

## N-Channel 80 V MOSFET

### Product summary

| $V_{DS}$ (V) | $R_{DS(on),max}$ (m $\Omega$ ) | $I_D$ (A)          |
|--------------|--------------------------------|--------------------|
| 80           | 1.8 @ $V_{GS} = 10V$           | 215 <sup>(1)</sup> |

### Features

- Low  $R_{DS(on)}$  SGT technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

### Applications

- DC/DC conversion
- Power switch
- Motor drives

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### Package and ordering information

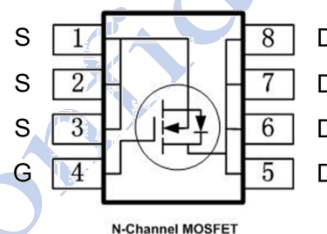
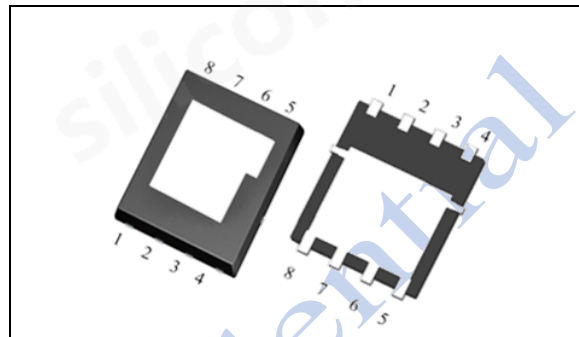
| Ordering code  | Package        | Device code |
|----------------|----------------|-------------|
| SDH08N1P8NF-BA | PDFN5*6-8L DSC | ASX         |

### 1. Maximum ratings

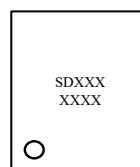
Absolute maximum ratings ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Parameter                                        | Symbol                                  | Limit      | Unit             |
|--------------------------------------------------|-----------------------------------------|------------|------------------|
| Drain-source voltage                             | $V_{DS}$                                | 80         | V                |
| Gate-source voltage                              | $V_{GS}$                                | $\pm 20$   |                  |
| Continuous drain current                         | $T_C = 25^\circ\text{C}$ <sup>(1)</sup> | 215        | A                |
|                                                  | $T_C = 100^\circ\text{C}$               | 152        |                  |
|                                                  | $T_A = 25^\circ\text{C}$ <sup>(4)</sup> | 28.9       |                  |
| Pulsed drain current <sup>(2)</sup>              | $I_{D,pulse}$                           | 862.4      |                  |
| Avalanche energy, single pulse <sup>(3)</sup>    | $E_{AS}$                                | 750        | mJ               |
| Power dissipation                                | $T_C = 25^\circ\text{C}$                | 166.6      | W                |
|                                                  | $T_A = 25^\circ\text{C}$ <sup>(4)</sup> | 3          |                  |
| Operating junction and storage temperature range | $T_J, T_{stg}$                          | -55 to 175 | $^\circ\text{C}$ |

### PDFN5\*6-8L DSC



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**



SDXXX  
XXXX

Device code  
Product Type Code  
Assembly Site Code  
Assy Lot# Code  
Week code  
Year code

## 2. Thermal resistance ratings

| Thermal resistance ratings                             |              |                         |      |      |
|--------------------------------------------------------|--------------|-------------------------|------|------|
| Parameter                                              |              | Symbol                  | Max. | Unit |
| Thermal resistance, junction-to-case, bottom           | Steady state | $R_{\theta JC, bottom}$ | 0.9  | °C/W |
| Thermal resistance, junction-to-case, top              | Steady state | $R_{\theta JC, top}$    | 1.2  |      |
| Thermal resistance, junction-to-ambient <sup>(4)</sup> | Steady state | $R_{\theta JA}$         | 50   |      |

