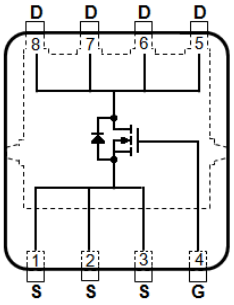
# PJQ54404VUC-AU

## 40V N-Channel Enhancement Mode MOSFET

| Voltage | 40 V | Current | 240 A |
|---|---|---|---|

**DFN5060XC-8L**




### Features

- $R_{DS(ON)}$, $V_{GS}$@10V, $I_D$@90A<1.4mΩ
- $R_{DS(ON)}$, $V_{GS}$@7V, $I_D$@50A<1.8mΩ
- Standard 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 : DFN5060XC-8L Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.098 grams

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

| PARAMETER | | SYMBOL | LIMIT | UNIT |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 40 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current(Note 3) | $T_C$=25°C | $I_D$ | 240 | A |
| | $T_C$=100°C | | 170 | |
| Pulsed Drain Current(Note 1) | $T_C$=25°C | $I_{DM}$ | 950 | |
| Power Dissipation | $T_C$=25°C | $P_D$ | 176 | W |
| | $T_C$=100°C | | 88 | |
| Continuous Drain Current(Note 4) | $T_A$=25°C | $I_D$ | 36 | A |
| | $T_A$=70°C | | 30 | |
| Power Dissipation | $T_A$=25°C | $P_D$ | 3.8 | W |
| | $T_A$=70°C | | 2.6 | |
| Single Pulse Avalanche Current(Note 6) | | $I_{AS}$ | 33 | A |
| Single Pulse Avalanche Energy(Note 6) | | $E_{AS}$ | 545 | mJ |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | -55~175 | °C |
| Thermal Resistance | Junction to Case | $R_{\theta JC}$ | 0.85 | °C/W |
| | Junction to Ambient | $R_{\theta JA}$(Note 4) | 40 | |
| | | $R_{\theta JA}$(Note 5) | 26 (Typ.) | |

# PJQ54404VUC-AU

## Electrical Characteristics ($T_A$=25°C unless otherwise noted)

| PARAMETER | SYMBOL | TEST CONDITION | MIN. | TYP. | MAX. | UNIT |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250uA | 40 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=250uA | 2 | 2.8 | 3.5 | |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=90A | - | 1.1 | 1.4 | mΩ |
| | | $V_{GS}$=7V, $I_D$=50A | - | 1.41 | 1.8 | |
| 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 7) | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=32V, $I_D$=50A, $V_{GS}$=10V | - | 206 | 270 | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 48 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 50 | - | |
| Input Capacitance | Ciss | $V_{DS}$=25V, $V_{GS}$=0V, f=1MHz | - | 13310 | 17500 | pF |
| Output Capacitance | Coss | | - | 831 | 1170 | |
| Reverse Transfer Capacitance | Crss | | - | 656 | 920 | |
| Gate resistance | $R_g$ | f=1MHz | - | 1.7 | - | Ω |
| Turn-On Delay Time | $td_{(on)}$ | $V_{DS}$=32V, $I_D$=50A, $V_{GS}$=10V, $R_G$=3Ω (Note 2) | - | 37 | - | ns |
| Turn-On Rise Time | $t_r$ | | - | 47 | - | |
| Turn-Off Delay Time | $td_{(off)}$ | | - | 115 | - | |
| Turn-Off Fall Time | $t_f$ | | - | 50 | - | |
| **Drain-Source Diode** | | | | | | |
| Diode Forward Current | $I_S$ | $T_C$=25°C (Package Limit) | - | - | 135 | A |
| Pulsed Diode Forward Current | $I_{SM}$ | | - | - | 950 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=90A, $V_{GS}$=0V | - | 0.8 | 1.3 | V |
| Reverse Recovery Time | Trr | $V_{DD}$=32V, $V_{GS}$=0V, $I_S$=20A,$dI_S/dt$=100A/us | - | 29 | - | ns |
| Reverse Recovery Charge | Qrr | | - | 23 | - | nC |

NOTES :

1. Pulse width≤100us, Duty cycle≤2%.
2. Essentially independent of operating temperature typical characteristics.
3. Chip capability with an $R_{\theta JC}$=0.85°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. Device on 2s2p FR4 PCB defined in accordance with JEDEC standards (JESD51-5,-7) PCB is vertical in still air.
6. $E_{AS}$ is calculated based on the condition of L=1mH, $I_{AS}$=33A, $V_{DD}$=30V, $V_{GS}$=10V. 100% test at L=0.5mH, $I_{AS}$=35A in production.
7. Guaranteed by design, not subject to production testing.

