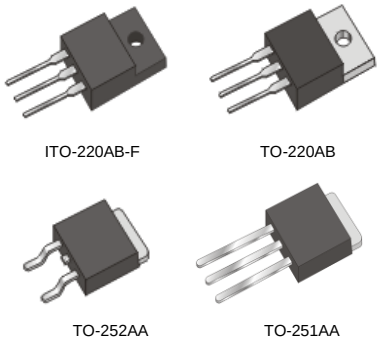
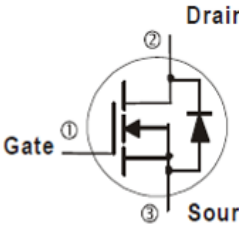
# PJU7NA60 / PJD7NA60 / PJP7NA60 / PJF7NA60

## 600V N-Channel MOSFET

| Voltage | 600 V | Current | 7 A |
|---|---|---|---|




### Features

- $R_{DS(ON)}$, $V_{GS}$@10V,$I_D$@3.5A<1.2Ω
- High switching speed
- Improved dv/dt capability
- Low Gate Charge
- Low reverse transfer capacitance
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

### Mechanical Data

- Case : TO-251AA,TO-252AA ,TO-220AB, ITO-220AB-F Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- TO-251AA Approx. Weight : 0.0104 ounces, 0.297grams
- TO-252AA Approx. Weight : 0.0104 ounces, 0.297grams
- TO-220AB Approx. Weight : 0.067 ounces, 1.9 grams
- ITO-220AB-F Approx. Weight : 0.068 ounces, 2 grams

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

| PARAMETER | | SYMBOL | TO-251AA | TO-220AB | ITO-220AB-F | TO-252AA | UNITS |
|---|---|---|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 600 | | | | V |
| Gate-Source Voltage | | $V_{GS}$ | ±30 | | | | V |
| Continuous Drain Current (Note 4) | | $I_D$ | 7 | | | | A |
| Pulsed Drain Current | | $I_{DM}$ | 28 | | | | A |
| Single Pulse Avalanche Energy (Note 1) | | $E_{AS}$ | 489 | | | | mJ |
| Power Dissipation | $T_C$=25°C | $P_D$ | 140 | 145 | 45 | 140 | W |
| | Derate above 25°C | | 1.12 | 1.16 | 0.36 | 1.12 | W/°C |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55~150 | | | | °C |
| Typical Thermal Resistance (Note 4) | | | | | | | |
| - Junction to Case | | $R_{\theta JC}$ | 0.89 | 0.88 | 2.78 | 0.89 | °C/W |
| - Junction to Ambient | | $R_{\theta JA}$ | 110 | 62.5 | 120 | 110 | °C/W |

- Limited only By Maximum Junction Temperature

# PJU7NA60 / PJD7NA60 / PJP7NA60 / PJF7NA60

## 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 | 600 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 2 | 3.2 | 4 | |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=3.5A | - | 1.02 | 1.2 | Ω |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=600V, $V_{GS}$=0V | - | - | 1 | uA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±30V, $V_{DS}$=0V | - | - | ±100 | nA |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=7A, $V_{GS}$=0V | - | 0.86 | 1.4 | V |
| **Dynamic** (Note 5) | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=480V, $I_D$=7A, $V_{GS}$=10V (Note 2,3) | - | 15.2 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 5 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 4.8 | - | |
| Input Capacitance | Ciss | $V_{DS}$=25V, $V_{GS}$=0V, f=1MHZ | - | 723 | - | pF |
| Output Capacitance | Coss | | - | 105 | - | |
| Reverse Transfer Capacitance | Crss | | - | 2 | - | |
| Turn-On Delay Time | $td_{(on)}$ | $V_{DD}$=300V, $I_D$=7A, $R_G$=25Ω (Note 2,3) | - | 28 | - | ns |
| Turn-On Rise Time | $t_r$ | | - | 58 | - | |
| Turn-Off Delay Time | $td_{(off)}$ | | - | 42 | - | |
| Turn-Off Fall Time | $t_f$ | | - | 31 | - | |
| **Drain-Source Diode** | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$ | --- | - | - | 7 | A |
| Maximum Pulsed Drain-Source Diode Forward Current | $I_{SM}$ | --- | - | - | 28 | |
| Reverse Recovery Time | trr | $V_{GS}$=0V, $I_S$=7A, $dI_F$/ dt=100A/us (Note 2) | - | 350 | - | ns |
| Reverse Recovery Charge | Qrr | | - | 3.1 | - | uC |

