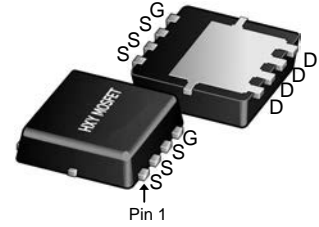




## General Description

The NTTFS5C471NL use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness and suitable.

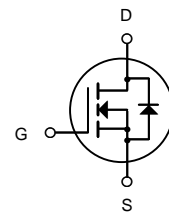


DFN3X3-8L

## General Features

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

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



N-Channel MOSFET

## Applications

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

## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
NTTFS5C471NL	DFN3X3-8L	HXY MOSFET	5000

## Absolute Maximum Ratings at $T_j = 25^\circ C$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	VDS	40	V
Gate source voltage	VGS	$\pm 20$	V
Continuous drain current <sup>1)</sup>	ID	60	A
Pulsed drain current <sup>2)</sup>	ID, pulse	130	A
Power dissipation <sup>3)</sup>	PD	39	W
Single pulsed avalanche energy <sup>5)</sup>	EAS	48	mJ
Operation and storage temperature	Tstg, Tj	-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 ( $T_J=25^\circ\text{C}$ , unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	40	---	---	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=10V, I_D=12A$	---	6.9	8.5	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	10.0	15	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.35	---	3	V
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=32V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=32V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
$R_g$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.7	---	$\Omega$
$Q_g$	Total Gate Charge (4.5V)	$V_{DS}=20V, V_{GS}=4.5V, I_D=12A$	---	5.8	---	nC
$Q_{gs}$	Gate-Source Charge		---	3	---	
$Q_{gd}$	Gate-Drain Charge		---	1.2	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V, V_{GS}=10V, R_G=3.3\Omega$ $I_D=1A$	---	14.3	---	ns
$T_r$	Rise Time		---	5.6	---	
$T_{d(off)}$	Turn-Off Delay Time		---	20	---	
$T_f$	Fall Time		---	11	---	
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	690	---	pF
$C_{oss}$	Output Capacitance		---	193	---	
$C_{riss}$	Reverse Transfer Capacitance		---	38	---	
$I_S$	Continuous Source Current <sup>1,5</sup>	$V_G=V_D=0V, \text{Force Current}$	---	---	60	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	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  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=31A$
- 4.The power dissipation is limited by  $150^\circ\text{C}$  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

