



## General Description

The HNVTFS5C471NLTAG use advanced SGT MOSFET technology to provide low  $R_{DS(ON)}$ , low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness.

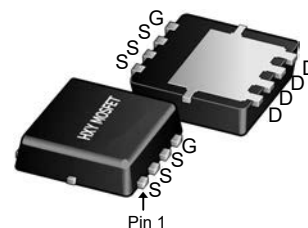
## General Features

$V_{DS} = 40V$   $I_D = 60A$

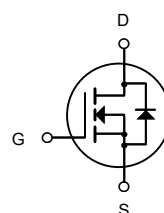
$R_{DS(ON)} < 8.5m\Omega @ V_{GS}=10V$

## Applications

Consumer electronic power supply Motor control  
Synchronous-rectification Isolated DC  
Synchronous-rectification applications



DFN3X3-8L



N-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HNVTFS5C471NLTAG	DFN3X3-8L	HXY MOSFET	5000

## Absolute Maximum Ratings at $T_J=25^{\circ}C$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	$V_{DS}$	40	V
Gate source voltage	$V_{GS}$	$\pm 20$	V
Continuous drain current <sup>1)</sup>	$I_D$	60	A
Pulsed drain current <sup>2)</sup>	$I_D$ , pulse	130	A
Power dissipation <sup>3)</sup>	$P_D$	39	W
Single pulsed avalanche energy <sup>5)</sup>	EAS	48	mJ
Operation and storage temperature	$T_{stg}$ , $T_J$	-55 to 150	$^{\circ}C$
Thermal resistance, junction-case	$R_{\theta JC}$	3.2	$^{\circ}C/W$
Thermal resistance, junction-ambient <sup>4)</sup>	$R_{\theta JA}$	60	$^{\circ}C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V , I <sub>D</sub> =250uA	40	---	---	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V , I <sub>D</sub> =12A	---	6.9	8.5	mΩ
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =10A	---	10.0	15	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.35	---	3	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =32V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =32V , V <sub>GS</sub> =0V , T <sub>J</sub> =55°C	---	---	5	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V , V <sub>DS</sub> =0V	---	---	±100	nA
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V , V <sub>GS</sub> =0V , f=1MHz	---	1.7	---	Ω
Q <sub>g</sub>	Total Gate Charge (4.5V)	V <sub>DS</sub> =20V , V <sub>GS</sub> =4.5V , I <sub>D</sub> =12A	---	5.8	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	3	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	1.2	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =15V , V <sub>GS</sub> =10V , R <sub>G</sub> =3.3Ω I <sub>D</sub> =1A	---	14.3	---	ns
T <sub>r</sub>	Rise Time		---	5.6	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	20	---	
T <sub>f</sub>	Fall Time		---	11	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V , V <sub>GS</sub> =0V , f=1MHz	---	690	---	pF
C <sub>oss</sub>	Output Capacitance		---	193	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	38	---	

### Diode Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,5</sup>	V <sub>G</sub> =V <sub>D</sub> =0V , Force Current	---	---	60	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V , I <sub>S</sub> =1A , T <sub>J</sub> =25°C	---	---	1	V

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3.The EAS data shows Max. rating . The test condition is V<sub>DD</sub>=25V,V<sub>GS</sub>=10V,L=0.1mH,I<sub>AS</sub>=31A
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub> , in real applications , should be limited by total power dissipation.



