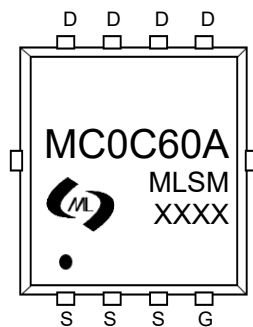


### Features

- 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

- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

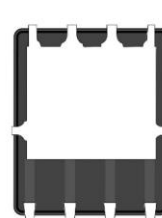


Marking and pin assignment

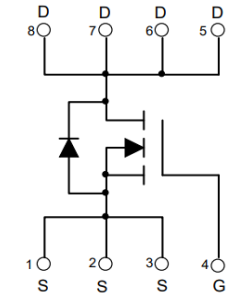
MC0C60A : Device code  
 XXXX : Code

### Product Summary

| $V_{DS}$ | $R_{DS(ON)}$ TYP | $I_D$ |
|----------|------------------|-------|
| 20V      | 4.8mΩ@4.5V       | 60A   |
|          | 7.0mΩ@2.5V       |       |



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      | 20                            | V    |
| $V_{GS}$                                               | Gate-Source Voltage                 | ±12                           | V    |
| $T_J$                                                  | Maximum Junction Temperature        | 150                           | °C   |
| $T_{STG}$                                              | Storage Temperature Range           | -50 to 155                    | °C   |
| $I_S$                                                  | Diode Continuous Forward Current    | $T_c=25^\circ\text{C}$<br>60  | A    |
| <b>Mounted on Large Heat Sink</b>                      |                                     |                               |      |
| $I_{DM}$                                               | Pulse Drain Current Tested          | $T_c=25^\circ\text{C}$<br>240 | A    |
| $I_D$                                                  | Continuous Drain Current            | $T_c=25^\circ\text{C}$<br>60  | A    |
| $P_D$                                                  | Maximum Power Dissipation           | $T_c=25^\circ\text{C}$<br>65  | W    |
| $R_{\theta JA}$                                        | Thermal Resistance Junction-Ambient | 33                            | °C/W |

### Ordering Information (Example)

| Type    | Package    | Marking | Minimum Package(pcs) | Inner Box Quantity(pcs) | Outer Carton Quantity(pcs) | Delivery Mode |
|---------|------------|---------|----------------------|-------------------------|----------------------------|---------------|
| MC0C60A | PDFN5X6-8L | MC0C60A | 5,000                | 10,000                  | 70,000                     | 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                                           | 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> =±12V, 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                             | 0.45 | 0.75 | 1.2  | V    |
| R <sub>DS(on)</sub>                                                      | Drain-Source On-State Resistance | V <sub>GS</sub> =4.5V, I <sub>D</sub> =20A                                           | --   | 4.8  | 7    | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =2.5V, I <sub>D</sub> =15A                                           | --   | 7    | 9    | 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                                    | --   | 2000 | --   | pF   |
| C <sub>OSS</sub>                                                         | Output Capacitance               |                                                                                      | --   | 500  | --   | pF   |
| C <sub>RSS</sub>                                                         | Reverse Transfer Capacitance     |                                                                                      | --   | 200  | --   | pF   |
| Switching Characteristics                                                |                                  |                                                                                      |      |      |      |      |
| Q <sub>g</sub>                                                           | Total Gate Charge                | V <sub>DS</sub> =10V, I <sub>D</sub> =20A, V <sub>GS</sub> =10V                      | --   | 25   | --   | nC   |
| Q <sub>gs</sub>                                                          | Gate Source Charge               |                                                                                      | --   | 6.6  | --   | nC   |
| Q <sub>gd</sub>                                                          | Gate Drain Charge                |                                                                                      | --   | 6.3  | --   | nC   |
| t <sub>d(on)</sub>                                                       | Turn-on Delay Time               | V <sub>DD</sub> =10V, I <sub>D</sub> =20A, V <sub>GS</sub> =4.5V, R <sub>G</sub> =3Ω | --   | 6.5  | --   | nS   |
| t <sub>r</sub>                                                           | Turn-on Rise Time                |                                                                                      | --   | 17   | --   | nS   |
| t <sub>d(off)</sub>                                                      | Turn-Off Delay Time              |                                                                                      | --   | 30   | --   | nS   |
| t <sub>f</sub>                                                           | Turn-Off Fall Time               |                                                                                      | --   | 15.5 | --   | nS   |
| Source- Drain Diode Characteristics                                      |                                  |                                                                                      |      |      |      |      |
| V <sub>SD</sub>                                                          | Forward on voltage               | Tj=25°C, Is=20A                                                                      | --   | --   | 1.2  | V    |

