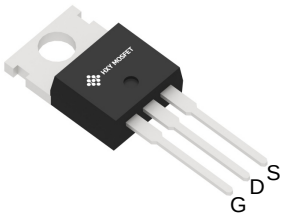
## Description

The IRF830APBF can be used in various power swithching circuit for system miniaturization and higher efficiency.The package form is TO-220C, which accords with the RoHS standard.



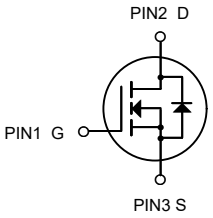

**TO-220C**

## General Features

$V_{DS}$ = 500V,$I_D$ = 4.5A
$R_{DS(ON)}$ < 1.5Ω@ $V_{GS}$=10V

## Application

● Power switch circuit of adaptor and charger.




N-Channel MOSFET

## Ordering Information

| Product ID | Pack | Brand | Units Tube |
|---|---|---|---|
| IRF830APBF | TO-220C | HXY MOSFET | 50 |

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

| Symbol | Parameter | Limit | Unit |
|---|---|---|---|
| $V_{DSS}$ | Drain-to-Source Voltage | 500 | V |
| $V_{GSS}$ | Gate-to-Source Voltage | ±30 | |
| $I_D$ | Continuous Drain Current [1] | 4.5 | A |
| $I_{D\ @\ Tc=100°C}$ | Continuous Drain Current @ Tc=100°C | 2.6 | |
| $I_{DM}$ | Pulsed Drain Current at $V_{GS}$=10V [1] [2] | 16 | |
| $E_{AS}$ | Single Pulse Avalanche Energy [3] | 315 | mJ |
| $P_D$ | Power Dissipation [1] | 139 | W |
| $T_J$& $T_{STG}$ | Operating and Storage Temperature Range | -55 to 150 | °C |
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case [1] | 0.9 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient [6] | 77 | |

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

| Parameter | Symbol | Test Condition | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **Off characteristics** | | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ =1mA | | 500 | - | - | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=500V, $V_{GS}$=0V | $T_J$=25°C | - | - | 1.0 | μA |
| | | | $T_J$=125°C | - | - | 100 | |
| Gate-body leakage current | $I_{GSS}$ | $V_{DS}$ =0V, $V_{GS}$ =±30V | | - | - | ±100 | nA |
| **On characteristics** [4] | | | | | | | |
| Gate-threshold voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$, $I_D$ =250μA | | 2.0 | 3.0 | 4.0 | V |
| Static drain-source on-resistance | $R_{DS(on)}$ | $V_{GS}$ =10V, $I_D$ =2A | | - | 1.2 | 1.5 | Ω |
| **Dynamic characteristics** [5] | | | | | | | |
| Input capacitance | $C_{iss}$ | $V_{DS}$ =50V,$V_{GS}$ =0V,f =1MHz | | - | 639 | - | pF |
| Output capacitance | $C_{oss}$ | | | - | 41 | - | |
| Reverse transfer capacitance | $C_{rss}$ | | | - | 2 | - | |
| Gate resistance | $R_g$ | f =1MHz | | - | 2.8 | - | Ω |
| **Switching characteristics** [5] | | | | | | | |
| Total gate charge | $Q_g$ | $V_{DS}$ =50V,$V_{GS}$ =10V,$I_D$ =4A | | - | 10 | - | nC |
| Gate-source charge | $Q_{gs}$ | | | - | 3 | - | |
| Gate-drain charge | $Q_{gd}$ | | | - | 2 | - | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=250V, $V_{GS}$=10V, $R_G$=10Ω, $I_D$ =10A | | - | 7 | - | ns |
| Turn-on rise time | $t_r$ | | | - | 5 | - | |
| Turn-off delay time | $t_{d(off)}$ | | | - | 13 | - | |
| Turn-off fall time | $t_f$ | | | - | 5 | - | |
| **Drain-Source Diode Characteristics** | | | | | | | |
| Drain-source diode forward voltage[4] | $V_{SD}$ | $V_{GS}$ =0V,$I_S$ =4A | | - | - | 1.2 | V |
| Maximum continuous drain-source diode forward current [1] | $I_S$ | | | - | - | 4 | A |
| Maximum pulsed drain-source diode forward current [1][2] | $I_{SM}$ | | | - | - | 16 | A |
| Reverse recovery time | trr | dIF/dt = 100A/μs, $I_S$ =10A, $V_{DD}$ = 50V | | - | 196 | - | ns |
| Reverse recovery charge | Qrr | | | - | 1131 | - | nC |

**Notes :**

1.$T_C$=25°C Limited only by maximum temperature allowed.

2.$P_W$≤10μs, Duty cycle≤1%.

