

## Features

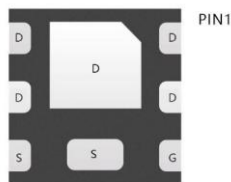
- Low  $R_{DS(on)}$  & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Fast switching and soft recovery

## Application

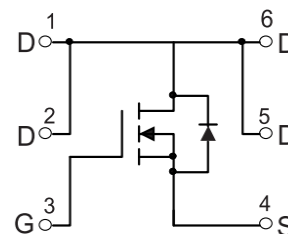
- Consumer electronic power supply
- Motor control
- Synchronous-rectification
- Isolated DC/DC convertor

## Product Summary

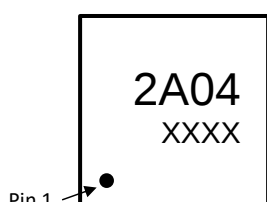
| $V_{DS}$ | $R_{DS(on)}$ TYP | $I_D$ |
|----------|------------------|-------|
| 200V     | 480mΩ@10V        | 4A    |



DFN2X2-6L view



Schematic diagram



2A04 : Device code  
 XXXX: Code  
 Solid dot: Pin1 indicator

Pin 1  
 Marking and pin assignment



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   | 200               | 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 | $T_C=25^{\circ}C$ | 4  |
|           |                                  |                   | A  |

### Mounted on Large Heat Sink

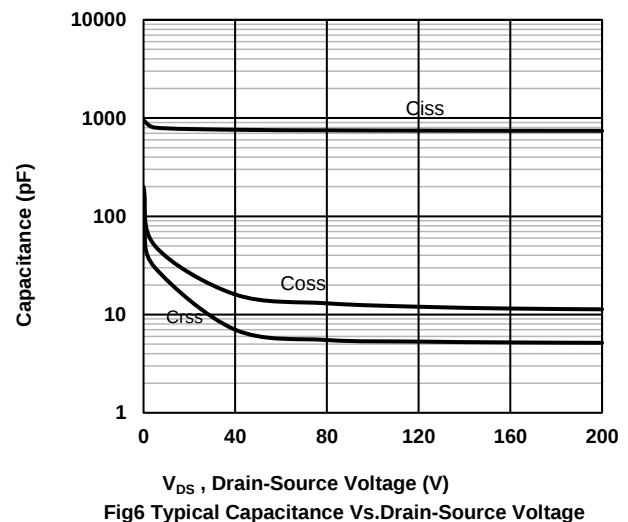
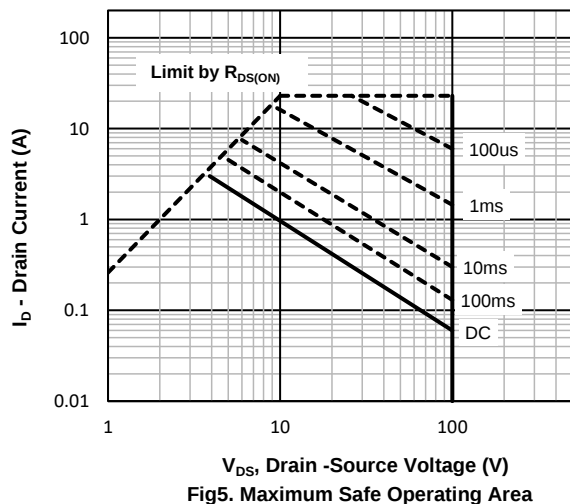
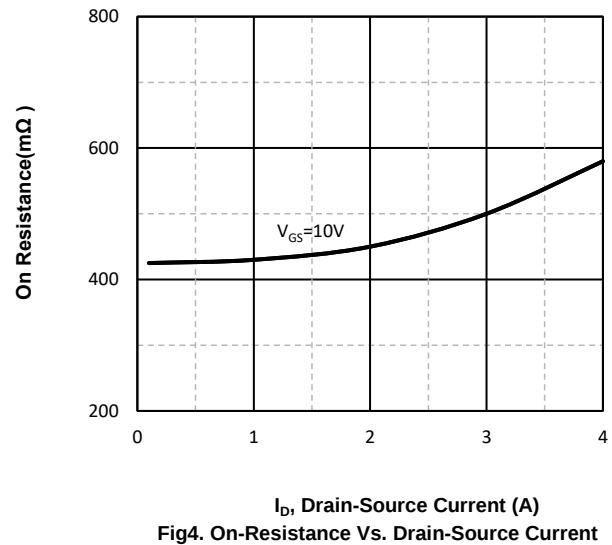
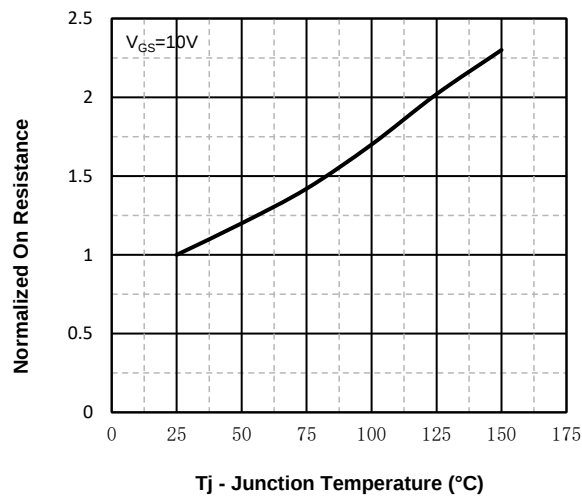
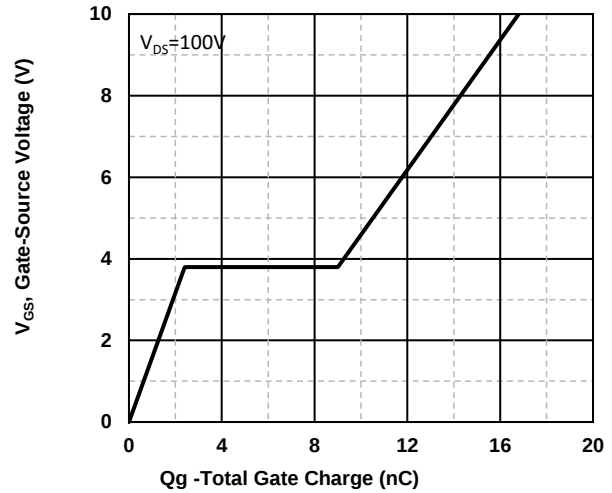
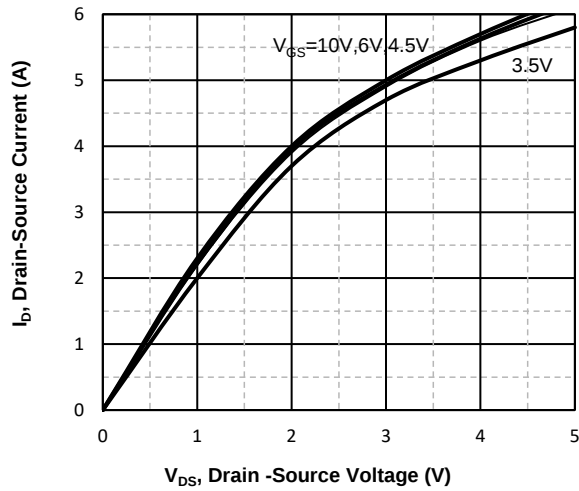
|                 |                                        |                   |      |      |
|-----------------|----------------------------------------|-------------------|------|------|
| $I_{DM}$        | Pulse Drain Current Tested             | $T_C=25^{\circ}C$ | 20   | A    |
| $I_D$           | Continuous Drain Current               | $T_C=25^{\circ}C$ | 4    | A    |
| $P_D$           | Maximum Power Dissipation              | $T_C=25^{\circ}C$ | 1.96 | W    |
| $R_{\theta JA}$ | Thermal Resistance Junction-to-Ambient |                   | 83.5 | °C/W |