# PJQ54404VUC-AU

## TYPICAL CHARACTERISTIC CURVES

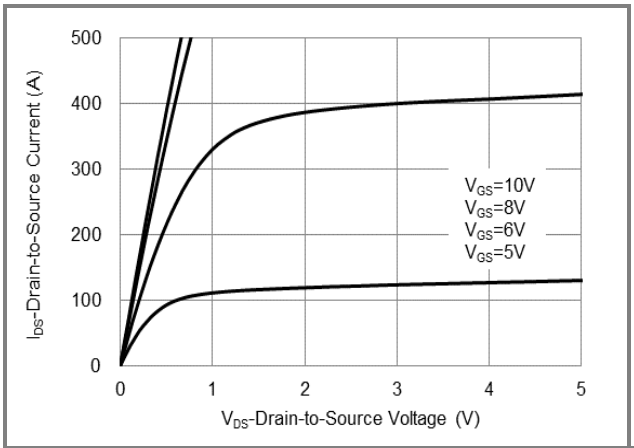



Fig.1 On-Region Characteristics

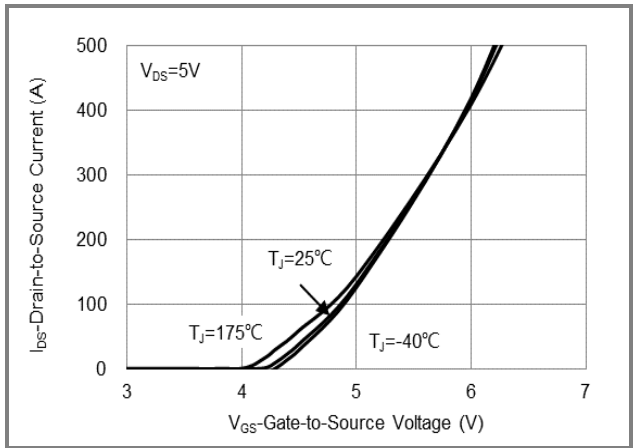



Fig.2 Transfer Characteristics

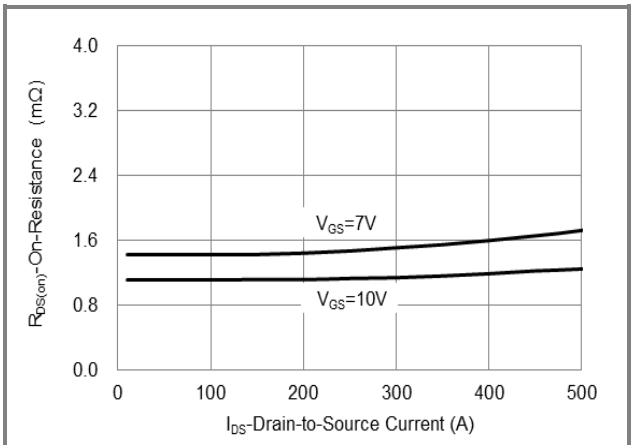



Fig.3 On-Resistance vs. Drain Current

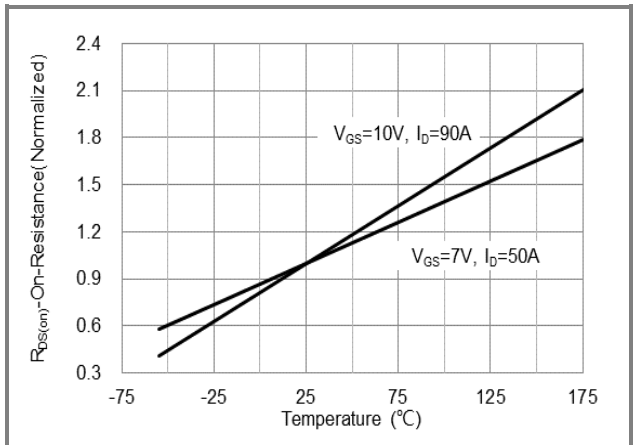



Fig.4 On-Resistance vs. Junction temperature

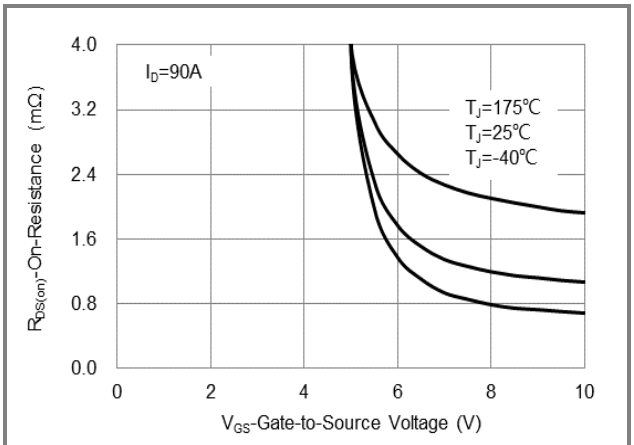



Fig.5 On-Resistance Variation with $V_{GS}$

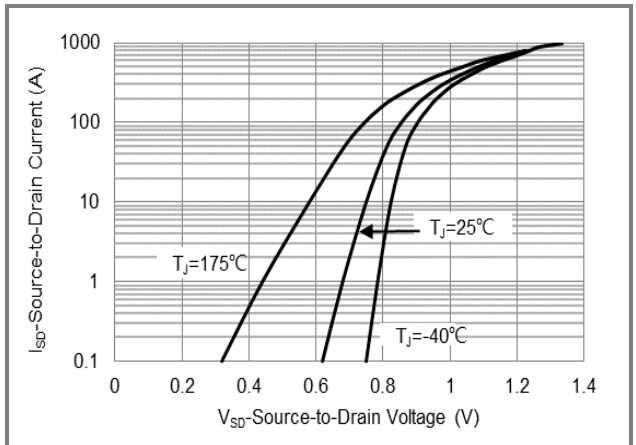



Fig.6 Source-Drain Diode Forward Voltage

# PJQ54404VUC-AU

## TYPICAL CHARACTERISTIC CURVES

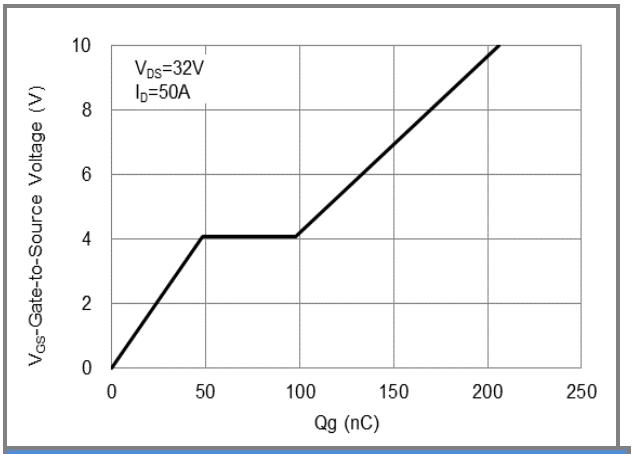



Fig.7 Gate-Charge Characteristics

