



PJU9P06A / PJD9P06A

60V P-Channel Enhancement Mode MOSFET

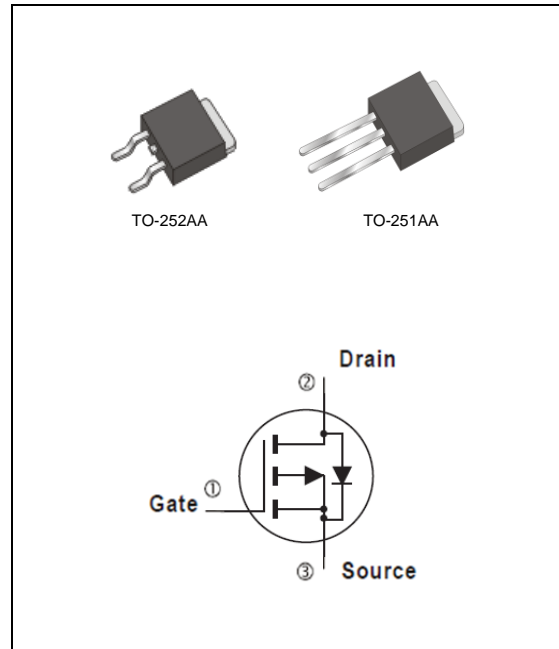
Voltage **-60 V** **Current** **-7 A**

Features

- $R_{DS(ON)}$, $V_{GS}@-10V, I_D@-3.5A < 190m\Omega$
- $R_{DS(ON)}$, $V_{GS}@-4.5V, I_D@-2A < 240m\Omega$
- High switching speed
- Improved dv/dt capability
- Low Gate Charge
- Low reverse transfer capacitance
- Lead free in compliance with EU RoHS2.0 (2011/65/EU & 2015/865/EU directive)
- Green molding compound as per IEC61249 Std. (Halogen Free)

Mechanical Data

- Case : TO-251AA, TO-252AA 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



Maximum Ratings and Thermal Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

| PARAMETER | | SYMBOL | LIMIT | UNITS |
|--|-------------------------|-----------------|---------|--------------------|
| Drain-Source Voltage | | V_{DS} | -60 | V |
| Gate-Source Voltage | | V_{GS} | +20 | V |
| Continuous Drain Current | $T_C=25^\circ\text{C}$ | I_D | -7.0 | A |
| | $T_C=100^\circ\text{C}$ | | -4.3 | |
| Pulsed Drain Current (Note 1) | $T_C=25^\circ\text{C}$ | I_{DM} | -28 | |
| Power Dissipation | $T_C=25^\circ\text{C}$ | P_D | 15.6 | W |
| | $T_C=100^\circ\text{C}$ | | 6.2 | |
| Continuous Drain Current | $T_A=25^\circ\text{C}$ | I_D | -2.5 | A |
| | $T_A=70^\circ\text{C}$ | | -2.0 | A |
| Power Dissipation | $T_A=25^\circ\text{C}$ | P_D | 2.0 | W |
| Power Dissipation | $T_A=70^\circ\text{C}$ | | 1.3 | |
| Single Pulse Avalanche Energy (Note 6) | | E_{AS} | 32 | mJ |
| Operating Junction and Storage Temperature Range | | T_J, T_{STG} | -55~150 | $^\circ\text{C}$ |
| Typical Thermal Resistance (Note 4,5) | Junction to Case | $R_{\theta JC}$ | 8 | $^\circ\text{C/W}$ |
| | Junction to Ambient | $R_{\theta JA}$ | 62.5 | |

- 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} | $V_{GS}=0V, I_D=-250\mu A$ | -60 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1.0 | -1.88 | -2.5 | |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=-10V, I_D=-3.5A$ | - | 150 | 190 | m Ω |
| | | $V_{GS}=-4.5V, I_D=-2A$ | - | 190 | 240 | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-60V, V_{GS}=0V$ | - | - | -1.0 | μA |
| Gate-Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| Dynamic (Note 7) | | | | | | |
| Total Gate Charge | Q_g | $V_{DS}=-30V, I_D=-3A,$ $V_{GS}=-10V$ (Note 2,3) | - | 8.3 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 1.8 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 1.6 | - | |
| Input Capacitance | C_{iss} | $V_{DS}=-30V, V_{GS}=0V,$ $f=1.0\text{MHz}$ | - | 430 | - | pF |
| Output Capacitance | C_{oss} | | - | 33 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 29 | - | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DS}=-30V, I_D=-1.0A,$ $V_{GS}=-10V, R_G=6\Omega$ (Note 2,3) | - | 5.1 | - | ns |
| Turn-On Rise Time | t_r | | - | 20 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 36 | - | |
| Turn-Off Fall Time | t_f | | - | 11 | - | |
| Drain-Source Diode | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | I_S | --- | - | - | -7 | A |
| Reverse Recovery Time | V_{SD} | $I_S=-1A, V_{GS}=0V$ | - | -0.76 | -1.0 | V |

