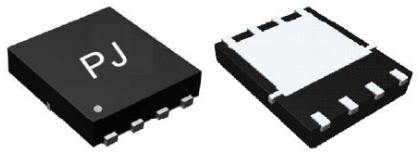
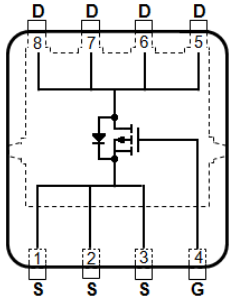
# PJQ4409P

## 30V P-Channel Enhancement Mode MOSFET

| Voltage | -30 V | Current | -24 A |
|---|---|---|---|

**DFN3333-8L**




### Features

- $R_{DS(ON)}$, $V_{GS}$@-10V,$I_D$@-4A<30mΩ
- $R_{DS(ON)}$, $V_{GS}$@-4.5V,$I_D$@-2A<45mΩ
- 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

### Maximum Ratings and Thermal Characteristics ($T_A$=25°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°C | $I_D$ | -24 | A |
| | $T_C$=100°C | | -15 | |
| Pulsed Drain Current (Note 1) | $T_C$=25°C | $I_{DM}$ | -50 | |
| Power Dissipation | $T_C$=25°C | $P_D$ | 30 | W |
| | $T_C$=100°C | | 12 | |
| Continuous Drain Current | $T_A$=25°C | $I_D$ | -6.5 | A |
| | $T_A$=70°C | | -5.0 | |
| Power Dissipation | $T_A$=25°C | $P_D$ | 2.0 | W |
| Power Dissipation | $T_A$=70°C | | 1.3 | |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55~150 | °C |
| Typical Thermal Resistance (Note 4,5) | Junction to Case | $R_{\theta JC}$ | 4.2 | °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°C unless otherwise noted)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V,$I_D$=-250uA | -30 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=-250uA | -1.0 | -1.6 | -2.5 | |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=-10V,$I_D$=-4A | - | 26 | 30 | mΩ |
| | | $V_{GS}$=-4.5V,$I_D$=-2A | - | 36 | 45 | |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-30V,$V_{GS}$=0V | - | - | -1.0 | uA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V,$V_{DS}$=0V | - | - | ±100 | nA |
| **Dynamic** (Note 6) | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-15V, $I_D$=-5A, $V_{GS}$=-4.5V (Note 1,2) | - | 7.8 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 2.7 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 2.8 | - | |
| Input Capacitance | Ciss | $V_{DS}$=-15V, $V_{GS}$=0V, f=1.0MHZ | - | 870 | - | pF |
| Output Capacitance | Coss | | - | 130 | - | |
| Reverse Transfer Capacitance | Crss | | - | 93 | - | |
| Turn-On Delay Time | $td_{(on)}$ | $V_{DS}$=-15V,ID=-1A, $V_{GS}$=-10V, $R_G$=6Ω (Note 1,2) | - | 6.5 | - | ns |
| Turn-On Rise Time | $t_r$ | | - | 8.8 | - | |
| Turn-Off Delay Time | $td_{(off)}$ | | - | 73 | - | |
| Turn-Off Fall Time | $t_f$ | | - | 44 | - | |
| **Drain-Source Diode** | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$ | --- | - | - | -24 | A |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=-1A,$V_{GS}$=0V | - | -0.75 | -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 $T_{J(MAX)}$=150°C. Ratings are based on low frequency and duty cycles to keep initial $T_J$ =25°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 $inch^2$ with 2oz.square pad of copper
6. Guaranteed by design, not subject to production testing.

