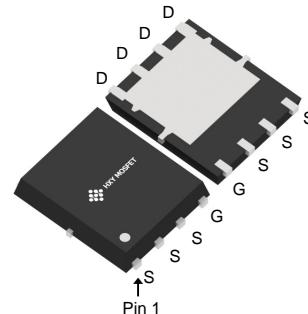




Description

The NVMFS5C450NWFAFT1G 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.



DFN5X6-8L

General Features

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

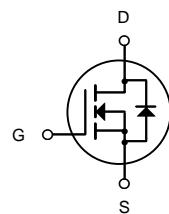
$R_{DS(ON)} < 3.5m\Omega$ $V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|--------------------|-----------|------------|----------|
| NVMFS5C450NWFAFT1G | 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 | °C |
| T_J | Operating Junction Temperature Range | -55 to 175 | °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} | $\text{V}_{\text{GS}}=0\text{V}, \text{I}_{\text{D}}=250\mu\text{A}$ | 40 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $\text{V}_{\text{DS}}=40\text{V}, \text{V}_{\text{GS}}=0\text{V}$ | - | - | 1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $\text{V}_{\text{GS}}=\pm 20\text{V}, \text{V}_{\text{DS}}=0\text{V}$ | - | - | ± 100 | nA |
| On Characteristics ^(Note 3) | | | | | | |
| Gate Threshold Voltage | $\text{V}_{\text{GS(th)}}$ | $\text{V}_{\text{DS}}=\text{V}_{\text{GS}}, \text{I}_{\text{D}}=250\mu\text{A}$ | 1 | 1.6 | 2.5 | V |
| Drain-Source On-State Resistance | $\text{R}_{\text{DS(ON)}}$ | $\text{V}_{\text{GS}}=10\text{V}, \text{I}_{\text{D}}=30\text{A}$ | - | 2.8 | 3.5 | $\text{m}\Omega$ |
| Forward Transconductance | g_{FS} | $\text{V}_{\text{DS}}=5\text{V}, \text{I}_{\text{D}}=20\text{A}$ | 50 | - | - | S |
| Dynamic Characteristics ^(Note 4) | | | | | | |
| Input Capacitance | C_{iss} | $\text{V}_{\text{DS}}=25\text{V}, \text{V}_{\text{GS}}=0\text{V},$ $F=1.0\text{MHz}$ | - | 5584 | - | PF |
| Output Capacitance | C_{oss} | | - | 410 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 338 | - | PF |
| Switching Characteristics ^(Note 4) | | | | | | |
| Turn-on Delay Time | $t_{\text{d(on)}}$ | $\text{V}_{\text{DD}}=20\text{V}, \text{I}_{\text{D}}=20\text{A}, \text{R}=1\Omega$ $\text{V}_{\text{GS}}=10\text{V}, \text{R}_{\text{GEN}}=3\Omega$ | - | 11 | - | nS |
| Turn-on Rise Time | t_r | | - | 15 | - | nS |
| Turn-Off Delay Time | $t_{\text{d(off)}}$ | | - | 38 | - | nS |
| Turn-Off Fall Time | t_f | | - | 14 | - | nS |
| Total Gate Charge | Q_g | $\text{V}_{\text{DS}}=30\text{V}, \text{I}_{\text{D}}=30\text{A},$ $\text{V}_{\text{GS}}=10\text{V}$ | - | 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} | $\text{V}_{\text{GS}}=0\text{V}, \text{I}_{\text{S}}=30\text{A}$ | - | - | 1.2 | V |
| Diode Forward Current ^(Note 2) | I_{S} | | - | - | 130 | A |
| Reverse Recovery Time | t_{rr} | $\text{T}_j = 25^\circ\text{C}, \text{IF} = 30\text{A}$ $\text{di}/\text{dt} = 100\text{A}/\mu\text{s}$ ^(Note 3) | - | 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 $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. E_{AS} condition: $\text{T}_j=25^\circ\text{C}, \text{V}_{\text{DD}}=30\text{V}, \text{V}_{\text{G}}=10\text{V}, \text{L}=0.5\text{mH}, \text{R}_g=25\Omega$



