



# PJQ4401P

## 30V P-Channel Enhancement Mode MOSFET

**Voltage**    **-30 V**    **Current**    **-50 A**

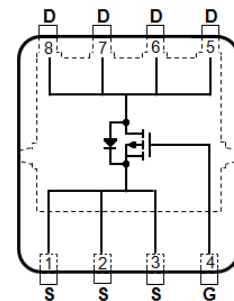
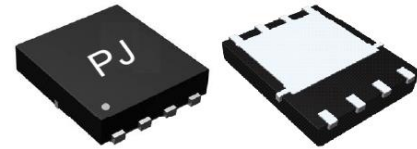
### Features

- $R_{DS(ON)}$ ,  $V_{GS}@-10V, I_D@-10A < 8.5m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@-4.5V, I_D@-8A < 14m\Omega$
- 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: 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 ( $T_A=25^\circ\text{C}$ unless otherwise noted)

| PARAMETER  |                         | SYMBOL          | LIMIT   | UNITS              |
|--|-------------------------|-----------------|---------|--------------------|
| Drain-Source Voltage                             |                         | $V_{DS}$        | -30     | V                  |
| Gate-Source Voltage                              |                         | $V_{GS}$        | +20     | V                  |
| Continuous Drain Current                         | $T_C=25^\circ\text{C}$  | $I_D$           | -50     | A                  |
|  | $T_C=100^\circ\text{C}$ |                 | -32     |                    |
| Pulsed Drain Current <sup>(Note 1)</sup>         | $T_C=25^\circ\text{C}$  | $I_{DM}$        | -200    |                    |
| Power Dissipation                                | $T_C=25^\circ\text{C}$  | $P_D$           | 60      | W                  |
|  | $T_C=100^\circ\text{C}$ |                 | 24      |                    |
| Continuous Drain Current                         | $T_A=25^\circ\text{C}$  | $I_D$           | -10     | A                  |
|  | $T_A=70^\circ\text{C}$  |                 | -8      | A                  |
| Power Dissipation                                | $T_A=25^\circ\text{C}$  | $P_D$           | 2.0     | W                  |
| Power Dissipation                                | $T_A=70^\circ\text{C}$  |                 | 1.3     |                    |
| Operating Junction and Storage Temperature Range |                         | $T_J, T_{STG}$  | -55~150 | $^\circ\text{C}$   |
| Typical Thermal Resistance <sup>(Note 4,5)</sup> | Junction to Case        | $R_{\theta JC}$ | 2.1     | $^\circ\text{C/W}$ |
|  | Junction to Ambient     | $R_{\theta JA}$ | 62.5    |                    |

- Limited only By Maximum Junction Temperature



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## Electrical Characteristics (T<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  | -1.0 | -1.5 | -2.5 | V     |
| Drain-Source On-State Resistance                      | R <sub>DS(on)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A  | -    | 7.1  | 8.5  | mΩ    |
|   |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-8A  | -    | 10   | 14   |       |
| Zero Gate Voltage Drain Current                       | I <sub>DSS</sub>    | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V   | -    | -    | -1.0 | 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> =-10A,<br>V <sub>GS</sub> =-4.5V(Notes 1,2)                      | -    | 27   | -    | nC    |
| Gate-Source Charge                                    | Q <sub>gs</sub>     |  | -    | 8.4  | -    |       |
| Gate-Drain Charge                                     | Q <sub>gd</sub>     |  | -    | 8.7  | -    |       |
| Input Capacitance                                     | C <sub>iss</sub>    | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V,<br>f=1.0MHZ  | -    | 3228 | -    | pF    |
| Output Capacitance                                    | C <sub>oss</sub>    |  | -    | 396  | -    |       |
| Reverse Transfer Capacitance                          | C <sub>rss</sub>    |  | -    | 254  | -    |       |
| Turn-On Delay Time                                    | t <sub>d(on)</sub>  | V <sub>DS</sub> =-15V, I <sub>D</sub> =-1A,<br>V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω<br>(Note 1,2) | -    | 10   | -    | ns    |
| Turn-On Rise Time                                     | t <sub>r</sub>      |  | -    | 13   | -    |       |
| Turn-Off Delay Time                                   | t <sub>d(off)</sub> |  | -    | 111  | -    |       |
| Turn-Off Fall Time                                    | t <sub>f</sub>      |  | -    | 51   | -    |       |
| <b>Drain-Source Diode</b>                             |                     |  |      |      |      |       |
| Maximum Continuous Drain-Source Diode Forward Current | I <sub>S</sub>      | ---  | -    | -    | -50  | A     |
| Diode Forward Voltage                                 | V <sub>SD</sub>     | I <sub>S</sub> =-1A, V <sub>GS</sub> =0V   | -    | -0.7 | -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.