## Typical Operating Characteristics

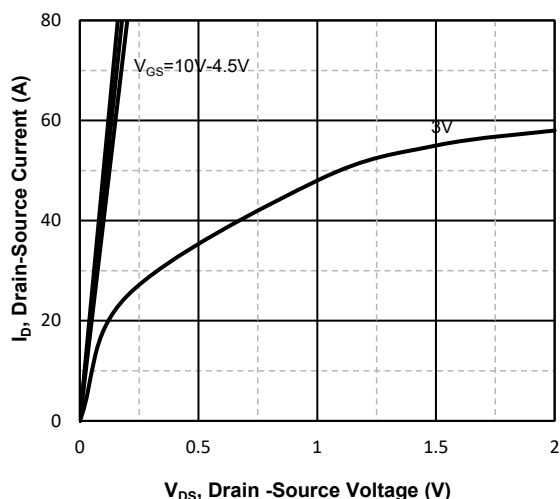


Fig1. Typical Output Characteristics

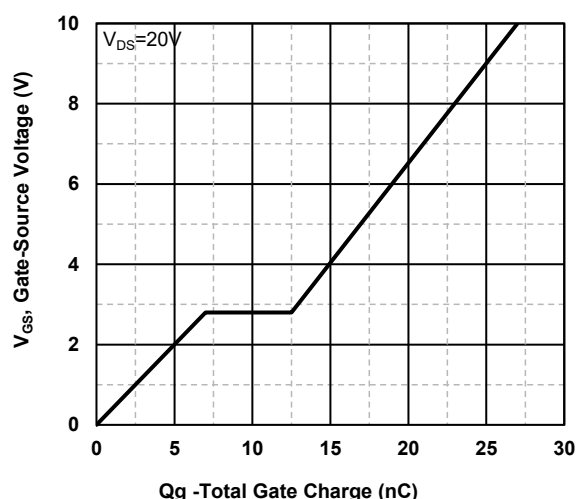


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

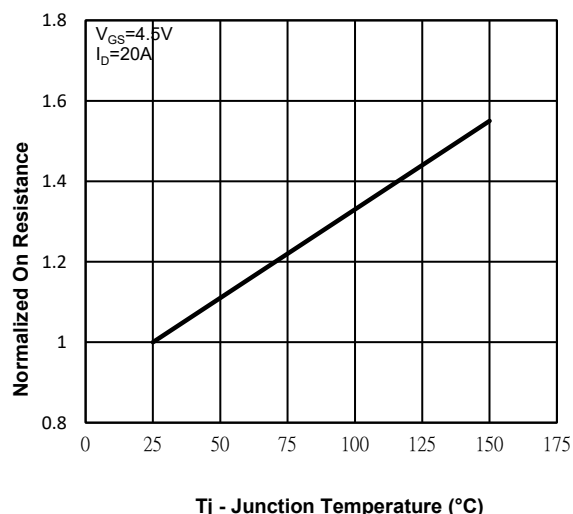


Fig3. Normalized On-Resistance Vs. Temperature

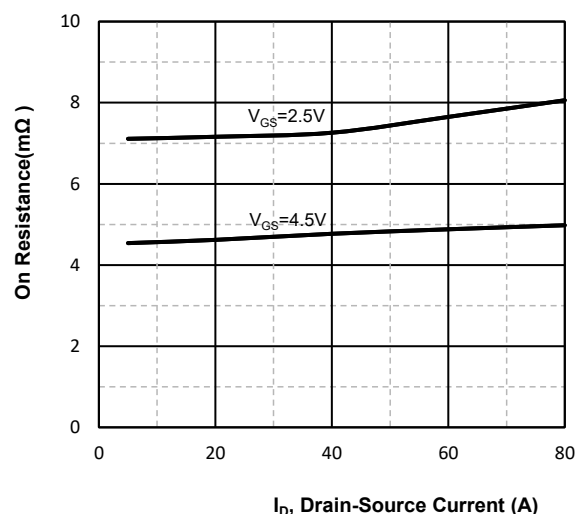