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## TYPICAL CHARACTERISTIC CURVES

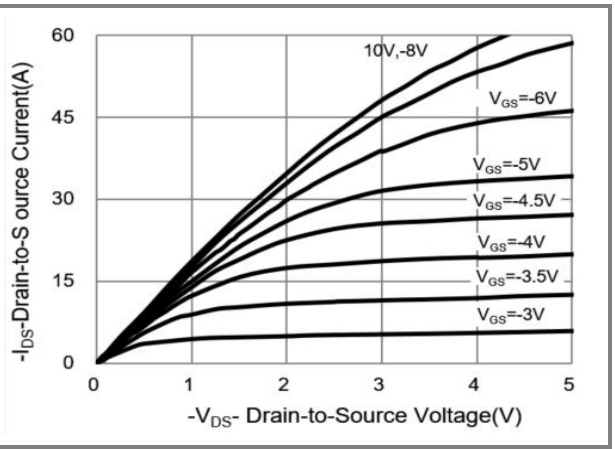


Fig.1 On-Region Characteristics

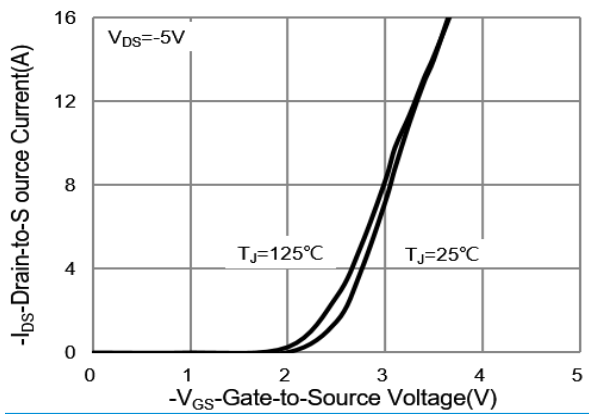


Fig.2 Transfer Characteristics

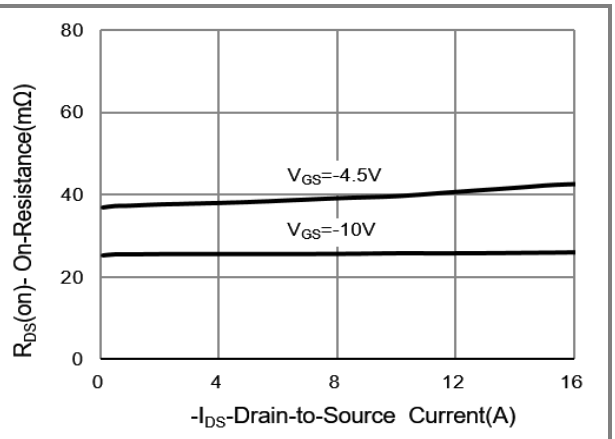


Fig.3 On-Resistance vs. Drain Current

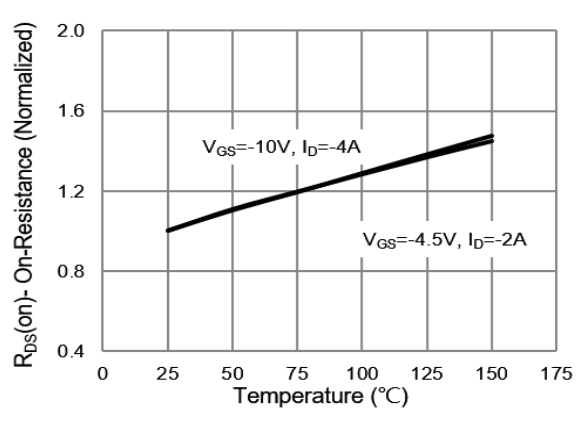


Fig.4 On-Resistance vs. Junction temperature

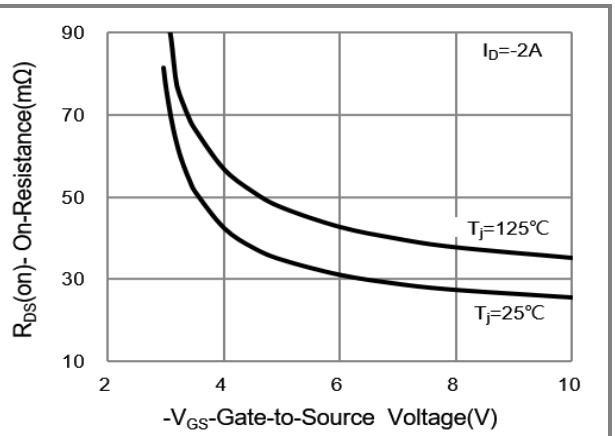


Fig.5 On-Resistance Variation with VGS.

