

# PJQ4524S6P-AU

## 30V N-Channel Enhancement Mode MOSFET

**Voltage**

**30 V**

**Current**

**77 A**

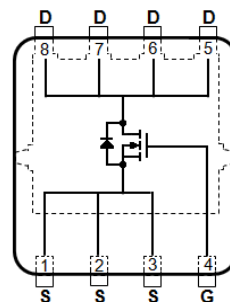
### Features

- $R_{DS(ON)}$ ,  $V_{GS}@10V$ ,  $I_D@10A < 4.6m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@4.5V$ ,  $I_D@6A < 7.3m\Omega$
- Excellent FOM
- Logic Level Drive
- AEC-Q101 qualified
- 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 : 0.03 grams

DFN3333-8L



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

| PARAMETER                                          |                     | SYMBOL          | LIMIT    | UNITS         |
|----------------------------------------------------|---------------------|-----------------|----------|---------------|
| Drain-Source Voltage                               |                     | $V_{DS}$        | 30       | V             |
| Gate-Source Voltage                                |                     | $V_{GS}$        | $\pm 20$ |               |
| Continuous Drain Current <sup>(Note 3)</sup>       | $T_C=25^{\circ}C$   | $I_D$           | 77       | A             |
|                                                    | $T_C=100^{\circ}C$  |                 | 55       |               |
| Pulsed Drain Current <sup>(Note 1)</sup>           | $T_C=25^{\circ}C$   | $I_{DM}$        | 270      |               |
| Power Dissipation                                  | $T_C=25^{\circ}C$   | $P_D$           | 49       | W             |
|                                                    | $T_C=100^{\circ}C$  |                 | 24       |               |
| Continuous Drain Current <sup>(Note 4)</sup>       | $T_A=25^{\circ}C$   | $I_D$           | 17.4     | A             |
|                                                    | $T_A=70^{\circ}C$   |                 | 14.5     |               |
| Power Dissipation                                  | $T_A=25^{\circ}C$   | $P_D$           | 2.5      | W             |
|                                                    | $T_A=70^{\circ}C$   |                 | 1.8      |               |
| Single Pulse Avalanche Current <sup>(Note 5)</sup> |                     | $I_{AS}$        | 10.5     | A             |
| Single Pulse Avalanche Energy <sup>(Note 5)</sup>  |                     | $E_{AS}$        | 50       | mJ            |
| Operating Junction and Storage Temperature Range   |                     | $T_J, T_{STG}$  | -55~175  | $^{\circ}C$   |
| Thermal Resistance <sup>(Note 4)</sup>             | Junction to Case    | $R_{\theta JC}$ | 3.05     | $^{\circ}C/W$ |
|                                                    | Junction to Ambient | $R_{\theta JA}$ | 60       |               |

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## Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)