NOTES :

1. L=30mH, $I_{AS}$=5.5A, $V_{DD}$=50V, $R_G$=25 ohm, Starting $T_J$=25°C
2. Pulse width≤300us, Duty cycle≤2%.
3. Essentially independent of operating temperature typical characteristics.
4. The maximum current rating is package limited.
5. Guaranteed by design, not subject to production testing.

# PJU7NA60 / PJD7NA60 / PJP7NA60 / PJF7NA60

## TYPICAL CHARACTERISTIC CURVES

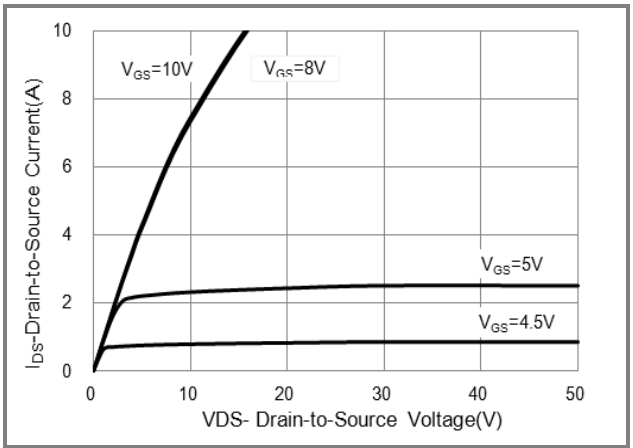



Fig.1 Output Characteristics

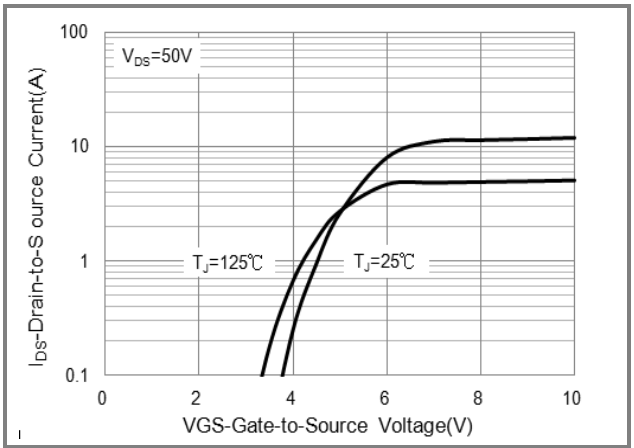



Fig.2 Transfer Characteristics

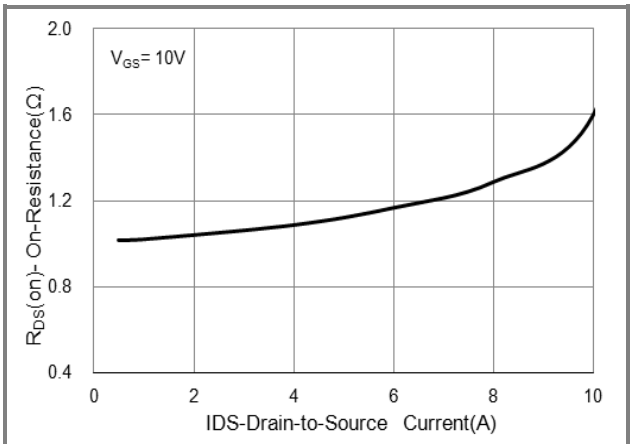



Fig.3 On-Resistance vs. Drain Current

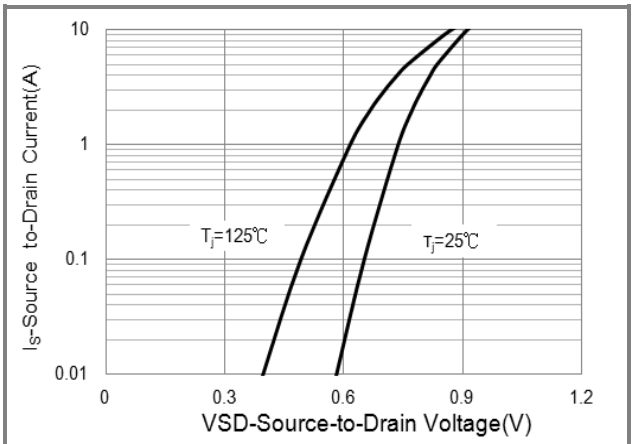



Fig.4 Source-Drain Diode Forward Voltage

