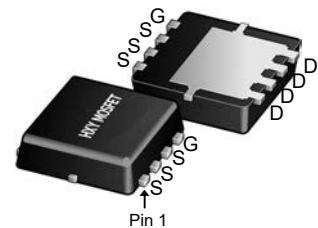




## Description

The HNVTFS5C680NLTAG 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.

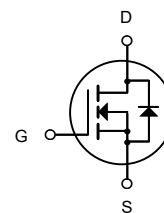


DFN3X3-8L

## General Features

$V_{DS} = 60V$   $I_D = 30A$

$R_{DS(ON)} < 30m\Omega$  @  $V_{GS}=10V$



N-Channel MOSFET

## Application

Battery protection

Load switch

Uninterruptible power supply

## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HNVTFS5C680NLTAG	DFN3X3-8L	HXY MOSFET	5000

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	60	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	30	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	16	A
IDM	Pulsed Drain Current <sup>2</sup>	90	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	42	mJ
$P_D@T_C=25^{\circ}C$	Total Power Dissipation <sup>4</sup>	33	W
TSTG	Storage Temperature Range	-55 to 150	$^{\circ}C$
$T_J$	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient <sup>1</sup>	62	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	3.79	$^{\circ}C/W$



**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**

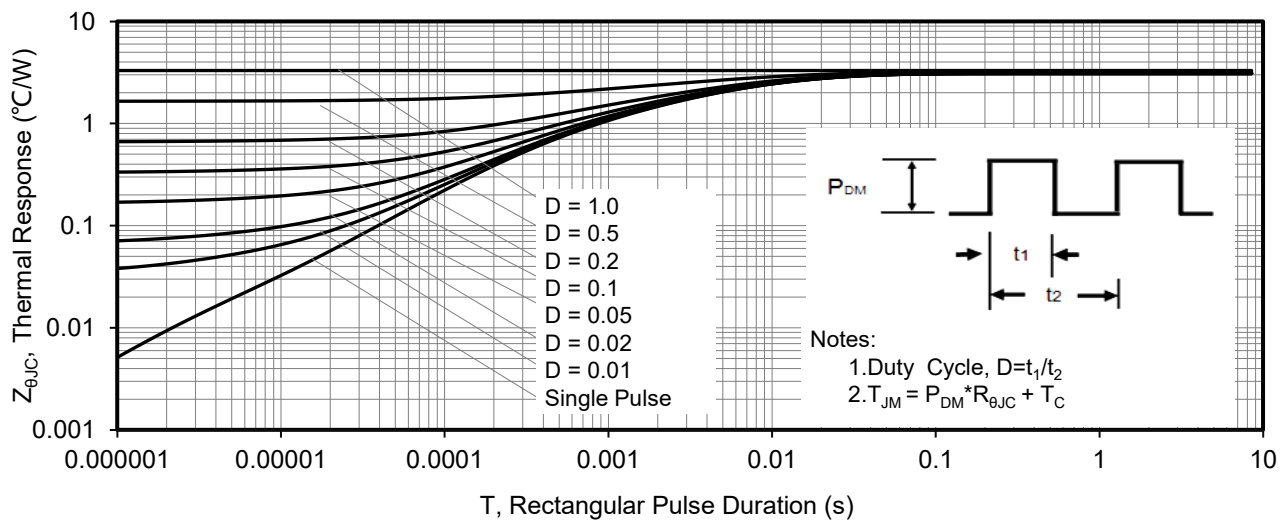
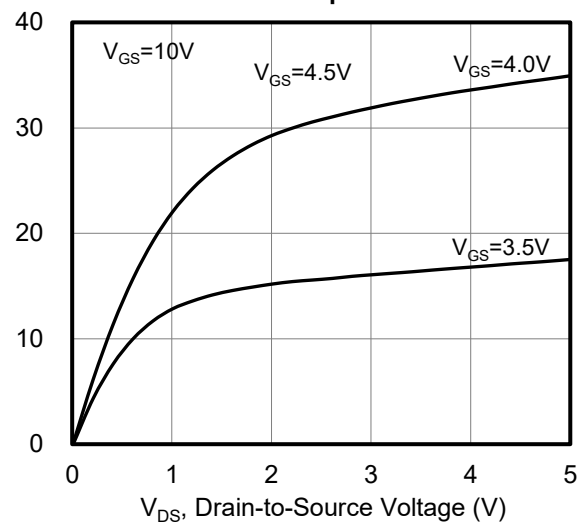
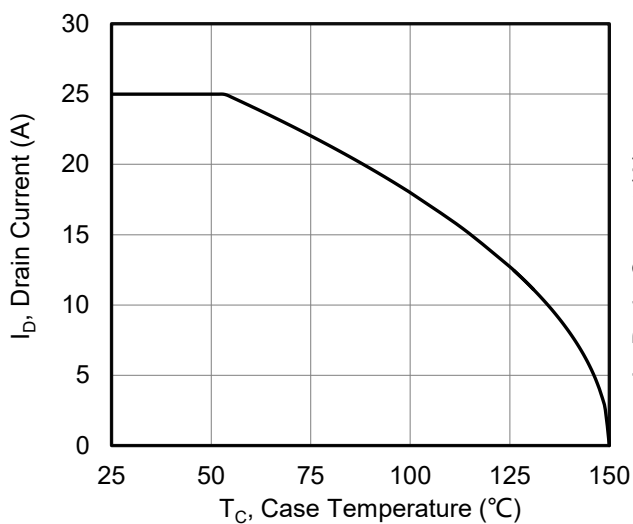
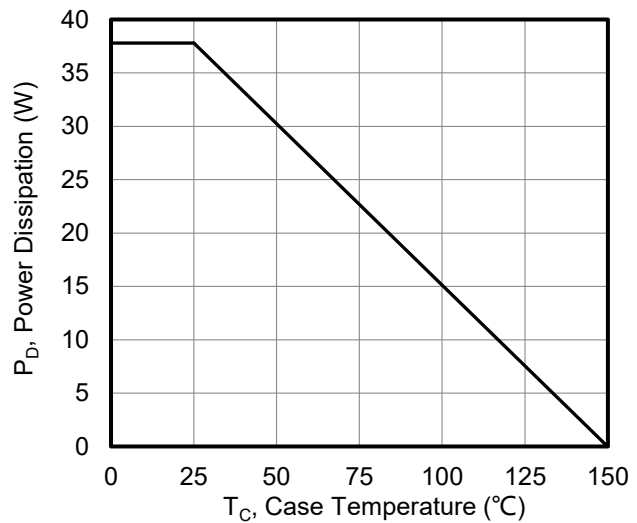
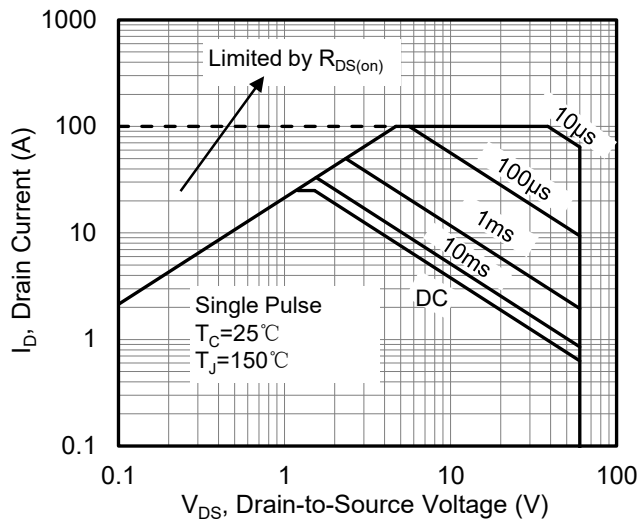
Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>GS</sub> =0V, V <sub>DS</sub> =60V	---	---	1	μA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0A	---	---	±100	nA
