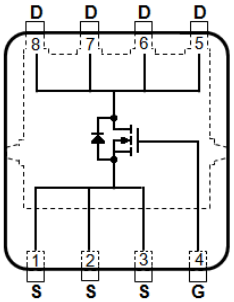
# PJQ5546-AU

## 40V N-Channel Enhancement Mode MOSFET

| Voltage | 40 V | Current | 85 A |
|---|---|---|---|

**DFN5060-8L**




### Features

- $R_{DS(ON)}$, $V_{GS}$@10V, $I_D$@20A<5.3mΩ
- $R_{DS(ON)}$, $V_{GS}$@4.5V, $I_D$@20A<7.4mΩ
- 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 : DFN5060-8L Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.08 grams

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

| PARAMETER | | SYMBOL | LIMIT | UNITS |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 40 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current(Note 3) | $T_C$=25°C | $I_D$ | 85 | A |
| | $T_C$=100°C | | 60 | |
| Pulsed Drain Current(Note 1) | $T_C$=25°C | $I_{DM}$ | 340 | |
| Power Dissipation | $T_C$=25°C | $P_D$ | 68 | W |
| | $T_C$=100°C | | 34 | |
| Continuous Drain Current(Note 4) | $T_A$=25°C | $I_D$ | 18.7 | A |
| | $T_A$=70°C | | 15.6 | |
| Power Dissipation | $T_A$=25°C | $P_D$ | 3.3 | W |
| | $T_A$=70°C | | 2.3 | |
| Single Pulse Avalanche Energy(Note 5) | | $E_{AS}$ | 90 | mJ |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55~175 | °C |
| Thermal Resistance(Note 4) | Junction to Case | $R_{\theta JC}$ | 2.2 | °C/W |
| | Junction to Ambient | $R_{\theta JA}$ | 45 | |

# PJQ5546-AU

## 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 | 40 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=50uA | 1.1 | 1.7 | 2.3 | |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=20A | - | 4.2 | 5.3 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=20A | - | 5.7 | 7.4 | |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=40V, $V_{GS}$=0V | - | - | 1 | uA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| **Dynamic**(Note 6) | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=32V, $I_D$=20A, $V_{GS}$=10V | - | 20 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 3.1 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 6.4 | - | |
| Input Capacitance | Ciss | $V_{DS}$=25V, $V_{GS}$=0V, f=1MHz | - | 1320 | - | pF |
| Output Capacitance | Coss | | - | 250 | - | |
| Reverse Transfer Capacitance | Crss | | - | 30 | - | |
| Gate resistance | $R_g$ | f=1MHz | - | 0.8 | - | Ω |
| Turn-On Delay Time | $td_{(on)}$ | $V_{DS}$=32V, $I_D$=20A, $V_{GS}$=10V, $R_G$=3Ω (Note 2) | - | 11 | - | ns |
| Turn-On Rise Time | $t_r$ | | - | 3 | - | |
| Turn-Off Delay Time | $td_{(off)}$ | | - | 28 | - | |
| Turn-Off Fall Time | $t_f$ | | - | 5 | - | |
| **Drain-Source Diode** | | | | | | |
| Diode Forward Current | $I_S$ | $T_C$=25°C | - | - | 85 | A |
| Pulsed Diode Forward Current | $I_{SM}$ | | - | - | 340 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=20A, $V_{GS}$=0V | - | 0.85 | 1.3 | V |
| Reverse Recovery Time | Trr | $V_{GS}$=0V, $I_S$=20A, dIs/dt=100A/us | - | 23 | - | ns |
| Reverse Recovery Charge | Qrr | | - | 15 | - | nC |

NOTES :

1. Pulse width≤100us, Duty cycle≤2%.
2. Essentially independent of operating temperature typical characteristics.
3. Chip capability with an $R_{\theta JC}$=2.2°C/W.
4. $R_{\theta JA}$ 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.
5. The test condition is L=0.5mH, $I_{AS}$=19A, $V_{DD}$=25V, $V_{GS}$=10V, Starting $T_J$=25°C.
6. Guaranteed by design, not subject to production testing.

