repetitive Rating: Pulse width limited by maximum junction temperature

Typical Characteristics

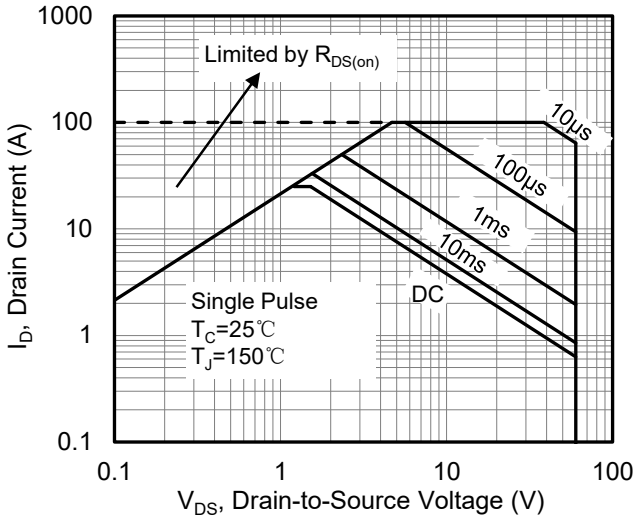


Figure 1. Maximum Safe Operating Area

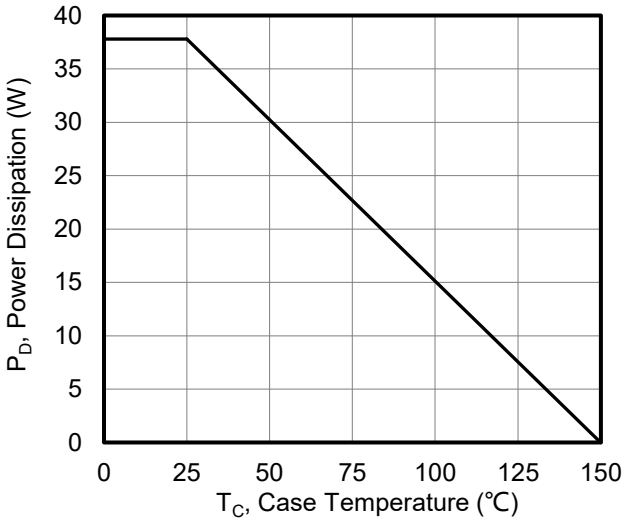


Figure 2. Maximum Power Dissipation vs Case Temperature

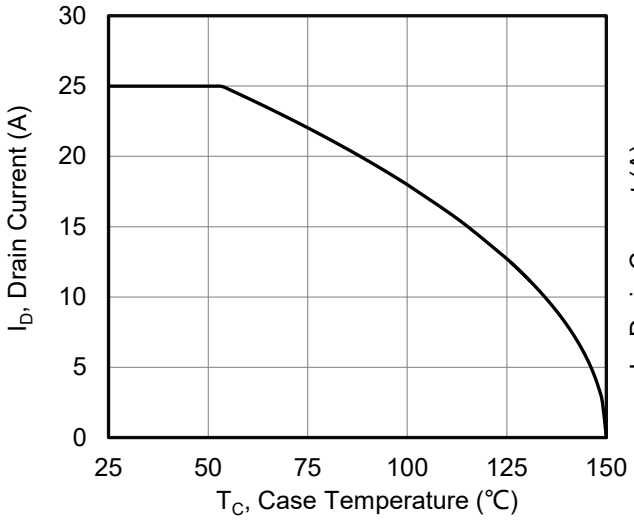


Figure 3. Maximum Continuous Drain Current vs Case Temperature

