

## Features

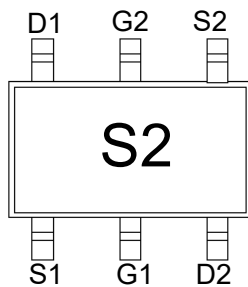
- Trench Power LV MOSFET technology
- High Power and current handling capability

## Product Summary

| $V_{DS}$ | $R_{DS(ON)}$ MAX | $I_D$ MAX |
|----------|------------------|-----------|
| 20V      | 65mΩ@4.5V        | 2.5A      |
|          | 85mΩ@2.5V        |           |

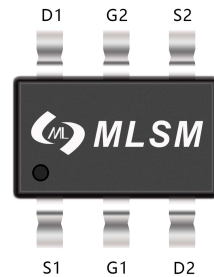
## Application

- PWM application
- Load switch

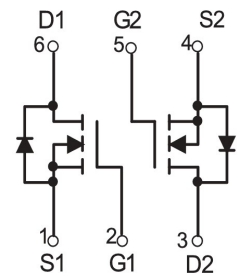


S2 : Device code

Marking and pin assignment



SOT-363 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)

|           |                                  |                          |    |
|-----------|----------------------------------|--------------------------|----|
| $V_{DS}$  | Drain-Source Breakdown Voltage   | 20                       | V  |
| $V_{GS}$  | Gate-Source Voltage              | ±10                      | V  |
| $T_J$     | Maximum Junction Temperature     | 150                      | °C |
| $T_{STG}$ | Storage Temperature Range        | -50 to 155               | °C |
| $I_S$     | Diode Continuous Forward Current | $T_C=25^{\circ}C$<br>2.5 | A  |

## Mounted on Large Heat Sink

|                 |                                        |                          |      |
|-----------------|----------------------------------------|--------------------------|------|
| $I_{DM}$        | Pulse Drain Current Tested             | $T_C=25^{\circ}C$<br>8   | A    |
| $I_D$           | Continuous Drain Current               | $T_C=25^{\circ}C$<br>2.5 | A    |
| $P_D$           | Maximum Power Dissipation              | $T_C=25^{\circ}C$<br>0.5 | W    |
| $R_{\theta JA}$ | Thermal Resistance Junction-to-Ambient | 178                      | °C/W |