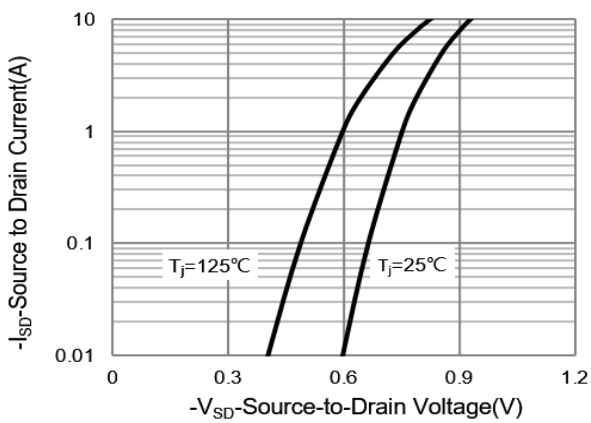


Fig.6 Source-Drain Diode Forward Voltage

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## TYPICAL CHARACTERISTIC CURVES

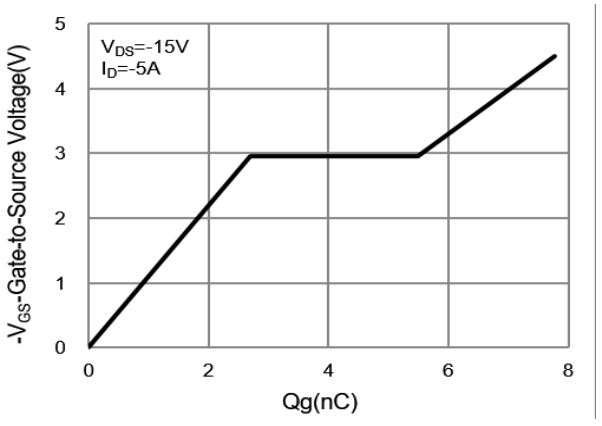


Fig.7 Gate-Charge Characteristics

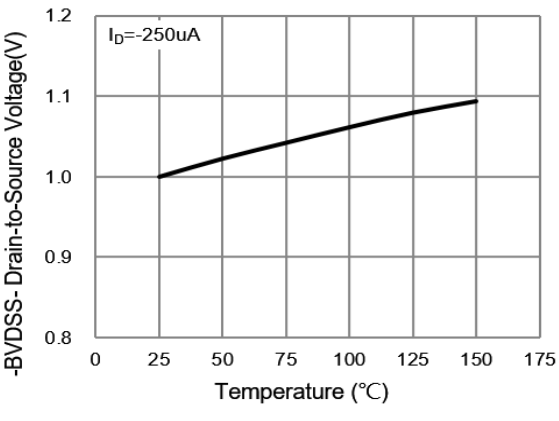


Fig.8 Breakdown Voltage Variation vs. Temperature.

