

## FEATURES

|  $V_{DS} = 60V, I_D = 50A$

|  $R_{DS(ON) Typ} = 12.5m\Omega @ V_{GS} = 10V$

|  $R_{DS(ON) Typ} = 15.5m\Omega @ V_{GS} = 4.5V$

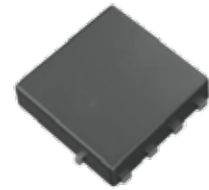
| Advanced Trench Technology

| Excellent  $R_{DS(ON)}$  and Low Gate Charge

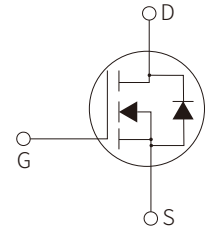
| 100% UIS TESTED!

| 100%  $\Delta V_{ds}$  TESTED!

| Meet AEC-Q101 Requirements



PDFN3×3-8L



Schematic Symbol

## APPLICATION

| Load Switch

| PWM Application

| Power Management

## APPROVALS

**RoHS** | Compliance with 2011/65/EU

**HF** | Compliance with IEC61249-2-21:2003

## ABSOLUTE MAXIMUM RATINGS

| Parameter                                     | Symbol          | Value               | Unit         |
|---|-----------------|---------------------|--------------|
| Drain-to-Source Voltage                       | $V_{DS}$        | 60                  | V            |
| Pulsed Drain Current <sup>(1)</sup>           | $I_{DM}$        | 200                 | A            |
| Continuous Drain Current                      | $I_D$           | $T_C = 25^\circ C$  | 50           |
|   |                 | $T_C = 100^\circ C$ | 30           |
| Power Dissipation $T_C = 25^\circ C$          | $P_D$           | 48                  | W            |
| Gate-to-Source Voltage                        | $V_{GS}$        | $\pm 20$            | V            |
| Single Pulsed Avalanche Energy <sup>(2)</sup> | $E_{AS}$        | 36                  | mJ           |
| Junction & Storage Temperature Range          | $T_J, T_{STG}$  | -55 to 150          | $^\circ C$   |
| Thermal Resistance, Junction to Case          | $R_{\theta JC}$ | 2.6                 | $^\circ C/W$ |

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C)

