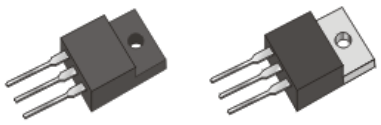
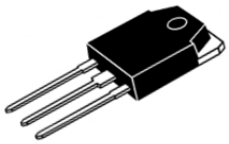
# PJP9NA90 / PJF9NA90 / PJZ9NA90

## 900V N-Channel MOSFET

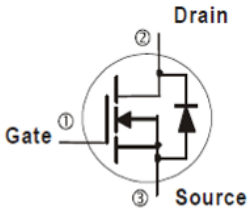
| Voltage | 900 V | Current | 9 A |
|---|---|---|---|



ITO-220AB-F TO-220AB



TO-3PL




### Features

- $R_{DS(ON)}$, $V_{GS}$@10V,$I_D$@4.5A<1.4Ω
- High switching speed
- Improved dv/dt capability
- Low Gate Charge
- Low reverse transfer capacitance
- Lead free in compliance with EU RoHS 2011/65/EU directive.
- Green molding compound as per IEC61249 Std. (Halogen Free)

### Mechanical Data

- Case : TO-220AB, ITO-220AB-F, TO-3PL Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- TO-220AB Approx. Weight : 0.065 ounces, 1.859 grams
- ITO-220AB-F Approx. Weight : 0.068 ounces, 1.945 grams
- TO-3PL Approx. Weight : 0.182 ounces, 5.174grams

### Maximum Ratings and Thermal Characteristics ($T_A$=25°C unless otherwise noted)

| PARAMETER | | SYMBOL | TO-220AB | ITO-220AB-F | TO-3PL | UNITS |
|---|---|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 900 | | | V |
| Gate-Source Voltage | | $V_{GS}$ | ±30 | | | V |
| Continuous Drain Current | | $I_D$ | 9 | | | A |
| Pulsed Drain Current | | $I_{DM}$ | 36 | | | A |
| Single Pulse Avalanche Energy (Note 1) | | $E_{AS}$ | 823 | | | mJ |
| Power Dissipation | $T_C$=25°C | $P_D$ | 205 | 68 | 240 | W |
| | Derate above 25°C | | 1.64 | 0.54 | 1.92 | W/°C |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55~150 | | | °C |
| Typical Thermal resistance | | | | | | |
| - Junction to Case | | $R_{\theta JC}$ | 0.61 | 1.84 | 0.52 | °C/W |
| - Junction to Ambient | | $R_{\theta JA}$ | 62.5 | 120 | 50 | |

- Limited only By Maximum Junction Temperature

# PJP9NA90 / PJF9NA90 / PJZ9NA90

## Electrical Characteristics ($T_A$=25°C unless otherwise noted)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V,$I_D$=250uA | 900 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250uA | 2 | - | 4 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=10V,$I_D$=4.5A | - | 1.1 | 1.4 | Ω |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=900V,$V_{GS}$=0V | - | 0.03 | 1.0 | uA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±30V,$V_{DS}$=0V | - | ±10 | ±100 | nA |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=9A,$V_{GS}$=0V | - | - | 1.4 | V |
| **Dynamic** (Note 4) | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=720V, $I_D$=9A, $V_{GS}$=10V (Note 2,3) | - | 31 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 8 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 12 | - | |
| Input Capacitance | Ciss | $V_{DS}$=25V, $V_{GS}$=0V, f=1.0MHZ | - | 1634 | - | pF |
| Output Capacitance | Coss | | - | 143 | - | |
| Reverse Transfer Capacitance | Crss | | - | 7.1 | - | |
| Turn-On Delay Time | $td_{(on)}$ | $V_{DD}$=450V, $I_D$=9A, $R_G$=25Ω (Note 2,3) | - | 22 | - | ns |
| Turn-On Rise Time | $t_r$ | | - | 31 | - | |
| Turn-Off Delay Time | $td_{(off)}$ | | - | 56 | - | |
| Turn-Off Fall Time | $t_f$ | | - | 31 | - | |
| **Drain-Source Diode** | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$ | --- | - | - | 9 | A |
| Maximum Pulsed Drain-Source Diode Forward Current | $I_{SM}$ | --- | - | - | 36 | A |
| Reverse Recovery Time | trr | $V_{GS}$=0V, $I_S$=9A $dI_F$/ dt=100A/us (Note 2) | - | 657 | - | ns |
| Reverse Recovery Charge | Qrr | | - | 5.6 | - | uC |

NOTES :

