



## Description

The NVTFWS004N04CTAG 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

$V_{DS} = 40V$   $I_D = 70A$

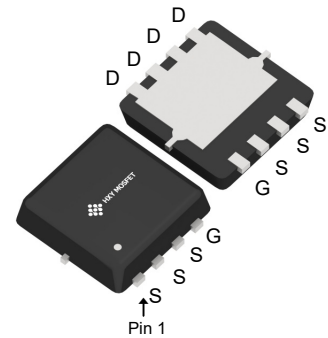
$R_{DS(ON)} < 5.5m\Omega @ V_{GS}=10V$

## Application

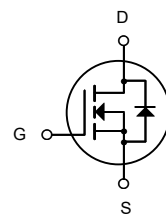
Battery protection

Load switch

Uninterruptible power supply



DFN3X3-8L



N-Channel MOSFET

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
NVTFWS004N04CTAG	DFN3X3-8L	HXY MOSFET	5000

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	40	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	70	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	44.3	A
$I_{DM}$	Pulsed Drain Current	280	A
EAS	Single Pulse Avalanche Energy	100	mJ
$I_{AS}$	Avalanche Current	22	A
$P_D@T_C=25^\circ C$	Total Power Dissipation	52	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	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case	2.4	°C/W



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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>BV<sub>DSS</sub></b>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	40	---	---	V
<b>I<sub>DSS</sub></b>	Zero Gate Voltage Drain Current	V <sub>GS</sub> =0V, V <sub>DS</sub> =40V	---	---	1	μA
<b>I<sub>GSS</sub></b>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V V <sub>DS</sub> =0A	---	---	±100	nA
<b>V<sub>GS(th)</sub></b>	Gate-Source Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	1.0	1.6	2.1	V
<b>R<sub>DS(on)</sub></b>	Drain-Source On Resistance <sup>4</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	4.2	5.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	---	5.5	7	
<b>C<sub>iss</sub></b>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz	---	2800	---	pF
<b>C<sub>oss</sub></b>	Output Capacitance		---	233	--	
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance		---	152	---	
<b>t<sub>d(on)</sub></b>	Turn-On Delay Time	V <sub>DS</sub> =20V, I <sub>D</sub> =1A, R <sub>G</sub> =3.3Ω, V <sub>GS</sub> 10V	---	14.2	---	ns
<b>t<sub>r</sub></b>	Rise Time		---	18.3	---	ns
<b>t<sub>d(off)</sub></b>	Turn-Off Delay Time		---	38.8	---	ns
<b>t<sub>f</sub></b>	Fall Time		---	13.9	---	ns
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =4.5V, V <sub>DS</sub> =32V, I <sub>D</sub> =10A	---	25	---	nC
<b>Q<sub>gs</sub></b>	Gate-Source Charge		---	6.4	---	nC
<b>Q<sub>gd</sub></b>	Gate-Drain "Miller" Charge		---	12.1	---	nC
<b>V<sub>SD</sub></b>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>SD</sub> =1A	---	---	1	V
<b>I<sub>S</sub></b>	Continuous Drain Current	V <sub>D</sub> =V <sub>G</sub> =0V	---	---	70	A
<b>I<sub>SM</sub></b>	Pulsed Drain Current		---	---	280	A

**Notes:**

1. Computed continuous current assumes the condition of T<sub>J,Max</sub> while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=20 V, V<sub>G</sub>=10V, L=0.5mH
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%