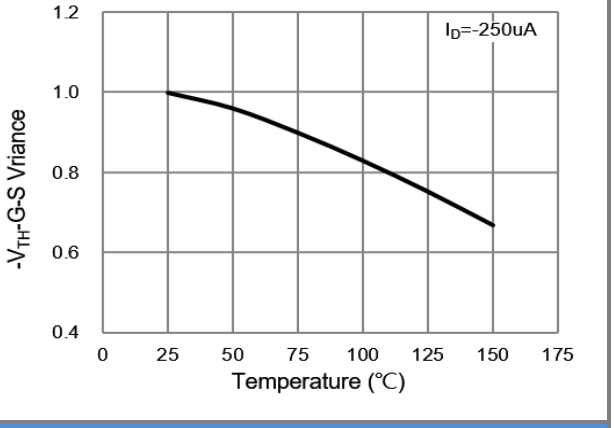


Fig.9 Threshold Voltage Variation with Temperature

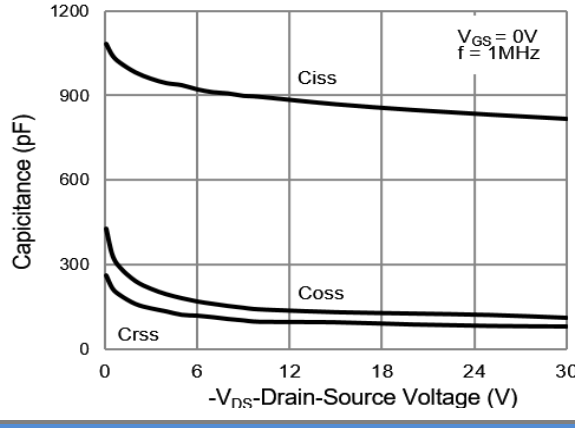


Fig.10 Capacitance vs. Drain-Source Voltage

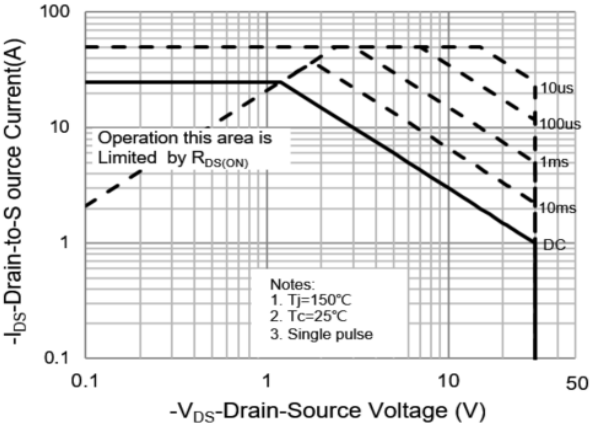


Fig.11 Maximum Safe Operating Area

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## TYPICAL CHARACTERISTIC CURVES

