



# PJQ4402P-AU

## 30V N-Channel Enhancement Mode MOSFET

**Voltage** 30 V **Current** 70 A

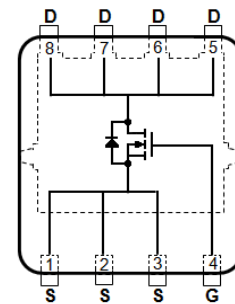
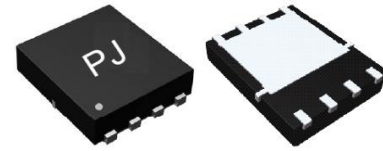
### Features

- $R_{DS(ON)}$ ,  $V_{GS}@10V$ ,  $I_D@10A < 3.8m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@4.5V$ ,  $I_D@5A < 5.5m\Omega$
- High switching speed
- Improved dv/dt capability
- Low gate charge
- Low reverse transfer capacitance
- AEC-Q101 qualified
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

### Mechanical Data

- Case : DFN3333-8L Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.001 ounces, 0.03 grams

DFN3333-8L



### Maximum Ratings and Thermal Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| PARAMETER  | SYMBOL              | LIMIT             | UNITS |
|--|---------------------|-------------------|-------|
| Drain-Source Voltage                             | $V_{DS}$            | 30                | V     |
| Gate-Source Voltage                              | $V_{GS}$            | ±20               |       |
| Continuous Drain Current <sup>(Note 4)</sup>     | $I_D$               | $T_C=25^\circ C$  | 70    |
|  |                     | $T_C=100^\circ C$ | 44    |
| Pulsed Drain Current <sup>(Note 1)</sup>         | $I_{DM}$            | 280               | A     |
| Power Dissipation                                | $P_D$               | $T_C=25^\circ C$  | 39    |
|  |                     | $T_C=100^\circ C$ | 15.6  |
| Continuous Drain Current <sup>(Note 4)</sup>     | $I_D$               | $T_A=25^\circ C$  | 16    |
|  |                     | $T_A=70^\circ C$  | 13    |
| Power Dissipation                                | $P_D$               | $T_A=25^\circ C$  | 2     |
| Power Dissipation                                |                     | $T_A=70^\circ C$  | 1.3   |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$      | -55~150           | °C    |
| Typical Thermal Resistance <sup>(Note 4,5)</sup> | Junction to Case    | $R_{\theta JC}$   | 3.21  |
|  | Junction to Ambient | $R_{\theta JA}$   | 62.5  |

- Limited only By Maximum Junction Temperature



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## Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| PARAMETER   | SYMBOL              | TEST CONDITION   | MIN. | TYP. | MAX. | UNITS |
|---|---------------------|--|------|------|------|-------|
| <b>Static</b>   |                     |  |      |      |      |       |
| Drain-Source Breakdown Voltage                        | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA   | 30   | -    | -    | V     |
| Gate Threshold Voltage                                | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA   | 1    | 1.6  | 2.5  |       |
| Drain-Source On-State Resistance                      | R <sub>DS(on)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =10A  | -    | 3.3  | 3.8  | mΩ    |
|   |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A  | -    | 5    | 5.5  |       |
| Zero Gate Voltage Drain Current                       | I <sub>DSS</sub>    | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V  | -    | -    | 1    | uA    |
| Gate-Source Leakage Current                           | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V   | -    | -    | ±100 | nA    |
| <b>Dynamic</b> (Note 6)                               |                     |  |      |      |      |       |
| Total Gate Charge                                     | Q <sub>g</sub>      | V <sub>DS</sub> =15V, I <sub>D</sub> =24A,<br>V <sub>GS</sub> =4.5V (Note 2,3)                       | -    | 23   | -    | nC    |
| Gate-Source Charge                                    | Q <sub>gs</sub>     |  | -    | 8    | -    |       |
| Gate-Drain Charge                                     | Q <sub>gd</sub>     |  | -    | 9    | -    |       |
| Input Capacitance                                     | C <sub>iss</sub>    | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V,<br>f=1MHZ   | -    | 2436 | -    | pF    |
| Output Capacitance                                    | C <sub>oss</sub>    |  | -    | 306  | -    |       |
| Reverse Transfer Capacitance                          | C <sub>rss</sub>    |  | -    | 196  | -    |       |
| Turn-On Delay Time                                    | t <sub>d(on)</sub>  | V <sub>DS</sub> =15V, I <sub>D</sub> =15A,<br>V <sub>GS</sub> =10V, R <sub>G</sub> =1Ω<br>(Note 2,3) | -    | 32   | -    | ns    |
| Turn-On Rise Time                                     | t <sub>r</sub>      |  | -    | 169  | -    |       |
| Turn-Off Delay Time                                   | t <sub>d(off)</sub> |  | -    | 232  | -    |       |
| Turn-Off Fall Time                                    | t <sub>f</sub>      |  | -    | 170  | -    |       |
| <b>Drain-Source Diode</b>                             |                     |  |      |      |      |       |
| Maximum Continuous Drain-Source Diode Forward Current | I <sub>S</sub>      | ---  | -    | -    | 70   | A     |
| Diode Forward Voltage                                 | V <sub>SD</sub>     | I <sub>S</sub> =1A, V <sub>GS</sub> =0V  | -    | 0.66 | 1    | V     |