| PARAMETER                        | SYMBOL              | TEST CONDITION                                                                                               | MIN. | TYP. | MAX. | UNITS |
|----------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------|------|------|------|-------|
| Static                           |                     |                                                                                                              |      |      |      |       |
| 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                                                     | 1.2  | 1.6  | 2.2  |       |
| Drain-Source On-State Resistance | R <sub>DS(on)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =10A                                                                    | -    | 3.6  | 4.6  | mΩ    |
|                                  |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =6A                                                                    | -    | 5.6  | 7.3  |       |
| Zero Gate Voltage Drain Current  | I <sub>DSS</sub>    | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V                                                                    | -    | -    | 1    | uA    |
| Gate-Source Leakage Current      | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                                   | -    | -    | ±100 | nA    |
| Dynamic <sup>(Note 6)</sup>      |                     |                                                                                                              |      |      |      |       |
| Total Gate Charge                | Q <sub>g</sub>      | V <sub>DS</sub> =24V, I <sub>D</sub> =10A,<br>V <sub>GS</sub> =10V <sup>(Note 2,3)</sup>                     | -    | 17.5 | 25   | nC    |
| Gate-Source Charge               | Q <sub>gs</sub>     |                                                                                                              | -    | 2.6  | -    |       |
| Gate-Drain Charge                | Q <sub>gd</sub>     |                                                                                                              | -    | 3.5  | -    |       |
| Input Capacitance                | C <sub>iss</sub>    | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V,<br>f=1MHz                                                         | -    | 872  | 1300 | pF    |
| Output Capacitance               | C <sub>oss</sub>    |                                                                                                              | -    | 301  | 485  |       |
| Reverse Transfer Capacitance     | C <sub>rss</sub>    |                                                                                                              | -    | 30   | 55   |       |
| Gate resistance                  | R <sub>g</sub>      | f=1MHz                                                                                                       | -    | 1.6  | -    | Ω     |
| Turn-On Delay Time               | td <sub>(on)</sub>  | V <sub>DS</sub> =24V, I <sub>D</sub> =10A,<br>V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω <sup>(Note 2,3)</sup> | -    | 6    | -    | ns    |
| Turn-On Rise Time                | t <sub>r</sub>      |                                                                                                              | -    | 3.7  | -    |       |
| Turn-Off Delay Time              | td <sub>(off)</sub> |                                                                                                              | -    | 20   | -    |       |
| Turn-Off Fall Time               | t <sub>f</sub>      |                                                                                                              | -    | 5    | -    |       |
| Drain-Source Diode               |                     |                                                                                                              |      |      |      |       |
| Diode Forward Current            | I <sub>S</sub>      | T <sub>C</sub> =25°C<br>(Package Limit)                                                                      | -    | -    | 56   | A     |
| Pulsed Diode Forward Current     | I <sub>SM</sub>     |                                                                                                              | -    | -    | 270  |       |
| Diode Forward Voltage            | V <sub>SD</sub>     | I <sub>S</sub> =20A, V <sub>GS</sub> =0V                                                                     | -    | 0.8  | 1.3  | V     |
| Reverse Recovery Time            | T <sub>rr</sub>     | V <sub>DD</sub> =24V, V <sub>GS</sub> =0V,                                                                   | -    | 14   | -    | ns    |
| Reverse Recovery Charge          | Q <sub>rr</sub>     | I <sub>S</sub> =20A, dI <sub>S</sub> /dt=100A/us                                                             | -    | 4    | -    | nC    |

### NOTES :

1. Pulse width≤100us, Duty cycle≤2%.
2. Essentially independent of operating temperature typical characteristics.
3. Chip capability with an R<sub>θJC</sub>=3.05°C/W.
4. 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.
5. E<sub>AS</sub> is calculated based on the condition of L=1mH, I<sub>AS</sub>=10A, V<sub>DD</sub>=30V, V<sub>GS</sub>=10V. 100% test at L=0.5mH, I<sub>AS</sub>=10.5A in production.
6. Guaranteed by design, not subject to production testing.

