# HSTP75NF75

N-Channel Enhancement Mode MOSFET

## Description

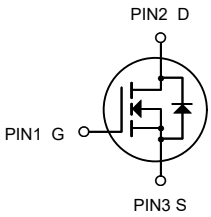
The HSTP75NF75 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gat e charge. It can be used in a wide variety of applications.


**TO-220C**

## General Features

$V_{DS}$ =80V,$I_D$ =96A

$R_{DS(ON)}$ < 7.2mΩ @ $V_{GS}$=10V




N-Channel MOSFET

## Application

High efficiency switch mode power supplies

Power factor correction

Electronic lamp ballast

## Package Marking and Ordering Information

| Product ID | Pack | Brand | Units Tube |
|---|---|---|---|
| HSTP75NF75 | TO-220C | HXY MOSFET | 50 |

## Absolute Maximum Ratings@$T_j$=25°C(unless otherwise specified)

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 80 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous | $I_D$ | 96 | A |
| Drain Current-Continuous($T_C$=100℃) | $I_D$ (100℃) | 67 | A |
| Pulsed Drain Current | $I_{DM}$ | 368 | A |
| Maximum Power Dissipation | $P_D$ | 146 | W |
| Derating factor | - | 1.06 | W/℃ |
| Single pulse avalanche energy (Note 5) | $E_{AS}$ | 625 | mJ |
| Thermal Resistance,Junction-to-Case(Note 2) | $R_{\theta JC}$ | 1.02 | ℃/W |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55 To 150 | ℃ |

## Electrical Characteristics $T_J$ = 25°C unless otherwise noted

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{DS}$ | $V_{DS}$ = 0, $I_D$ = 250 µA | 80 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 µA | 2.0 | | 4.0 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ± 20 V | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 80 V , $V_{GS}$ = 0 V | | | 1 | µA |
| | | $V_{DS}$ = 80 V, $V_{GS}$ = 0 V, $T_J$ = 125 °C | | | 50 | |
| | | $V_{DS}$ = 80 V, $V_{GS}$ = 0 V, $T_J$ = 150 °C | | | 250 | |
| On-State Drain Current[a] | $I_{D(on)}$ | $V_{DS}$ ≥ 10 V, $V_{GS}$ = 10 V | 96 | | | A |
| Drain-Source On-State Resistance[a] | $R_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 40 A | | 6.2 | 7.2 | mΩ |
| Forward Transconductance[a] | $g_{fs}$ | $V_{DS}$ = 15 V, $I_D$ = 40 A | | 13 | | S |
| **Dynamic[b]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz | | 6395 | | pF |
| Output Capacitance | $C_{oss}$ | | | 386 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 255 | | |
| Total Gate Charge[c] | $Q_g$ | $V_{DS}$ = 50 V, $V_{GS}$ = 10 V, $I_D$ = 40 A | | 116 | | nC |
| Gate-Source Charge[c] | $Q_{gs}$ | | | 27 | | |
| Gate-Drain Charge[c] | $Q_{gd}$ | | | 39 | | |
| Turn-On Delay Time[c] | $t_{d(on)}$ | $V_{DD}$ = 30 V, $R_L$ = 2.5Ω<br>$I_D$ ≅ 40 A, $V_{GEN}$ = 10 V, $R_g$ = 1 Ω | | 22 | | ns |
| Rise Time[c] | $t_r$ | | | 50 | | |
| Turn-Off Delay Time[c] | $t_{d(off)}$ | | | 65 | | |
| Fall Time[c] | $t_f$ | | | 22 | | |
| **Source-Drain Diode Ratings and Characteristics** $T_C$ = 25 °C[b] | | | | | | |
| Continuous Current | $I_S$ | | | | 96 | A |
| Pulsed Current | $I_{SM}$ | | | | 368 | |
| Forward Voltage[a] | $V_{SD}$ | $I_F$ = 40 A, $V_{GS}$ = 0 V | | 0.89 | | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 10 A, dI/dt = 100 A/µs | | 41 | | NS |
| Peak Reverse Recovery Current | $I_{RM(REC)}$ | | | 3.0 | | A |
| Reverse Recovery Charge | $Q_{rr}$ | | | 86 | | nC |

Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

## Typical Characteristics

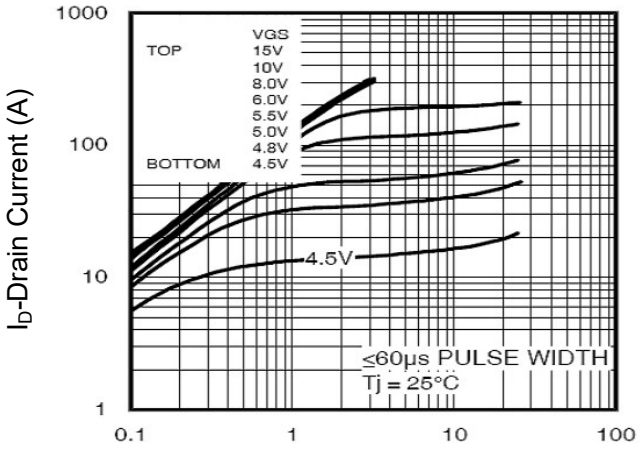



**Figure1. Output Characteristics**

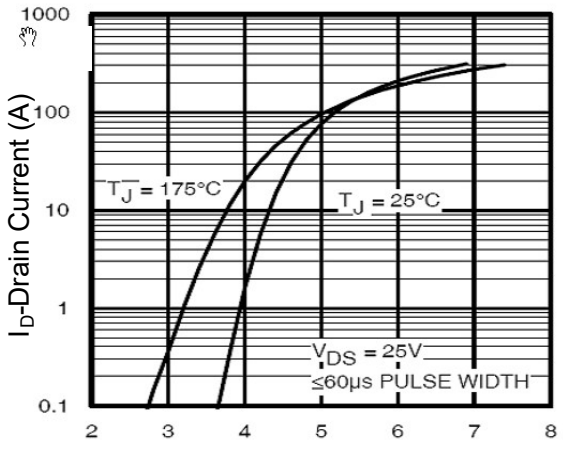



**Figure2. Transfer Characteristics**

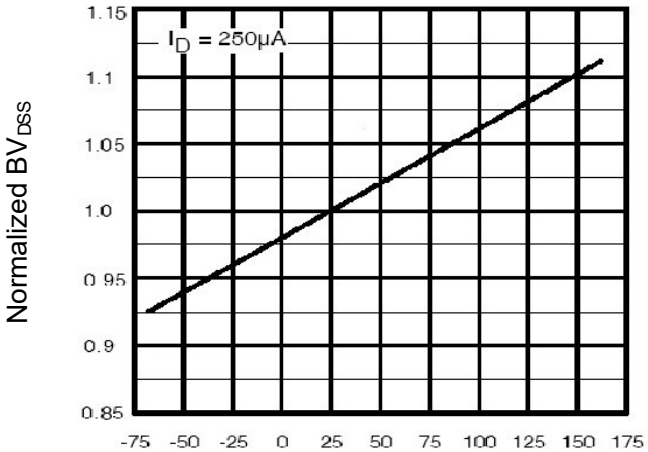



**Figure3.BVDSS vs Junction Temperature**

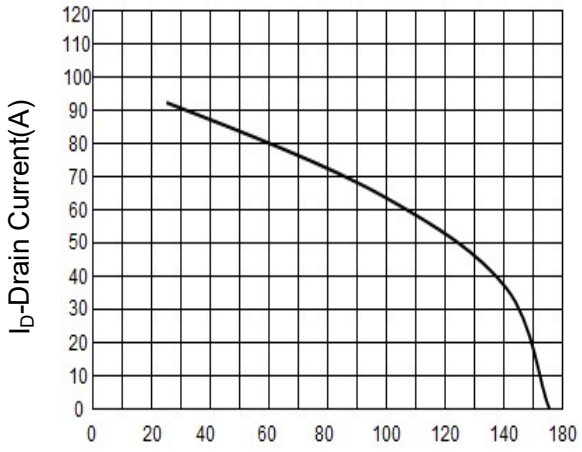



**Figure4.ID vs Junction Temperature**

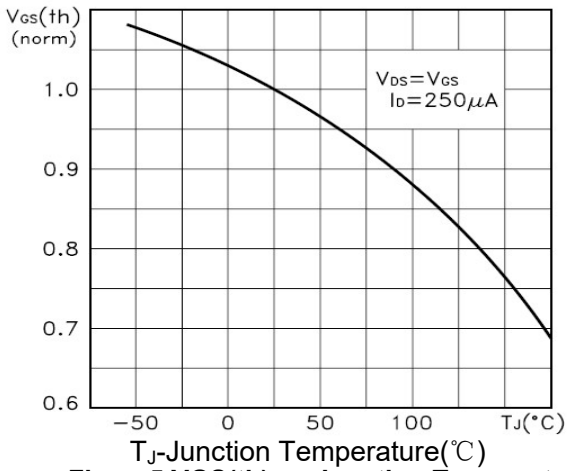



**Figure5.VGS(th) vs Junction Temperature**

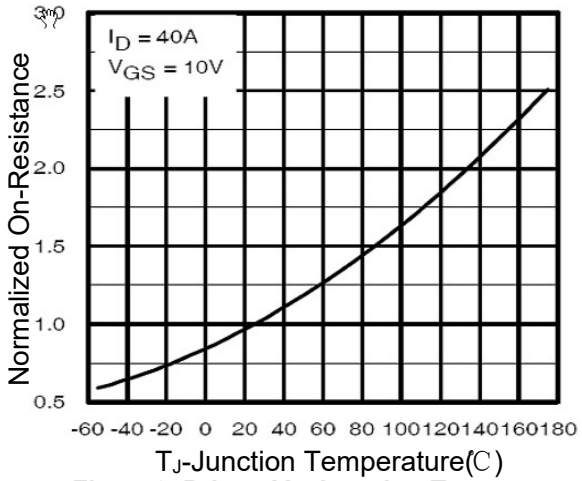



**Figure6. Rdson Vs Junction Temperature**

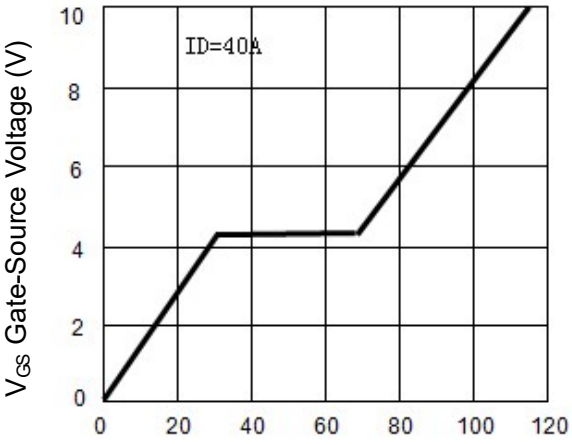



**Figure7. Gate Charge**

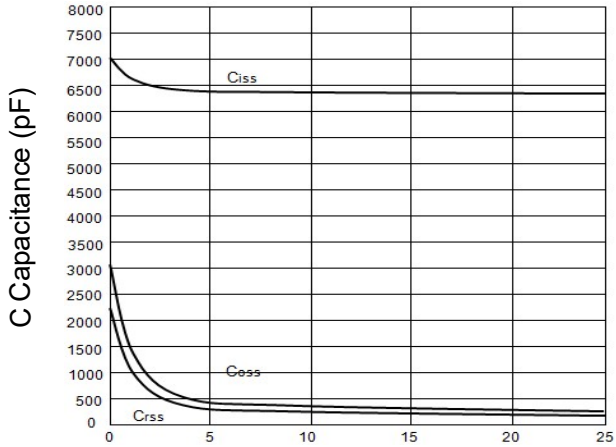



**Figure8. Capacitance vs Vds**

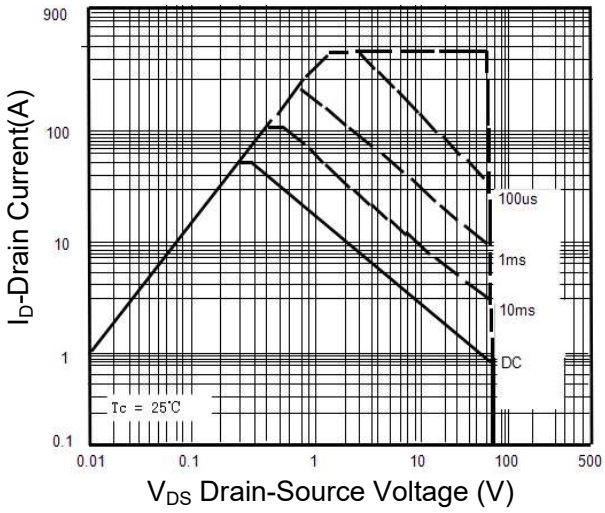



