

### Features

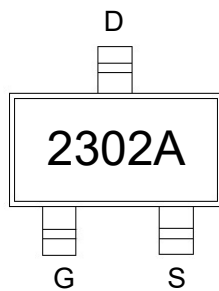
- Trench Power LV MOSFET technology
- High Power and current handing capability

### Product Summary

| $V_{DS}$ | $R_{DS(ON)}$ MAX | $I_D$ MAX |
|----------|------------------|-----------|
| 20V      | 35mΩ@4.5V        | 4A        |
|          | 45mΩ@2.5V        |           |

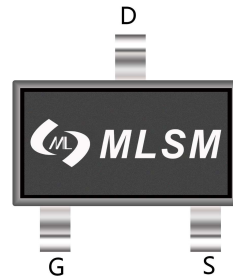
### Application

- PWM application
- Load switch

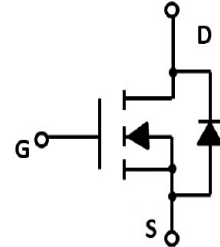


2302A: Device code

Marking and pin assignment



SOT-23-3L 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   |         | 20         | V  |
| V <sub>GS</sub>  | Gate-Source Voltage              |         | ±10        | 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 | 4          | A  |

### Mounted on Large Heat Sink

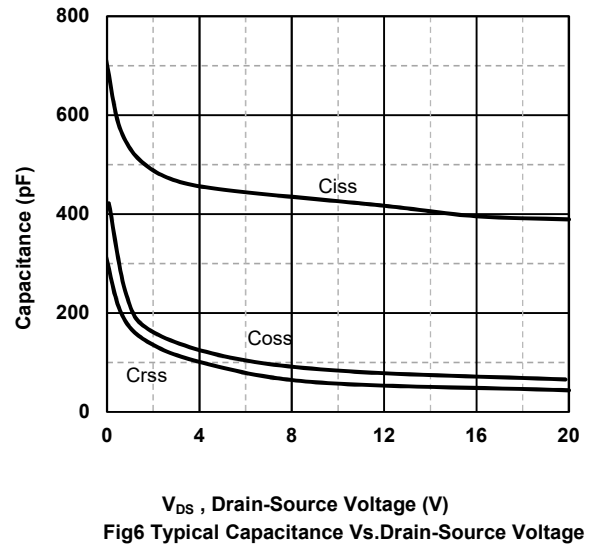
