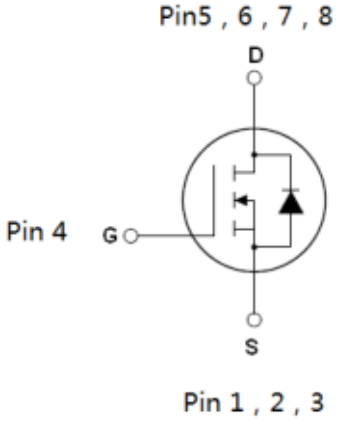
RECTRON SEMICONDUCTOR
TECHNICAL SPECIFICATION

# RM80N30DF

## N-Channel Enhancement Mode Power MOSFET

### Description

The RM80N30DF uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge . This device is suitable for use as a load switch or in PWM applications.




### General Features

- $V_{DS}$ = 30V,$I_D$ = 80A
  $R_{DS(ON)}$ <4.2mΩ @$V_{GS}$=10V TYP:3.6mΩ
  $R_{DS(ON)}$ <7.0mΩ @$V_{GS}$=4.5V TYP:5.5mΩ
- High Power and current handing capability
- Lead free product is acquired
- Surface mount package

### Schematic diagram




Top View Bottom View

### Application

- PWM applications
- Load switch
- Power management
- Halogen-free

### Package Marking and Ordering Information

| Device Marking | Device | Device Package | Packaging Code | Reel Size | Quantity(PCS) |
|---|---|---|---|---|---|
| 80N30 | RM80N30DF | DFN5X6 | -W | 13inch | 5000 |

### Absolute Maximum Ratings ($T_C$=25℃unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current (Tc=25℃)(1) | $I_D$ | 80 | A |
| Continuous Drain Current (Tc=100℃) | $I_D$ | 48 | A |
| Pulsed Drain Current (2,3) | $I_{DM}$ | 320 | A |
| Drain Power Dissipation(1) | $P_D$ | 30 | W |
| Single Pulsed Avalanche Energy | $E_{AS}$ | 200 | mJ |
| Thermal Resistance from Junction to Case(1) | $R_{\theta JC}$ | 4.17 | ℃/W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 62.5 | ℃/W |
| Junction Temperature | $T_J$ | -55~ +150 | ℃ |
| Storage Temperature | $T_{STG}$ | -55~ +150 | ℃ |

## MOSFET ELECTRICAL CHARACTERISTICS($T_J$=25℃ unless otherwise noted)

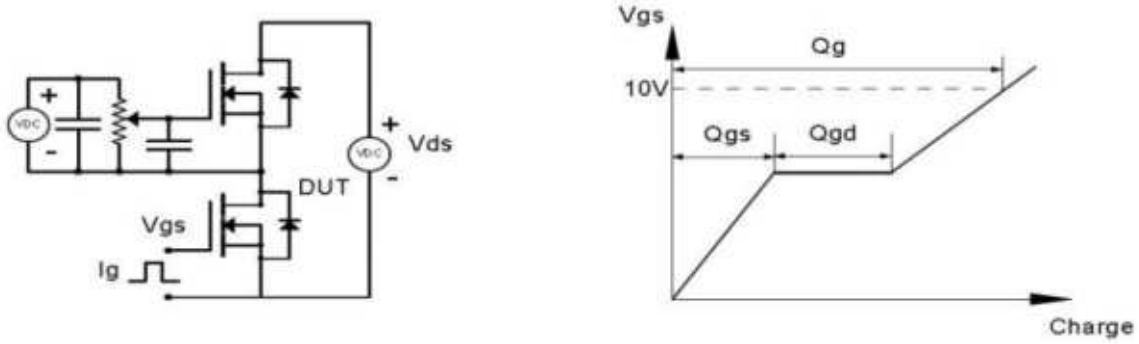
| Parameter | Symbol | Test Condition | Min | Type | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$= 0V, $I_D$=250μA | 30 | - | - | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=30V, $V_{GS}$ = 0V | - | - | 1 | μA |
| Gate-body leakage current | $I_{GSS}$ | $V_{GS}$= ±20V, $V_{DS}$ = 0V | - | - | ±100 | nA |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=250μA | 1 | 1.5 | 2 | V |
| Drain-source on-resistance(4) | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$= 30A | - | 3.6 | 4.2 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=20A | - | 5.5 | 7.0 | |
| **Dynamic characteristics**(5) | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =25V, VGS=0V, f=1MHz | - | 1950 | 2350 | pF |
| Output Capacitance | $C_{oss}$ | | - | 320 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 240 | - | |
| **Switching characteristics**(5) | | | | | | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=15V, $I_D$=15A, $R_G$=3.3Ω, $V_{GS}$=10V | - | 13 | - | nS |
| Turn-on rise time | $t_r$ | | - | 36 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 43 | - | |
| Turn-off fall time | $t_f$ | | - | 16 | - | |
| Total Gate Charge | Qg | $V_{DS}$=24V, $I_D$=20A, $V_{GS}$=10V | - | 42 | 84 | nC |
| Gate-Source Charge | Qgs | | - | 3.9 | - | |
| Gate-Drain Charge | Qgd | | - | 14 | - | |
| **Source-Drain Diode characteristics** | | | | | | |
| Diode Forward voltage(4) | $V_{SD}$ | $T_J$=25℃, $V_{GS}$=0V, $I_S$=30A | - | - | 1.2 | V |
| Diode Forward current | $I_S$ | $T_C$=25℃ | - | - | 80 | A |
| Body Diode Reverse Recovery Time | trr | $T_J$=25℃, $I_F$=10A,di/dt=100A/us | - | 16 | - | nS |
| Body Diode Reverse Recovery Charge | Qrr | | - | 5 | - | nC |

**Notes:**

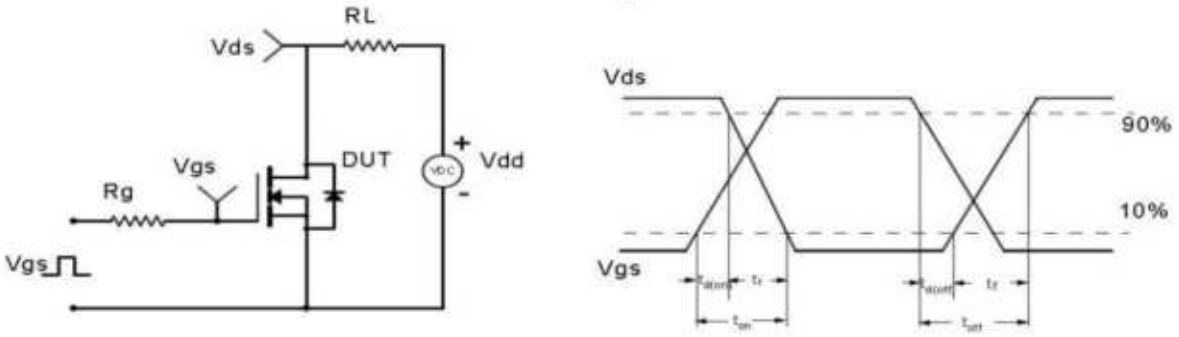
1) Surface Mounted on 1 in² pad area, t ≤ 10 sec
2) Pulse width ≤ 10μs, duty cycle ≤ 1 %
3) Limited by bonding wire
4) Pulse width ≤ 300 μs, duty cycle ≤ 2%
5) Guaranteed by design, not subject to production testing

## Test Circuit & Waveform

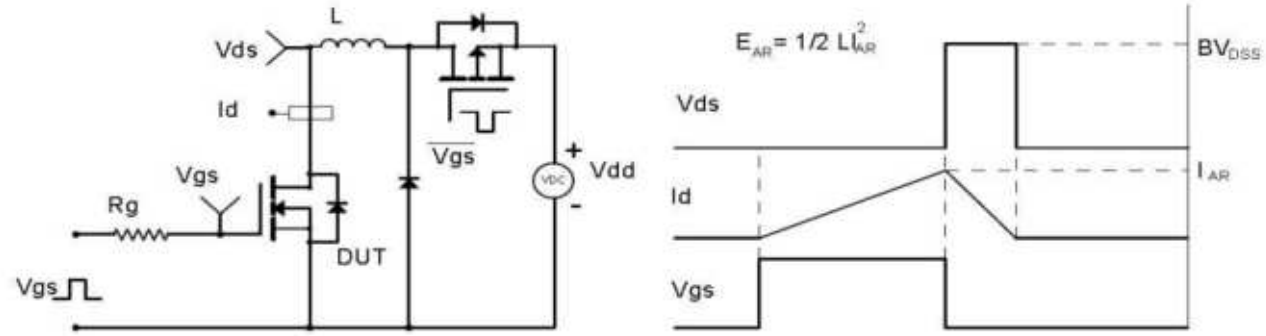
Gate Charge Test Circuit & Waveform



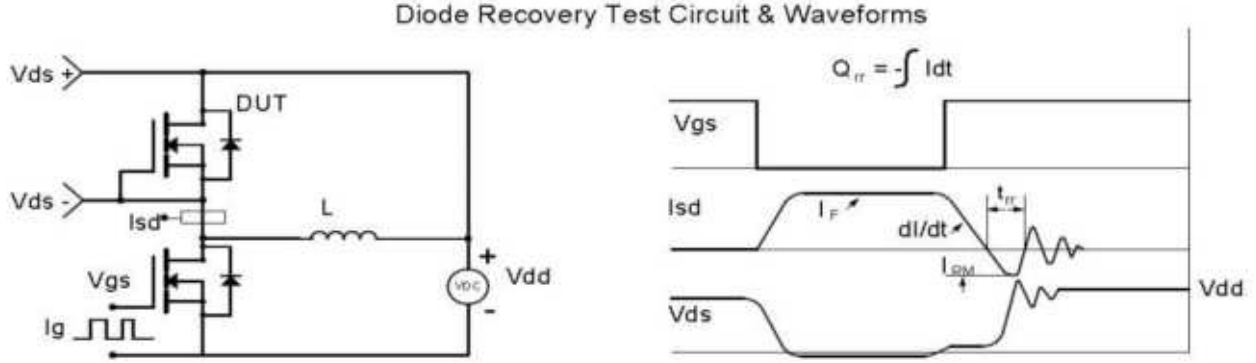

Resistive Switching Test Circuit & Waveforms




Unclamped Inductive Switching (UIS) Test Circuit & Waveforms




Diode Recovery Test Circuit & Waveforms



## RATING AND CHARACTERISTICS CURVES (RM80N30DF)

**Figure1:** Output Characteristics

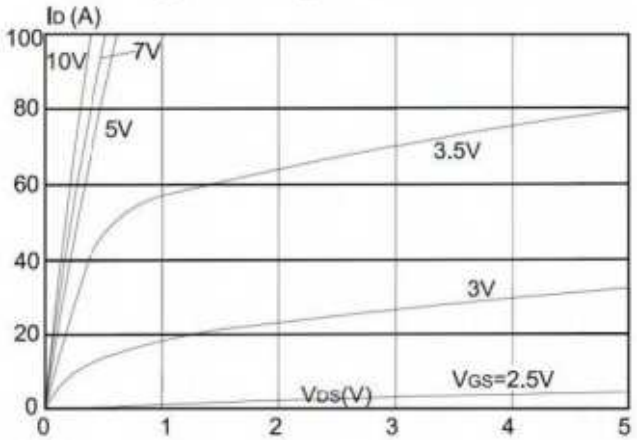



**Figure 2:** Typical Transfer Characteristics

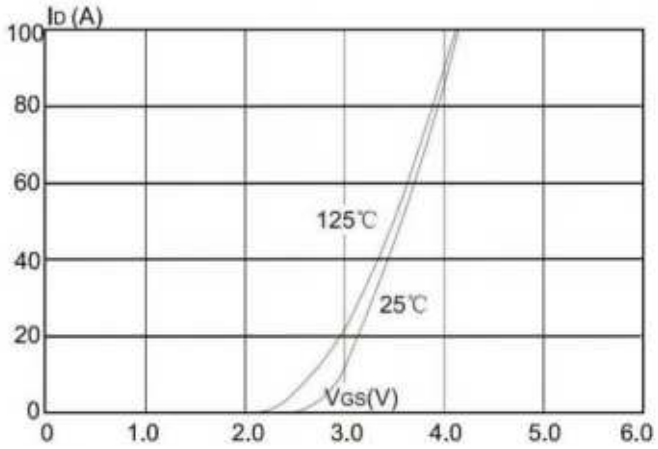



**Figure 3:**On-resistance vs. Drain Current

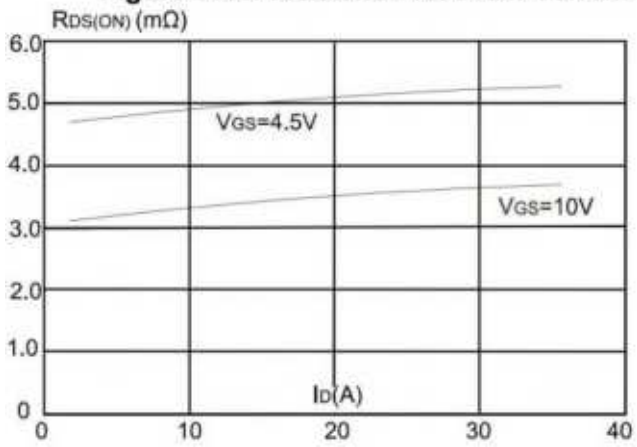



**Figure 4**: Body Diode Characteristics

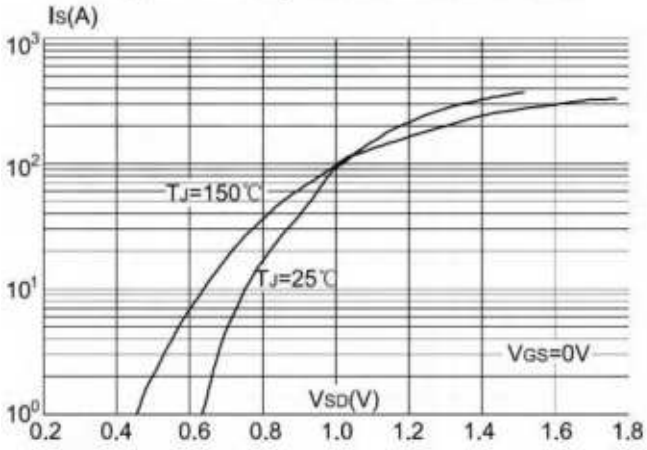



**Figure 5:** Gate Charge Characteristics

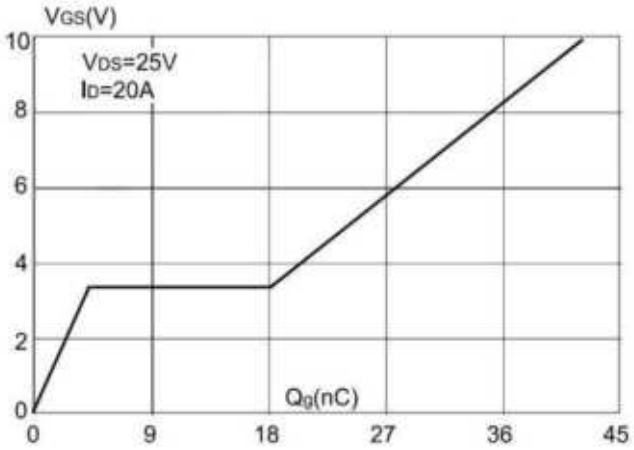
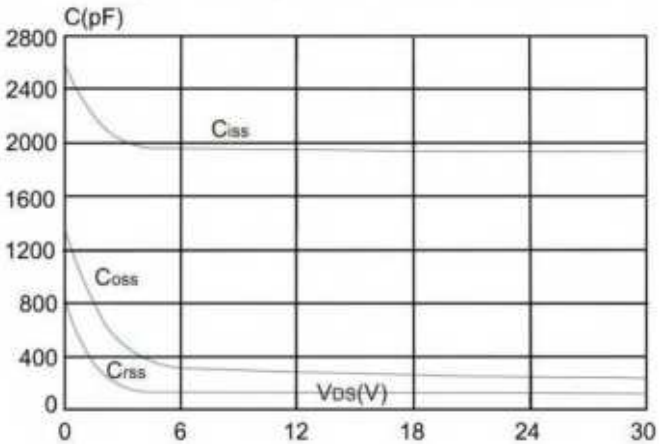



**Figure 6:** Capacitance Characteristics



## RATING AND CHARACTERISTICS CURVES (RM80N30DF)

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

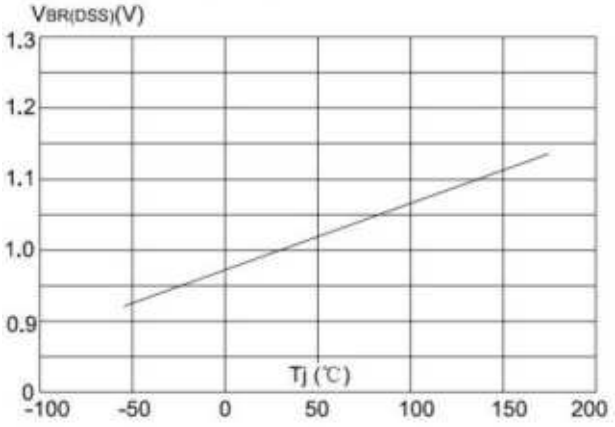



**Figure 8:** Normalized on Resistance vs. Junction Temperature

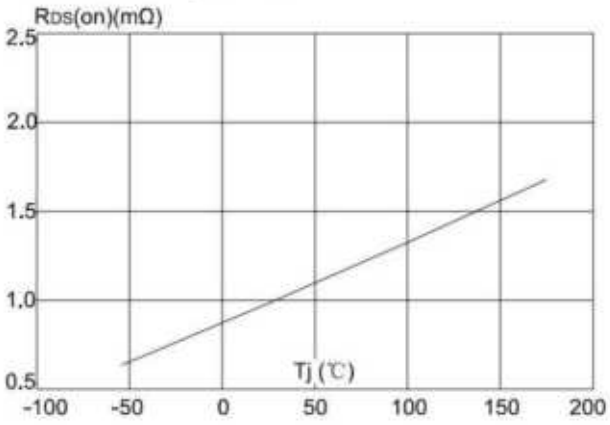



**Figure 9:** Maximum Continuous Drain Current vs. Case Temperature

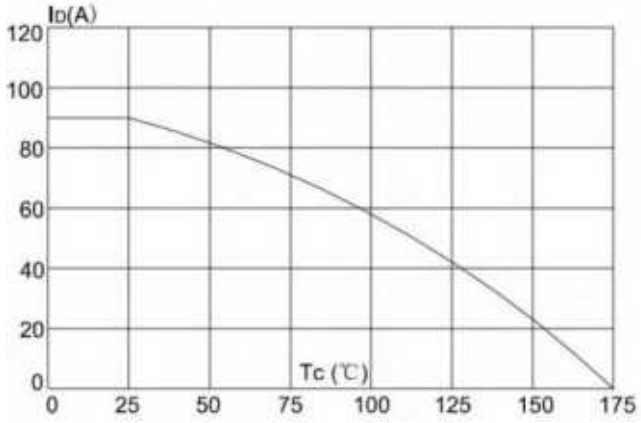
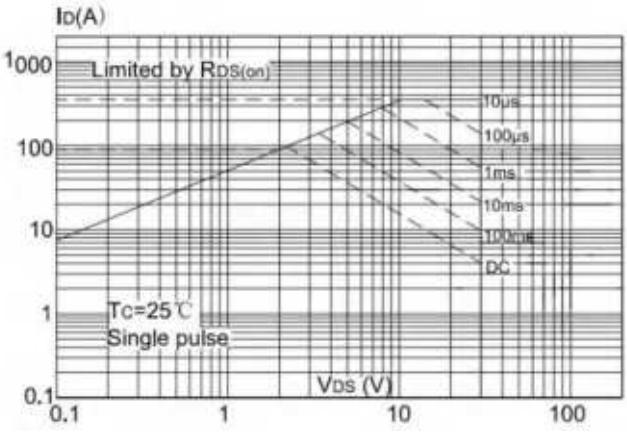



**Figure 10:** Maximum Safe Operating Area




# RECTRON

### Marking on the body

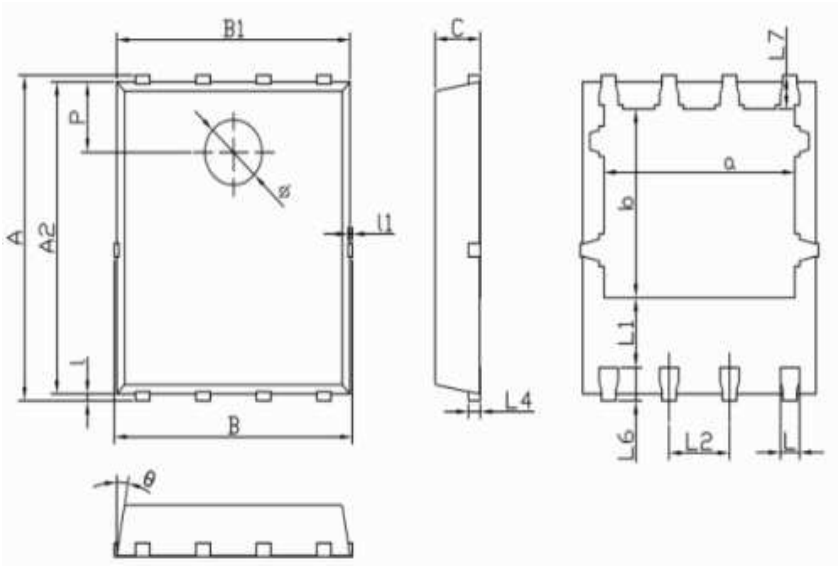
Rectron Logo →  Y Y W W

Year – Code
(Y:24-----2024
25-----2025.....)

Week – code
(WW:01~52)

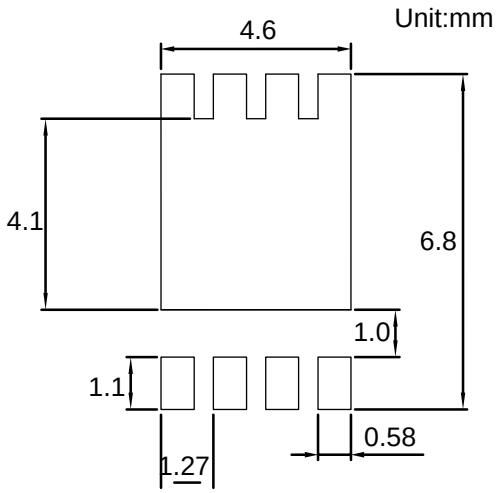
**8 0 N 3 0** ← Part No.

## DFN5X6-8L Package Information




| Dimensions In Millimeters | | | |
|---|---|---|---|
| Symbol | MIN | TYP | MAX |
| A | 5.90 | 6.00 | 6.10 |
| a | 3.91 | 4.01 | 4.11 |
| A2 | 5.70 | 5.75 | 5.80 |
| B | 4.90 | 5.00 | 5.10 |
| b | 3.375 | 3.475 | 3.575 |
| B1 | 4.80 | 4.90 | 5.00 |
| C | 0.90 | 0.95 | 1.00 |
| L | 0.30 | 0.40 | 0.50 |
| l | 0.06 | 0.13 | 0.20 |
| L1 | 1.10 | - | - |
| l1 | - | - | 0.10 |
| L2 | 1.17 | 1.27 | 1.37 |
| L4 | 0.21 | 0.26 | 0.34 |
| L6 | 0.51 | 0.61 | 0.71 |
| L7 | 0.51 | 0.61 | 0.71 |
| P | 1.15 | 1.30 | 1.45 |
| θ | 8° | 10° | 12° |
| ϕ | 1.10 | 1.20 | 1.30 |

## Solder Pad layout



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