



PJU7NA65 / PJD7NA65 / PJP7NA65 / PJF7NA65

650V N-Channel MOSFET

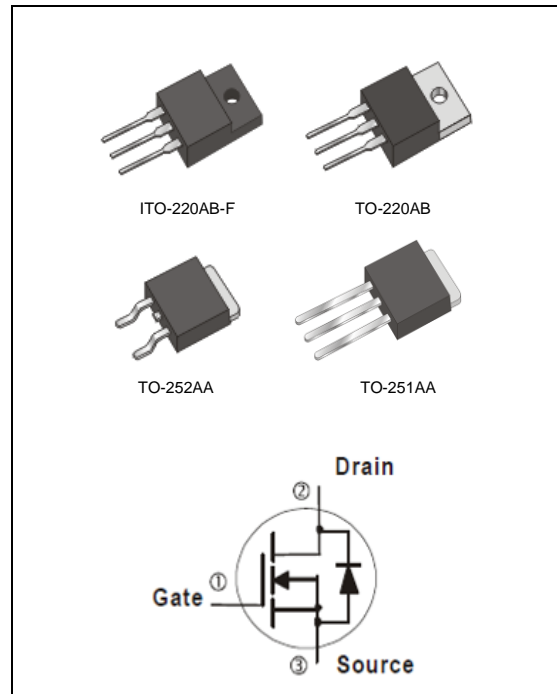
| | | | |
|----------------|--------------|----------------|------------|
| Voltage | 650 V | Current | 7 A |
|----------------|--------------|----------------|------------|

Features

- $R_{DS(ON)}$, $V_{GS}@10V$, $I_D@3.5A < 1.5\Omega$
- 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 ($T_A=25^\circ\text{C}$ unless otherwise noted)

| PARAMETER | SYMBOL | TO-251AA | TO-220AB | ITO-220AB-F | TO-252AA | UNITS | |
|---|---------------------------------|------------|----------|-------------|----------|--------------------|---------------------|
| | | TO-251AA-1 | | | | | |
| Drain-Source Voltage | V_{DS} | 650 | | | | V | |
| Gate-Source Voltage | V_{GS} | ± 30 | | | | | |
| Continuous Drain Current ^(Note 4) | I_D | 7 | | | | A | |
| Pulsed Drain Current | I_{DM} | 28 | | | | | |
| Single Pulse Avalanche Energy ^(Note 1) | E_{AS} | 435 | | | | mJ | |
| Power Dissipation | $T_C=25^\circ\text{C}$ | P_D | 140 | 145 | 46 | 140 | W |
| | Derate above 25°C | | 1.12 | 1.16 | 0.37 | 1.12 | W/ $^\circ\text{C}$ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55~150 | | | | $^\circ\text{C}$ | |
| Typical Thermal Resistance ^(Note 4) | | | | | | | |
| - Junction to Case | $R_{\theta JC}$ | 0.89 | 0.88 | 2.72 | 0.89 | $^\circ\text{C/W}$ | |
| - Junction to Ambient | $R_{\theta JA}$ | 110 | 62.5 | 120 | 110 | | |

- Limited only By Maximum Junction Temperature



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Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNITS |
|---|--------------|--|------|------|-----------|----------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=250\mu A$ | 650 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2 | 2.88 | 4 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=3.5A$ | - | 1.35 | 1.5 | Ω |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=650V, V_{GS}=0V$ | - | - | 1 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 30V, V_{DS}=0V$ | - | - | ± 100 | nA |
| Diode Forward Voltage | V_{SD} | $I_S=7A, V_{GS}=0V$ | - | 0.88 | 1.4 | V |
| Dynamic (Note 5) | | | | | | |
| Total Gate Charge | Q_g | $V_{DS}=520V, I_D=7A,$ $V_{GS}=10V$ (Note 2,3) | - | 16.8 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 5 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 6 | - | |
| Input Capacitance | C_{iss} | $V_{DS}=25V, V_{GS}=0V,$ $f=1\text{MHz}$ | - | 754 | - | pF |
| Output Capacitance | C_{oss} | | - | 97 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 0.8 | - | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}=325V, I_D=7A,$ $R_G=25\Omega$ (Note 2,3) | - | 14 | - | ns |
| Turn-On Rise Time | t_r | | - | 28 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 38 | - | |
| Turn-Off Fall Time | t_f | | - | 28 | - | |
| Drain-Source Diode | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | I_S | --- | - | - | 7 | A |
| Maximum Pulsed Drain-Source Diode Forward Current | I_{SM} | --- | - | - | 28 | A |
| Reverse Recovery Time | t_{rr} | $V_{GS}=0V, I_S=7A$ | - | 493 | - | ns |
| Reverse Recovery Charge | Q_{rr} | $di_F/dt=100A/\mu s$ (Note 2) | - | 2.99 | - | μC |

