

# PJA3414

## 20V N-Channel Enhancement Mode MOSFET

**Voltage**

**20 V**

**Current**

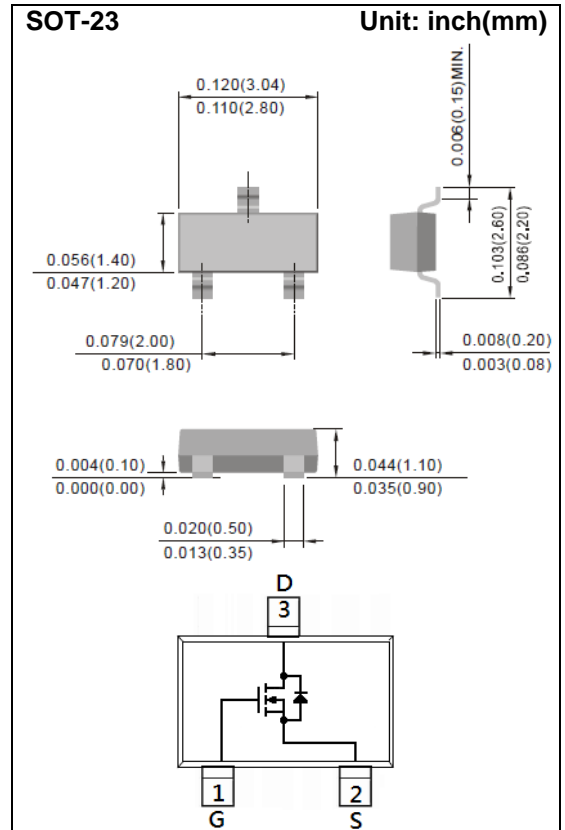
**5.2A**

### Features

- $R_{DS(ON)}$  ,  $V_{GS}@4.5V$  ,  $I_D@5.2A < 36m\Omega$
- $R_{DS(ON)}$  ,  $V_{GS}@2.5V$  ,  $I_D@3.2A < 52m\Omega$
- $R_{DS(ON)}$  ,  $V_{GS}@1.8V$  ,  $I_D@1.5A < 92m\Omega$
- Advanced Trench Process Technology
- Specially Designed for Switch Load, PWM Application, etc.
- Lead free in compliance with EU RoHS 2011/65/EU directive.
- Green molding compound as per IEC61249 Std. (Halogen Free)

### Mechanical Data

- Case : SOT-23 Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.0003 ounces, 0.0084 grams
- Marking : A14



### Maximum Ratings and Thermal Characteristics ( $T_A=25^\circ C$ unless otherwise noted)

| PARAMETER  | SYMBOL          | LIMIT                     | UNITS        |                |
|--|-----------------|---------------------------|--------------|----------------|
| Drain-Source Voltage                             | $V_{DS}$        | 20                        | V            |                |
| Gate-Source Voltage                              | $V_{GS}$        | $\pm 12$                  | V            |                |
| Continuous Drain Current                         | $I_D$           | 5.2                       | A            |                |
| Pulsed Drain Current                             | $I_{DM}$        | 20.8                      | A            |                |
| Power Dissipation                                | $P_D$           | $T_a=25^\circ C$          | 1.25         | W              |
|  |                 | Derate above $25^\circ C$ | 10           | mW/ $^\circ C$ |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$  | -55~150                   | $^\circ C$   |                |
| Typical Thermal Resistance                       | $R_{\theta JA}$ | 100                       | $^\circ C/W$ |                |
| - Junction to Ambient <sup>(Note 3)</sup>        |                 |                           |              |                |