# PJQ4524S6P-AU

## TYPICAL CHARACTERISTIC CURVES

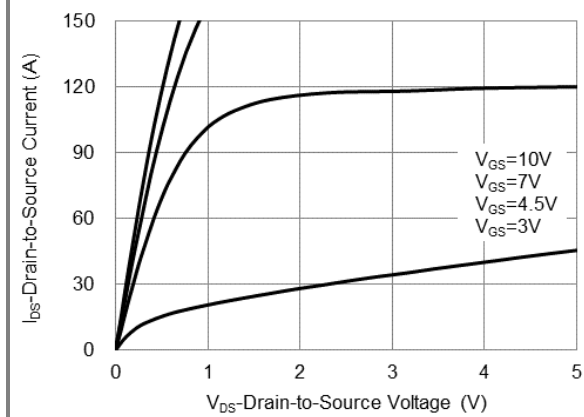


Fig.1 On-Region Characteristics

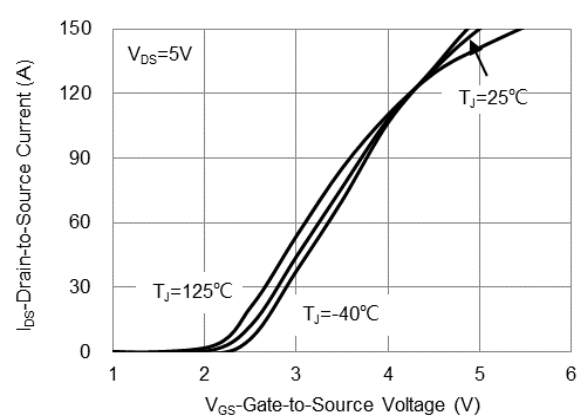


Fig.2 Transfer Characteristics

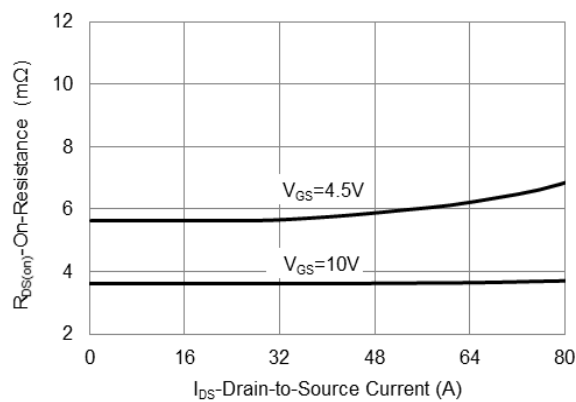


Fig.3 On-Resistance vs. Drain Current

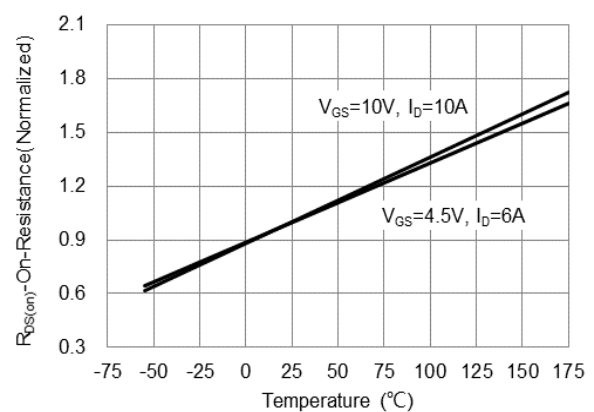


Fig.4 On-Resistance vs. Junction temperature

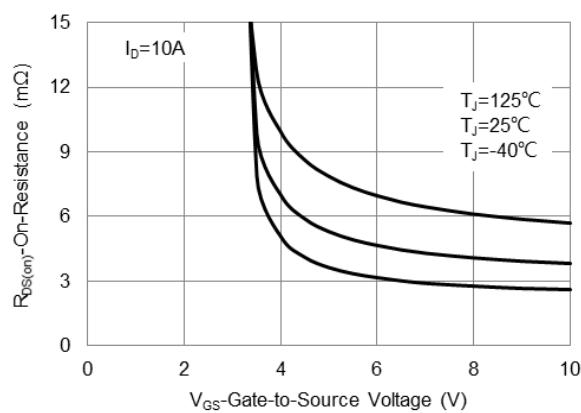


Fig.5 On-Resistance Variation with  $V_{GS}$

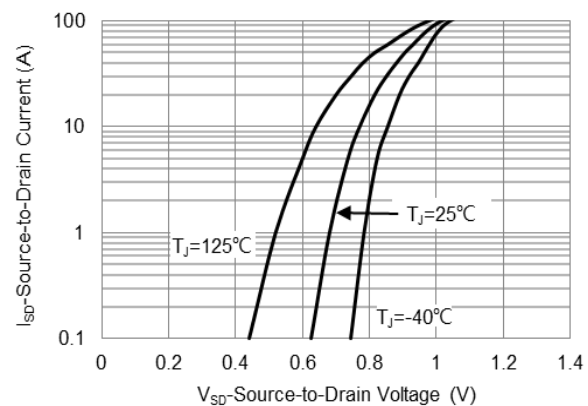


Fig.6 Source-Drain Diode Forward Voltage

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## TYPICAL CHARACTERISTIC CURVES

