

### Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---------------|-----------------|-------|
| 30V           | 5mΩ@10V         | 65A   |
|               | 8mΩ@4.5V        |       |

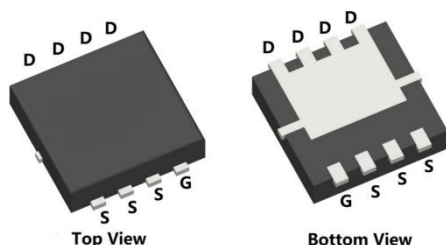
### Feature

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Suffix "-Q1" for AEC-Q101

### Application

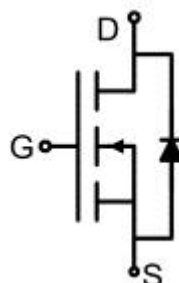
- High current load applications
- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

### Package

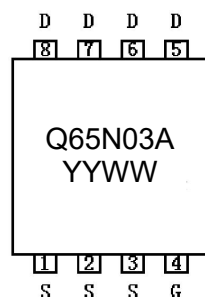


PDFN3.3X3.3-8L

### Circuit diagram



### Marking



### Absolute maximum ratings (T<sub>A</sub>=25°C unless otherwise noted)

| Parameter                                        | Symbol                  | Value      | Unit |
|--------------------------------------------------|-------------------------|------------|------|
| Drain-Source Voltage                             | V <sub>DS</sub>         | 30         | V    |
| Gate-Source Voltage                              | V <sub>GS</sub>         | ±20        | V    |
| Continuous Drain Current(T <sub>C</sub> =25°C )  | I <sub>D</sub>          | 65         | A    |
| Continuous Drain Current(T <sub>C</sub> =100°C ) | I <sub>D</sub> (100 °C) | 41         | A    |
| Pulsed Drain Current <sup>1)</sup>               | I <sub>DM</sub>         | 200        | A    |
| Power Dissipation <sup>3)</sup>                  | P <sub>D</sub>          | 2          | W    |
| Single pulse avalanche energy <sup>2)</sup>      | E <sub>AS</sub>         | 112        | mJ   |
| Thermal Resistance,Junction-to-Case              | R <sub>θJC</sub>        | 2.5        | °C/W |
| Junction Temperature                             | T <sub>J</sub>          | 150        | °C   |
| Storage Temperature                              | T <sub>STG</sub>        | -55 ~ +150 | °C   |

### Electrical characteristics (T<sub>J</sub>=25°C unless otherwise noted)

| Parameter                             | Symbol               | Test Condition                                                                             | Min. | Typ. | Max. | Unit |
|---------------------------------------|----------------------|--------------------------------------------------------------------------------------------|------|------|------|------|
| Static Characteristics                |                      |                                                                                            |      |      |      |      |
| Drain-source breakdown voltage        | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA                                                | 30   |      |      | V    |
| Zero gate voltage drain current       | I <sub>DSS</sub>     | V <sub>DS</sub> =30V,V <sub>GS</sub> = 0V                                                  |      |      | 1    | μA   |
| Gate-body leakage current             | I <sub>GSS</sub>     | V <sub>GS</sub> =±20V, V <sub>DS</sub> = 0V                                                |      |      | ±100 | nA   |
| Gate threshold voltage                | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                   | 1.0  | 1.5  | 2.5  | V    |
| Drain-source on-resistance            | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =32.5A                                                |      | 3.7  | 5    | mΩ   |
|                                       |                      | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                                  |      | 3.7  | 5    |      |
|                                       |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A                                                 |      | 6    | 8    |      |
| Dynamic characteristics <sup>4)</sup> |                      |                                                                                            |      |      |      |      |
| Input Capacitance                     | C <sub>iss</sub>     | V <sub>DS</sub> =15V,V <sub>GS</sub> =0V,f =1MHz                                           |      | 1790 |      | pF   |
| Output Capacitance                    | C <sub>oss</sub>     |                                                                                            |      | 300  |      |      |
| Reverse Transfer Capacitance          | C <sub>rss</sub>     |                                                                                            |      | 280  |      |      |
| Total Gate Charge                     | Q <sub>g</sub>       | V <sub>DS</sub> =15V,V <sub>GS</sub> =10V,<br>I <sub>D</sub> =32.5A                        |      | 38   |      | nC   |
| Gate-Source Charge                    | Q <sub>gs</sub>      |                                                                                            |      | 7    |      |      |
| Gate-Drain Charge                     | Q <sub>gd</sub>      |                                                                                            |      | 12   |      |      |
| Turn-on delay time                    | t <sub>d(on)</sub>   | V <sub>DD</sub> =15V,V <sub>GS</sub> =10V,<br>I <sub>D</sub> =32.5A,R <sub>GEN</sub> =2.2Ω |      | 9    |      | nS   |
| Turn-on rise time                     | t <sub>r</sub>       |                                                                                            |      | 242  |      |      |
| Turn-off delay time                   | t <sub>d(off)</sub>  |                                                                                            |      | 24   |      |      |
| Turn-off fall time                    | t <sub>f</sub>       |                                                                                            |      | 17   |      |      |
| Source-Drain Diode characteristics    |                      |                                                                                            |      |      |      |      |
| Diode Forward Current                 | I <sub>S</sub>       |                                                                                            |      |      | 65   | A    |
| Diode Forward voltage                 | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =32.5A                                                 |      |      | 1.2  | V    |
| Reverse Recovery Time                 | t <sub>rr</sub>      | I <sub>F</sub> = 32.5A, di/dt = 120A/μs                                                    |      | 16   |      | nS   |
| Reverse Recovery Charge               | Q <sub>rr</sub>      |                                                                                            |      | 7    |      | nC   |

