

## Features

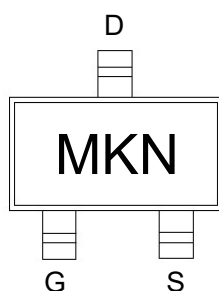
- Reliable and Rugged
- Fast Switching Speed
- ESD protected

## Product Summary

| $V_{DS}$ | $R_{DS(ON)}$ MAX | $I_D$ MAX |
|----------|------------------|-----------|
| 30V      | 400mΩ@10V        | 0.75A     |
|          | 600mΩ@4.5V       |           |

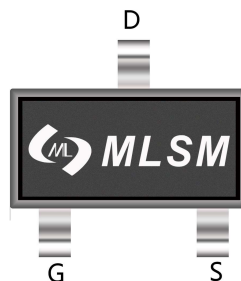
## Application

- Battery Operated Systems
- Portable Equipment

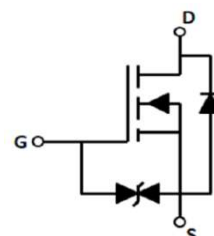


MKN: Device code

Marking and pin assignment



SOT-523 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              |         | ±12        | 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 | 0.75       | A    |

## Mounted on Large Heat Sink

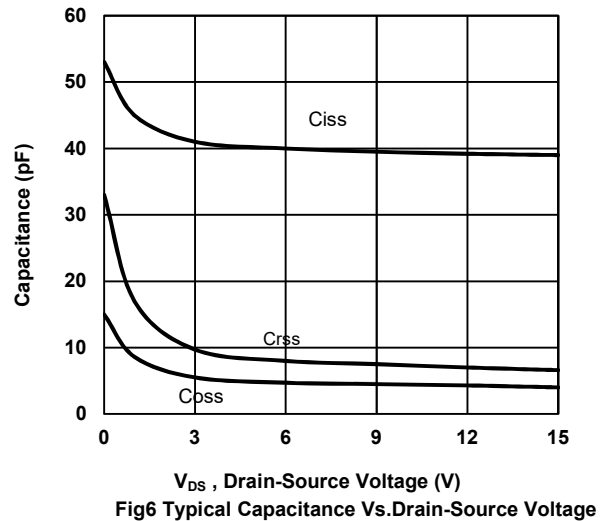
