

### 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

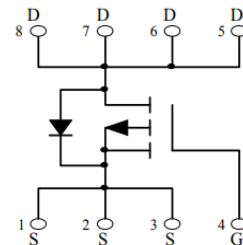
| $V_{DS}$ | $R_{DS(ON)}$ TYP | $I_D$ |
|----------|------------------|-------|
| -30V     | 4.5mΩ@-10V       | -90A  |
|          | 6.3mΩ@-4.5V      |       |

### Application

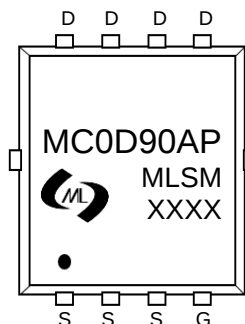
- Battery and loading switching
- Excellent package for good heat dissipation



PDFN5X6-8L view



Schematic diagram



MC0D90AP: Device code  
XXXX : Code

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   | -30                      | V  |
| $V_{GS}$       | Gate-Source Voltage              | ±20                      | V  |
| $T_J, T_{STG}$ | Storage Temperature Range        | -55 to 175               | °C |
| $I_S$          | Diode Continuous Forward Current | $T_C=25^{\circ}C$<br>-90 | A  |

### Mounted on Large Heat Sink

|                 |                                     |                           |      |
|-----------------|-------------------------------------|---------------------------|------|
| $I_{DM}$        | Pulse Drain Current Tested          | $T_C=25^{\circ}C$<br>-360 | A    |
| $I_D$           | Continuous Drain Current            | $T_C=25^{\circ}C$<br>-90  | A    |
| $P_D$           | Maximum Power Dissipation           | $T_C=25^{\circ}C$<br>100  | 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 |
|----------|------------|----------|----------------------|-------------------------|----------------------------|---------------|
| MC0D90AP | PDFN5X6-8L | MC0D90AP | 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                                             | --   | --   | -1.0 | 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 | -1.5 | -2.5 | V    |
| R <sub>DS(on)</sub>                                                      | Drain-Source On-State Resistance | V <sub>GS</sub> =-10V, I <sub>D</sub> =-20A                                            | --   | 4.5  | 6.0  | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-15A                                           | --   | 6.3  | 8.0  | 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                                     | --   | 4450 | --   | pF   |
| C <sub>OSS</sub>                                                         | Output Capacitance               |                                                                                        | --   | 800  | --   | pF   |
| C <sub>RSS</sub>                                                         | Reverse Transfer Capacitance     |                                                                                        | --   | 520  | --   | pF   |
| Switching Characteristics                                                |                                  |                                                                                        |      |      |      |      |
| Q <sub>g</sub>                                                           | Total Gate Charge                | V <sub>DD</sub> =-15V, I <sub>D</sub> =-20A, V <sub>GS</sub> =-4.5V                    | --   | 38   | --   | nC   |
| Q <sub>gs</sub>                                                          | Gate Source Charge               |                                                                                        | --   | 23   | --   | nC   |
| Q <sub>gd</sub>                                                          | Gate Drain Charge                |                                                                                        | --   | 14   | --   | nC   |
| t <sub>d(on)</sub>                                                       | Turn-on Delay Time               | V <sub>DS</sub> =-15V, I <sub>D</sub> =-20A, V <sub>GS</sub> =-10V, R <sub>G</sub> =3Ω | --   | 15   | --   | nS   |
| t <sub>r</sub>                                                           | Turn-on Rise Time                |                                                                                        | --   | 22   | --   | nS   |
| t <sub>d(off)</sub>                                                      | Turn-Off Delay Time              |                                                                                        | --   | 85   | --   | nS   |
| t <sub>f</sub>                                                           | Turn-Off Fall Time               |                                                                                        | --   | 45   | --   | nS   |
| Source- Drain Diode Characteristics                                      |                                  |                                                                                        |      |      |      |      |
| V <sub>SD</sub>                                                          | Forward on voltage               | Tj=25°C, Is=-20A                                                                       | --   | --   | -1.2 | V    |

