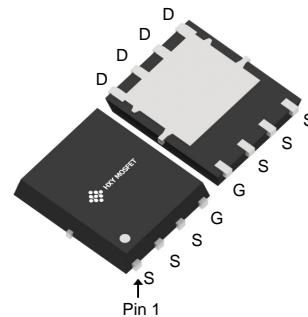




## Description

The HXY50N06NF 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.



DFN5X6-8L

## General Features

$V_{DS} = 60V$   $I_D = 50A$

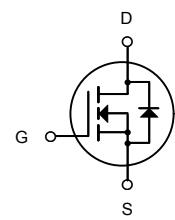
$R_{DS(ON)} < 20 m\Omega$  @  $V_{GS}=10V$

## Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HXY50N06NF	DFN5X6-8L	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, $V_{GS} @ 10V$	50	A
$I_{DM}$	Pulsed Drain Current	200	A
EAS	Single Pulse Avalanche Energy	300	mJ
$P_D @ T_c=25^\circ C$	Total Power Dissipation	60	W
$T_{STG}$	Storage Temperature Range	-55 to 175	$^\circ C$
$T_J$	Operating Junction Temperature Range	-55 to 175	$^\circ C$
$R_{\theta JC}$	Thermal Resistance Junction-Case	1.8	$^\circ C/W$



**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_{\text{D}}=250\mu\text{A}$	60	-	-	V
Zero Gate Voltage Drain Current	$\text{I}_{\text{DSS}}$	$\text{V}_{\text{DS}}=60\text{V}, \text{V}_{\text{GS}}=0\text{V}$	-	-	1	$\mu\text{A}$
Gate-Body Leakage Current	$\text{I}_{\text{GSS}}$	$\text{V}_{\text{GS}}=\pm20\text{V}, \text{V}_{\text{DS}}=0\text{V}$	-	-	$\pm100$	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	$\text{V}_{\text{GS}(\text{th})}$	$\text{V}_{\text{DS}}=\text{V}_{\text{GS}}, \text{I}_{\text{D}}=250\mu\text{A}$	1.4	1.9	2.5	V
Drain-Source On-State Resistance	$\text{R}_{\text{DS}(\text{ON})}$	$\text{V}_{\text{GS}}=10\text{V}, \text{I}_{\text{D}}=20\text{A}$	-	14	20	$\text{m}\Omega$
Forward Transconductance	$\text{g}_{\text{FS}}$	$\text{V}_{\text{DS}}=5\text{V}, \text{I}_{\text{D}}=20\text{A}$	18	-	-	S
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	$\text{C}_{\text{iss}}$	$\text{V}_{\text{DS}}=30\text{V}, \text{V}_{\text{GS}}=0\text{V},$ $\text{F}=1.0\text{MHz}$	-	2050	-	PF
Output Capacitance	$\text{C}_{\text{oss}}$		-	158	-	PF
Reverse Transfer Capacitance	$\text{C}_{\text{rss}}$		-	120	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	$\text{t}_{\text{d}(\text{on})}$	$\text{V}_{\text{DD}}=30\text{V}, \text{R}_{\text{L}}=6.7\Omega$ $\text{V}_{\text{GS}}=10\text{V}, \text{R}_{\text{G}}=3\Omega$	-	7.4	-	nS
Turn-on Rise Time	$\text{t}_r$		-	5.1	-	nS
Turn-Off Delay Time	$\text{t}_{\text{d}(\text{off})}$		-	28.2	-	nS
Turn-Off Fall Time	$\text{t}_f$		-	5.5	-	nS
Total Gate Charge	$\text{Q}_g$	$\text{V}_{\text{DS}}=30\text{V}, \text{I}_{\text{D}}=20\text{A},$ $\text{V}_{\text{GS}}=10\text{V}$	-	50	-	nC
Gate-Source Charge	$\text{Q}_{\text{gs}}$		-	6	-	nC
Gate-Drain Charge	$\text{Q}_{\text{gd}}$		-	15	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Voltage (Note 3)	$\text{V}_{\text{SD}}$	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_{\text{S}}=20\text{A}$	-		1.2	V
Diode Forward Current (Note 2)	$\text{I}_{\text{S}}$		-	-	50	A
Reverse Recovery Time	$\text{t}_{\text{rr}}$	$\text{T}_J = 25^\circ\text{C}, \text{IF} = 20\text{A}$ $\text{di}/\text{dt} = 100\text{A}/\mu\text{s}$ (Note 3)	-	28	-	nS
Reverse Recovery Charge	$\text{Q}_{\text{rr}}$		-	40	-	nC
Forward Turn-On Time	$\text{t}_{\text{on}}$	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5. EAS condition :  $T_J=25^\circ\text{C}, \text{VDD}=30\text{V}, \text{VG}=10\text{V}, \text{L}=0.5\text{mH}, \text{Rg}=25\Omega$



