



## Description

The HNTTFS4C10NTAG 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

$V_{DS} = 30V$   $I_D = 50A$

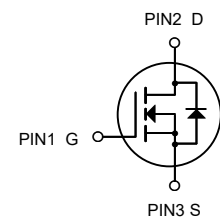
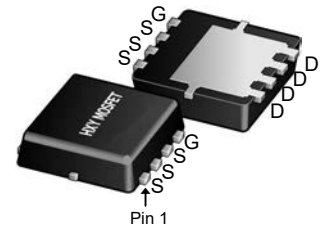
$R_{DS(ON)} < 10m\Omega$  @  $V_{GS}=10V$

## Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
HNTTFS4C10NTAG	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	30	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>	50	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	30	A
$I_D@T_A=25^{\circ}C$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	11	A
$I_D@T_A=70^{\circ}C$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	9	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	112	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	24.2	mJ
$I_{AS}$	Avalanche Current	22	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation <sup>4</sup>	37.5	W
$P_D@T_A=25^{\circ}C$	Total Power Dissipation <sup>4</sup>	2.42	W
$T_{STG}$	Storage Temperature Range	-55 to 175	$^{\circ}C$
$T_J$	Operating Junction Temperature Range	-55 to 175	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient <sup>1</sup>	62	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	4	$^{\circ}C/W$



