

# PM046N150CM

150V 28A 46mΩ Single N channel Trench MOSFET with Normal Diode

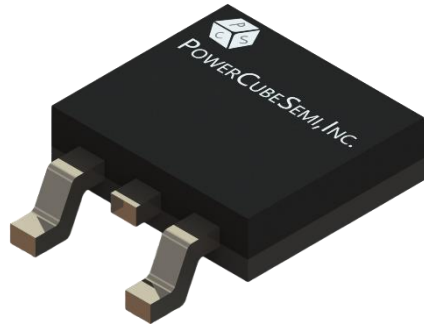
## Features

### Si Single N channel Trench MOSFET

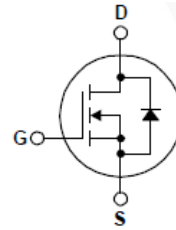
- Rated to 150V at 28Amps @ $T_j = 25^\circ\text{C}$
- Max  $R_{DS(on)} = 46\text{ m}\Omega$
- Typ  $R_{DS(on)} = 37\text{ m}\Omega$
- Gate Charge(Typ.  $Q_g=19.6\text{ nC}$ )
- 100% UIL Tested
- 100% Rg Tested

## Application

- Synchronous Rectification
- Server
- General purpose applications



PKG type : TO-252(DPAK)



## Description

PM046N150CM uses advanced PowerCubeSemi's MOSFET technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. PM046N150CM is suitable device for Synchronous Rectification for Server and general purpose applications.

## Absolute Maximum Ratings

| Symbol     | Parameter                      | Test Condition                                    | Value      | Unit             |
|------------|--------------------------------|---|------------|------------------|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$                         | 150        | V                |
| $I_D$      | Drain Current                  | $T_c=25^\circ\text{C}$                            | 28         | A                |
| $I_{DM}$   | Pulsed Drain Current           | Pulse width limited by junction temperature       | 110        | A                |
| $V_{GS}$   | Gate-Source Voltage            |   | $\pm 20$   | V                |
| $E_{AS}$   | Single Pulsed Avalanche Energy | $I_{AS}=10A, V_{GS}=10V$<br>$V_{DD}=50V, L=1.0mH$ | 50         | mJ               |
| $P_d$      | Power Dissipation              | $T_c=25^\circ\text{C}$                            | 70         | W                |
| $T_j$      | Operating Junction Temperature |   | 150        | $^\circ\text{C}$ |
| $T_{stg}$  | Storage Temperature            |   | -55 to 150 | $^\circ\text{C}$ |



## Package Marking and Ordering Information

| Device Marking | Device    | Package | Packing Method | Tape width | Quantity |
|----------------|-----------|---------|----------------|------------|----------|
| PM046N150CM    | PM046N150 | TO-252  | Tube & Reel    | -          | -        |

## Electrical Characteristics of Si MOSFET

| Symbol       | Parameter                               | Test Condition   | Numerical |      |           | Unit       |
|--------------|---|--|-----------|------|-----------|------------|
|              |   |  | Min       | Typ. | Max.      |            |
| $BV_{DSS}$   | Drain-Source Breakdown Voltage          | $V_{GS} = 0V, I_D = 250\mu A, T_J = 25^\circ C$        | 150       | -    | -         | V          |
| $I_{DSS}$    | Zero Gate Voltage Drain Current         | $V_{DS} = 120V, V_{GS} = 0V$                           | -         | -    | 1         | $\mu A$    |
| $I_{GSS}$    | Gate-Source Leakage Current             | $V_{GS} = \pm 20V, V_{DS} = 0V$                        | -         | -    | $\pm 100$ | nA         |
| $V_{GS(th)}$ | Gate Threshold Voltage                  | $V_{DS} = V_{GS}, I_D = 250\mu A$                      | 1.2       | 2.2  | 3.2       | V          |
| $R_{DS(ON)}$ | Static Drain-Source on state resistance | $V_{GS} = 10V, I_D = 20A$                              | -         | 37   | 46        | m $\Omega$ |
| $g_{FS}$     | Forward Transconductance                | $V_{DS} = 10V, I_D = 20A$                              | -         | 30   | -         | S          |
| $t_{d(on)}$  | Turn-on Delay time                      | $V_{DS} = 75V, I_D = 20A, V_{GS} = 10V, R_G = 3\Omega$ | -         | 15   | -         | ns         |
| $T_r$        | Turn-on Rise time                       |  | -         | 10   | -         |            |
| $t_{d(off)}$ | Turn-off Delay time                     |  | -         | 20   | -         |            |
| $T_f$        | Turn-off Fall time                      |  | -         | 5    | -         |            |