1. L=30mH, $I_{AS}$=7.1A, $V_{DD}$=50V, $R_G$=25ohm, Starting $T_J$=25°C
2. Pulse width≤300us, Duty cycle≤2%
3. Essentially independent of operating temperature typical characteristics.
4. Guaranteed by design, not subject to production testing

# PJP9NA90 / PJF9NA90 / PJZ9NA90

## TYPICAL CHARACTERISTIC CURVES

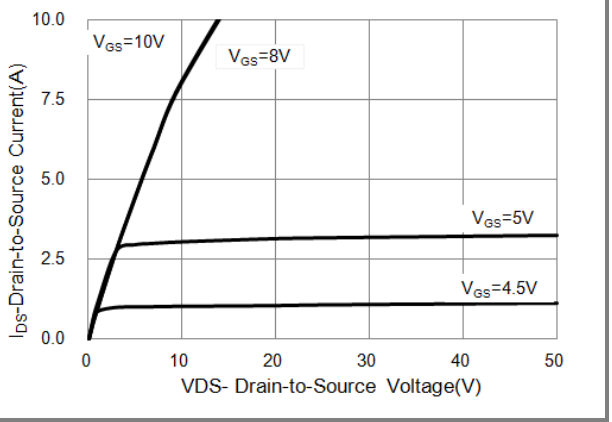



Fig.1 Output Characteristics

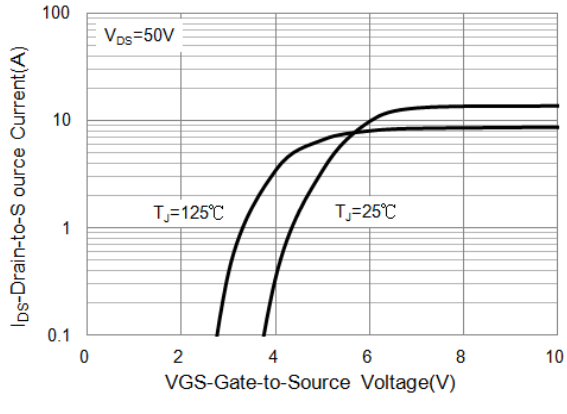



Fig.2 Transfer Characteristics

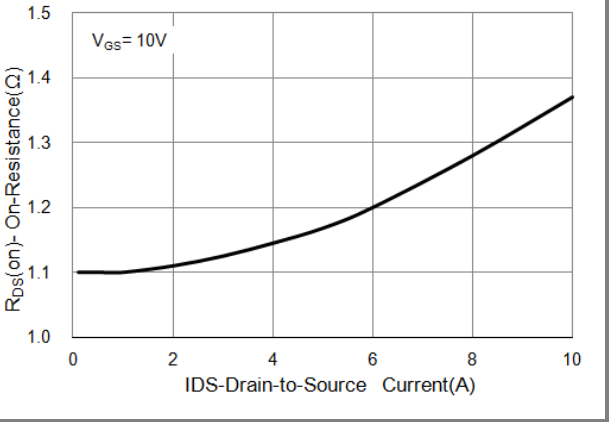