**NOTES :**

1. Pulse width ≤ 300us, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature typical characteristics.
3. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C. Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub> = 25°C.
4. The maximum current rating is package limited.
5. R<sub>θJA</sub> 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 inch<sup>2</sup> with 2oz.square pad of copper.
6. Guaranteed by design, not subject to production testing.



# PJQ4402P-AU

## TYPICAL CHARACTERISTIC CURVES

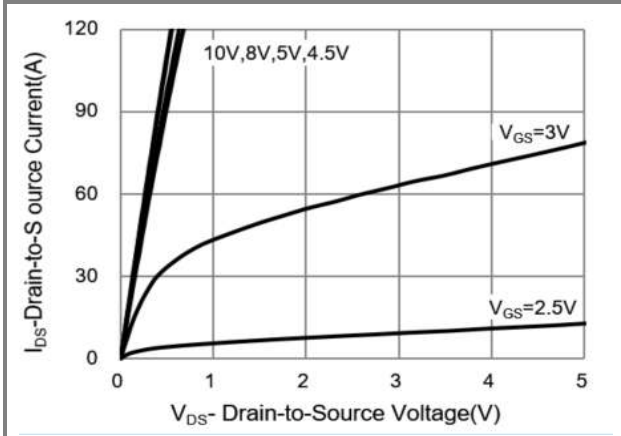


