

# PJQ2461-AU

## 60V P-Channel Enhancement Mode MOSFET

**Voltage**

**-60 V**

**Current**

**-2.4 A**

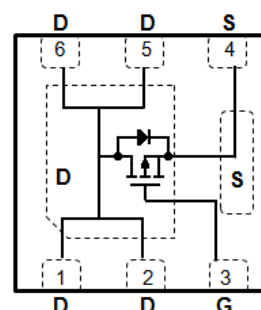
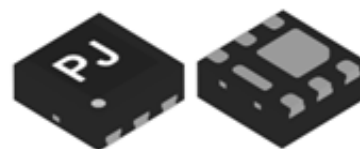
### Features

- $R_{DS(ON)}$ ,  $V_{GS}@-10V$ ,  $I_D@-2A < 170m\Omega$
- $R_{DS(ON)}$ ,  $V_{GS}@-4.5V$ ,  $I_D@-1.5A < 220m\Omega$
- High switching speed
- Improved dv/dt capability
- Low Gate Charge
- Low reverse transfer capacitance
- AEC-Q101 qualified
- Lead free in compliance with EU RoHS 2.0
- Green molding compound as per IEC 61249 standard

### Mechanical Data

- Case : DFN2020B-6L Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.0003 ounces, 0.0086 grams

DFN2020B-6L



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

| PARAMETER                                         |                      | SYMBOL                           | LIMIT   | UNITS |
|---------------------------------------------------|----------------------|----------------------------------|---------|-------|
| Drain-Source Voltage                              |                      | V <sub>DS</sub>                  | -60     | V     |
| Gate-Source Voltage                               |                      | V <sub>GS</sub>                  | ±20     |       |
| Continuous Drain Current <sup>(Note 4)</sup>      | T <sub>A</sub> =25°C | I <sub>D</sub>                   | -2.4    | A     |
|                                                   | T <sub>A</sub> =70°C |                                  | -1.9    |       |
| Pulsed Drain Current <sup>(Note 1)</sup>          |                      | I <sub>DM</sub>                  | -9.6    |       |
| Power Dissipation                                 | T <sub>A</sub> =25°C | P <sub>D</sub>                   | 2       | W     |
|                                                   | T <sub>A</sub> =70°C |                                  | 1.3     |       |
| Single Pulse Avalanche Energy <sup>(Note 6)</sup> |                      | E <sub>AS</sub>                  | 32      | mJ    |
| Operating Junction and Storage Temperature Range  |                      | T <sub>J</sub> ,T <sub>STG</sub> | -55~150 | °C    |
| Typical Thermal Resistance                        |                      | R <sub>θJA</sub>                 | 62.5    | °C/W  |
| - Junction to Ambient <sup>(Note 4,5)</sup>       |                      |                                  |         |       |



## PJQ2461-AU

### Electrical Characteristics ( $T_A=25^{\circ}\text{C}$ 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                                                            | -60  | -     | -    | V     |
| Gate Threshold Voltage                                | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250uA                                              | -1.0 | -1.88 | -2.5 |       |
| Drain-Source On-State Resistance                      | R <sub>DS(on)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-2A                                                             | -    | 140   | 170  | mΩ    |
|                                                       |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1.5A                                                          | -    | 190   | 220  |       |
| Zero Gate Voltage Drain Current                       | I <sub>DSS</sub>    | V <sub>DS</sub> =-60V, 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 7)                                      |                     |                                                                                                        |      |       |      |       |
| Total Gate Charge                                     | Q <sub>g</sub>      | V <sub>DS</sub> =-30V, I <sub>D</sub> =-2A,<br>V <sub>GS</sub> =-10V (Note 1,2)                        | -    | 8.3   | -    | nC    |
| Gate-Source Charge                                    | Q <sub>gs</sub>     |                                                                                                        | -    | 1.8   | -    |       |
| Gate-Drain Charge                                     | Q <sub>gd</sub>     |                                                                                                        | -    | 1.6   | -    |       |
| Input Capacitance                                     | C <sub>iss</sub>    | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V,<br>f=1MHZ                                                  | -    | 430   | -    | pF    |
| Output Capacitance                                    | C <sub>oss</sub>    |                                                                                                        | -    | 33    | -    |       |
| Reverse Transfer Capacitance                          | C <sub>rss</sub>    |                                                                                                        | -    | 29    | -    |       |
| Turn-On Delay Time                                    | td <sub>(on)</sub>  | V <sub>DD</sub> =-30V, I <sub>D</sub> =-1A,<br>V <sub>GS</sub> =-10V,<br>R <sub>G</sub> =6Ω (Note 1,2) | -    | 5.1   | -    | ns    |
| Turn-On Rise Time                                     | tr                  |                                                                                                        | -    | 20    | -    |       |
| Turn-Off Delay Time                                   | td <sub>(off)</sub> |                                                                                                        | -    | 36    | -    |       |
| Turn-Off Fall Time                                    | tf                  |                                                                                                        | -    | 11    | -    |       |
| Drain-Source Diode                                    |                     |                                                                                                        |      |       |      |       |
| 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> =-1A, V <sub>GS</sub> =0V                                                               | -    | -0.78 | -1   | V     |