## Typical Characteristics

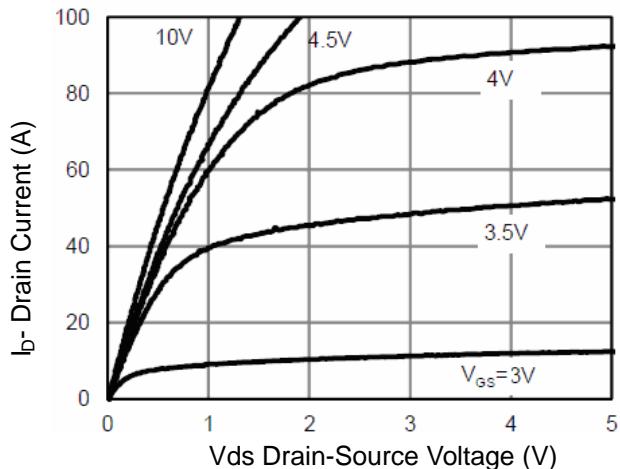


Figure 1 Output Characteristics

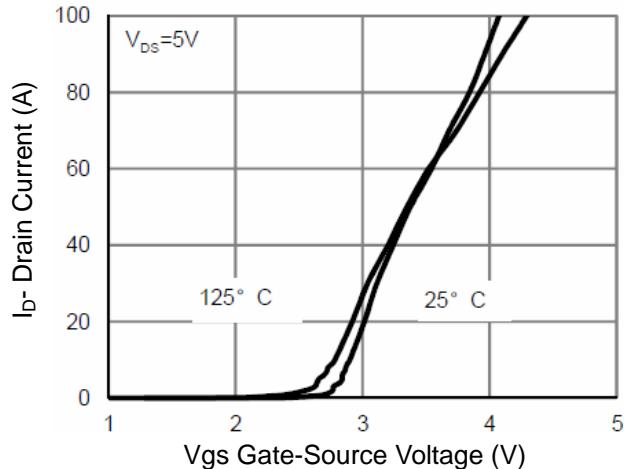


Figure 2 Transfer Characteristics

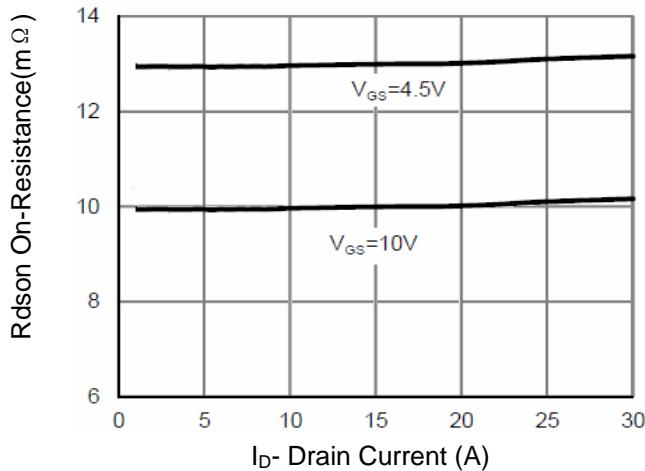