Fig.1 On-Region Characteristics

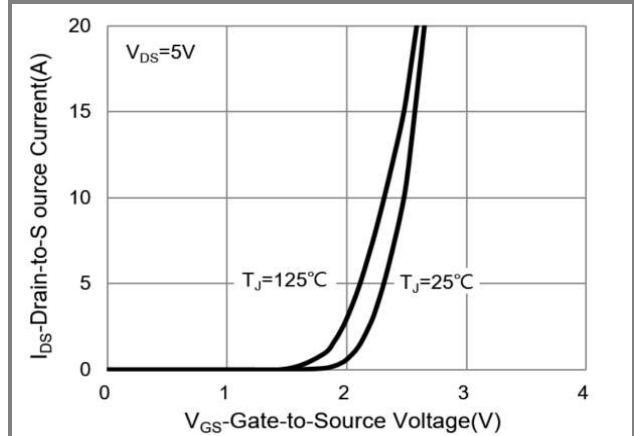


Fig.2 Transfer Characteristics

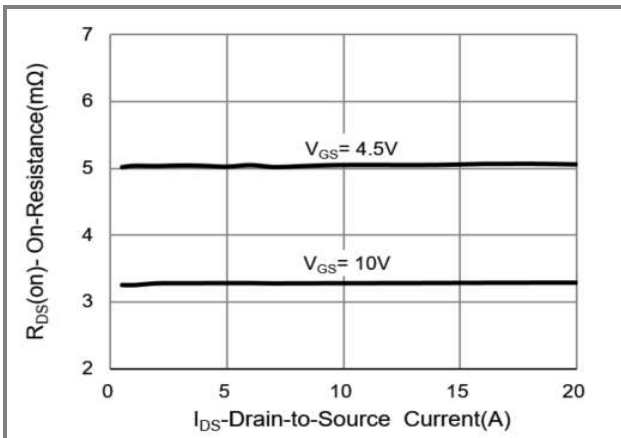


Fig.3 On-Resistance vs. Drain Current

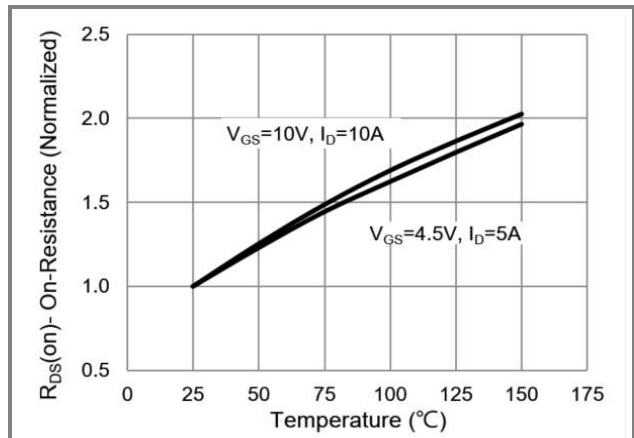


Fig.4 On-Resistance vs. Junction temperature

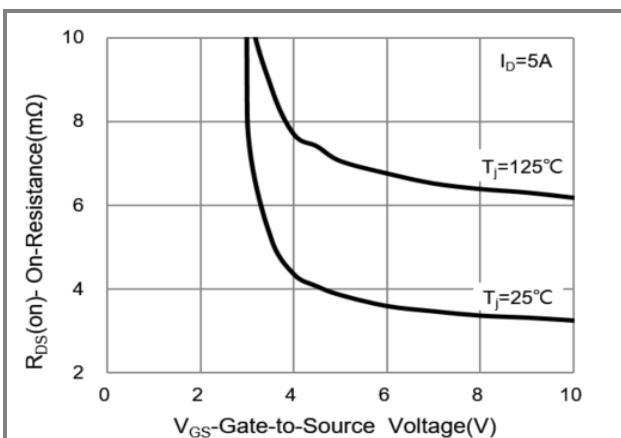


Fig.5 On-Resistance Variation with  $V_{GS}$

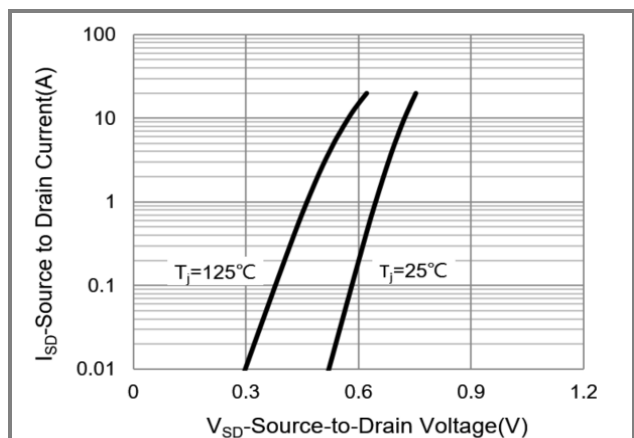


Fig.6 Source-Drain Diode Forward Voltage



# PJQ4402P-AU

## TYPICAL CHARACTERISTIC CURVES

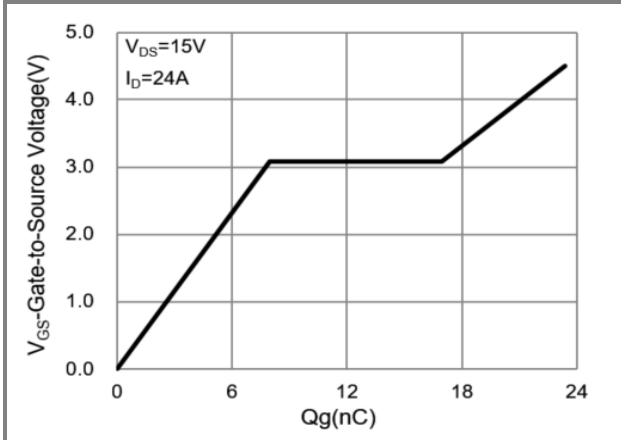