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## TYPICAL CHARACTERISTIC CURVES

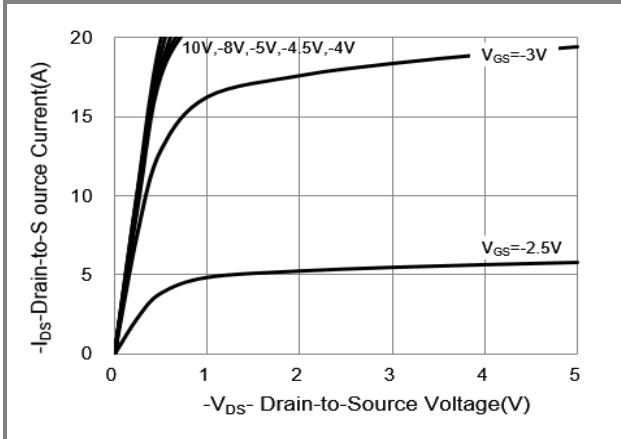


Fig.1 On-Region Characteristics

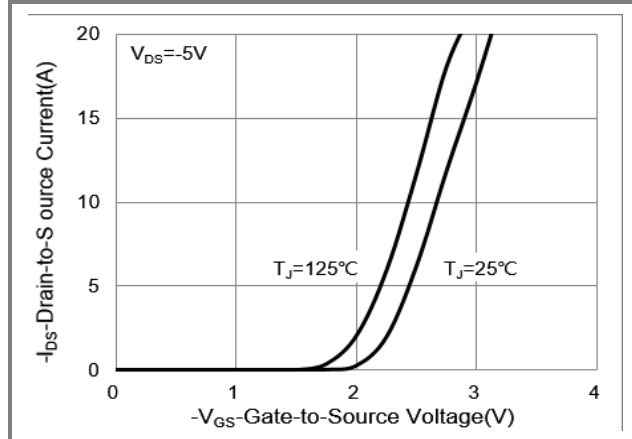


Fig.2 Transfer Characteristics

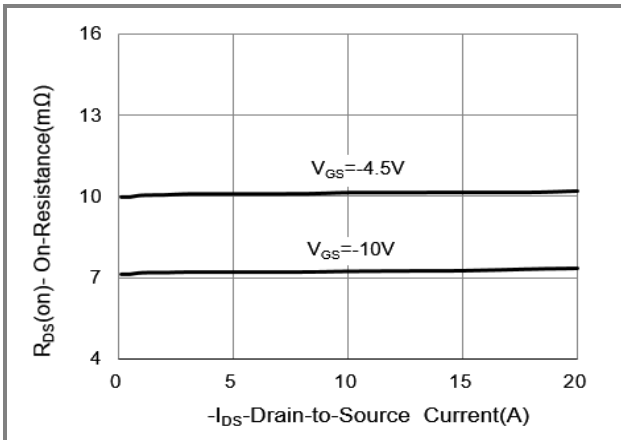


Fig.3 On-Resistance vs. Drain Current

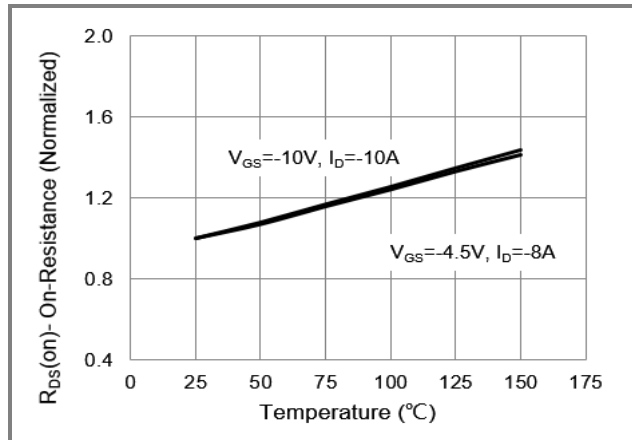


Fig.4 On-Resistance vs. Junction temperature

