



# PJQ4411P

## 20V P-Channel Enhancement Mode MOSFET

**Voltage**

**-20 V**

**Current**

**-60 A**

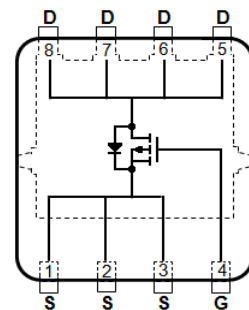
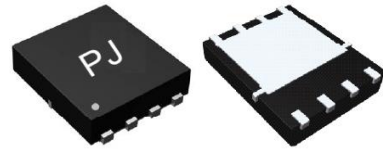
### Features

- $R_{DS(ON)}$ ,  $V_{GS}@-4.5V, I_D@-8A < 8m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@-2.5V, I_D@-5A < 11m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@-1.8V, I_D@-3A < 16m\Omega$
- Advanced Trench Process Technology.
- High density cell design for ultra-low on-resistance.
- 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                             |                         | $V_{DS}$        | -20     | V                  |
| Gate-Source Voltage                              |                         | $V_{GS}$        | +12     |                    |
| Continuous Drain Current                         | $T_C=25^\circ\text{C}$  | $I_D$           | -60     | A                  |
|                                                  | $T_C=100^\circ\text{C}$ |                 | -38     |                    |
| Pulsed Drain Current <sup>(Note 1,4)</sup>       |                         | $I_{DM}$        | -200    |                    |
| Power Dissipation                                | $T_C=25^\circ\text{C}$  | $P_D$           | 60      | W                  |
|                                                  | $T_C=100^\circ\text{C}$ |                 | 24      |                    |
| Continuous Drain Current                         | $T_A=25^\circ\text{C}$  | $I_D$           | -13     | A                  |
|                                                  | $T_A=70^\circ\text{C}$  |                 | -10     |                    |
| 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                                                              | -20  | -    | -    | V     |
| Gate Threshold Voltage                                | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA                                                | -0.3 | -0.6 | -1.0 |       |
| Drain-Source On-State Resistance                      | R <sub>DS(on)</sub> | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-8A                                                              | -    | 6    | 8    | mΩ    |
|                                                       |                     | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-5A                                                              | -    | 8    | 11   |       |
|                                                       |                     | V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-3A                                                              | -    | 11   | 16   |       |
| Zero Gate Voltage Drain Current                       | I <sub>DSS</sub>    | V <sub>DS</sub> =-20V, V <sub>GS</sub> =0V                                                               | -    | -    | -1.0 | uA    |
| Gate-Source Leakage Current                           | I <sub>GSS</sub>    | V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V                                                               | -    | -    | ±100 | nA    |
| <b>Dynamic</b> (Note 6)                               |                     |                                                                                                          |      |      |      |       |
| Total Gate Charge                                     | Q <sub>g</sub>      | V <sub>DS</sub> =-10V, I <sub>D</sub> =-5A,<br>V <sub>GS</sub> =-4.5V (Note 1,2)                         | -    | 46.8 | -    | nC    |
| Gate-Source Charge                                    | Q <sub>gs</sub>     |                                                                                                          | -    | 7.4  | -    |       |
| Gate-Drain Charge                                     | Q <sub>gd</sub>     |                                                                                                          | -    | 11.1 | -    |       |
| Input Capacitance                                     | C <sub>iss</sub>    | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V,<br>f=1.0MHZ                                                  | -    | 4659 | -    | pF    |
| Output Capacitance                                    | C <sub>oss</sub>    |                                                                                                          | -    | 539  | -    |       |
| Reverse Transfer Capacitance                          | C <sub>rss</sub>    |                                                                                                          | -    | 440  | -    |       |
| Turn-On Delay Time                                    | t <sub>d(on)</sub>  | V <sub>DS</sub> =-10V, I <sub>D</sub> =-1A,<br>V <sub>GS</sub> =-4.5V, R <sub>G</sub> =25Ω<br>(Note 1,2) | -    | 42   | -    | ns    |
| Turn-On Rise Time                                     | t <sub>r</sub>      |                                                                                                          | -    | 78   | -    |       |
| Turn-Off Delay Time                                   | t <sub>d(off)</sub> |                                                                                                          | -    | 510  | -    |       |
| Turn-Off Fall Time                                    | t <sub>f</sub>      |                                                                                                          | -    | 265  | -    |       |
| <b>Drain-Source Diode</b>                             |                     |                                                                                                          |      |      |      |       |
| Maximum Continuous Drain-Source Diode Forward Current | I <sub>S</sub>      | ---                                                                                                      | -    | -    | -60  | 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.



