

PJQ5540C-AU

40V N-Channel Enhancement Mode MOSFET

Voltage

40 V

Current

240 A

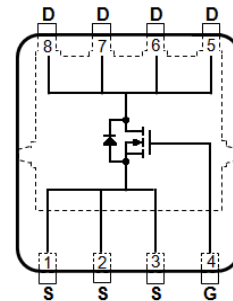
Features

- $R_{DS(ON)}$, $V_{GS}@10V$, $I_D@20A < 1.38m\Omega$
- $R_{DS(ON)}$, $V_{GS}@4.5V$, $I_D@20A < 1.82m\Omega$
- 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 : DFN5060X-8L Package
- Terminals : Solderable per MIL-STD-750, Method 2026
- Approx. Weight : 0.087 grams

DFN5060X-8L



Maximum Ratings and Thermal Characteristics ($T_A=25^\circ\text{C}$ 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) | $T_C=25^\circ\text{C}$ | I_D | 240 | A |
| | $T_C=100^\circ\text{C}$ | | 170 | |
| Pulsed Drain Current ^(Note 1) | $T_C=25^\circ\text{C}$ | I_{DM} | 800 | |
| Power Dissipation | $T_C=25^\circ\text{C}$ | P_D | 167 | W |
| | $T_C=100^\circ\text{C}$ | | 83 | |
| Continuous Drain Current ^(Note 4) | $T_A=25^\circ\text{C}$ | I_D | 34 | A |
| | $T_A=70^\circ\text{C}$ | | 28 | |
| Power Dissipation | $T_A=25^\circ\text{C}$ | P_D | 3.3 | W |
| | $T_A=70^\circ\text{C}$ | | 2.3 | |
| Single Pulse Avalanche Current ^(Note 5) | | I_{AS} | 29 | A |
| Single Pulse Avalanche Energy ^(Note 5) | | E_{AS} | 221 | mJ |
| Operating Junction and Storage Temperature Range | | T_J, T_{STG} | -55~175 | $^\circ\text{C}$ |
| Thermal Resistance ^(Note 4) | Junction to Case | $R_{\theta JC}$ | 0.9 | $^\circ\text{C/W}$ |
| | Junction to Ambient | $R_{\theta JA}$ | 45 | |

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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 | 1.5 | 2.3 | |
| Drain-Source On-State Resistance | R _{DS(on)} | V _{GS} =10V, I _D =20A | - | 1.1 | 1.38 | mΩ |
| | | V _{GS} =4.5V, I _D =20A | - | 1.4 | 1.82 | |
| 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 | - | 75 | 98 | nC |
| Gate-Source Charge | Q _{gs} | | - | 15 | - | |
| Gate-Drain Charge | Q _{gd} | | - | 10 | - | |
| Input Capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V, f=1MHz | - | 4973 | 6465 | pF |
| Output Capacitance | C _{oss} | | - | 1038 | 1349 | |
| Reverse Transfer Capacitance | C _{rss} | | - | 160 | 240 | |
| Gate resistance | R _g | f=1MHz | - | 1 | - | Ω |
| Turn-On Delay Time | t _{d(on)} | V _{DS} =32V, I _D =20A, V _{GS} =10V, R _G =3Ω (Note 2) | - | 20 | - | ns |
| Turn-On Rise Time | t _r | | - | 32 | - | |
| Turn-Off Delay Time | t _{d(off)} | | - | 68 | - | |
| Turn-Off Fall Time | t _f | | - | 17 | - | |
| Drain-Source Diode | | | | | | |
| Diode Forward Current | I _S | T _C =25°C | - | - | 240 | A |
| Pulsed Diode Forward Current | I _{SM} | | - | - | 800 | |
| Diode Forward Voltage | V _{SD} | I _S =20A, V _{GS} =0V | - | 0.75 | 1.3 | V |
| Reverse Recovery Time | T _{rr} | V _{DD} =20V, V _{GS} =0V | - | 52 | - | ns |
| Reverse Recovery Charge | Q _{rr} | I _S =20A, dI _S /dt=100A/us | - | 50 | - | nC |

NOTES :

1. Pulse width ≤ 100us, Duty cycle ≤ 2%.
2. Essentially independent of operating temperature typical characteristics.
3. Chip capability with an R_{θJC}=0.9°C/W, Package limited 120A.
4. R_{θJA} 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 inch² with 2oz. square pad of copper.
5. E_{AS} is calculated based on the condition of L=1mH, I_{AS}=21A, V_{DD}=30V, V_{GS}=10V. 100% test at L=0.5mH, I_{AS}=29A in production.
6. Guaranteed by design, not subject to production testing.