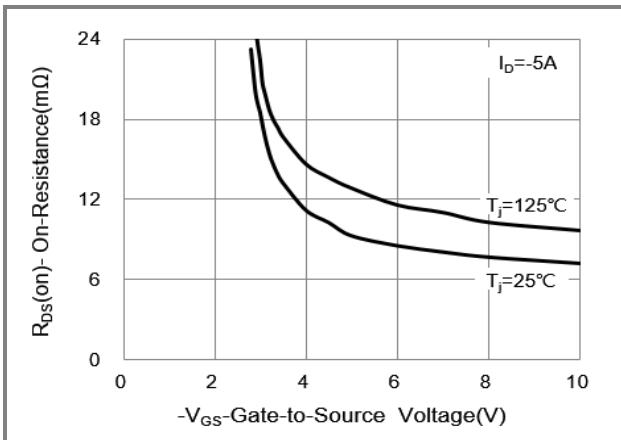


Fig.5 On-Resistance Variation with V\_GS.

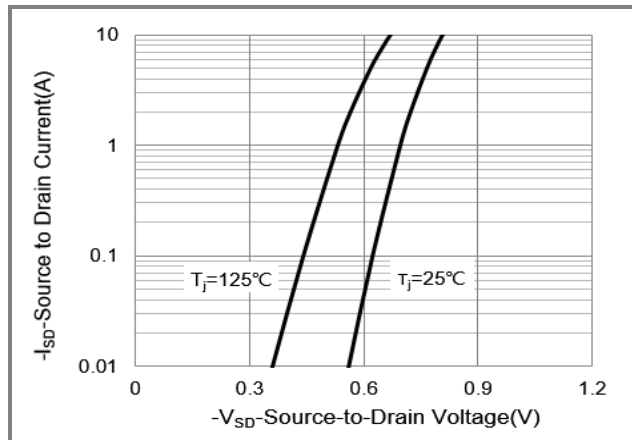


Fig.6 Source-Drain Diode Forward Voltage



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## TYPICAL CHARACTERISTIC CURVES

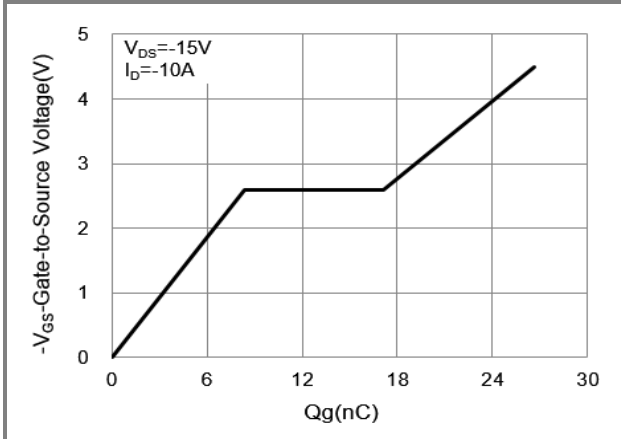


Fig.7 Gate-Charge Characteristics

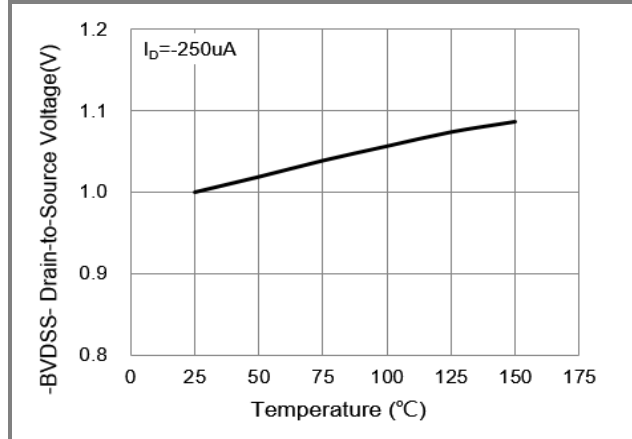


Fig.8 Breakdown Voltage Variation vs. Temperature.