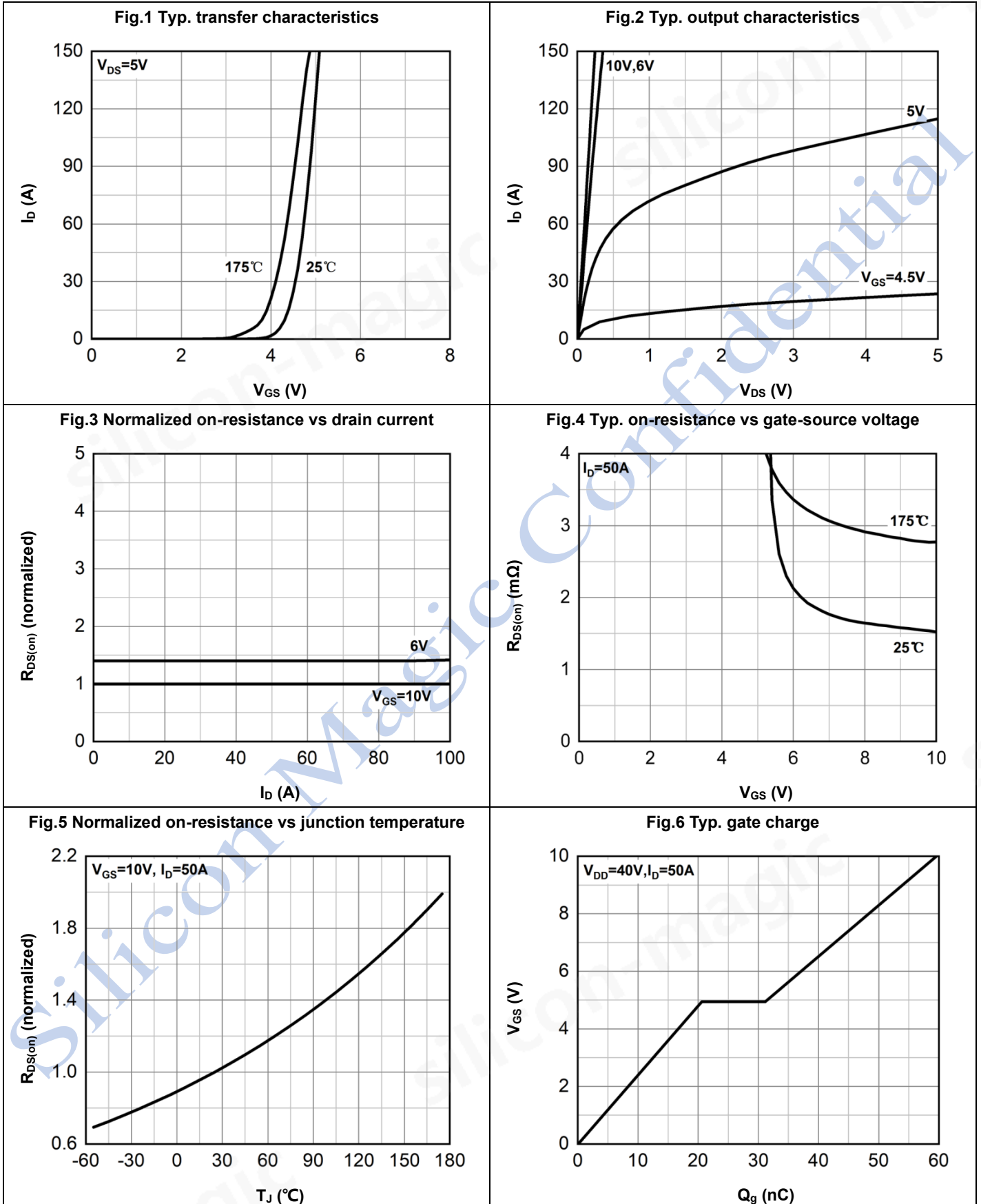
## 3. Electrical Characteristics

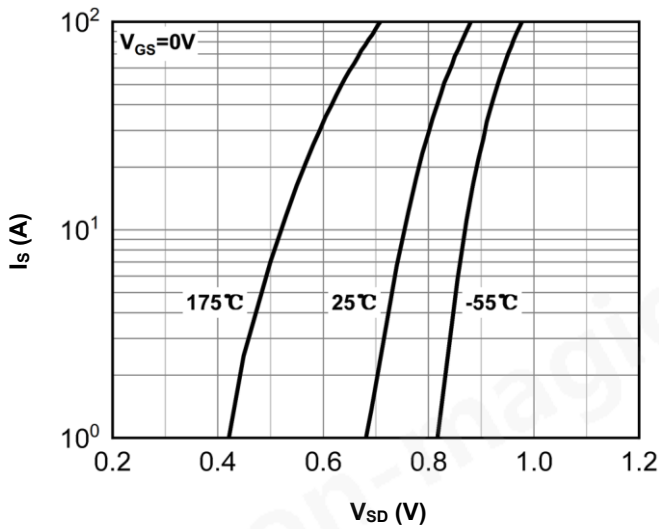
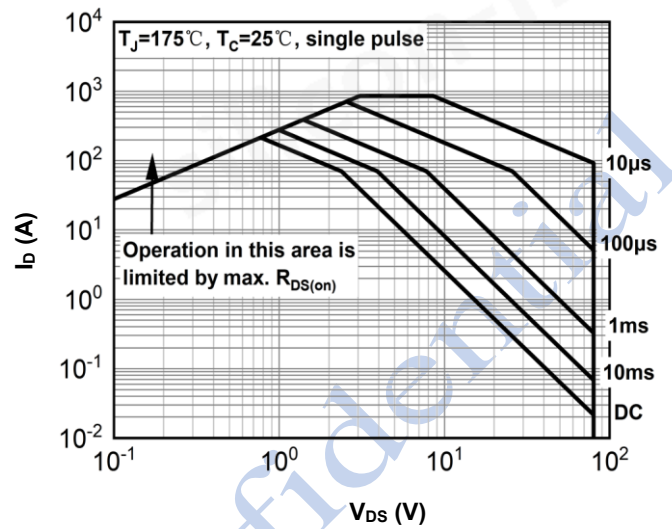
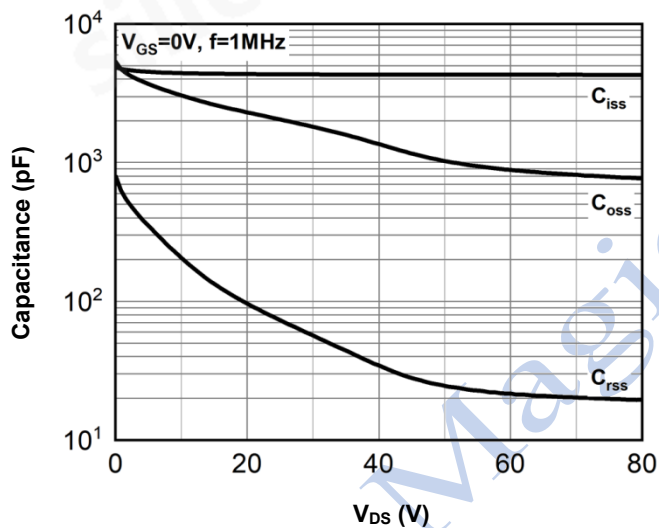
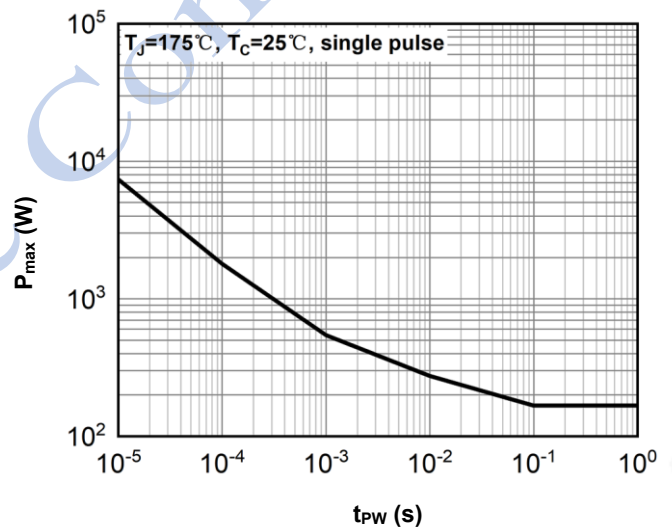
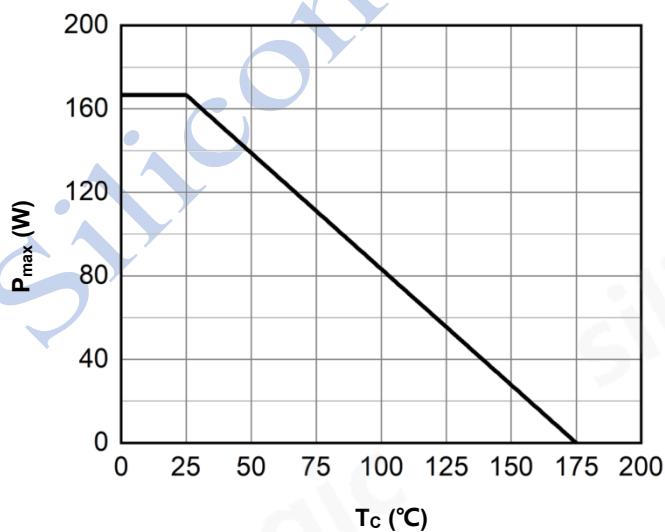
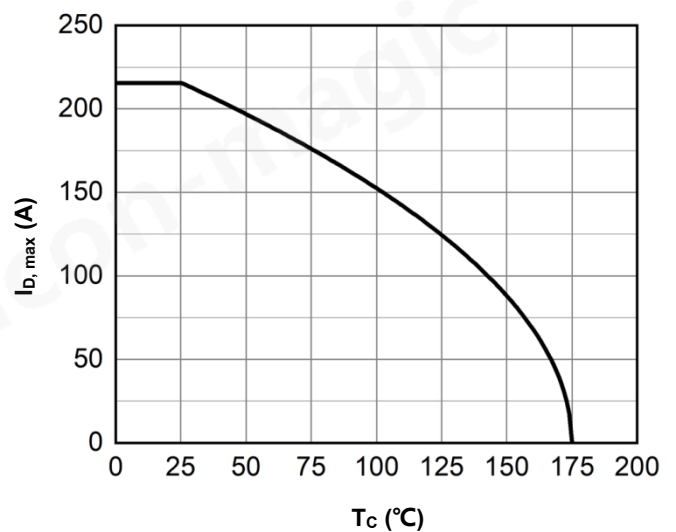
| Electrical characteristics (T <sub>J</sub> = 25°C unless otherwise noted) |                      |                                                                                                    |      |      |      |      |
|---------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------|------|------|------|------|
| Parameter                                                                 | Symbol               | Test conditions                                                                                    | Min. | Typ. | Max. | Unit |
| Static parameter                                                          |                      |                                                                                                    |      |      |      |      |
| Drain to source breakdown voltage                                         | V <sub>(BR)DSS</sub> | V <sub>GS</sub> = 0 V, I <sub>D</sub> = 1 mA                                                       | 80   |      |      | V    |
| Gate-source threshold voltage                                             | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 1 mA                                          | 2.2  | 3.0  | 3.8  | V    |
| Gate-body leakage                                                         | I <sub>GSS</sub>     | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V                                                     |      |      | ±100 | nA   |
| Zero gate voltage drain current                                           | I <sub>DSS</sub>     | V <sub>DS</sub> = 80 V, V <sub>GS</sub> = 0 V                                                      |      |      | 1    | μA   |