NOTES :

1. Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$
2. Essentially independent of operating temperature typical characteristics
3. Repetitive rating, pulse width limited by junction temperature $T_J(\text{MAX})=150^{\circ}\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^{\circ}\text{C}$.
4. The maximum current rating is package limited
5. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. Mounted on a 1 inch² with 2oz.square pad of copper
6. $L=0.1\text{mH}, I_{AS}=-8A, V_{GS}=-10V, V_{DS}=-25V, R_G=25\text{ohm}$
7. Guaranteed by design, not subject to production testing.



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TYPICAL CHARACTERISTIC CURVES

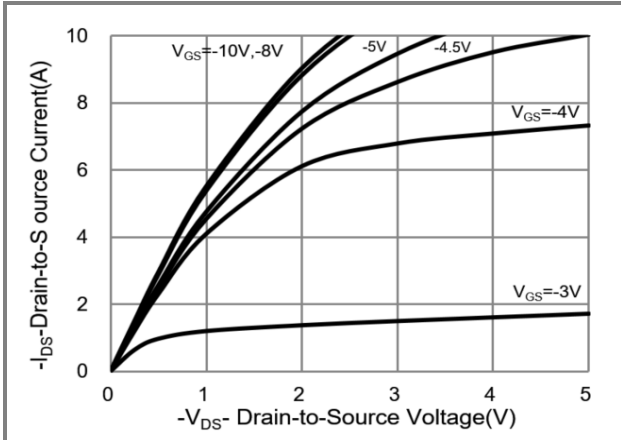


Fig.1 On-Region Characteristics

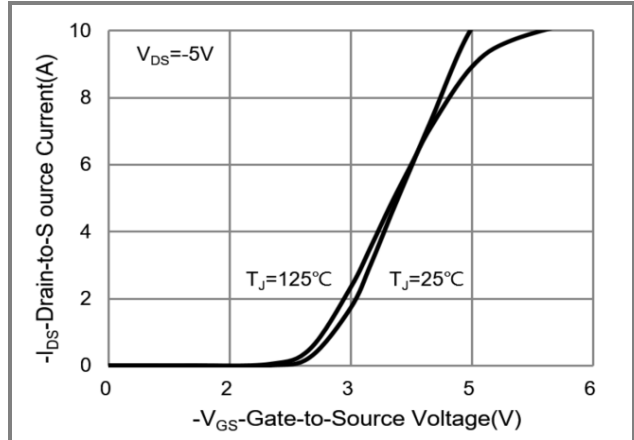


Fig.2 Transfer Characteristics

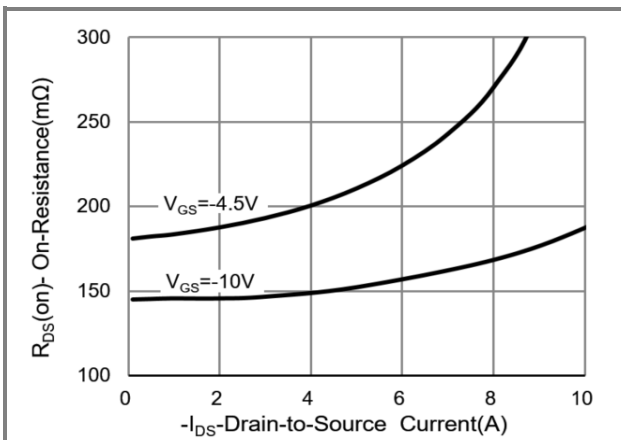


Fig.3 On-Resistance vs. Drain Current

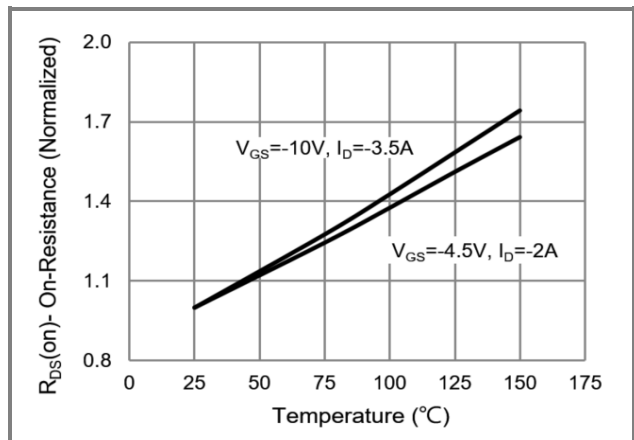


Fig.4 On-Resistance vs. Junction temperature

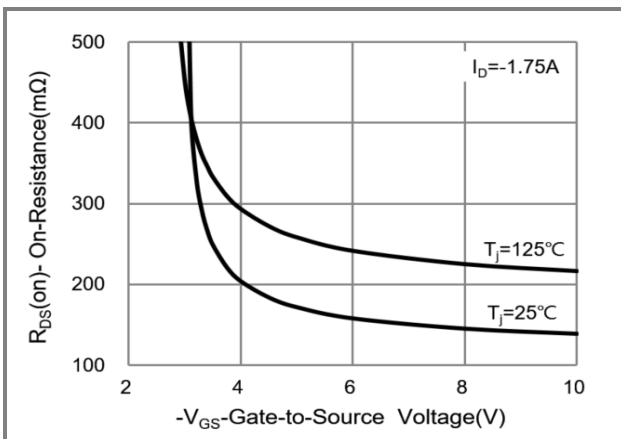


Fig.5 On-Resistance Variation with V_{GS} .

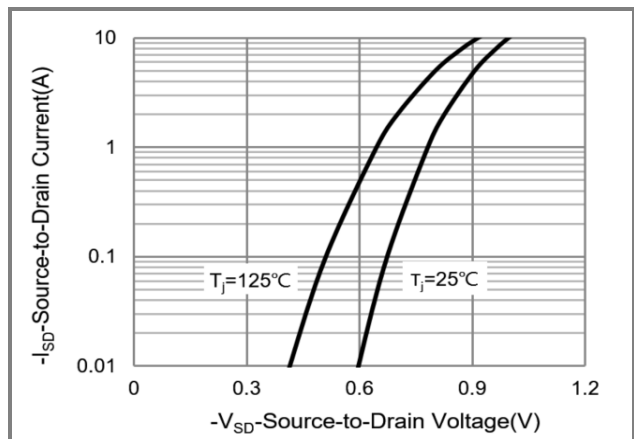


Fig.6 Body Diode Characteristics



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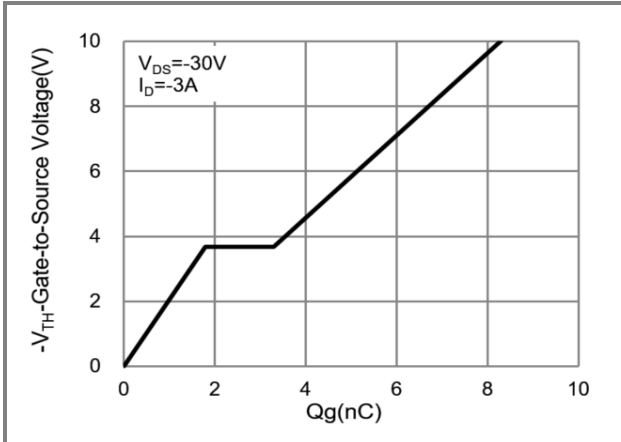