NOTES :

1. $L=30\text{mH}, I_{AS}=5.25A, V_{DD}=50V, R_G=25\text{ohm}$, Starting $T_J=25^\circ\text{C}$.
2. Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.
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.



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TYPICAL CHARACTERISTIC CURVES

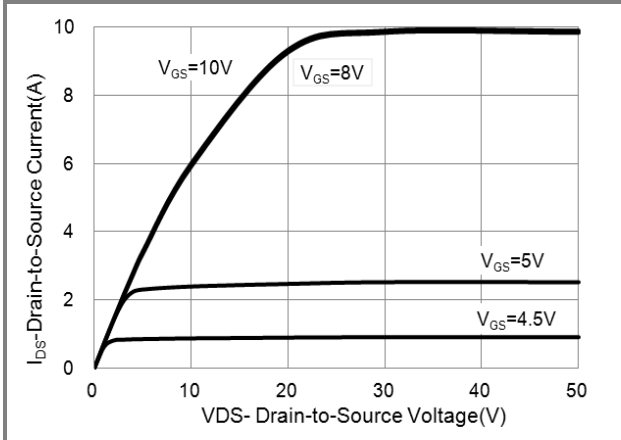


Fig.1 Output Characteristics

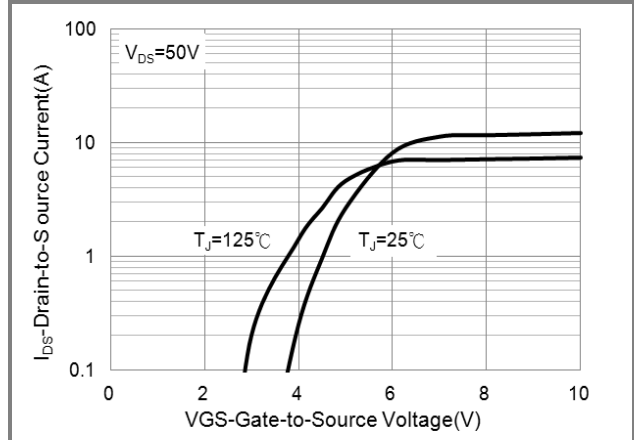


Fig.2 Transfer Characteristics

