

### Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---------------|-----------------|-------|
| 60V           | 75mΩ@10V        | 4A    |
|               | 90mΩ@4.5V       |       |

### Feature

- Trench power MV MOSFET technology
- High speed switching
- Suffix “-Q1” for AEC-Q101

### Application

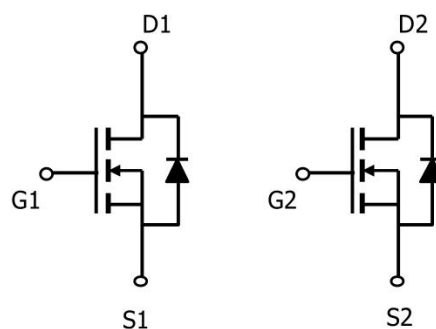
- Uninterruptible power supply
- Load switch
- Power switching application

### Package

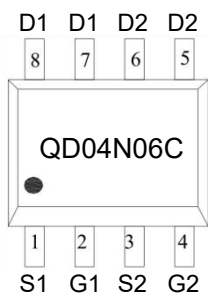


SOP-8

### Circuit diagram



### Marking



### Absolute maximum ratings ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter                                              | Symbol                       | Value           | Unit                        |
|--------------------------------------------------------|------------------------------|-----------------|-----------------------------|
| Drain-Source Voltage                                   | $V_{DS}$                     | 60              | V                           |
| Gate-Source Voltage                                    | $V_{GS}$                     | $\pm 20$        | V                           |
| Continuous Drain Current                               | $I_D$                        | 4               | A                           |
| Continuous Drain Current ( $T_A=100^{\circ}\text{C}$ ) | $I_{D(100^{\circ}\text{C})}$ | 2.5             | A                           |
| Pulsed Drain Current <sup>1)</sup>                     | $I_{DM}$                     | 20              | A                           |
| Power Dissipation <sup>2)</sup>                        | $P_D$                        | 1.6             | W                           |
| Thermal Resistance Junction to Ambient <sup>3)</sup>   | $R_{\theta JA}$              | 75              | $^{\circ}\text{C}/\text{W}$ |
| Operating Junction Temperature                         | $T_J$                        | $-55 \sim +150$ | $^{\circ}\text{C}$          |
| Storage Temperature                                    | $T_{STG}$                    | $-55 \sim +150$ | $^{\circ}\text{C}$          |

### Electrical characteristics ( $T_J=25^{\circ}\text{C}$ , unless otherwise noted)

| Parameter                             | Symbol        | Test Condition                                      | Min. | Typ. | Max.      | Unit       |
|---------------------------------------|---------------|-----------------------------------------------------|------|------|-----------|------------|
| Static Characteristics                |               |                                                     |      |      |           |            |
| Drain-source breakdown voltage        | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$                           | 60   |      |           | V          |
| Zero gate voltage drain current       | $I_{DSS}$     | $V_{DS}=60V, V_{GS}=0V$                             |      |      | 1         | $\mu A$    |
| Gate-body leakage current             | $I_{GSS}$     | $V_{DS}=0V, V_{GS}=\pm 20V$                         |      |      | $\pm 100$ | nA         |
| Gate threshold voltage                | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=250\mu A$                       | 0.9  | 1.3  | 2         | V          |
| Drain-source on-resistance            | $R_{DS(on)}$  | $V_{GS}=10V, I_D=4A$                                |      | 55   | 75        | m $\Omega$ |
|                                       |               | $V_{GS}=4.5V, I_D=2A$                               |      | 65   | 90        |            |
| Dynamic characteristics <sup>4)</sup> |               |                                                     |      |      |           |            |
| Input Capacitance                     | $C_{iss}$     | $V_{DS}=30V, V_{GS}=0V, f=1MHz$                     |      | 400  |           | pF         |
| Output Capacitance                    | $C_{oss}$     |                                                     |      | 60   |           |            |
| Reverse Transfer Capacitance          | $C_{rss}$     |                                                     |      | 25   |           |            |
| Total Gate Charge                     | $Q_g$         | $V_{DS}=30V, V_{GS}=10V, I_D=4A$                    |      | 9    |           | nC         |
| Gate-Source Charge                    | $Q_{gs}$      |                                                     |      | 1    |           |            |
| Gate-Drain Charge                     | $Q_{gd}$      |                                                     |      | 2.5  |           |            |
| Turn-on delay time                    | $t_{d(on)}$   | $V_{DS}=30V, V_{GS}=10V, I_D=4A$<br>$R_G=2.3\Omega$ |      | 4.5  |           | nS         |
| Turn-on rise time                     | $t_r$         |                                                     |      | 10   |           |            |
| Turn-off delay time                   | $t_{d(off)}$  |                                                     |      | 12.5 |           |            |
| Turn-off fall time                    | $t_f$         |                                                     |      | 1.5  |           |            |
| Source-Drain Diode characteristics    |               |                                                     |      |      |           |            |
| Diode Forward Current                 | $I_S$         |                                                     |      |      | 4         | A          |
| Diode Forward voltage                 | $V_{SD}$      | $V_{GS}=0V, I_S=4A$                                 |      |      | 1.2       | V          |
| Reverse recover time                  | $T_{rr}$      | $I_F=4A, di/dt=500A/us$                             |      | 12   |           | nS         |
| Reverse recovery charge               | $Q_{rr}$      |                                                     |      | 24   |           | nC         |