Fig.7 Gate-Charge Characteristics

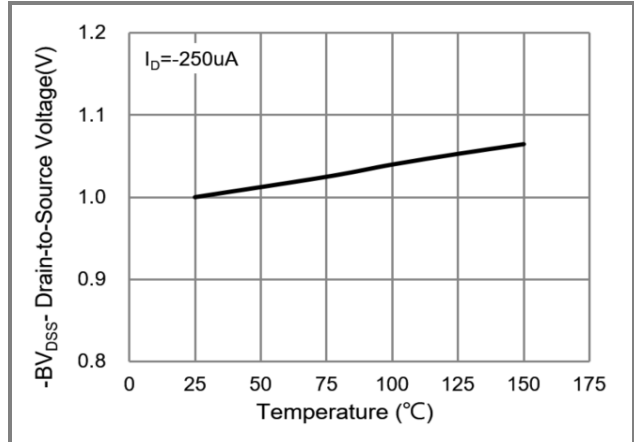


Fig.8 Breakdown Voltage Variation vs. Temperature

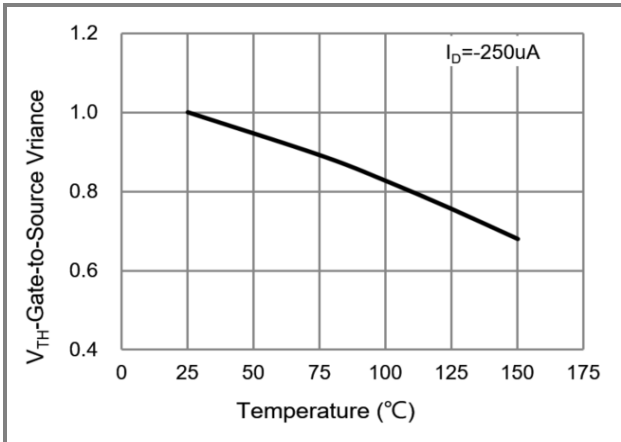


Fig.9 Threshold Voltage Variation with Temperature.

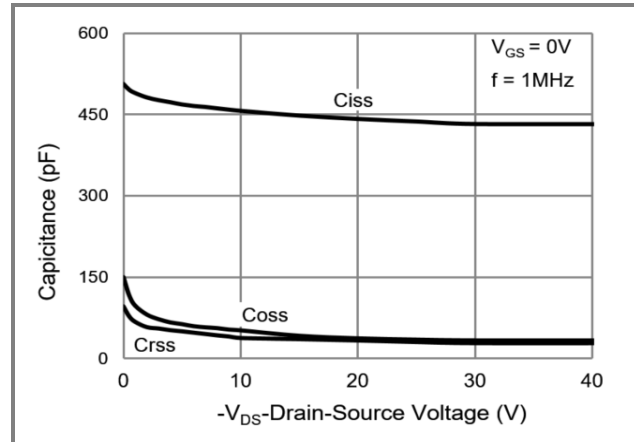


Fig.10 Capacitance vs. Drain-Source Voltage.