Typical Characteristics

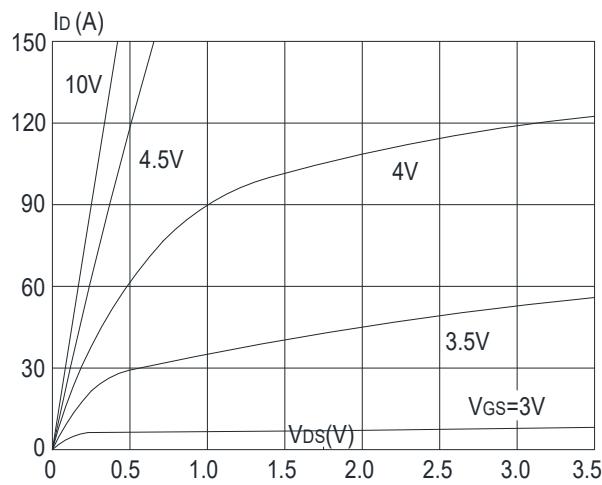


Figure 1: Output Characteristics

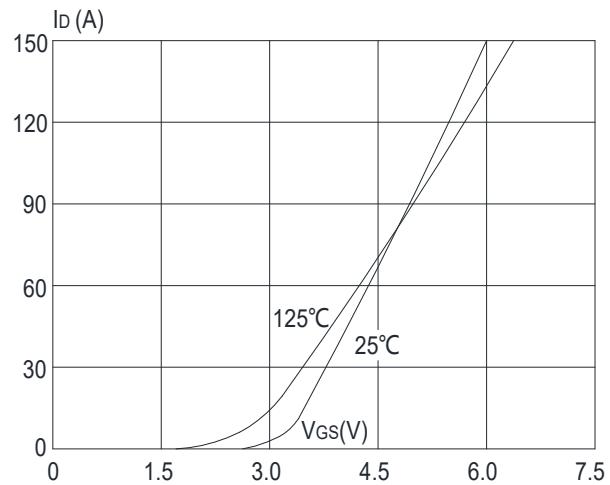


Figure 2: Typical Transfer Characteristics

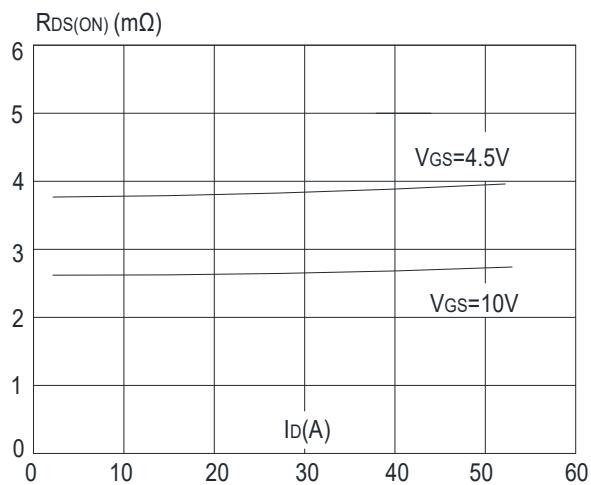


Figure 3: On-resistance vs. Drain Current

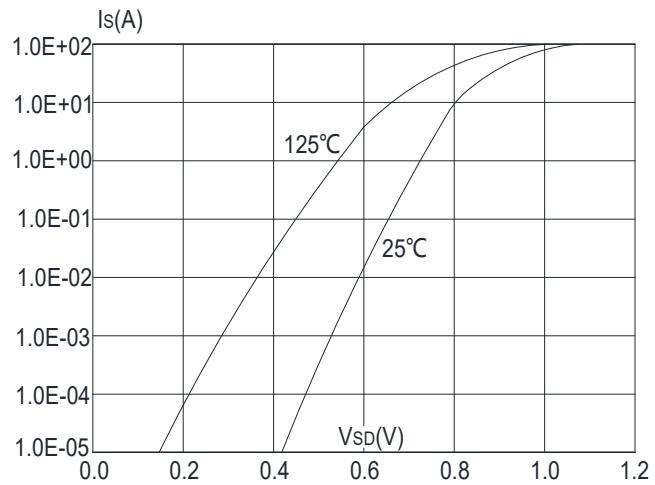


Figure 4: Body Diode Characteristics

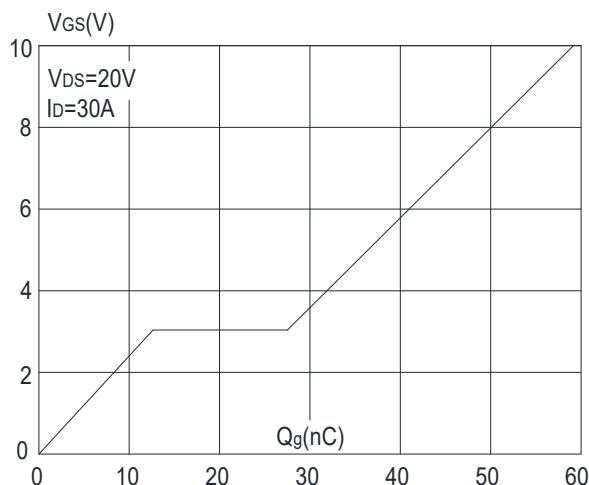