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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  | 0.5  | 0.77 | 1.2  | V     |
| Drain-Source On-State Resistance                      | R <sub>DS(on)</sub> | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5.2A   | -    | 29   | 36   | mΩ    |
|   |                     | V <sub>GS</sub> =2.5V, I <sub>D</sub> =3.2A   | -    | 39   | 52   |       |
|   |                     | V <sub>GS</sub> =1.8V, I <sub>D</sub> =1.5A   | -    | 58   | 92   |       |
| Zero Gate Voltage Drain Current                       | I <sub>DSS</sub>    | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V   | -    | 0.01 | 1    | uA    |
| Gate-Source Leakage Current                           | I <sub>GSS</sub>    | V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V  | -    | ±10  | ±100 | nA    |
| <b>Dynamic</b>  |                     |   |      |      |      |       |
| Total Gate Charge                                     | Q <sub>g</sub>      | V <sub>DS</sub> =10V, I <sub>D</sub> =5.2A,<br>V <sub>GS</sub> =4.5V <sup>(Note 1,2)</sup>                        | -    | 4.1  | -    | nC    |
| Gate-Source Charge                                    | Q <sub>gs</sub>     |   | -    | 1.1  | -    |       |
| Gate-Drain Charge                                     | Q <sub>gd</sub>     |   | -    | 0.7  | -    |       |
| Input Capacitance                                     | C <sub>iss</sub>    | V <sub>DS</sub> =10V, V <sub>GS</sub> =0V,<br>f=1.0MHZ  | -    | 396  | -    | pF    |
| Output Capacitance                                    | C <sub>oss</sub>    |   | -    | 54   | -    |       |
| Reverse Transfer Capacitance                          | C <sub>rss</sub>    |   | -    | 40   | -    |       |
| <b>Switching</b>                                      |                     |   |      |      |      |       |
| Turn-On Delay Time                                    | t <sub>d(on)</sub>  | V <sub>DD</sub> =10V, I <sub>D</sub> =5.2A,<br>V <sub>GS</sub> =4.5V,<br>R <sub>G</sub> =6Ω <sup>(Note 1,2)</sup> | -    | 14   | -    | ns    |
| Turn-On Rise Time                                     | t <sub>r</sub>      |   | -    | 10   | -    |       |
| Turn-Off Delay Time                                   | t <sub>d(off)</sub> |   | -    | 30   | -    |       |
| Turn-Off Fall Time                                    | t <sub>f</sub>      |   | -    | 7    | -    |       |
| <b>Drain-Source Diode</b>                             |                     |   |      |      |      |       |
| Maximum Continuous Drain-Source Diode Forward Current | I <sub>S</sub>      | ---   | -    | -    | 1.5  | A     |
| Diode Forward Voltage                                 | V <sub>SD</sub>     | I <sub>S</sub> =1.0A, V <sub>GS</sub> =0V   | -    | 0.75 | 1.2  | V     |

NOTES :

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

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## TYPICAL CHARACTERISTIC CURVES