Fig4. On-Resistance Vs. Drain-Source Current

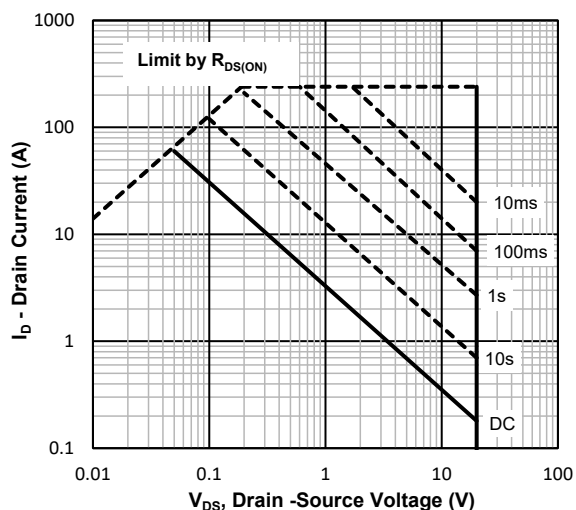


Fig5. Maximum Safe Operating Area

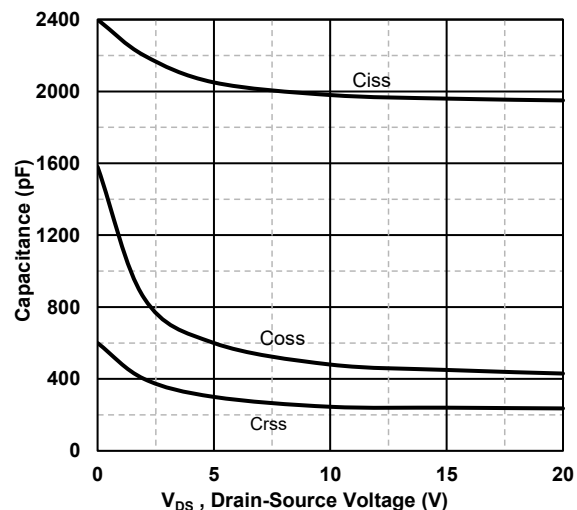
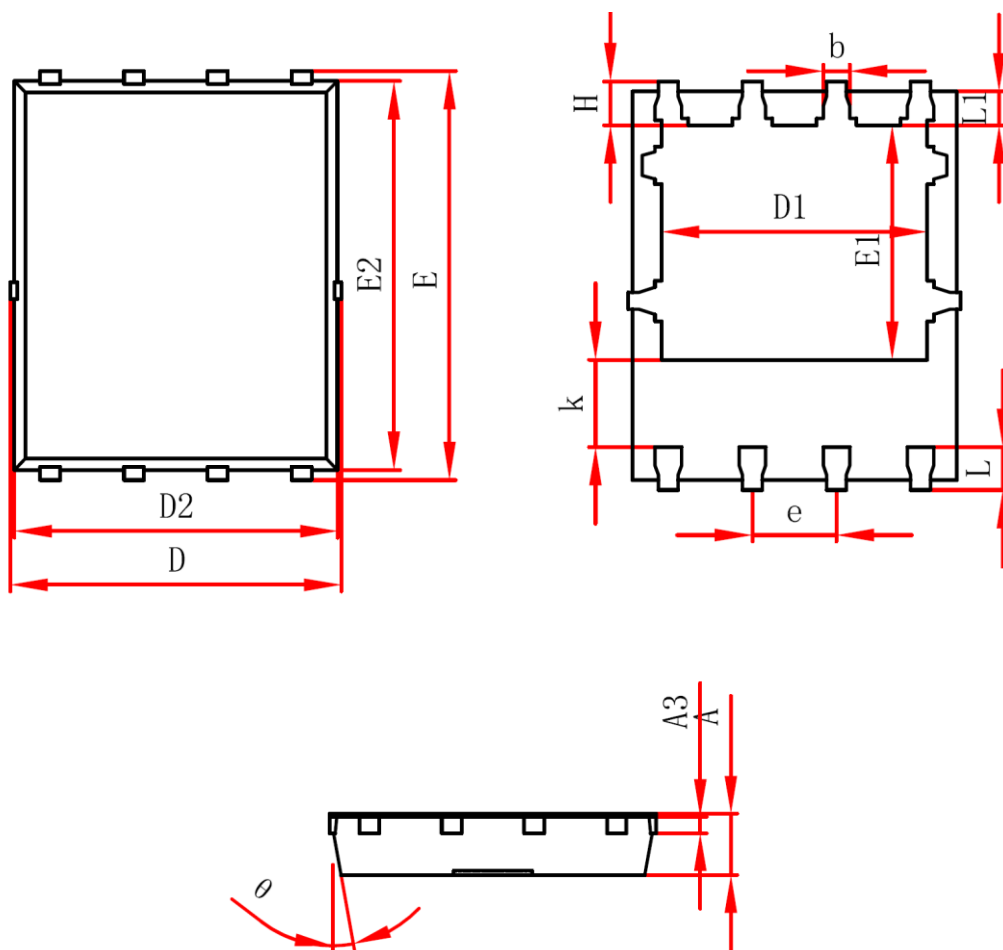


Fig6 Typical Capacitance Vs. Drain-Source Voltage

## 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°   |