# PJQ5546-AU

## TYPICAL CHARACTERISTIC CURVES

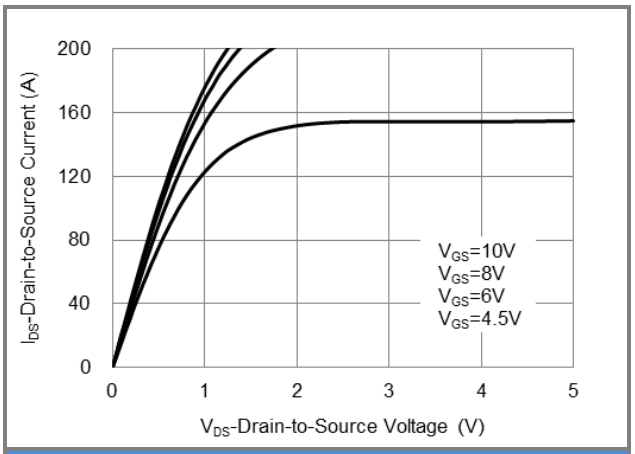



Fig.1 On-Region Characteristics

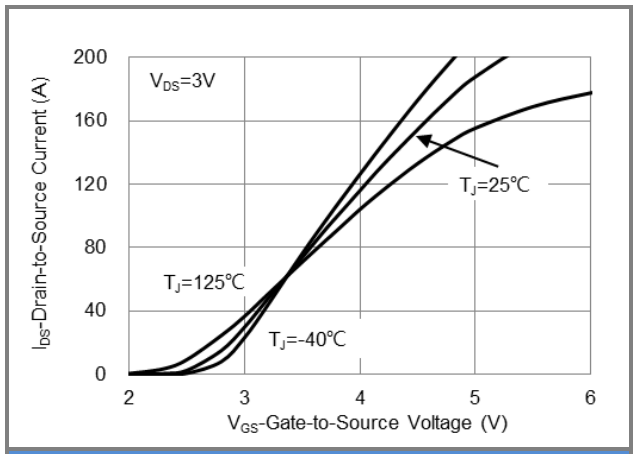



Fig.2 Transfer Characteristics

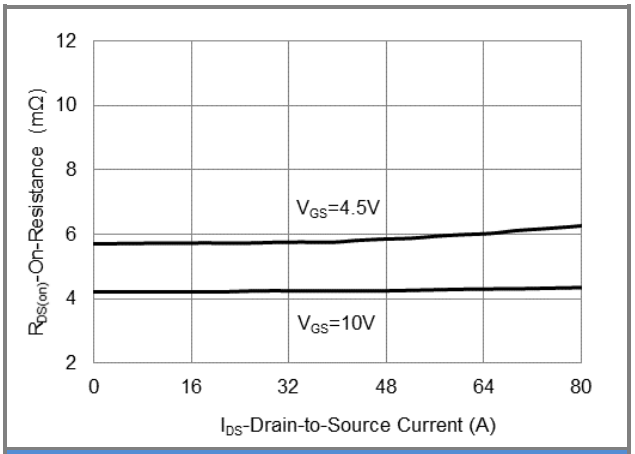



Fig.3 On-Resistance vs. Drain Current

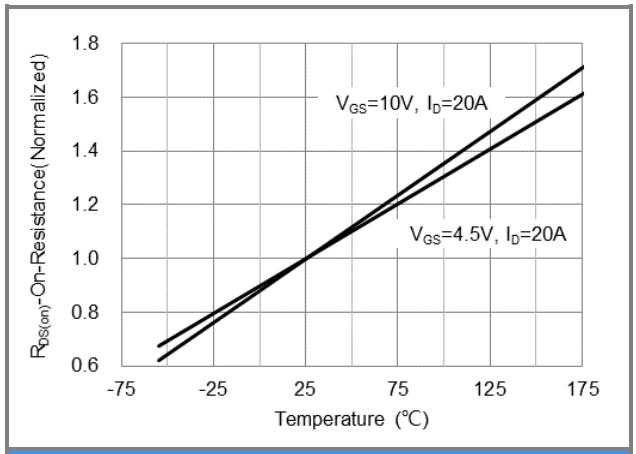



Fig.4 On-Resistance vs. Junction temperature

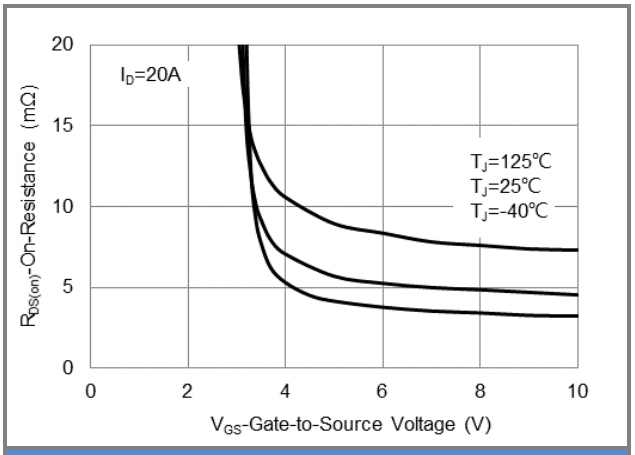



Fig.5 On-Resistance Variation with $V_{GS}$

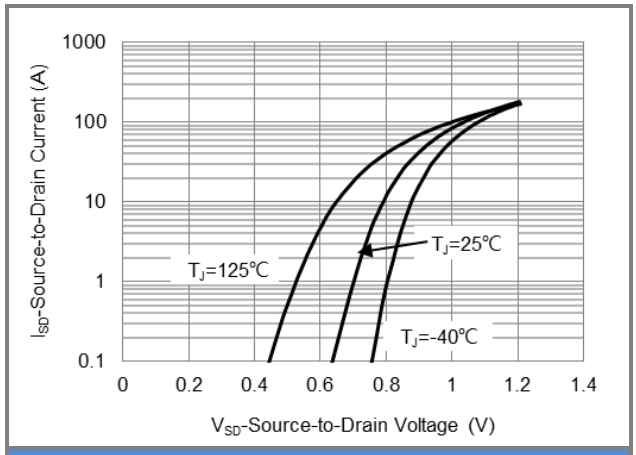