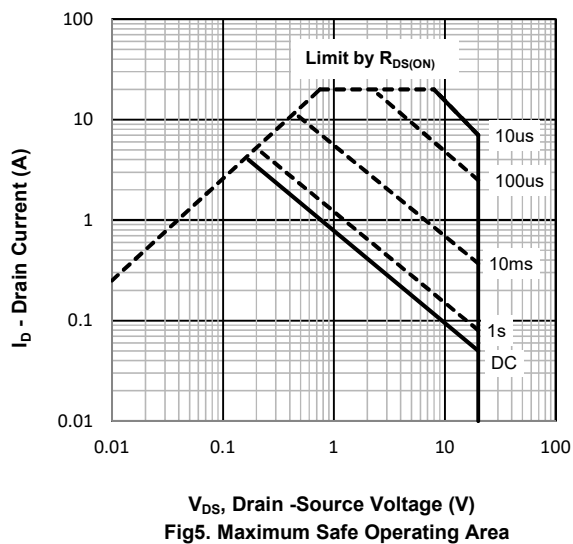
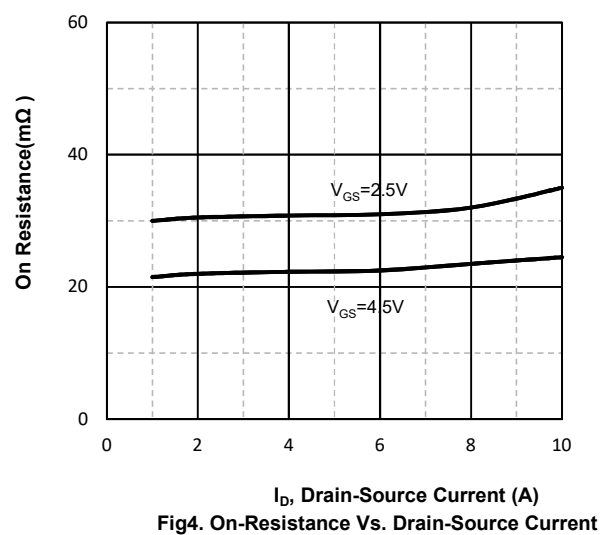
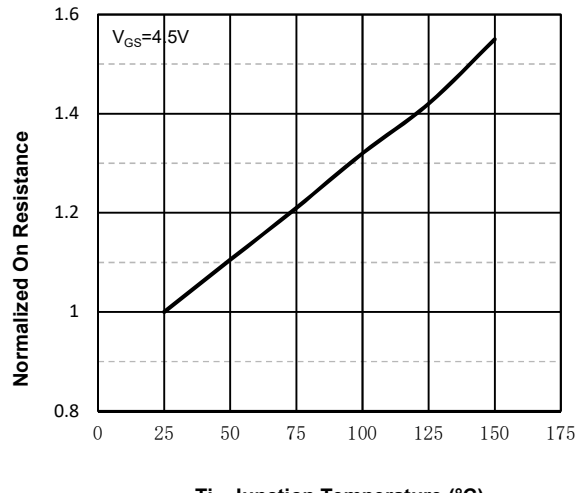
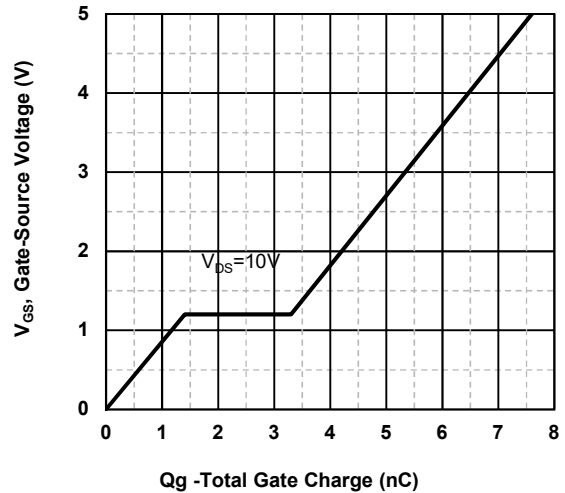
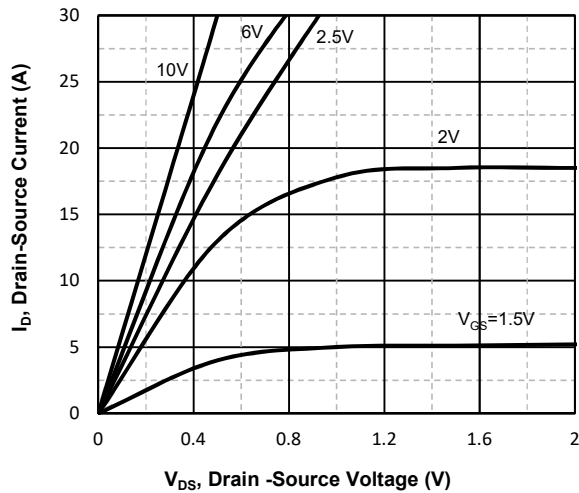
|                 |                                        |                        |     |      |
|-----------------|----------------------------------------|------------------------|-----|------|
| $I_{DM}$        | Pulse Drain Current Tested             | $T_c=25^\circ\text{C}$ | 20  | A    |
| $I_D$           | Continuous Drain Current               | $T_c=25^\circ\text{C}$ | 4   | A    |
| $P_D$           | Maximum Power Dissipation              | $T_c=25^\circ\text{C}$ | 1   | W    |
| $R_{\theta JA}$ | Thermal Resistance Junction-to-Ambient |                        | 125 | °C/W |