#### NOTES :

- Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .
- Essentially independent of operating temperature typical characteristics.
- Repetitive rating, pulse width limited by junction temperature  $T_{J(MAX)}=150^{\circ}\text{C}$ . Ratings are based on low frequency and duty cycles to keep initial  $T_J=25^{\circ}\text{C}$ .
- The maximum current rating is package limited.
- $R_{\theta JA}$  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<sup>2</sup> with 2oz.square pad of copper.
- The test condition is  $L=1\text{mH}$ ,  $I_{AS}=-8A$ ,  $V_{DD}=-25V$ ,  $V_{GS}=-10V$
- Guaranteed by design, not subject to production testing.

# PJQ2461-AU

## TYPICAL CHARACTERISTIC CURVES

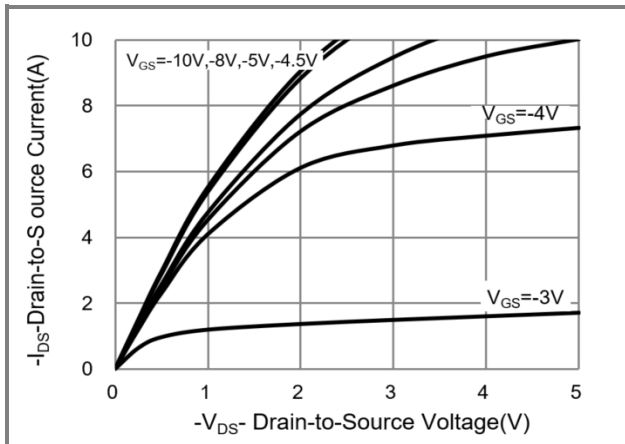


Fig.1 On-Region Characteristics

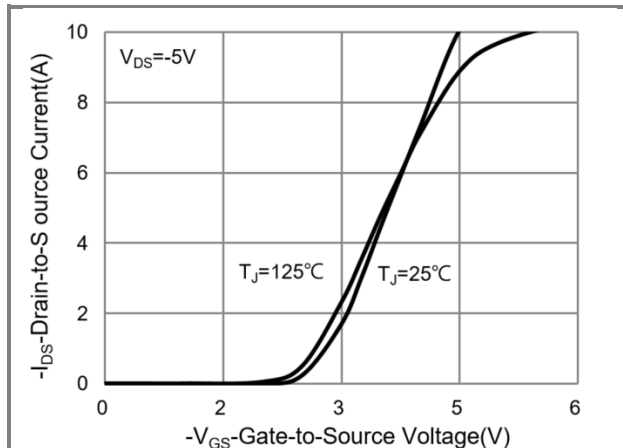


Fig.2 Transfer Characteristics

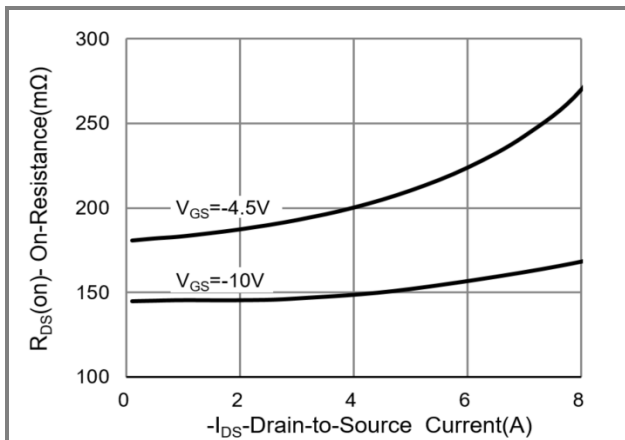


Fig.3 On-Resistance vs. Drain Current

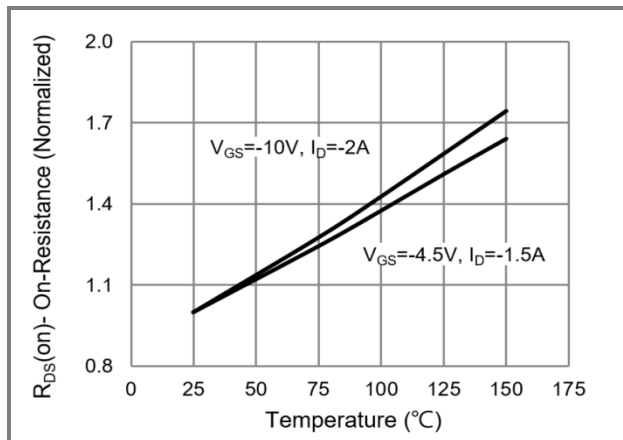


Fig.4 On-Resistance vs. Junction temperature

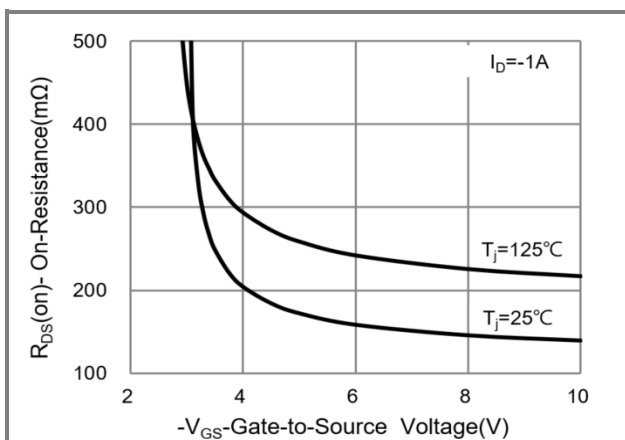


Fig.5 On-Resistance Variation with  $V_{GS}$