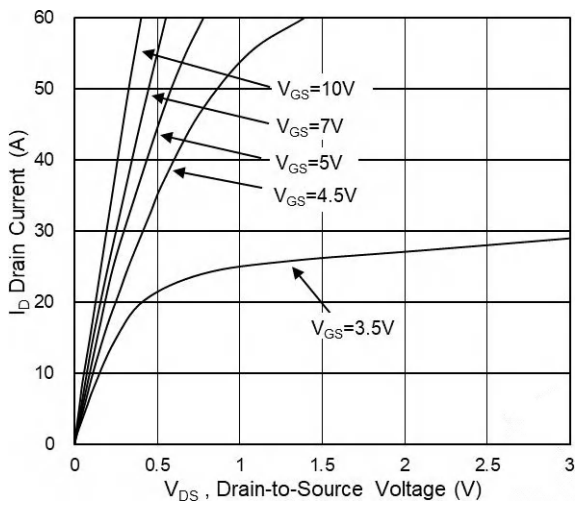


Fig.1 Typical Output Characteristics

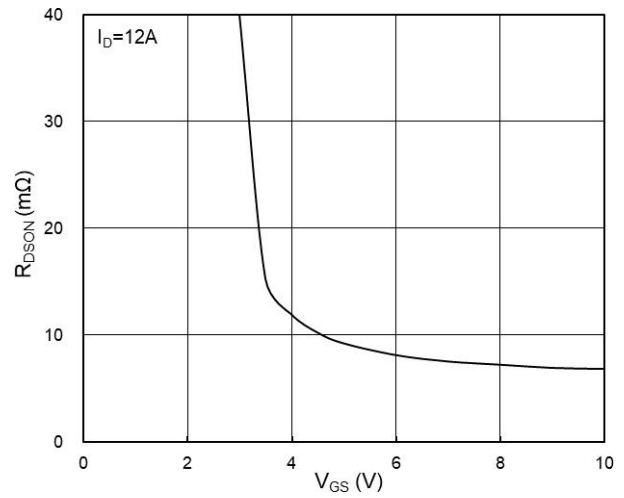


Fig.2 On-Resistance vs G-S Voltage

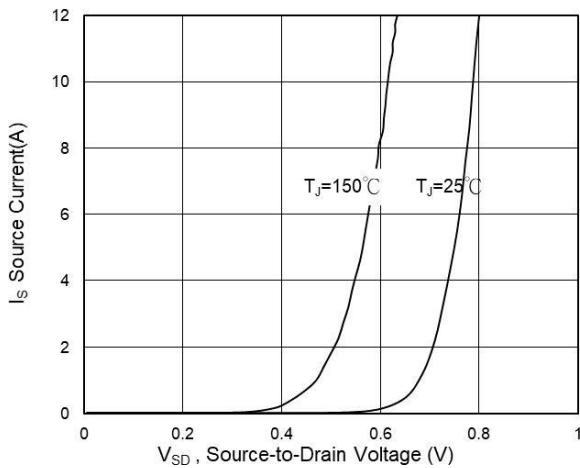


Fig.3 Source Drain Forward Characteristics

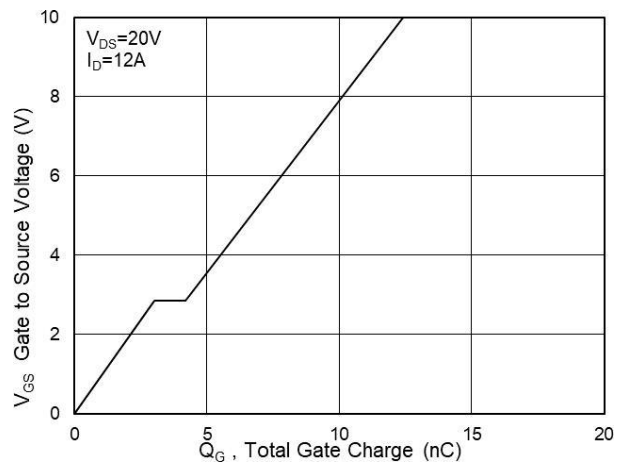


Fig.4 Gate-Charge Characteristics

