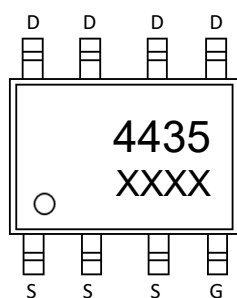


## Features

- Trench Power LV MOSFET technology
- High density cell design for Low  $R_{DS(ON)}$
- High Speed switching

## Application

- Battery protection
- Load switch
- Power management

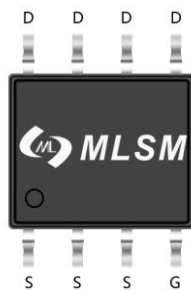


4435 : Device code  
 XXXX : Code

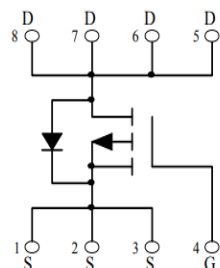
Marking and pin assignment

## Product Summary

| $V_{DS}$ | $R_{DS(ON)}$ TYP | $I_D$  |
|----------|------------------|--------|
| -30V     | 15mΩ@-10V        | -10.5A |
|          | 27mΩ@-5V         |        |



SOP-8 top view



Schematic diagram



Halogen-Free

## Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Symbol | Parameter | Rating | Unit |
|--------|-----------|--------|------|
|--------|-----------|--------|------|

### Common Ratings (TC=25°C Unless Otherwise Noted)

|                  |                                  |         |            |    |
|------------------|----------------------------------|---------|------------|----|
| V <sub>DS</sub>  | Drain-Source Breakdown Voltage   |         | -30        | V  |
| V <sub>GS</sub>  | Gate-Source Voltage              |         | ±25        | V  |
| T <sub>J</sub>   | Maximum Junction Temperature     |         | 150        | °C |
| T <sub>STG</sub> | Storage Temperature Range        |         | -50 to 155 | °C |
| I <sub>S</sub>   | Diode Continuous Forward Current | Tc=25°C | -10.5      | A  |

### Mounted on Large Heat Sink

|                 |                                     |                   |       |      |
|-----------------|-------------------------------------|-------------------|-------|------|
| $I_{DM}$        | Pulse Drain Current Tested          | $T_c=25^{\circ}C$ | -45   | A    |
| $I_D$           | Continuous Drain Current            | $T_c=25^{\circ}C$ | -10.5 | A    |
| $P_D$           | Maximum Power Dissipation           | $T_c=25^{\circ}C$ | 2.5   | W    |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient |                   | 50    | °C/W |

## Ordering Information (Example)

| Type   | Package | Marking | Minimum Package(pcs) | Inner Box Quantity(pcs) | Outer Carton Quantity(pcs) | Delivery Mode |
|--------|---------|---------|----------------------|-------------------------|----------------------------|---------------|
| MQ4435 | SOP-8   | 4435    | 3,000                | 6,000                   | 42,000                     | 13"reel       |