Figure 5: Gate Charge Characteristics

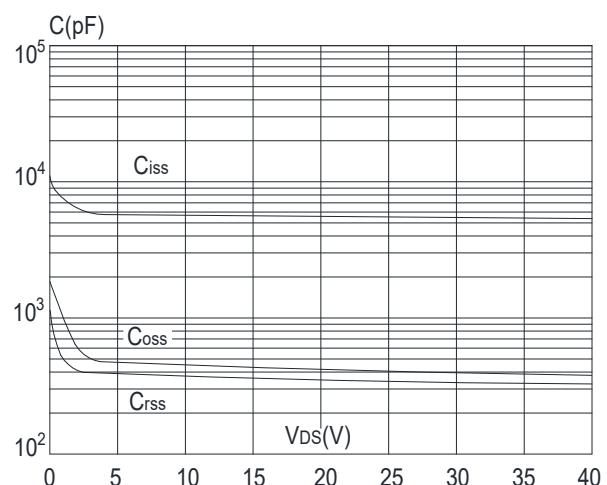


Figure 6: Capacitance Characteristics

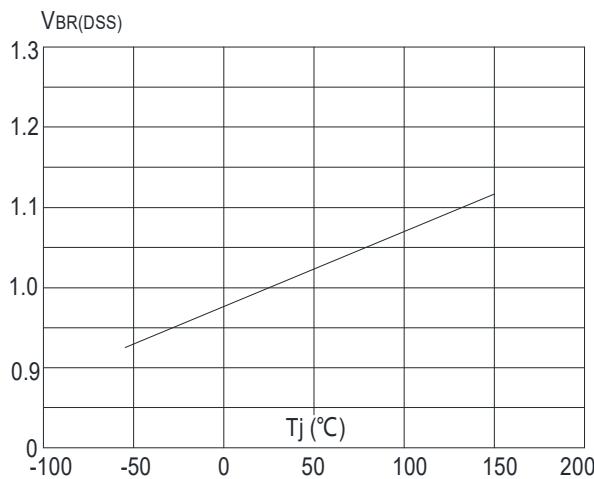


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

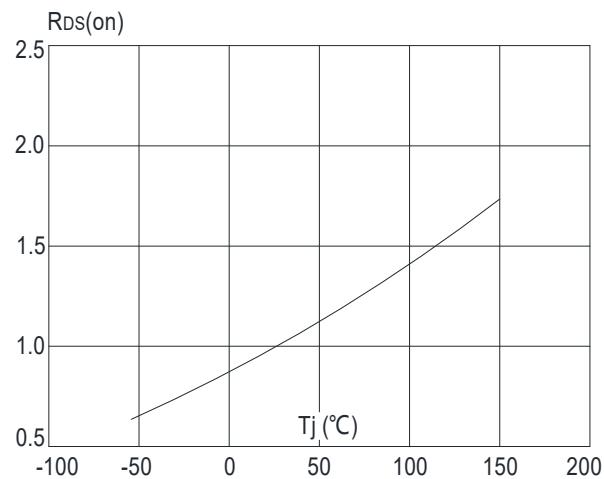


Figure 8: Normalized on Resistance vs. Junction Temperature

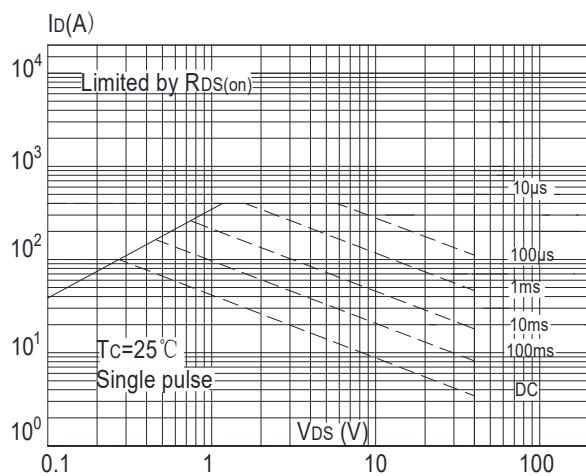