Notes:

- 1) Repetitive rating; pulse width limited by max. junction temperature.
- 2)  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.
- 3) The value of  $R_{\theta JA}$  is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in the still air environment with  $T_A=25^{\circ}\text{C}$ . The maximum allowed junction temperature of  $150^{\circ}\text{C}$ .  
The value in any given application depends on the user's specific board design.
- 4) Guaranteed by design, not subject to production testing.

### Typical Characteristics

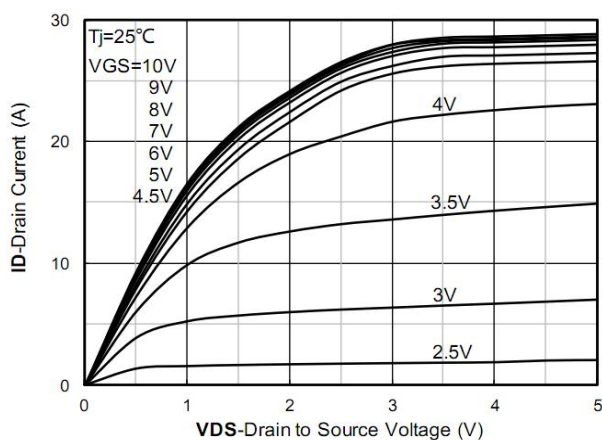


Figure 1. Output Characteristics

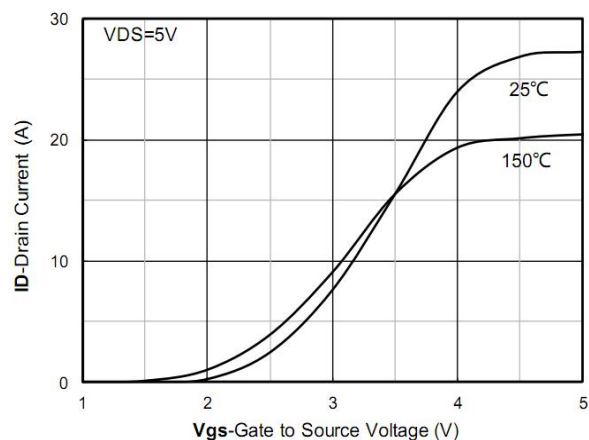


Figure 2. Transfer Characteristics