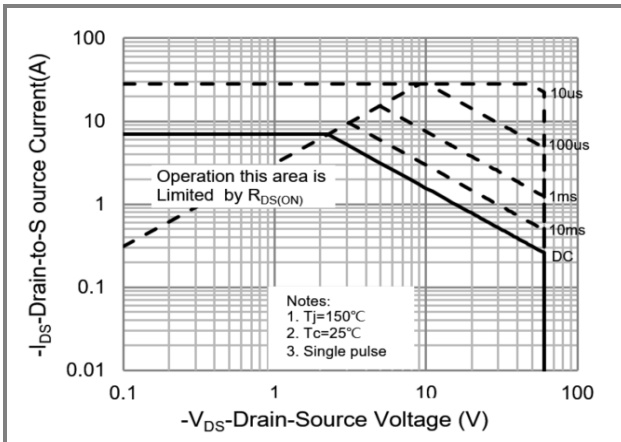


Fig.11 Maximum Safe Operating Area



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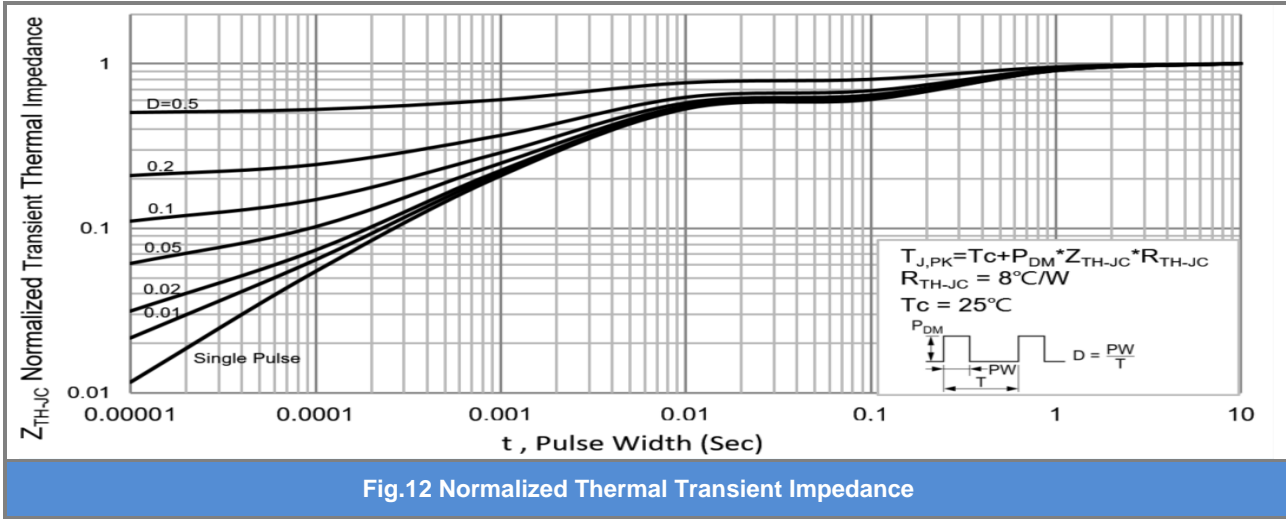
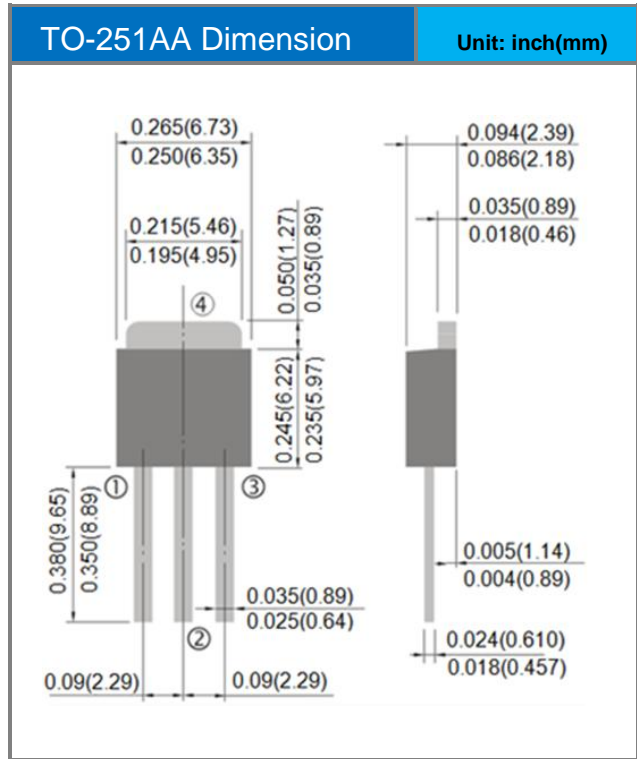
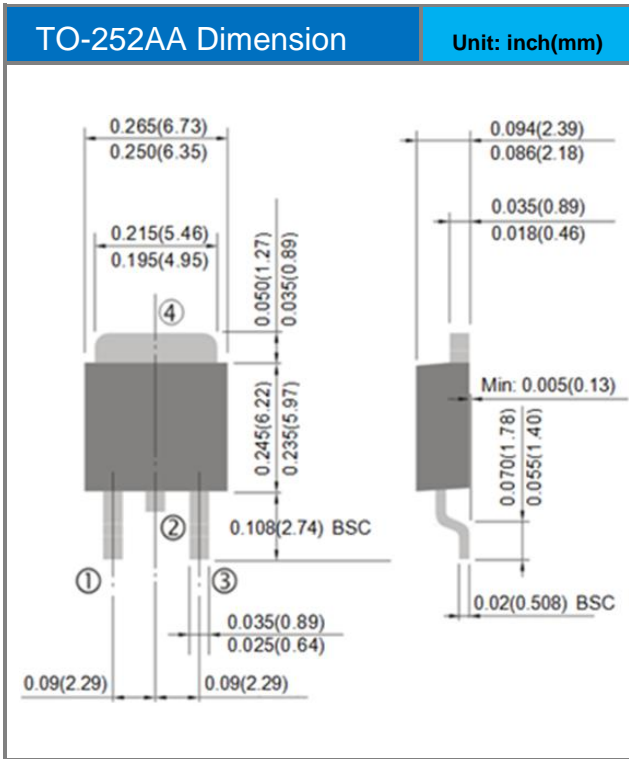


Fig.12 Normalized Thermal Transient Impedance



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Packaging Information





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PART NO PACKING CODE VERSION

| Part No Packing Code | Package Type | Packing Type | Marking | Version |
|----------------------|--------------|---------------------|---------|--------------|
| PJU9P06A_T0_00001 | TO-251AA | 80pcs / Tube | U9P06A | Halogen free |
| PJD9P06A_L2_00001 | TO-252AA | 3,000pcs / 13" reel | D9P06A | Halogen free |



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