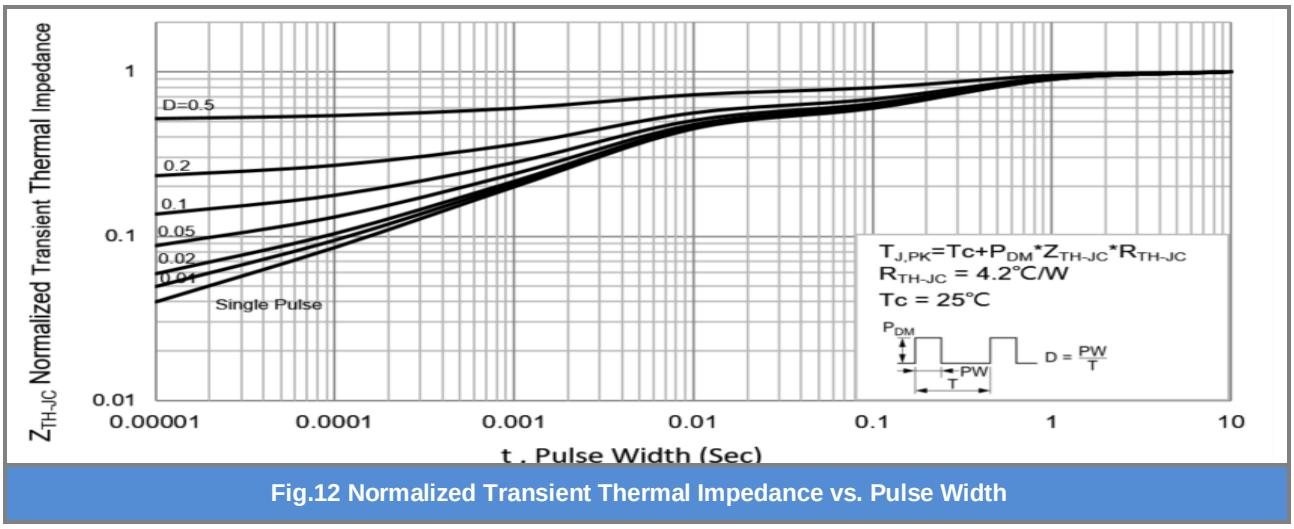


Fig.12 Normalized Transient Thermal Impedance vs. Pulse Width

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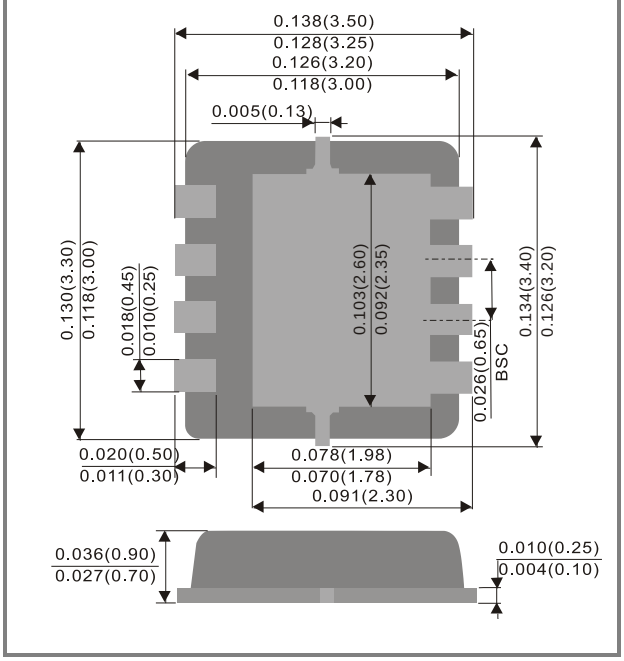
## Part No Packing Code Version

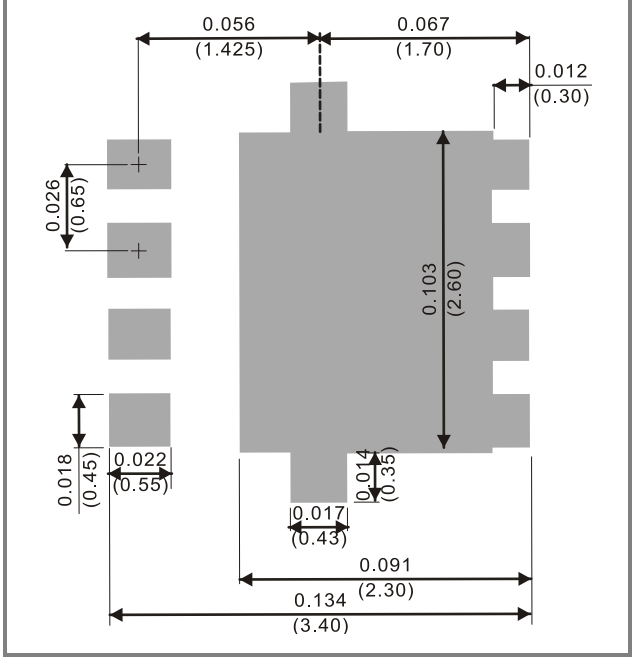
| Part No Packing Code | Package Type | Packing Type | Marking | Version |
|---|---|---|---|---|
| PJQ4409P_R2_00001 | DFN3333-8L | 5K pcs / 13” reel | 4409 | Halogen free |

## Packaging Information & Mounting Pad Layout

DFN3333-8L Dimension — Unit: inch(mm)




DFN3333-8L Pad Layout — Unit: inch(mm)



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