

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | I_D |
|---------------|-----------------|-------|
| 150V | 5.8mΩ@10V | 170A |

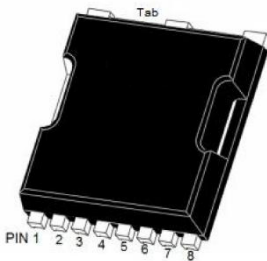
Feature

- Excellent gate charge x $R_{DS(on)}$ product(FOM)
- Very low on-resistance $R_{DS(on)}$
- Suffix "-Q1" for AEC-Q101

Application

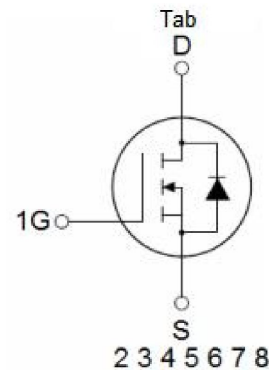
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

Package

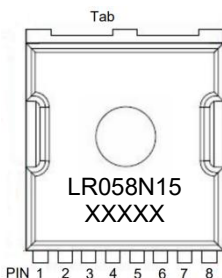


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Circuit diagram



Marking



Absolute maximum ratings (Tc=25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|------------------|------------|------|
| Drain-Source Voltage | V _{DS} | 150 | V |
| Gate-Source Voltage | V _{GS} | ±20 | V |
| Continuous Drain Current | I _D | 170 | A |
| Continuous Drain Current (T _c =100°C) | I _D | 120 | A |
| Pulsed Drain Current ¹⁾ | I _{DM} | 680 | A |
| Power Dissipation | P _D | 380 | W |
| Thermal Resistance,Junction-to-Case ²⁾ | R _{θJC} | 0.4 | °C/W |
| Single pulse avalanche energy ⁵⁾ | E _{AS} | 1300 | mJ |
| Junction Temperature | T _J | 175 | °C |
| Storage Temperature | T _{STG} | -55 ~ +175 | °C |

Electrical characteristics (Tc=25°C unless otherwise noted)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|----------------------|--|------|------|------|------|
| Static Characteristics | | | | | | |
| Drain-source breakdown voltage | V _{(BR)DSS} | V _{GS} = 0V, I _D =250μA | 150 | | | V |
| Zero gate voltage drain current | I _{DSS} | V _{DS} =150V, V _{GS} = 0V | | | 1 | μA |
| Gate-body leakage current | I _{GSS} | V _{GS} =±20V, V _{DS} = 0V | | | ±100 | nA |
| Gate threshold voltage ³⁾ | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250μA | 2.0 | 3.0 | 4.0 | V |
| Drain-source on-resistance ³⁾ | R _{DS(on)} | V _{GS} =10V, I _D =85A | | 5.0 | 5.8 | mΩ |
| Dynamic characteristics⁴⁾ | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =75V, V _{GS} =0V, f =1MHz | | 5500 | | pF |
| Output Capacitance | C _{oss} | | | 690 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 24 | | |
| Total Gate Charge | Q _g | V _{DS} =75V, V _{GS} =10V, I _D =85A | | 80 | | nC |
| Gate-Source Charge | Q _{gs} | | | 32 | | |
| Gate-Drain Charge | Q _{gd} | | | 22 | | |
| Turn-on delay time | t _{d(on)} | V _{DD} =75V, V _{GS} =10V, I _D =85A, R _G =4.7Ω | | 26 | | nS |
| Turn-on rise time | t _r | | | 36 | | |
| Turn-off delay time | t _{d(off)} | | | 47 | | |
| Turn-off fall time | t _f | | | 15 | | |
| Source-Drain Diode characteristics | | | | | | |
| Diode Forward Current ²⁾ | I _S | | | | 170 | A |
| Diode Forward voltage ³⁾ | V _{SD} | V _{GS} =0V, I _S =85A | | | 1.2 | V |
| Reverse Recovery Time | t _{rr} | T _J = 25°C, I _F =I _S di/dt = 100A/μs ³⁾ | | 146 | | nS |
| Reverse Recovery Charge | Q _{rr} | | | 485 | | nC |

Notes:

- 1) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2) The value of R_{θJA} is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The value in anygiven application depends on the user's specific board design, and the maximum temperature of 175° C may be used if the PCB allows it.
- 3) Pulse Test: Pulse Width ≤300μs, Duty Cycle ≤2%.
- 4) Guaranteed by design, not subject to production.
- 5) EAS condition : T_J=25°C , V_{DD}=50V, V_G=10V, L=0.5mH, R_G=25Ω.