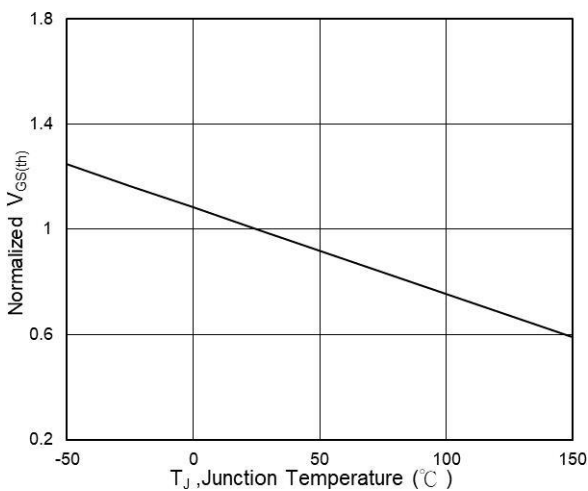


Fig.5 Normalized  $V_{GS(th)}$  vs  $T_J$

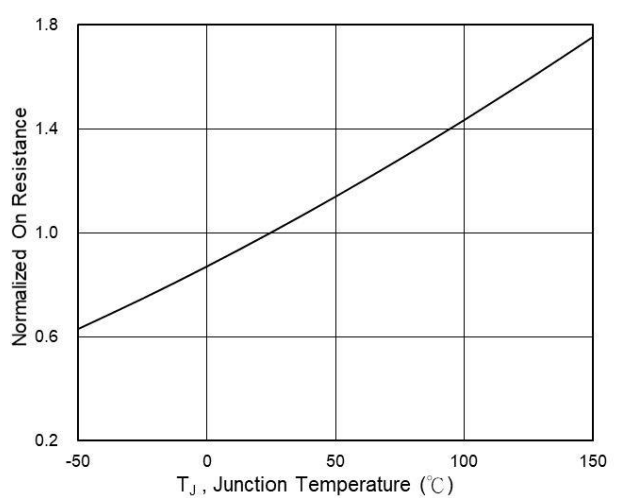


Fig.6 Normalized  $R_{DS(on)}$  vs  $T_J$

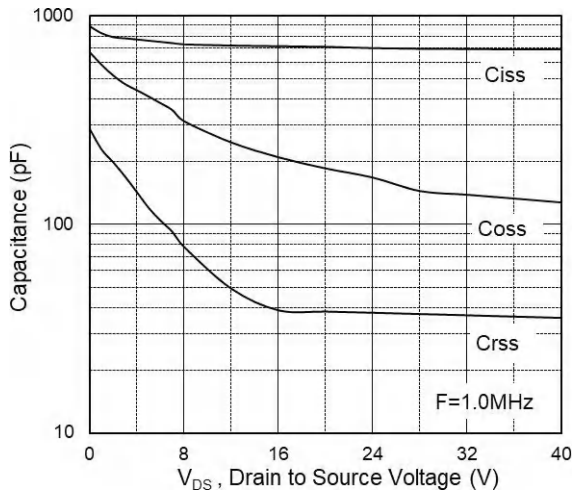


Fig.7 Capacitance

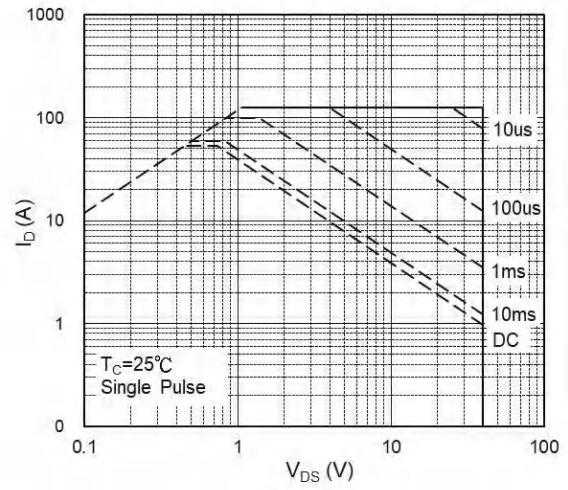


Fig.8 Safe Operating Area

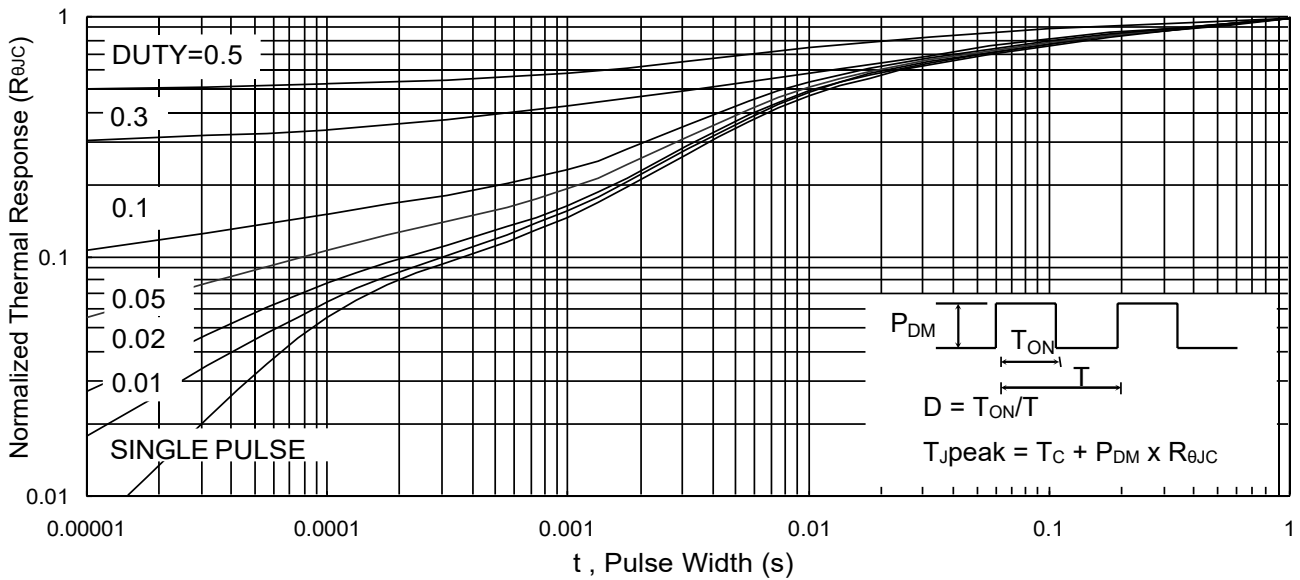