Fig.3 On-Resistance vs. Drain Current

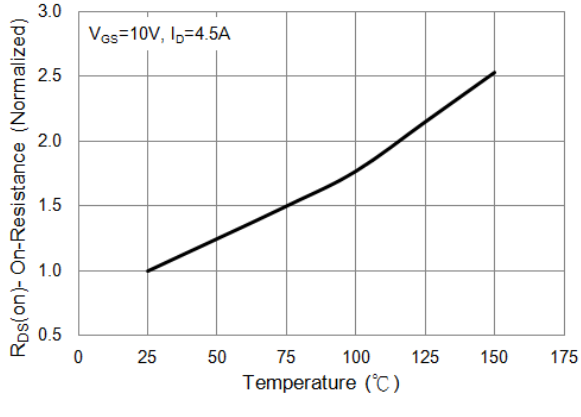



Fig.4 On-Resistance vs. Junction Temperature

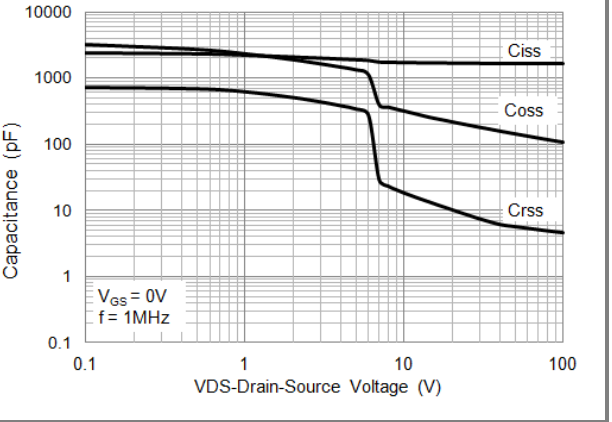



Fig.5 Capacitance vs. Drain-Source Voltage

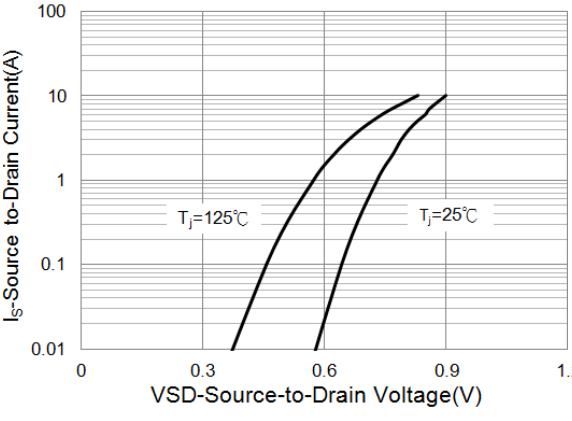



Fig.6 Source-Drain Diode Forward Voltage

# PJP9NA90 / PJF9NA90 / PJZ9NA90

## TYPICAL CHARACTERISTIC CURVES

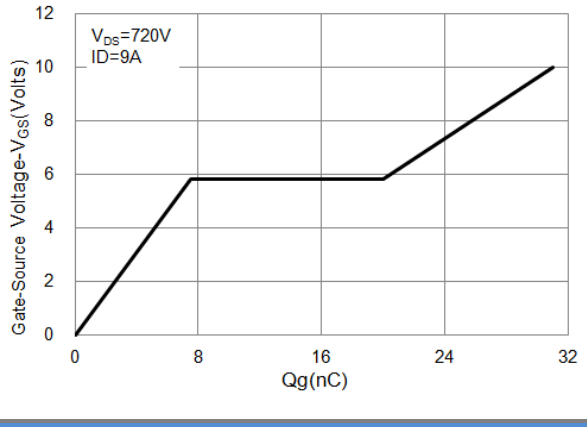



Fig.7 Gate Charge

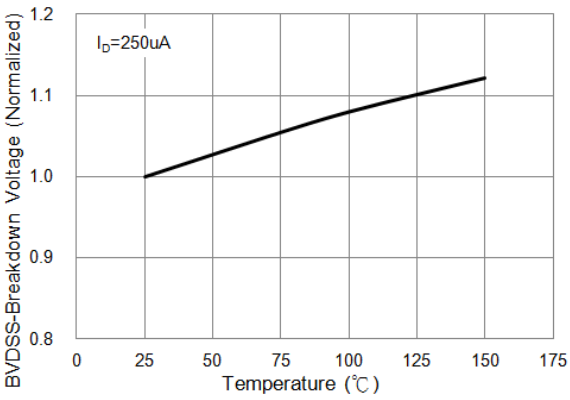



Fig.8 $BV_{DSS}$ vs. Junction Temperature