V <sub>GS(th)</sub>	GATE-Source Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	1.2	1.8	2.5	V
R <sub>DS(ON)</sub>	Drain-Source On Resistance <sup>3</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	24	30	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A	---	31	40	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz	---	1060	---	pF
C <sub>oss</sub>	Output Capacitance		---	64	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	54	---	
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =30V , V <sub>GS</sub> =10V , I <sub>D</sub> =20A, R <sub>G</sub> = 3Ω	---	8.4	---	ns
t <sub>r</sub>	Rise Time		---	8.5	---	ns
t <sub>d(off)</sub>	Turn-Off Delay Time		---	36	---	ns
t <sub>f</sub>	Fall Time		---	5	---	ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =30V , V <sub>GS</sub> =10V , I <sub>D</sub> =20A	---	26	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	5.7	---	nC
Q <sub>gd</sub>	Gate-Drain "Miller" Charge		---	5.2	---	nC
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V	---	---	20	A
I <sub>SM</sub>	Pulsed Source Current	V <sub>G</sub> =V <sub>D</sub> =0V	---	---	90	A
V <sub>SD</sub>	Forward on voltage	I <sub>S</sub> =20A, V <sub>GS</sub> =0V	---	---	1.2	V
T <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =20A, dI/dt=100A/μs	---	18	---	nS
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge		---	13	---	nC