Fig.7 Gate-Charge Characteristics

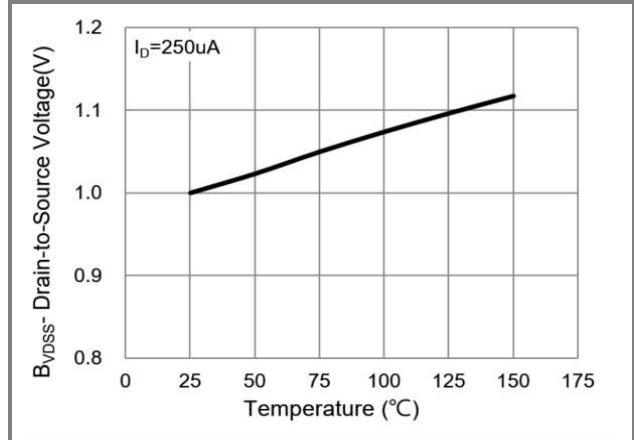


Fig.8 Breakdown Voltage Variation vs. Temperature

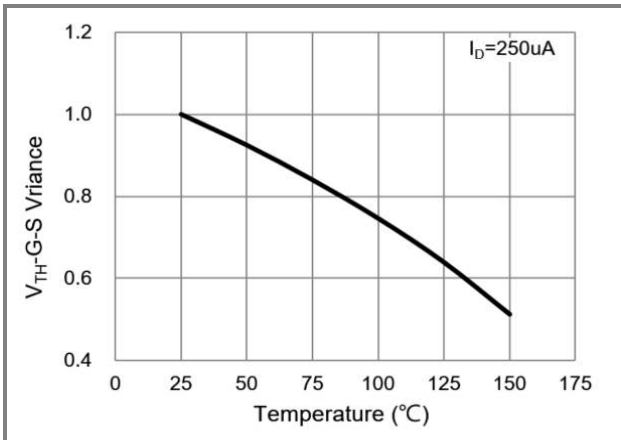


Fig.9 Threshold Voltage Variation with Temperature

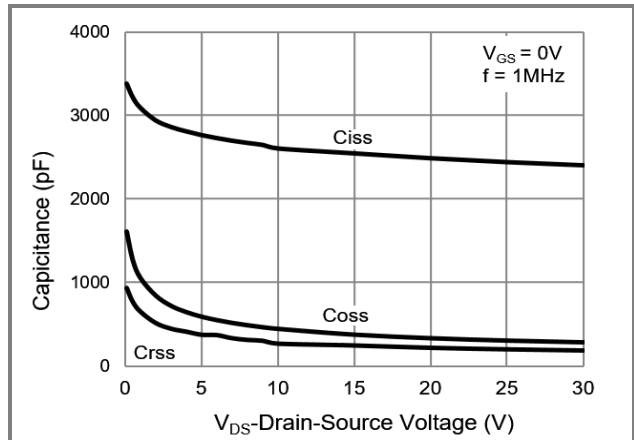


Fig.10 Capacitance vs. Drain-Source Voltage

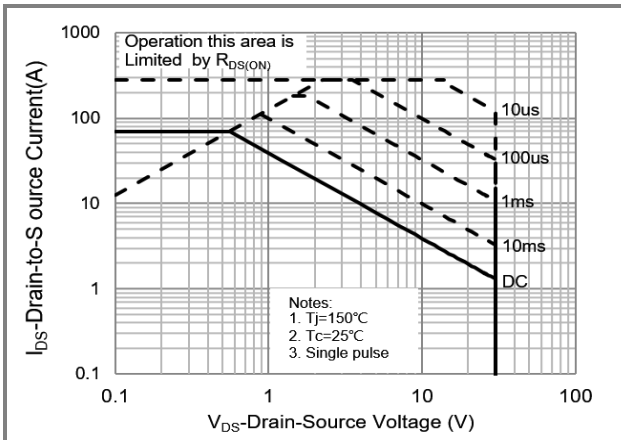


Fig.11 Maximum Safe Operating Area



# PJQ4402P-AU

## TYPICAL CHARACTERISTIC CURVES

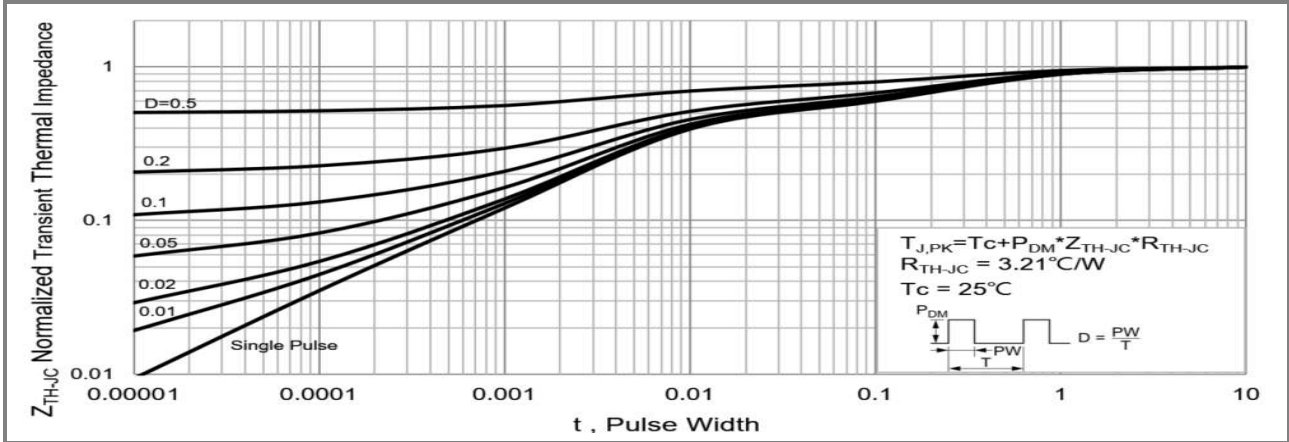


Fig.12 Normalized Transient Thermal Impedance vs. Pulse Width