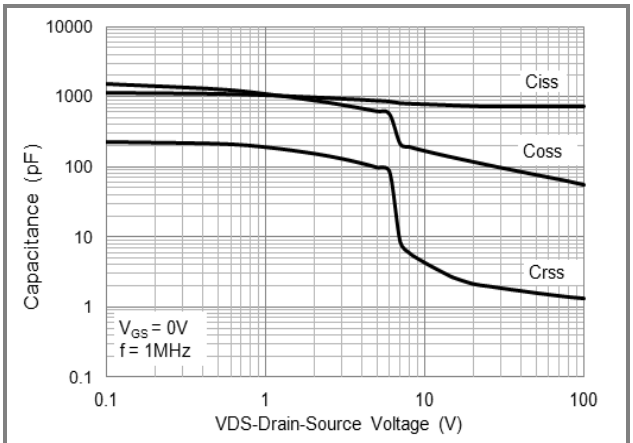



Fig.5 Capacitance vs. Drain-Source Voltage

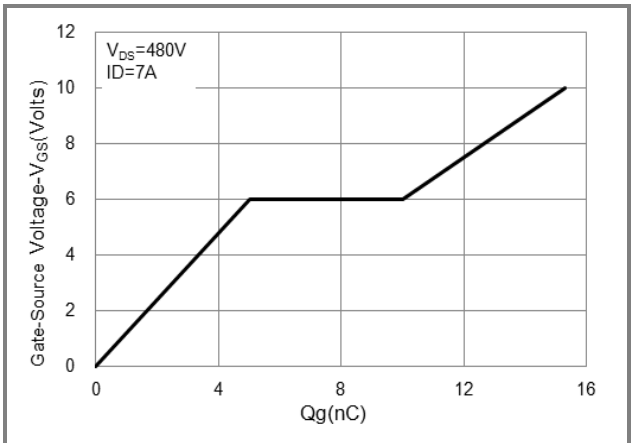



Fig.6 Gate Charge

# PJU7NA60 / PJD7NA60 / PJP7NA60 / PJF7NA60

## TYPICAL CHARACTERISTIC CURVES

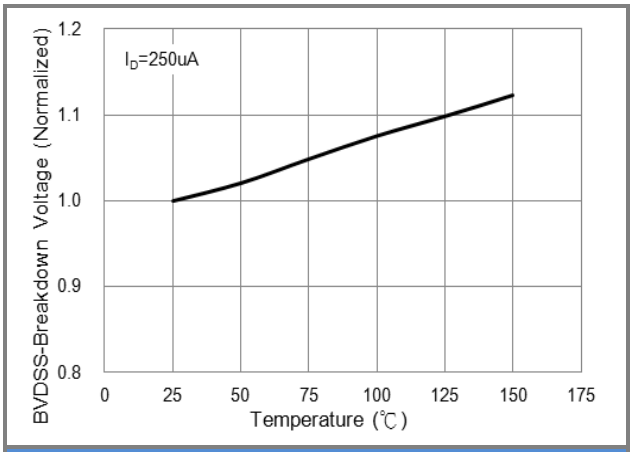



Fig.7 $BV_{DSS}$ vs. Junction Temperature

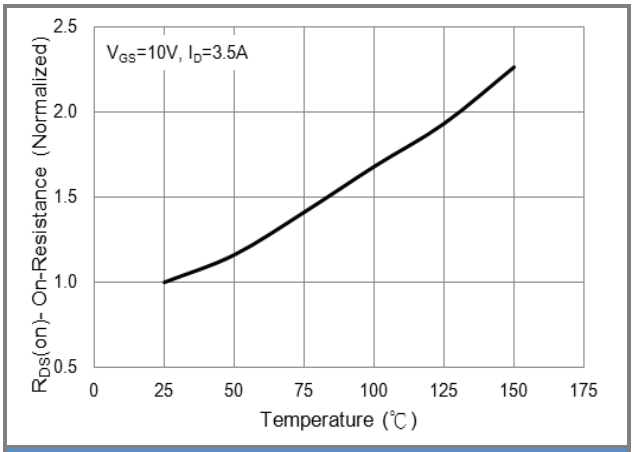



