

## 25V/100A N-Channel MOSFET

### Features

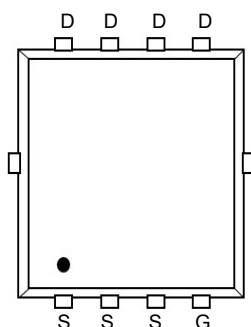
- Trench Power LV MOSFET technology
- High Power and Current handling capability
- Low Gate Charge

### Product Summary

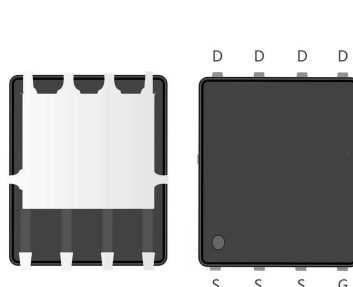
| $V_{DS}$ | $R_{DS(ON)}$ MAX   | $I_D$ MAX |
|----------|--------------------|-----------|
| 25V      | 4.6m $\Omega$ @10V | 100A      |
|          | 10m $\Omega$ @4.5V |           |

### Application

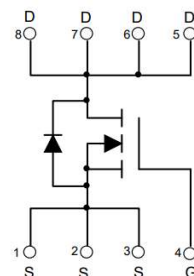
- PWM applications
- Power management
- Load switch



Marking and pin assignment



PDFN5X6-8L view



Schematic diagram



Halogen-Free

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

| Symbol | Parameter | Rating | Unit |
|--------|-----------|--------|------|
|--------|-----------|--------|------|

### Common Ratings (TC=25°C Unless Otherwise Noted)

|                  |                                  |         |            |    |
|------------------|----------------------------------|---------|------------|----|
| V <sub>DS</sub>  | Drain-Source Breakdown Voltage   |         | 25         | V  |
| V <sub>GS</sub>  | Gate-Source Voltage              |         | ±20        | V  |
| T <sub>J</sub>   | Maximum Junction Temperature     |         | 150        | °C |
| T <sub>STG</sub> | Storage Temperature Range        |         | -55 to 150 | °C |
| I <sub>S</sub>   | Diode Continuous Forward Current | Tc=25°C | 100        | A  |

### Mounted on Large Heat Sink

|                 |                                        |                        |     |      |
|-----------------|----------------------------------------|------------------------|-----|------|
| $I_{DM}$        | Pulse Drain Current Tested             | $T_c=25^\circ\text{C}$ | 460 | A    |
| $I_D$           | Continuous Drain Current               | $T_c=25^\circ\text{C}$ | 100 | A    |
| $P_D$           | Maximum Power Dissipation              | $T_c=25^\circ\text{C}$ | 3.3 | W    |
| $R_{\theta JA}$ | Thermal Resistance Junction-to-Ambient |                        | 89  | °C/W |

| 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                                              | 25  | --   | --   | V    |
| I <sub>DSS</sub>                                                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =25V, 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  | 2.5  | V    |
| R <sub>DS(on)</sub>                                                      | Drain-Source On-State Resistance | V <sub>GS</sub> =10V, I <sub>D</sub> =30A                                               | --  | 3.8  | 4.6  | mΩ   |
|                                                                          |                                  | V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A                                              | --  | 7.9  | 10   | mΩ   |
| Dynamic Electrical Characteristics @ TJ = 25°C (unless otherwise stated) |                                  |                                                                                         |     |      |      |      |
| C <sub>ISS</sub>                                                         | Input Capacitance                | V <sub>DS</sub> =12.5V, V <sub>GS</sub> =0V, f=1MHz                                     | --  | 1050 | --   | pF   |
| C <sub>OSS</sub>                                                         | Output Capacitance               |                                                                                         | --  | 220  | --   | pF   |
| C <sub>RSS</sub>                                                         | Reverse Transfer Capacitance     |                                                                                         | --  | 190  | --   | pF   |
| Switching Characteristics                                                |                                  |                                                                                         |     |      |      |      |
| Q <sub>g</sub>                                                           | Total Gate Charge                | V <sub>DS</sub> =12.5V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V                       | --  | 33   | --   | nC   |
| Q <sub>gs</sub>                                                          | Gate Source Charge               |                                                                                         | --  | 7    | --   | nC   |
| Q <sub>gd</sub>                                                          | Gate Drain Charge                |                                                                                         | --  | 11   | --   | nC   |
| t <sub>d(on)</sub>                                                       | Turn-on Delay Time               | V <sub>DD</sub> =12.5V, I <sub>D</sub> =30A, V <sub>GS</sub> =10V, R <sub>G</sub> =2.5Ω | --  | 6    | --   | nS   |
| t <sub>r</sub>                                                           | Turn-on Rise Time                |                                                                                         | --  | 20.5 | --   | nS   |
| t <sub>d(off)</sub>                                                      | Turn-Off Delay Time              |                                                                                         | --  | 19   | --   | nS   |
| t <sub>f</sub>                                                           | Turn-Off Fall Time               |                                                                                         | --  | 9    | --   | nS   |
| Source- Drain Diode Characteristics                                      |                                  |                                                                                         |     |      |      |      |
| V <sub>SD</sub>                                                          | Forward on voltage               | Tj=25°C, Is=30A                                                                         | --  | --   | 1.2  | V    |