## Typical Operating Characteristics

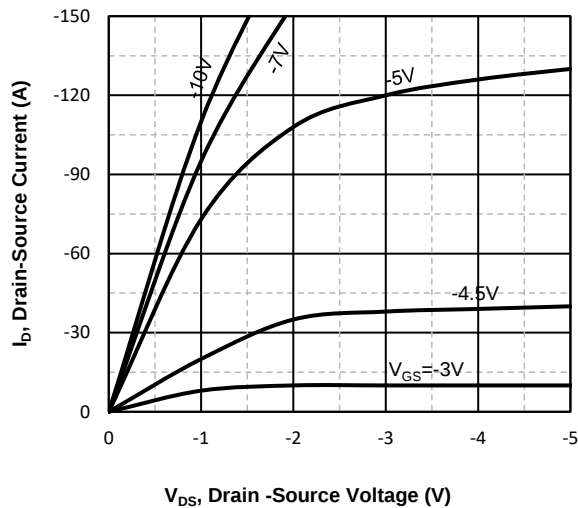


Fig1. Typical Output Characteristics

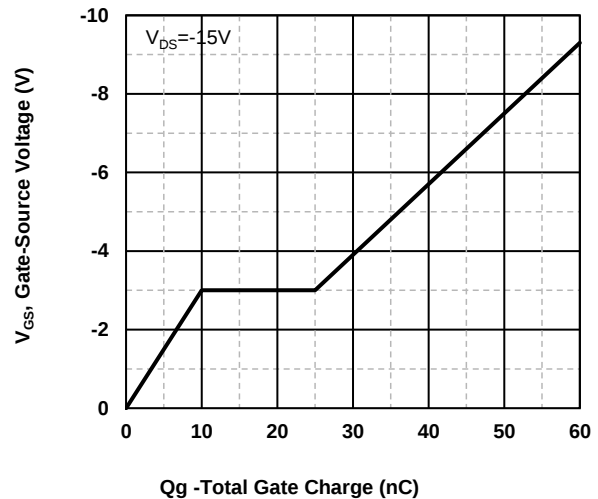


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

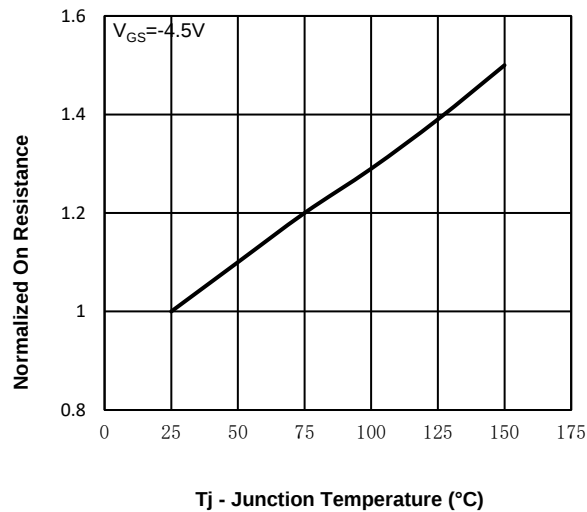


Fig3. Normalized On-Resistance Vs. Temperature

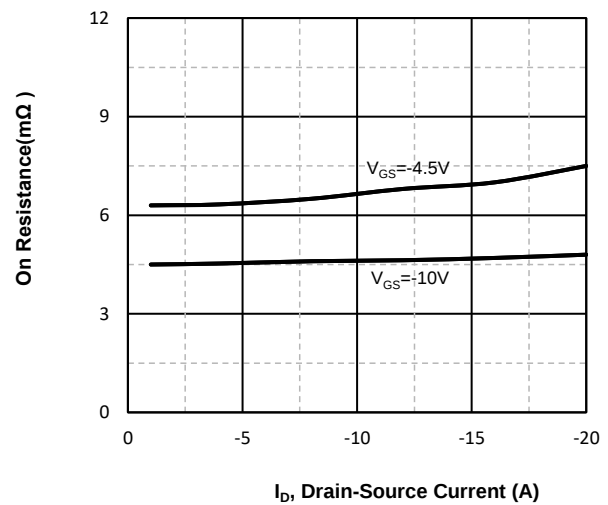


Fig4. On-Resistance Vs. Drain-Source Current

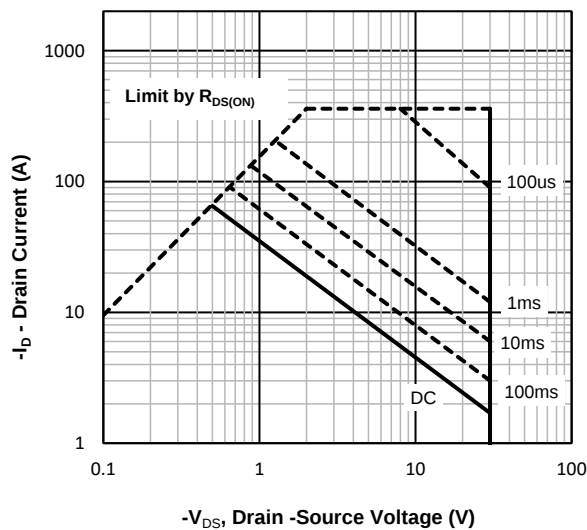


Fig5. Maximum Safe Operating Area

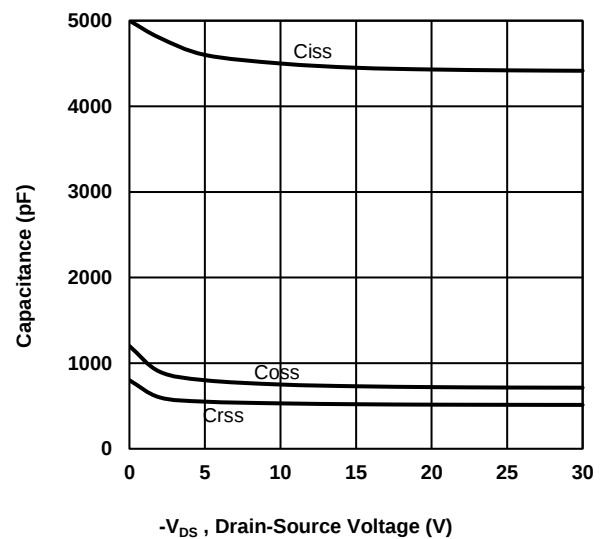


Fig6 Typical Capacitance Vs. Drain-Source Voltage