Fig.8 On-Resistance vs. Junction Temperature

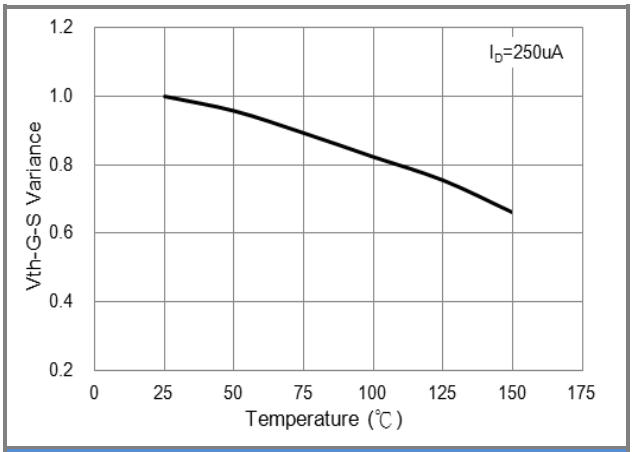



Fig.9 Threshold Voltage Variation with Temperature

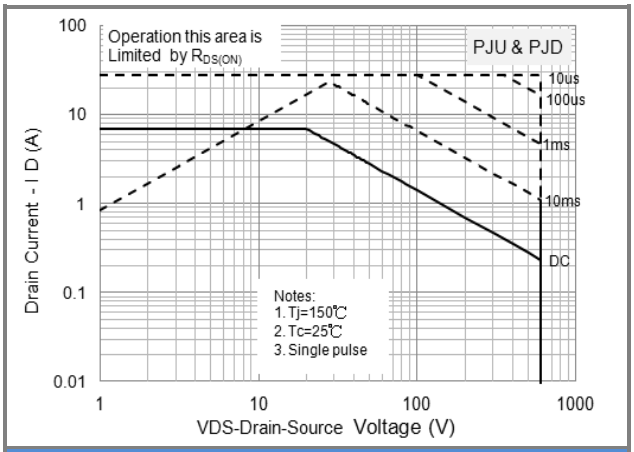



Fig.10 Maximum Safe Operating Area

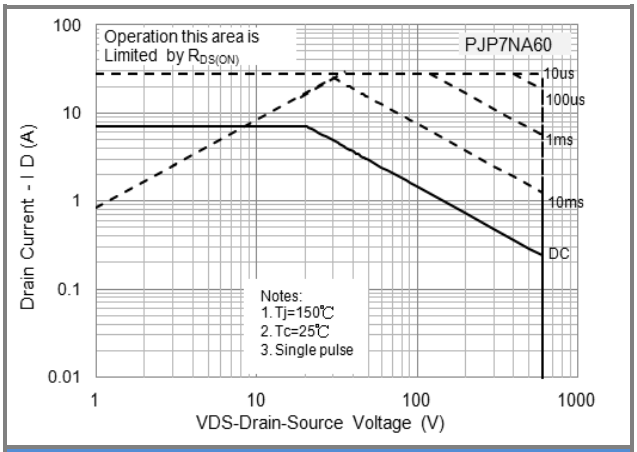



Fig.11 Maximum Safe Operating Area

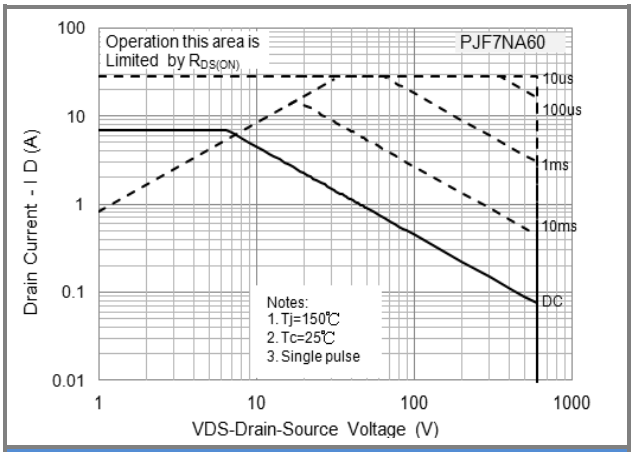



Fig.12 Maximum Safe Operating Area