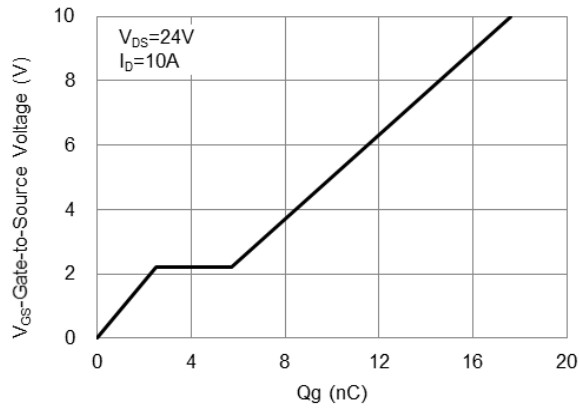


Fig.7 Gate-Charge Characteristics

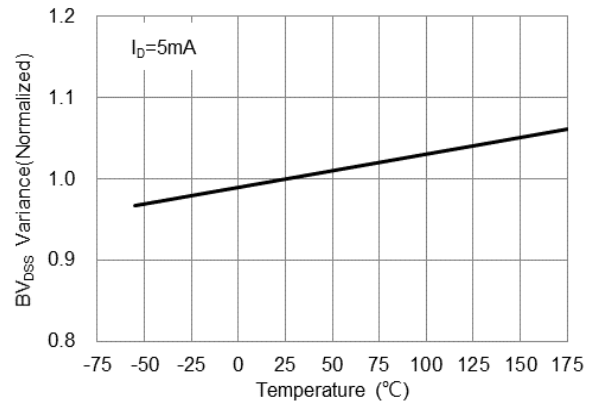


Fig.8 Breakdown Voltage Variation vs. Temperature

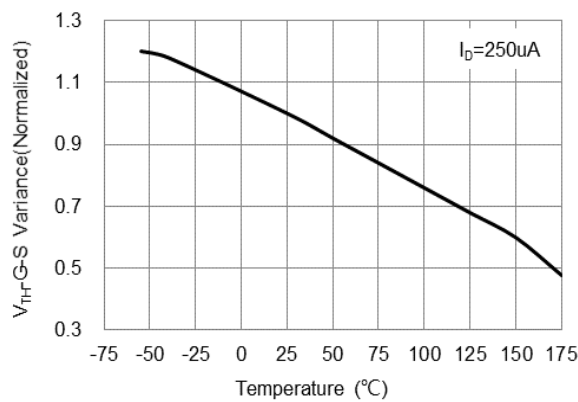


Fig.9 Threshold Voltage Variation with Temperature

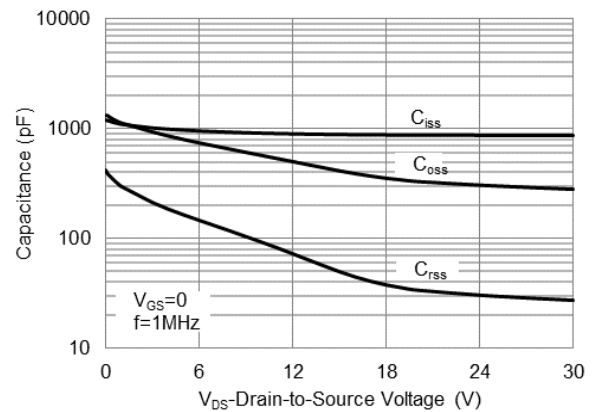


Fig.10 Capacitance vs. Drain-Source Voltage

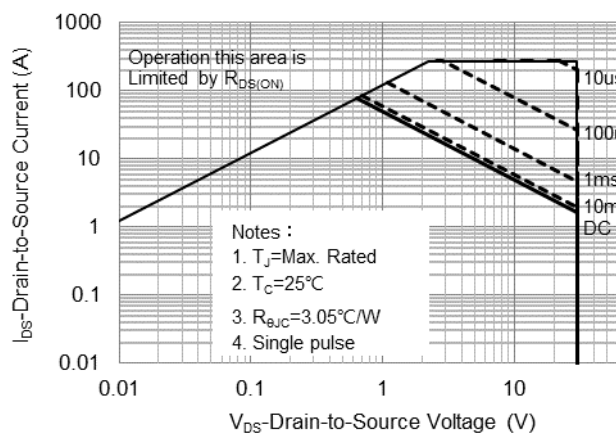


Fig.11 Maximum Safe Operating Area

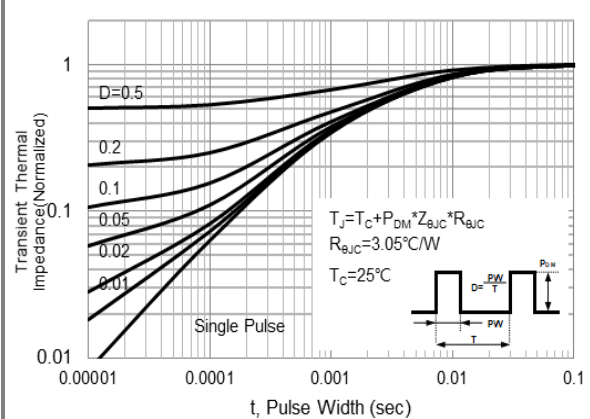