Figure 3 Rdson- Drain Current

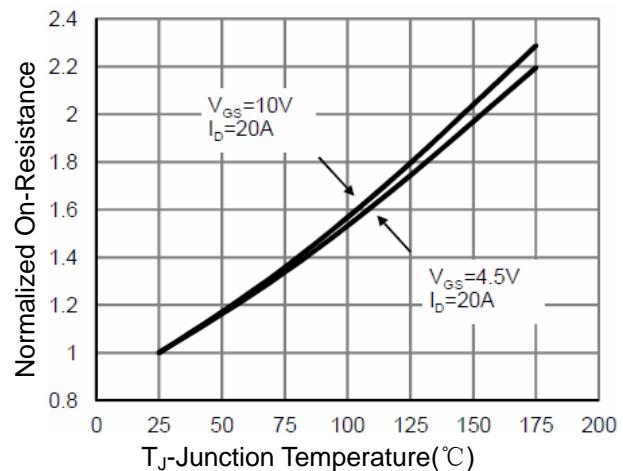


Figure 4 Rdson-JunctionTemperature

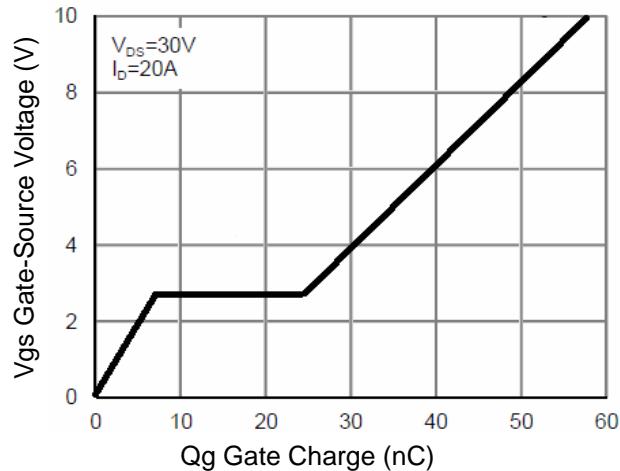


Figure 5 Gate Charge

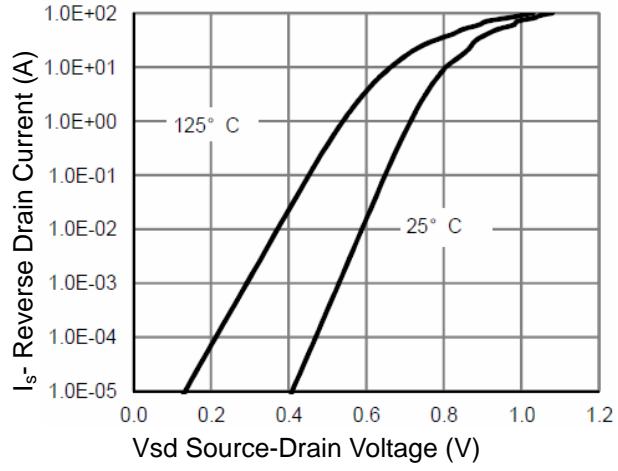
