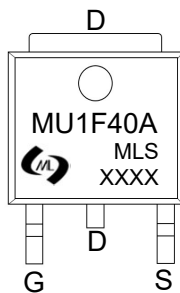


### Features

- High density cell design for ultra low  $R_{DS(ON)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high  $E_{AS}$
- Excellent package for good heat dissipation

### Application

- Power switching application



Marking and pin assignment

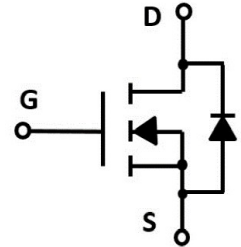
MU1F40A: Device code  
XXXX:Code

### Product Summary

| $V_{DS}$ | $R_{DS(ON)}$ MAX | $I_D$ MAX |
|----------|------------------|-----------|
| 150V     | 50mΩ@10V         | 40A       |
|          | 55mΩ@4.5V        |           |



TO-252 top view



Schematic diagram



Pb-Free



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   | 150                     | V  |
| $V_{GS}$  | Gate-Source Voltage              | ±20                     | 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>40 | A  |

### Mounted on Large Heat Sink

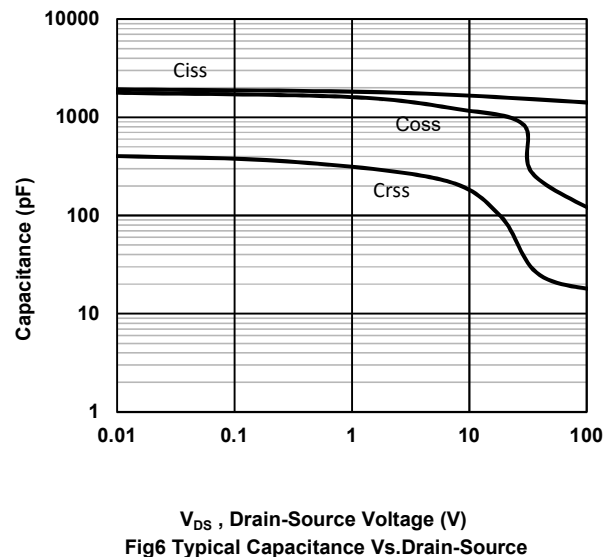
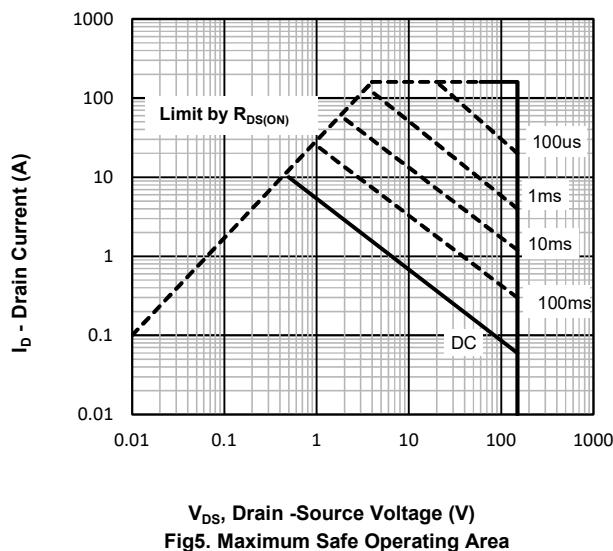
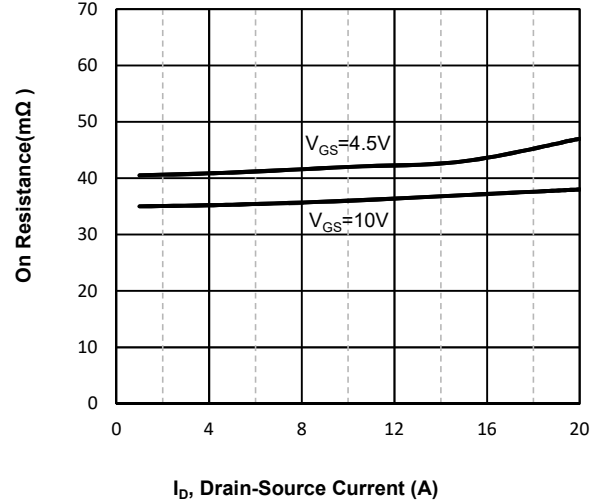
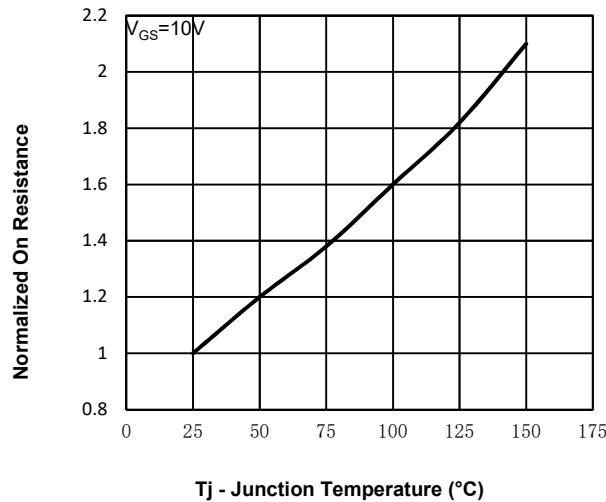
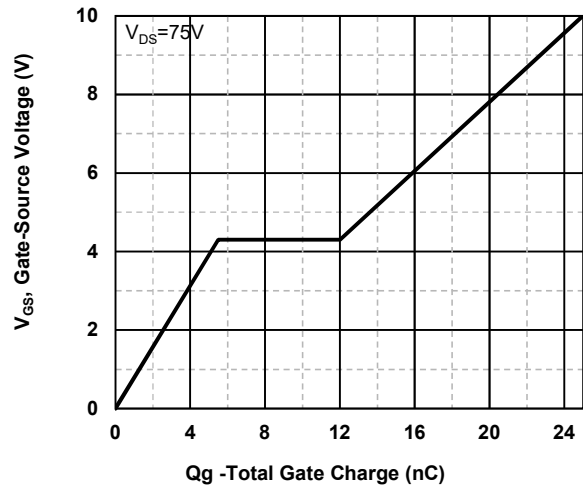
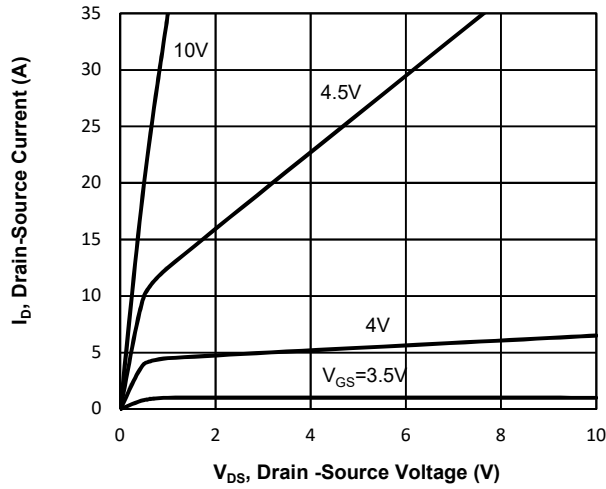
|                 |                                     |                          |      |
|-----------------|-------------------------------------|--------------------------|------|
| $I_{DM}$        | Pulse Drain Current Tested          | $T_C=25^{\circ}C$<br>160 | A    |
| $I_D$           | Continuous Drain Current            | $T_C=25^{\circ}C$<br>40  | A    |
| $P_D$           | Maximum Power Dissipation           | $T_C=25^{\circ}C$<br>75  | W    |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient | 50                       | °C/W |