| Drain-source on-resistance                                                | R <sub>DS(on)</sub>  | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 50 A                                                      |      | 1.5  | 1.8  | mΩ   |
| Forward transconductance <sup>(5)</sup>                                   | g <sub>fs</sub>      | V <sub>DS</sub> = 5 V, I <sub>D</sub> = 50 A                                                       |      | 146  |      | S    |
| Gate resistance                                                           | R <sub>g</sub>       | f = 1 MHz                                                                                          |      | 1    |      | Ω    |
| Dynamic <sup>(5)</sup>                                                    |                      |                                                                                                    |      |      |      |      |
| Total gate charge                                                         | Q <sub>g</sub>       | V <sub>DS</sub> = 40 V, I <sub>D</sub> = 50 A, V <sub>GS</sub> = 10 V                              |      | 59.5 |      | nC   |
| Gate-source charge                                                        | Q <sub>gs</sub>      |                                                                                                    |      | 20.5 |      |      |
| Gate-drain charge                                                         | Q <sub>gd</sub>      |                                                                                                    |      | 10.5 |      |      |
| Turn-on delay time                                                        | t <sub>d(on)</sub>   | V <sub>DS</sub> = 40 V, I <sub>D</sub> = 50 A, V <sub>GS</sub> = 10 V,<br>R <sub>GEN</sub> = 1.6 Ω |      | 13.6 |      | ns   |
| Rise time                                                                 | t <sub>r</sub>       |                                                                                                    |      | 12.0 |      |      |