Typical Characteristics

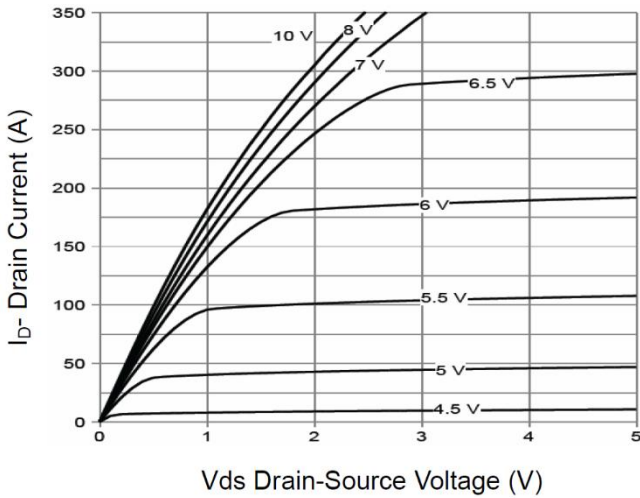


Figure 1 Output Characteristics

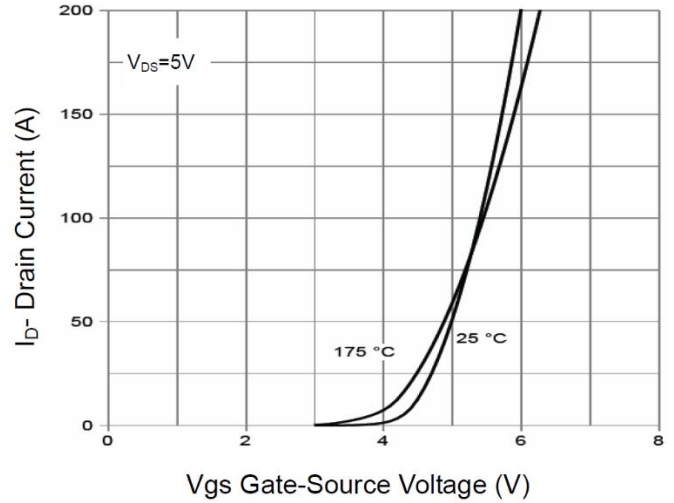


Figure 2 Transfer Characteristics

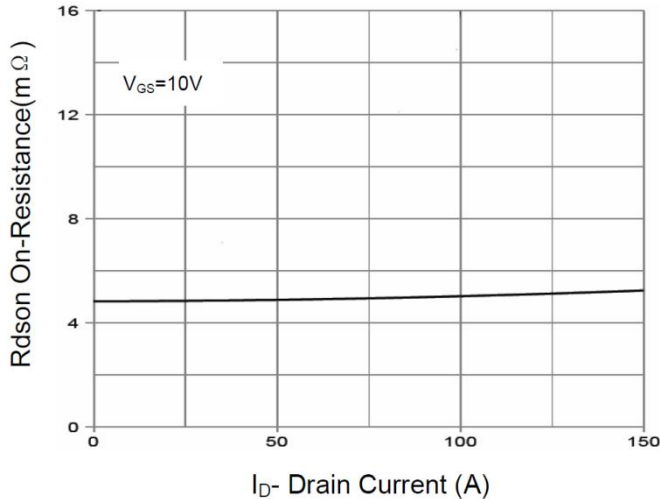


Figure 3 Rdson- Drain Current

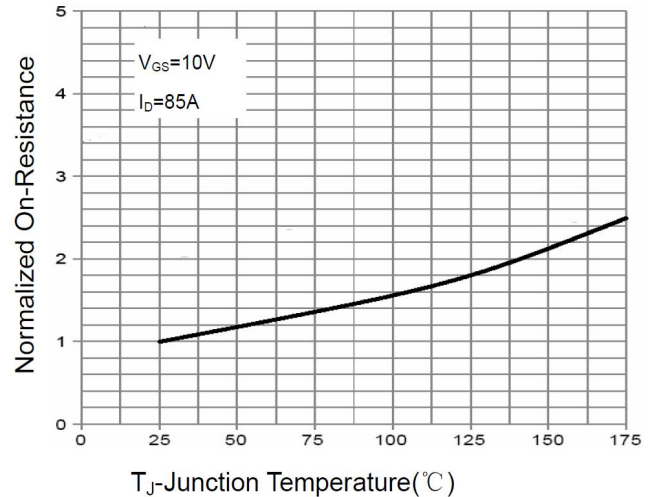


Figure 4 Rdson-Junction Temperature

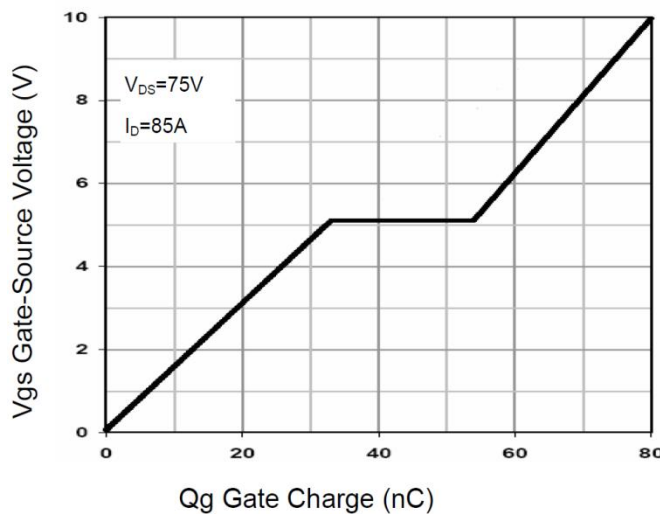


Figure 5 Gate Charge