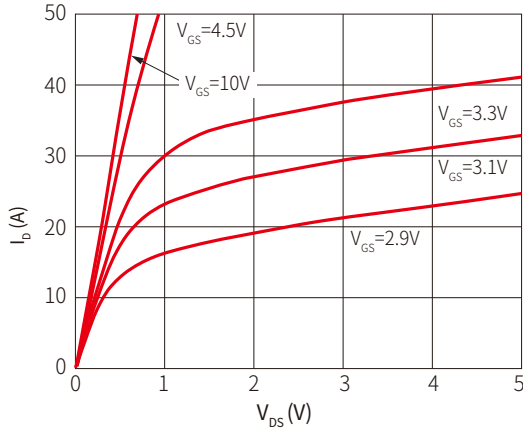
| Parameter   | Symbol               | Test Conditions   | Min. | Typ. | Max. | Unit |
|---|----------------------|---|------|------|------|------|
| <b>Off Characteristics</b>                                |                      |   |      |      |      |      |
| Drain-Source Breakdown Voltage                            | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA  | 60   |      |      | V    |
| Gate-Body Leakage Current                                 | I <sub>GSS</sub>     | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V  |      |      | ±100 | nA   |
| Zero Gate Voltage Drain Current                           | I <sub>DSS</sub>     | V <sub>DS</sub> =60V, V <sub>GS</sub> =0V   |      |      | 1.0  | μA   |
| <b>On Characteristics</b>                                 |                      |   |      |      |      |      |
| Gate Threshold Voltage                                    | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                | 1.0  | 1.3  | 1.8  | V    |
| Static Drain-Source ON-Resistance <sup>2</sup>            | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =20A   |      | 12.5 | 15   | mΩ   |
|   |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A  |      | 15.5 | 19   | mΩ   |
| <b>Dynamic Characteristics</b>                            |                      |   |      |      |      |      |
| Input capacitance   | C <sub>iss</sub>     | V <sub>GS</sub> =0V, V <sub>DS</sub> =30V,<br>f = 1MHz                                  |      | 590  |      | pF   |
| Output capacitance  | C <sub>oss</sub>     |   |      | 210  |      | pF   |
| Reverse transfer capacitance                              | C <sub>rss</sub>     |   |      | 10   |      | pF   |
| Total Gate Charge   | Q <sub>g</sub>       | V <sub>DS</sub> =30V, V <sub>GS</sub> =0 to 10V<br>I <sub>D</sub> =20A                  |      | 13.9 |      | nC   |
| Gate-Source Charge  | Q <sub>gs</sub>      |   |      | 1.6  |      | nC   |
| Gate Drain("Miller") Charge                               | Q <sub>gd</sub>      |   |      | 3.1  |      | nC   |
| <b>Switching Characteristics</b>                          |                      |   |      |      |      |      |
| Turn-on Delay Time  | t <sub>d(on)</sub>   | V <sub>DD</sub> =30V, V <sub>GS</sub> =10V<br>R <sub>GEN</sub> =6Ω, I <sub>D</sub> =20A |      | 3.7  |      | nS   |
| Turn-on Rise Time   | t <sub>r</sub>       |   |      | 4.3  |      | nS   |
| Turn-Off Delay Time                                       | t <sub>d(off)</sub>  |   |      | 16.2 |      | nS   |
| Turn-Off Fall Time  | t <sub>f</sub>       |   |      | 6.5  |      | nS   |
| <b>Drain-Source Diode Characteristics and Max Ratings</b> |                      |   |      |      |      |      |
| Drain to Source Diode Forward Voltage                     | V <sub>SD</sub>      | I <sub>S</sub> =20A, V <sub>GS</sub> =0V  |      |      | 1.2  | V    |
| Body Diode Reverse Recovery Time                          | t <sub>rr</sub>      | I <sub>F</sub> =15A<br>di/dt = 100A/us  |      | 24   |      | nS   |
| Body Diode Reverse Recovery Charge                        | Q <sub>rr</sub>      |   |      | 9.3  |      | nC   |
| Maximum Continuous Drain to Source Diode Forward Current  | I <sub>S</sub>       |   |      |      | 50   | A    |
| Maximum Pulsed Drain to Source Diode Forward Current      | I <sub>SM</sub>      |   |      |      | 200  | A    |

**Notes:**

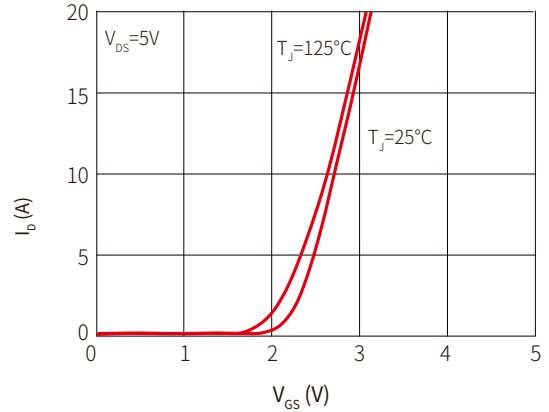
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. E<sub>AS</sub> condition: Starting T<sub>J</sub>=25°C, V<sub>DD</sub>=30V, V<sub>G</sub>=10V, R<sub>G</sub>=25ohm, L=0.5mH, I<sub>AS</sub>=12A
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%

