

# PJQ59710A-AU

## 100V Dual N-Channel Enhancement Mode MOSFET

**Voltage**

**100 V**

**Current**

**21 A**

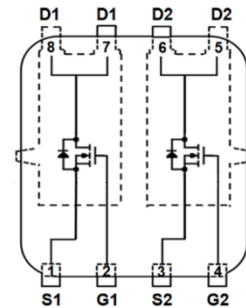
### Features

- $R_{DS(ON)}$ ,  $V_{GS}@10V$ ,  $I_D@10A<28.5m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@4.5V$ ,  $I_D@5A<39m\Omega$
- 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 : DFN5060B-8L Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.092 grams

DFN5060B-8L



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

| PARAMETER                                        |                     | SYMBOL          | LIMIT    | UNITS         |
|--------------------------------------------------|---------------------|-----------------|----------|---------------|
| Drain-Source Voltage                             |                     | $V_{DS}$        | 100      | V             |
| Gate-Source Voltage                              |                     | $V_{GS}$        | $\pm 20$ |               |
| Continuous Drain Current (Note 3)                | $T_C=25^{\circ}C$   | $I_D$           | 21       | A             |
|                                                  | $T_C=100^{\circ}C$  |                 | 15       |               |
| Pulsed Drain Current (Note 1)                    | $T_C=25^{\circ}C$   | $I_{DM}$        | 84       |               |
| Power Dissipation                                | $T_C=25^{\circ}C$   | $P_D$           | 29.4     | W             |
|                                                  | $T_C=100^{\circ}C$  |                 | 14.7     |               |
| Continuous Drain Current (Note 4)                | $T_A=25^{\circ}C$   | $I_D$           | 6.8      | A             |
|                                                  | $T_A=70^{\circ}C$   |                 | 5.7      |               |
| Power Dissipation                                | $T_A=25^{\circ}C$   | $P_D$           | 3        | W             |
|                                                  | $T_A=70^{\circ}C$   |                 | 2.1      |               |
| Single Pulse Avalanche Current (Note 5)          |                     | $I_{AS}$        | 6.3      | A             |
| Single Pulse Avalanche Energy (Note 5)           |                     | $E_{AS}$        | 4.5      | mJ            |
| Operating Junction and Storage Temperature Range |                     | $T_J, T_{STG}$  | -55~175  | $^{\circ}C$   |
| Thermal Resistance (Note 4)                      | Junction to Case    | $R_{\theta JC}$ | 5.1      | $^{\circ}C/W$ |
|                                                  | Junction to Ambient | $R_{\theta JA}$ | 50       |               |