# PJQ4411P

## TYPICAL CHARACTERISTIC CURVES

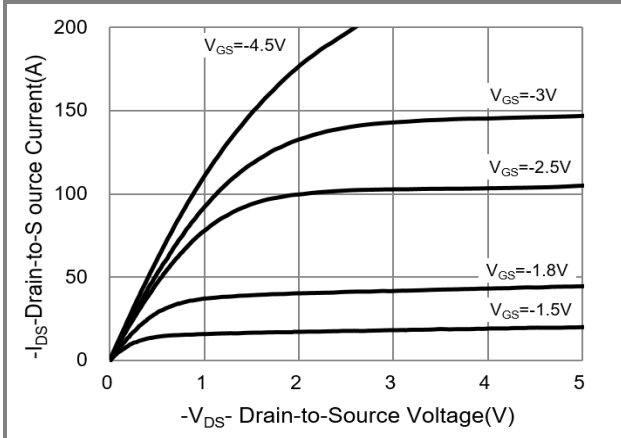


Fig.1 On-Region Characteristics

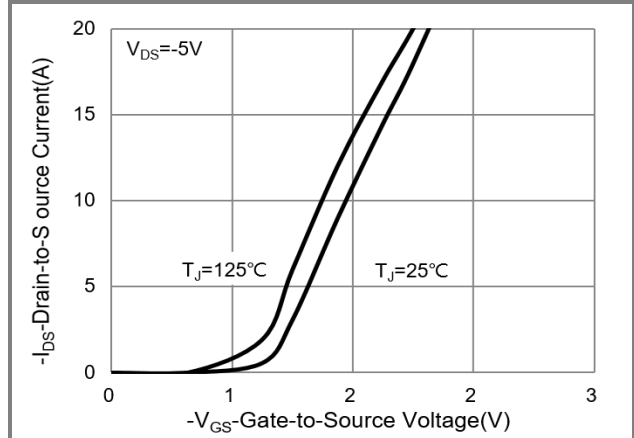


Fig.2 Transfer Characteristics

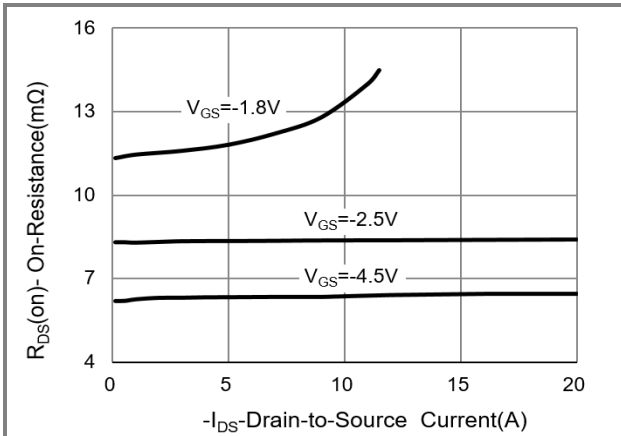


Fig.3 On-Resistance vs. Drain Current

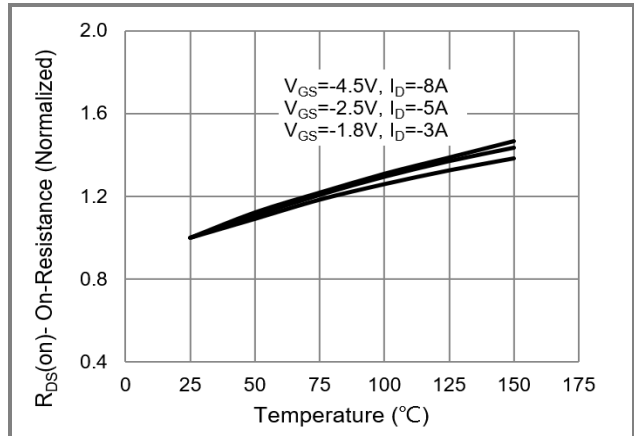


Fig.4 On-Resistance vs. Junction temperature