# PJU7NA60 / PJD7NA60 / PJP7NA60 / PJF7NA60

## TYPICAL CHARACTERISTIC CURVES

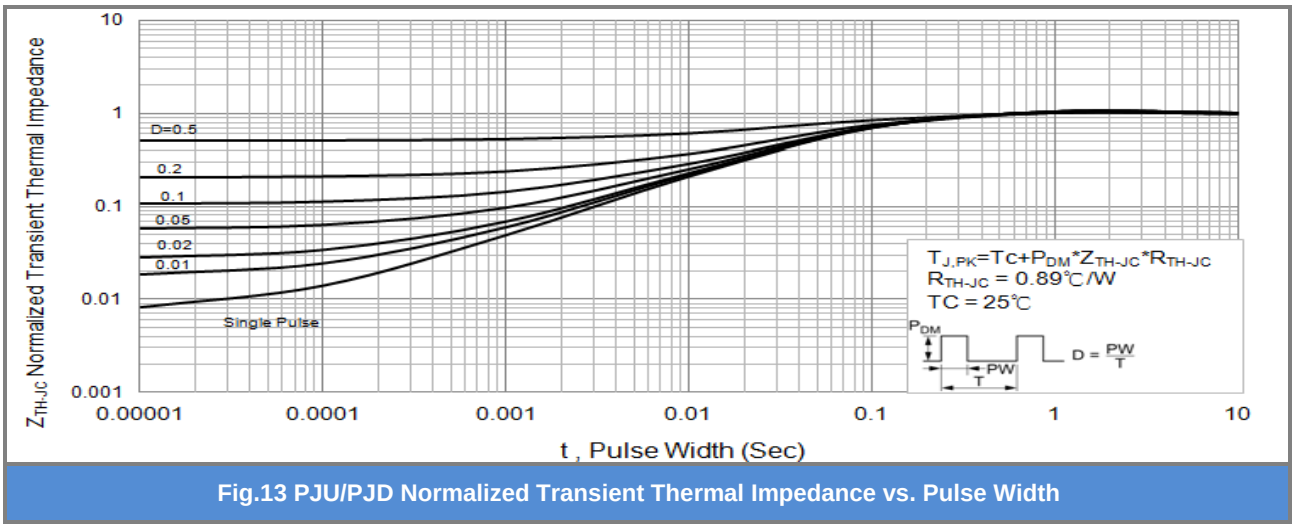



Fig.13 PJU/PJD Normalized Transient Thermal Impedance vs. Pulse Width

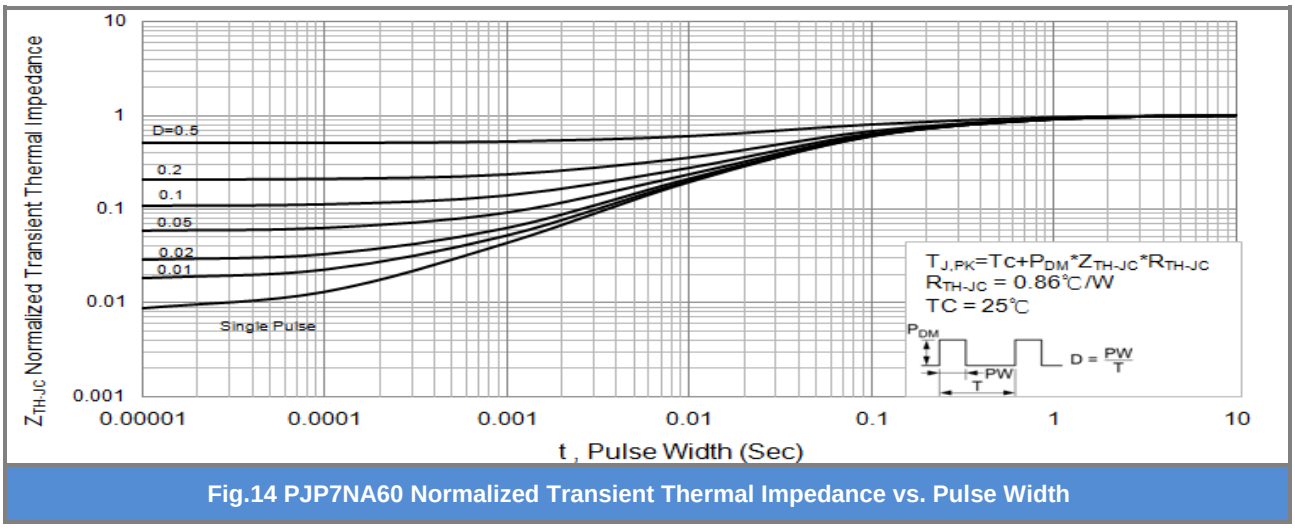



Fig.14 PJP7NA60 Normalized Transient Thermal Impedance vs. Pulse Width

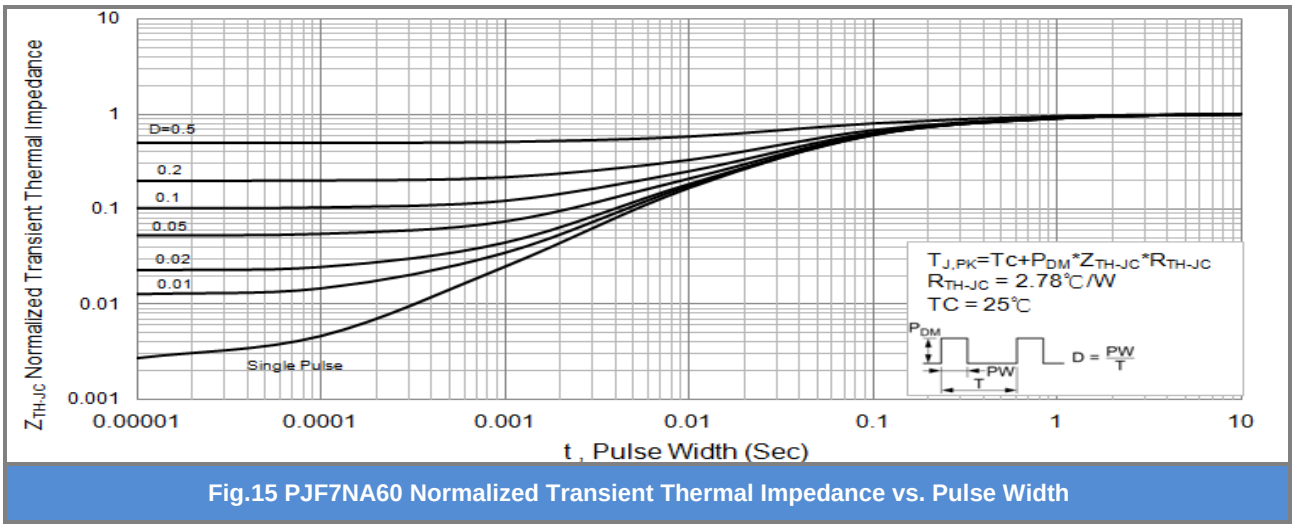