| Turn-off delay time                                                       | t <sub>d(off)</sub>  |                                                                                                    |      | 10.0 |      |      |
| Fall time                                                                 | t <sub>f</sub>       |                                                                                                    |      | 6.8  |      |      |
| Input capacitance                                                         | C <sub>iss</sub>     | V <sub>DS</sub> = 40 V, V <sub>GS</sub> = 0 V, f = 1 MHz                                           |      | 4314 |      | pF   |
| Output capacitance                                                        | C <sub>oss</sub>     |                                                                                                    |      | 1361 |      |      |
| Reverse transfer capacitance                                              | C <sub>rss</sub>     |                                                                                                    |      | 33   |      |      |
| Reverse Diode Characteristics <sup>(5)</sup>                              |                      |                                                                                                    |      |      |      |      |
| Diode forward voltage                                                     | V <sub>SD</sub>      | V <sub>GS</sub> = 0 V, I <sub>F</sub> = 50 A                                                       |      | 0.8  | 1.1  | V    |
| Reverse recovery time                                                     | t <sub>rr</sub>      | V <sub>DS</sub> = 40 V, I <sub>F</sub> = 50 A, di/dt = 1000 A/μs                                   |      | 28   |      | ns   |
| Reverse recovery charge                                                   | Q <sub>rr</sub>      |                                                                                                    |      | 226  |      | nC   |