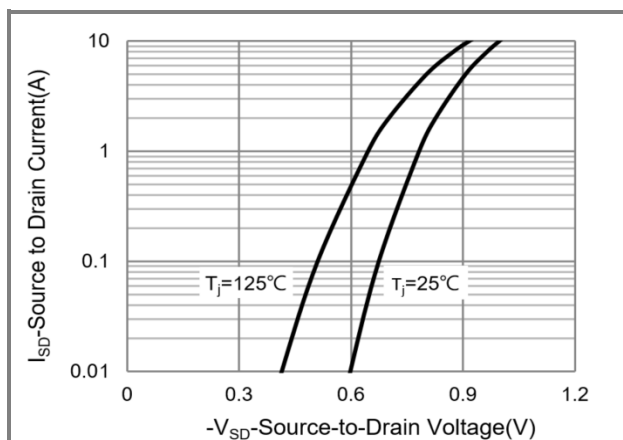


Fig.6 Body Diode Characteristics

# PJQ2461-AU

## TYPICAL CHARACTERISTIC CURVES

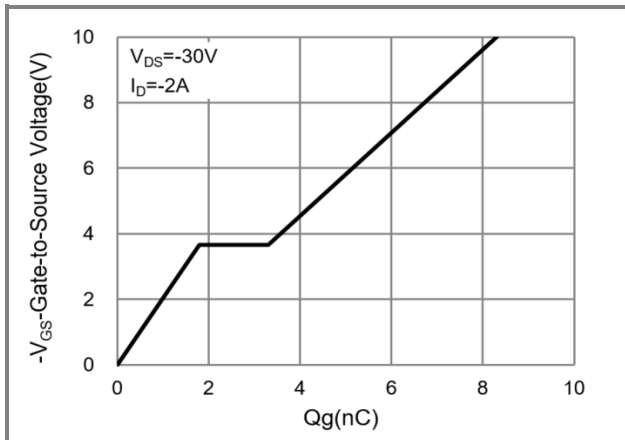


Fig.7 Gate-Charge Characteristics

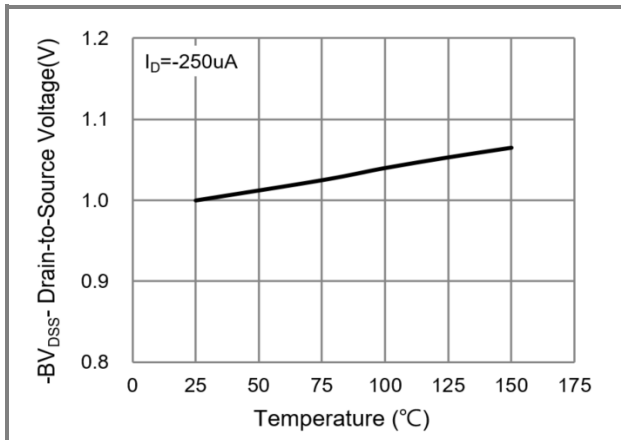


Fig.8 Breakdown Voltage Variation vs. Temperature

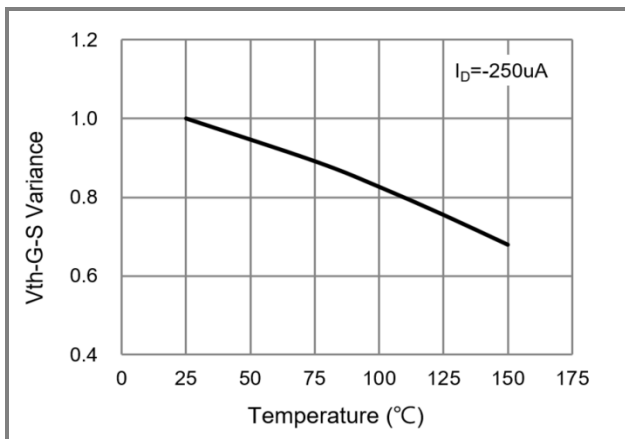


Fig.9 Threshold Voltage Variation with Temperature

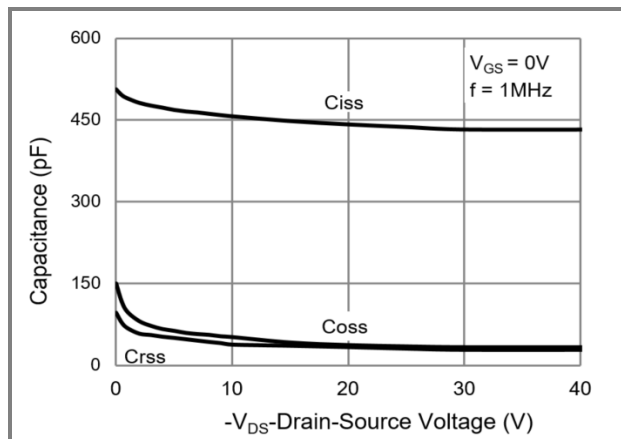


Fig.10 Capacitance vs. Drain-Source Voltage

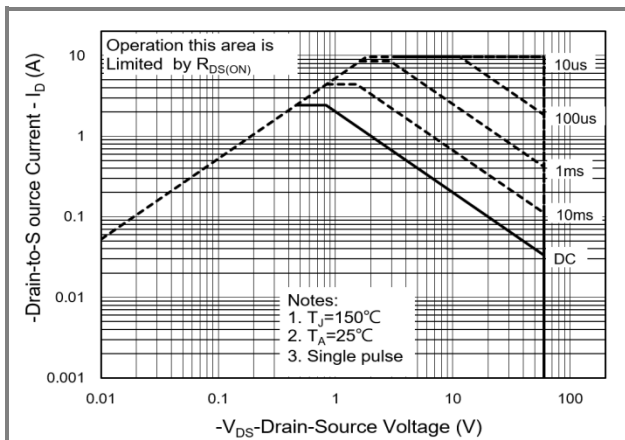


Fig.11 Maximum Safe Operating Area.

