



Description

The NTMFS5H431NLT1G 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

$V_{DS} = 40V$ $I_D = 130A$

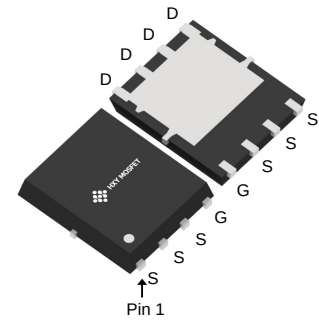
$R_{DS(ON)} < 3.5m\Omega$ $V_{GS}=10V$

Application

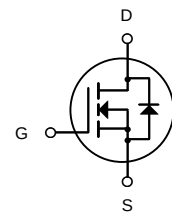
Battery protection

Load switch

Uninterruptible power supply



DFN5X6-8L



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
NTMFS5H431NLT1G	DFN5X6-8L	HXY MOSFET	5000

Absolute Maximum Ratings ($T_c=25^{\circ}C$ unless otherwise noted)

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, $V_{GS} @ 10V^1$	130	A
$I_D@T_c=100^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	65	A
I_{DM}	Pulsed Drain Current ²	400	A
EAS	Single Pulse Avalanche Energy ³	150	mJ
T_{STG}	Storage Temperature Range	-55 to 175	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 175	$^{\circ}C$



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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	40	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =40V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1	1.6	2.5	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =30A	-	2.8	3.5	mΩ
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =20A	50	-	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, F=1.0MHz	-	5584	-	PF
Output Capacitance	C _{OSS}		-	410	-	PF
Reverse Transfer Capacitance	C _{RSS}		-	338	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =20V, I _D =20A, R _L =1Ω V _{GS} =10V, R _{GEN} =3Ω	-	11	-	nS
Turn-on Rise Time	t _r		-	15	-	nS
Turn-Off Delay Time	t _{d(off)}		-	38	-	nS
Turn-Off Fall Time	t _f		-	14	-	nS
Total Gate Charge	Q _g	V _{DS} =30V, I _D =30A, V _{GS} =10V	-	64	-	nC
Gate-Source Charge	Q _{gs}		-	12.4	-	nC
Gate-Drain Charge	Q _{gd}		-	14	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V, I _S =30A	-	-	1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	130	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F =30A di/dt = 100A/μs ^(Note3)	-	22		nS
Reverse Recovery Charge	Q _{rr}		-	11		nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$