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

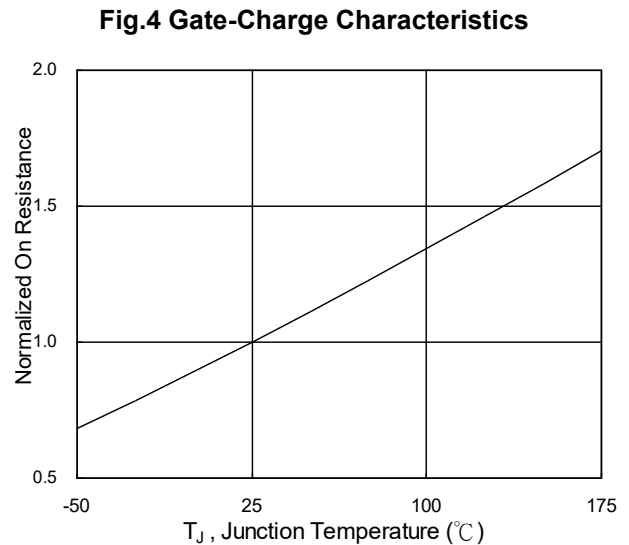
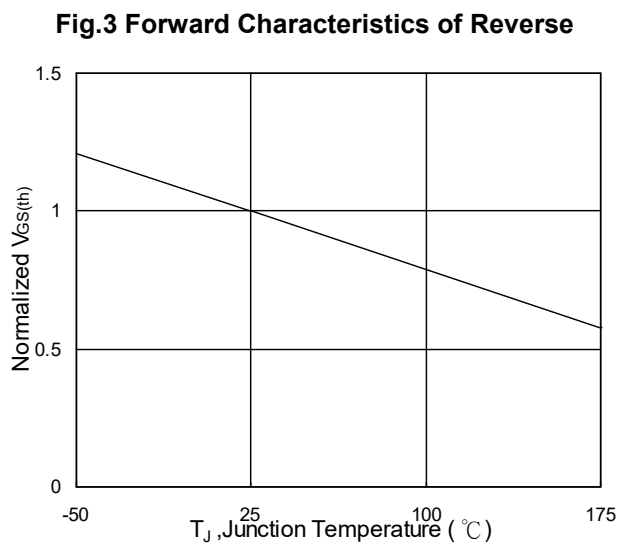
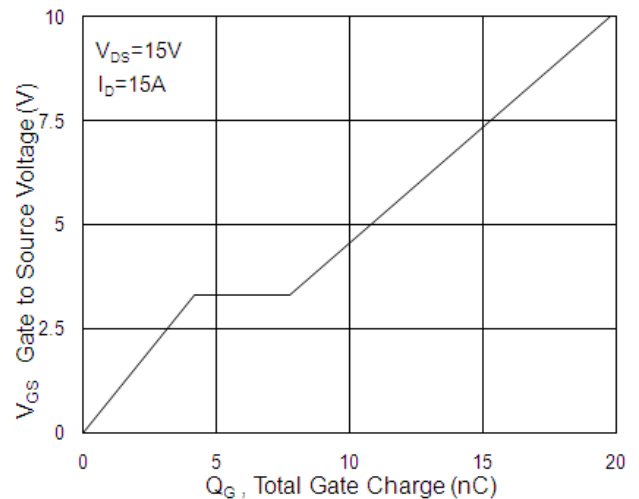
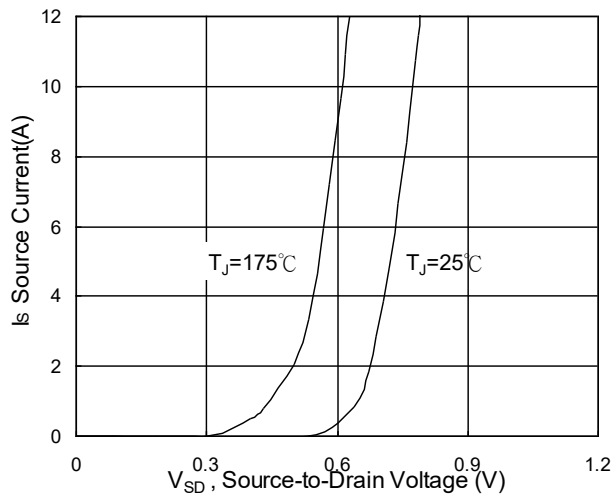
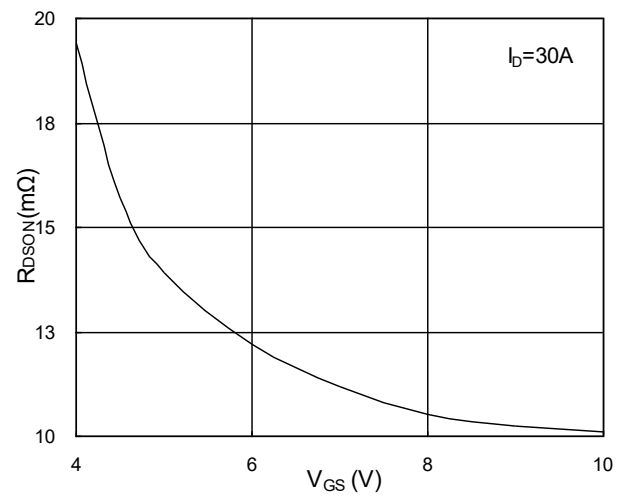
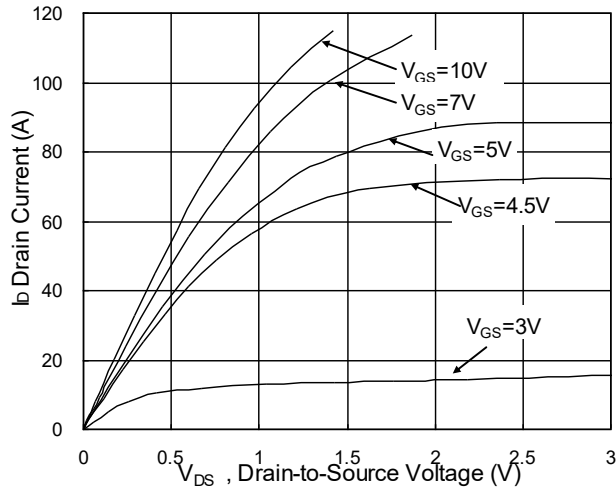
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V$ , $I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to $25^{\circ}\text{C}$ , $I_D=1mA$	---	0.0193	---	$V/^{\circ}\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V$ , $I_D=30A$	---	7.5	10	m $\Omega$
		$V_{GS}=4.5V$ , $I_D=15A$	---	11	18	
$V_{GS(th)}$	Gate Threshold Voltage		1.2	---	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient	$V_{GS}=V_{DS}$ , $I_D=250\mu A$	---	-3.97	---	mV/ $^{\circ}\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=24V$ , $V_{GS}=0V$ , $T_J=25^{\circ}\text{C}$	---	---	1	uA
		$V_{DS}=24V$ , $V_{GS}=0V$ , $T_J=55^{\circ}\text{C}$	---	---	5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V$ , $V_{DS}=0V$	---	---	$\pm 100$	nA
