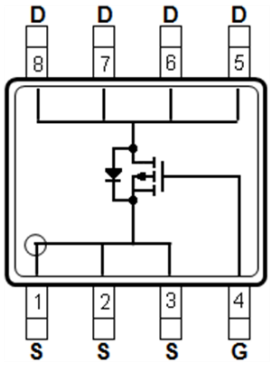
# PJL9413

## 30V P-Channel Enhancement Mode MOSFET

| Voltage | -30 V | Current | -10A |
|---|---|---|---|

SOP-8






### Features

- $R_{DS(ON)}$ , $V_{GS}$@-10V, $I_D$@-10A<15.5mΩ
- $R_{DS(ON)}$ , $V_{GS}$@-4.5V, $I_D$@-6A<23mΩ
- 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: SOP-8 package
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.0029 ounces, 0.083 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 | $T_A$=25°C | $I_D$ | -10 | A |
| | $T_A$=70°C | | -8 | |
| Pulsed Drain Current (Note 1) | | $I_{DM}$ | -40 | |
| Power Dissipation | $T_A$=25°C | $P_D$ | 1.7 | W |
| | $T_A$=70°C | | 1.1 | |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55~150 | °C |
| Typical Thermal Resistance<br>- Junction to Ambient (Note 5) | | $R_{\theta JA}$ | 73.5 | °C/W |

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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,$I_D$=-10A | - | 12 | 15.5 | mΩ |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=-4.5V,$I_D$=-6A | - | 19 | 23 | |
| 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, $I_D$=-8A, $V_{GS}$=-4.5V(Note 1,2) | - | 14 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 4.6 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 5.4 | - | |
| Input Capacitance | Ciss | $V_{DS}$=-15V, $V_{GS}$=0V, f=1.0MHZ | - | 1556 | - | pF |
| Output Capacitance | Coss | | - | 243 | - | |
| Reverse Transfer Capacitance | Crss | | - | 175 | - | |
| Turn-On Delay Time | $td_{(on)}$ | $V_{DD}$=-15V, $I_D$=-1A, $V_{GS}$=-10V, $R_G$=6Ω (Note 1,2) | - | 7.3 | - | ns |
| Turn-On Rise Time | tr | | - | 13 | - | |
| Turn-Off Delay Time | $td_{(off)}$ | | - | 88 | - | |
| Turn-Off Fall Time | tf | | - | 48 | - | |
| **Drain-Source Diode** | | | | | | |
| Maximum Continuous Drain-Source Diode Forward Current | $I_S$ | --- | - | - | -10 | A |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=-1A, $V_{GS}$=0V | - | -0.7 | -1.0 | V |

NOTES :

1. Pulse width≤300us, Duty cycle≤2%
2. Essentially independent of operating temperature typical characteristics.
3. The maximum current rating is package limited.
4. 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.
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