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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                                                          | 100  | -    | -    | V     |
| Gate Threshold Voltage           | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =100uA                                            | 1.2  | 1.7  | 2.3  |       |
| Drain-Source On-State Resistance | R <sub>DS(on)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =10A                                                           | -    | 25   | 28.5 | mΩ    |
|                                  |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A                                                           | -    | 31.5 | 39   |       |
| Zero Gate Voltage Drain Current  | I <sub>DSS</sub>    | V <sub>DS</sub> =100V, 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 (Note 6)                 |                     |                                                                                                     |      |      |      |       |
| Total Gate Charge                | Q <sub>g</sub>      | V <sub>DS</sub> =50V, I <sub>D</sub> =10A,<br>V <sub>GS</sub> =10V                                  | -    | 9    | 11.7 | nC    |
| Gate-Source Charge               | Q <sub>gs</sub>     |                                                                                                     | -    | 2    | -    |       |
| Gate-Drain Charge                | Q <sub>gd</sub>     |                                                                                                     | -    | 1.3  | -    |       |
| Input Capacitance                | C <sub>iss</sub>    | V <sub>DS</sub> =50V, V <sub>GS</sub> =0V,<br>f=250KHz                                              | -    | 525  | 680  | pF    |
| Output Capacitance               | C <sub>oss</sub>    |                                                                                                     | -    | 200  | 260  |       |
| Reverse Transfer Capacitance     | C <sub>rss</sub>    |                                                                                                     | -    | 7.5  | -    |       |
| Gate resistance                  | R <sub>g</sub>      | f=1MHz                                                                                              | -    | 1.05 | -    | Ω     |
| Turn-On Delay Time               | td <sub>(on)</sub>  | V <sub>DS</sub> =50V, I <sub>D</sub> =5A,<br>V <sub>GS</sub> =10V, R <sub>G</sub> =1.6Ω<br>(Note 2) | -    | 3    | -    | ns    |
| Turn-On Rise Time                | tr                  |                                                                                                     | -    | 2.2  | -    |       |
| Turn-Off Delay Time              | td <sub>(off)</sub> |                                                                                                     | -    | 8.2  | -    |       |
| Turn-Off Fall Time               | tf                  |                                                                                                     | -    | 1.6  | -    |       |
| Drain-Source Diode               |                     |                                                                                                     |      |      |      |       |
| Diode Forward Current            | I <sub>S</sub>      | T <sub>C</sub> =25 <sup>o</sup> C                                                                   | -    | -    | 21   | A     |
| Pulsed Diode Forward Current     | I <sub>SM</sub>     |                                                                                                     | -    | -    | 84   |       |
| Diode Forward Voltage            | V <sub>SD</sub>     | I <sub>S</sub> =10A, V <sub>GS</sub> =0V                                                            | -    | 0.9  | 1.2  | V     |
| Reverse Recovery Time            | T <sub>rr</sub>     | V <sub>DD</sub> =50V V <sub>GS</sub> =0V,                                                           | -    | 21   | -    | ns    |
| Reverse Recovery Charge          | Q <sub>rr</sub>     | I <sub>S</sub> =10A, dI <sub>S</sub> /dt=100A/us                                                    | -    | 27   | -    | nC    |

### NOTES :

1. Pulse width≤300us, Duty cycle≤2%.
2. Essentially independent of operating temperature typical characteristics.
3. Chip capability with an R<sub>θJC</sub>=5.1°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>=3.5A, V<sub>DD</sub>=50V, V<sub>GS</sub>=10V. 100% test at L=0.1mH, I<sub>AS</sub>=6.3A in production.
6. Guaranteed by design, not subject to production testing.