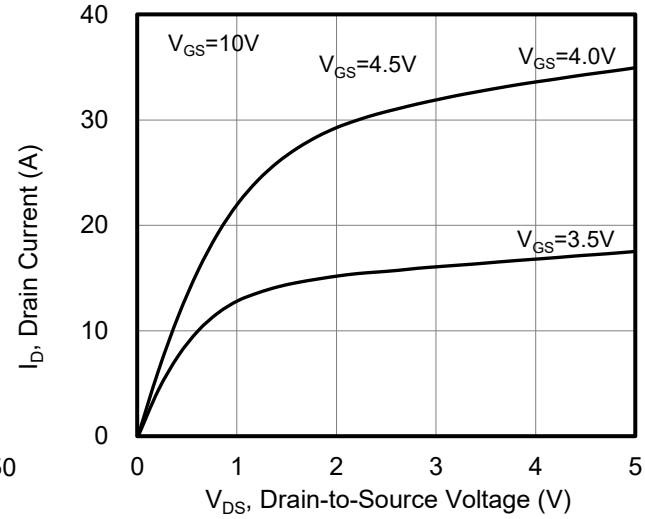


Figure 4. Typical output Characteristics

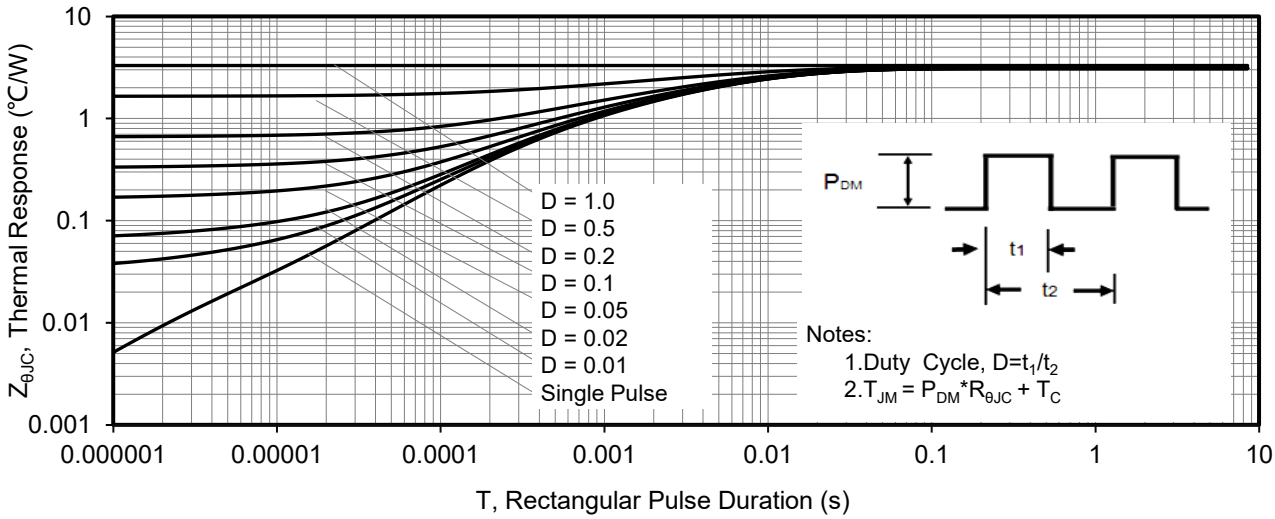


Figure 5. Maximum Effective Thermal Impedance, Junction to Case

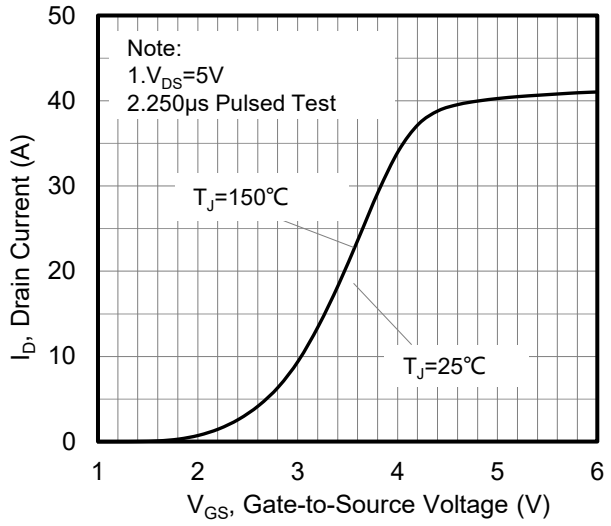


Figure 6. Typical Transfer Characteristics

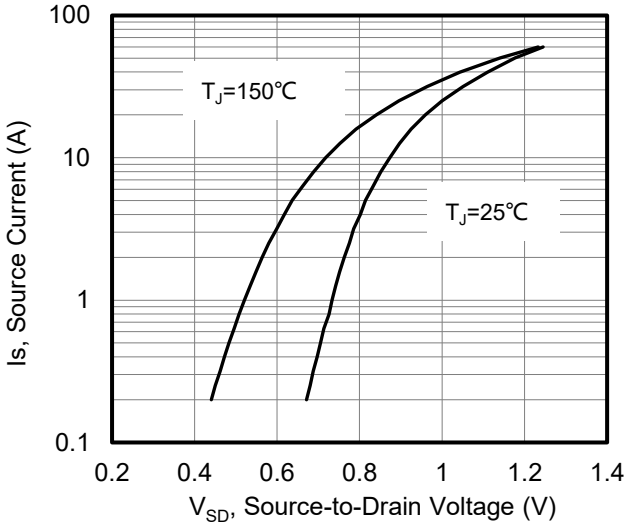


Figure 7. Typical Body Diode Transfer Characteristics