### Notes

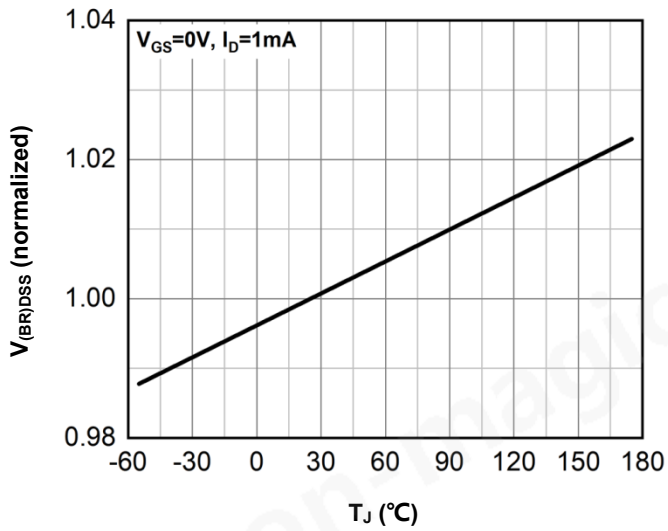
- (1) Package limited.
- (2) Pulse width limited by maximum junction temperature.
- (3)  $V_{DS} = 40\text{ V}, V_{GS} = 10\text{ V}, L = 1\text{ mH}$ .
- (4)  $R_{\theta JA}$  is determined with the device mounted on a 1 in<sup>2</sup> pad 2 oz copper pad on a 1.5x1.5 in. board of FR-4 material.
- (5) Guaranteed by design, not subject to production testing.