**Figure9. Safe Operation Area**

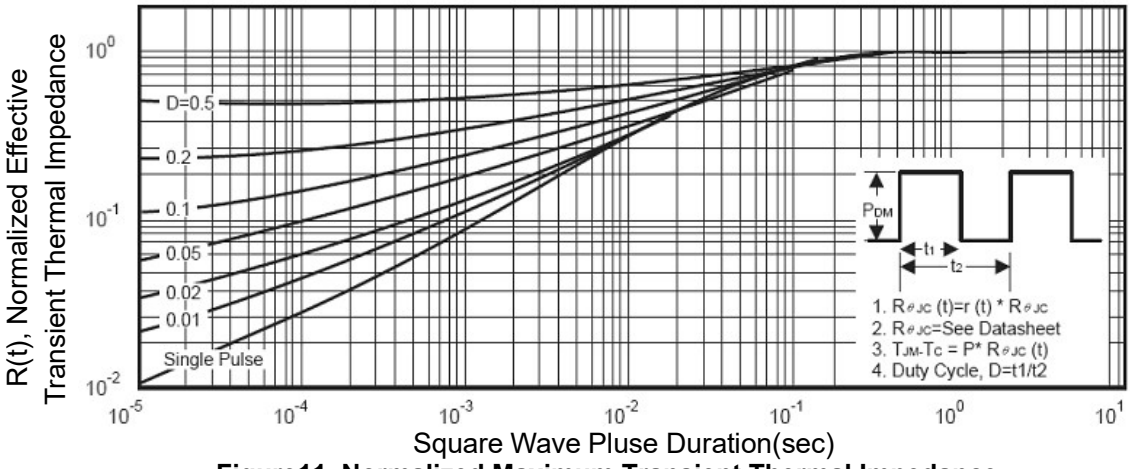
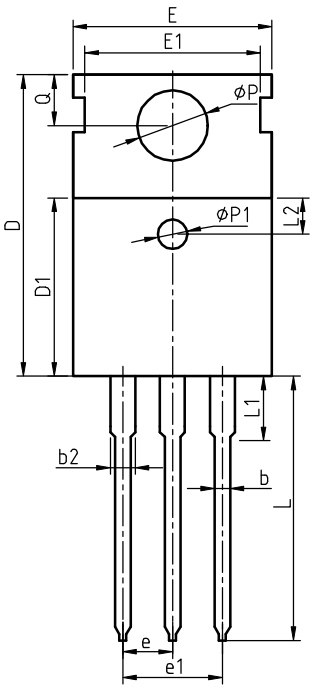
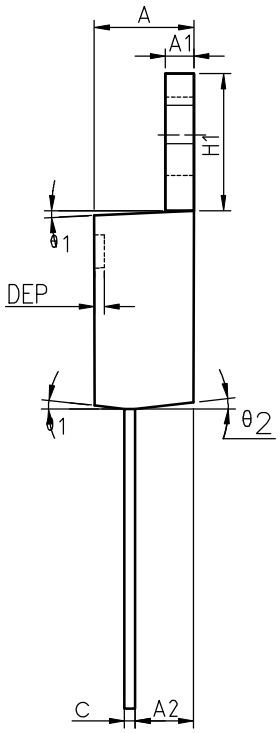
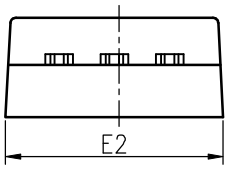



**Figure11. Normalized Maximum Transient Thermal Impedance**

## Package Information
## TO-220C




COMMON DIMENSIONS

| SYMBOL | MIN | NOM | MAX | MIN | NOM | MAX |
|---|---|---|---|---|---|---|
| A | 4.40 | 4.57 | 4.70 | 0.173 | 0.180 | 0.185 |
| A1 | 1.27 | 1.30 | 1.33 | 0.050 | 0.051 | 0.052 |
| A2 | 2.35 | 2.40 | 2.50 | 0.093 | 0.094 | 0.098 |
| b | 0.77 | 0.80 | 0.90 | 0.030 | 0.031 | 0.035 |
| b2 | 1.17 | 1.27 | 1.36 | 0.046 | 0.050 | 0.054 |
| c | 0.48 | 0.50 | 0.56 | 0.019 | 0.020 | 0.022 |
| D | 15.40 | 15.60 | 15.80 | 0.606 | 0.614 | 0.622 |
| D1 | 9.00 | 9.10 | 9.20 | 0.354 | 0.358 | 0.362 |