**Notes:**

- 1) L=0.5mH, V<sub>DD</sub>=30V, Start T<sub>J</sub>=25°C.
- 2) Limited by maximum junction temperature.
- 3) Repetitive Rating: Pulse width limited by maximum junction temperature



## Typical Characteristics



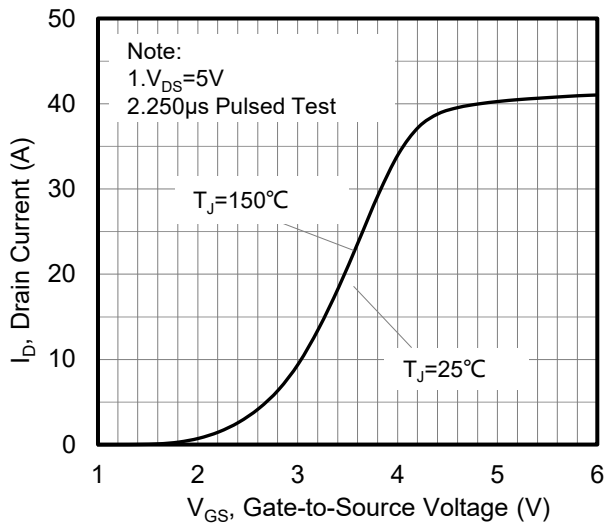


Figure 6. Typical Transfer Characteristics

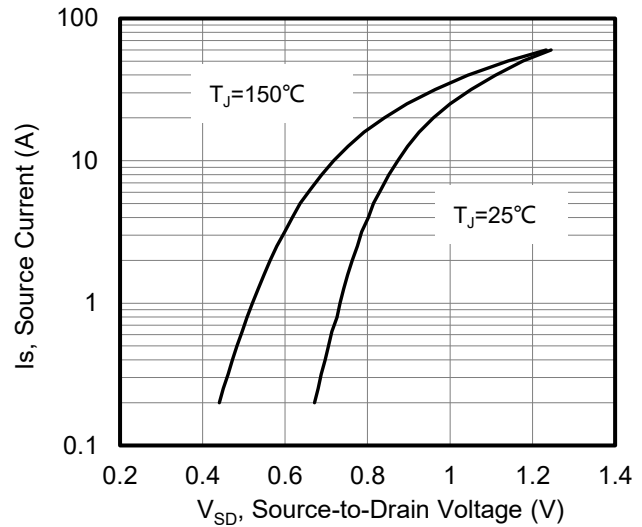