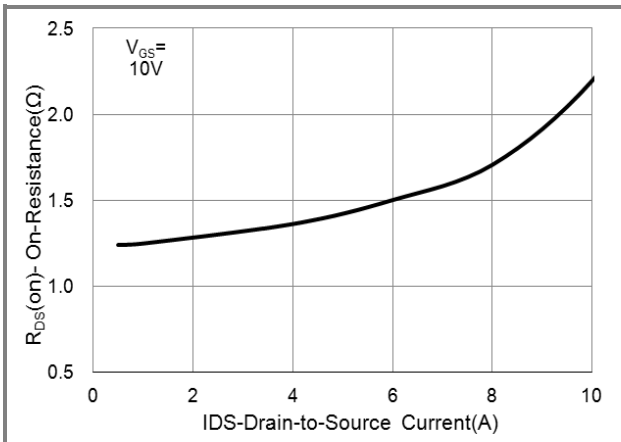


Fig.3 On-Resistance vs. Drain Current

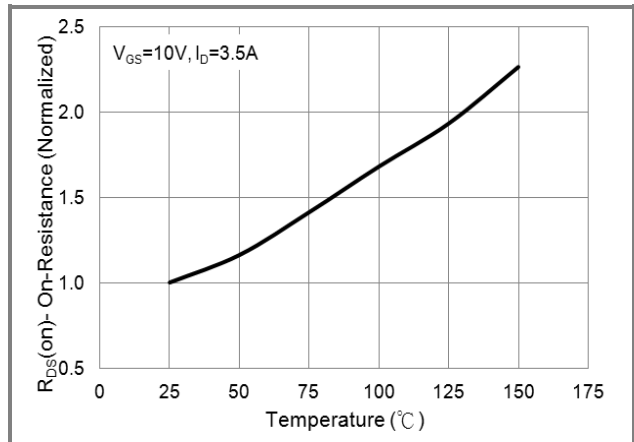


Fig.4 Resistance vs. Junction Temperature

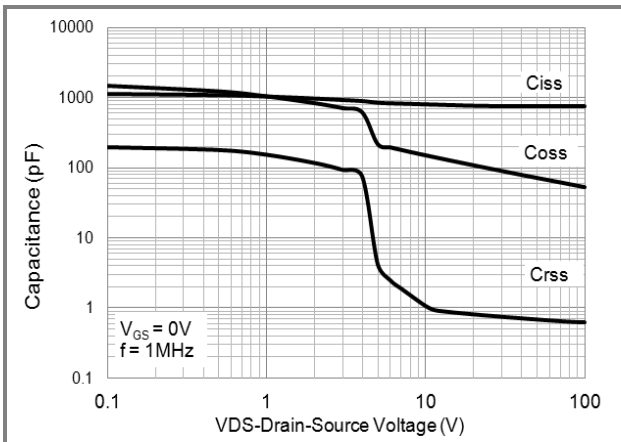


Fig.5 Capacitance vs. Drain-Source Voltage

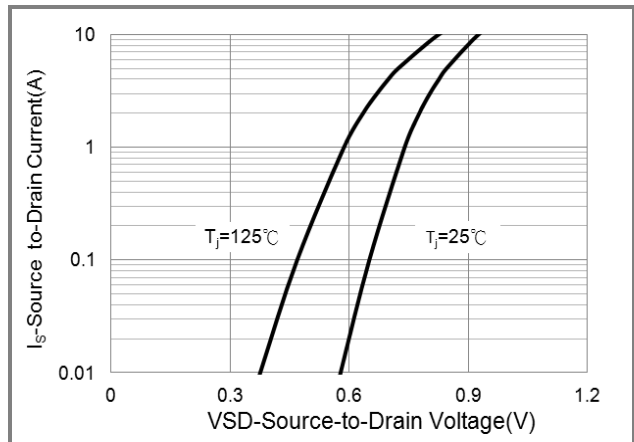


Fig.6 Source-Drain Diode Forward Voltage



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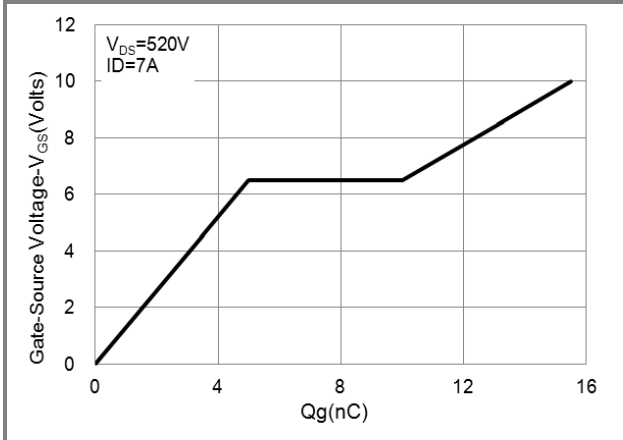