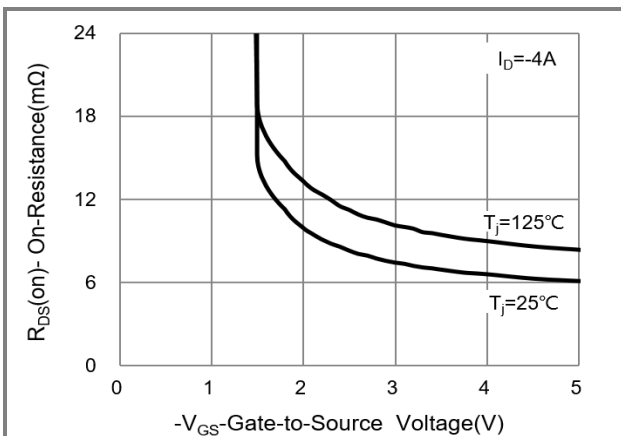


Fig.5 On-Resistance Variation with  $V_{GS}$ .

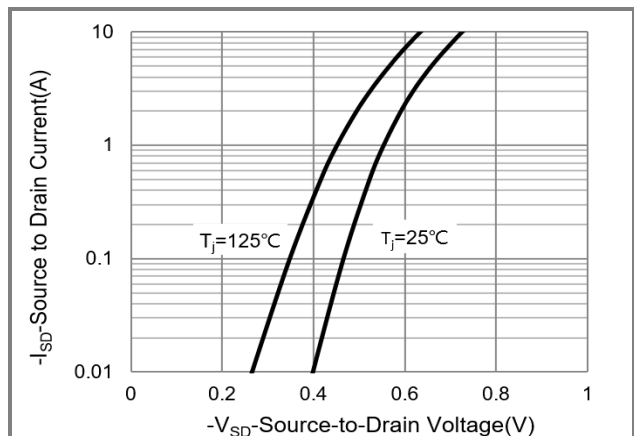


Fig.6 Source-Drain Diode Forward Voltage



# PJQ4411P

## TYPICAL CHARACTERISTIC CURVES

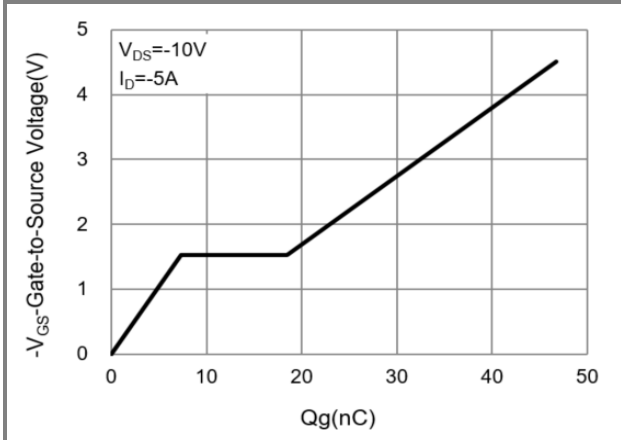


Fig.7 Gate-Charge Characteristics

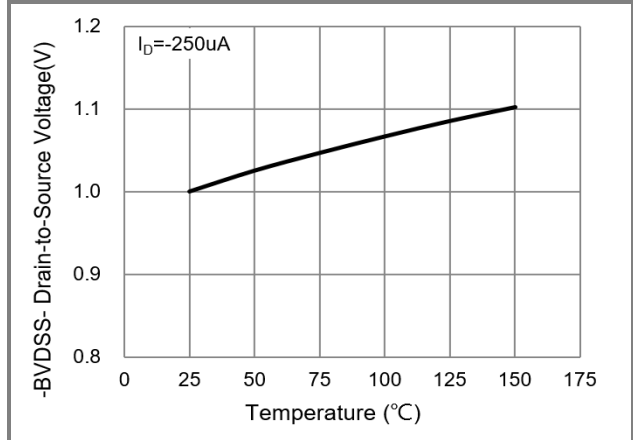


Fig.8 Breakdown Voltage Variation vs. Temperature.