| DEP | 0.05 | 0.10 | 0.20 | 0.002 | 0.004 | 0.008 |
| E | 9.80 | 10.00 | 10.20 | 0.386 | 0.394 | 0.402 |
| E1 | - | 8.70 | - | - | 0.343 | - |
| E2 | 9.80 | 10.00 | 10.20 | 0.386 | 0.394 | 0.402 |
| e | | 2.54 | BSC | | 0.100 | BSC |
| e1 | | 5.08 | BSC | | 0.200 | BSC |
| H1 | 6.40 | 6.50 | 6.60 | 0.252 | 0.256 | 0.260 |
| L | 12.75 | 13.50 | 13.65 | 0.502 | 0.531 | 0.537 |
| L1 | - | 3.10 | 3.30 | - | 0.122 | 0.130 |
| L2 | | 2.50 | REF | | 0.098 | REF |
| P | 3.50 | 3.60 | 3.63 | 0.138 | 0.142 | 0.143 |
| P1 | 3.50 | 3.60 | 3.63 | 0.138 | 0.142 | 0.143 |
| Q | 2.73 | 2.80 | 2.87 | 0.107 | 0.110 | 0.113 |
| θ1 | 5° | 7° | 9° | 5° | 7° | 9° |
| θ2 | 1° | 3° | 5° | 1° | 3° | 5° |
| θ3 | 1° | 3° | 5° | 1° | 3° | 5° |

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