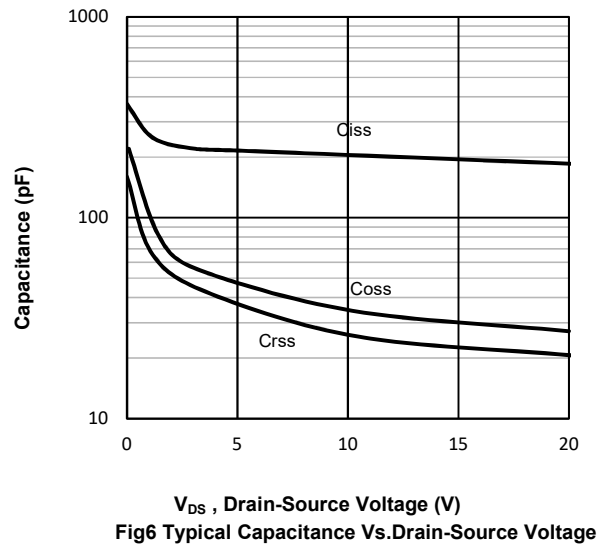
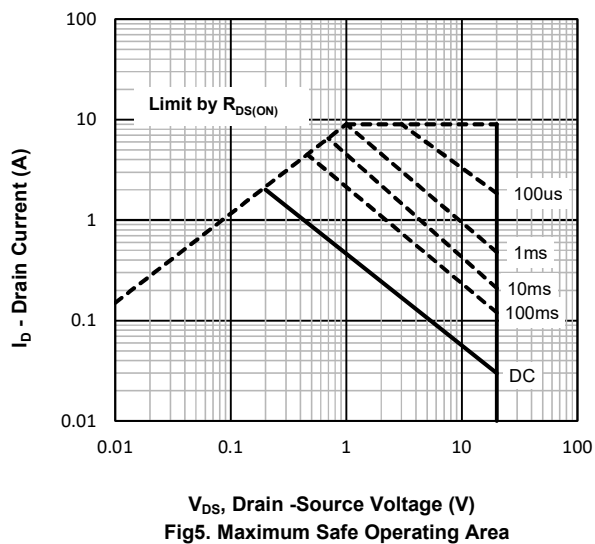
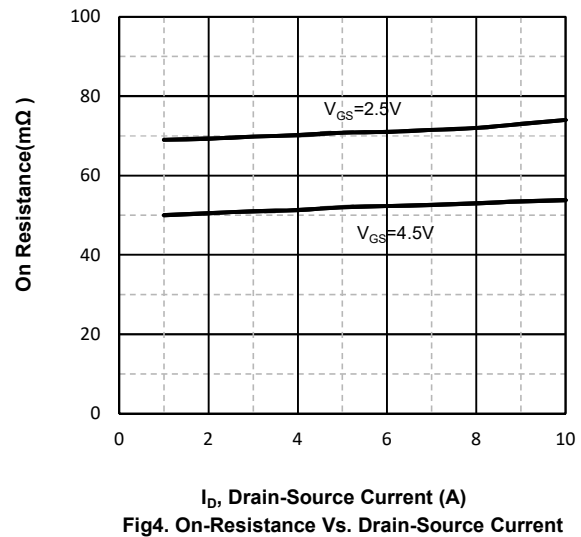
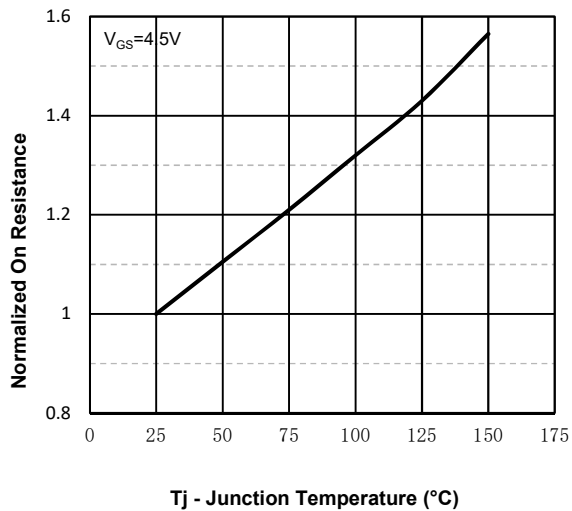
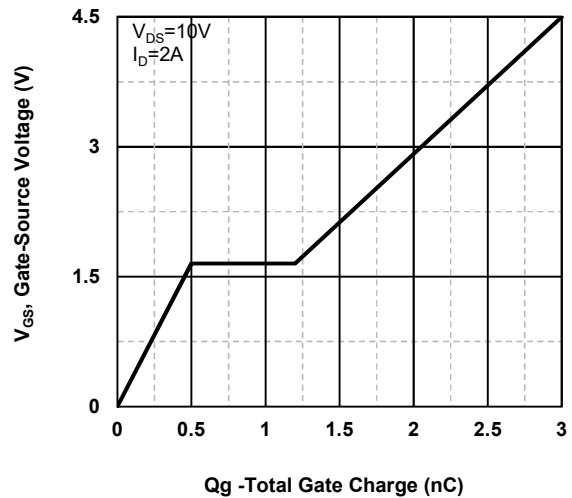
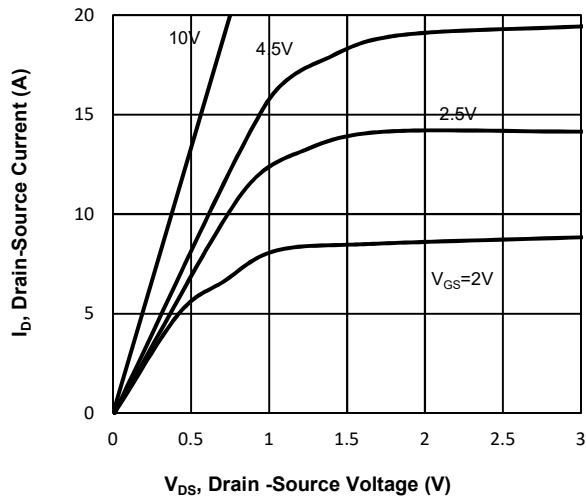
## Ordering Information (Example)