Typical Characteristics

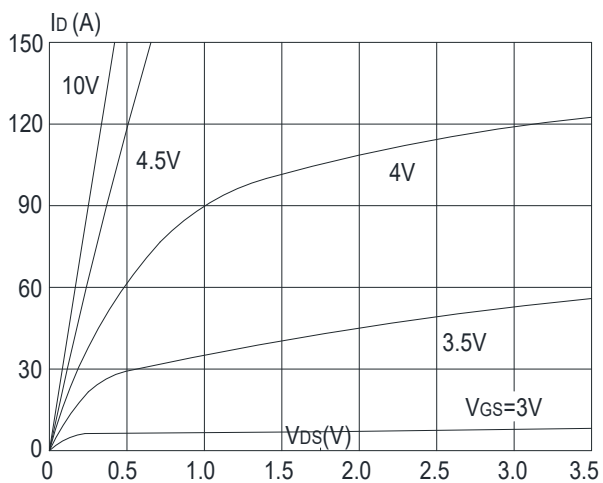


Figure1: Output Characteristics

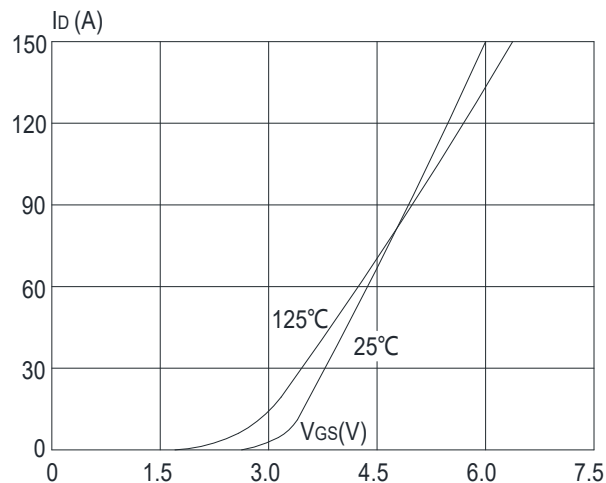


Figure 2: Typical Transfer Characteristics

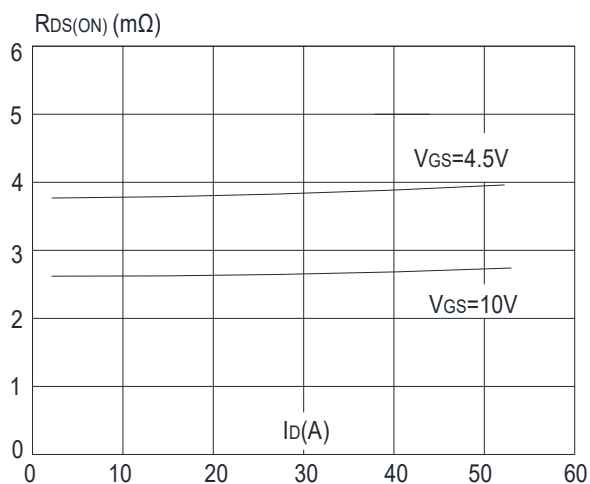


Figure 3: On-resistance vs. Drain Current

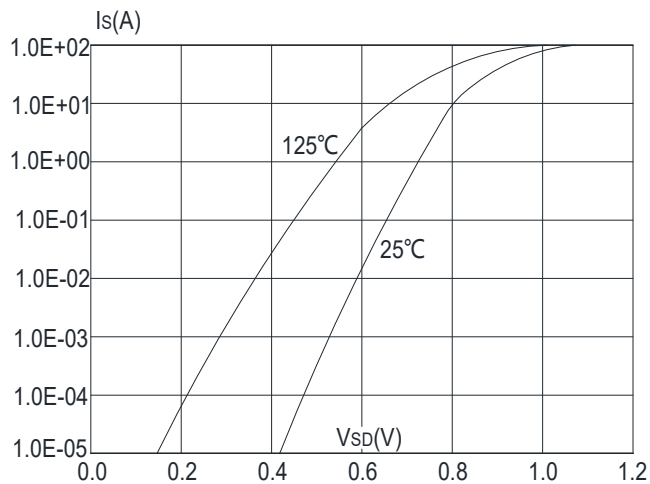


Figure 4: Body Diode Characteristics

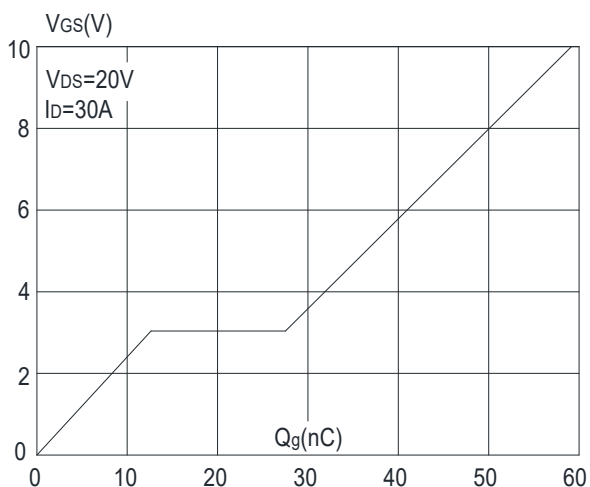