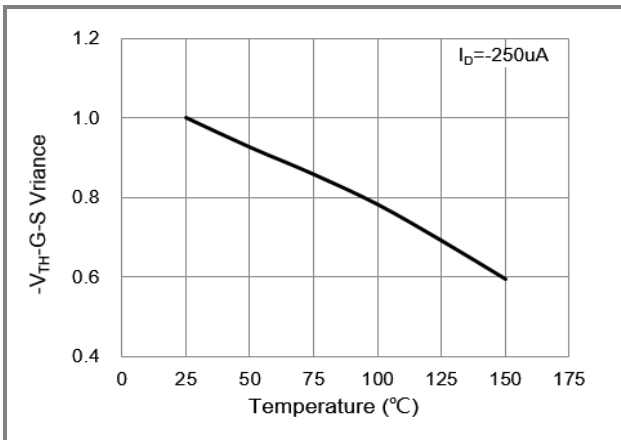


Fig.9 Threshold Voltage Variation with Temperature

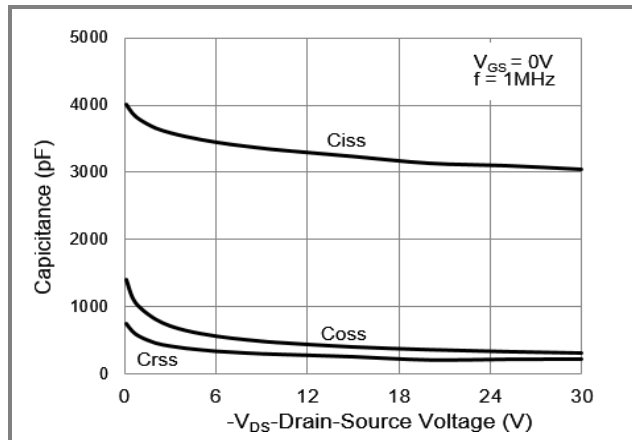


Fig.10 Capacitance vs. Drain-Source Voltage

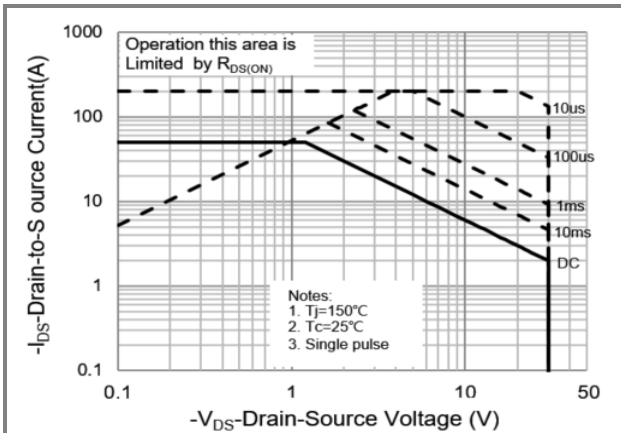


Fig.11 Maximum Safe Operating Area



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## TYPICAL CHARACTERISTIC CURVES