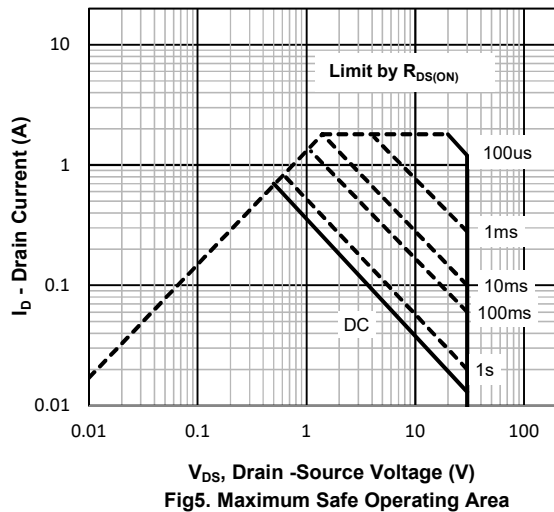
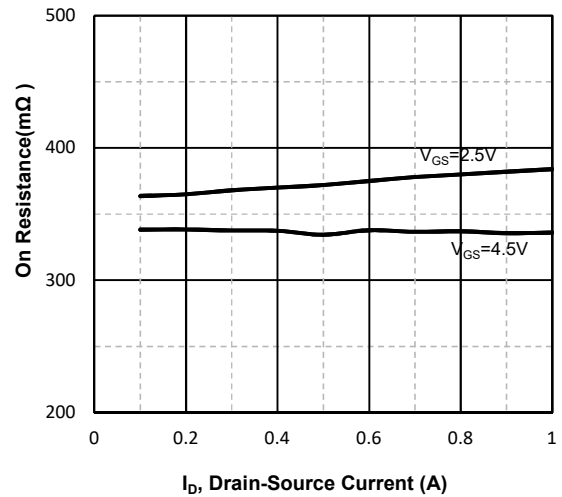
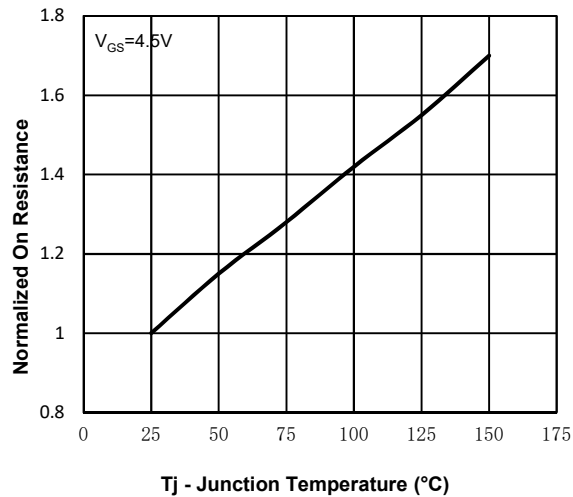
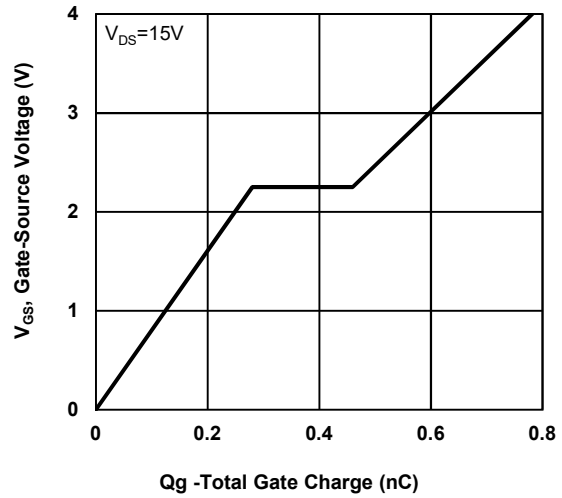
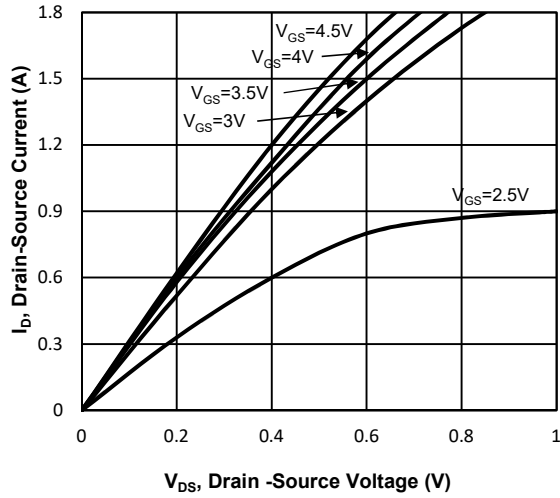
|                 |                                     |                        |      |      |
|-----------------|-------------------------------------|------------------------|------|------|
| $I_{DM}$        | Pulse Drain Current Tested          | $T_c=25^\circ\text{C}$ | 1.8  | A    |
| $I_D$           | Continuous Drain Current            | $T_c=25^\circ\text{C}$ | 0.75 | A    |
| $P_D$           | Maximum Power Dissipation           | $T_c=25^\circ\text{C}$ | 0.35 | W    |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient |                        | 350  | °C/W |