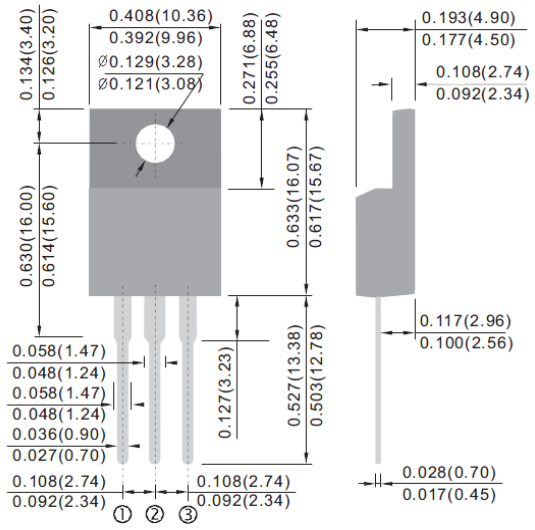

Fig.15 PJF7NA60 Normalized Transient Thermal Impedance vs. Pulse Width

# PJU7NA60 / PJD7NA60 / PJP7NA60 / PJF7NA60

## Packaging Information

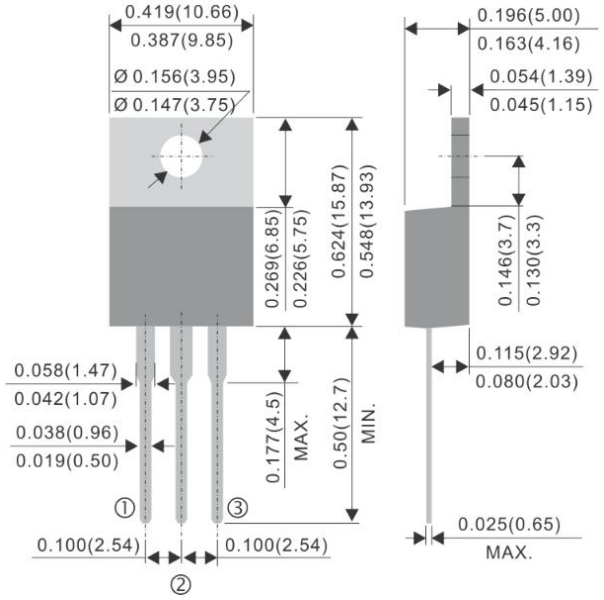
### ITO-220AB-F Dimension

Unit: inch(mm)



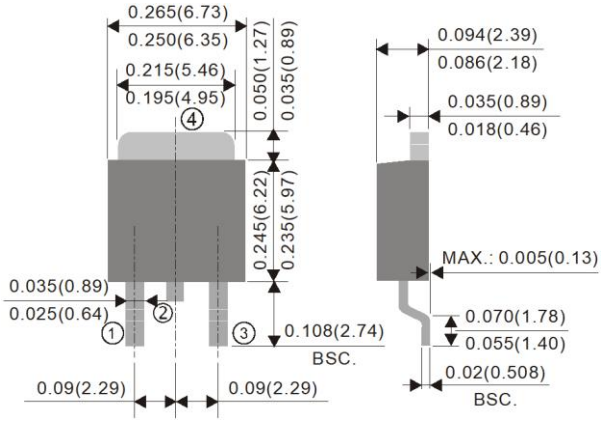

### TO-220AB Dimension

Unit: inch(mm)