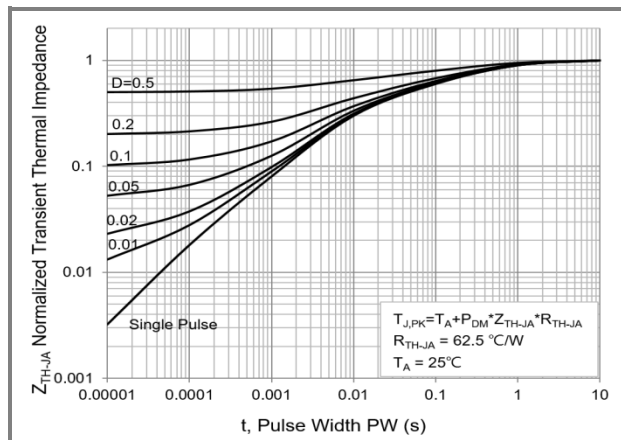


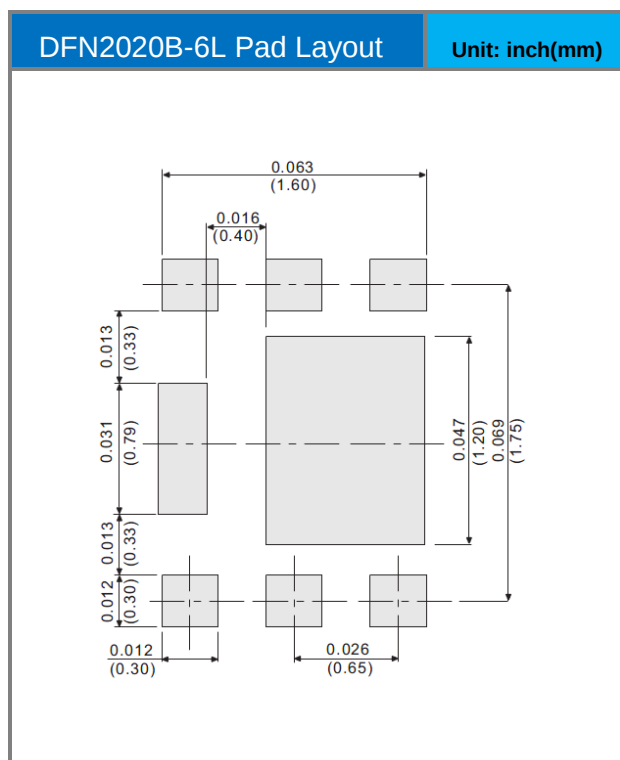
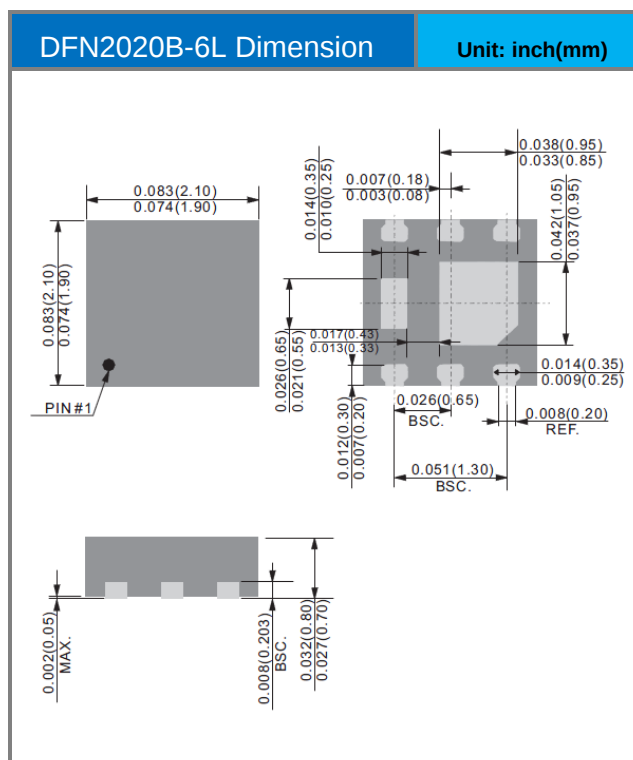
Fig.12 Normalized Transient Thermal Impedance

# PJQ2461-AU

## Part No Packing Code Version

| Part No Packing Code | Package Type | Packing Type     | Marking | Version      |
|----------------------|--------------|------------------|---------|--------------|
| PJQ2461-AU_R1_000A1  | DFN2020B-6L  | 3K pcs / 7" reel | 461     | Halogen free |

## Packaging Information & Mounting Pad Layout





## PJQ2461-AU

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