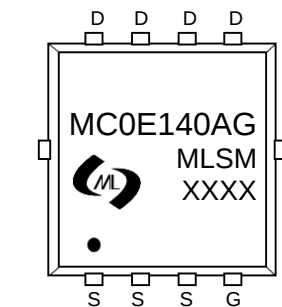


### Features

- Low  $R_{DS(on)}$  & FOM
- Extremely low switching loss
- Split gate trench MOSFET technology
- Fast switching and soft recovery

### Application

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

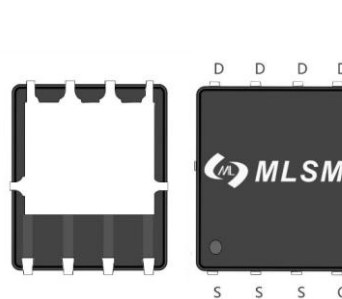


Marking and pin assignment

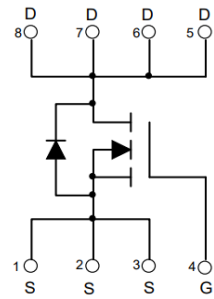
MC0E140AG: Device code  
XXXX : Code

### Product Summary

| $V_{DS}$ | $R_{DS(on)}$ TYP | $I_D$ |
|----------|------------------|-------|
| 40V      | 2.2mΩ@10V        | 140A  |
|          | 3.3mΩ@4.5V       |       |



PDFN5X6-8L view



Schematic diagram



Halogen-Free

### Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Symbol                                                 | Parameter                                        | Rating                   | Unit |
|--------------------------------------------------------|--------------------------------------------------|--------------------------|------|
| <b>Common Ratings (TC=25°C Unless Otherwise Noted)</b> |                                                  |                          |      |
| $V_{DS}$                                               | Drain-Source Breakdown Voltage                   | 40                       | V    |
| $V_{GS}$                                               | Gate-Source Voltage                              | ±20                      | V    |
| $T_J, T_{STG}$                                         | Operating Junction and Storage Temperature Range | -55 to 175               | °C   |
| $E_{AS}$                                               | Single pulse avalanche energy <sup>(Note1)</sup> | 121                      | mJ   |
| $I_S$                                                  | Diode Continuous Forward Current                 | $T_C=25^{\circ}C$<br>140 | A    |

### Mounted on Large Heat Sink

|                 |                                     |                          |      |
|-----------------|-------------------------------------|--------------------------|------|
| $I_{DM}$        | Pulse Drain Current Tested          | $T_C=25^{\circ}C$<br>420 | A    |
| $I_D$           | Continuous Drain Current            | $T_C=25^{\circ}C$<br>140 | A    |
| $P_D$           | Maximum Power Dissipation           | $T_C=25^{\circ}C$<br>75  | W    |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient | 60                       | °C/W |