3.EAS condition: VDD=50V,VGS=10V, L=10mH, Rg=25Ω,Starting $T_J$ = 25°C.

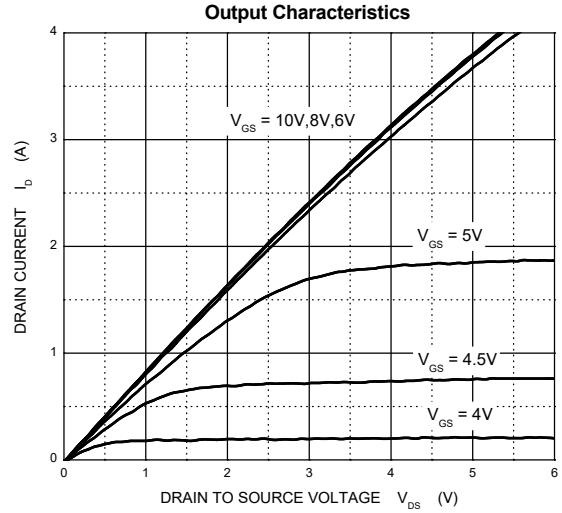
4.Pulse Test : Pulse Width≤300μs, duty cycle ≤2%.

5.Guaranteed by design, not subject to production.

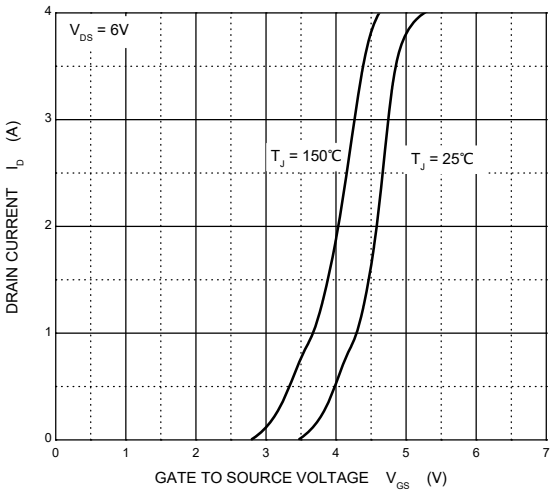
6.The value of $R_{\theta JA}$ is measured with the device in a still air environment with $T_a$=25°C.