# PARAMETER CHARACTERISTIC CURVE

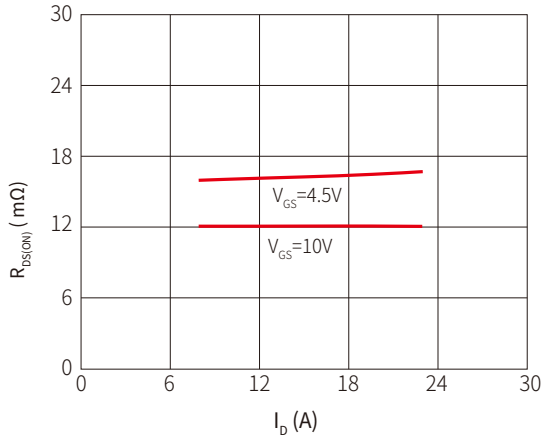
**Fig 1: Output Characteristics**



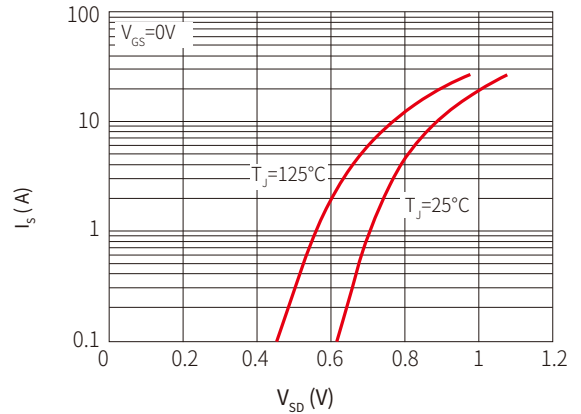
**Figure 2: Typical Transfer Characteristics**



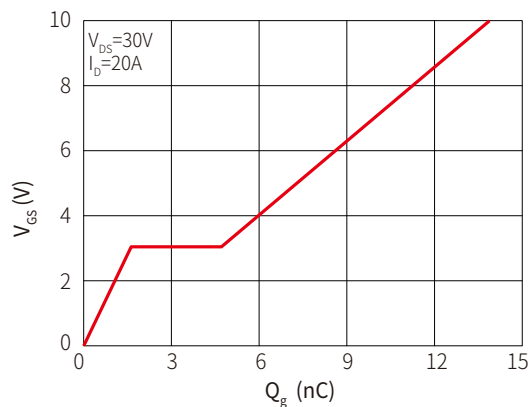
**Figure 3: On-Resistance vs. Drain Current**



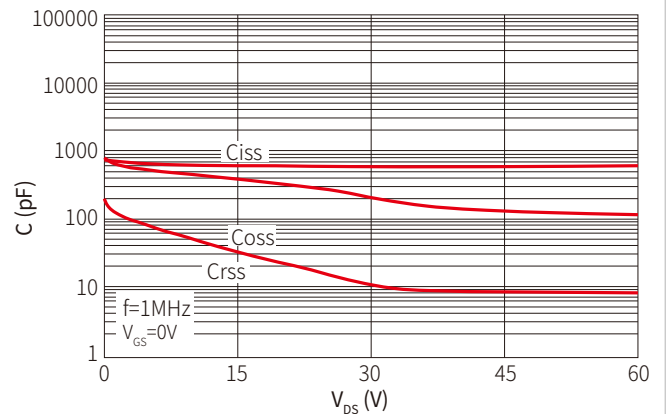
**Figure 4: Body Diode Characteristics**



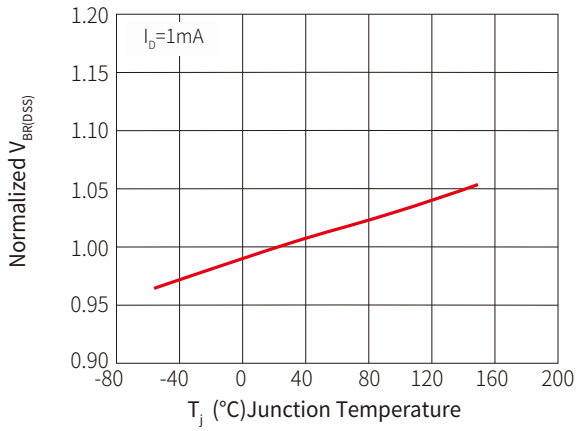
**Figure 5: Gate Charge Characteristics**