Figure 5: Gate Charge Characteristics

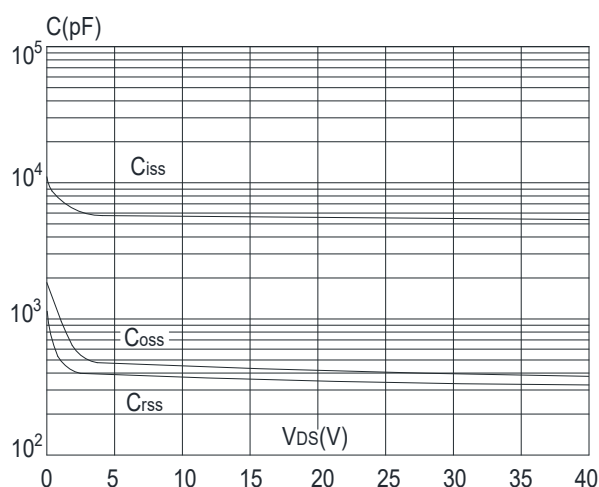


Figure 6: Capacitance Characteristics

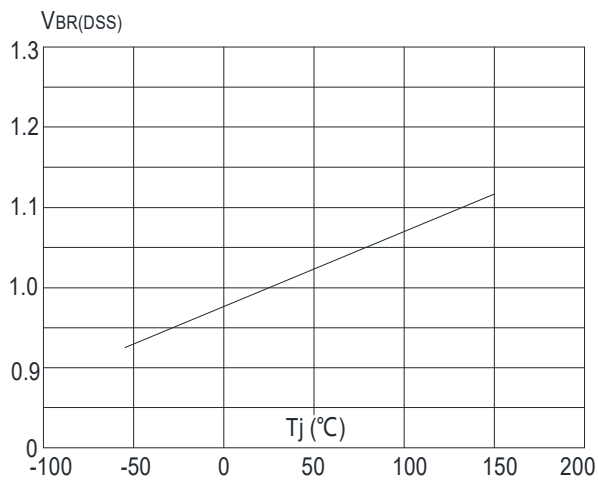


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

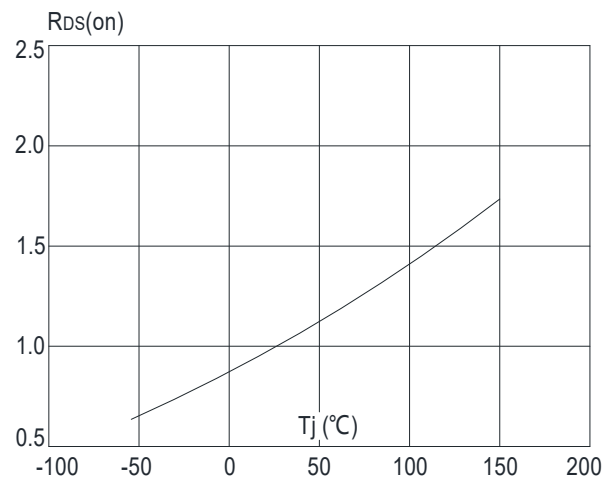


Figure 8: Normalized on Resistance vs. Junction Temperature

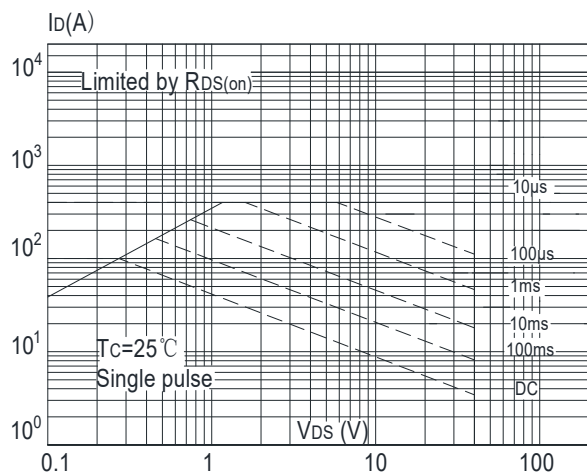


Figure 9: Maximum Safe Operating Area