## Typical Characteristics

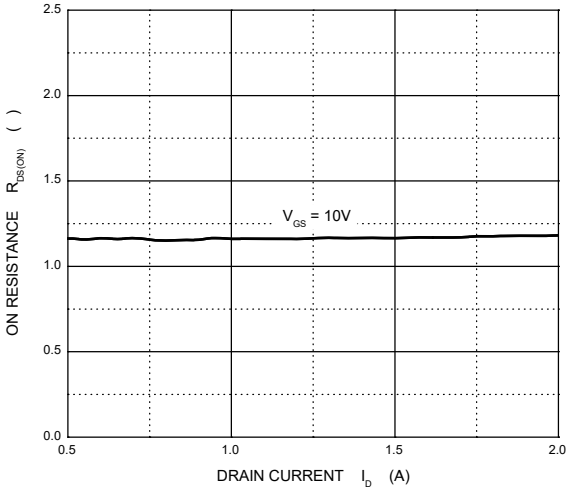
**Output Characteristics**



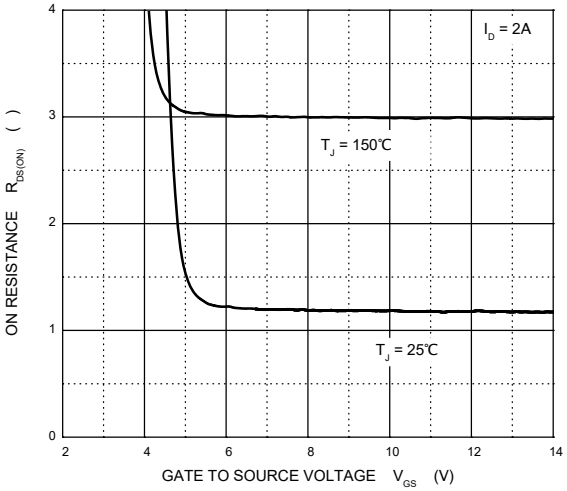

**Transfer Characteristics**



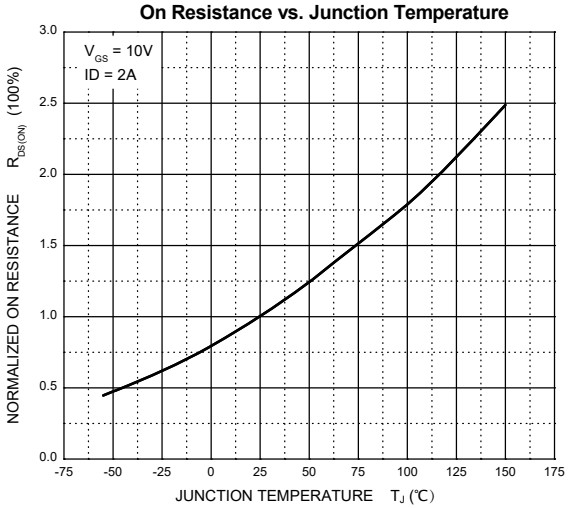

**On Resistance vs. Drain Current**



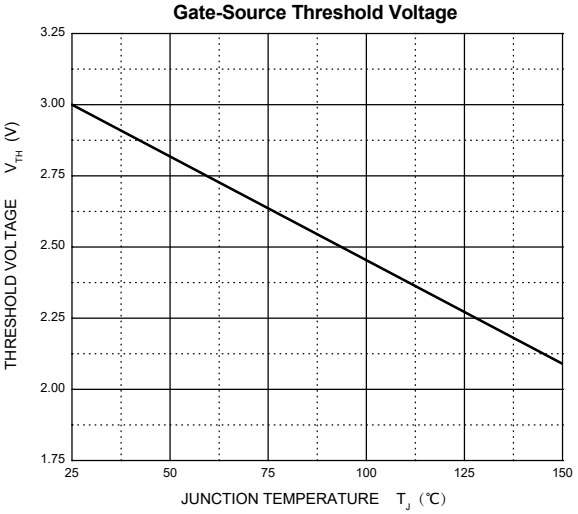

**On Resistance vs. Gate-Source Bias**



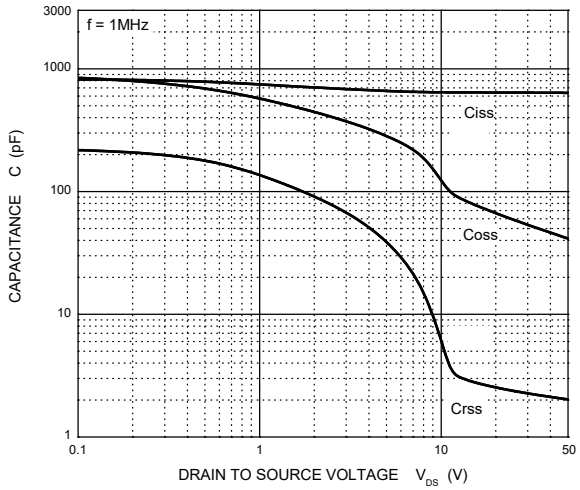

**On Resistance vs. Junction Temperature**



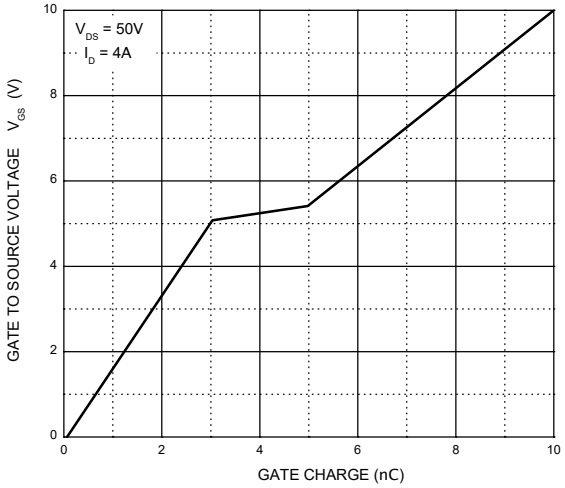

**Gate-Source Threshold Voltage**



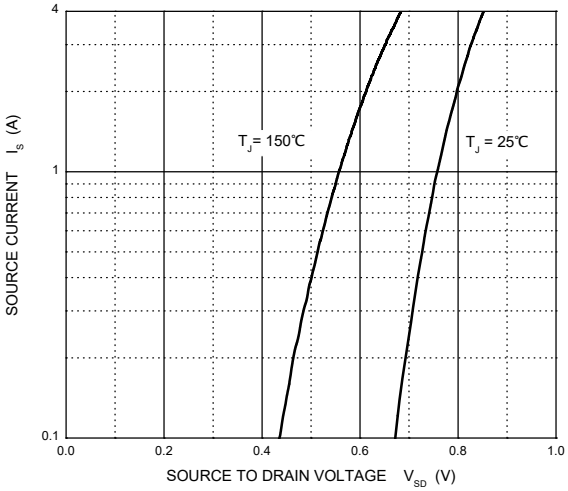