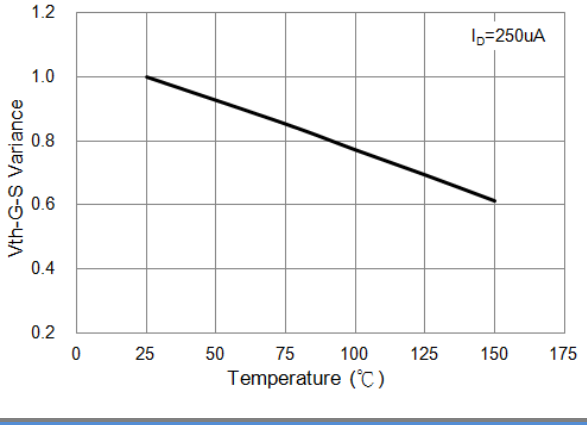



Fig.9 Threshold Voltage Variation with Temperature

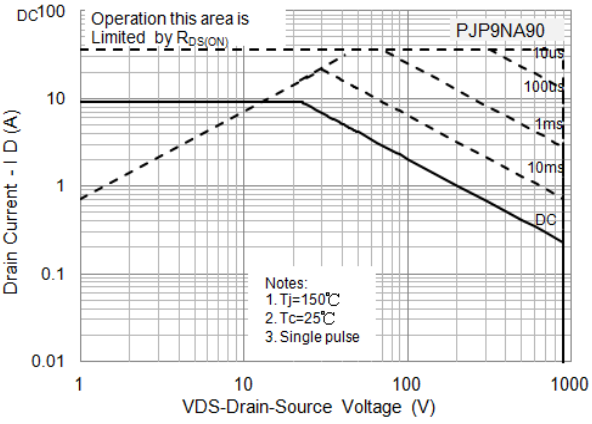



Fig.10 Maximum Safe Operating Area

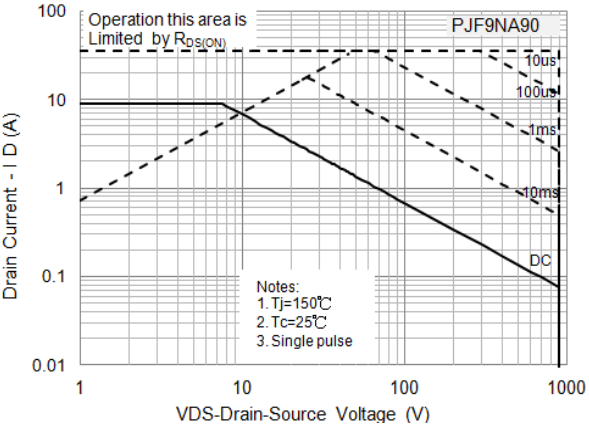



Fig.11 Maximum Safe Operating Area

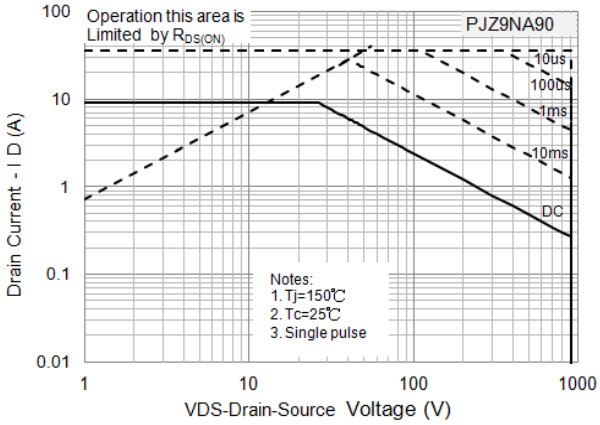



Fig.12 Maximum Safe Operating Area

# PJP9NA90 / PJF9NA90 / PJZ9NA90

## TYPICAL CHARACTERISTIC CURVES

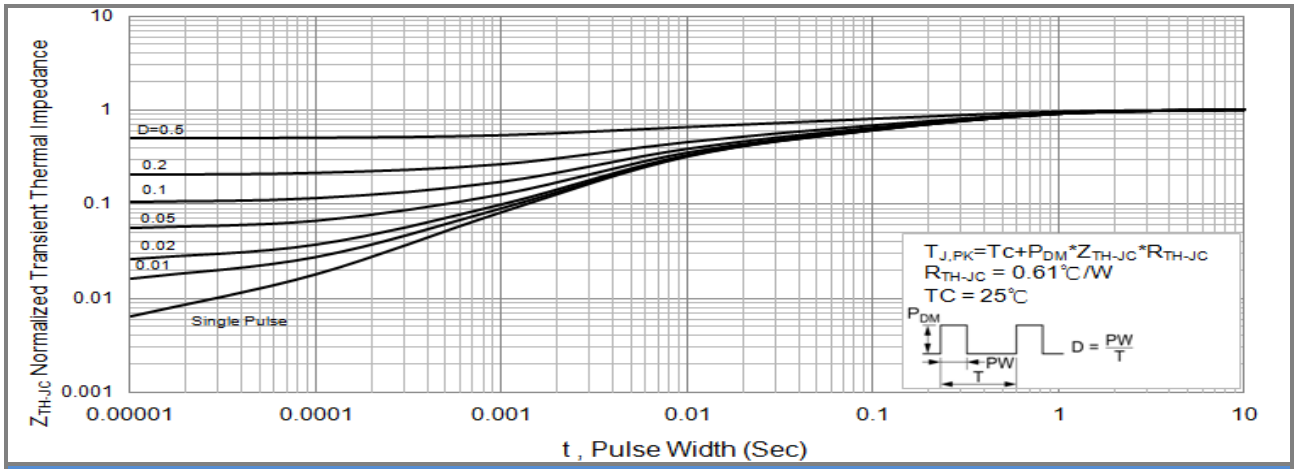



Fig.13 PJP9NA90 Normalized Transient Thermal Impedance vs. Pulse Width