## Typical Characteristics

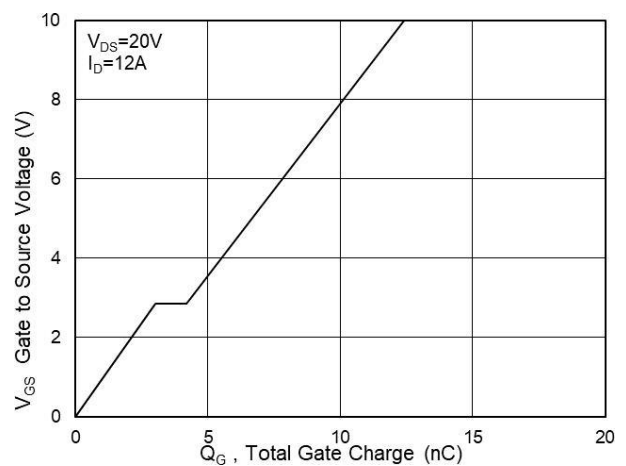
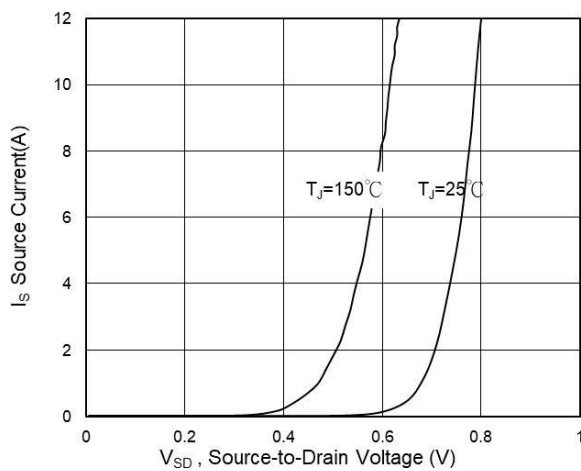
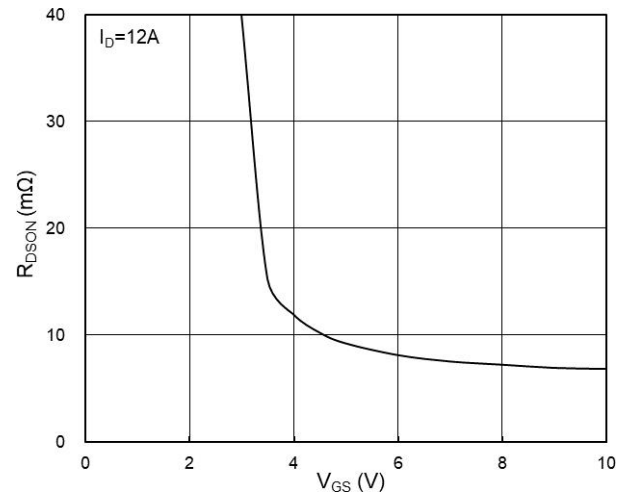
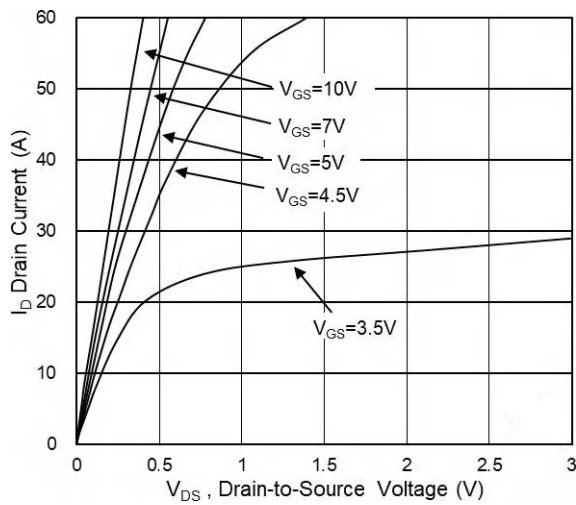
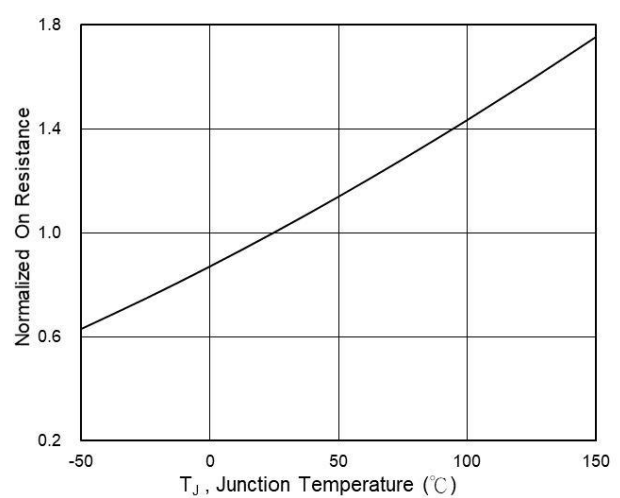
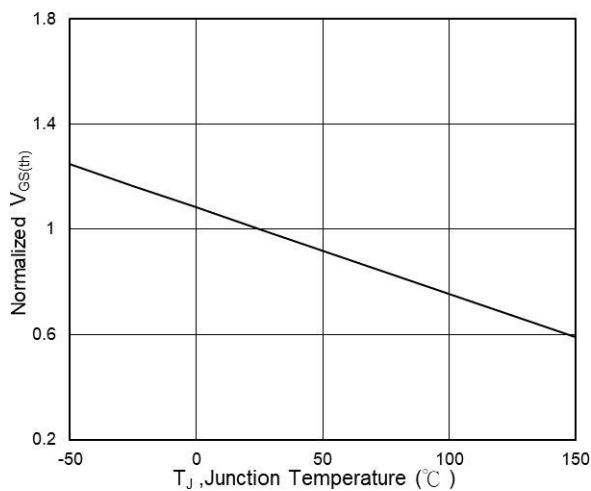


