

### Features

- High density cell design for ultra low  $R_{DS(ON)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high EAS

### Product Summary

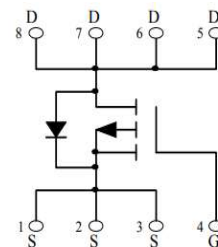
| $V_{DS}$ | $R_{DS(ON)}$ MAX | $I_D$ MAX |
|----------|------------------|-----------|
| -30V     | 10mΩ@-10V        | -50A      |
|          | 14mΩ@-4.5V       |           |

### Application

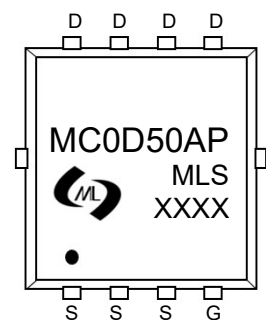
- Battery and loading switching
- Excellent package for good heat dissipation



PDFN5X6-8L view



Schematic diagram



Marking and pin assignment

MC0D50AP: Device code  
XXXX : Code



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   | -30                           | V  |
| $V_{GS}$       | Gate-Source Voltage              | ±20                           | V  |
| $E_{AS}$       | Single pulse avalanche energy    | 77                            | mJ |
| $T_J, T_{STG}$ | Storage Temperature Range        | -55 to 175                    | °C |
| $I_S$          | Diode Continuous Forward Current | $T_C=25^\circ\text{C}$<br>-50 | A  |

### Mounted on Large Heat Sink

|                 |                                     |                                |      |
|-----------------|-------------------------------------|--------------------------------|------|
| $I_{DM}$        | Pulse Drain Current Tested          | $T_C=25^\circ\text{C}$<br>-210 | A    |
| $I_D$           | Continuous Drain Current            | $T_C=25^\circ\text{C}$<br>-50  | A    |
| $P_D$           | Maximum Power Dissipation           | $T_C=25^\circ\text{C}$<br>65   | W    |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient | 62.5                           | °C/W |

### Ordering Information (Example)

| Type     | Package    | Marking  | Minimum Package(pcs) | Inner Box Quantity(pcs) | Outer Carton Quantity(pcs) | Delivery Mode |
|----------|------------|----------|----------------------|-------------------------|----------------------------|---------------|
| MC0D50AP | PDFN5X6-8L | MC0D50AP | 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                                              | -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> =±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 | -1.5 | -2.2 | V    |
| R <sub>DS(on)</sub>                                                      | Drain-Source On-State Resistance | V <sub>GS</sub> =-10V, I <sub>D</sub> =-25A                                              | --   | 8.5  | 10   | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-10A                                             | --   | 11.7 | 14   | 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                                       | --   | 1988 | --   | pF   |
| C <sub>OSS</sub>                                                         | Output Capacitance               |                                                                                          | --   | 305  | --   | pF   |
| C <sub>RSS</sub>                                                         | Reverse Transfer Capacitance     |                                                                                          | --   | 266  | --   | pF   |
| Switching Characteristics                                                |                                  |                                                                                          |      |      |      |      |
| Q <sub>g</sub>                                                           | Total Gate Charge                | V <sub>DD</sub> =-15V, I <sub>D</sub> =-25A, V <sub>GS</sub> =-10V                       | --   | 35   | --   | nC   |
| Q <sub>gs</sub>                                                          | Gate Source Charge               |                                                                                          | --   | 5.8  | --   | nC   |
| Q <sub>gd</sub>                                                          | Gate Drain Charge                |                                                                                          | --   | 8.8  | --   | nC   |
| t <sub>d(on)</sub>                                                       | Turn-on Delay Time               | V <sub>DD</sub> =-15V, I <sub>D</sub> =-25A, V <sub>GS</sub> =-10V, R <sub>G</sub> =2.5Ω | --   | 11   | --   | nS   |
| t <sub>r</sub>                                                           | Turn-on Rise Time                |                                                                                          | --   | 7.7  | --   | nS   |
| t <sub>d(off)</sub>                                                      | Turn-Off Delay Time              |                                                                                          | --   | 43.3 | --   | nS   |
| t <sub>f</sub>                                                           | Turn-Off Fall Time               |                                                                                          | --   | 18   | --   | nS   |
| Source- Drain Diode Characteristics                                      |                                  |                                                                                          |      |      |      |      |
| V <sub>SD</sub>                                                          | Forward on voltage               | Tj=25°C, Is=-25A                                                                         | --   | --   | -1.2 | V    |