# PJQ59710A-AU

## TYPICAL CHARACTERISTIC CURVES

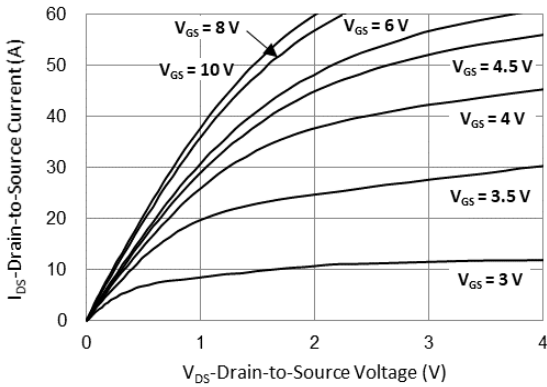


Fig.1 On-Region Characteristics

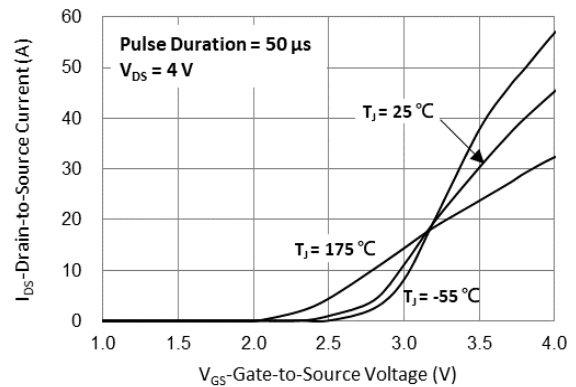


Fig.2 Transfer Characteristics

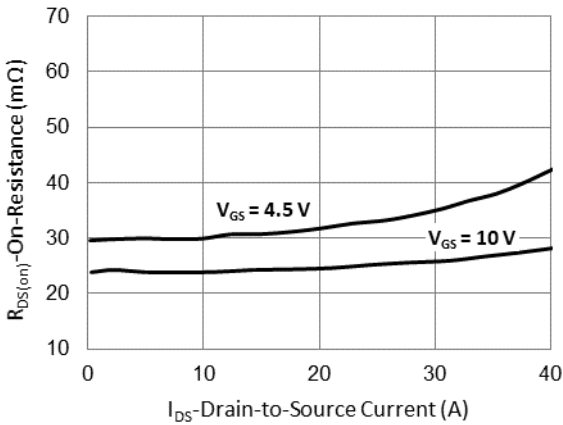


Fig.3 On-Resistance vs. Drain Current

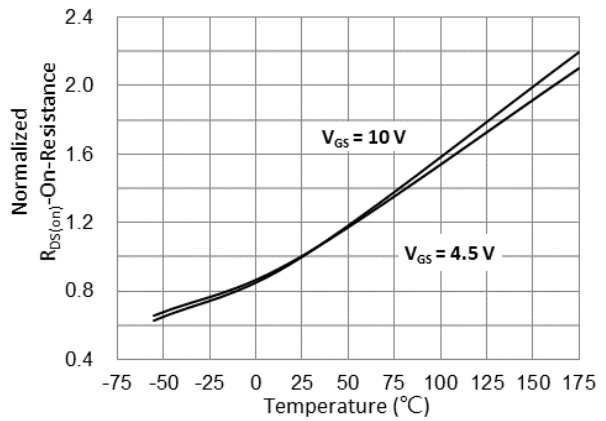


Fig.4 On-Resistance vs. Junction temperature