Fig.7 Gate Charge

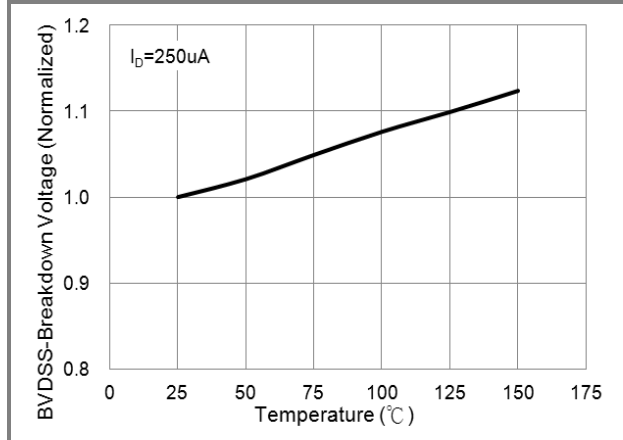


Fig.8 BV_{DSS} vs. Junction Temperature On-

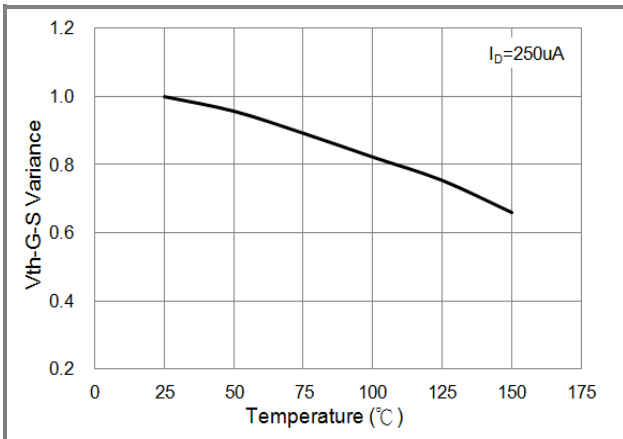


Fig.9 Threshold Voltage Variation with Temperature

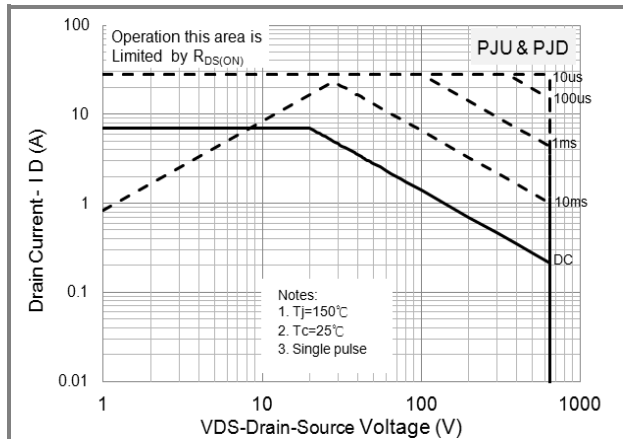


Fig.10 Maximum Safe Operating Area

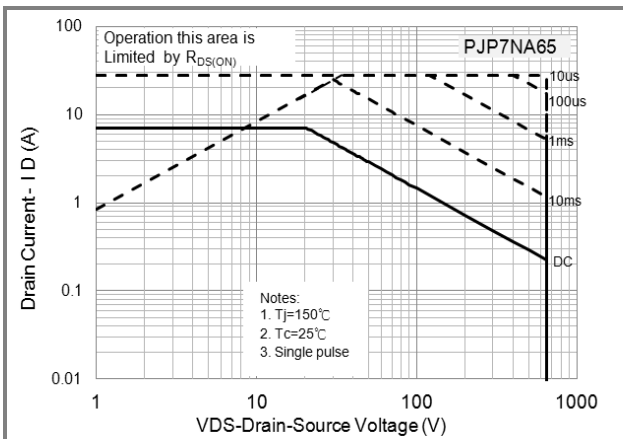


Fig.11 Maximum Safe Operating Area

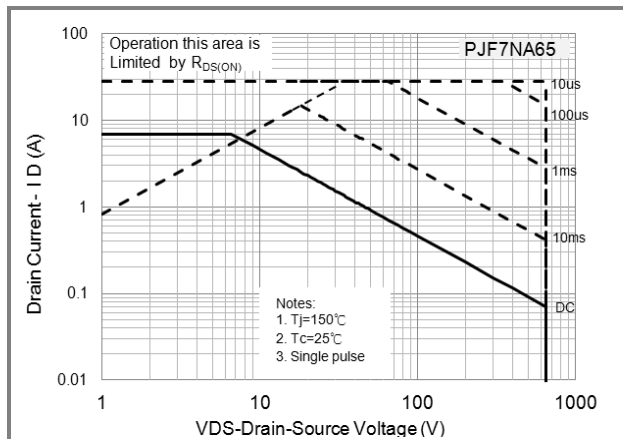


Fig.12 Maximum Safe Operating Area



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TYPICAL CHARACTERISTIC CURVES