## Typical Operating Characteristics

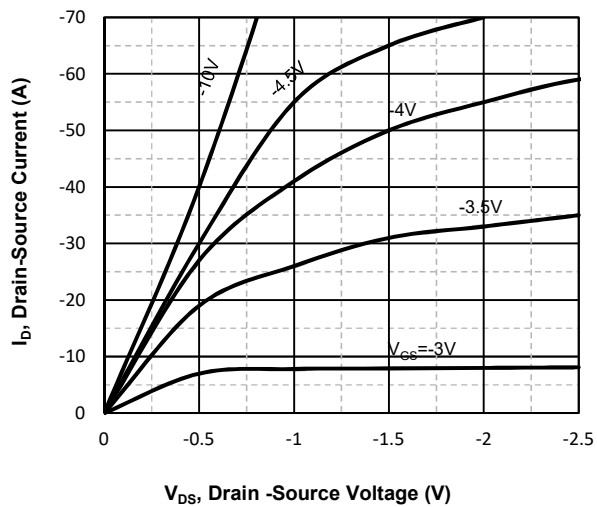


Fig1. Typical Output Characteristics

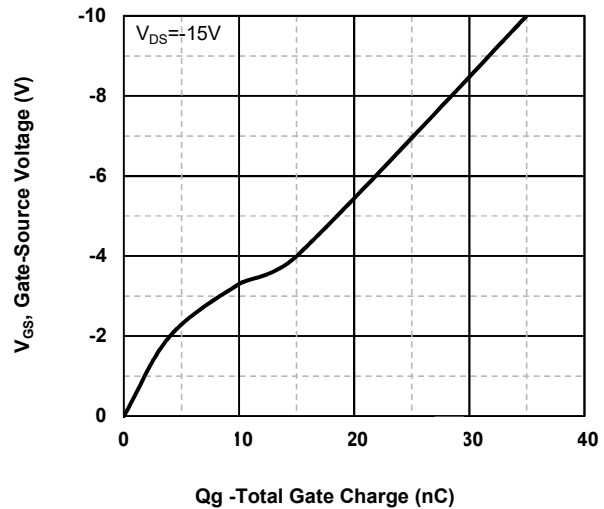


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

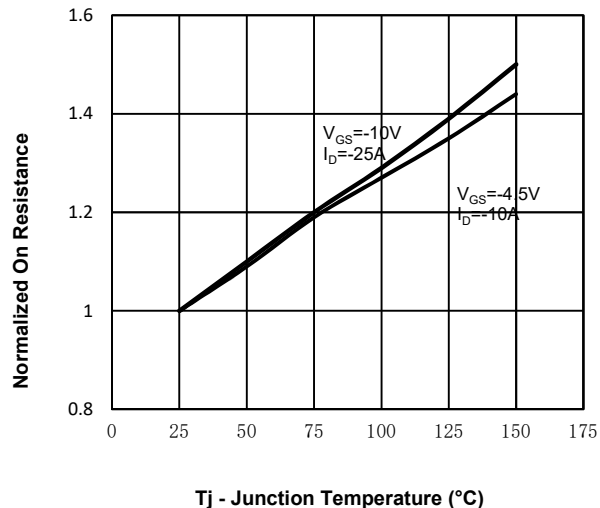


Fig3. Normalized On-Resistance Vs. Temperature

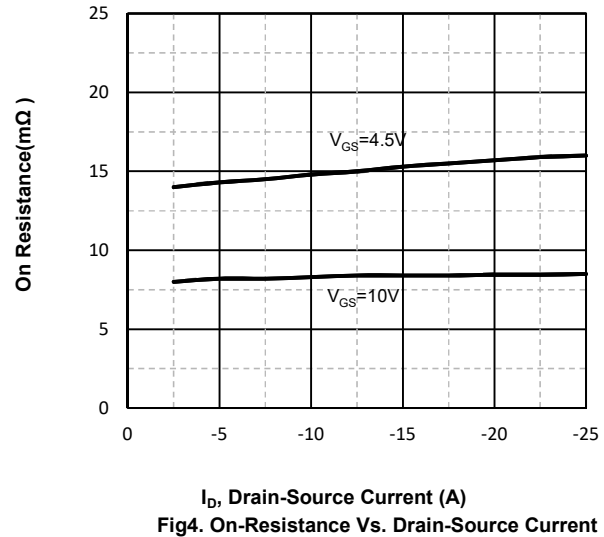


Fig4. On-Resistance Vs. Drain-Source Current

