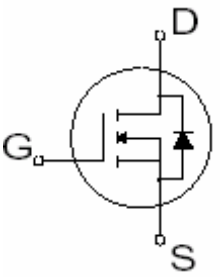
STEK

# 75NF75

HEXFET® Power MOSFET

- Dynamic dv/dt Rating
- 175°C Operating Temperature
- Fast switching
- Ease of Paralleling
- Simple Drive Requirements




**$V_{DSS}$ = 75V**

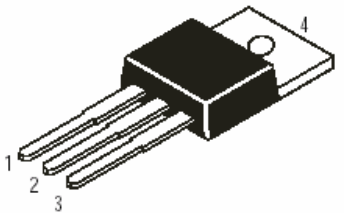
**$I_{D25}$ = 75A**

**$R_{DS(ON)}$ = 13.0 mΩ**

## Description

Third Generation HEXFETs from International Rectifier provide the designer with the best combination of fast switching, ruggedized device design, low on-resistance and cost-effectiveness.

The TO-220 package is universally preferred for all commercial-industrial applications at power dissipation levels to approximately 50watts. The low thermal resistance and low package cost of the TO-220 contribute to its wide acceptance throughout the industry.




**Pin1–Gate**
**Pin2–Drain**
**Pin3–Source**

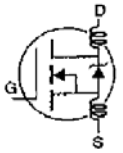
## Absolute Maximum Ratings

| | Parameter | Max. | Units |
|---|---|---|---|
| $I_D$@$T_C$=25°C | Continuous Drain Current, $V_{GS}$@10V | 75 ① | A |
| $I_D$@$T_C$=100°C | Continuous Drain Current, $V_{GS}$@10V | 60 | |
| $I_{DM}$ | Pulsed Drain Current ② | 300 | |
| $P_D$@$T_C$=25°C | Power Dissipation | 200 | W |
| | Linear Derating Factor | 1.5 | W/°C |
| $V_{GS}$ | Gate-to-Source Voltage | ±20 | V |
| $E_{AR}$ | Single Pulse Avalanche Energy ③ | 23 | mJ |
| dv/dt | Peak Diode Recovery dv/dt ④ | 5.9 | V/ns |
| $T_J$<br>$T_{STG}$ | Operating Junction and<br>Storage Temperature Range | －55 to +175 | ℃ |
| | Soldering Temperature, for 10 seconds | 300(1.6mm from case) | |
| | Mounting Torque,6-32 or M3 screw | 10 lbf . in(1.1N . m) | |

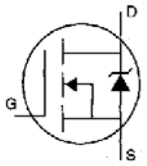
## Thermal Resistance

| | Parameter | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Junction-to-case | — | — | 0.65 | ℃ /W |
| $R_{\theta CS}$ | Case-to-Sink, Flat, Greased Surface | — | 0.50 | — | |
| $R_{\theta JA}$ | Junction-to-Ambient | — | — | 62 | |

**Electrical Characteristics @$T_J$=25 °C (unless otherwise specified)**

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-to-Source Breakdown Voltage | 75 | — | — | V | $V_{GS}$=0V,$I_D$=250uA |
| △$V_{(BR)DSS}$/△$T_J$ | Breakdown Voltage Temp. Coefficient | — | 0.074 | — | V/°C | Reference to 25°C,$I_D$=1mA |
| $R_{DS(on)}$ | Static Drain-to-Source On-resistance | — | — | 13.0 | mΩ | $V_{GS}$=10V,$I_D$=40A ⑤ |
| $V_{GS(th)}$ | Gate Threshold Voltage | 2.0 | — | 4.0 | V | $V_{DS}$=$V_{GS}$, $I_D$=250μA |
| $g_{fs}$ | Forward Transconductance | 20 | — | — | S | $V_{DS}$=25V,$I_D$=40A ⑤ |
| $I_{DSS}$ | Drain-to-Source Leakage current | — | — | 25 | μA | $V_{DS}$=75V,$V_{GS}$=0V |
| | | — | — | 250 | | $V_{DS}$=60V,$V_{GS}$=0V,$T_J$=150°C |
| $I_{GSS}$ | Gate-to-Source Forward leakage | — | — | 100 | nA | $V_{GS}$=20V |
| | Gate-to-Source Reverse leakage | — | — | -100 | | $V_{GS}$=-20V |
| Qg | Total Gate Charge | — | — | 160 | nC | $I_D$=40A |
| Qgs | Gate-to-Source charge | — | — | 29 | | $V_{DS}$=60V |
| Qgd | Gate-to-Drain ("Miller") charge | — | — | 55 | | $V_{GS}$=10V See Fig.6 and 13⑤ |
| $t_{d(on)}$ | Turn-on Delay Time | — | 13 | — | nS | $V_{DD}$=38V |
| $t_r$ | Rise Time | — | 64 | — | | $I_D$=40A |
| $t_{d(off)}$ | Turn-Off Delay Time | — | 49 | — | | $R_G$=2.5Ω |
| $t_f$ | Fall Time | — | 48 | — | | $V_{GS}$=10V See Figure 10⑤ |
| $L_D$ | Internal Drain Inductance | — | 4.5 | — | nH | Between lead, 6mm(0.25in.) from package and center of die contact  |
| $L_S$ | Internal Source Inductance | — | 7.5 | — | | |
| Ciss | Input Capacitance | — | 3820 | — | pF | $V_{GS}$=0V |
| Coss | Output Capacitance | — | 610 | — | | $V_{DS}$=25V |
| Crss | Reverse Transfer Capacitance | — | 130 | — | | f=1.0MHz See Figure 5 |

**Source-Drain Ratings and Characteristics**

| | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $I_S$ | Continuous Source Current (Body Diode) | — | — | 75 | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ② | — | — | 300 | | |
| $V_{SD}$ | Diode Forward Voltage | — | — | 1.3 | V | $T_J$=25°C,$I_S$=40A,$V_{GS}$=0V ⑤ |
| trr | Reverse Recovery Time | — | 100 | 150 | nS | $T_J$=25°C,$I_F$=40A |
| Qrr | Reverse Recovery Charge | — | 410 | 610 | nC | di/dt=100A/μs ⑤ |
| ton | Forward Turn-on Time | Intrinsic turn-on time is negligible (turn-on is dominated by Ls + $L_D$) | | | | |

**Notes:**

① Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.

② Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)

③ Starting $T_J$ = 25°C, L = 370mH, $R_G$ = 25Ω, $I_{AS}$ = 40A, $V_{GS}$=10V (See Figure 12)

④ $I_{SD}$ ≤ 40A, di/dt ≤ 300A/μs, $V_{DD}$ ≤ $V_{(BR)DSS}$,$T_J$ ≤ 175°C

⑤ Pulse width ≤ 400μs; duty cycle ≤ 2%.