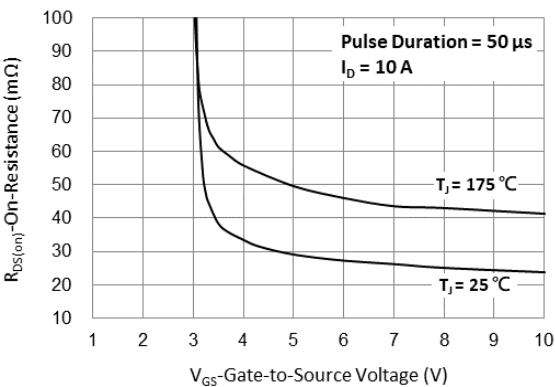


Fig.5 On-Resistance Variation with  $V_{GS}$

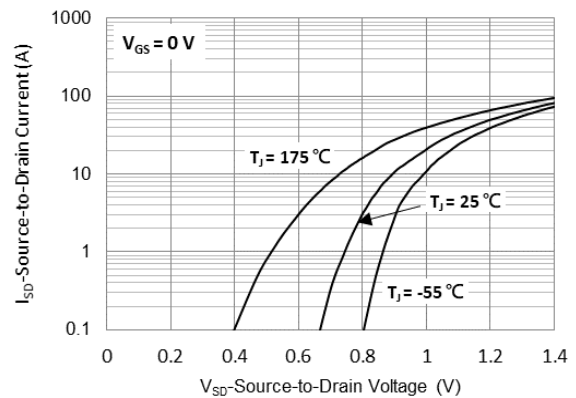
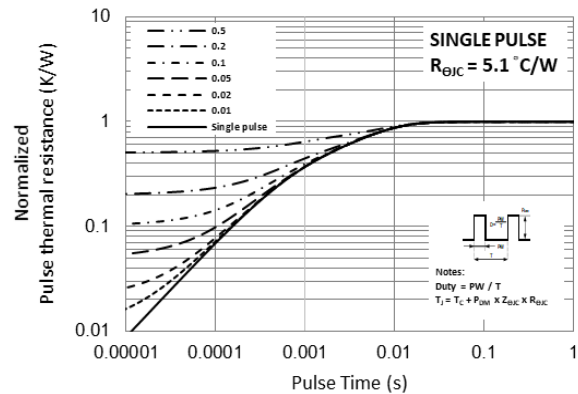
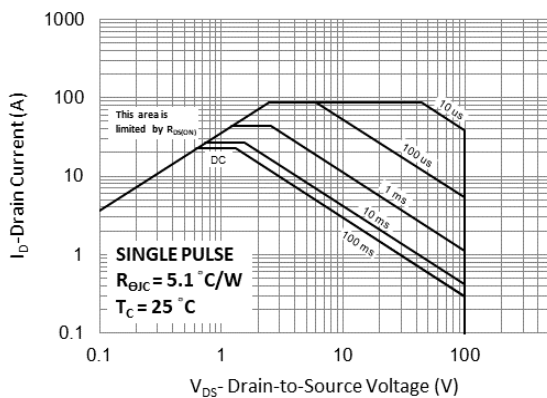
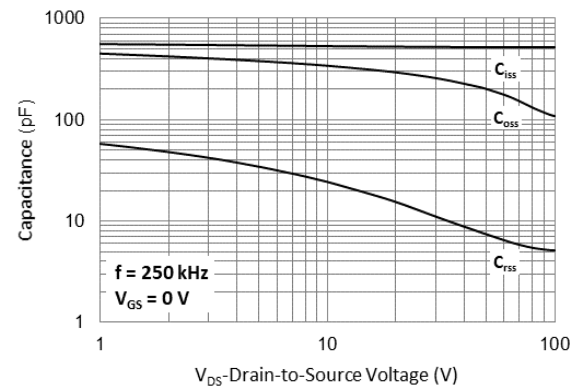
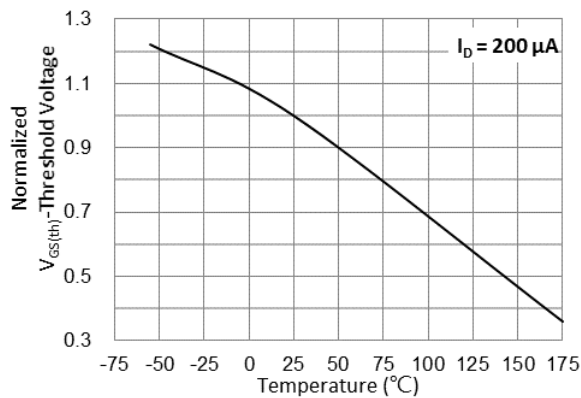
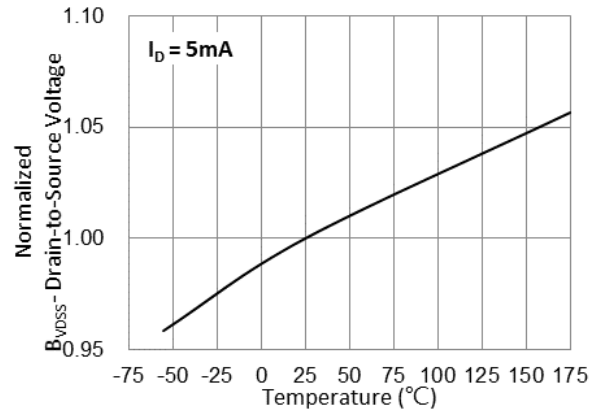
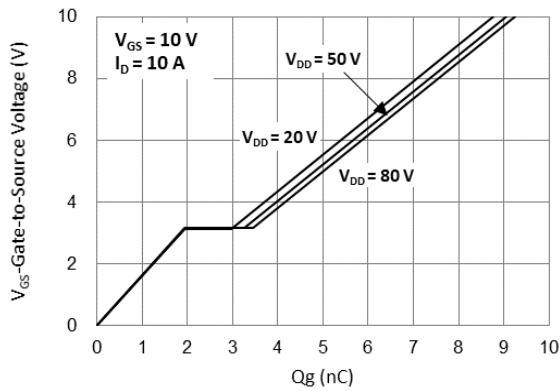