### Typical Characteristics

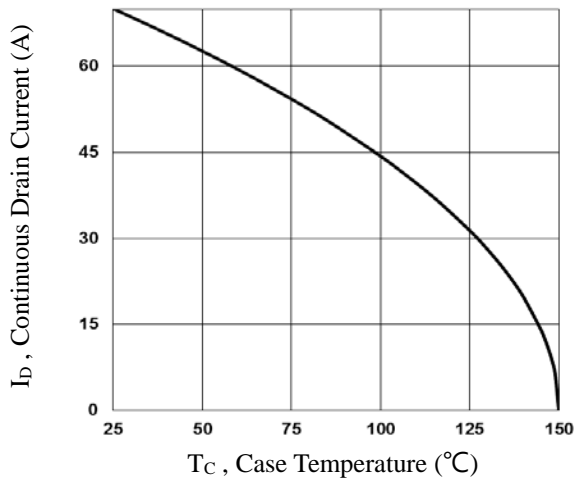


Fig.1 Continuous Drain Current vs.  $T_C$

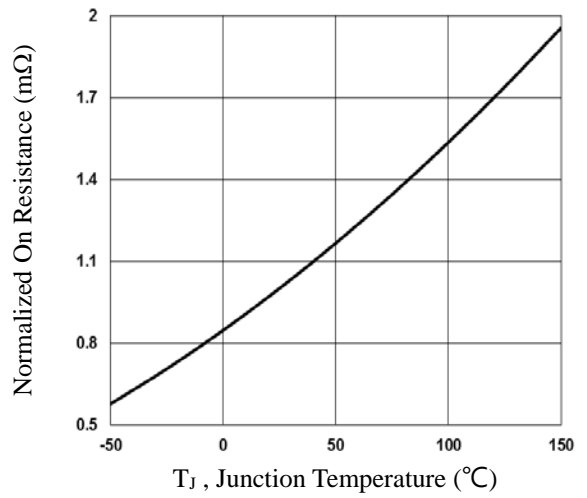


Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$

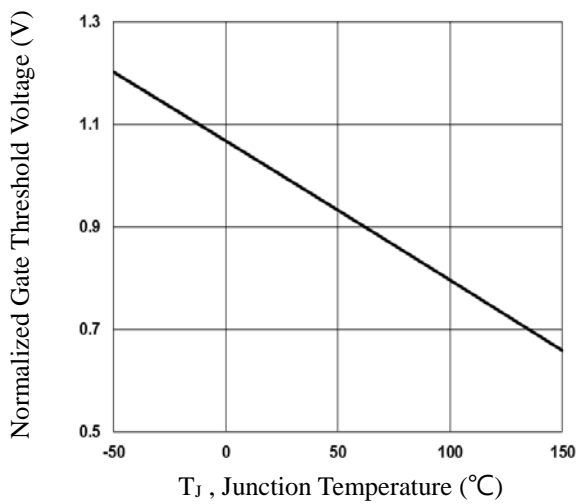


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

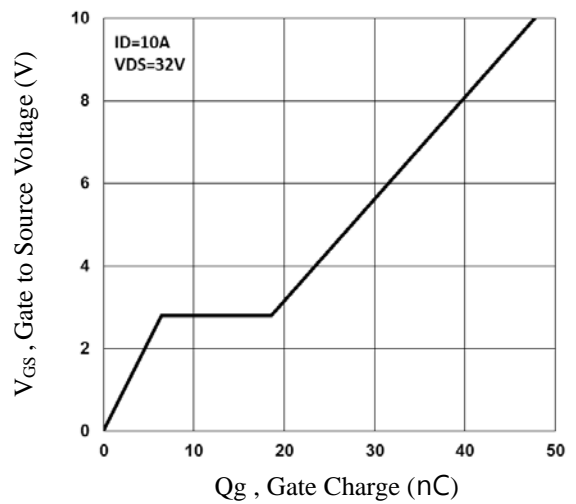


Fig.4 Gate Charge Waveform

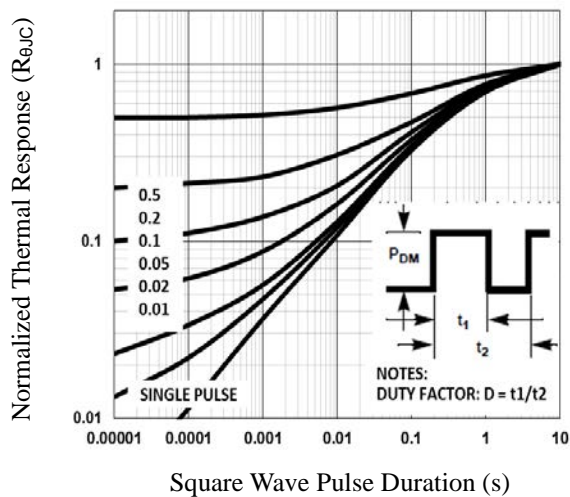


Fig.5 Normalized Transient Impedance

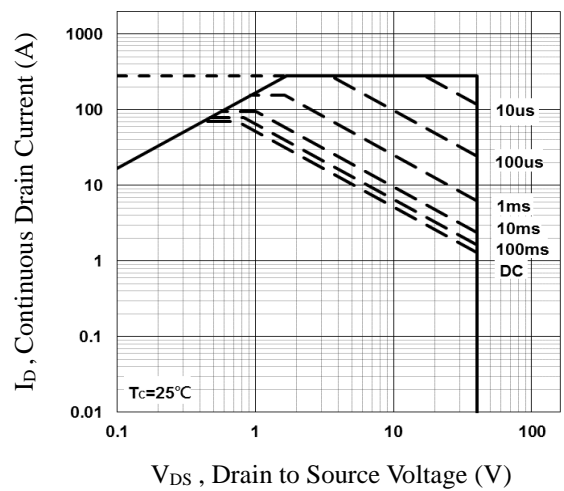


Fig.6 Maximum Safe Operation Area

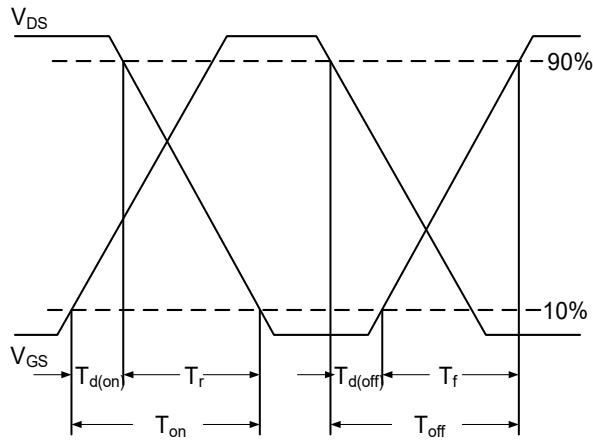


Fig.7 Switching Time Waveform

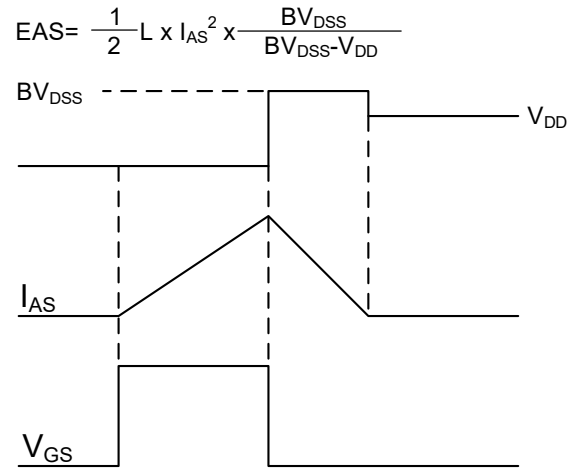


Fig.8 EAS Waveform



### 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
$\theta$		10°	12°



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