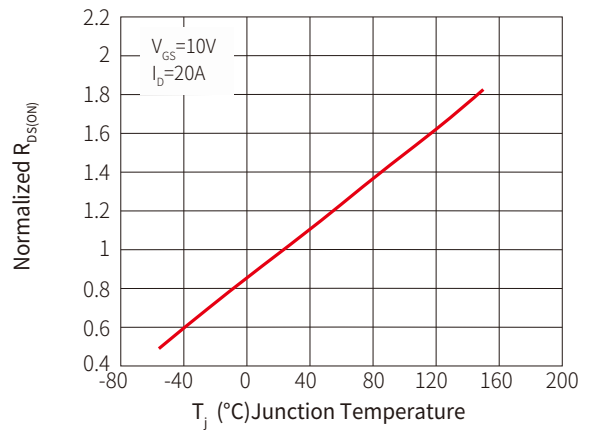
**Figure 6: Capacitance Characteristics**



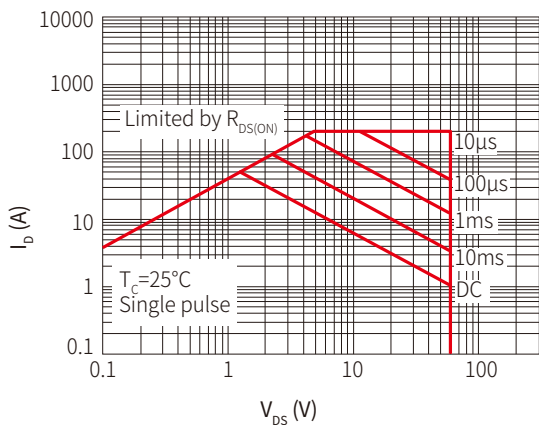
**Figure 7: Normalized Breakdown Voltage vs. Junction Temperature**



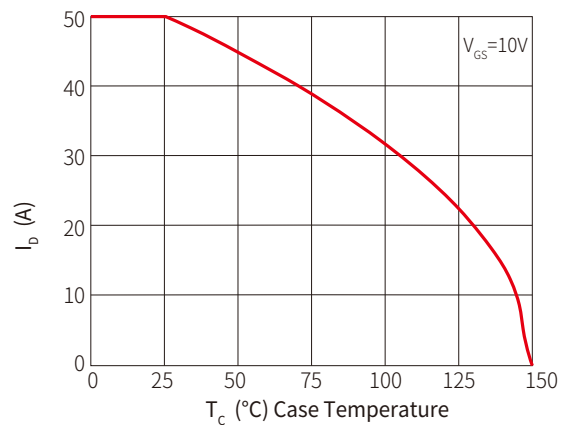
**Figure 8: Normalized on Resistance vs. Junction Temperature**



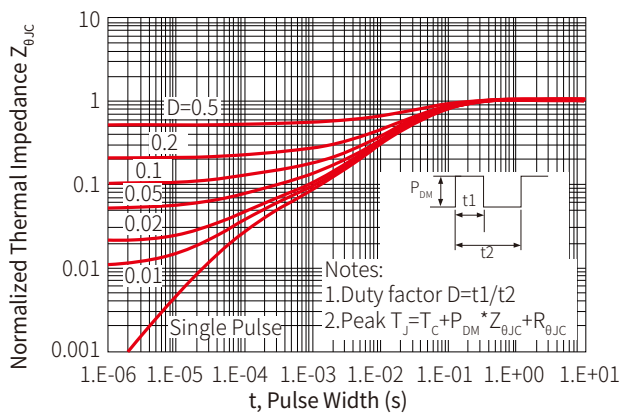
**Figure 9: Maximum Safe Operating Area**