### Ordering Information (Example)

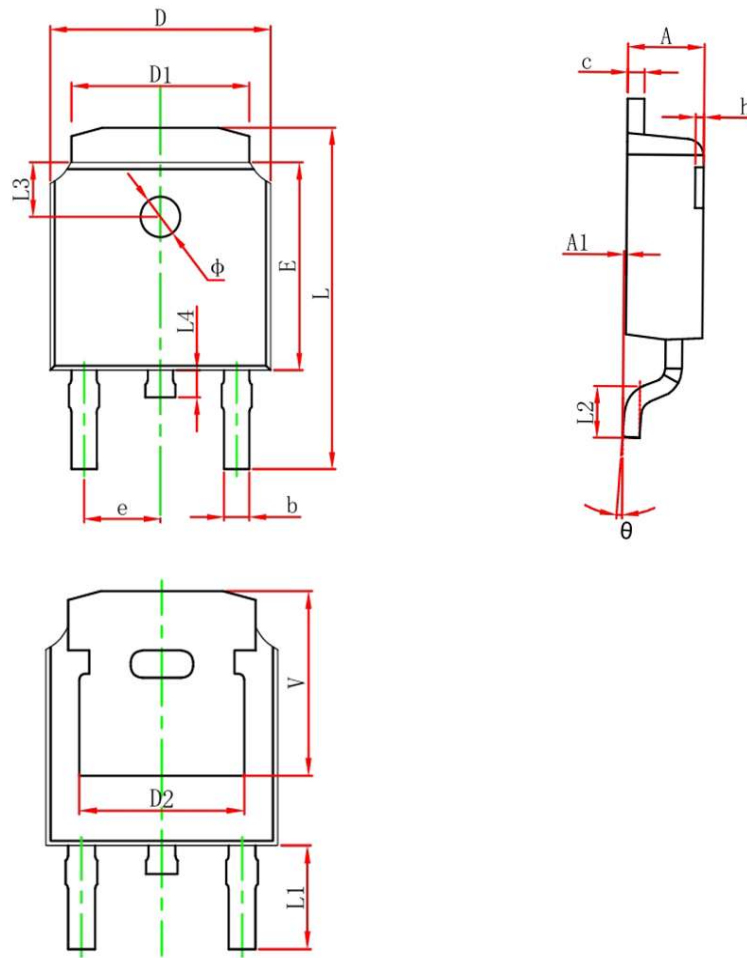
| Type    | Package | Marking | Minimum Package(pcs) | Inner Box Quantity(pcs) | Outer Carton Quantity(pcs) | Delivery Mode |
|---------|---------|---------|----------------------|-------------------------|----------------------------|---------------|
| MU1F40A | TO-252  | MU1F40A | 2,500                | 5,000                   | 35,000                     | 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                                           | 150 | --   | --   | V    |
| I <sub>DSS</sub>                                                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =150V, V <sub>GS</sub> =0V                                           | --  | --   | 1    | μA   |
| I <sub>GSS</sub>                                                         | Gate-Body Leakage Current        | V <sub>GS</sub> =±20V, 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   | --   | 3    | V    |
| R <sub>DS(on)</sub>                                                      | Drain-Source On-State Resistance | V <sub>GS</sub> =10V, I <sub>D</sub> =20A                                            | --  | 35   | 50   | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A                                           | --  | 40   | 55   | mΩ   |
| Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated) |                                  |                                                                                      |     |      |      |      |
| C <sub>ISS</sub>                                                         | Input Capacitance                | V <sub>DS</sub> =75V, V <sub>GS</sub> =0V, f=1MHz                                    | --  | 1470 | --   | pF   |
| C <sub>OSS</sub>                                                         | Output Capacitance               |                                                                                      | --  | 140  | --   | pF   |
| C <sub>RSS</sub>                                                         | Reverse Transfer Capacitance     |                                                                                      | --  | 18   | --   | pF   |
| Switching Characteristics                                                |                                  |                                                                                      |     |      |      |      |
| Q <sub>g</sub>                                                           | Total Gate Charge                | V <sub>DS</sub> =75V, I <sub>D</sub> =25A, V <sub>GS</sub> =10V                      | --  | 25   | --   | nC   |
| Q <sub>gs</sub>                                                          | Gate Source Charge               |                                                                                      | --  | 5.4  | --   | nC   |
| Q <sub>gd</sub>                                                          | Gate Drain Charge                |                                                                                      | --  | 6.4  | --   | nC   |
| t <sub>d(on)</sub>                                                       | Turn-on Delay Time               | V <sub>DD</sub> =75V, I <sub>D</sub> =25A, V <sub>GS</sub> =10V, R <sub>G</sub> =10Ω | --  | 21   | --   | nS   |
| t <sub>r</sub>                                                           | Turn-on Rise Time                |                                                                                      | --  | 12   | --   | nS   |
| t <sub>d(off)</sub>                                                      | Turn-Off Delay Time              |                                                                                      | --  | 41   | --   | nS   |
| t <sub>f</sub>                                                           | Turn-Off Fall Time               |                                                                                      | --  | 17   | --   | nS   |
| Source- Drain Diode Characteristics                                      |                                  |                                                                                      |     |      |      |      |
| V <sub>SD</sub>                                                          | Forward on voltage               | Tj=25°C, Is=10A                                                                      | --  | --   | 1.2  | V    |

## Typical Operating Characteristics



TO-252 Package information



| Symbol   | Dimensions in Millimeters(mm) |        | Dimensions In Inches |       |
|----------|-------------------------------|--------|----------------------|-------|
|          | Min                           | Max    | Min                  | Max   |
| A        | 2.200                         | 2.400  | 0.087                | 0.094 |
| A1       | 0.000                         | 0.127  | 0.000                | 0.005 |
| b        | 0.635                         | 0.770  | 0.025                | 0.030 |
| c        | 0.450                         | 0.580  | 0.018                | 0.023 |
| D        | 6.500                         | 6.700  | 0.256                | 0.264 |
| D1       | 5.100                         | 5.460  | 0.201                | 0.215 |
| D2       | 4.830 REF.                    |        | 0.190 REF.           |       |
| E        | 6.000                         | 6.200  | 0.236                | 0.244 |
| e        | 2.186                         | 2.386  | 0.086                | 0.094 |
| L        | 9.712                         | 10.312 | 0.386                | 0.406 |
| L1       | 2.900 REF.                    |        | 0.114 REF.           |       |
| L2       | 1.400                         | 1.700  | 0.055                | 0.067 |
| L3       | 1.600 REF.                    |        | 0.063 REF.           |       |
| L4       | 0.600                         | 1.000  | 0.024                | 0.039 |
| $\Phi$   | 1.100                         | 1.300  | 0.043                | 0.051 |
| $\theta$ | 0°                            | 8°     | 0°                   | 8°    |
| h        | 0.000                         | 0.300  | 0.000                | 0.012 |
| V        | 5.250 REF.                    |        | 0.207 REF.           |       |