PJQ5540C-AU

TYPICAL CHARACTERISTIC CURVES

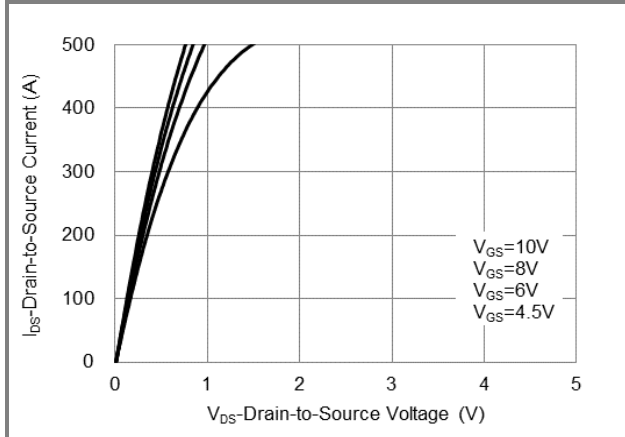


Fig.1 On-Region Characteristics

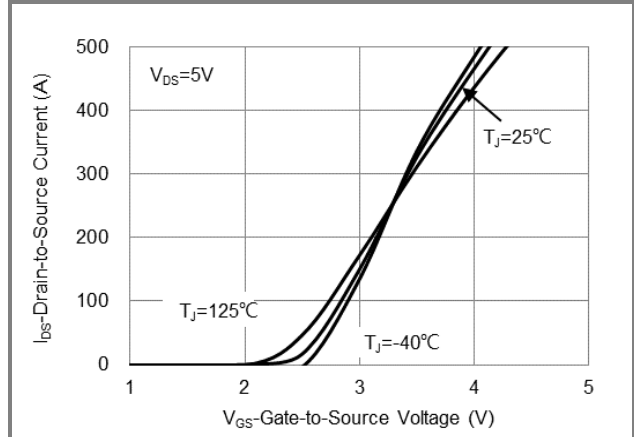


Fig.2 Transfer Characteristics

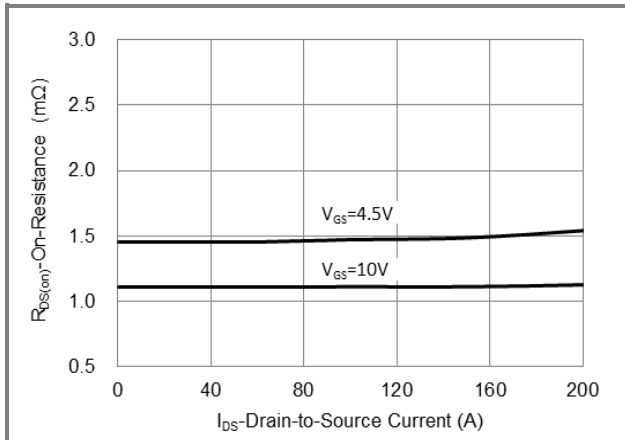


Fig.3 On-Resistance vs. Drain Current

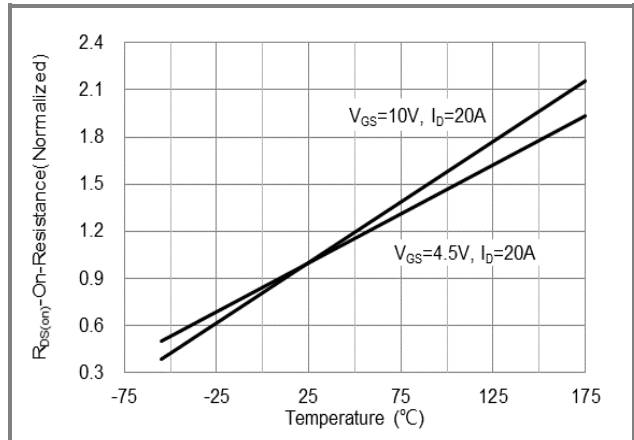