Figure 7. Typical Body Diode Transfer Characteristics

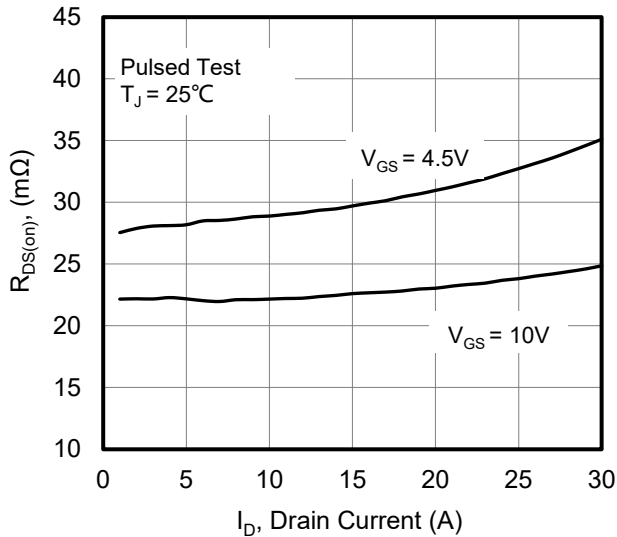


Figure 8. Drain-to-Source On Resistance vs Drain Current

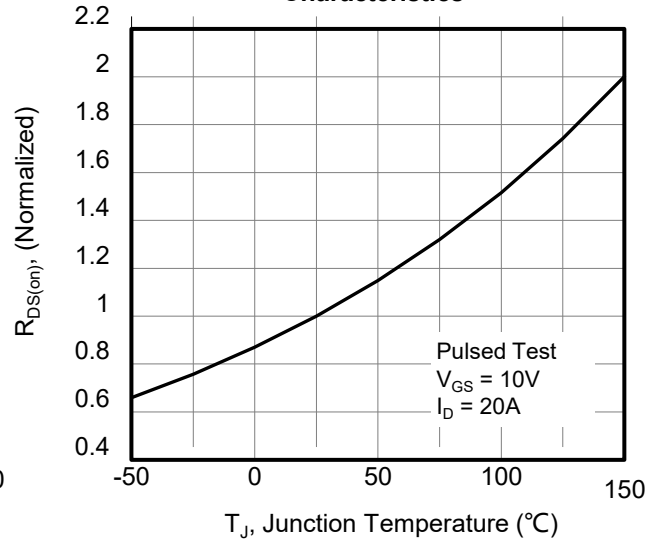


Figure 9. Normalized On Resistance vs Junction Temperature

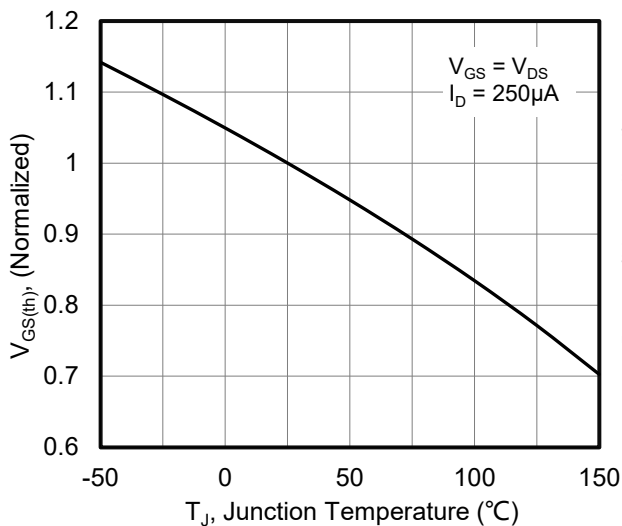


Figure 10. Normalized Threshold Voltage vs Junction Temperature