Fig.6 Source-Drain Diode Forward Voltage

# PJQ5546-AU

## TYPICAL CHARACTERISTIC CURVES

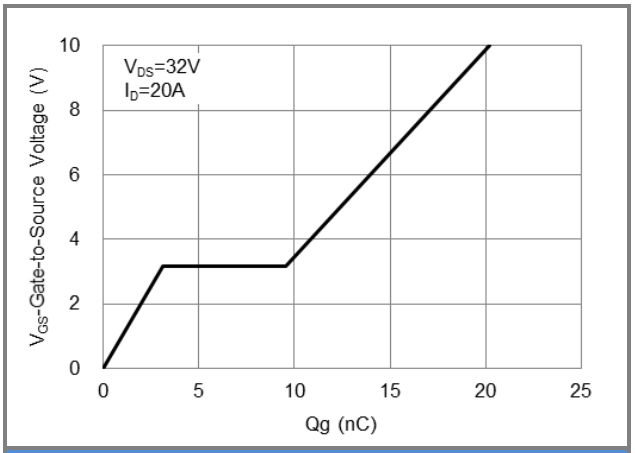



Fig.7 Gate-Charge Characteristics

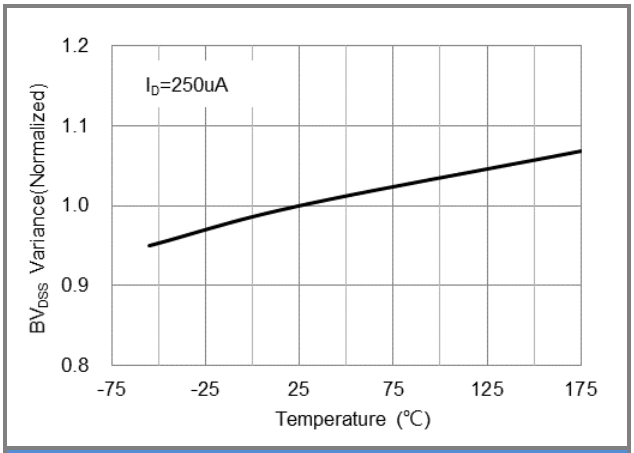



Fig.8 Breakdown Voltage Variation vs. Temperature

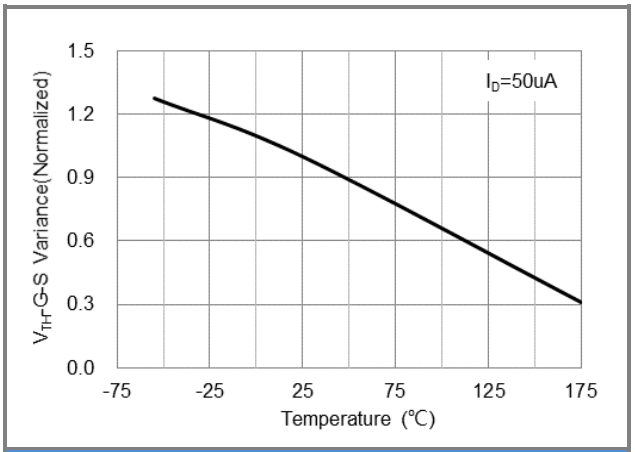



Fig.9 Threshold Voltage Variation with Temperature

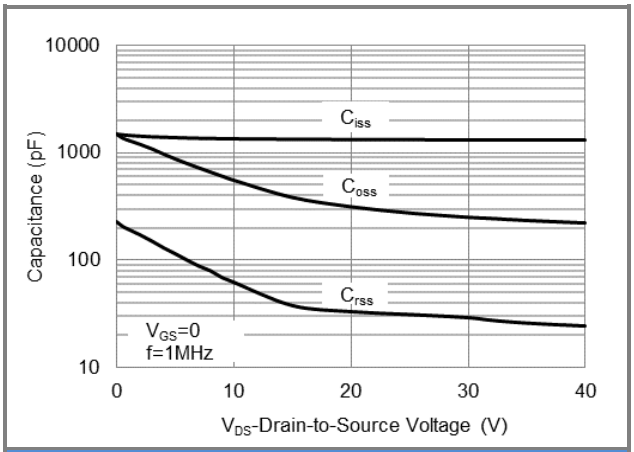



Fig.10 Capacitance vs. Drain-Source Voltage

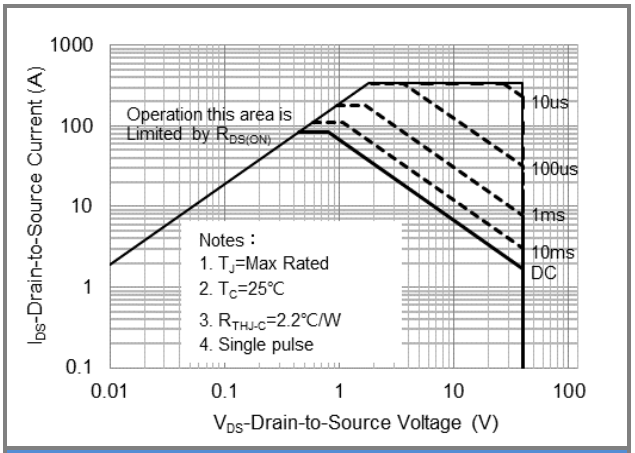



Fig.11 Maximum Safe Operating Area