## Electrical Characteristics of Si MOSFET

| Symbol              | Parameter                            | Test Condition   | Numerical |      | Unit                        |
|---------------------|--------------------------------------|--|-----------|------|-----------------------------|
|                     |                                      |  | Typ.      | Max. |                             |
| $R_{\theta JC}$     | Thermal Resistance, Junction to Case |  | 1.8       | -    | $^{\circ}\text{C}/\text{W}$ |
| $C_{iss}$           | Input Capacitance                    | $V_{DS} = 40\text{V}, V_{GS} = 0\text{V},$<br>$f = 1\text{MHz}$              | 1270      | -    | pF                          |
| $C_{oss}$           | Output Capacitance                   |  | 385       | -    |                             |
| $C_{rss}$           | Reverse Transfer Capacitance         |  | 30        | -    |                             |
| $Q_{g(\text{tot})}$ | Total Gate Charge at 10V             | $V_{DS} = 75\text{V}, I_D = 20\text{A},$<br>$V_{GS(\text{on})} = 10\text{V}$ | 19.6      |      | nC                          |
| $Q_{gs}$            | Gate to Source Gate Charge           |  | 5.2       |      |                             |
| $Q_{gd}$            | Gate to Drain "Miller" Charge        |  | 5.2       |      |                             |

## Electrical Characteristics of Si Diode

| Symbol   | Parameter  | Test Condition  | Numerical |      | Unit |
|----------|--|---|-----------|------|------|
|          |  |   | Typ.      | Max. |      |
| $I_S$    | Maximum Continuous Drain to Source Diode Forward Current |   | -         | 28   | A    |
| $I_{SM}$ | Maximum Pulsed Drain to Source Diode Forward Current     |   | -         | 110  | A    |
| $V_{SD}$ | Drain to Source Diode Forward Voltage                    | $I_S = 20\text{A}, V_{GS} = 0\text{V}$                | 0.8       | 1.3  | V    |
| $T_{rr}$ | Reverse Recovery Time                                    | $I_F = 20\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$ | 73        | -    | ns   |
| $Q_{rr}$ | Reverse Recovery Charge                                  |   | 245       | -    | nC   |