Fig.3 Source Drain Forward Characteristics

Fig.4 Gate-Charge Characteristics



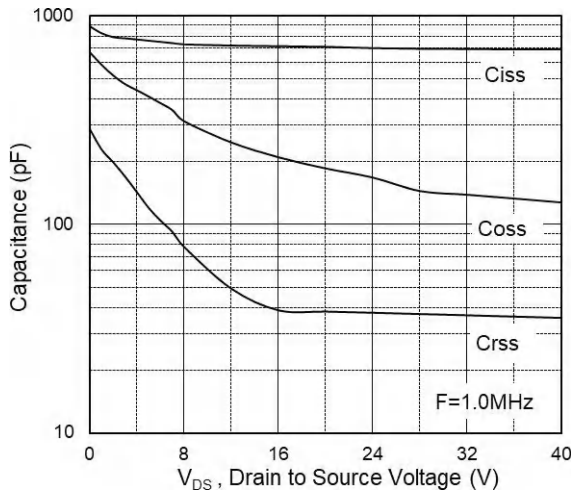


Fig.7 Capacitance

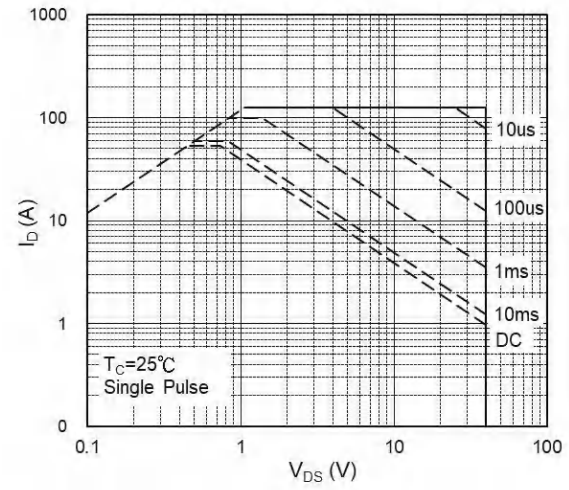


Fig.8 Safe Operating Area

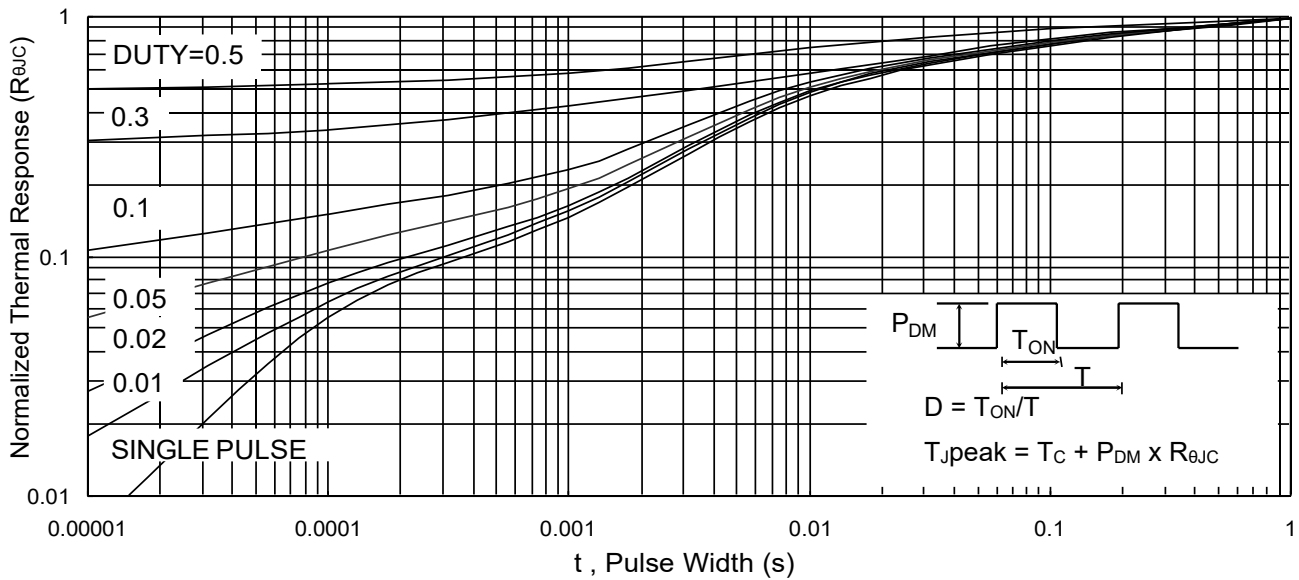


Fig.9 Normalized Maximum Transient Thermal Impedance