| Type      | Package | Marking | Minimum Package(pcs) | Inner Box Quantity(pcs) | Outer Carton Quantity(pcs) | Delivery Mode |
|-----------|---------|---------|----------------------|-------------------------|----------------------------|---------------|
| MLS2302DW | SOT-363 | S2      | 3,000                | 45,000                  | 180,000                    | 7"reel        |

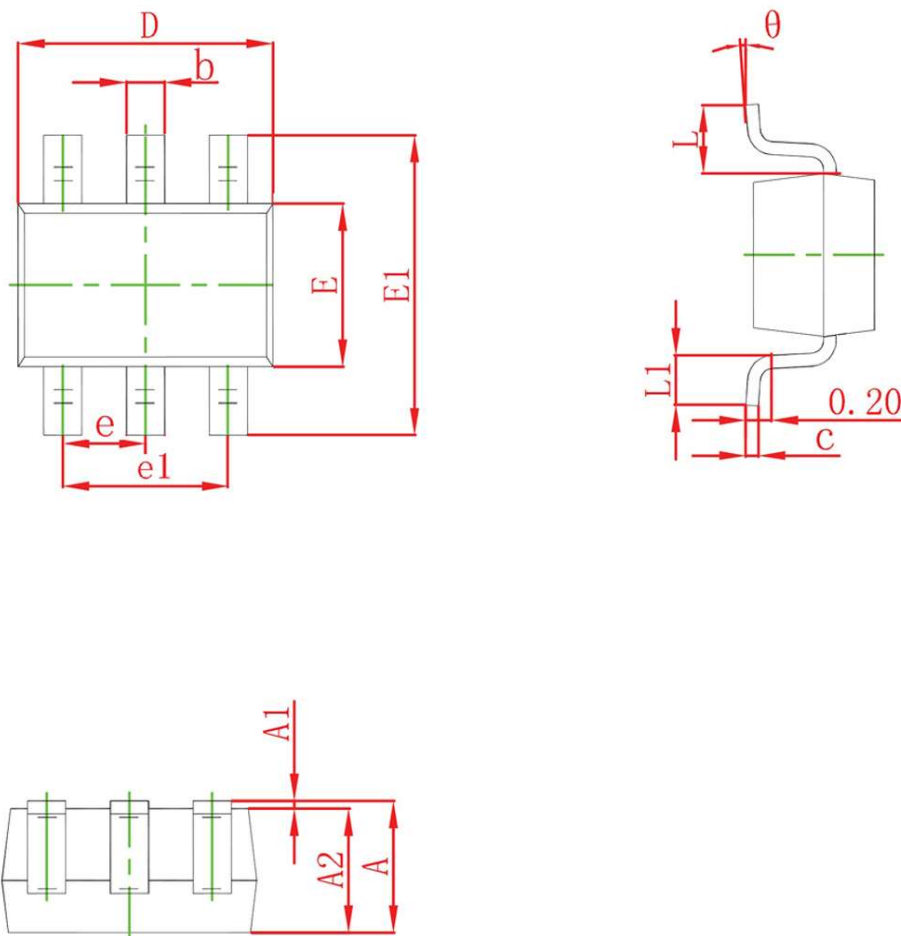
**Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)**

| 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                                          | 20   | --  | --   | V    |
| I <sub>DSS</sub>                                                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V                                           | --   | --  | 1    | μA   |
| I <sub>GSS</sub>                                                         | Gate-Body Leakage Current        | V <sub>GS</sub> =±10V, 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                            | 0.45 | 0.7 | 1.0  | V    |
| R <sub>DS(on)</sub>                                                      | Drain-Source On-State Resistance | V <sub>GS</sub> =4.5V, I <sub>D</sub> =2.5A                                         | --   | 50  | 65   | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =2.5V, I <sub>D</sub> =2.0A                                         | --   | 69  | 85   | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =1.8V, I <sub>D</sub> =1.5A                                         | --   | 105 | 150  | mΩ   |
| Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated) |                                  |                                                                                     |      |     |      |      |
| C <sub>ISS</sub>                                                         | Input Capacitance                | V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz                                   | --   | 200 | --   | pF   |
| C <sub>OSS</sub>                                                         | Output Capacitance               |                                                                                     | --   | 35  | --   | pF   |
| C <sub>RSS</sub>                                                         | Reverse Transfer Capacitance     |                                                                                     | --   | 28  | --   | pF   |
| Switching Characteristics                                                |                                  |                                                                                     |      |     |      |      |
| Q <sub>g</sub>                                                           | Total Gate Charge                | V <sub>DS</sub> =10V, I <sub>D</sub> =2A, V <sub>GS</sub> =4.5V                     | --   | 3   | --   | nC   |
| Q <sub>gs</sub>                                                          | Gate Source Charge               |                                                                                     | --   | 0.5 | --   | nC   |
| Q <sub>gd</sub>                                                          | Gate Drain Charge                |                                                                                     | --   | 0.7 | --   | nC   |
| t <sub>d(on)</sub>                                                       | Turn-on Delay Time               | V <sub>DD</sub> =10V, I <sub>D</sub> =2A, V <sub>GS</sub> =4.5V, R <sub>G</sub> =3Ω | --   | 3   | --   | nS   |
| t <sub>r</sub>                                                           | Turn-on Rise Time                |                                                                                     | --   | 11  | --   | nS   |
| t <sub>d(off)</sub>                                                      | Turn-Off Delay Time              |                                                                                     | --   | 20  | --   | nS   |
| t <sub>f</sub>                                                           | Turn-Off Fall Time               |                                                                                     | --   | 8   | --   | nS   |
| Source- Drain Diode Characteristics                                      |                                  |                                                                                     |      |     |      |      |
| V <sub>SD</sub>                                                          | Forward on voltage               | Tj=25°C, Is=2.5A                                                                    | --   | --  | 1.2  | V    |

## Typical Operating Characteristics



**SOT-363 Package information**



| Symbol | Dimensions in Millimeters(mm) |       | Dimensions In Inches |       |
|--------|-------------------------------|-------|----------------------|-------|
|        | Min                           | Max   | Min                  | Max   |
| A      | 0.900                         | 1.100 | 0.035                | 0.043 |
| A1     | 0.000                         | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                         | 1.000 | 0.035                | 0.039 |
| b      | 0.150                         | 0.350 | 0.006                | 0.014 |
| c      | 0.100                         | 0.150 | 0.004                | 0.006 |
| D      | 2.000                         | 2.200 | 0.079                | 0.087 |
| E      | 1.150                         | 1.350 | 0.045                | 0.053 |
| E1     | 2.150                         | 2.400 | 0.085                | 0.094 |
| e      | 0.650TYP                      |       | 0.026TYP             |       |
| e1     | 1.200                         | 1.400 | 0.047                | 0.055 |
| L      | 0.525REF                      |       | 0.021REF             |       |
| L1     | 0.260                         | 0.460 | 0.010                | 0.018 |
| θ      | 0°                            | 8°    | 0°                   | 8°    |