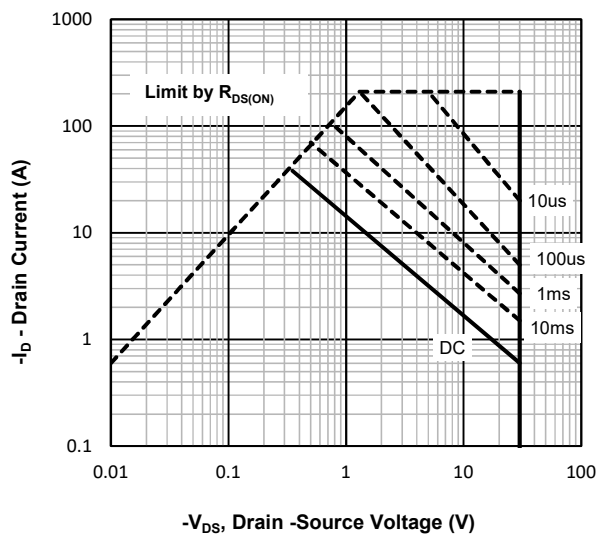


Fig5. Maximum Safe Operating Area

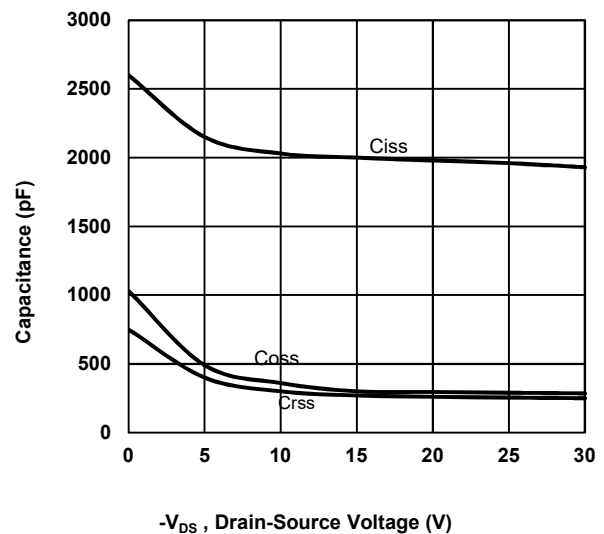
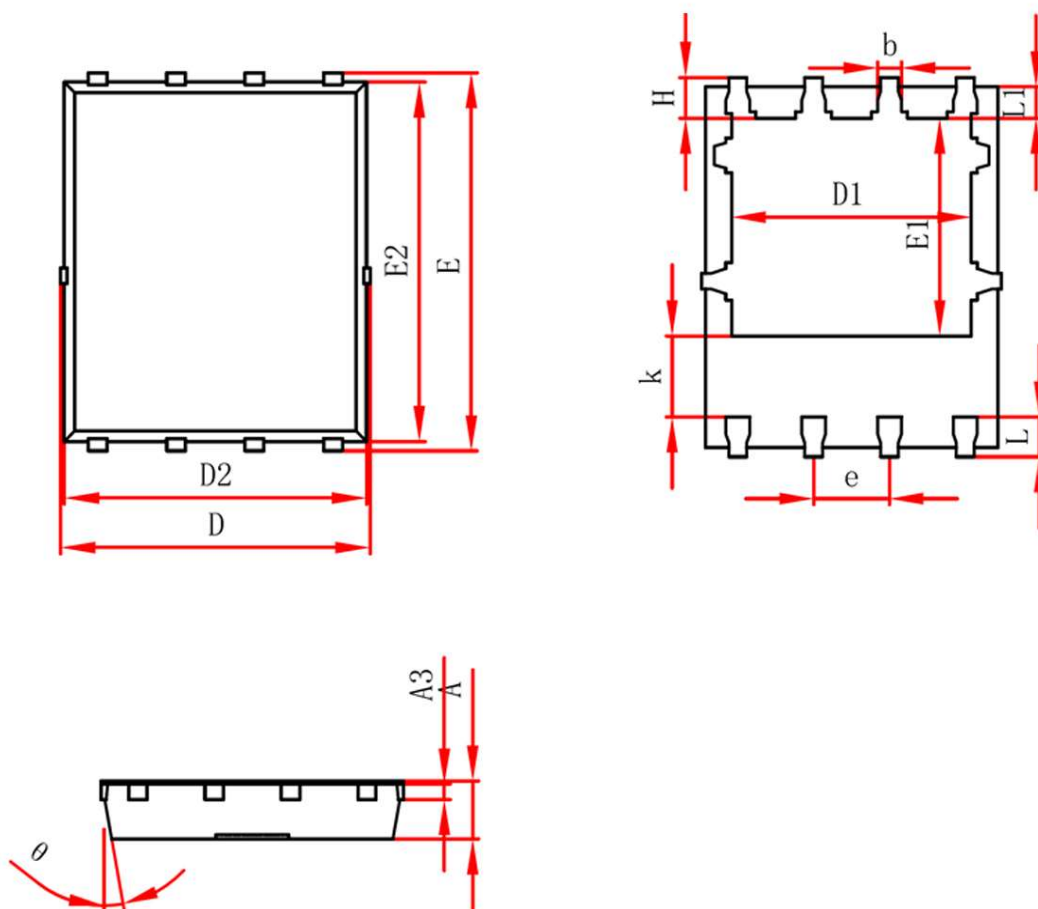


Fig6 Typical Capacitance Vs. Drain-Source Voltage

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 |
| $\theta$ | 10°                           | 12°   | 10°                  | 12°   |