**Typical Capacitances**



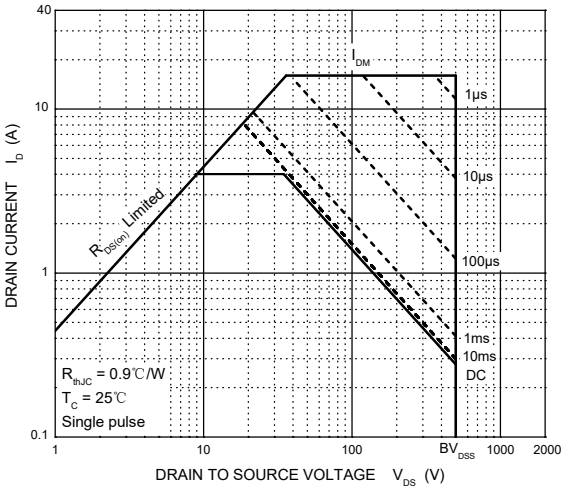

**Gate Charge**



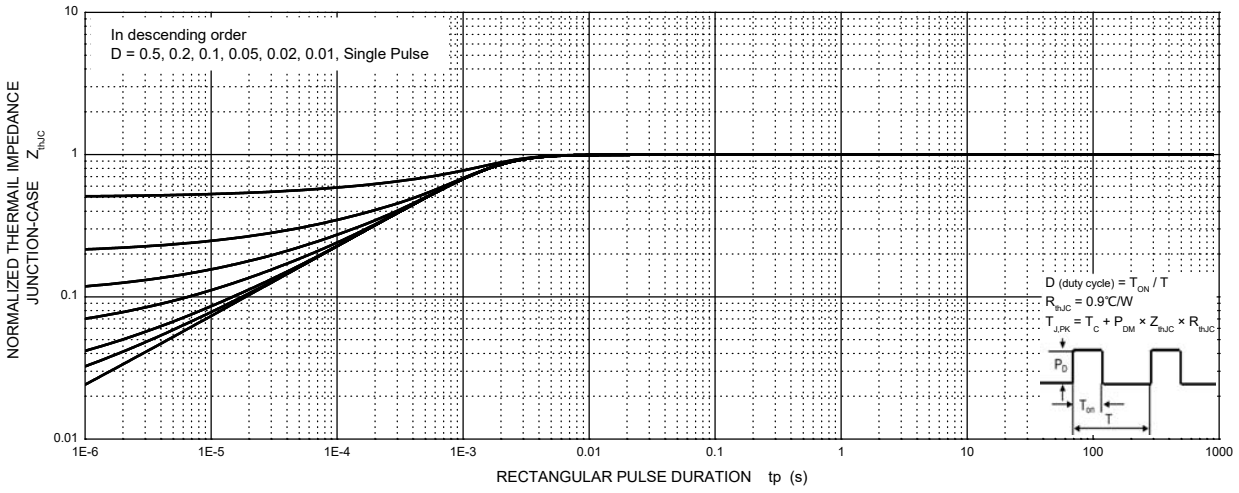

**Source-Drain Diode Forward Characteristics**



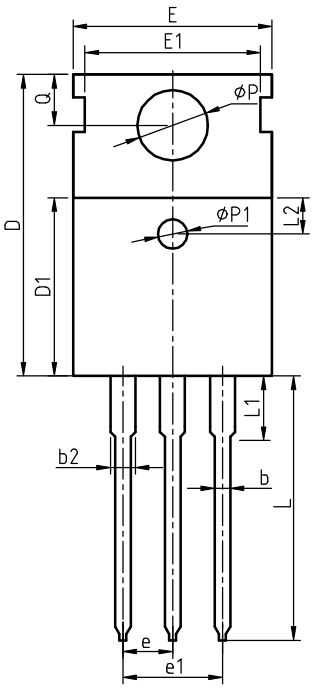

**Maximum Safe Operating Area**

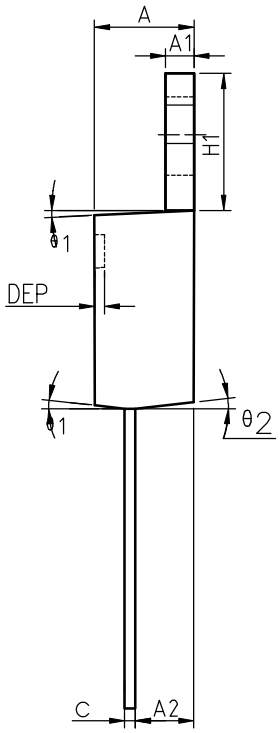


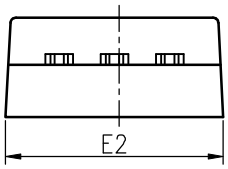

**Transient Thermal Impedance, Junction-Case**



## 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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