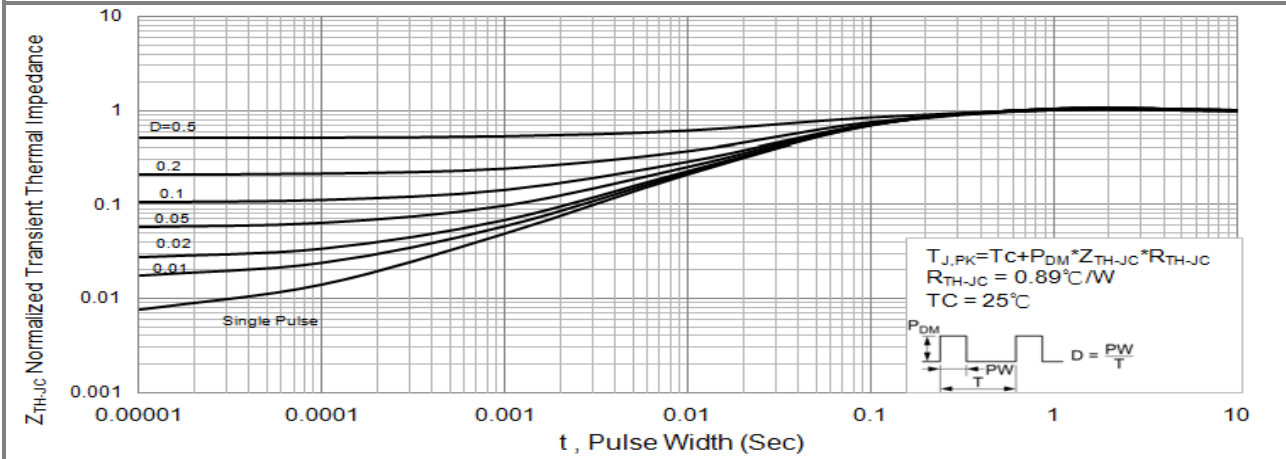


Fig.13 PJU/PJD Normalized Transient Thermal Impedance vs. Pulse Width

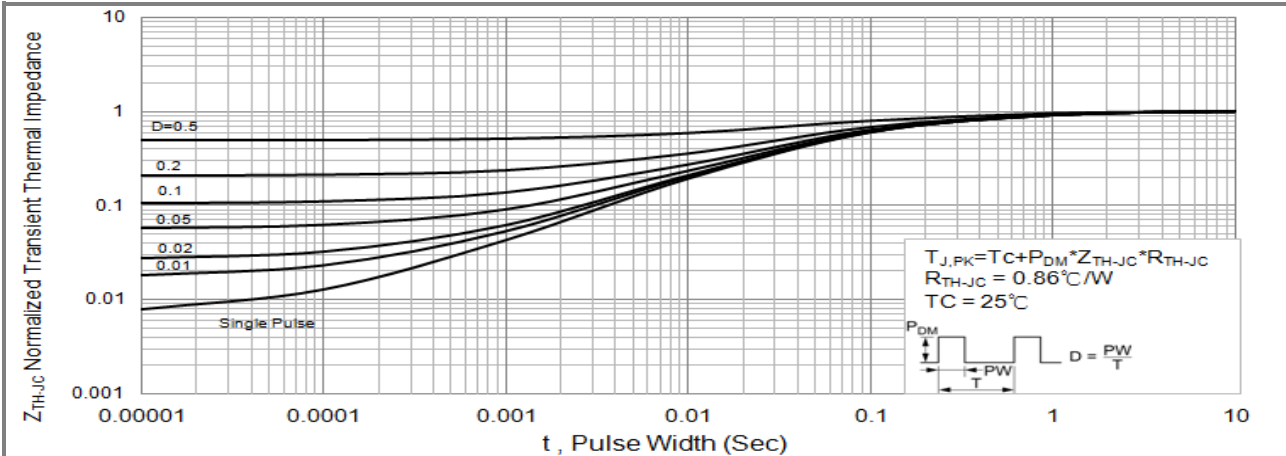


Fig.14 PJP7NA65 Normalized Transient Thermal Impedance vs. Pulse Width

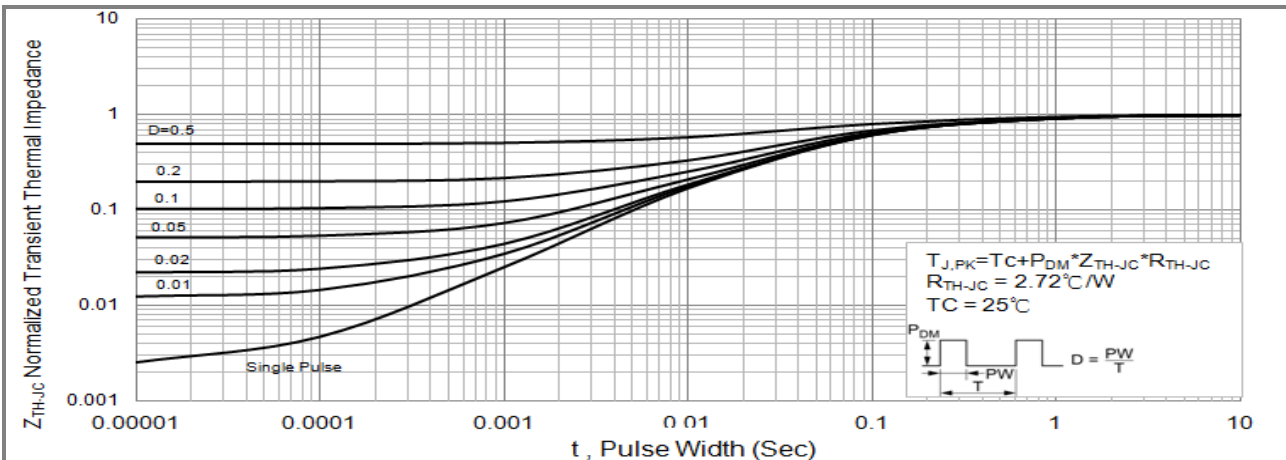