Fig.6 Source-Drain Diode Forward Voltage

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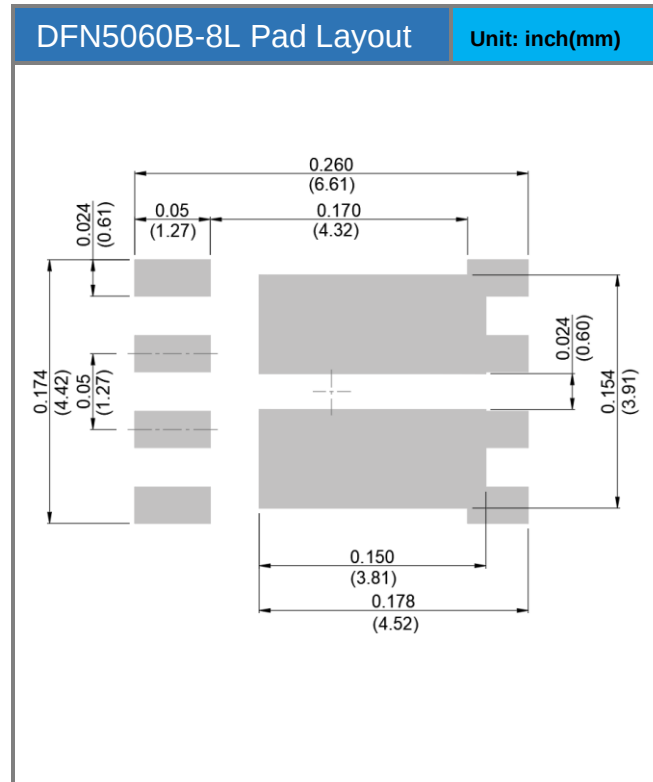
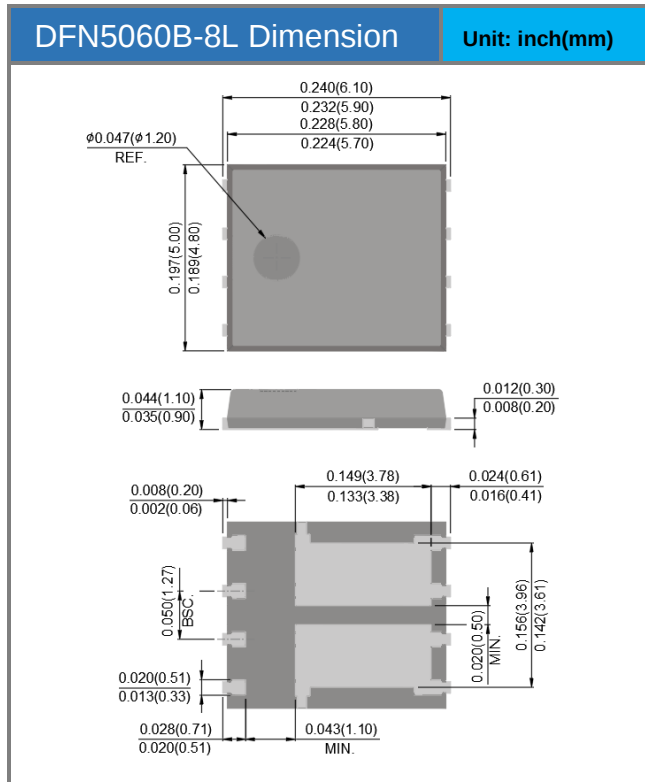


# PJQ59710A-AU

## Product and Packing Information

| Part No.     | Package Type | Packing Type      | Marking |
|--------------|--------------|-------------------|---------|
| PJQ59710A-AU | DFN5060B-8L  | 3K pcs / 13" reel | Q59710A |

## Packaging Information & Mounting Pad Layout



## PJQ59710A-AU

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