### Ordering Information (Example)

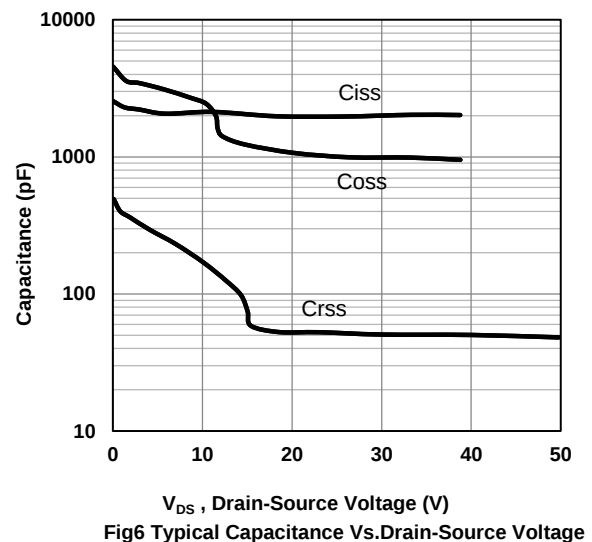
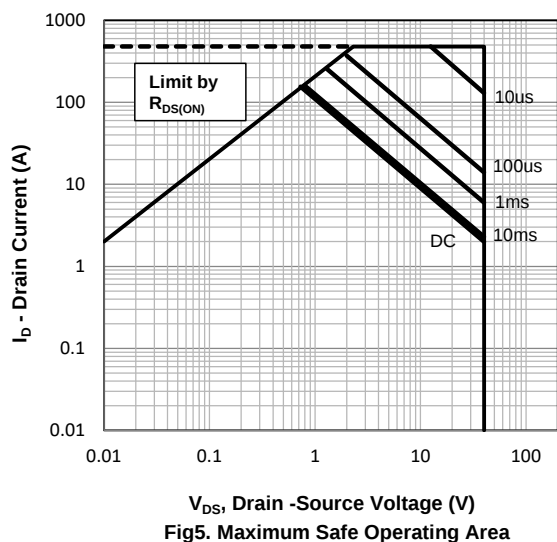
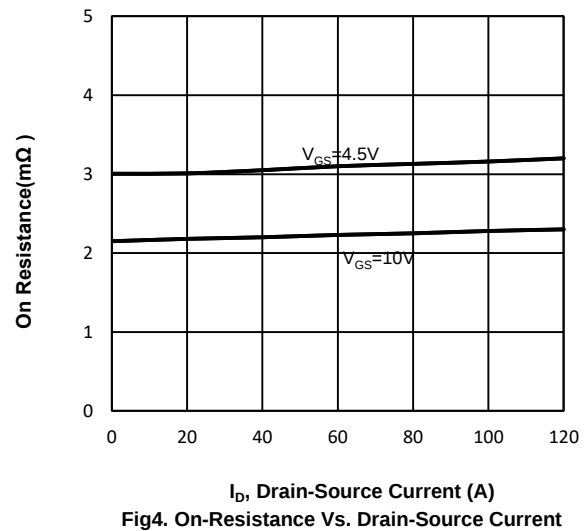
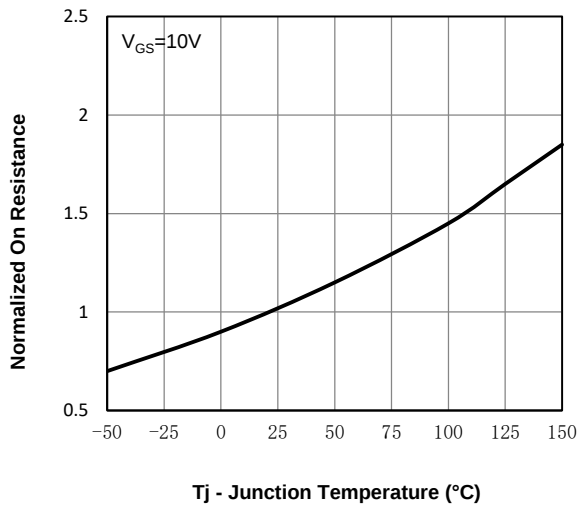
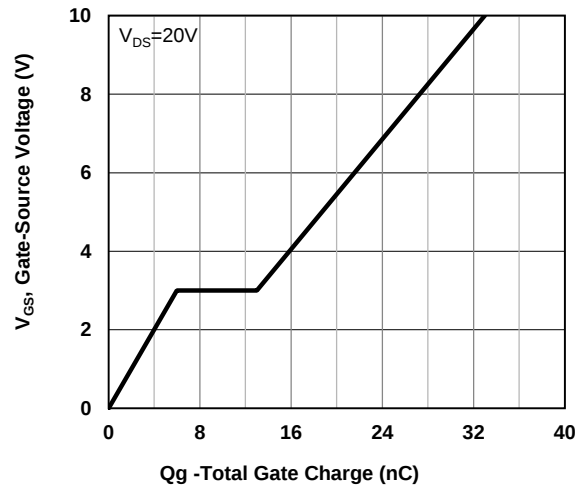
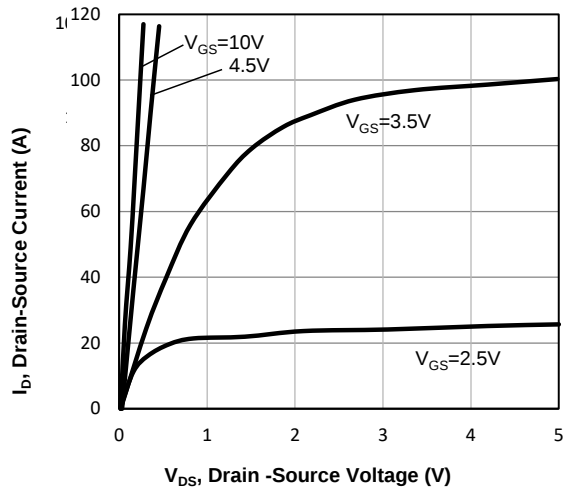
| Type      | Package    | Marking   | Minimum Package(pcs) | Inner Box Quantity(pcs) | Outer Carton Quantity(pcs) | Delivery Mode |
|-----------|------------|-----------|----------------------|-------------------------|----------------------------|---------------|
| MC0E140AG | PDFN5X6-8L | MC0E140AG | 5,000                | 10,000                  | 70,000                     | 13"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                                            | 40  | --   | --   | V    |
| I <sub>DSS</sub>                                                        | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =40V, V <sub>GS</sub> =0V                                             | --  | --   | 1.0  | 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                              | 1.0 | 1.6  | 2.5  | V    |
| R <sub>DS(on)</sub>                                                     | Drain-Source On-State Resistance | V <sub>GS</sub> =10V, I <sub>D</sub> =15A                                             | --  | 2.2  | 2.8  | mΩ   |
|                                                                         |                                  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A                                            | --  | 3.3  | 4.2  | mΩ   |
| Dynamic Electrical Characteristics @ TJ = 25℃ (unless otherwise stated) |                                  |                                                                                       |     |      |      |      |
| C <sub>ISS</sub>                                                        | Input Capacitance                | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, f=1MHz                                     | --  | 2078 | --   | pF   |
| C <sub>OSS</sub>                                                        | Output Capacitance               |                                                                                       | --  | 1130 | --   | pF   |
| C <sub>RSS</sub>                                                        | Reverse Transfer Capacitance     |                                                                                       | --  | 44   | --   | pF   |
| Switching Characteristics                                               |                                  |                                                                                       |     |      |      |      |
| Q <sub>g</sub>                                                          | Total Gate Charge                | V <sub>DS</sub> =20V, I <sub>D</sub> =50A, V <sub>GS</sub> =10V                       | --  | 33   | --   | nC   |
| Q <sub>gs</sub>                                                         | Gate Source Charge               |                                                                                       | --  | 6.2  | --   | nC   |
| Q <sub>gd</sub>                                                         | Gate Drain Charge                |                                                                                       | --  | 5.6  | --   | nC   |
| t <sub>d(on)</sub>                                                      | Turn-on Delay Time               | V <sub>DS</sub> =20V, I <sub>D</sub> =50A, V <sub>GS</sub> =10V, R <sub>G</sub> =1.6Ω | --  | 14   | --   | nS   |
| t <sub>r</sub>                                                          | Turn-on Rise Time                |                                                                                       | --  | 5    | --   | nS   |
| t <sub>d(off)</sub>                                                     | Turn-Off Delay Time              |                                                                                       | --  | 45   | --   | nS   |
| t <sub>f</sub>                                                          | Turn-Off Fall Time               |                                                                                       | --  | 11   | --   | nS   |
| Source- Drain Diode Characteristics                                     |                                  |                                                                                       |     |      |      |      |
| V <sub>SD</sub>                                                         | Forward on voltage               | Tj=25℃, Is=10A                                                                        | --  | --   | 1.2  | V    |