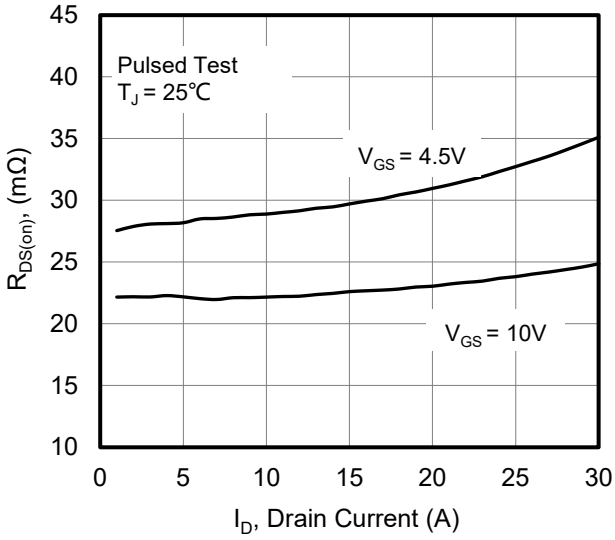


Figure 8. Drain-to-Source On Resistance vs Drain Current

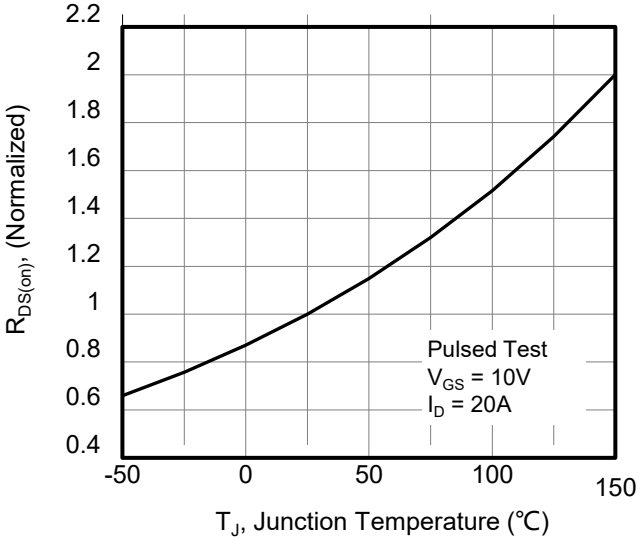


Figure 9. Normalized On Resistance vs Junction Temperature

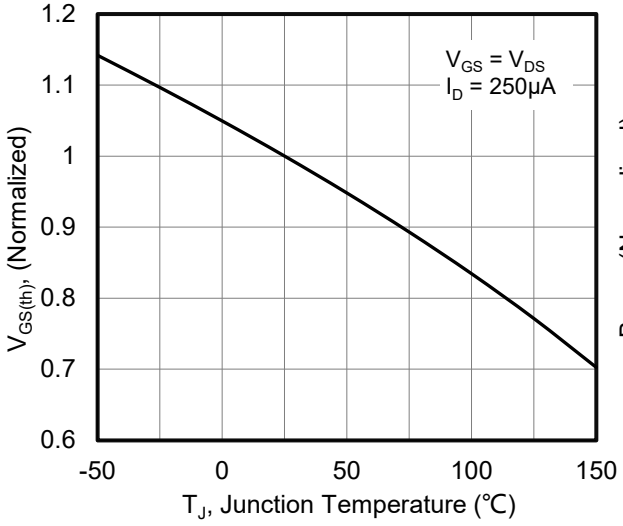


Figure 10. Normalized Threshold Voltage vs Junction Temperature

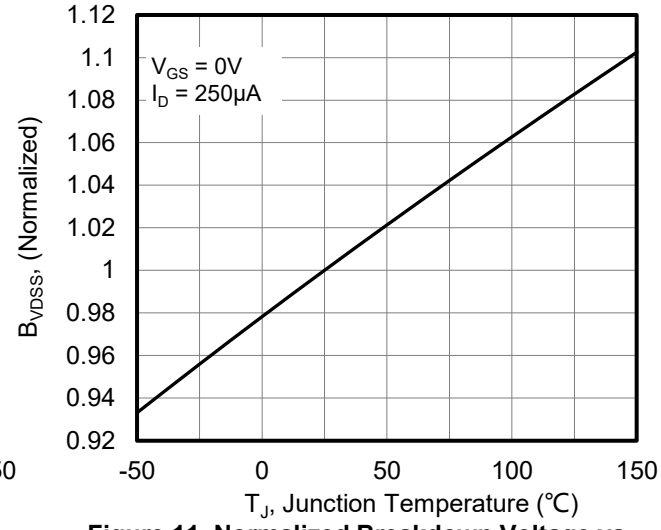