Fig.15 PJF7NA65 Normalized Transient Thermal Impedance vs. Pulse Width

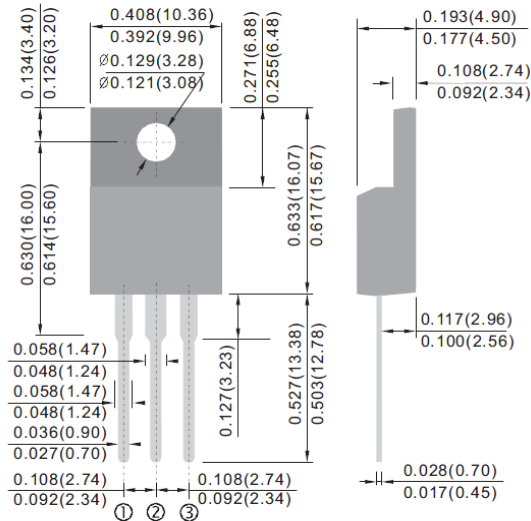


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Packaging Information

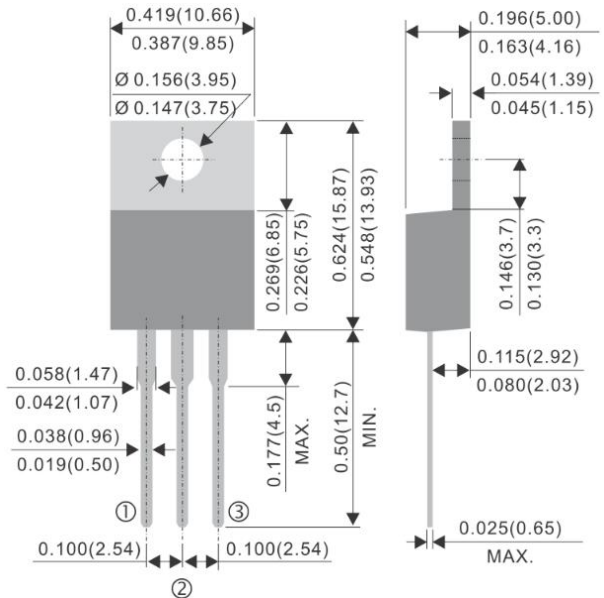
ITO-220AB-F Dimension

Unit: inch(mm)