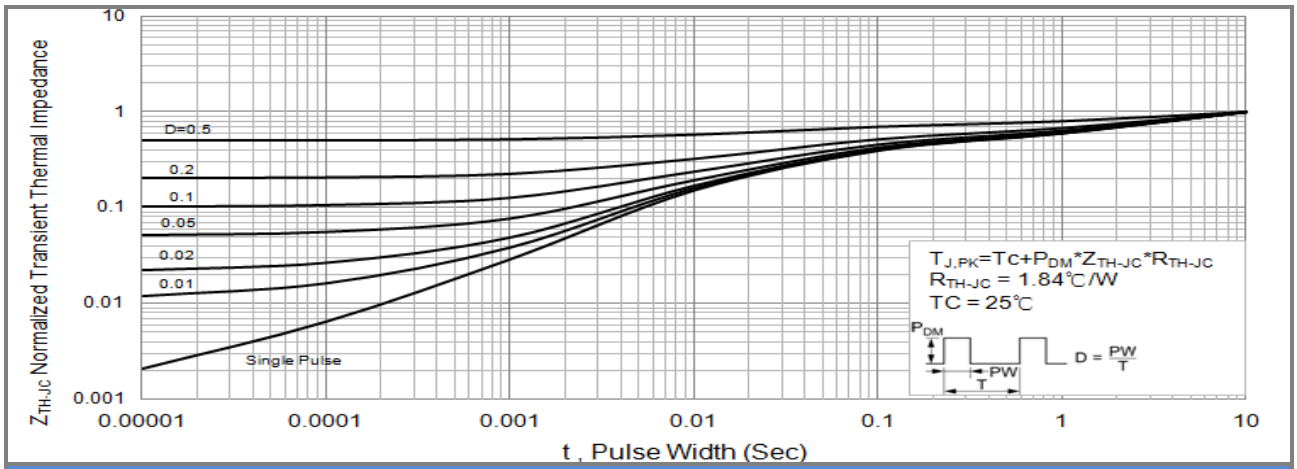



Fig.14 PJF9NA90 Normalized Transient Thermal Impedance vs. Pulse Width

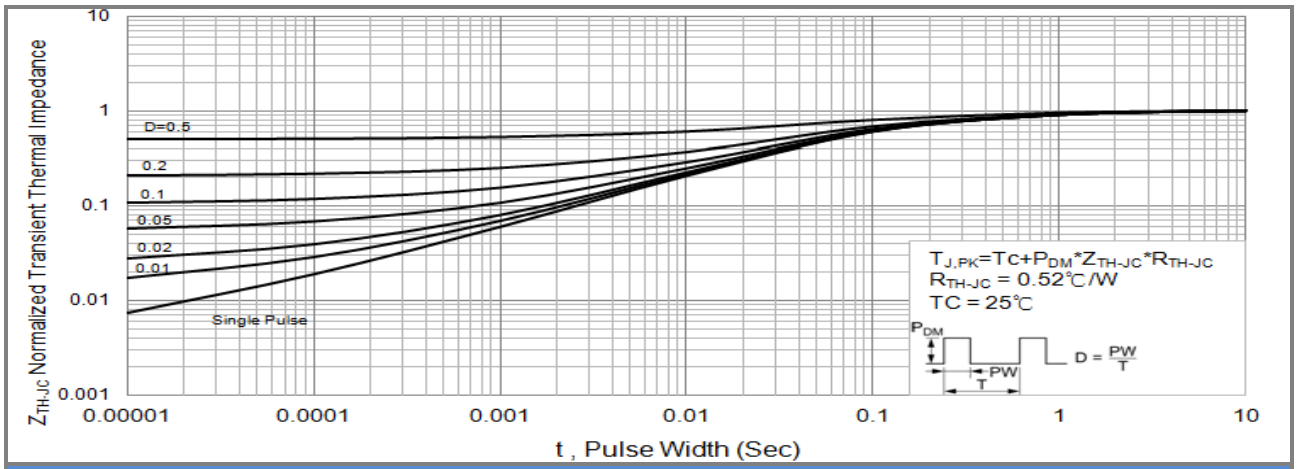


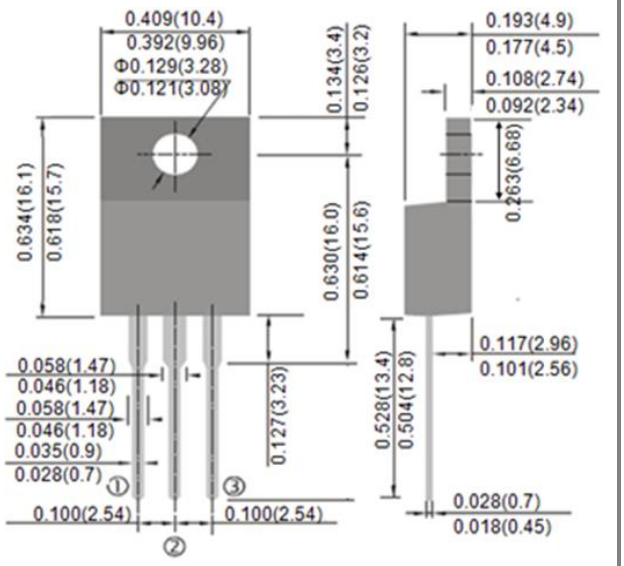

Fig.15 PJZ9NA90 Normalized Transient Thermal Impedance vs. Pulse Width

# PJP9NA90 / PJF9NA90 / PJZ9NA90

## Packaging Information

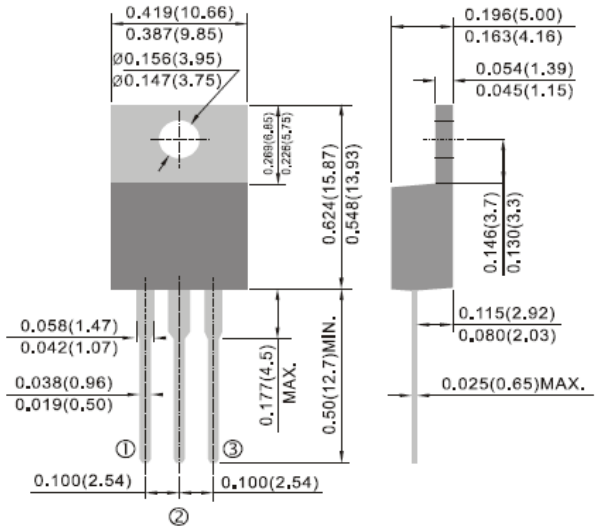
### ITO-220AB-F Dimension

Unit: mm



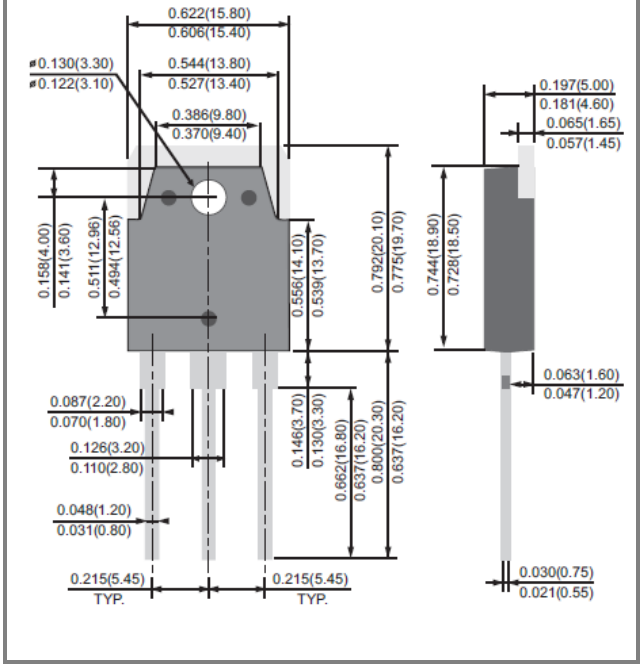

### TO-220AB Dimension

Unit: mm




### TO-3PL Dimension

Unit: mm



# PJP9NA90 / PJF9NA90 / PJZ9NA90

## PART NO PACKING CODE VERSION

| Part No Packing Code | Package Type | Packing type | Marking | Version |
|---|---|---|---|---|
| PJP9NA90_T0_00001 | TO-220AB | 50pcs / Tube | P9NA90 | Halogen free |
| PJF9NA90_T0_00001 | ITO-220AB-F | 50pcs / Tube | F9NA90 | Halogen free |
| PJZ9NA90_T0_10001 | TO-3PL | 30pcs / Tube | Z9NA90 | Rohs |

# PJP9NA90 / PJF9NA90 / PJZ9NA90

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