# Typical Characteristics

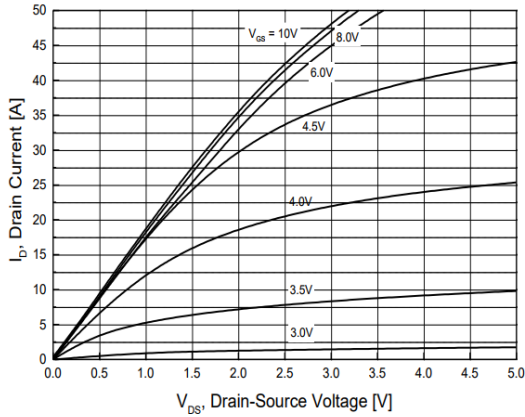


Figure 1. On-Region Characteristics

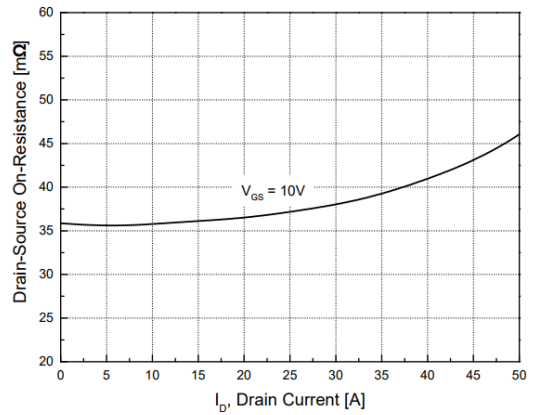


Figure 2. On-Resistance vs. Drain Current and Gate Voltage

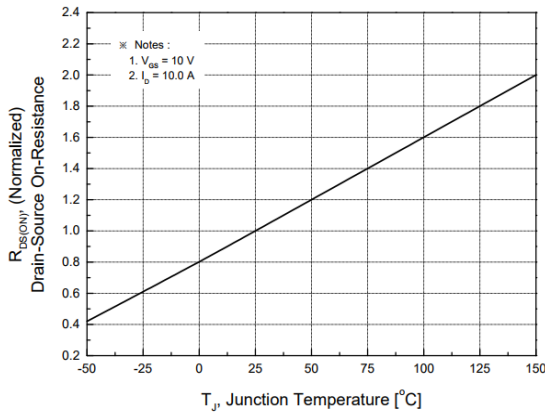


Figure 3. On Resistance vs. Junction Temperature

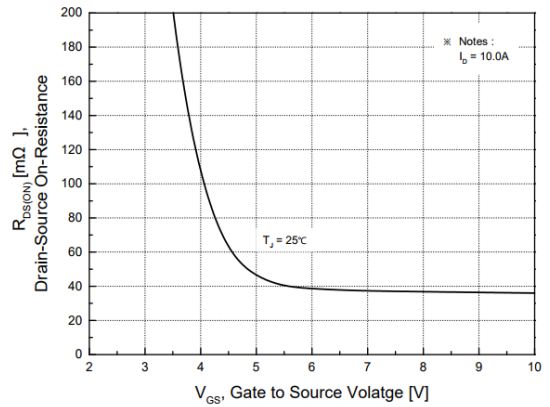


Figure 4. On-Resistance vs. Gate to Source Voltage

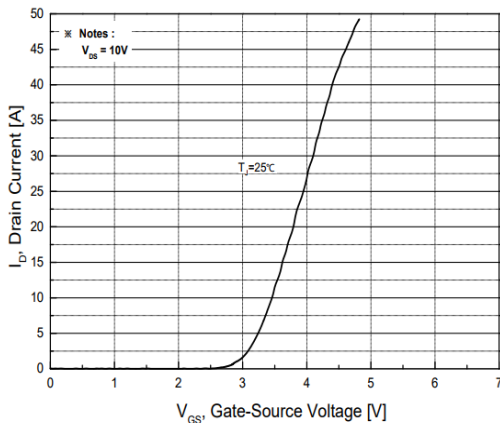


Figure 5. Transfer Characteristics

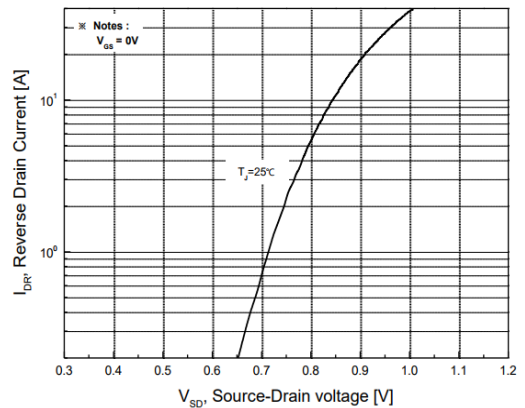


Figure 6. Source to Drain Diode Forward Voltage

# Typical Characteristics

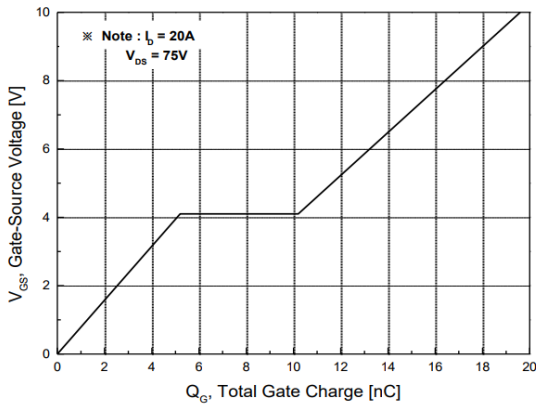


Figure 7. Gate Charge Characteristics

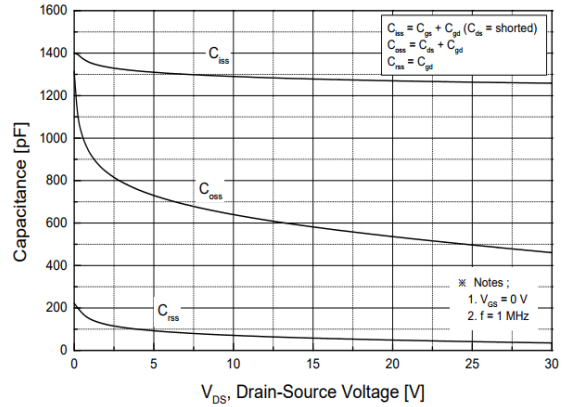


Figure 8. Capacitance Characteristics

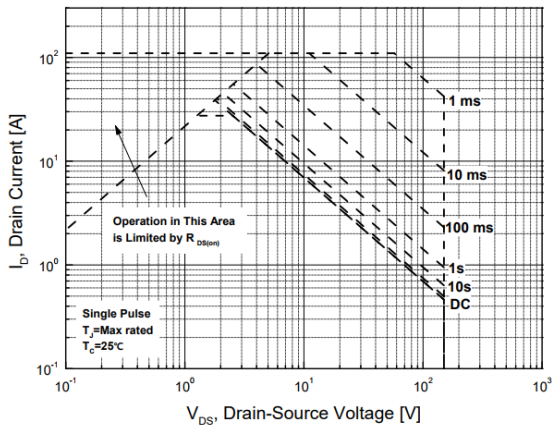


Figure 9. Maximum Safe Operating Area

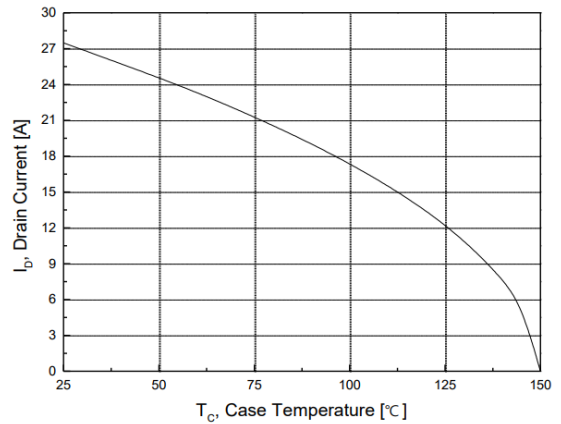