Figure 11. Normalized Breakdown Voltage vs Junction Temperature

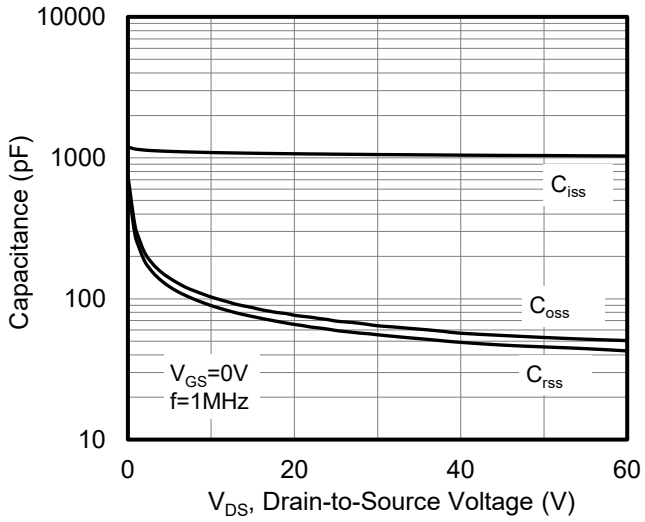


Figure 12. Capacitance Characteristics

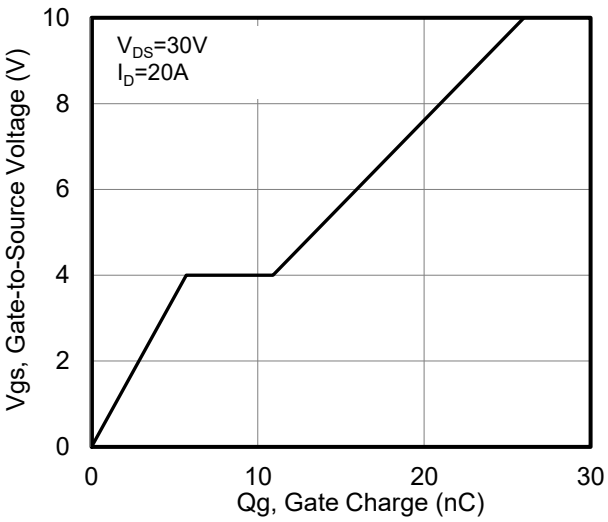
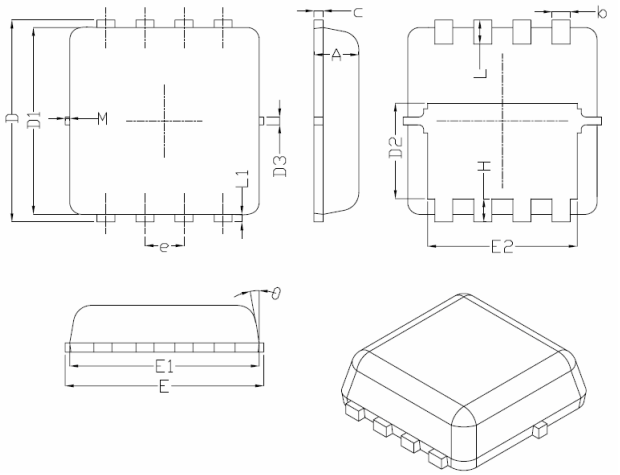


Figure 13. Typical Gate Charge vs Gate to Source Voltage

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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