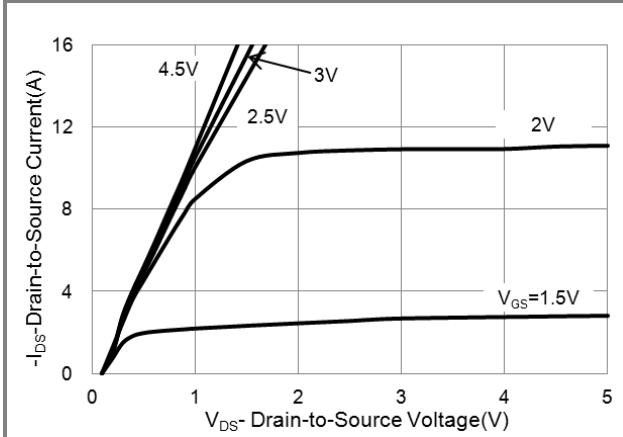


Fig.1 On-Region Characteristics

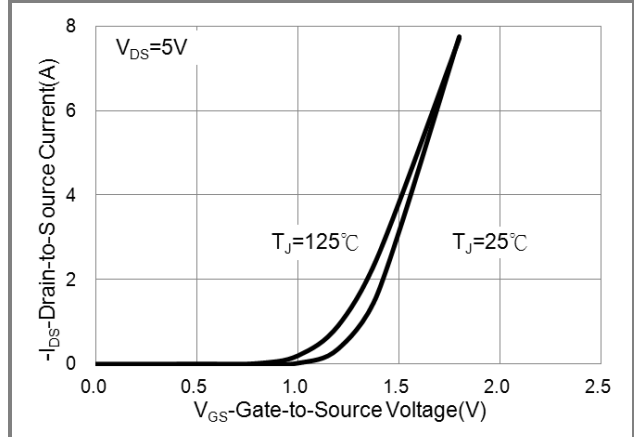


Fig.2 Transfer Characteristics

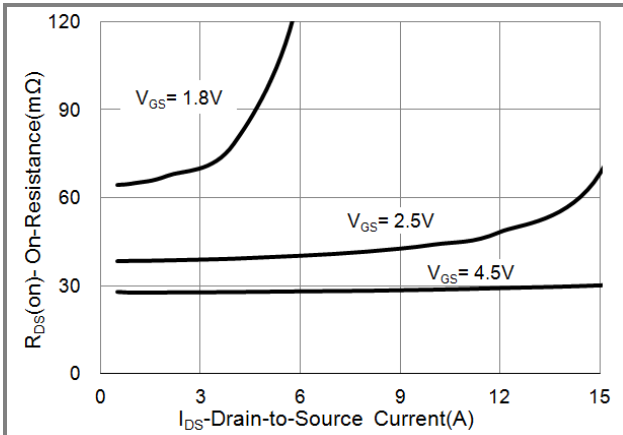


Fig.3 On-Resistance vs. Drain Current

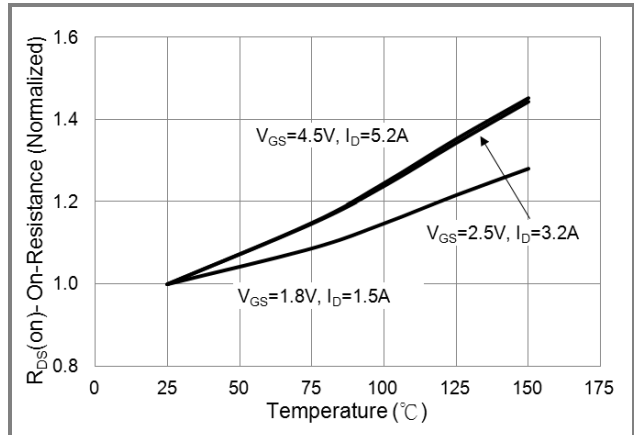


Fig.4 On-Resistance vs. Junction temperature

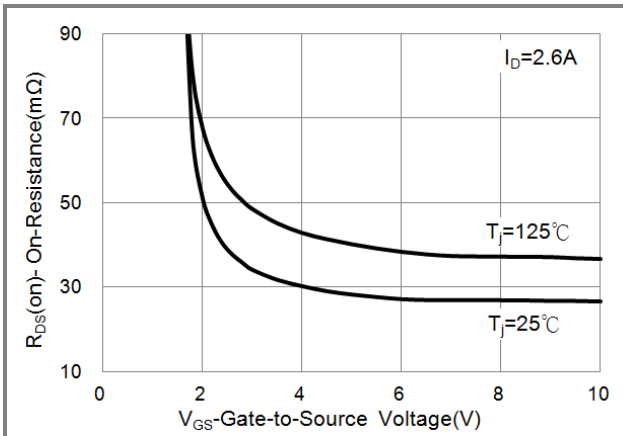


Fig.5 On-Resistance Variation with V\_GS.

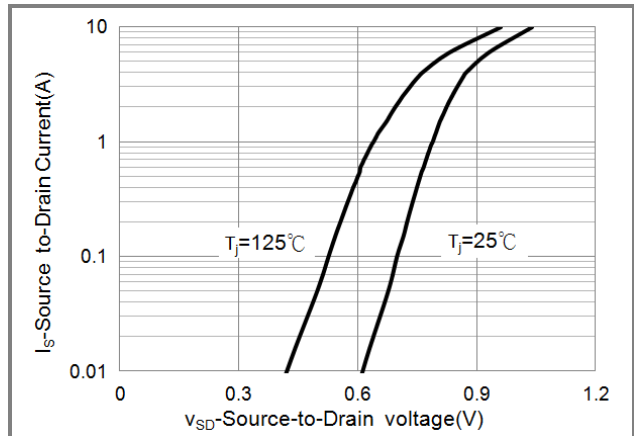


Fig.6 Body Diode Characteristics

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## TYPICAL CHARACTERISTIC CURVES