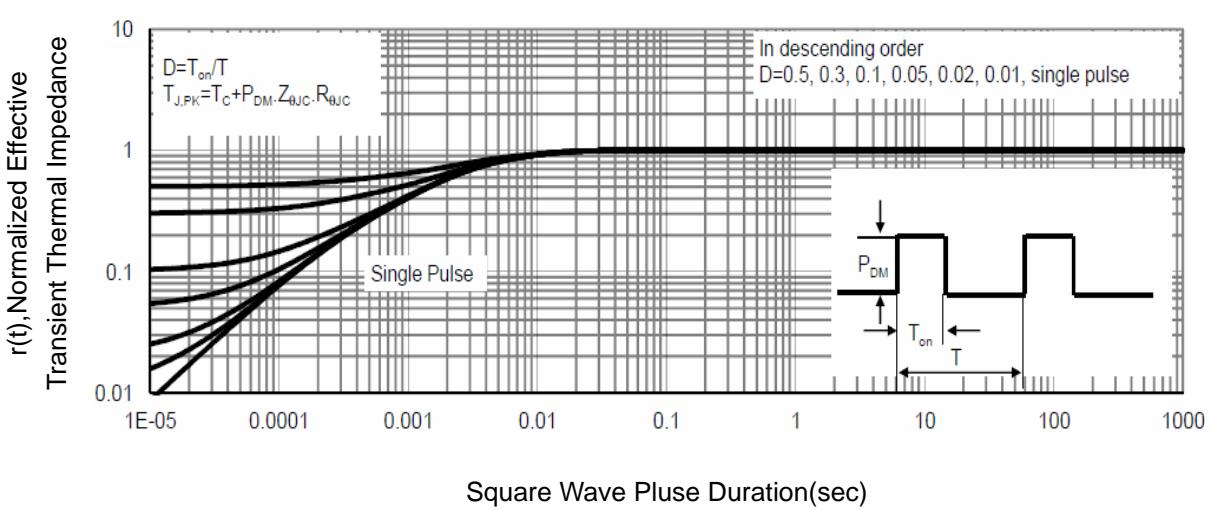
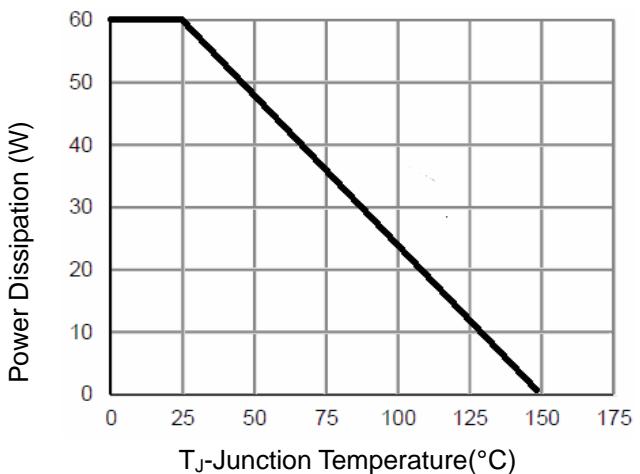
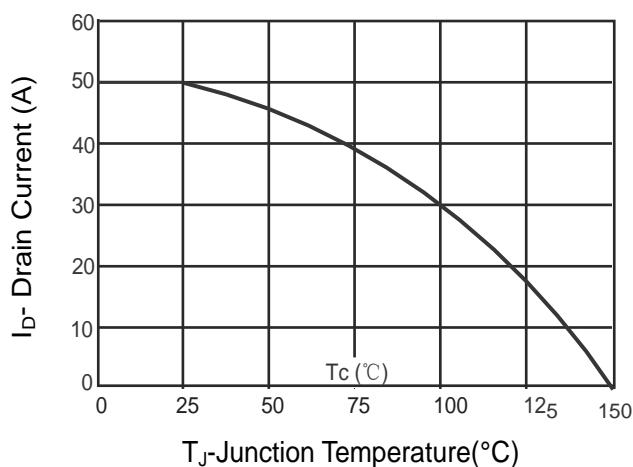
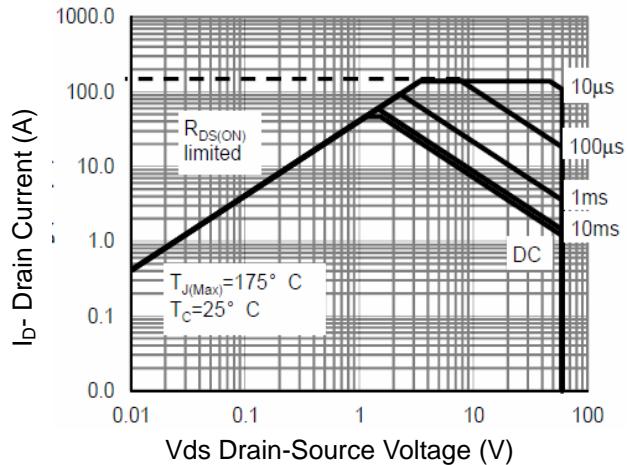
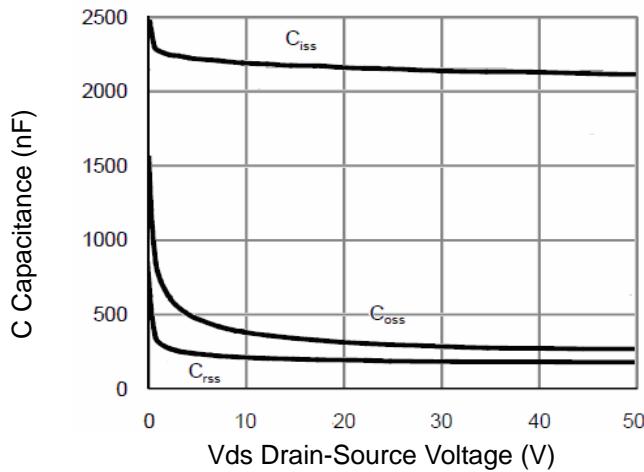
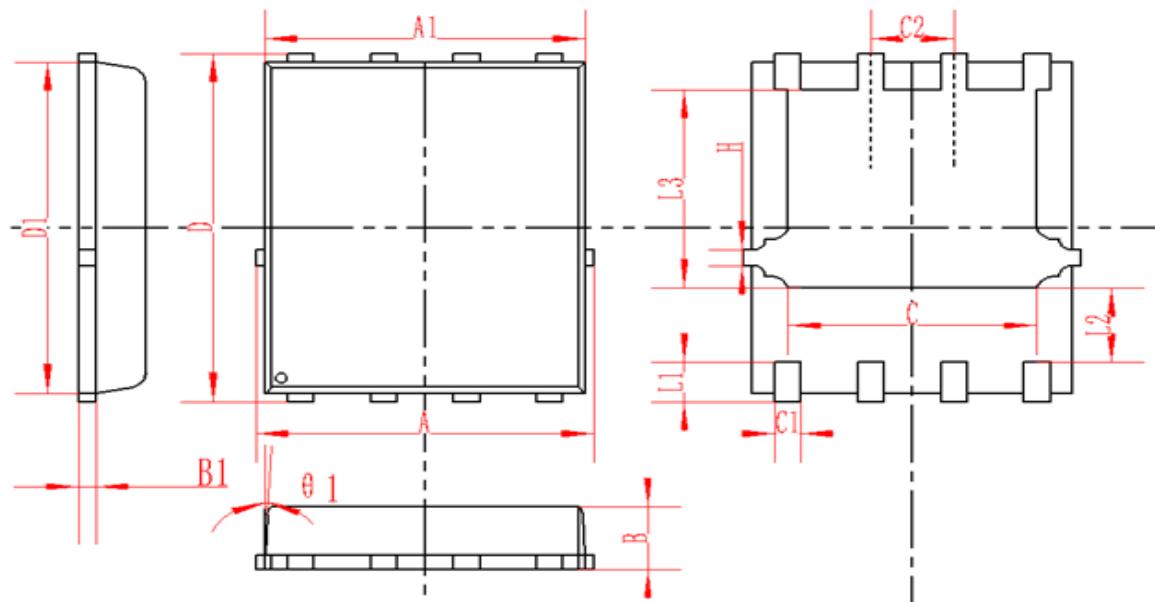


Figure 6 Source- Drain Diode Forward





### DFN5X6-8L Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
θ1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010



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