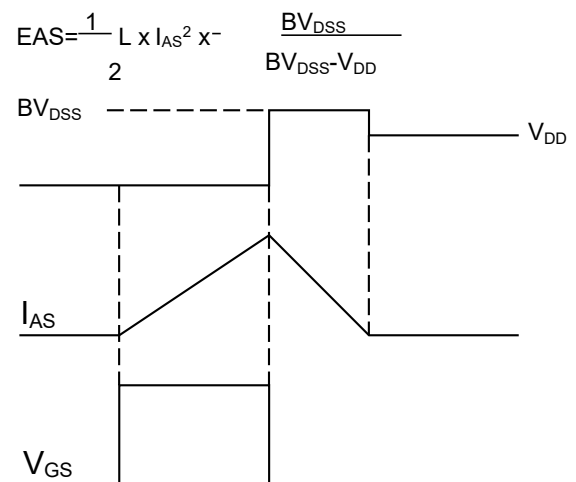
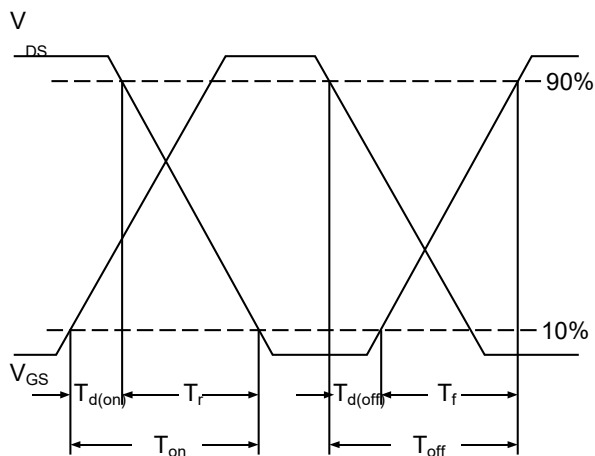
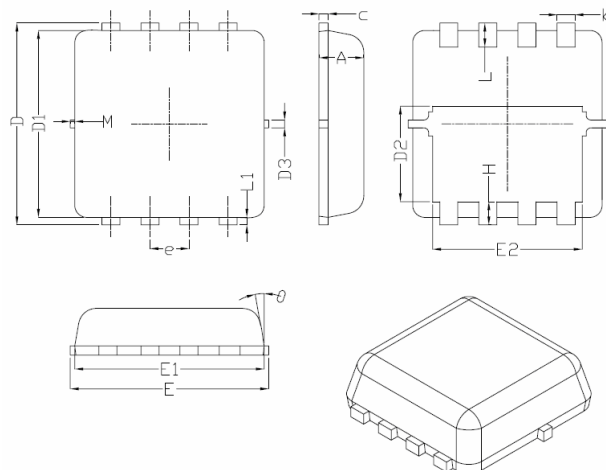


Fig.11 Unclamped Inductive Waveform



## 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
θ		10°	12°



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