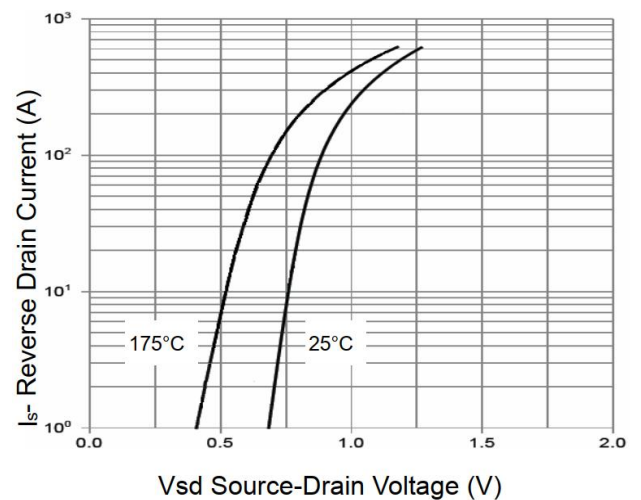


Figure 6 Source- Drain Diode Forward

Typical Characteristics

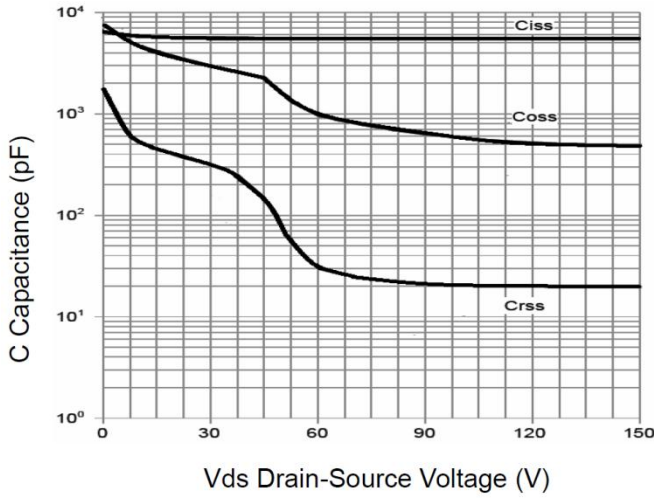


Figure 7 Capacitance vs Vds

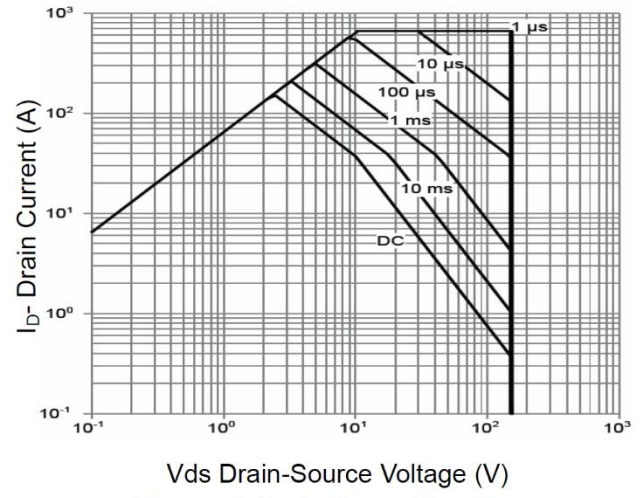


Figure 8 Safe Operation Area

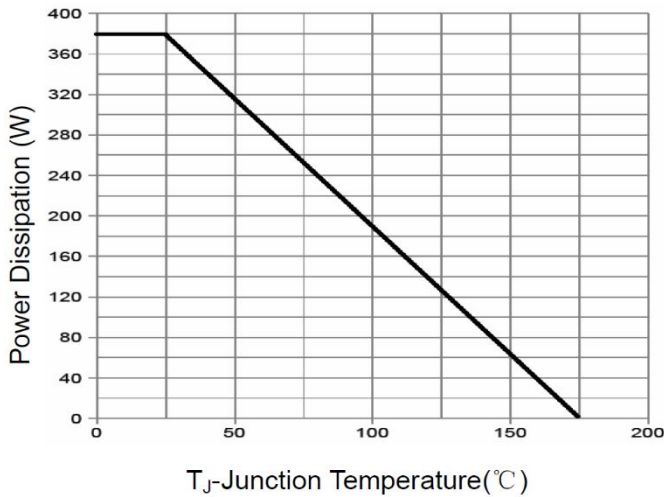


Figure 9 Power De-rating

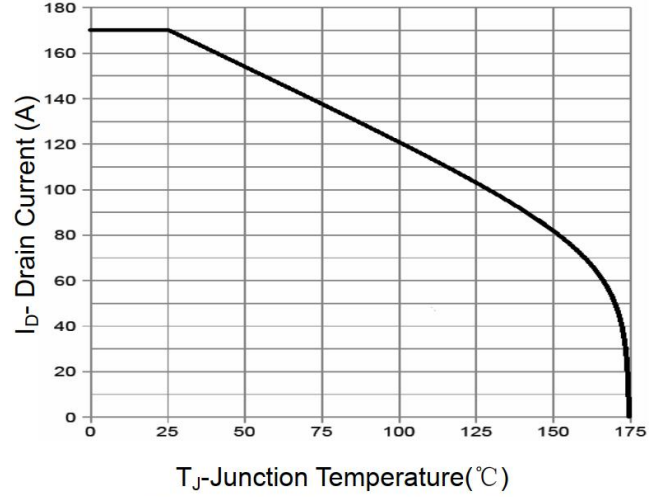


Figure 10 Current De-rating

