



## Description

The IRF530NPBF 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

$V_{DS} = 100V$   $I_D = 17A$

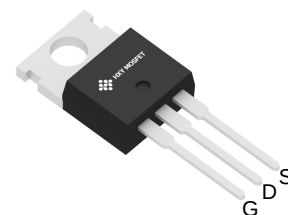
$R_{DS(ON)} < 120m\Omega$  @  $V_{GS} = 10V$

## Application

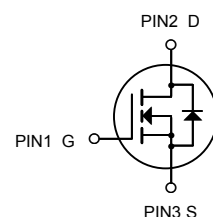
Battery protection

Load switch

Uninterruptible power supply



**TO-220C  
(TO-220AB)**



N-Channel MOSFET

## Package Marking and Ordering Information

| Product ID | Pack              | Brand      | Units Tube |
|------------|-------------------|------------|------------|
| IRFZ44NPBF | TO-220C(TO-220AB) | HXY MOSFET | 50         |

## Absolute Maximum Ratings ( $T_C = 25^\circ C$ unless otherwise noted)

| Symbol          | Parameter                                        | Rating     | Units        |
|-----------------|--------------------------------------------------|------------|--------------|
| $V_{DS}$        | Drain-Source Voltage                             | 100        | V            |
| $V_{GS}$        | Gate-Source Voltage                              | $\pm 20$   | V            |
| $I_D$           | Continuous Drain Current $T_C = 25^\circ C$      | 17         | A            |
| $I_D$           | Continuous Drain Current $T_C = 100^\circ C$     | 8          | A            |
| $I_{DM}$        | Pulsed Drain Current note1                       | 50         | A            |
| EAS             | Single Pulse Avalanche Energy <sup>3</sup>       | 250        | mJ           |
| $T_{STG}$       | Storage Temperature Range                        | -55 to 150 | $^\circ C$   |
| $T_J$           | Operating Junction Temperature Range             | -55 to 150 | $^\circ C$   |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient <sup>1</sup> | 62.5       | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Ambient <sup>1</sup> | 1.42       | $^\circ C/W$ |



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

| Symbol        | Parameter                                                | Test Condition                                   | Min. | Typ. | Max.      | Units      |
|---------------|----------------------------------------------------------|--------------------------------------------------|------|------|-----------|------------|
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage                           | $V_{GS}=0V, I_D=250\mu A$                        | 100  |      |           | V          |
| $I_{DSS}$     | Zero Gate Voltage Drain Current                          | $V_{DS}=100V, V_{GS}=0V, T_J=25^{\circ}\text{C}$ |      |      | 5         | $\mu A$    |
| $I_{GSS}$     | Gate to Body Leakage Current                             | $V_{DS}=0V, V_{GS}=\pm 20V$                      |      |      | $\pm 100$ | nA         |
| $V_{GS(th)}$  | Gate Threshold Voltage                                   | $V_{DS}=V_{GS}, I_D=250\mu A$                    | 1.5  | 2.0  | 2.5       | V          |
| $R_{DS(on)}$  | Static Drain-Source on-Resistance<br>note3               | $V_{GS}=10V, I_D=8A$                             |      | 80   | 120       | m $\Omega$ |
| $C_{iss}$     | Input Capacitance                                        | $V_{DS}=25V, V_{GS}=0V, f=1.0\text{MHz}$         |      | 1331 |           | pF         |
| $C_{oss}$     | Output Capacitance                                       |                                                  |      | 276  |           | pF         |
| $C_{rss}$     | Reverse Transfer Capacitance                             |                                                  |      | 88   |           | pF         |
| $Q_g$         | Total Gate Charge                                        | $V_{DD}=80V, I_D=18A, V_{GS}=10V$                |      | 53   |           | nC         |
| $Q_{gs}$      | Gate-Source Charge                                       |                                                  |      | 6    |           | nC         |
| $Q_{gd}$      | Gate-Drain("Miller") Charge                              |                                                  |      | 29   |           | nC         |
| $t_{d(on)}$   | Turn-on Delay Time                                       | $V_{DD}=50V, I_D=18A, R_G=25\Omega$              |      | 35   |           | ns         |
| $t_r$         | Turn-on Rise Time                                        |                                                  |      | 45   |           | ns         |
| $t_{d(off)}$  | Turn-off Delay Time                                      |                                                  |      | 187  |           | ns         |
| $t_f$         | Turn-off Fall Time                                       |                                                  |      | 64   |           | ns         |
| $I_S$         | Maximum Continuous Drain to Source Diode Forward Current |                                                  |      |      | 18        | A          |
| $I_{SM}$      | Maximum Pulsed Drain to Source Diode Forward Current     |                                                  |      |      | 50        | A          |
| $V_{SD}$      | Drain to Source Diode Forward Voltage                    | $V_{GS}=0V, I_{SD}=18A$                          |      |      | 2         | V          |
| $t_{rr}$      | Reverse Recovery Time                                    | $V_{GS}=0V, I_S=18A, di/dt=100A/\mu s$           |      | 102  |           | ns         |
| $Q_{rr}$      | Reverse Recovery Charge                                  |                                                  |      | 0.5  |           | $\mu C$    |

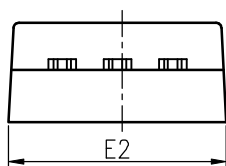
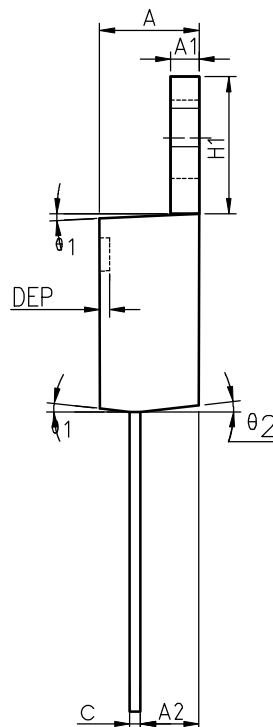
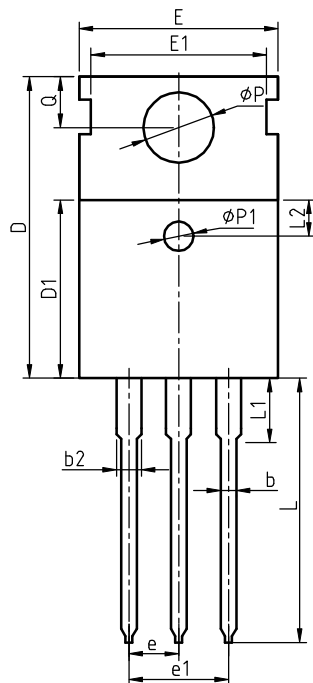
Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2.  $I_{AS}=15A, V_{DD}=50V, R_G=25\Omega$ , Starting  $T_J=25^{\circ}\text{C}$

3. Pulse Test: Pulse Width $\leq 325\mu s$ , Duty Cycle $\leq 1\%$



## Package Information TO-220C(TO-220AB)



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 |
| θ 1    | 5°    | 7°    | 9°    | 5°    | 7°    | 9°    |
| θ 2    | 1°    | 3°    | 5°    | 1°    | 3°    | 5°    |
| θ 3    | 1°    | 3°    | 5°    | 1°    | 3°    | 5°    |



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