Figure 10. Maximum Drain Current vs. Case Temperature

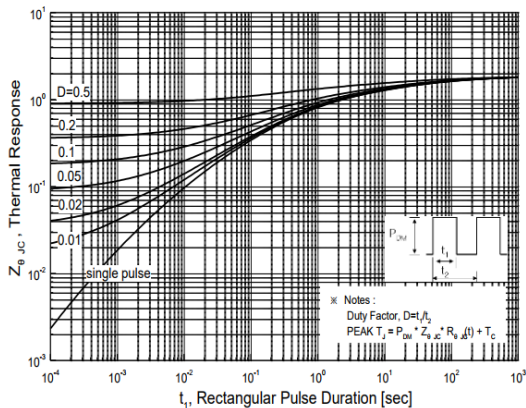
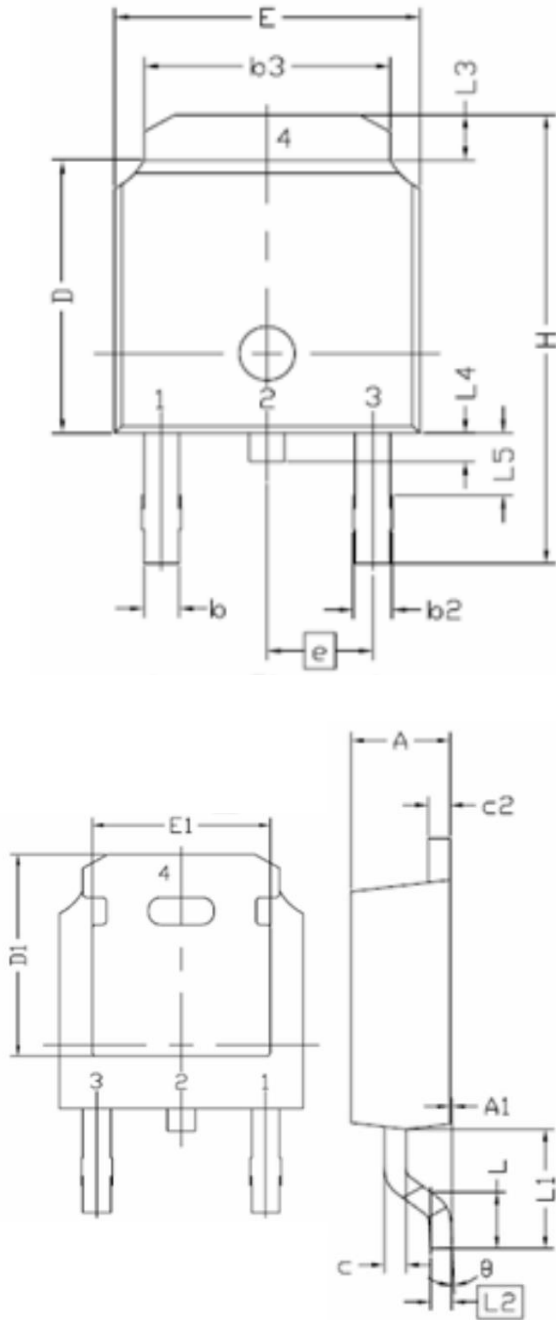


Figure 11. Transient Thermal Impedance, Junction to Ambient

**Package Outline**

Unit : mm



| SYMBOL                     | DIMENSIONS |        |      | NOTES |
|----------------------------|------------|--------|------|-------|
|                            | MIN        | NOM    | MAX  |       |
| <b>E</b>                   | 6.34       | 6.54   | 6.74 |       |
| <b>L</b>                   | 1.30       | 1.60   | 1.90 |       |
| <b>L1</b>                  | 2.60       | 2.90   | 3.20 |       |
| <b>L2</b>                  | 0.5 BSC    |        |      |       |
| <b>L3</b>                  | 0.82       | 1.02   | 1.22 |       |
| <b>L4</b>                  | 0.80       | 1.00   | 1.20 |       |
| <b>L5</b>                  | 2.60       | 2.90   | 3.20 |       |
| <b>D</b>                   | 5.80       | 6.10   | 6.40 |       |
| <b>H</b>                   | 8.40       | 9.00   | 9.60 |       |
| <b>b</b>                   | 1.42       | 1.52   | 1.62 |       |
| <b>b2</b>                  | 2.35       | 2.55   | 2.75 |       |
| <b>b3</b>                  | 5.20       | 5.30   | 5.40 |       |
| <b>e</b>                   | 4.58 BSC   |        |      |       |
| <b>A</b>                   | 2.08       | 2.28   | 2.48 |       |
| <b>A1</b>                  | 0.00       | 0.15   | -    |       |
| <b>c</b>                   | 0.40       | 0.50   | 0.60 |       |
| <b>c2</b>                  | 0.40       | 0.50   | 0.60 |       |
| <b>D1</b>                  | -          | 5.25   | -    |       |
| <b>E1</b>                  | -          | 4.8    | -    |       |
| <b><math>\theta</math></b> | 0.00°      | 10.00° |      |       |