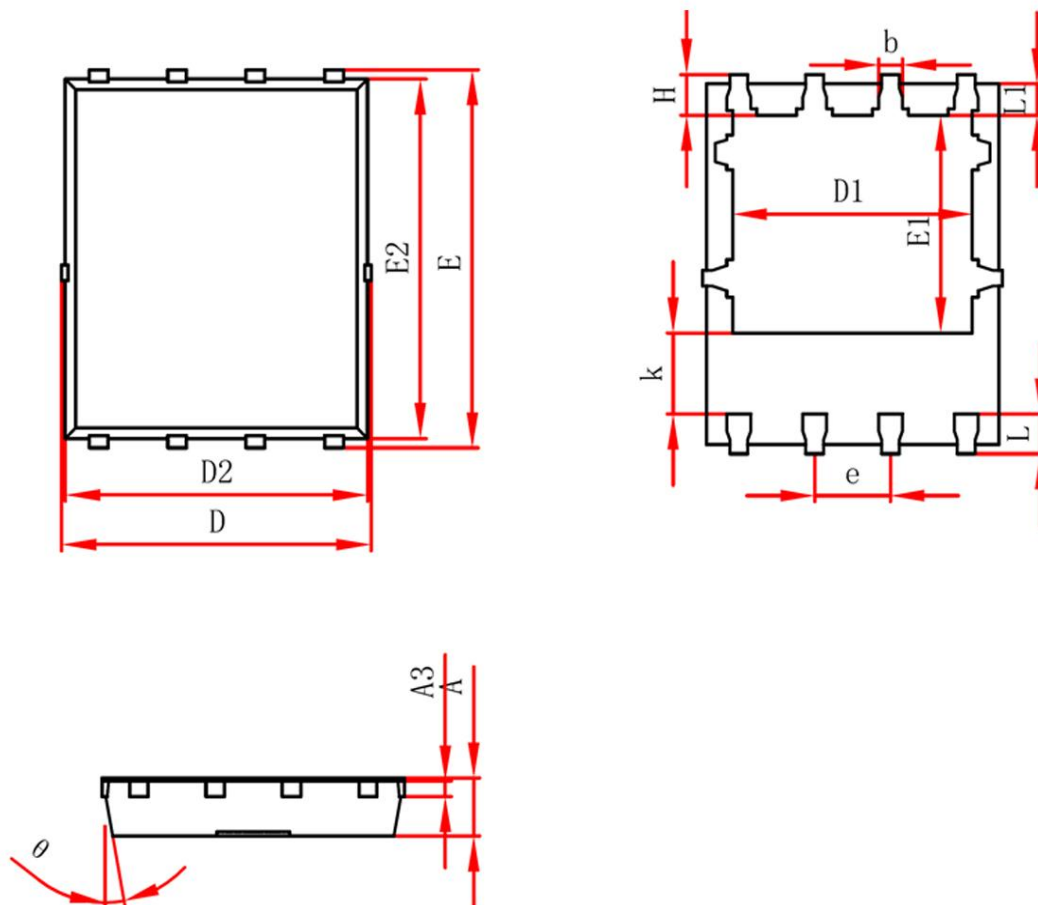
Note:

1、L=0.5mH, V<sub>DD</sub>=20V, V<sub>GS</sub>=10V, R<sub>G</sub>=25Ω, I=22A, Starting T<sub>J</sub>=25°C

## Typical Operating Characteristics



PDFN5X6-8L Package information



| Symbol | Dimensions in Millimeters(mm) |       | Dimensions In Inches |       |
|--------|-------------------------------|-------|----------------------|-------|
|        | Min                           | Max   | Min                  | Max   |
| A      | 0.950                         | 1.050 | 0.035                | 0.039 |
| A3     | 0.254REF.                     |       | 0.010REF.            |       |
| D      | 4.950                         | 5.050 | 0.196                | 0.200 |
| E      | 5.950                         | 6.050 | 0.235                | 0.239 |
| D1     | 4.026                         | 4.126 | 0.159                | 0.163 |
| E1     | 3.510                         | 3.610 | 0.139                | 0.143 |
| D2     | 4.850                         | 4.950 | 0.192                | 0.196 |
| E2     | 5.700                         | 5.800 | 0.225                | 0.229 |
| k      | 1.190                         | 1.390 | 0.047                | 0.055 |
| b      | 0.300                         | 0.400 | 0.012                | 0.016 |
| e      | 1.270TYP.                     |       | 0.050TYP.            |       |
| L      | 0.559                         | 0.711 | 0.022                | 0.028 |
| L1     | 0.424                         | 0.576 | 0.017                | 0.023 |
| H      | 0.574                         | 0.726 | 0.023                | 0.029 |
| θ      | 10°                           | 12°   | 10°                  | 12°   |