$g_{fs}$	Forward Transconductance	$V_{DS}=5V$ , $I_D=30A$	---	34	---	S
$R_g$	Gate Resistance	$V_{DS}=0V$ , $V_{GS}=0V$ , $f=1MHz$	---	1.8	---	$\Omega$
$Q_g$	Total Gate Charge (4.5V)		---	9.8	---	nC
$Q_{gs}$	Gate-Source Charge	$V_{DS}=15V$ , $V_{GS}=4.5V$ , $I_D=15A$	---	4.2	---	
$Q_{gd}$	Gate-Drain Charge		---	3.6	---	
$T_{d(on)}$	Turn-On Delay Time		---	4	---	ns
$T_r$	Rise Time	$V_{DD}=15V$ , $V_{GS}=10V$ , $R_G=3.3$	---	8	---	
$T_{d(off)}$	Turn-Off Delay Time	$I_D=15A$	---	31	---	
$T_f$	Fall Time		---	4	---	
$C_{iss}$	Input Capacitance		---	940	---	pF
$C_{oss}$	Output Capacitance	$V_{DS}=15V$ , $V_{GS}=0V$ , $f=1MHz$	---	131	---	
$C_{rss}$	Reverse Transfer Capacitance		---	109	---	
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V$ , Force Current	---	---	43	A
$I_{SM}$	Pulsed Source Current <sup>2,5</sup>		---	---	112	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V$ , $I_S=1A$ , $T_J=25^{\circ}\text{C}$	---	---	1	V
$t_{rr}$	Reverse Recovery Time	$I_F=30A$ , $di/dt=100A/\mu s$ , $T_J=25^{\circ}\text{C}$	---	8.5	---	nS
$Q_{rr}$	Reverse Recovery Charge		---	2.2	---	nC