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2) T<sub>J</sub>=25°C, V<sub>DD</sub>=25V, V<sub>G</sub>=10V, R<sub>G</sub>=25Ω, L=1mH, I<sub>AS</sub>=15A.
- 3) P<sub>d</sub> is based on max. junction temperature, using junction-case thermal resistance.
- 4) Guaranteed by design, not subject to production.

### Typical Characteristics

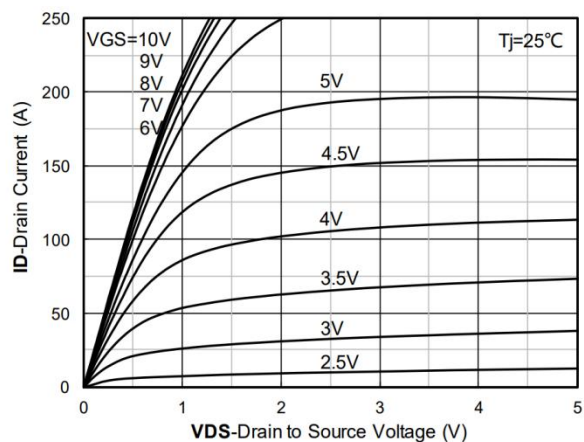


Figure 1. Output Characteristics

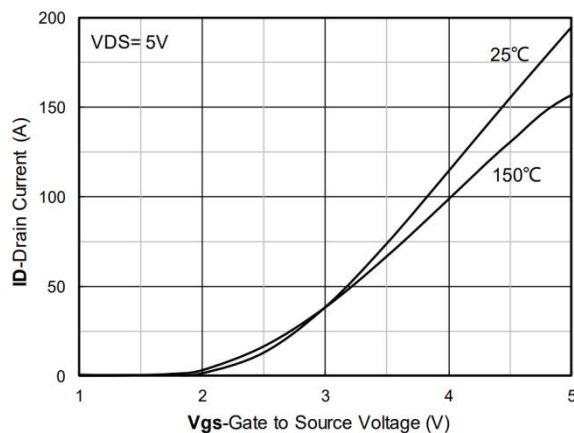


Figure 2. Transfer Characteristics

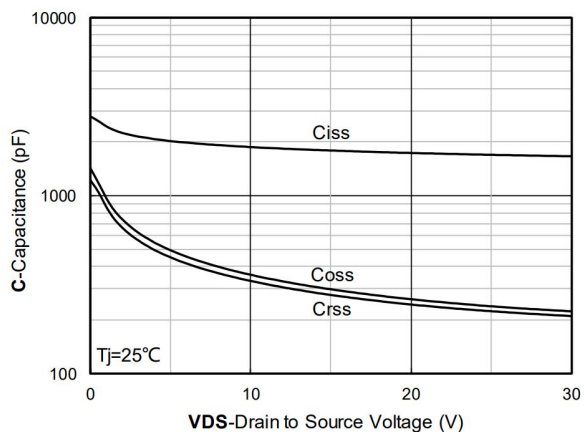


Figure 3. Capacitance Characteristics

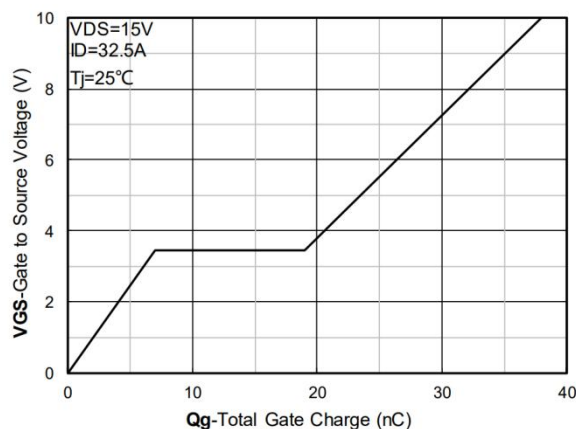


Figure 4. Gate Charge

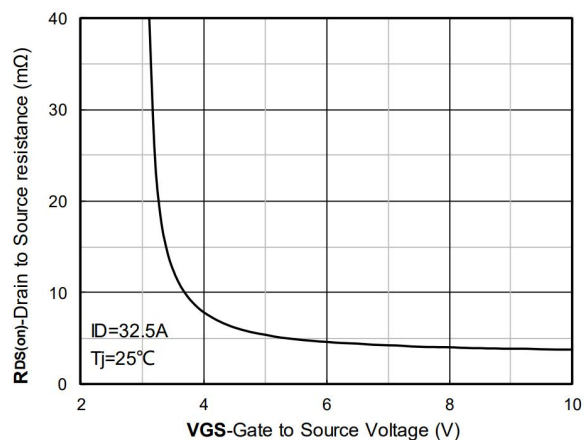


Figure 5. On-Resistance vs Gate to Source Voltage