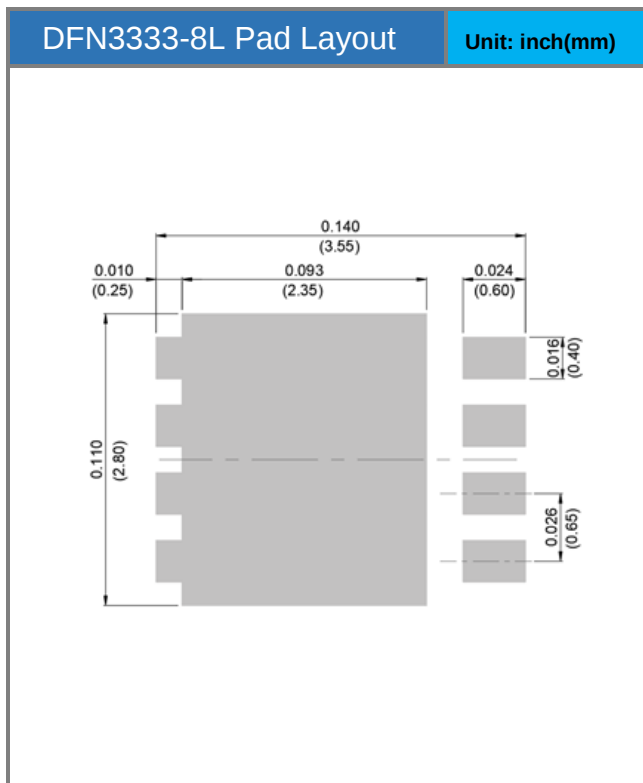
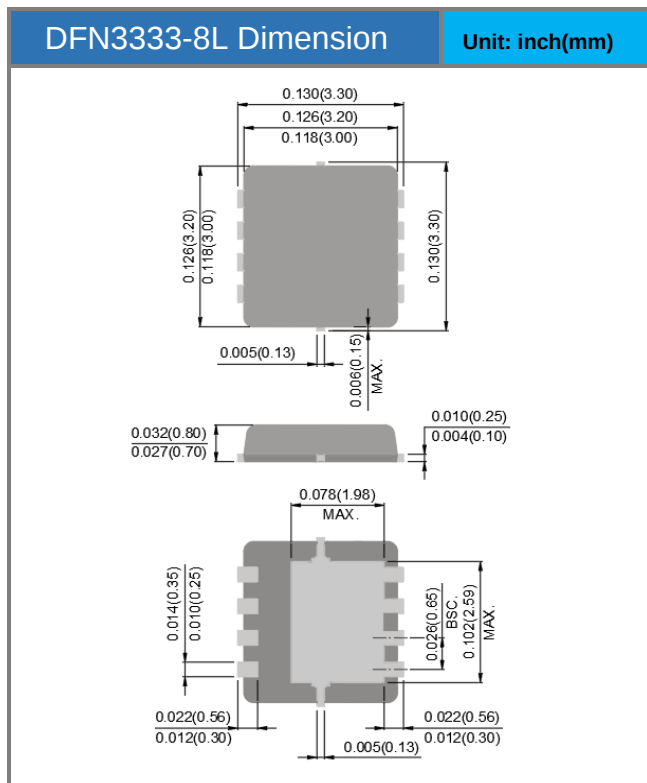
Fig.12 Normalized Transient Thermal Impedance

# PJQ4524S6P-AU

## Product and Packing Information

| Part No.      | Package Type | Packing Type      | Marking |
|---------------|--------------|-------------------|---------|
| PJQ4524S6P-AU | DFN3333-8L   | 5K pcs / 13" reel | 524W    |

## Packaging Information & Mounting Pad Layout



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