Fig.4 On-Resistance vs. Junction temperature

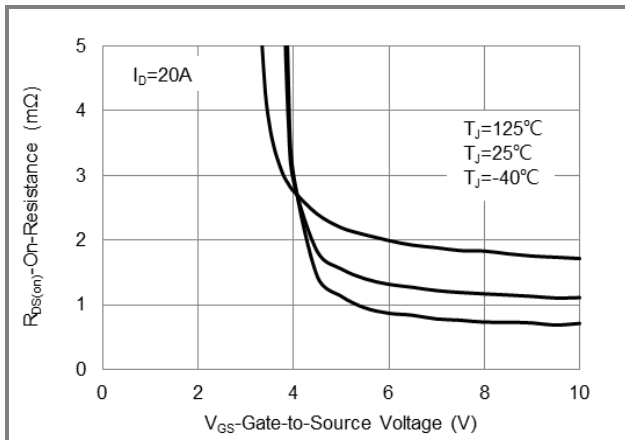


Fig.5 On-Resistance Variation with Vgs

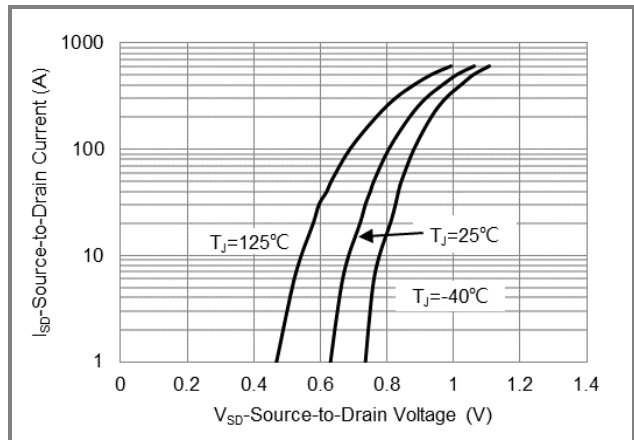


Fig.6 Source-Drain Diode Forward Voltage

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TYPICAL CHARACTERISTIC CURVES