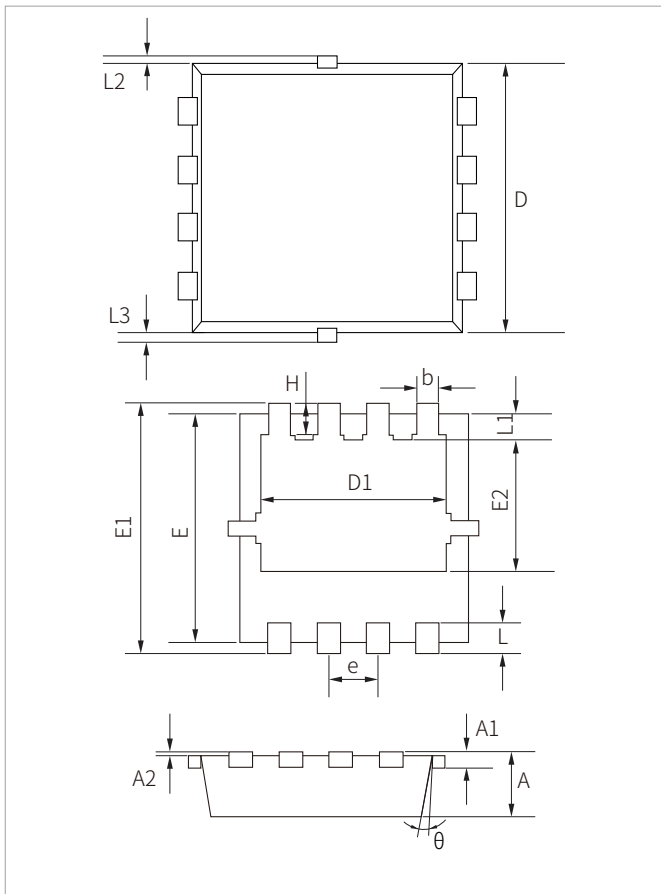
**Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature**



**Figure 11: Normalized Maximum Transient Thermal Impedance**




## PDFN3x3-8L PACKAGE INFORMATION



| Ref. | Millimeters |       | Inches   |       |
|------|-------------|-------|----------|-------|
|      | Min.        | Max.  | Min.     | Max.  |
| A    | 0.650       | 0.850 | 0.026    | 0.033 |
| A1   | 0.152REF    |       | 0.006REF |       |
| A2   | 0~0.05      |       | 0~0.002  |       |
| D    | 2.900       | 3.100 | 0.114    | 0.122 |
| D1   | 2.300       | 2.600 | 0.091    | 0.102 |
| E    | 2.900       | 3.100 | 0.114    | 0.122 |
| E1   | 3.150       | 3.450 | 0.124    | 0.136 |
| E2   | 1.535       | 1.935 | 0.060    | 0.076 |
| b    | 0.200       | 0.400 | 0.008    | 0.016 |
| e    | 0.550       | 0.750 | 0.022    | 0.030 |
| L    | 0.300       | 0.500 | 0.012    | 0.020 |
| L1   | 0.180       | 0.480 | 0.007    | 0.019 |
| L2   | 0~0.100     |       | 0~0.004  |       |
| L3   | 0~0.100     |       | 0~0.004  |       |
| H    | 0.315       | 0.515 | 0.012    | 0.020 |
| θ    | 9°          | 13°   | 9°       | 13°   |

## ORDERING INFORMATION

| Part Number | Component Package | Marking  | QTY/Reel | Reel Size |
|-------------|-------------------|--|----------|-----------|
| SNM0612QQ   | PDFN3×3-8L        |  0612Q XXXX | 5000PCS  | 13"       |

**Headquarters**

No.3387 Shendu Road  
Pujiang I&E Park  
Minhang Shanghai China  
201000

**Hotline**

400-021-5756

**Web**

<https://www.semiware.com>

**Sales Center**

Tel: 86-21-3463-7458  
Email: [sales18@semiware.com](mailto:sales18@semiware.com)

**Customer Service**

Tel: 86-21-5484-1001  
Email: [sales17@semiware.com](mailto:sales17@semiware.com)

**Technical Support**

Tel: 86-21-3463-7654  
Email: [fae01@semiware.com](mailto:fae01@semiware.com)

**Complaint & Suggestions**

Tel: 86-21-3463-7172  
Ext: 8868  
Email: [cs03@semiware.com](mailto:cs03@semiware.com)

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