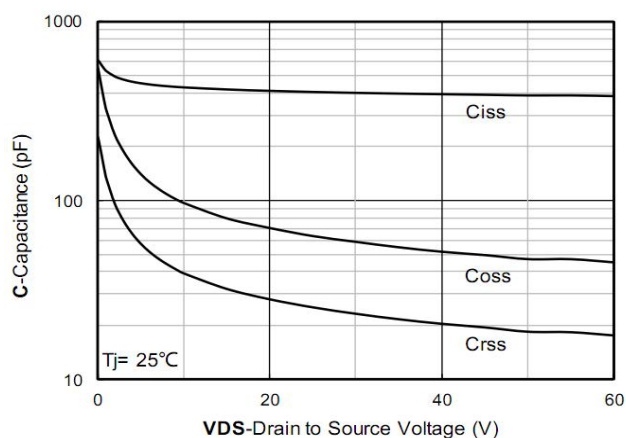


Figure 3. Capacitance Characteristics

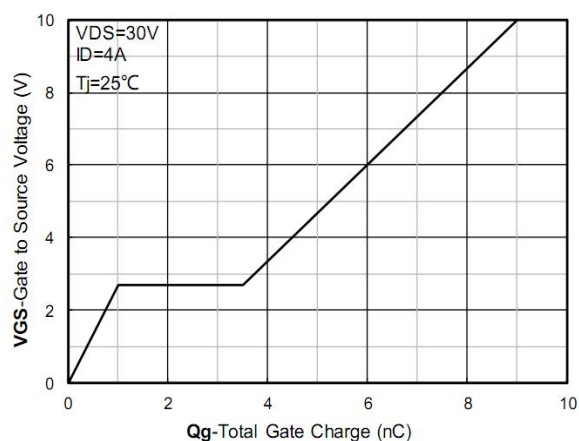


Figure 4. Gate Charge

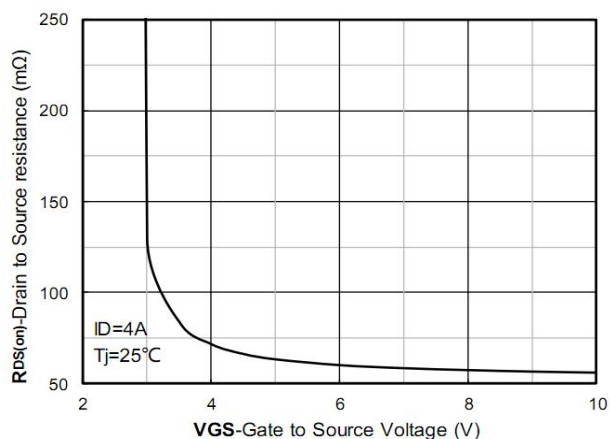


Figure 5. On-Resistance vs Gate to Source Voltage

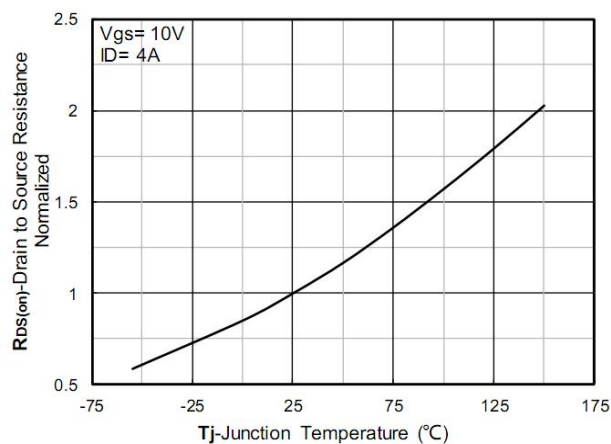


Figure 6. Normalized On-Resistance

### Typical Characteristics

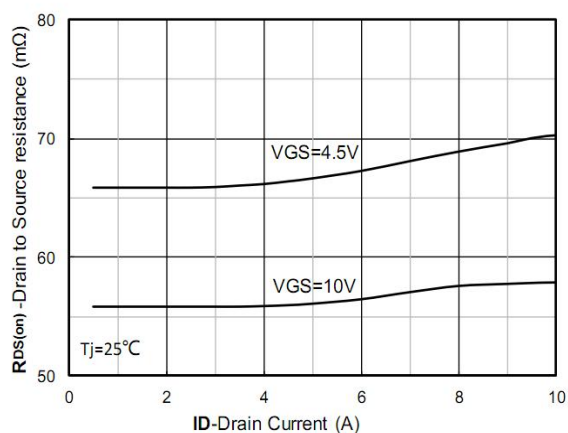


Figure 7. RDS(on) VS Drain Current

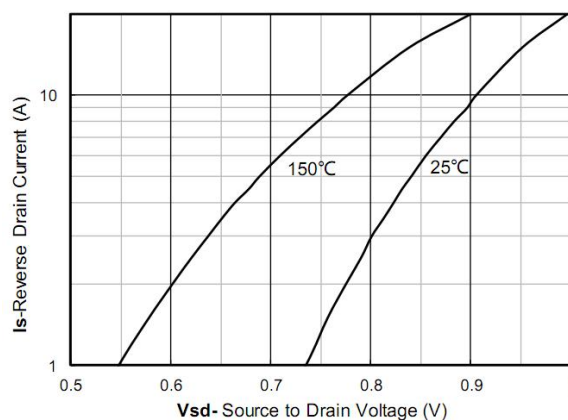


Figure 8. Forward characteristics of reverse diode

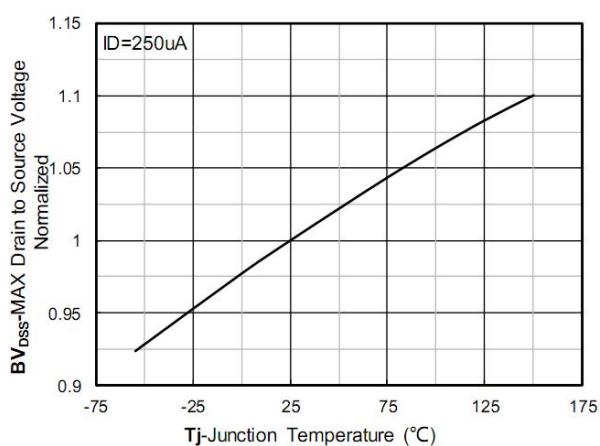


Figure 9. Normalized breakdown voltage

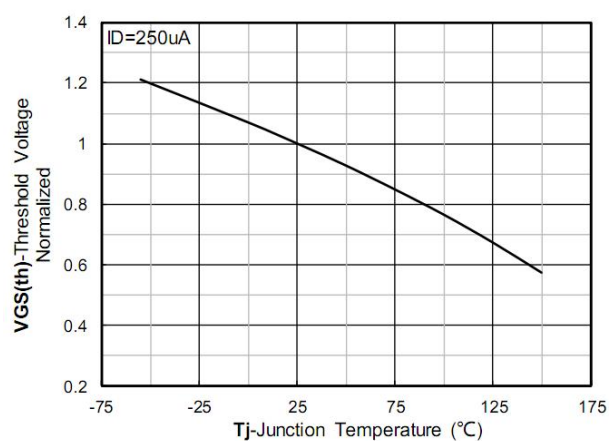


Figure 10. Normalized Threshold voltage