### Ordering Information (Example)

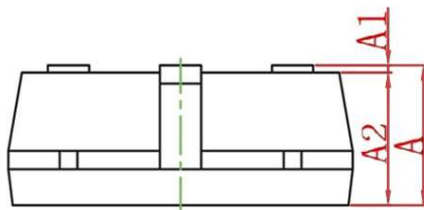
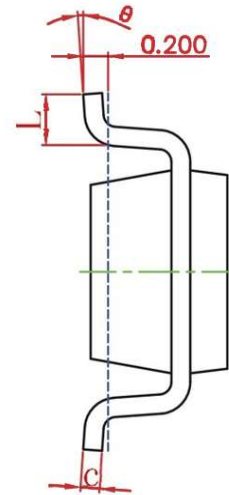
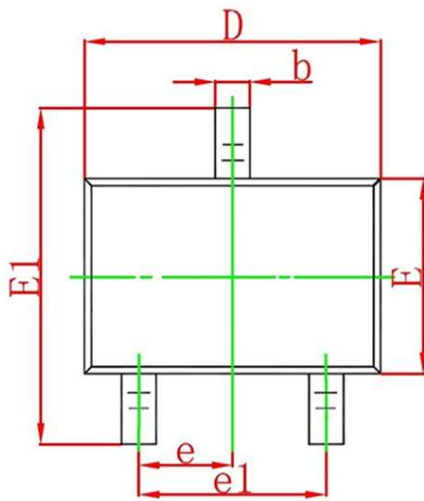
| Type      | Package   | Marking | Minimum Package(pcs) | Inner Box Quantity(pcs) | Outer Carton Quantity(pcs) | Delivery Mode |
|-----------|-----------|---------|----------------------|-------------------------|----------------------------|---------------|
| MLSK2302A | SOT-23-3L | 2302A   | 3,000                | 45,000                  | 180,000                    | 7"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                                            | 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                              | 0.5 | 0.8  | 1.5  | V    |
| R <sub>DS(on)</sub>                                                      | Drain-Source On-State Resistance | V <sub>GS</sub> =4.5V, I <sub>D</sub> =3.6A                                           | --  | 22   | 35   | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =2.5V, I <sub>D</sub> =2.5A                                           | --  | 30   | 45   | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =1.8V, I <sub>D</sub> =2.0A                                           | --  | 42   | 55   | 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                                     | --  | 371  | --   | pF   |
| C <sub>OSS</sub>                                                         | Output Capacitance               |                                                                                       | --  | 80   | --   | pF   |
| C <sub>RSS</sub>                                                         | Reverse Transfer Capacitance     |                                                                                       | --  | 67   | --   | pF   |
| Switching Characteristics                                                |                                  |                                                                                       |     |      |      |      |
| Q <sub>g</sub>                                                           | Total Gate Charge                | V <sub>DS</sub> =10V, I <sub>D</sub> =2.5A, V <sub>GS</sub> =4.5V                     | --  | 6.05 | --   | nC   |
| Q <sub>gs</sub>                                                          | Gate Source Charge               |                                                                                       | --  | 1.07 | --   | nC   |
| Q <sub>gd</sub>                                                          | Gate Drain Charge                |                                                                                       | --  | 1.95 | --   | nC   |
| t <sub>d(on)</sub>                                                       | Turn-on Delay Time               | V <sub>DD</sub> =10V, R <sub>L</sub> =1.5Ω, V <sub>GS</sub> =4.5V, R <sub>G</sub> =3Ω | --  | 4.2  | --   | nS   |
| t <sub>r</sub>                                                           | Turn-on Rise Time                |                                                                                       | --  | 19.8 | --   | nS   |
| t <sub>d(off)</sub>                                                      | Turn-Off Delay Time              |                                                                                       | --  | 22.6 | --   | nS   |
| t <sub>f</sub>                                                           | Turn-Off Fall Time               |                                                                                       | --  | 23.2 | --   | nS   |
| Source- Drain Diode Characteristics                                      |                                  |                                                                                       |     |      |      |      |
| V <sub>SD</sub>                                                          | Forward on voltage               | Tj=25°C, Is=4A                                                                        | --  | --   | 1.2  | V    |

## Typical Operating Characteristics



SOT-23-3L Package information



| Symbol   | Dimensions in Millimeters(mm) |       | Dimensions In Inches |       |
|----------|-------------------------------|-------|----------------------|-------|
|          | Min                           | Max   | Min                  | Max   |
| A        | 1.050                         | 1.250 | 0.042                | 0.050 |
| A1       | 0.000                         | 0.100 | 0.000                | 0.004 |
| A2       | 1.050                         | 1.150 | 0.042                | 0.046 |
| b        | 0.300                         | 0.500 | 0.012                | 0.020 |
| c        | 0.100                         | 0.200 | 0.004                | 0.008 |
| D        | 2.820                         | 3.020 | 0.112                | 0.120 |
| E        | 1.500                         | 1.700 | 0.060                | 0.068 |
| E1       | 2.650                         | 2.950 | 0.106                | 0.118 |
| e        | 0.950TYP                      |       | 0.037TYP             |       |
| e1       | 1.800                         | 2.000 | 0.071                | 0.079 |
| L        | 0.300                         | 0.600 | 0.012                | 0.024 |
| $\theta$ | 0°                            | 8°    | 0°                   | 8°    |