



Description

The HXY50N04DF 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.

General Features

$V_{DS} = 40V$ $I_D = 50A$

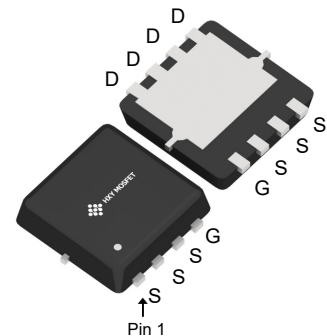
$R_{DS(ON)} < 10m\Omega @ V_{GS}=10V$

Application

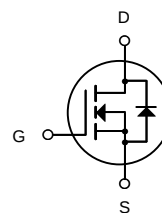
Battery protection

Load switch

Uninterruptible power supply



DFN3X3-8L



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HXY50N04DF	DFN3X3-8L	HXY MOSFET	5000

Absolute Maximum Ratings (Tc=25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	50	A
$I_D @ T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	22.1	A
I_{DM}	Pulsed Drain Current ²	140	A
$P_D @ T_C=25^\circ C$	Total Power Dissipation ⁴	44	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	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	2.8	°C/W



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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{GS}=0V, V_{DS}=40V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{GS}=0V, V_{DS}=32V, T_J=85^\circ\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
$V_{GS(th)}$	GATE-Source Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.8	2.5	V
$R_{DS(ON)}$	Drain-Source On Resistance	$V_{GS}=10V, I_D=8A$	---	7.4	10	m Ω
		$V_{GS}=4.5V, I_D=4A$	---	10.6	13.5	
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=2A$	---	13	---	S
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, f=1\text{MHz}$	---	1205	2180	pF
C_{oss}	Output Capacitance		---	128	245	
C_{rss}	Reverse Transfer Capacitance		---	52	106	
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2.2	---	Ω
$t_{d(on)}$	Turn-On Delay Time ^{2,3}	$V_{DD}=15V, V_{GS}=10V, R_G=3.3\Omega, I_D=1A$	---	13.2	25	ns
t_r	Rise Time ^{2,3}		---	2.2	5	ns
$t_{d(off)}$	Turn-Off Delay Time ^{2,3}		---	72	130	ns
t_f	Fall Time ^{2,3}		---	4.5	10	ns
Q_g	Total Gate Charge ^{2,3}	$V_{DS}=20V, V_{GS}=10V, I_D=8A$	---	19.7	30	nC
Q_{gs}	Gate-Source Charge ^{2,3}		---	2.8	4.2	nC
Q_{gd}	Gate-Drain "Miller" Charge ^{2,3}		---	5.1	7.6	nC
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	35	A
I_{SM}	Pulsed Source Current		---	---	70	A
V_{SD}	Source-Drain Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
t_{rr}	Reverse Recovery Time ³	$I_S=1A, di/dt=100A/\mu s$	---	17	---	nS
Q_{rr}	Reverse Recovery Charge ³	$\mu s, T_J=25^\circ\text{C}, V_{GS}=0V$	---	2.8	---	nC

Notes:

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.