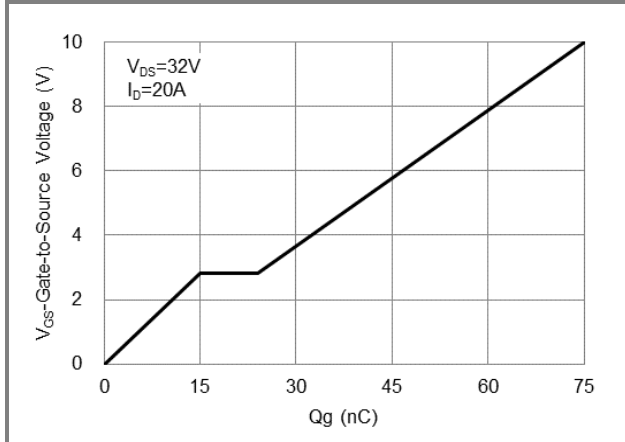


Fig.7 Gate-Charge Characteristics

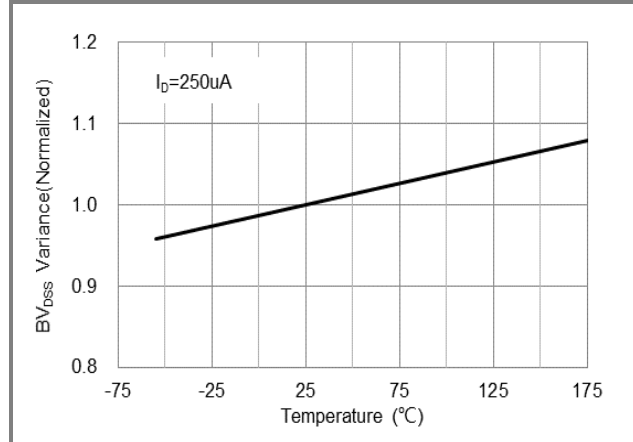


Fig.8 Breakdown Voltage Variation vs. Temperature

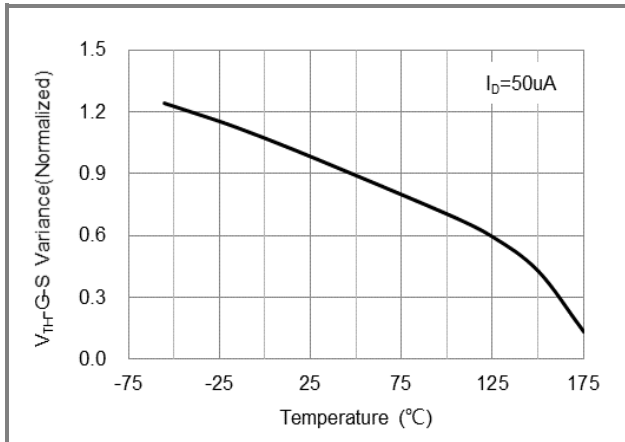


Fig.9 Threshold Voltage Variation with Temperature

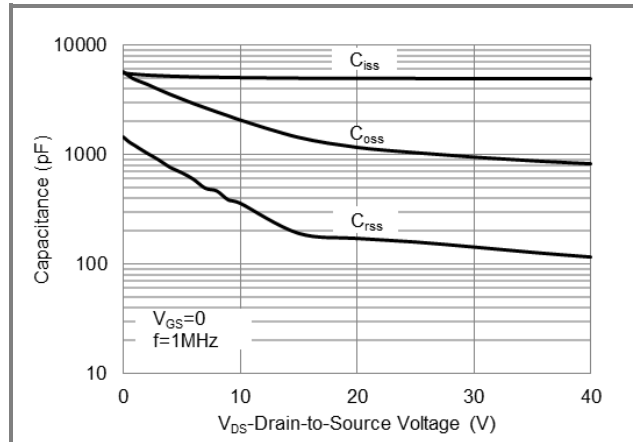


Fig.10 Capacitance vs. Drain-Source Voltage

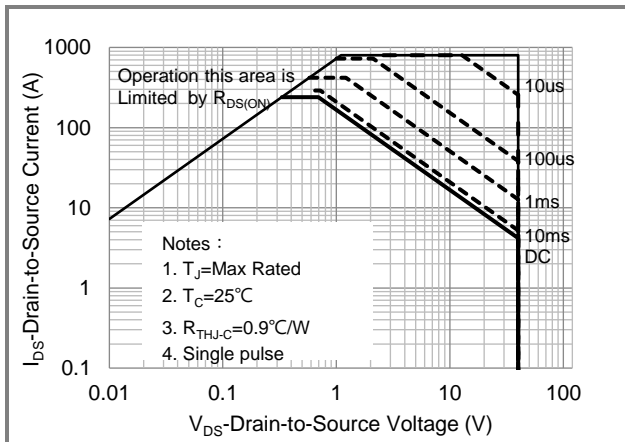


Fig.11 Maximum Safe Operating Area

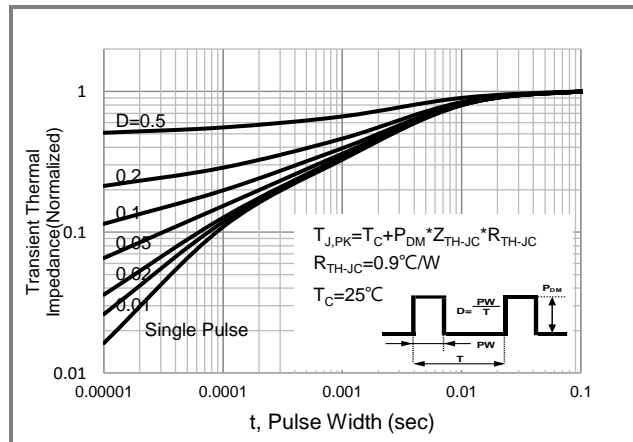