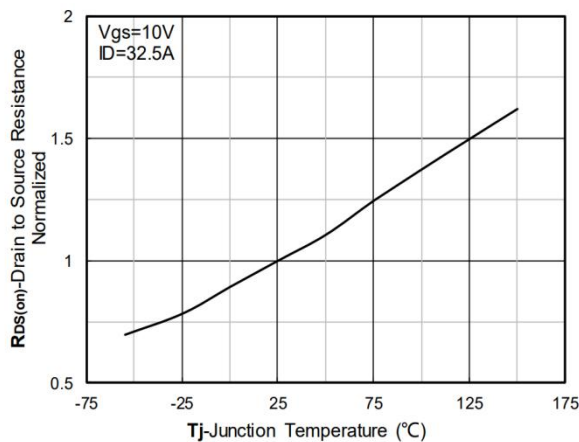


Figure 6. Normalized On-Resistance

### Typical Characteristics

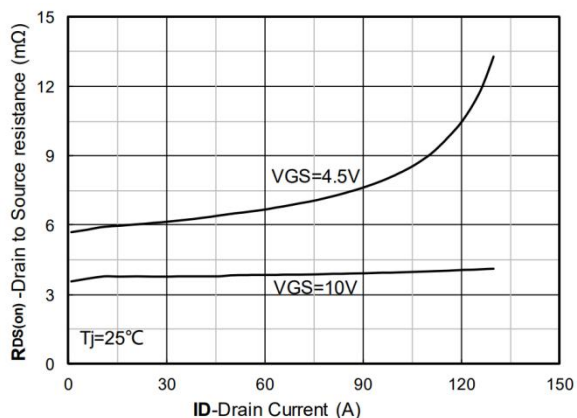


Figure 7. RDS(on) VS Drain Current

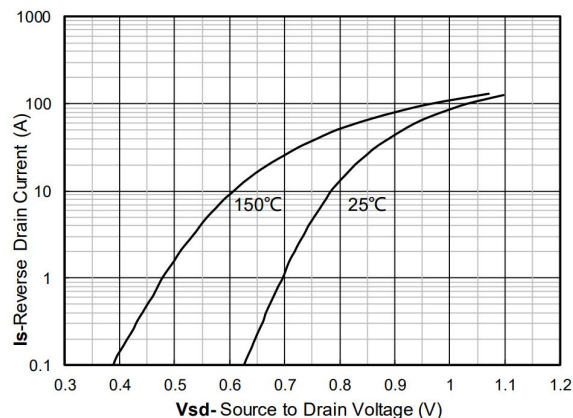


Figure 8. Forward characteristics of reverse diode

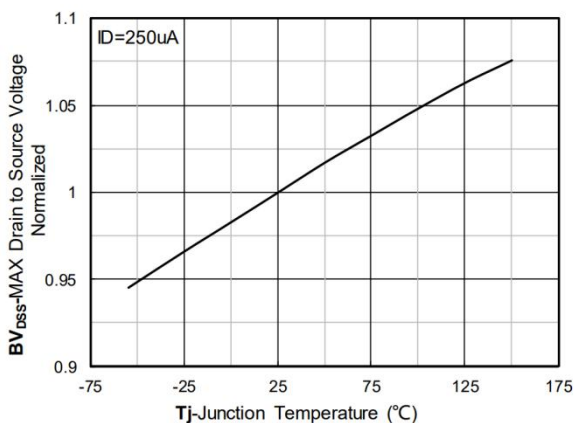


Figure 9. Normalized breakdown voltage

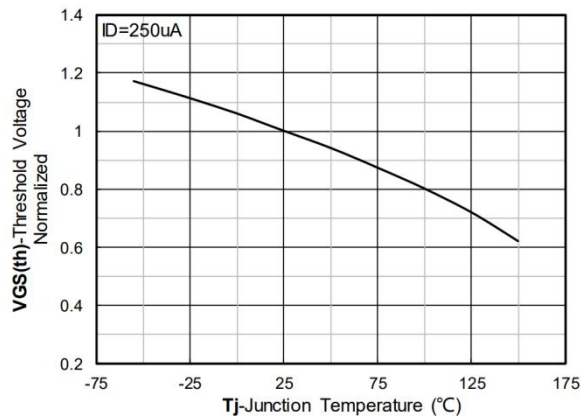


Figure 10. Normalized Threshold voltage

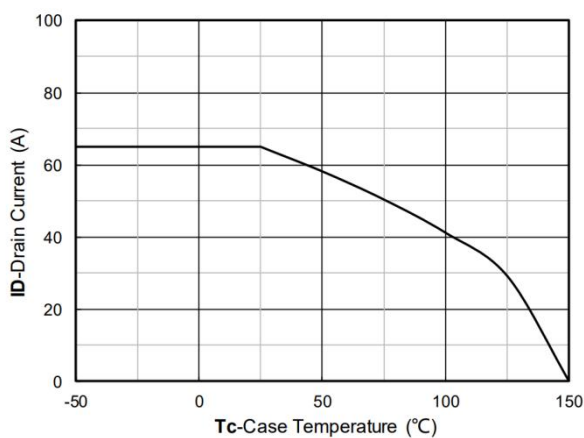


Figure 11. Current dissipation

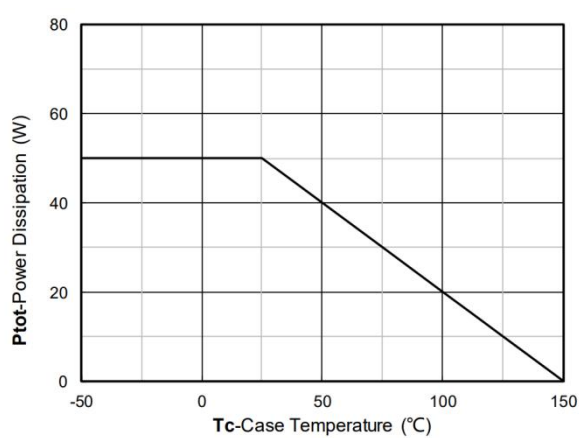


Figure 12. Power dissipation

### Typical Characteristics

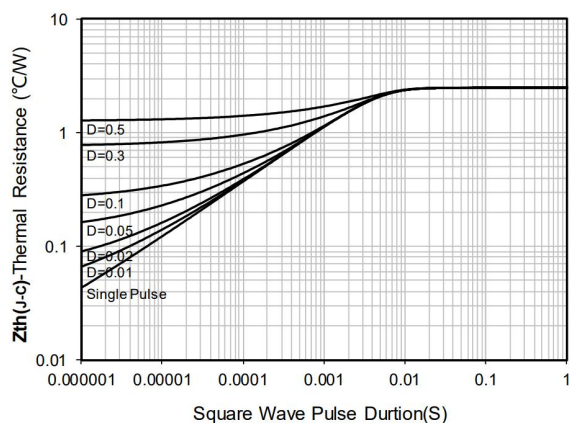


Figure 13. Maximum Transient Thermal Impedance