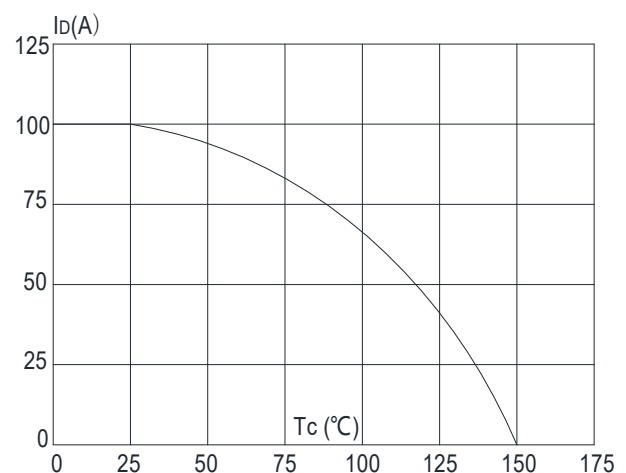


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

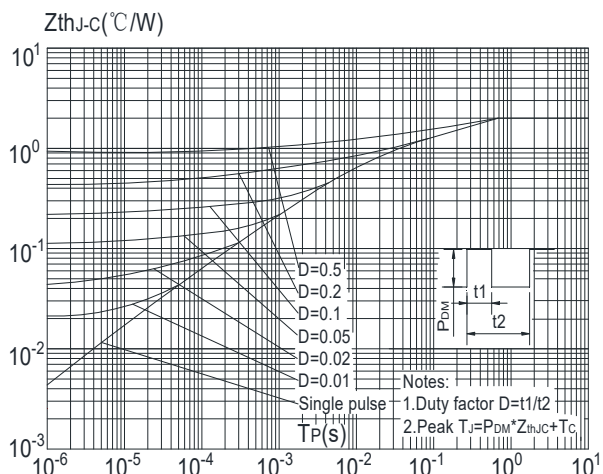
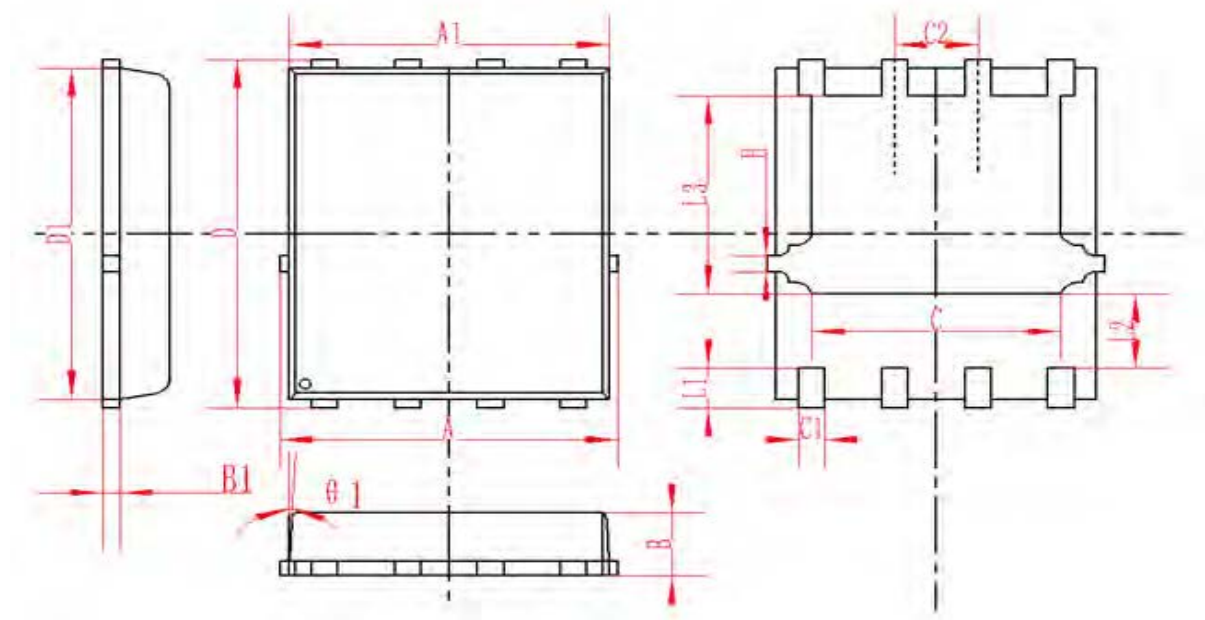


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



DFN5X6-8L Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
θ1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010



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