Figure 9: Maximum Safe Operating Area

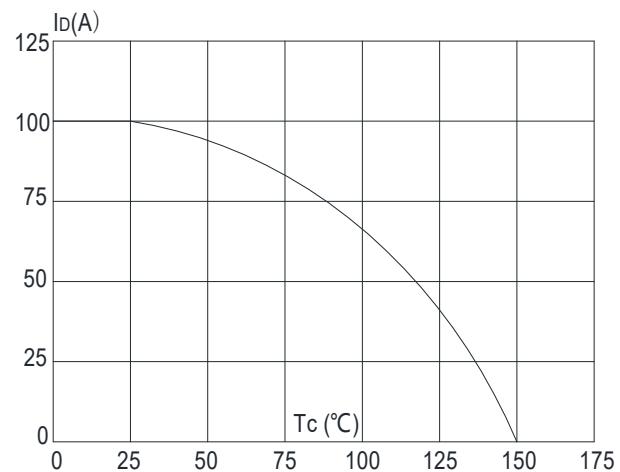


Figure 10: Maximum Continuous Drain Current vs. Case Temperature

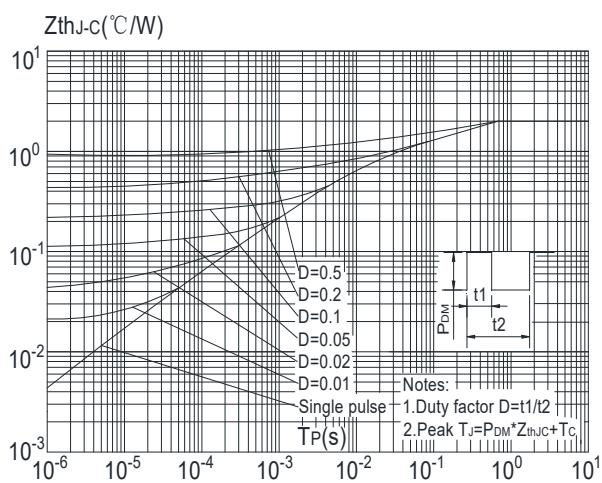
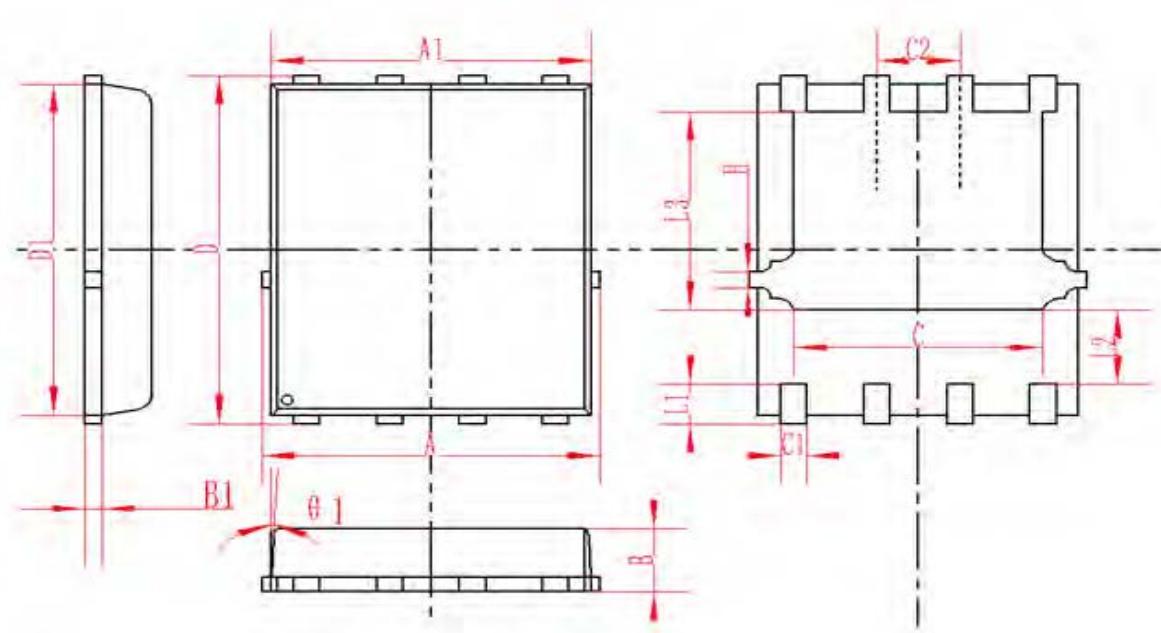


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Case



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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