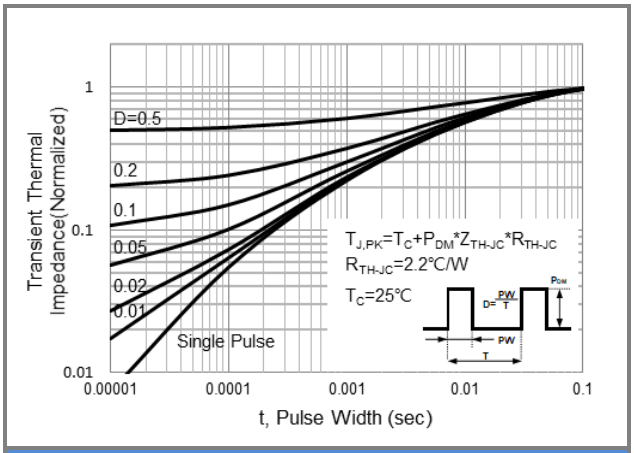



Fig.12 Normalized Transient Thermal Impedance

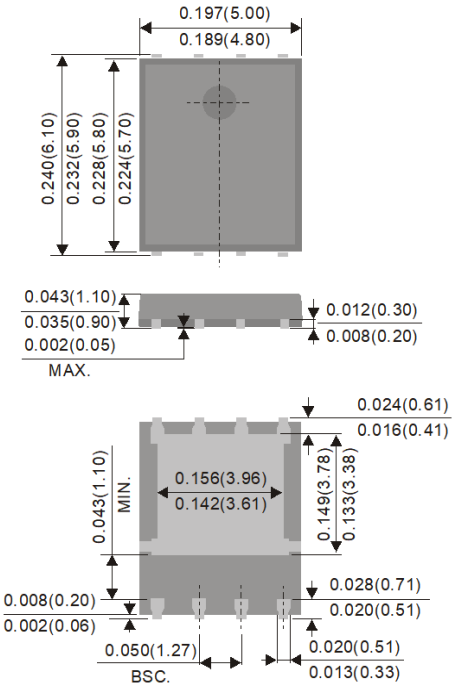
# PJQ5546-AU

## Product and Packing Information

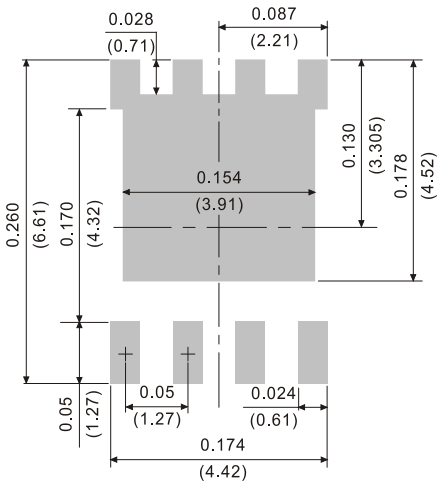
| Part No. | Package Type | Packing Type | Marking |
|---|---|---|---|
| PJQ5546-AU | DFN5060-8L | 3K pcs / 13” reel | Q5546 |

## Packaging Information & Mounting Pad Layout

DFN5060-8L Dimension — Unit: inch(mm)




DFN5060-8L Pad Layout — Unit: inch(mm)



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