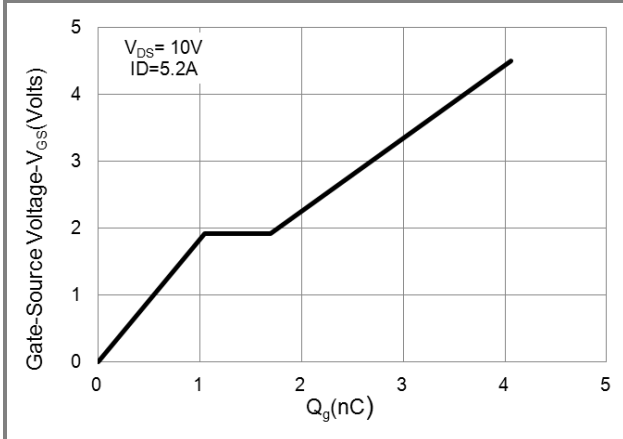


Fig.7 Gate-Charge Characteristics

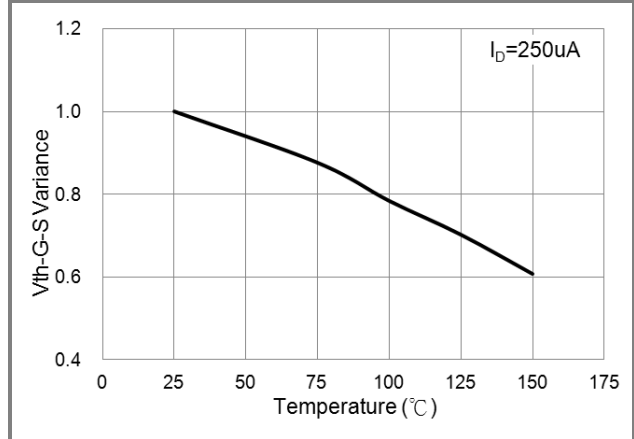


Fig.8 Threshold Voltage Variation with Temperature.

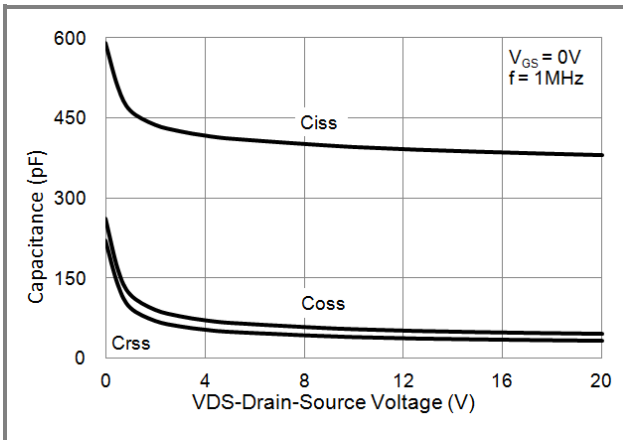


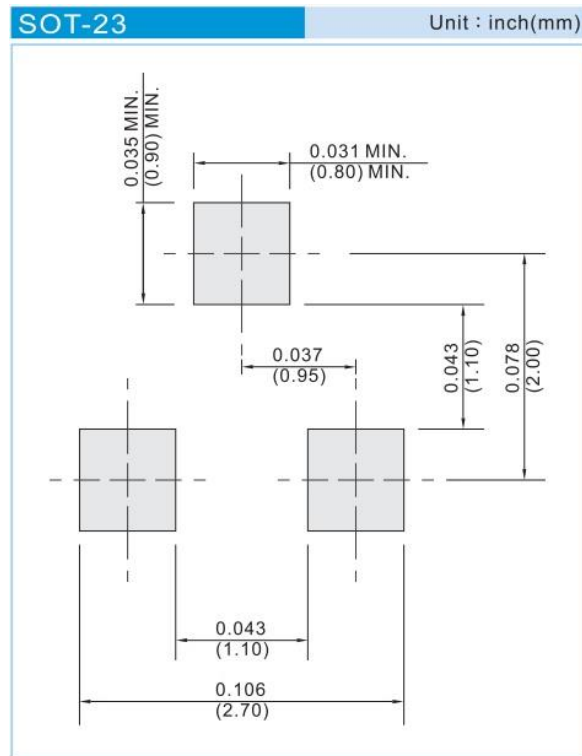
Fig.9 Capacitance vs. Drain-Source Voltage.

# PJA3414

## Product and Packing Information

| Part No. | Package Type | Packing Type     | Marking |
|----------|--------------|------------------|---------|
| PJA3414  | SOT-23       | 3K pcs / 7" reel | A14     |

## MOUNTING PAD LAYOUT



## PJA3414

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