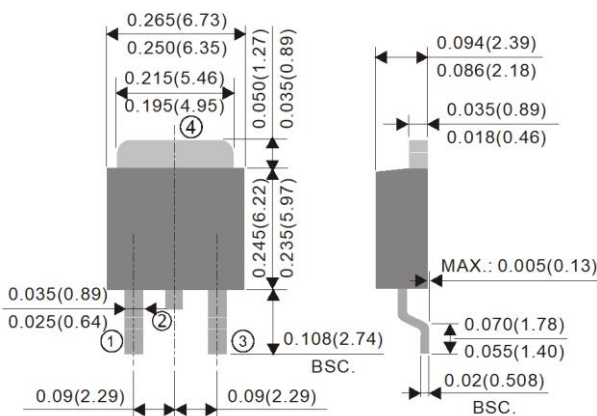
TO-220AB Dimension

Unit: inch(mm)



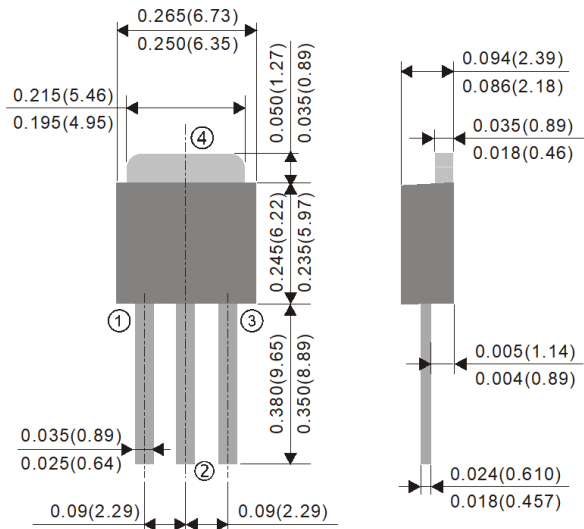
TO-252AA Dimension

Unit: inch(mm)



TO-251AA Dimension

Unit: inch(mm)



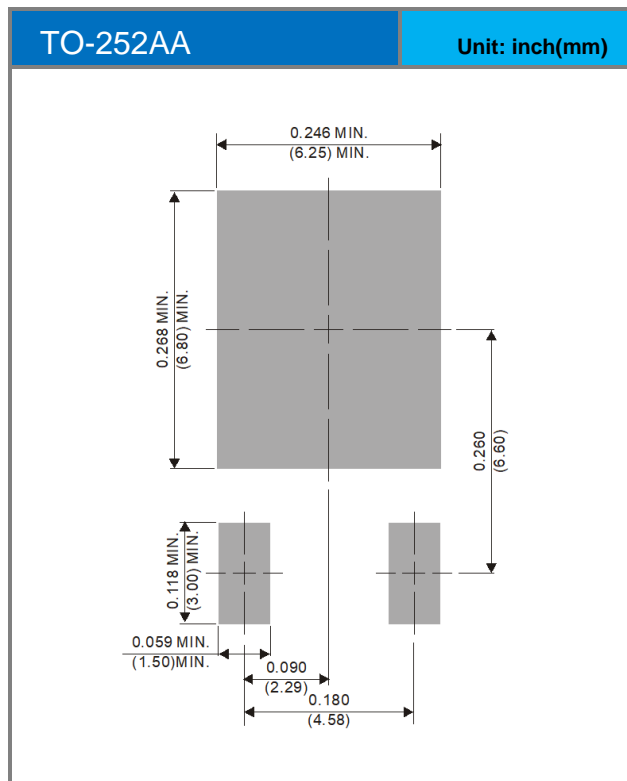


PJU7NA65 / PJD7NA65 / PJP7NA65 / PJF7NA65

Part No Packing Code Version

| Part No Packing Code | Package Type | Packing Type | Marking | Version |
|----------------------|--------------|---------------------|---------|--------------|
| PJU7NA65_T0_00001 | TO-251AA | 80pcs / Tube | U7NA65 | Halogen free |
| PJD7NA65_L2_00001 | TO-252AA | 3,000pcs / 13" reel | D7NA65 | Halogen free |
| PJP7NA65_T0_00001 | TO-220AB | 50pcs / Tube | P7NA65 | Halogen free |
| PJF7NA65_T0_00001 | ITO-220AB-F | 50pcs / Tube | F7NA65 | Halogen free |

Mounting Pad Layout





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