Fig.9 Normalized Maximum Transient Thermal Impedance

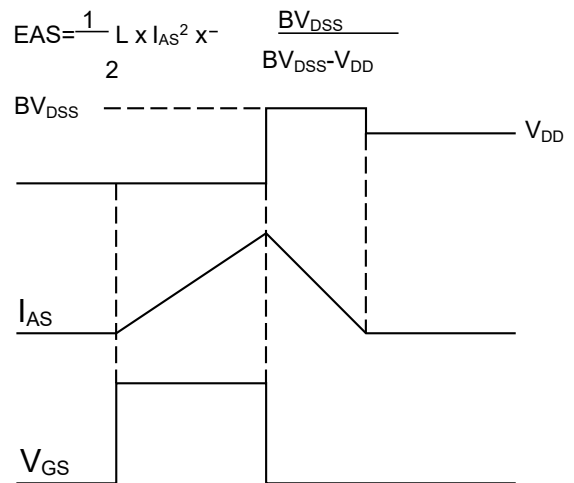
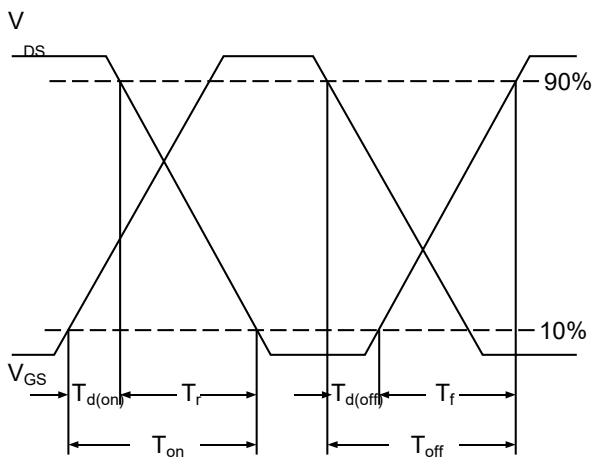
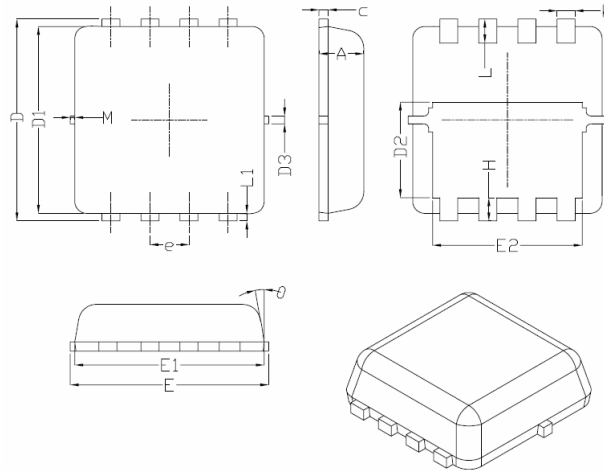


Fig.11 Unclamped Inductive Waveform



### 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
$\theta$		10°	12°



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