## Typical Operating Characteristics

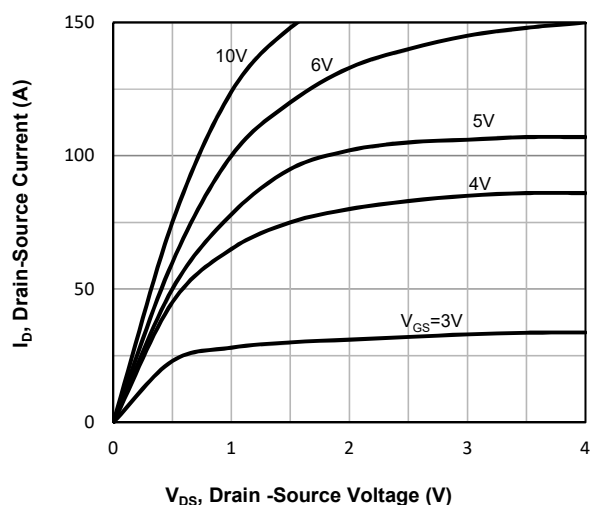


Fig1. Typical Output Characteristics

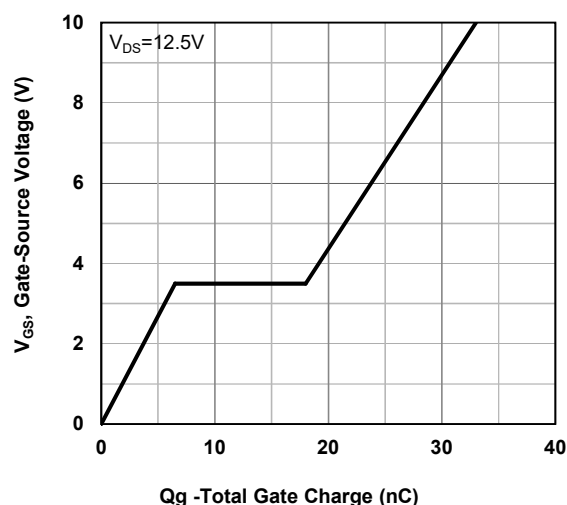


Fig2. Typical Gate Charge Vs. Gate-Source Voltage

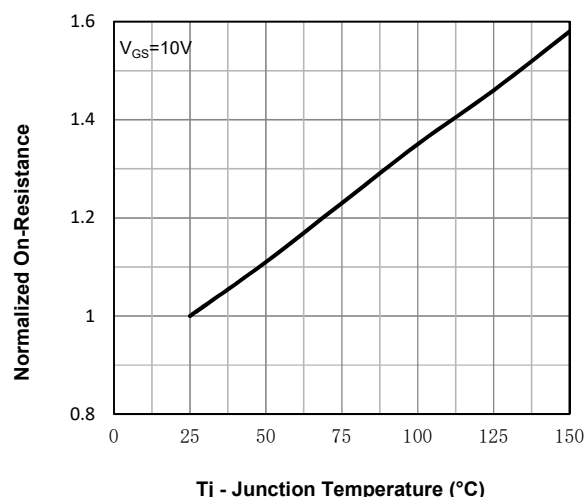


Fig3. Normalized On-Resistance Vs. Temperature

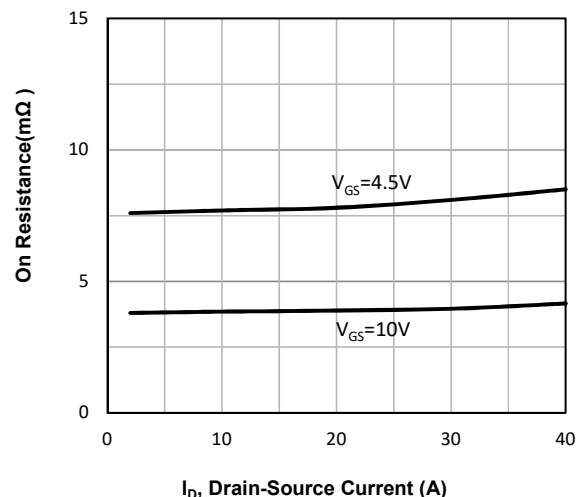


Fig4. On Resistance Vs. Drain-Source Current

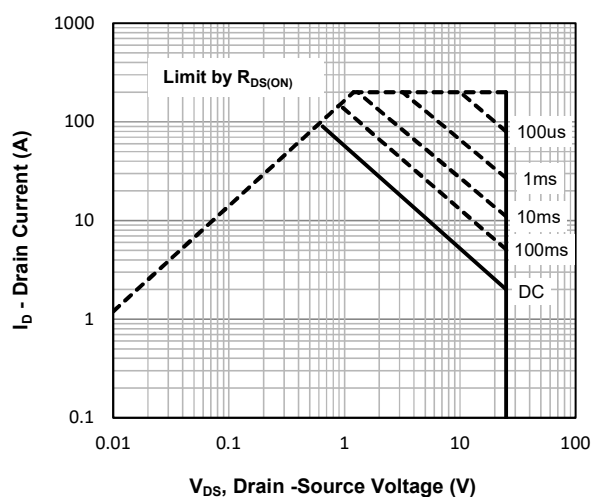


Fig5. Maximum Safe Operating Area

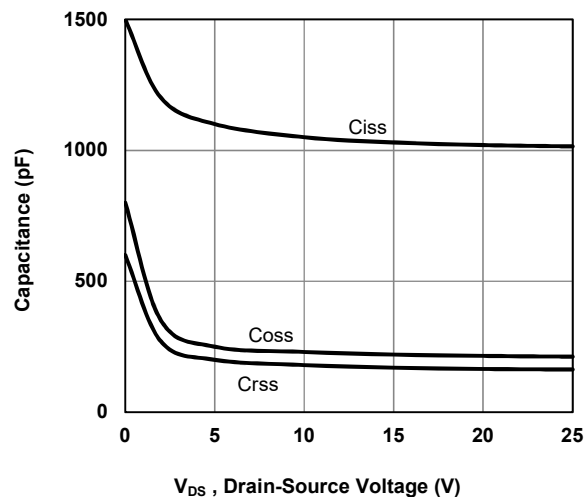


Fig6 Typical Capacitance Vs. Drain-Source Voltage

Figure 1 consists of three sub-diagrams labeled (a), (b), and (c), illustrating the geometric parameters of a square plate with a central hole and eight peripheral holes.

- (a) Top View:** Shows the square plate with overall dimensions  $D$  (width) and  $E$  (height). The inner square hole has dimensions  $D_1$  (width) and  $E_1$  (height). The distance between the centers of adjacent holes is  $D_2$  (width) and  $E_2$  (height).
- (b) Side View:** Shows the plate's thickness  $A$  and the height of the central hole  $A_3$ . The hole diameter is  $b$ .
- (c) Detail View:** Shows the hole diameter  $b$ , the hole spacing  $e$ , and the hole depth  $k$ .

| 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°   |