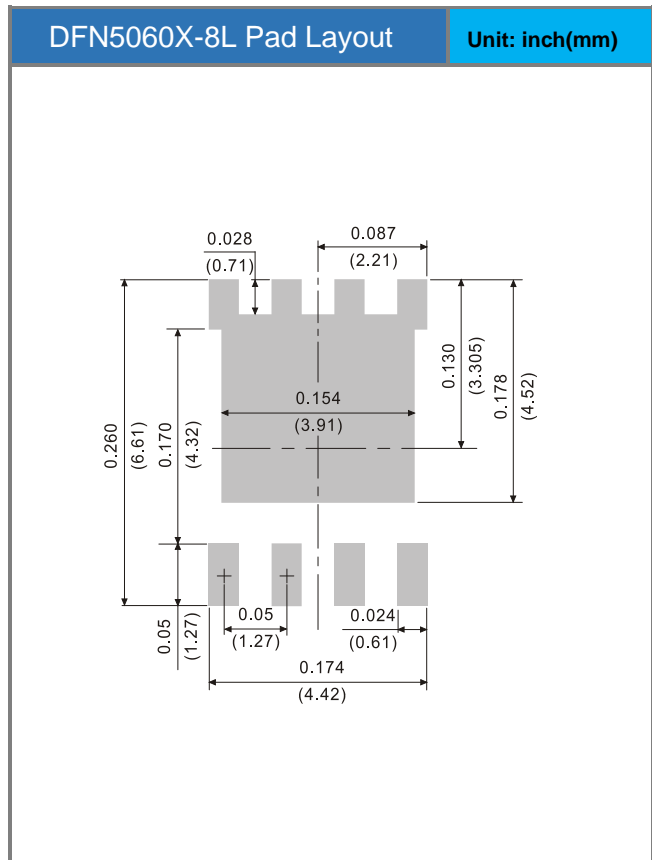
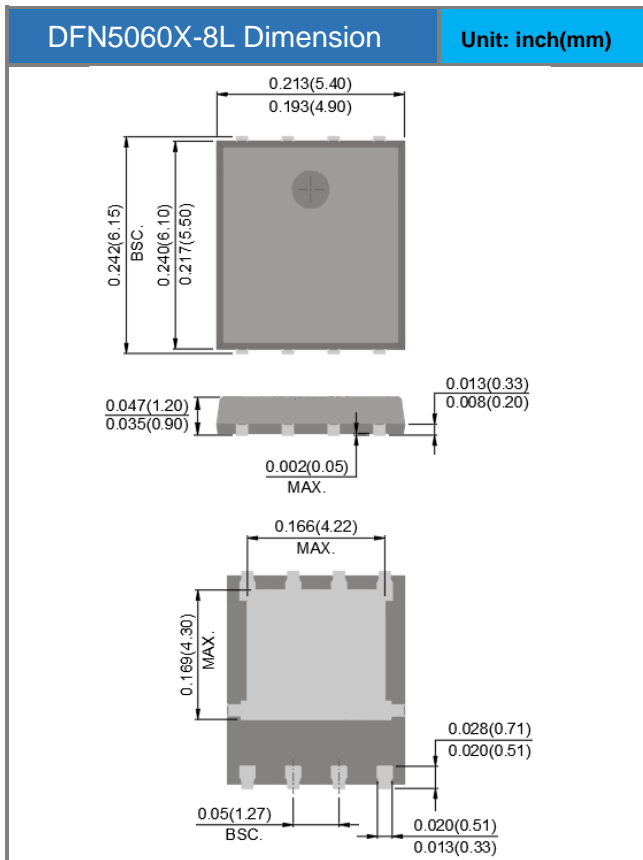
Fig.12 Normalized Transient Thermal Impedance

PJQ5540C-AU

Product and Packing Information

| Part No. | Package Type | Packing Type | Marking |
|-------------|--------------|-------------------|---------|
| PJQ5540C-AU | DFN5060X-8L | 3K pcs / 13" reel | Q5540C |

Packaging Information & Mounting Pad Layout



PJQ5540C-AU

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