#### 4. Electrical characteristics diagrams

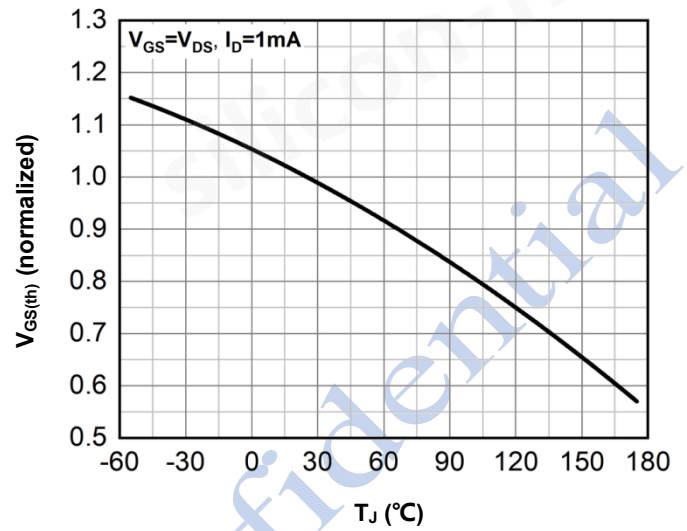


**Fig.7 Typ. forward characteristics of body diode**

**Fig.8 Safe operating area**

**Fig.9 Typ. Capacitance**

**Fig.10 Single pulse maximum power dissipation**

**Fig.11 Max. power dissipation vs case temperature**

**Fig.12 Max. continuous drain current vs case temperature**


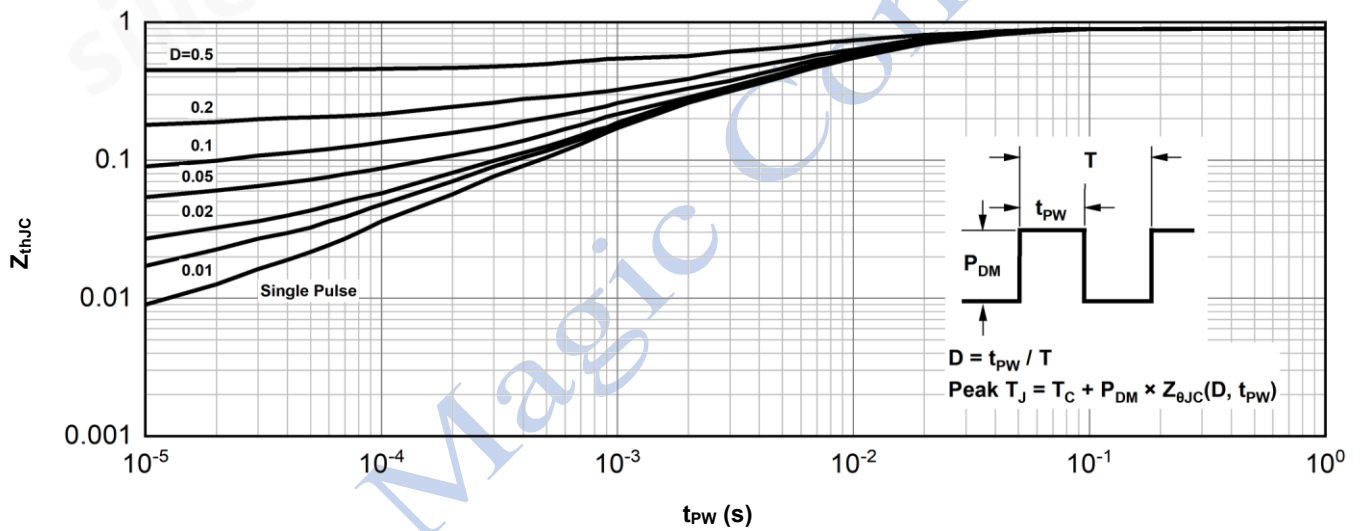
**Fig.13 Normalized  $V_{(BR)DSS}$  vs junction temperature**



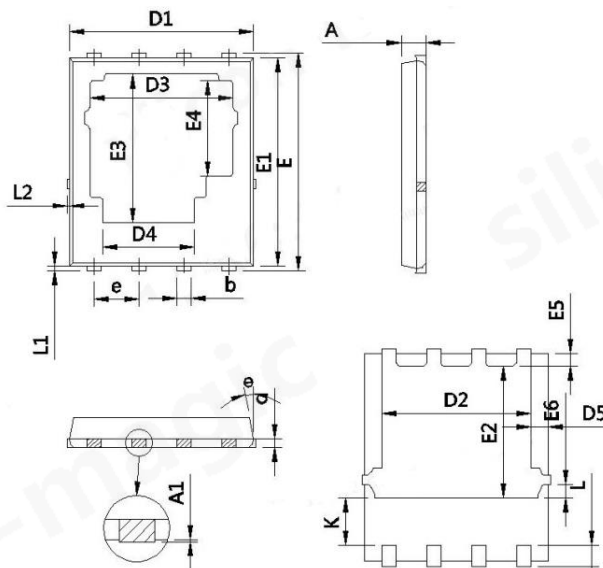
**Fig.14 Normalized  $V_{GS(th)}$  vs junction temperature**



**Fig.15 Transient thermal impedance from junction to case**



## 5. Package outline dimensions



| Dim | Millimeters |      |      |
|-----|-------------|------|------|
|     | Min         | Nom  | Max  |
| A   | 0.60        | 0.70 | 0.80 |
| A1  | 0           | —    | 0.05 |
| b   | 0.30        | 0.40 | 0.50 |
| c   | 0.20        | 0.25 | 0.30 |
| D1  | 5.10        | 5.20 | 5.30 |
| D2  | 4.06        | 4.21 | 4.36 |
| D3  | 3.88        | 4.03 | 4.18 |
| D4  | 2.45        | 2.60 | 2.75 |
| D5  | 0.35        | 0.50 | 0.65 |
| E   | 6.00        | 6.15 | 6.30 |
| E1  | 5.76        | 5.86 | 5.96 |
| E2  | 3.57        | 3.72 | 3.87 |
| E3  | 4.06        | 4.21 | 4.36 |
| E4  | 2.53        | 2.68 | 2.83 |
| E5  | 0.20        | 0.35 | 0.50 |
| E6  | 0.25        | 0.40 | 0.55 |
| e   | 1.27 BSC    |      |      |
| L   | 0.50        | 0.61 | 0.71 |
| L1  | 0.05        | 0.15 | 0.25 |
| L2  | 0.02        | 0.08 | 0.15 |
| K   | 1.10        | —    | —    |
| ø   | 8°          | 10°  | 12°  |

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