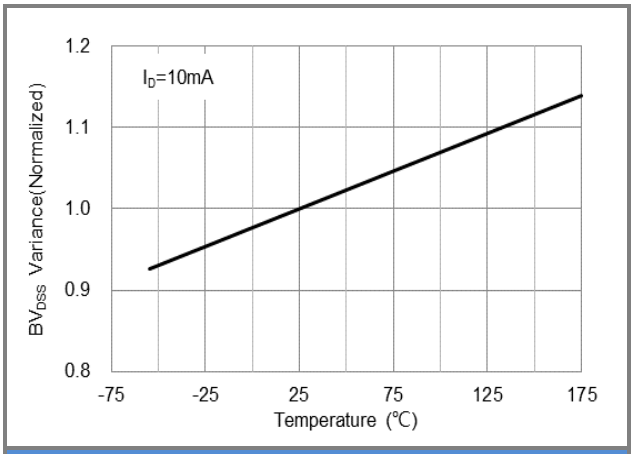



Fig.8 Breakdown Voltage Variation vs. Temperature

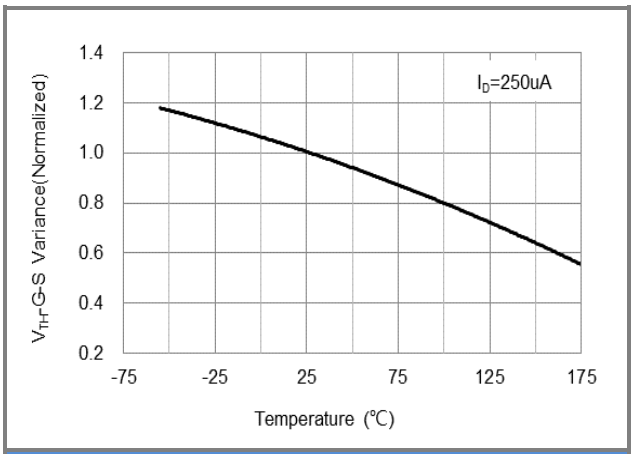



Fig.9 Threshold Voltage Variation with Temperature

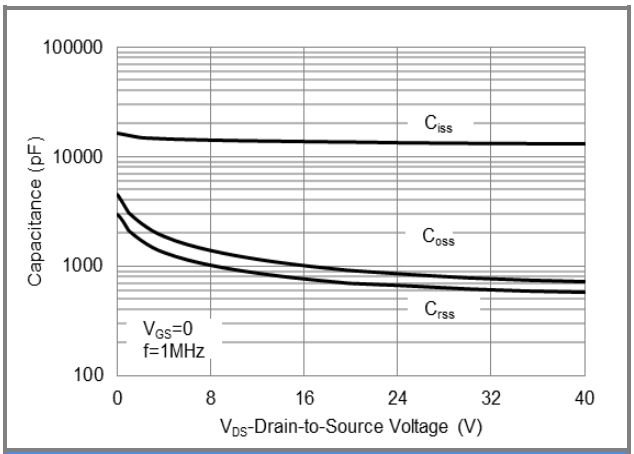



Fig.10 Capacitance vs. Drain-Source Voltage

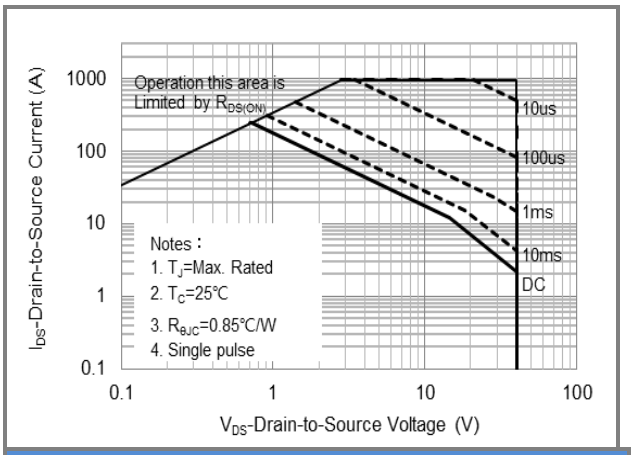



Fig.11 Maximum Safe Operating Area

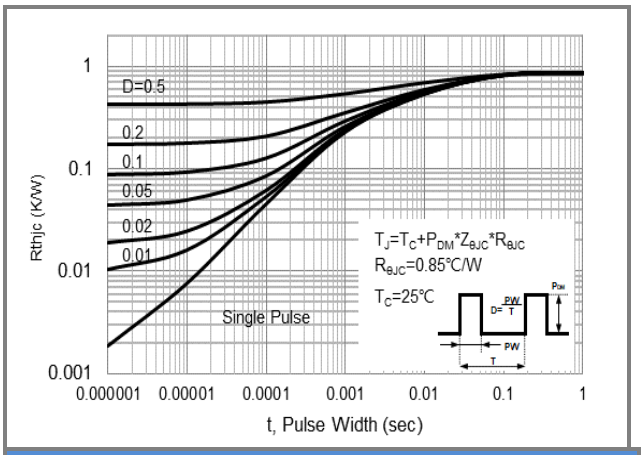



Fig.12 Normalized Transient Thermal Impedance

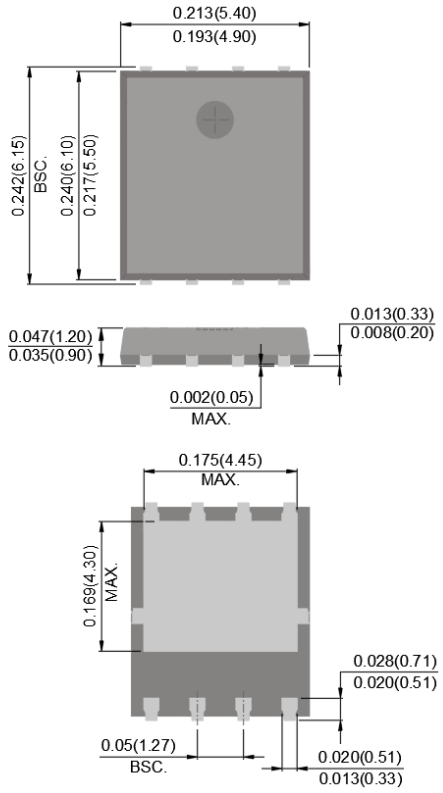
# PJQ54404VUC-AU

## Product and Packing Information

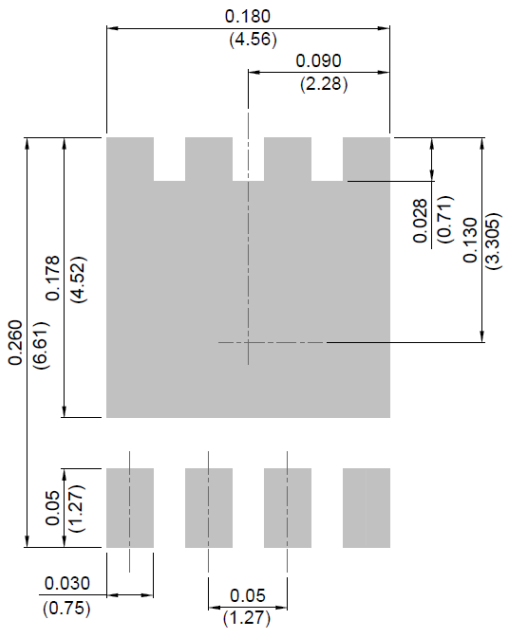
| Part No. | Package Type | Packing Type | Marking |
|---|---|---|---|
| PJQ54404VUC-AU | DFN5060XC-8L | 3K pcs / 13” reel | 54404VUC |

## Packaging Information & Mounting Pad Layout

DFN5060XC-8L Dimension — Unit: inch(mm)




DFN5060XC-8L Pad Layout — Unit: inch(mm)



# PJQ54404VUC-AU

## Disclaimer

- Reproducing and modifying information of the document is prohibited without permission from Panjit International Inc..
- Panjit International Inc. reserves the rights to make changes of the content herein the document follow PCN procedure. Please refer to our website for the latest document.
- Panjit International Inc. disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially occurred.
- Panjit International Inc. does not assume any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.
- Applications shown on the herein document are examples of standard use and operation. Customers are responsible in comprehending the suitable use in particular applications. Panjit International Inc. makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.
- The products shown herein are not designed and authorized for equipments relating to human life and for any applications concerning life-saving or life-sustaining, such as medical instruments, aerospace machinery et cetera. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Panjit International Inc. for any damages resulting from such improper use or sale.
- Since Panjit uses lot number as the tracking base, please provide the lot number for tracking when complaining.