Typical Characteristics

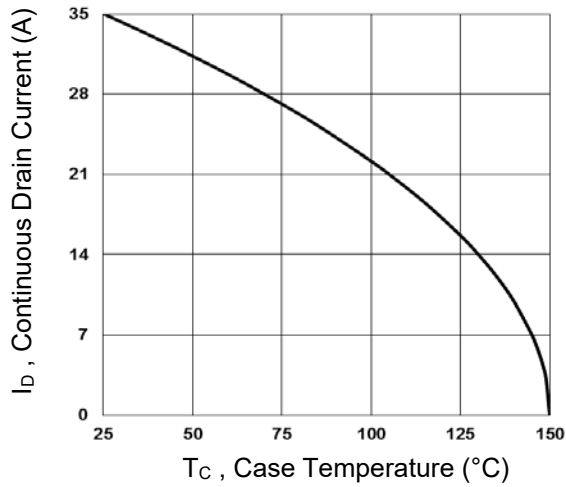


Fig.1 Continuous Drain Current vs. T_C

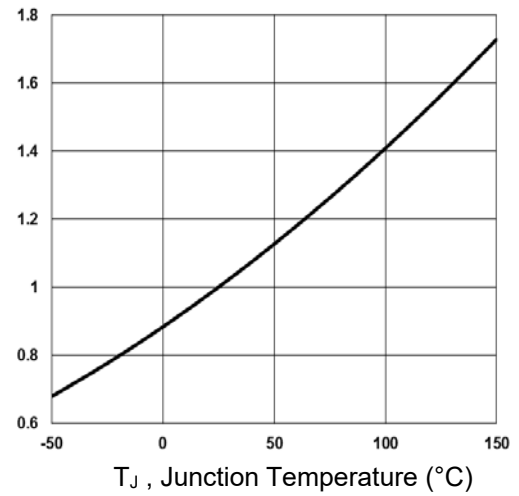


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

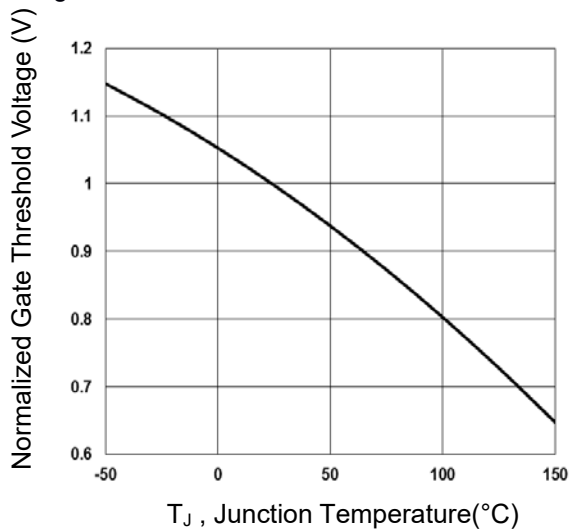


Fig.3 Normalized V_{th} vs. T_J

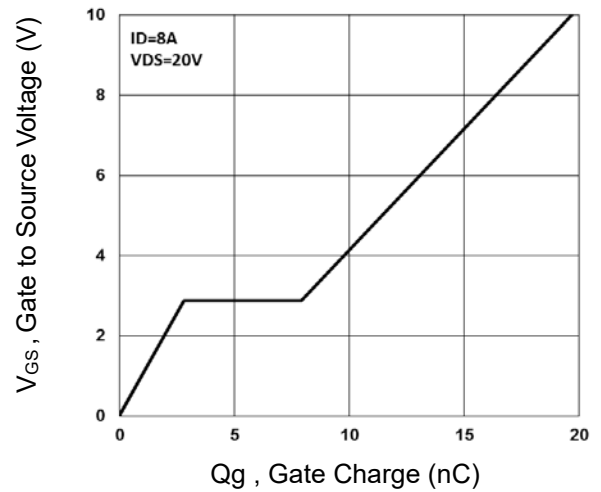


Fig.4 Gate Charge Waveform

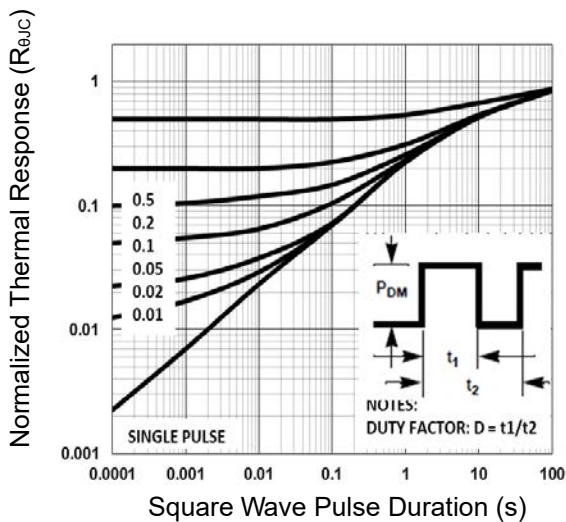


Fig.5 Normalized Transient Impedance

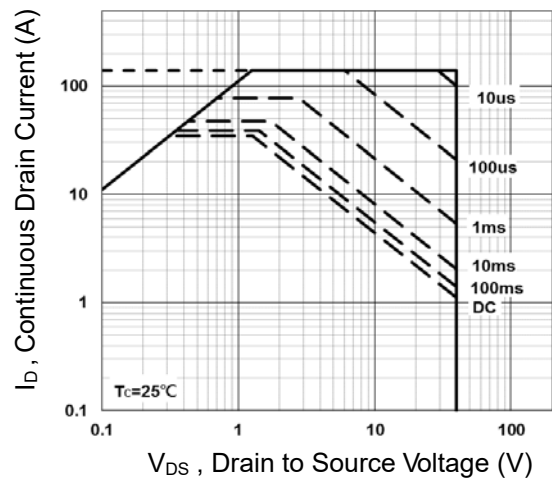
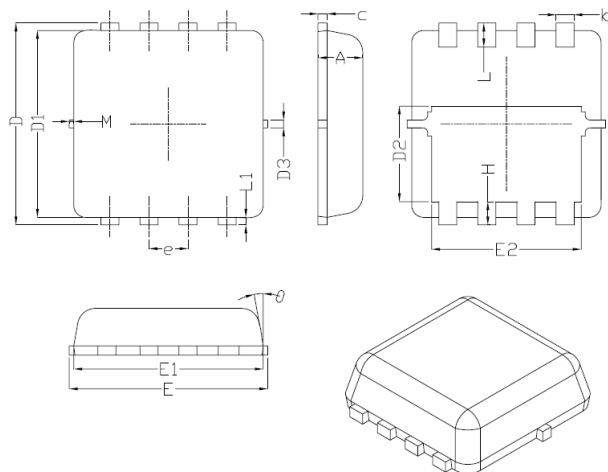


Fig.6 Maximum Safe Operation Area



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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