| Electrical Characteristics (TJ=25°C unless otherwise noted)              |                                  |                                                                                        |      |      |      |      |
|--------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------|------|------|------|------|
| Symbol                                                                   | Parameter                        | Condition                                                                              | Min  | Typ  | Max  | Unit |
| Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)  |                                  |                                                                                        |      |      |      |      |
| BV <sub>(BR)DSS</sub>                                                    | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA                                            | -30  | --   | --   | V    |
| I <sub>DSS</sub>                                                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V                                             | --   | --   | -1   | μA   |
| I <sub>GSS</sub>                                                         | Gate-Body Leakage Current        | V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V                                             | --   | --   | ±100 | nA   |
| V <sub>GS(th)</sub>                                                      | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA                              | -1.0 | --   | -3.0 | V    |
| R <sub>DS(on)</sub>                                                      | Drain-Source On-State Resistance | V <sub>GS</sub> =-20V, I <sub>D</sub> =-11A                                            | --   | 11   | 14   | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A                                            | --   | 15   | 18   | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =-5V, I <sub>D</sub> =-5A                                              | --   | 27   | 36   | mΩ   |
| Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated) |                                  |                                                                                        |      |      |      |      |
| C <sub>ISS</sub>                                                         | Input Capacitance                | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, f=1MHz                                     | --   | 1130 | --   | pF   |
| C <sub>OSS</sub>                                                         | Output Capacitance               |                                                                                        | --   | 160  | --   | pF   |
| C <sub>RSS</sub>                                                         | Reverse Transfer Capacitance     |                                                                                        | --   | 119  | --   | pF   |
| Q <sub>g</sub>                                                           | Total Gate Charge                | V <sub>DS</sub> =-15V, I <sub>D</sub> =-11A, V <sub>GS</sub> =-10V                     | --   | 18   | --   | nC   |
| Q <sub>gs</sub>                                                          | Gate Source Charge               |                                                                                        | --   | 5.4  | --   | nC   |
| Q <sub>gd</sub>                                                          | Gate Drain Charge                |                                                                                        | --   | 3.1  | --   | nC   |
| Switching Characteristics                                                |                                  |                                                                                        |      |      |      |      |
| t <sub>d(on)</sub>                                                       | Turn-on Delay Time               | V <sub>DS</sub> =-15V, R <sub>L</sub> =1.5Ω, V <sub>GS</sub> =-10V, R <sub>G</sub> =3Ω | --   | 8.7  | --   | nS   |
| t <sub>r</sub>                                                           | Turn-on Rise Time                |                                                                                        | --   | 8.6  | --   | nS   |
| t <sub>d(off)</sub>                                                      | Turn-Off Delay Time              |                                                                                        | --   | 18   | --   | nS   |
| t <sub>f</sub>                                                           | Turn-Off Fall Time               |                                                                                        | --   | 7    | --   | nS   |
| Source- Drain Diode Characteristics                                      |                                  |                                                                                        |      |      |      |      |
| V <sub>SD</sub>                                                          | Forward on voltage               | Tj=25°C, Is=-1A                                                                        | --   | --   | -1   | V    |