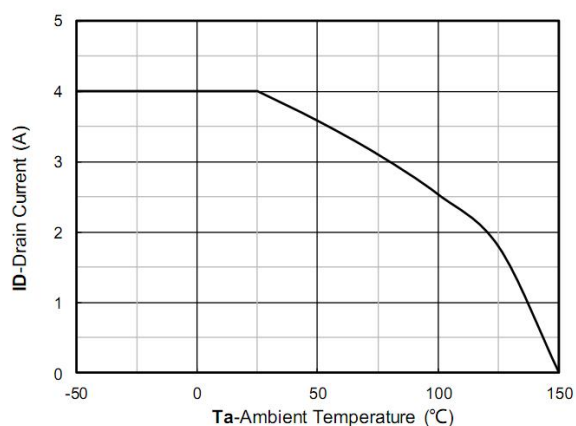


Figure 11. Current dissipation

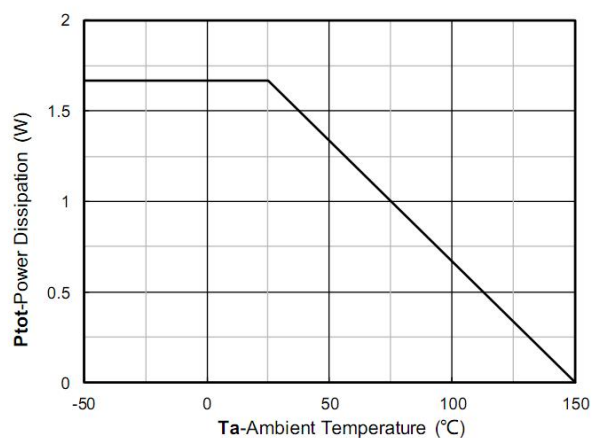


Figure 12. Power dissipation

## Typical Characteristics

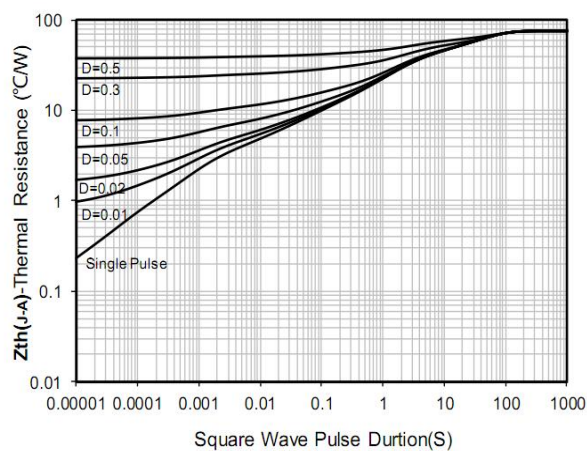


Figure 13. Maximum Transient Thermal Impedance

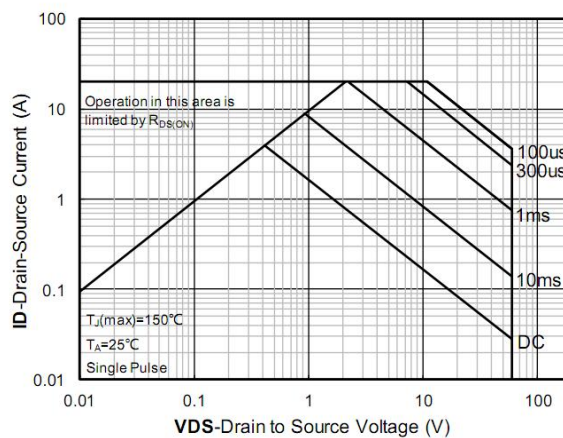
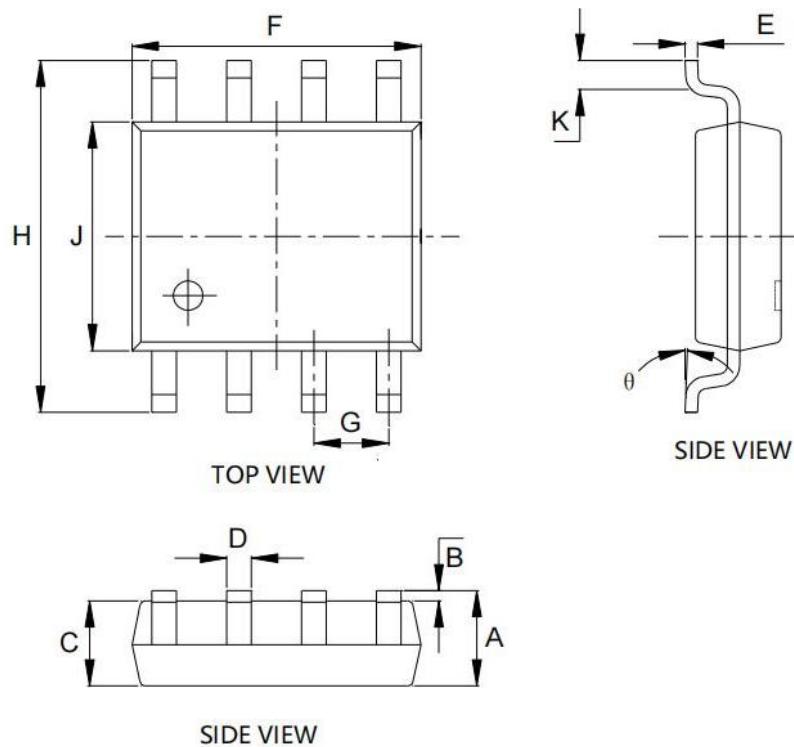


Figure 14. Safe Operation Area

## SOP-8 Package Information



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min.                      | Max.  | Min.                 | Max.  |
| A        | 1.350                     | 1.750 | 0.053                | 0.069 |
| B        | 0.100                     | 0.250 | 0.004                | 0.010 |
| C        | 1.350                     | 1.550 | 0.053                | 0.061 |
| D        | 0.330                     | 0.510 | 0.013                | 0.020 |
| E        | 0.170                     | 0.250 | 0.007                | 0.010 |
| F        | 4.800                     | 5.000 | 0.189                | 0.197 |
| G        | 1.270 BSC.                |       | 0.050 BSC.           |       |
| H        | 5.800                     | 6.200 | 0.228                | 0.244 |
| J        | 3.800                     | 4.000 | 0.150                | 0.157 |
| K        | 0.400                     | 1.270 | 0.016                | 0.050 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |