

#### • General Description

The TF030N03N uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

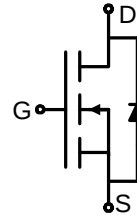
#### • Features

- Advance device constructure
- Low  $R_{DS(ON)}$  to minimize conduction loss
- Low Gate Charge for fast switching
- Low Thermal resistance

#### • Application

Synchronous Rectification for AC-DC/DC-DC converter  
Power Tools

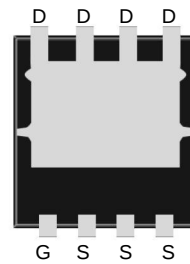
#### • Product Summary



$$V_{DS}=30V \quad I_D=100A$$

$$R_{DS(ON)}(10V \text{ typ})=2.5m\Omega$$

$$R_{DS(ON)}(4.5V \text{ typ})=4.0m\Omega$$



PDFN5x6-8L

#### • Package Marking and Ordering Information:

|                           |                                                 |
|---------------------------|-------------------------------------------------|
| Part NO.                  | TF030N03N                                       |
| Marking1                  | 030N03N                                         |
| Marking2                  | TF:tuofeng; AA:device code; Y:year code; X:Week |
| Basic ordering unit (pcs) | 5000                                            |

#### • Absolute Maximum Ratings ( $T_C = 25^\circ C$ )

| Parameter                      | Symbol                 | Rating     | Unit       |
|--------------------------------|------------------------|------------|------------|
| Drain-Source Voltage           | $V_{DS}$               | 30         | V          |
| Gate-Source Voltage            | $V_{GS}$               | $\pm 20$   | V          |
| Continuous Drain Current       | $I_{D@TC=25^\circ C}$  | 100        | A          |
|                                | $I_{D@TC=75^\circ C}$  | 70         | A          |
|                                | $I_{D@TC=100^\circ C}$ | 60         | A          |
| Pulsed Drain Current ①         | $I_{DM}$               | 300        | A          |
| Total Power Dissipation        | $P_D@TC=25^\circ C$    | 70         | W          |
| Total Power Dissipation        | $P_D@TA=25^\circ C$    | 1.0        | W          |
| Operating Junction Temperature | $T_J$                  | -55 to 150 | $^\circ C$ |
| Storage Temperature            | $T_{STG}$              | -55 to 150 | $^\circ C$ |
| Single Pulse Avalanche Energy  | $E_{AS}$               | 300        | mJ         |

●Thermal resistance

| Parameter                                    | Symbol     | Min. | Typ. | Max. | Unit  |
|----------------------------------------------|------------|------|------|------|-------|
| Thermal resistance, junction - case          | $R_{thJC}$ | -    | -    | 2.0  | ° C/W |
| Thermal resistance, junction - ambient       | $R_{thJA}$ | -    | -    | 50   | ° C/W |
| Soldering temperature, wavesoldering for 8 s | $T_{sold}$ | -    | -    | 265  | ° C   |

●Electronic Characteristics

| Parameter                         | Symbol       | Condition                     | Min. | Typ  | Max.      | Unit       |
|-----------------------------------|--------------|-------------------------------|------|------|-----------|------------|
| Drain-Source Breakdown Voltage    | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$     | 30   | -    | -         | V          |
| Gate Threshold Voltage            | $V_{GS(TH)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1.10 | 1.45 | 2.10      | V          |
| Drain-Source Leakage Current      | $I_{DSS}$    | $V_{DS}=30V, V_{GS}=0V$       | -    | -    | 1.0       | $\mu A$    |
| Gate- Source Leakage Current      | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$   | -    | -    | $\pm 100$ | nA         |
| Static Drain-source On Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=30A$         | -    | 2.5  | 3.9       | m $\Omega$ |
|                                   |              | $V_{GS}=4.5V, I_D=20A$        | -    | 4.0  | 5.9       | m $\Omega$ |
| Forward Transconductance          | $g_{FS}$     | $V_{DS}=25V, I_D=20A$         | -    | 45   | -         | S          |
| Source-drain voltage              | $V_{SD}$     | $I_S=20A$                     | -    | -    | 1.20      | V          |

●Electronic Characteristics

| Parameter                    | Symbol    | Condition                                 | Min. | Typ  | Max. | Unit |
|------------------------------|-----------|-------------------------------------------|------|------|------|------|
| Input capacitance            | $C_{iss}$ | $f = 1MHz$<br>$V_{DS}=15V$<br>$V_{GS}=0V$ | -    | 2764 | -    | pF   |
| Output capacitance           | $C_{oss}$ |                                           | -    | 289  | -    |      |
| Reverse transfer capacitance | $C_{rss}$ |                                           | -    | 265  | -    |      |

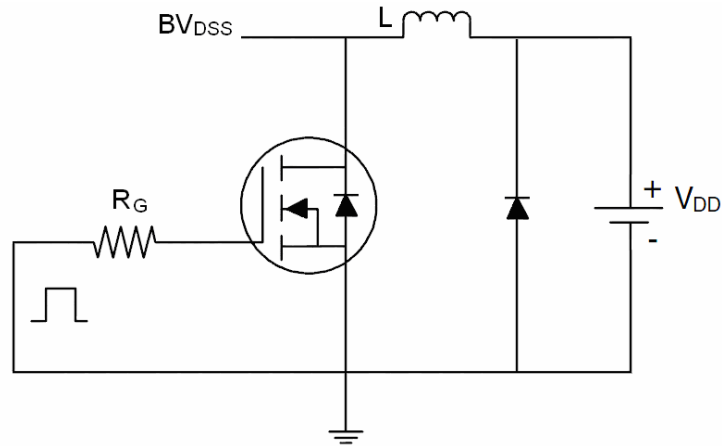
●Gate Charge characteristics( $T_a = 25^\circ C$ )

| Parameter            | Symbol       | Condition                                                            | Min. | Typ  | Max. | Unit |
|----------------------|--------------|----------------------------------------------------------------------|------|------|------|------|
| Total gate charge    | $Q_g$        | $V_{DD}=15V$<br>$I_D=20A$<br>$V_{GS}=10V$                            | -    | 48   | -    | nC   |
| Gate - Source charge | $Q_{gs}$     |                                                                      | -    | 5.2  | -    |      |
| Gate - Drain charge  | $Q_{gd}$     |                                                                      | -    | 9.6  | -    |      |
| Turn-on Delay Time   | $t_{d(on)}$  | $V_{DD}=15V$<br>$V_{GS}=10V$<br>$R_L=0.75\Omega$<br>$R_G=3.00\Omega$ | -    | 14.4 | -    | nS   |
| Turn-on Rise Time    | $t_r$        |                                                                      | -    | 36.0 | -    |      |
| Turn-off Delay Time  | $t_{d(off)}$ |                                                                      | -    | 43.6 | -    |      |
| Turn-off Fall Time   | $t_f$        |                                                                      | -    | 22.0 | -    |      |

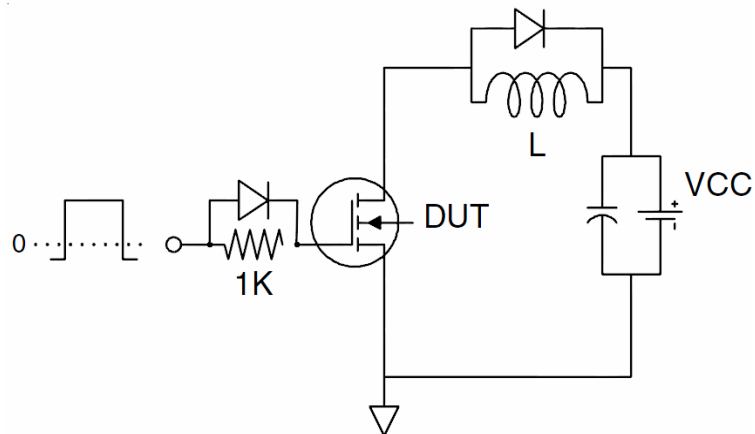
Note: ① Pulse Test : Pulse width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$  ;

## Test Circuit

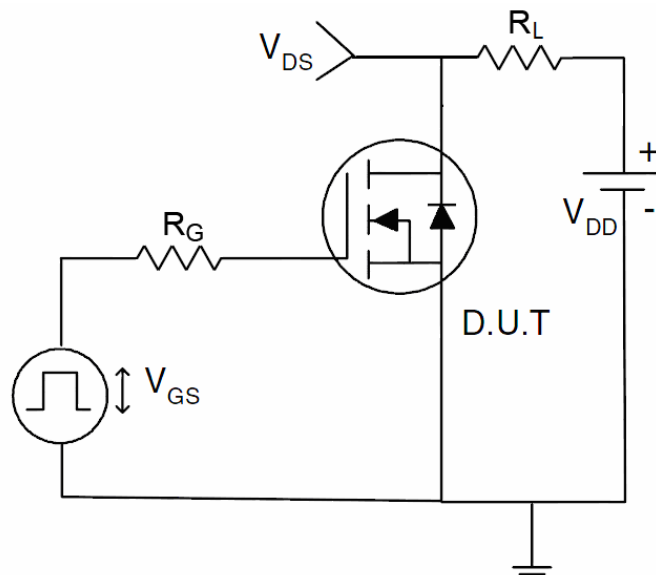
### 1) $E_{AS}$ test Circuit



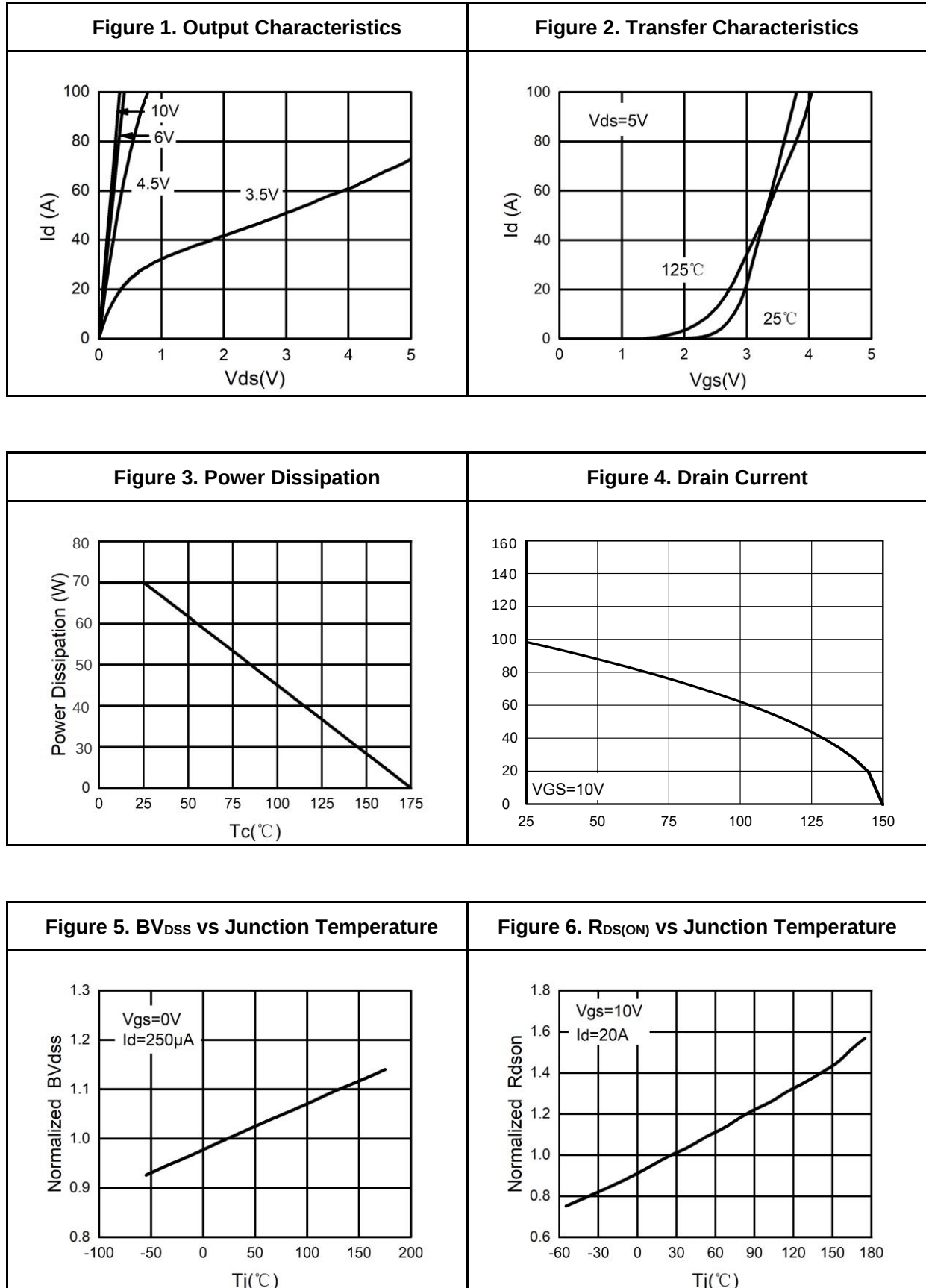
### 2) Gate charge test Circuit



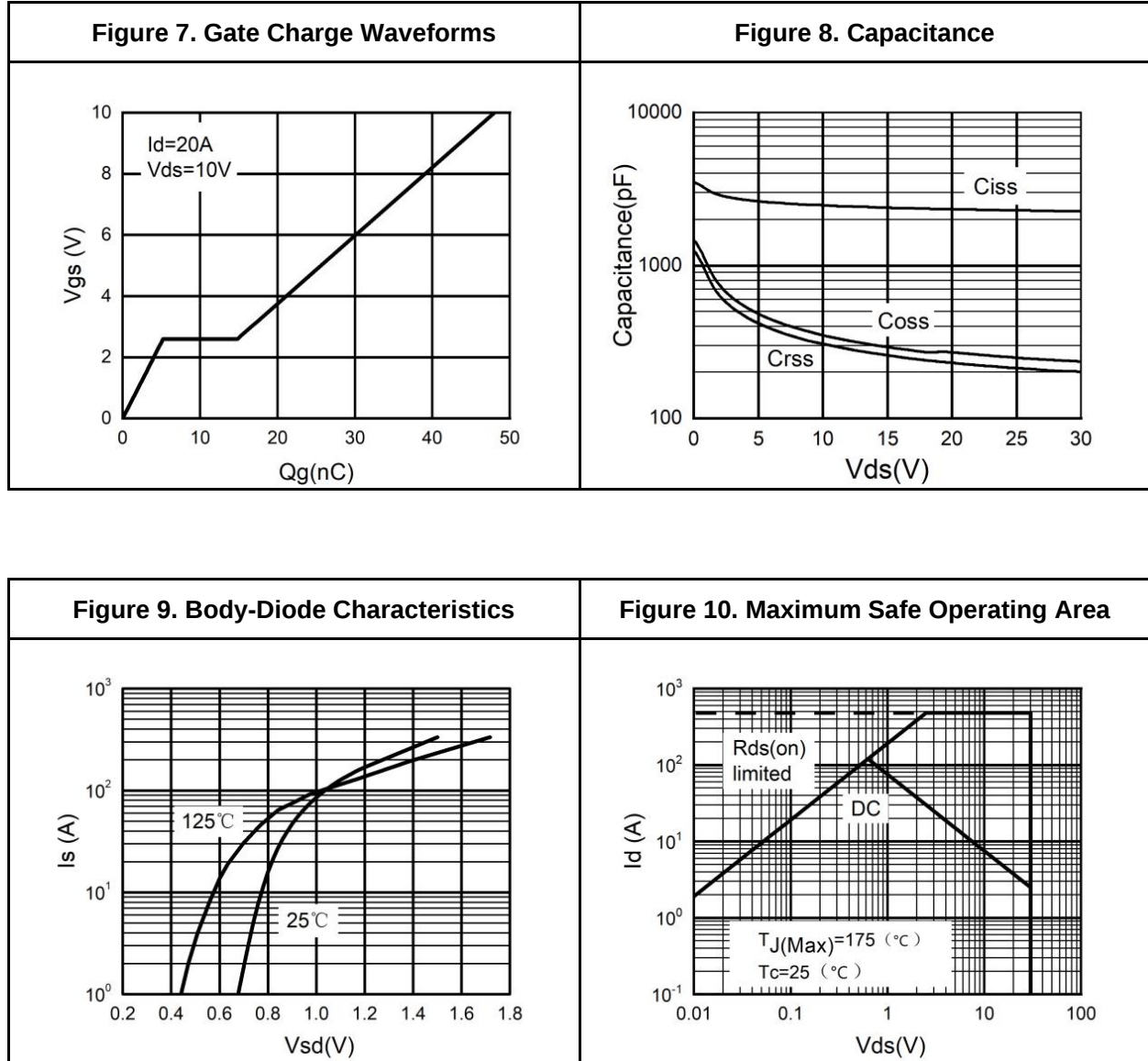
### 3) Switch Time Test Circuit



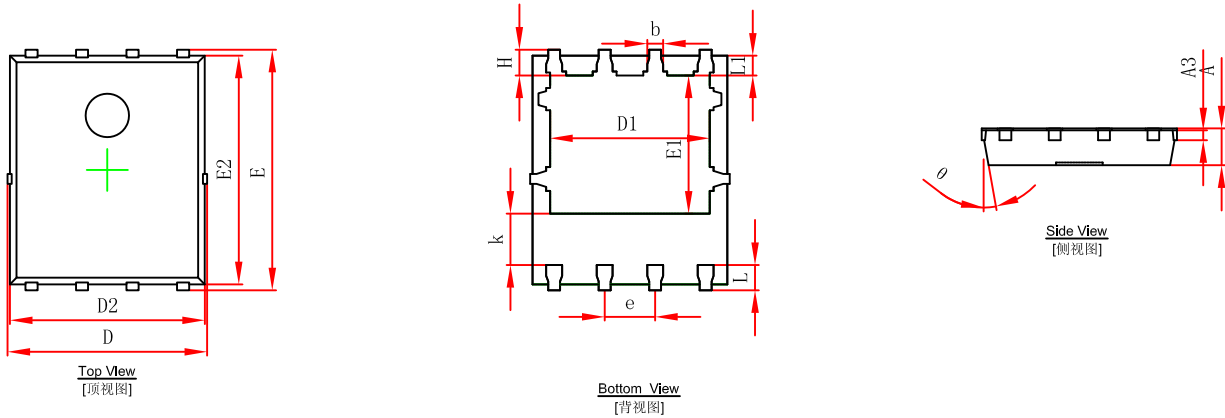
## Typical Electrical And Thermal Characteristics (Curves)



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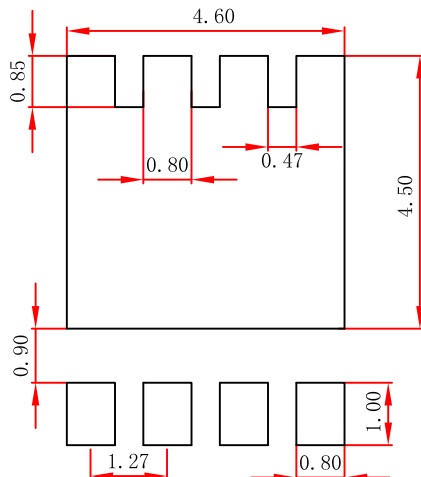


PDFN5x6-8L Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 0.900                     | 1.000 | 0.035                | 0.039 |
| A3     | 0.254REF.                 |       | 0.010REF.            |       |
| D      | 4.944                     | 5.096 | 0.195                | 0.201 |
| E      | 5.974                     | 6.126 | 0.235                | 0.241 |
| D1     | 3.910                     | 4.110 | 0.154                | 0.162 |
| E1     | 3.375                     | 3.575 | 0.133                | 0.141 |
| D2     | 4.824                     | 4.976 | 0.190                | 0.196 |
| E2     | 5.674                     | 5.826 | 0.223                | 0.229 |
| k      | 1.190                     | 1.390 | 0.047                | 0.055 |
| b      | 0.350                     | 0.450 | 0.014                | 0.018 |
| 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°   |

PDFN5x6-8L Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05\text{mm}$ .
3. The pad layout is for reference purposes only.