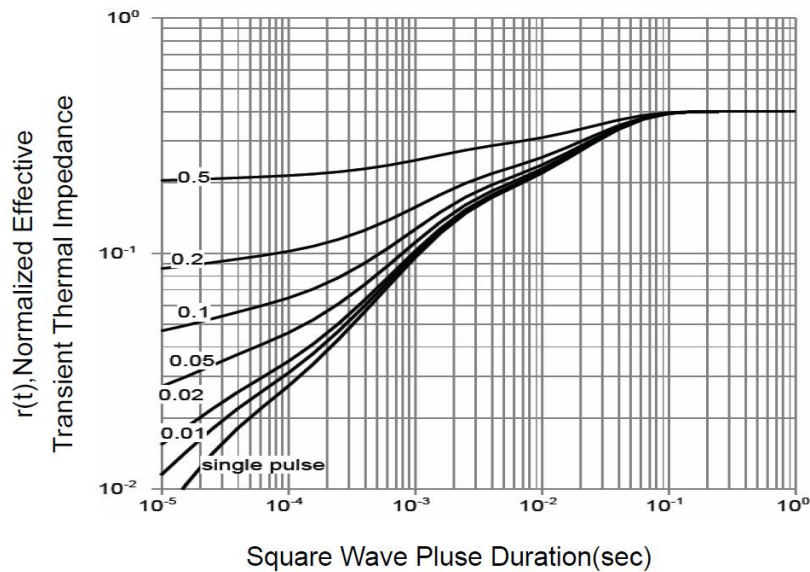
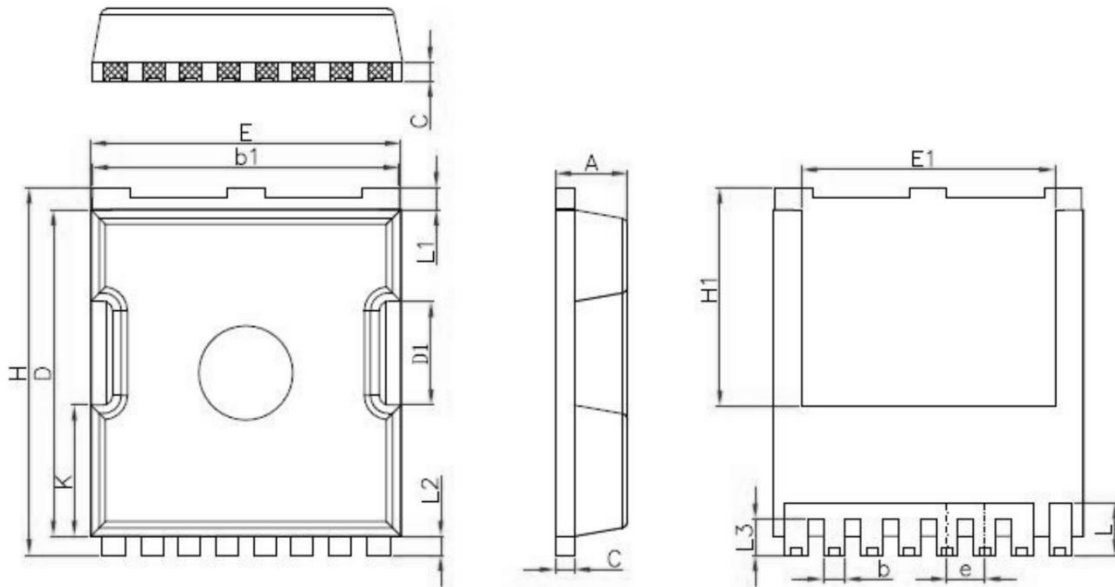


Figure 11 Normalized Maximum Transient Thermal Impedance

TOLL Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| b | 0.650 | 0.850 | 0.026 | 0.033 |
| b1 | 9.700 | 9.900 | 0.382 | 0.390 |
| C | 0.500 | 0.700 | 0.020 | 0.027 |
| D | 10.300 | 10.500 | 0.406 | 0.413 |
| D1 | 3.150 | 3.450 | 0.124 | 0.136 |
| E | 9.700 | 10.100 | 0.382 | 0.398 |
| E1 | 8.000 | 8.200 | 0.315 | 0.323 |
| e | 1.100 | 1.300 | 0.043 | 0.051 |
| H | 11.600 | 11.800 | 0.457 | 0.465 |
| H1 | 6.850 | 7.050 | 0.270 | 0.278 |
| K | 4.080 | 4.280 | 0.161 | 0.169 |
| L | 1.600 | 2.100 | 0.063 | 0.083 |
| L1 | 0.600 | 0.800 | 0.024 | 0.031 |
| L2 | 0.500 | 0.700 | 0.020 | 0.028 |
| L3 | 1.050 | 1.300 | 0.041 | 0.051 |