## Ordering Information (Example)

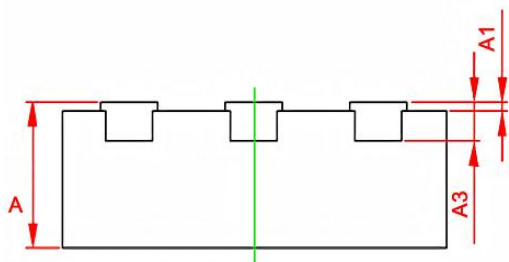
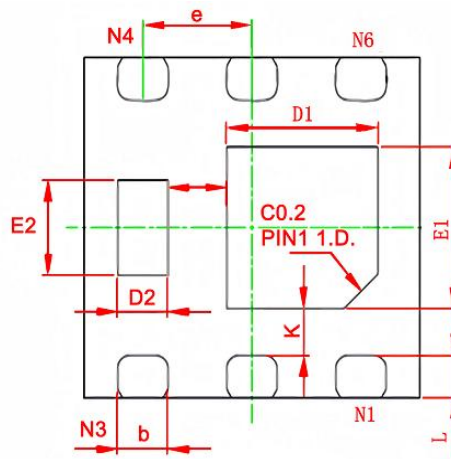
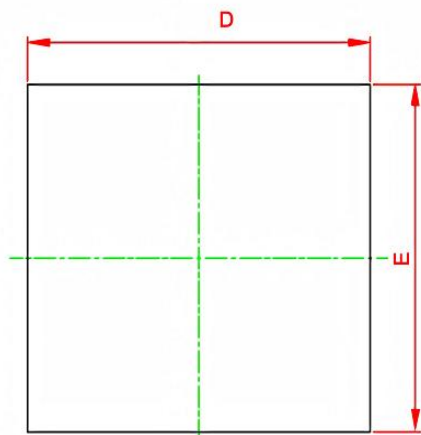
| Type     | Package   | Marking | Minimum Package(pcs) | Inner Box Quantity(pcs) | Outer Carton Quantity(pcs) | Delivery Mode |
|----------|-----------|---------|----------------------|-------------------------|----------------------------|---------------|
| MLSM2A04 | DFN2X2-6L | 2A04    | 3,000                | 45,000                  | 180,000                    | 7"reel        |