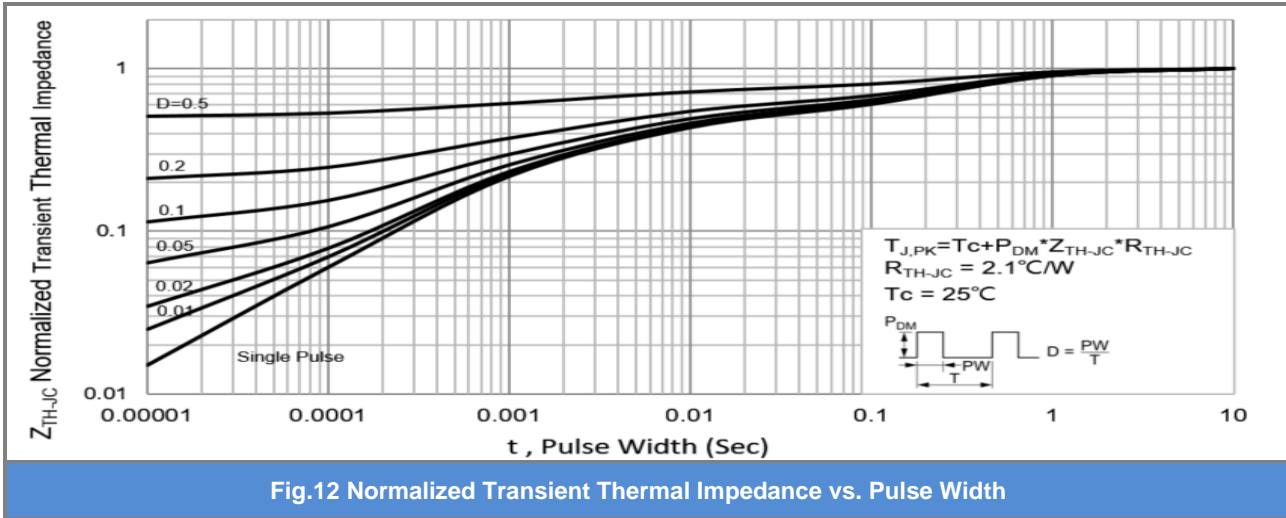


Fig.12 Normalized Transient Thermal Impedance vs. Pulse Width

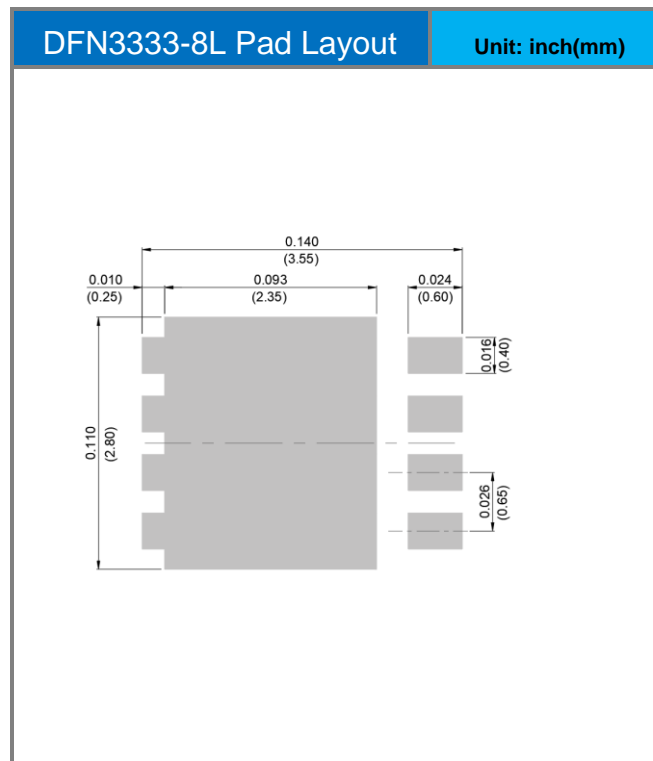
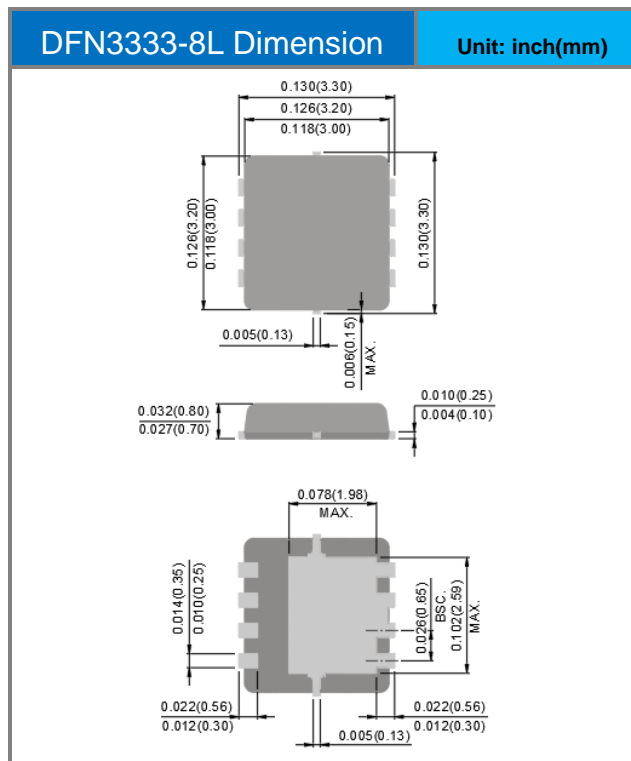


# PJQ4401P

Part No. Packing Code Version

| Part No. Packing Code | Package Type | Packing Type      | Marking | Version                        |
|-----------------------|--------------|-------------------|---------|--------------------------------|
| PJQ4401P_R2_00001     | DFN3333-8L   | 5K pcs / 13" reel | 4401    | Halogen free<br>RoHS compliant |

## Packaging Information & Mounting Pad Layout





## PJQ4401P

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