Note :

- 1 .The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 20Z copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3 .The EAS data shows Max. rating . The test condition is  $V_{DD}=25V$ ,  $V_{GS}=10V$ ,  $L=0.1mH$ ,  $I_{AS}=22A$
- 4.The power dissipation is limited by  $175^{\circ}\text{C}$  junction temperature
- 5.The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.



## Typical Characteristics



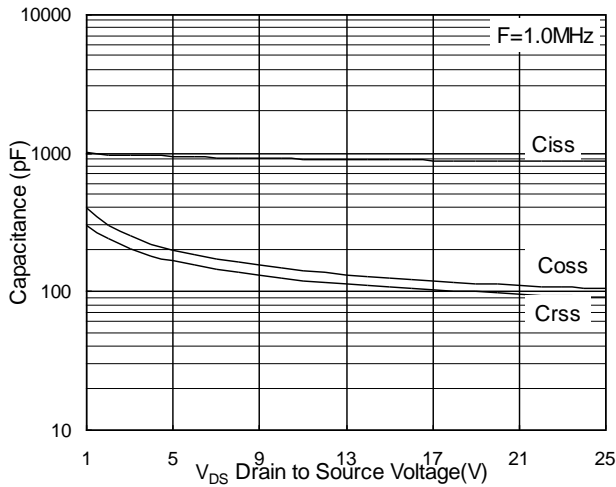


Fig.7 Capacitance

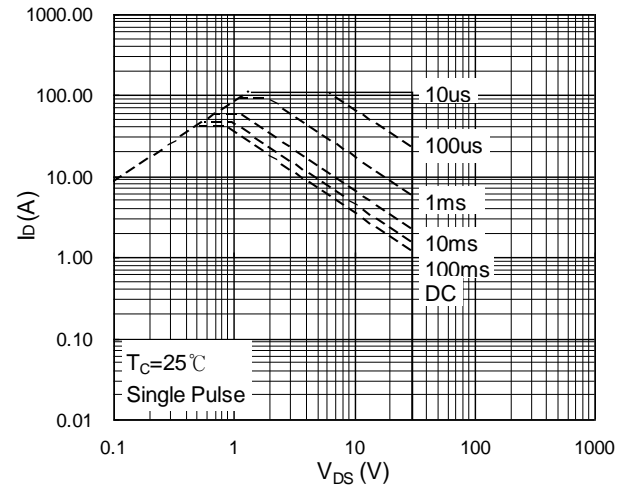


Fig.8 Safe Operating Area

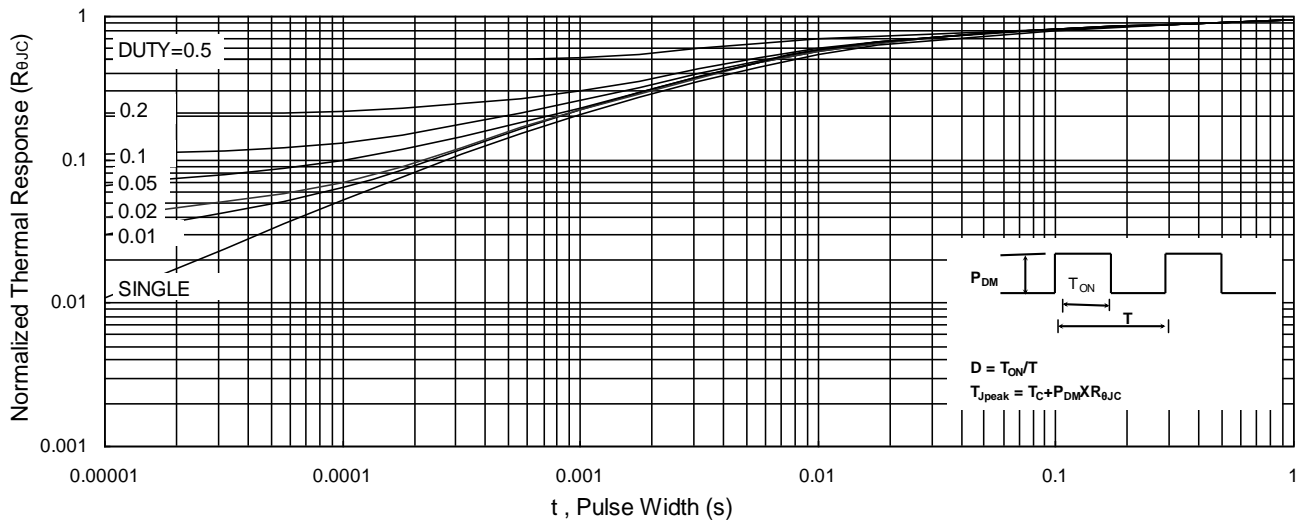


Fig.9 Normalized Maximum Transient Thermal Impedance

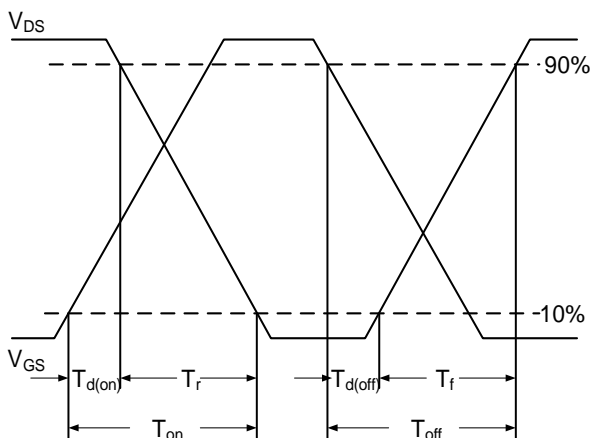


Fig.10 Switching Time Waveform

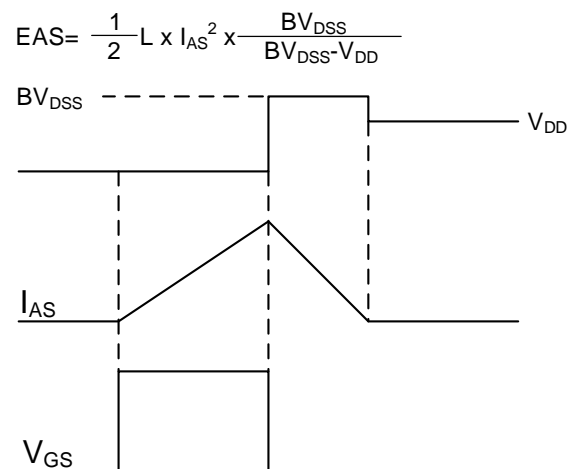
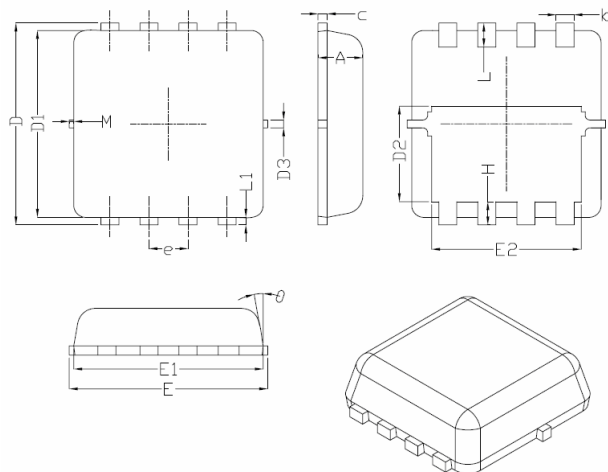


Fig.11 Unclamped Inductive Switching Waveform



## 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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