## Ordering Information (Example)

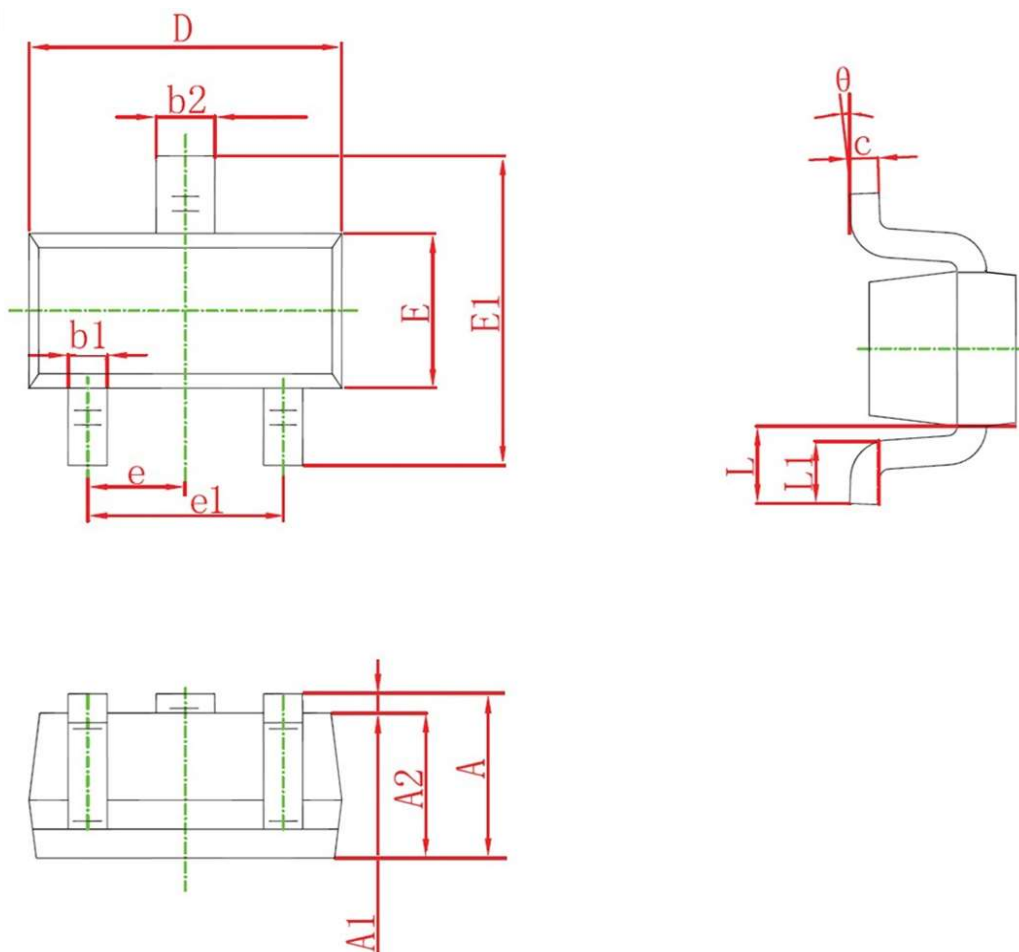
| Type      | Package | Marking | Minimum Package(pcs) | Inner Box Quantity(pcs) | Outer Carton Quantity(pcs) | Delivery Mode |
|-----------|---------|---------|----------------------|-------------------------|----------------------------|---------------|
| MLS1302KT | SOT-523 | MKN     | 3,000                | 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                                             | 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> =±12V, V <sub>DS</sub> =0V                                             | --   | --   | ±20 | μA   |
| V <sub>GS(th)</sub>                                                      | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                               | 0.35 | 0.7  | 1.1 | V    |
| R <sub>DS(on)</sub>                                                      | Drain-Source On-State Resistance | V <sub>GS</sub> =10V, I <sub>D</sub> =0.5A                                             | --   | 330  | 400 | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.3A                                            | --   | 360  | 600 | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.1A                                            | --   | --   | 800 | 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                                      | --   | 38   | --  | pF   |
| C <sub>OSS</sub>                                                         | Output Capacitance               |                                                                                        | --   | 5.1  | --  | pF   |
| C <sub>RSS</sub>                                                         | Reverse Transfer Capacitance     |                                                                                        | --   | 3.2  | --  | pF   |
| Switching Characteristics                                                |                                  |                                                                                        |      |      |     |      |
| Q <sub>g</sub>                                                           | Total Gate Charge                | V <sub>DS</sub> =15V, I <sub>D</sub> =0.75A, V <sub>GS</sub> =4.5V                     | --   | 0.8  | --  | nC   |
| Q <sub>gs</sub>                                                          | Gate Source Charge               |                                                                                        | --   | 0.3  | --  | nC   |
| Q <sub>gd</sub>                                                          | Gate Drain Charge                |                                                                                        | --   | 0.17 | --  | nC   |
| t <sub>d(on)</sub>                                                       | Turn-on Delay Time               | V <sub>DD</sub> =15V, I <sub>D</sub> =0.75A, V <sub>GS</sub> =4.5V, R <sub>G</sub> =6Ω | --   | 5.5  | --  | nS   |
| t <sub>r</sub>                                                           | Turn-on Rise Time                |                                                                                        | --   | 20.3 | --  | nS   |
| t <sub>d(off)</sub>                                                      | Turn-Off Delay Time              |                                                                                        | --   | 34.5 | --  | nS   |
| t <sub>f</sub>                                                           | Turn-Off Fall Time               |                                                                                        | --   | 30   | --  | nS   |
| Source- Drain Diode Characteristics                                      |                                  |                                                                                        |      |      |     |      |
| V <sub>SD</sub>                                                          | Forward on voltage               | Tj=25°C, Is=0.75A                                                                      | --   | --   | 1.2 | V    |

## Typical Operating Characteristics



**SOT-523 Package information**



| Symbol | Dimensions in Millimeters(mm) |       | Dimensions In Inches |       |
|--------|-------------------------------|-------|----------------------|-------|
|        | Min                           | Max   | Min                  | Max   |
| A      | 0.700                         | 0.900 | 0.028                | 0.035 |
| A1     | 0.000                         | 0.100 | 0.000                | 0.004 |
| A2     | 0.700                         | 0.800 | 0.028                | 0.031 |
| b1     | 0.150                         | 0.250 | 0.006                | 0.010 |
| b2     | 0.250                         | 0.350 | 0.010                | 0.014 |
| c      | 0.100                         | 0.200 | 0.004                | 0.008 |
| D      | 1.500                         | 1.700 | 0.059                | 0.067 |
| E      | 0.700                         | 0.900 | 0.028                | 0.035 |
| E1     | 1.450                         | 1.750 | 0.057                | 0.069 |
| e      | 0.500TYP                      |       | 0.020TYP             |       |
| e1     | 0.900                         | 1.100 | 0.035                | 0.043 |
| L      | 0.400REF                      |       | 0.016REF             |       |
| L1     | 0.260                         | 0.460 | 0.010                | 0.018 |
| θ      | 0°                            | 8°    | 0°                   | 8°    |