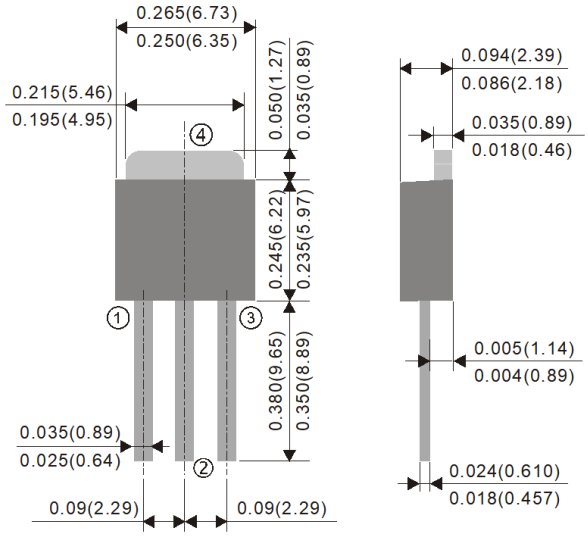

### TO-252AA Dimension

Unit: inch(mm)




### TO-251AA Dimension

Unit: inch(mm)



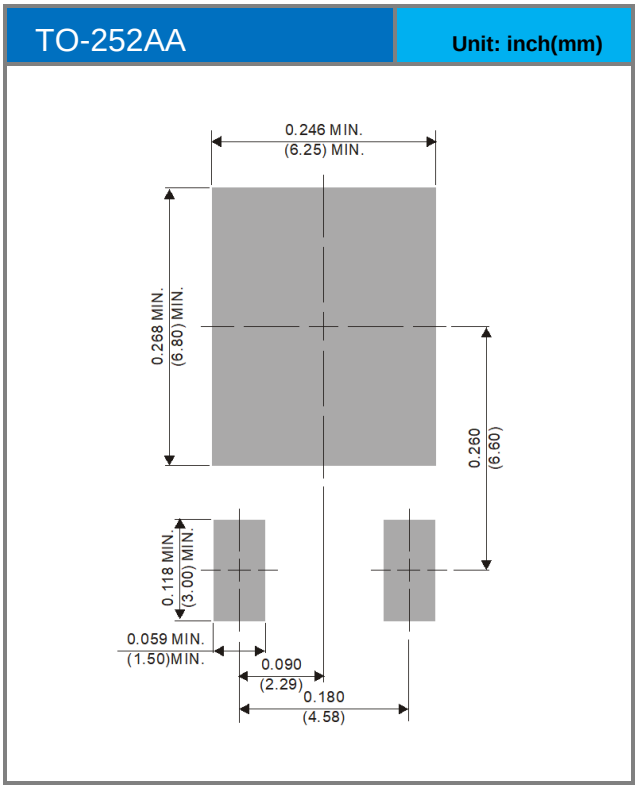
# PJU7NA60 / PJD7NA60 / PJP7NA60 / PJF7NA60

## Part No Packing Code Version

| Part No Packing Code | Package Type | Packing Type | Marking | Version |
|---|---|---|---|---|
| PJU7NA60_T0_00001 | TO-251AA | 80pcs / Tube | U7NA60 | Halogen free |
| PJD7NA60_L2_00001 | TO-252AA | 3,000pcs / 13” reel | D7NA60 | Halogen free |
| PJP7NA60_T0_00001 | TO-220AB | 50pcs / Tube | P7NA60 | Halogen free |
| PJF7NA60_T0_00001 | ITO-220AB-F | 50pcs / Tube | F7NA60 | Halogen free |

## Mounting Pad Layout

TO-252AA — Unit: inch(mm)



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