| Electrical Characteristics (TJ=25℃ unless otherwise noted)              |                                  |                                                                 |     |     |      |      |
|-------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------|-----|-----|------|------|
| Symbol                                                                  | Parameter                        | Condition                                                       | Min | Typ | Max  | Unit |
| Static Electrical Characteristics @ TJ = 25℃ (unless otherwise stated)  |                                  |                                                                 |     |     |      |      |
| BV <sub>(BR)DSS</sub>                                                   | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                      | 200 | --  | --   | V    |
| I <sub>DSS</sub>                                                        | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =200V, V <sub>GS</sub> =0V                      | --  | --  | 1.0  | uA   |
| 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        | 1.0 | 1.8 | 2.5  | V    |
| R <sub>DS(on)</sub>                                                     | Drain-Source On-State Resistance | V <sub>GS</sub> =10V, I <sub>D</sub> =4A                        | --  | 480 | 580  | mΩ   |
| Dynamic Electrical Characteristics @ TJ = 25℃ (unless otherwise stated) |                                  |                                                                 |     |     |      |      |
| C <sub>ISS</sub>                                                        | Input Capacitance                | V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, f=1MHz               | --  | 740 | --   | pF   |
| C <sub>OSS</sub>                                                        | Output Capacitance               |                                                                 | --  | 15  | --   | pF   |
| C <sub>RSS</sub>                                                        | Reverse Transfer Capacitance     |                                                                 | --  | 5   | --   | pF   |
| Switching Characteristics                                               |                                  |                                                                 |     |     |      |      |
| Q <sub>g</sub>                                                          | Total Gate Charge                | V <sub>DS</sub> =160V, I <sub>D</sub> =4A, V <sub>GS</sub> =10V | --  | 17  | --   | nC   |
| Q <sub>gs</sub>                                                         | Gate Source Charge               |                                                                 | --  | 2.5 | --   | nC   |
| Q <sub>gd</sub>                                                         | Gate Drain Charge                |                                                                 | --  | 7   | --   | nC   |
| t <sub>d(on)</sub>                                                      | Turn-on Delay Time               | V <sub>DD</sub> =100V, I <sub>D</sub> =4A, R <sub>G</sub> =25Ω  | --  | 10  | --   | nS   |
| t <sub>r</sub>                                                          | Turn-on Rise Time                |                                                                 | --  | 13  | --   | nS   |
| t <sub>d(off)</sub>                                                     | Turn-Off Delay Time              |                                                                 | --  | 16  | --   | nS   |
| t <sub>f</sub>                                                          | Turn-Off Fall Time               |                                                                 | --  | 15  | --   | nS   |
| Source- Drain Diode Characteristics                                     |                                  |                                                                 |     |     |      |      |
| V <sub>SD</sub>                                                         | Forward on voltage               | T <sub>J</sub> =25℃, I <sub>S</sub> =4A                         | --  | --  | 1.4  | V    |

## Typical Operating Characteristics



DFN2X2-6L Package information



| Symbol | Dimensions in Millimeters(mm) |       | Dimensions In Inches |       |
|--------|-------------------------------|-------|----------------------|-------|
|        | Min                           | Max   | Min                  | Max   |
| A      | 0.600                         | 0.700 | 0.023                | 0.027 |
| A1     | 0.000                         | 0.050 | 0.000                | 0.001 |
| A3     | 0.203REF                      |       | 0.007REF             |       |
| b      | 0.315                         | 0.415 | 0.012                | 0.016 |
| D      | 1.924                         | 2.076 | 0.075                | 0.081 |
| E      | 1.924                         | 2.076 | 0.075                | 0.081 |
| e      | 0.650TYP                      |       | 0.225TYP             |       |
| L      | 0.224                         | 0.376 | 0.008                | 0.014 |
| k      | 0.200                         | -     | 0.007                | -     |
| E1     | 1.000                         | 1.200 | 0.039                | 0.047 |
| D1     | 0.900                         | 1.100 | 0.035                | 0.043 |
| E2     | 0.700                         | 0.900 | 0.027                | 0.035 |
| D2     | 0.150                         | 0.350 | 0.005                | 0.013 |