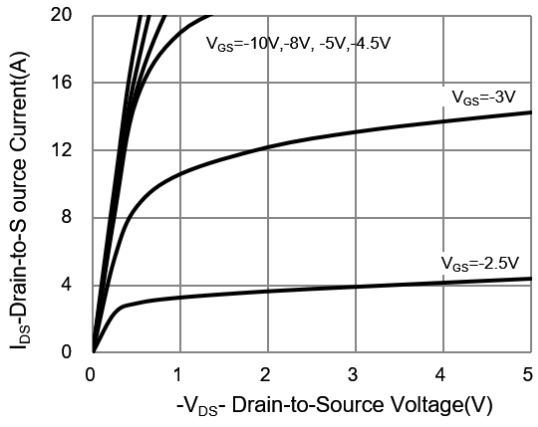


Fig.1 On-Region Characteristics

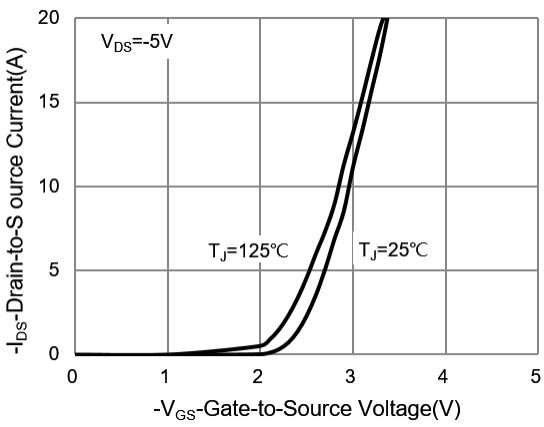


Fig.2 Transfer Characteristics

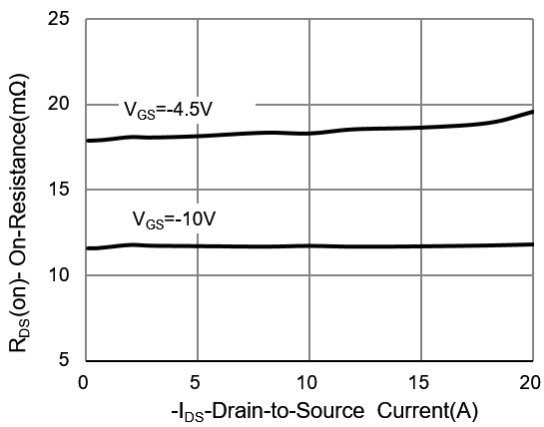


Fig.3 On-Resistance vs. Drain Current

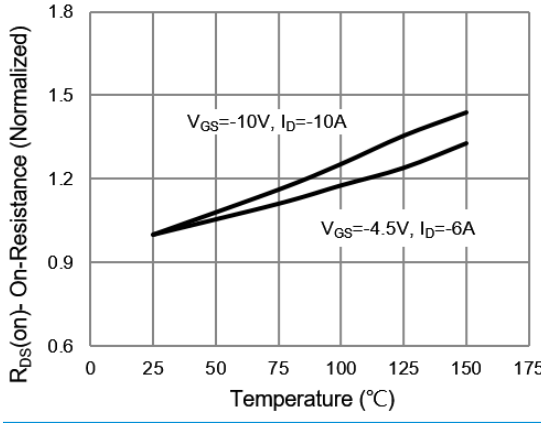


Fig.4 On-Resistance vs. Junction temperature

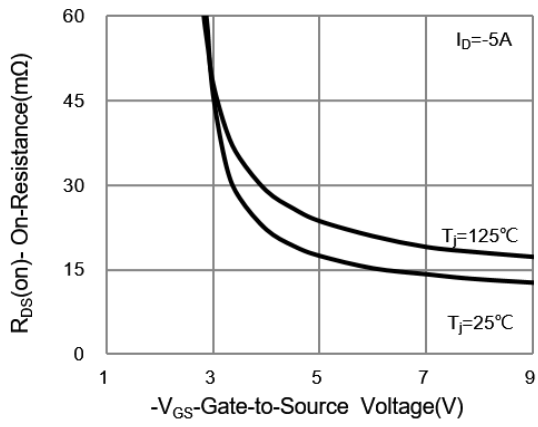


Fig.5 On-Resistance Variation with VGS.

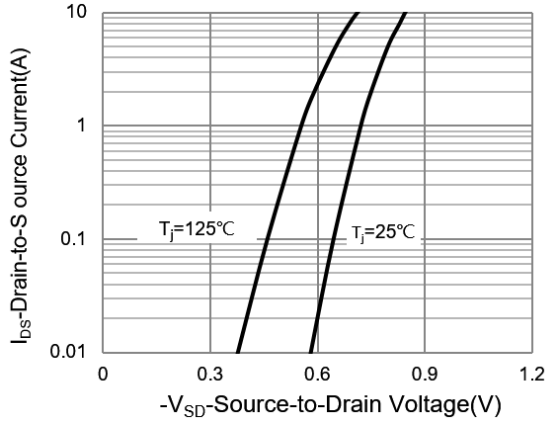


Fig.6 Body Diode Characteristics

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## TYPICAL CHARACTERISTIC CURVES