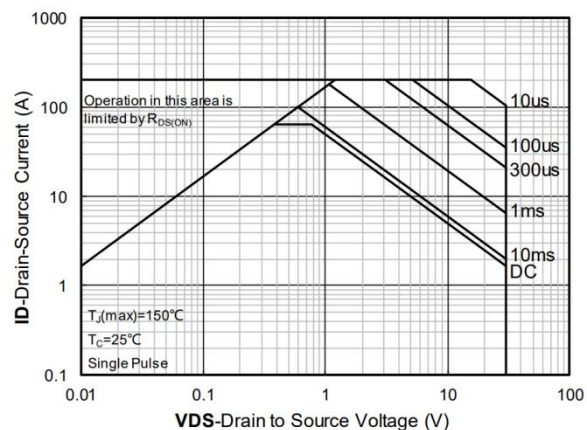
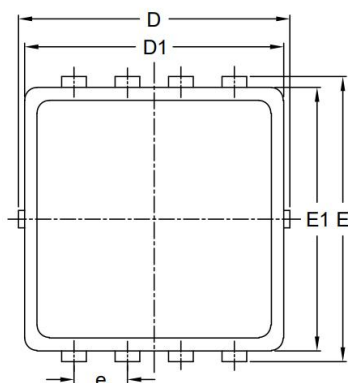
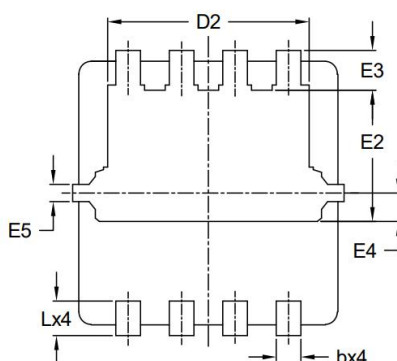


Figure 14. Safe Operation Area

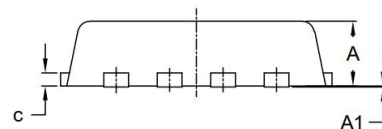
### PDFN3.3X3.3-8L Package Information



TOP VIEW



BOTTOM VIEW



SIDE VIEW

| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.700                     | 0.850 | 0.028                | 0.033 |
| A1     | 0.000                     | 0.050 | 0.000                | 0.002 |
| b      | 0.200                     | 0.400 | 0.008                | 0.016 |
| c      | 0.100                     | 0.250 | 0.004                | 0.010 |
| D      | 3.150                     | 3.450 | 0.124                | 0.136 |
| D1     | 3.000                     | 3.300 | 0.118                | 0.130 |
| D2     | 2.250                     | 2.650 | 0.089                | 0.104 |
| E      | 3.150                     | 3.450 | 0.124                | 0.136 |
| E1     | 2.900                     | 3.200 | 0.114                | 0.126 |
| E2     | 1.320                     | 1.720 | 0.052                | 0.068 |
| E3     | 0.280                     | 0.650 | 0.011                | 0.026 |
| E4     | 0.330 REF                 |       | 0.013 REF            |       |
| E5     | 0.200 REF                 |       | 0.008 REF            |       |
| e      | 0.650 BSC                 |       | 0.026 BSC            |       |
| L      | 0.300                     | 0.500 | 0.012                | 0.020 |