## Typical Operating Characteristics

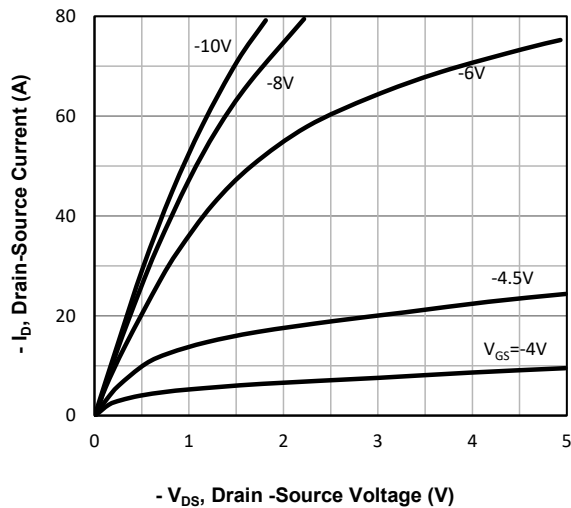


Fig1. Typical Output Characteristics

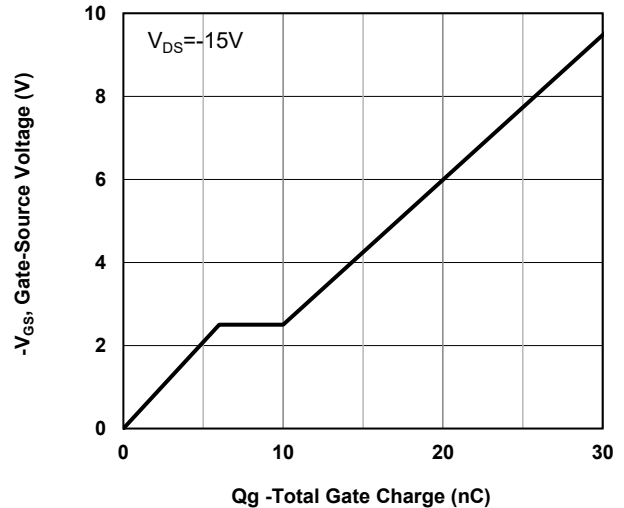


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

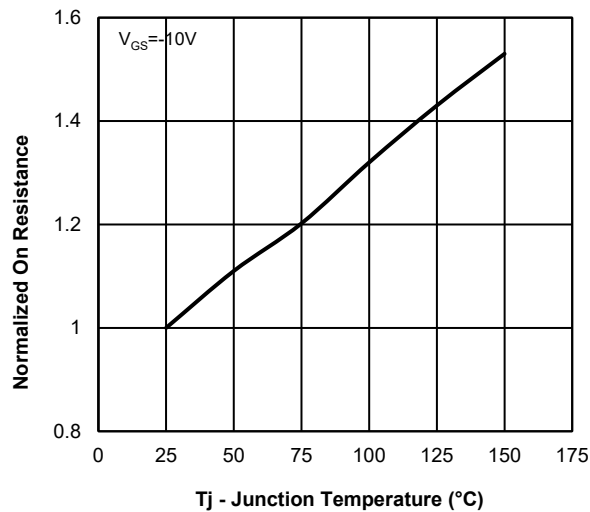


Fig3. Normalized On-Resistance Vs. Temperature

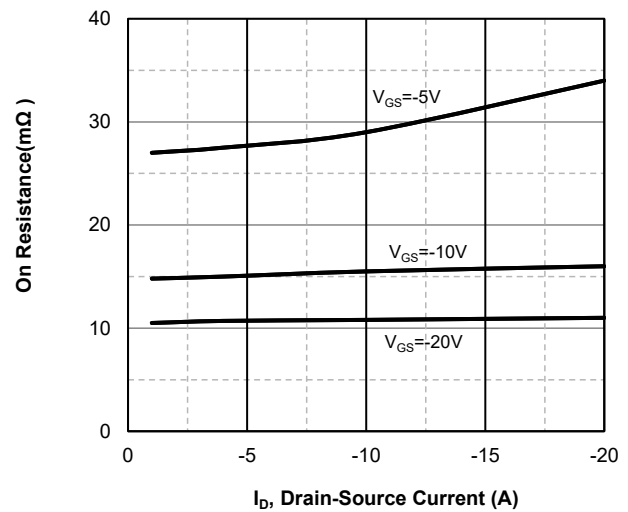


Fig4. On-Resistance Vs. Drain-Source Current

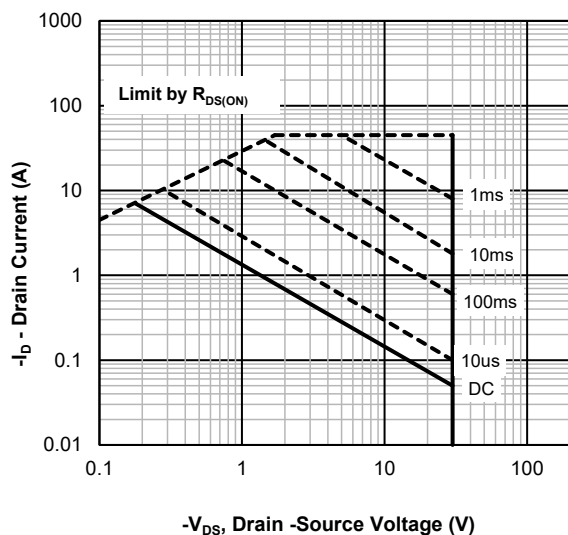


Fig5. Maximum Safe Operating Area

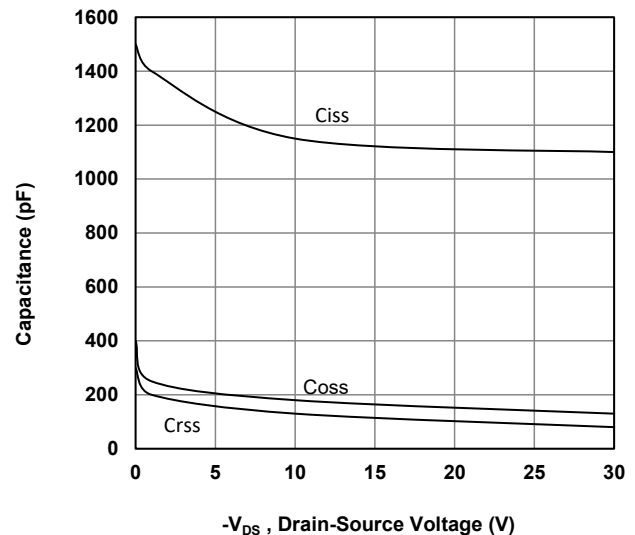
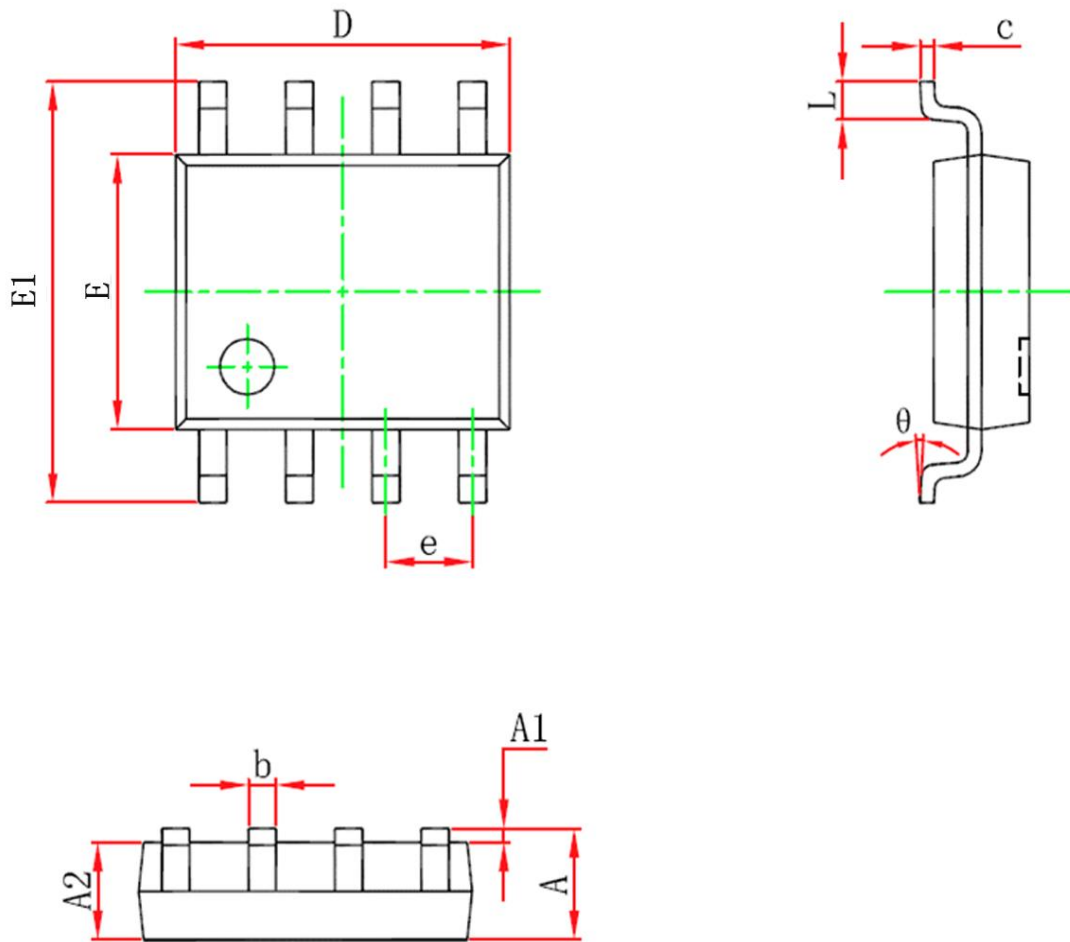


Fig6 Typical Capacitance Vs. Drain-Source Voltage

SOP-8 Package information



| Symbol   | Dimensions in Millimeters(mm) |       | Dimensions In Inches |       |
|----------|-------------------------------|-------|----------------------|-------|
|          | Min                           | Max   | Min                  | Max   |
| A        | 1.450                         | 1.750 | 0.057                | 0.068 |
| A1       | 0.100                         | 0.250 | 0.003                | 0.009 |
| A2       | 1.350                         | 1.550 | 0.053                | 0.061 |
| b        | 0.330                         | 0.510 | 0.012                | 0.020 |
| c        | 0.170                         | 0.250 | 0.006                | 0.009 |
| D        | 4.700                         | 5.100 | 0.185                | 0.200 |
| e        | 1.270(BSC)                    |       | 0.050(BSC)           |       |
| E        | 3.800                         | 4.000 | 0.149                | 0.157 |
| E1       | 5.800                         | 6.200 | 0.228                | 0.244 |
| L        | 0.400                         | 1.270 | 0.015                | 0.050 |
| $\theta$ | 0°                            | 8°    | 0°                   | 8°    |