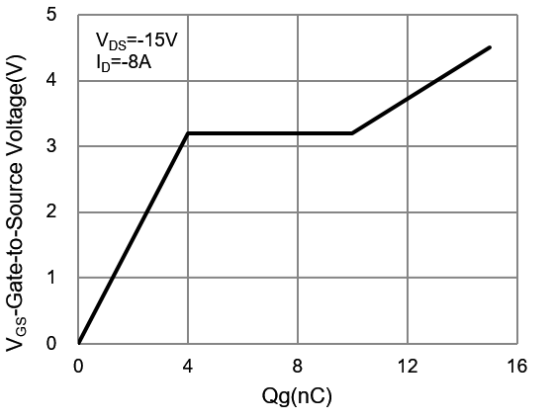



Fig.7 Gate-Charge Characteristics

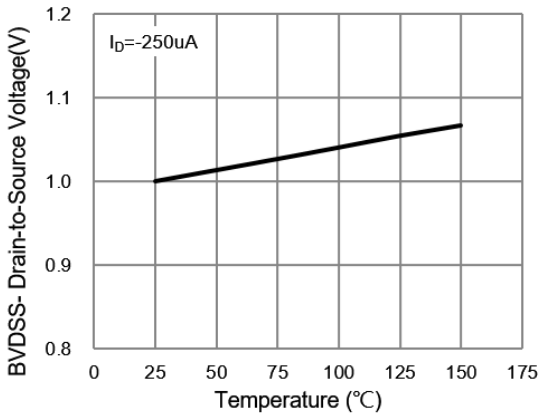



Fig.8 Breakdown Voltage Variation vs. Temperature

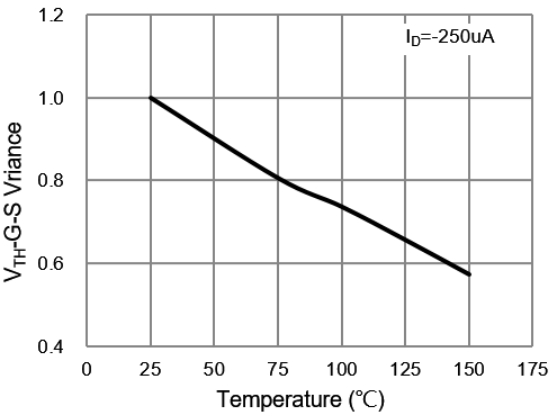



Fig.9 Threshold Voltage Variation with Temperature.

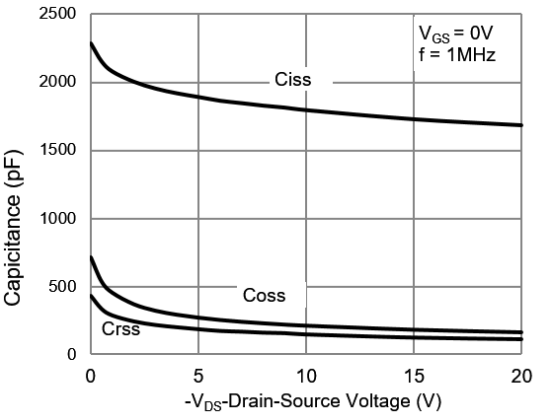



Fig.10 Capacitance vs. Drain-Source Voltage.

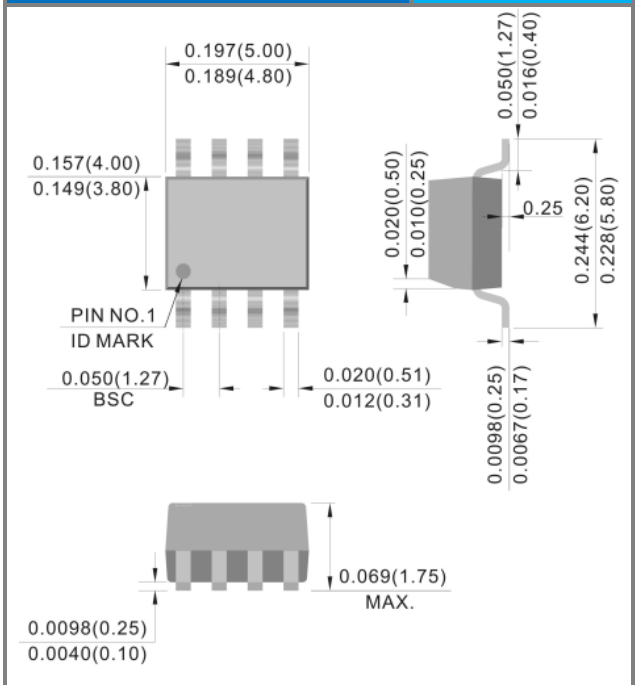
# PJL9413

## Part No Packing Code Version

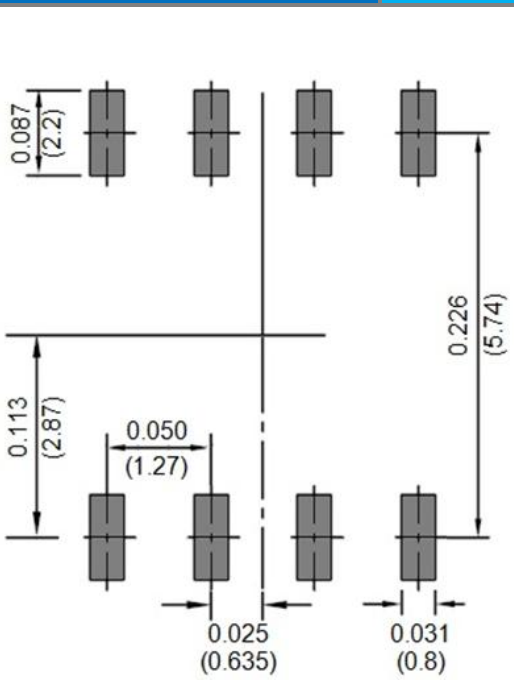
| Part No Packing Code | Package Type | Packing Type | Marking | Version |
|---|---|---|---|---|
| PJL9413_R2_00001 | SOP-8 | 2.5K pcs / 13” reel | L9413 | Halogen free |

## Packaging Information & Mounting Pad Layout

SOP-8 Dimension — Unit: inch(mm)




SOP-8 Pad Layout — Unit: inch(mm)



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