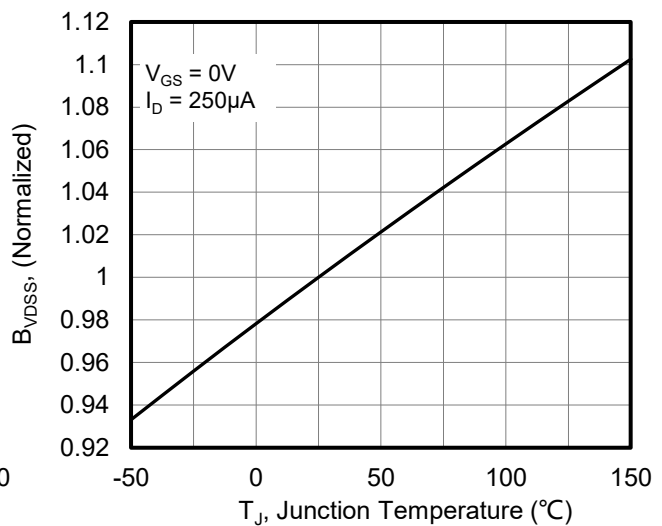
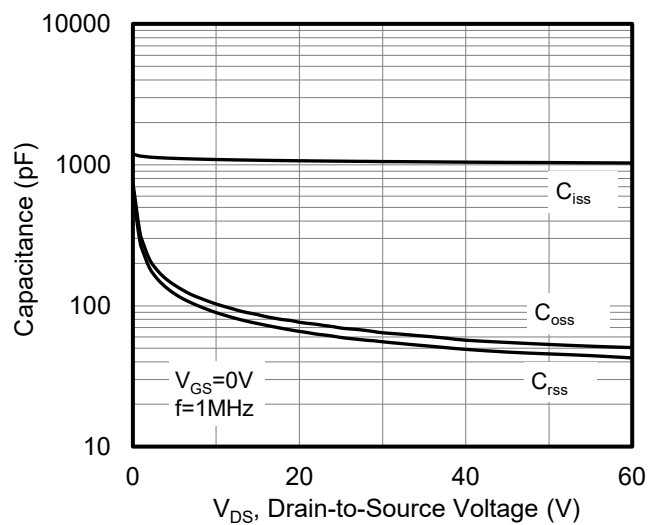
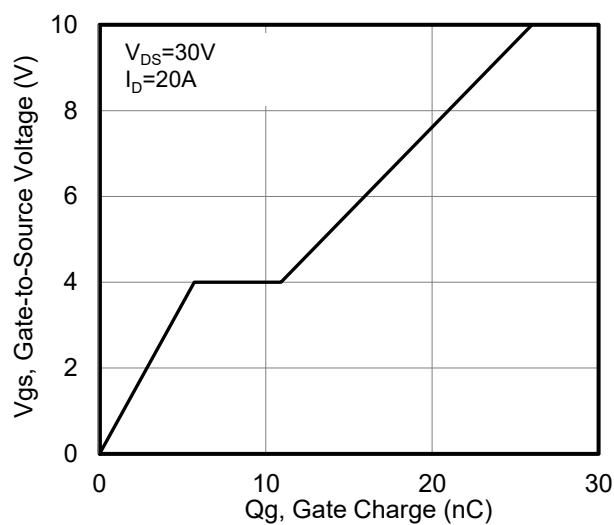


Figure 11. Normalized Breakdown Voltage vs Junction Temperature



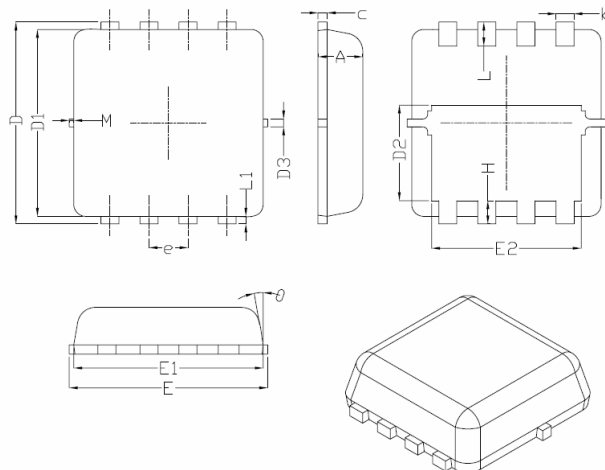
**Figure 12. Capacitance Characteristics**



**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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