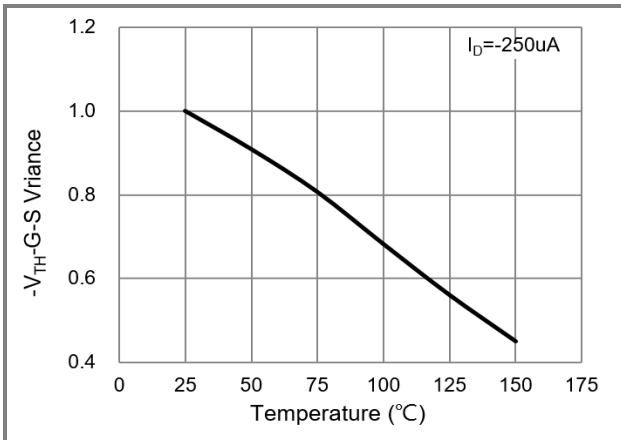


Fig.9 Threshold Voltage Variation with Temperature

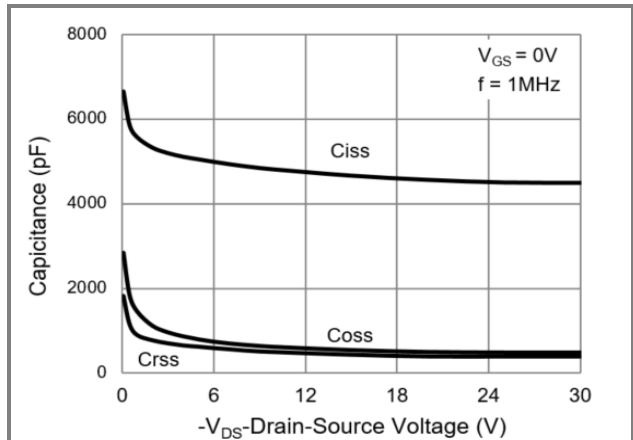


Fig.10 Capacitance vs. Drain-Source Voltage

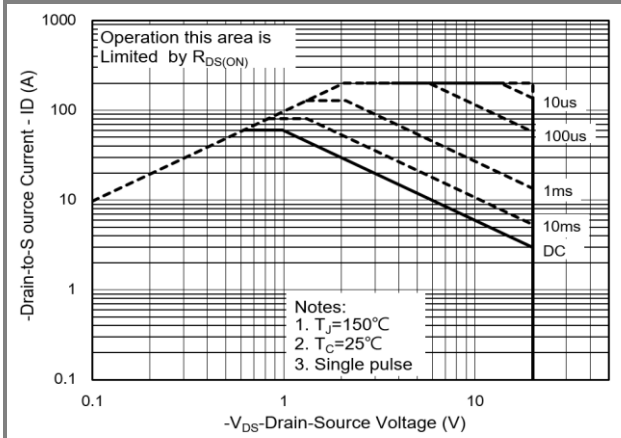


Fig.11 Maximum Safe Operating Area



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## TYPICAL CHARACTERISTIC CURVES