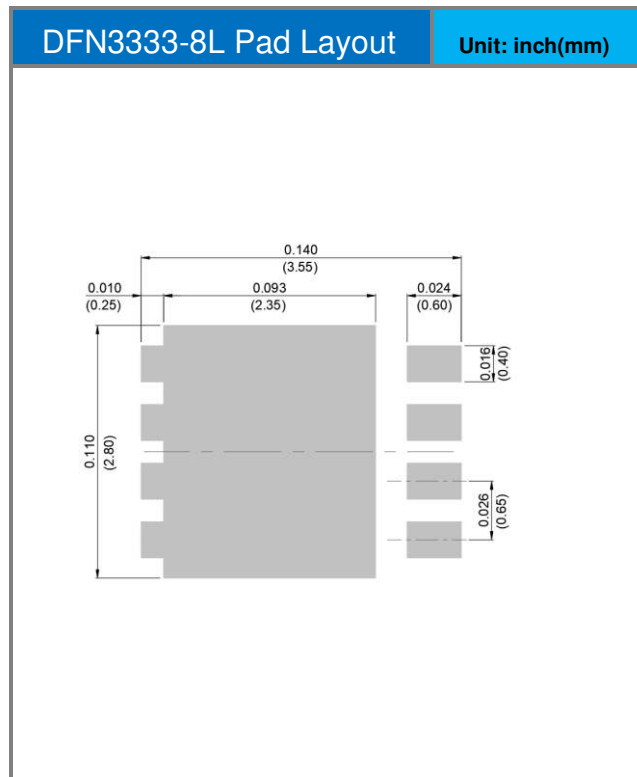
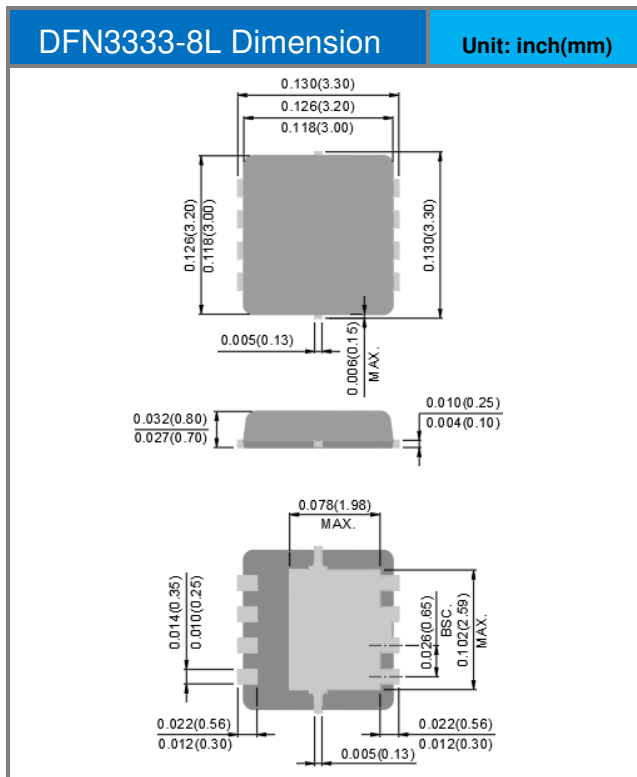


# PJQ4402P-AU

## Part No. Packing Code Version

| Part No. Packing Code | Package Type | Packing Type      | Marking | Version                        |
|-----------------------|--------------|-------------------|---------|--------------------------------|
| PJQ4402P-AU_R2_000A1  | DFN3333-8L   | 5K pcs / 13" reel | 4402    | Halogen free<br>RoHS compliant |

## Packaging Information & Mounting Pad Layout





## PJQ4402P-AU

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