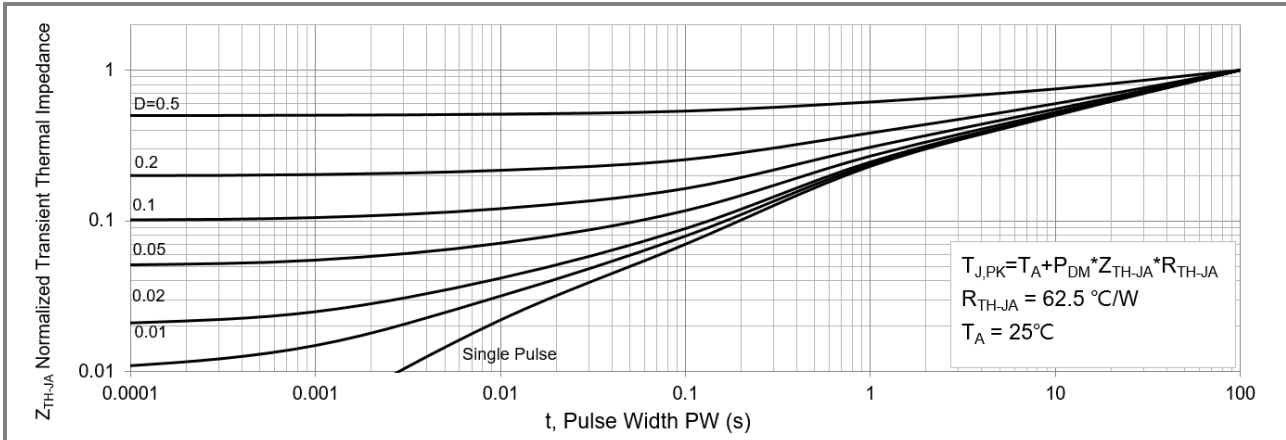


Fig.12 Normalized Transient Thermal Impedance vs. Pulse Width

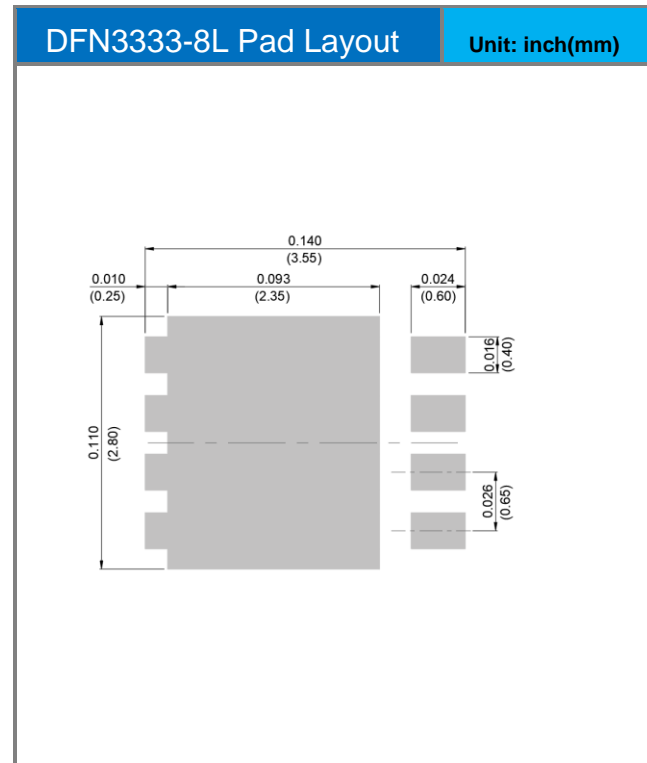
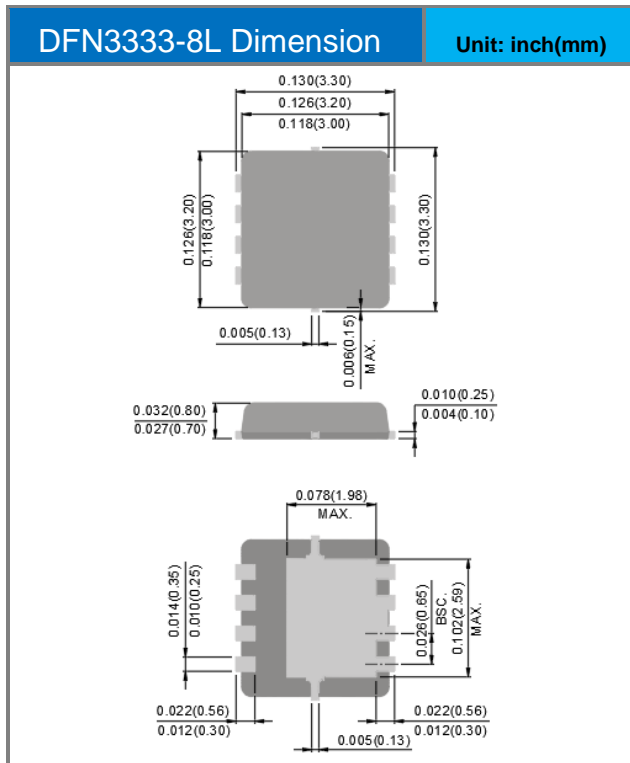


# PJQ4411P

## Part No. Packing Code Version

| Part No. Packing Code | Package Type | Packing Type      | Marking | Version                        |
|-----------------------|--------------|-------------------|---------|--------------------------------|
| PJQ4411P_R2_00001     | DFN3333-8L   | 5K pcs / 13" reel | 4411    | Halogen free<br>RoHS compliant |

## Packaging Information & Mounting Pad Layout





## PJQ4411P

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