

# AN005r: IC Package / PCB Footprint Guidelines - QFN20 3x3

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**This application note is meant to be a practical guideline for a specific TRINAMIC IC package and its PCB footprint. The document covers package dimensions, example footprint and general information on PCB footprints.**

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### 3 Overview

This application note is meant to be a practical guideline for a specific TRINAMIC IC package and its PCB footprint. The document covers package dimensions, example footprint and general information on PCB footprints with their packaging as well.

## 4 QFN20 3x3 Package Details

### 4.1 QFN20 3x3

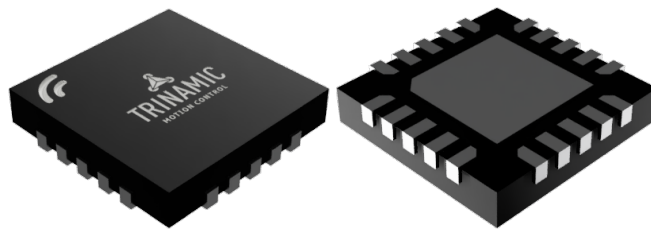


Figure 1: QFN20 3x3 3D examples

## 4.2 Dimensions

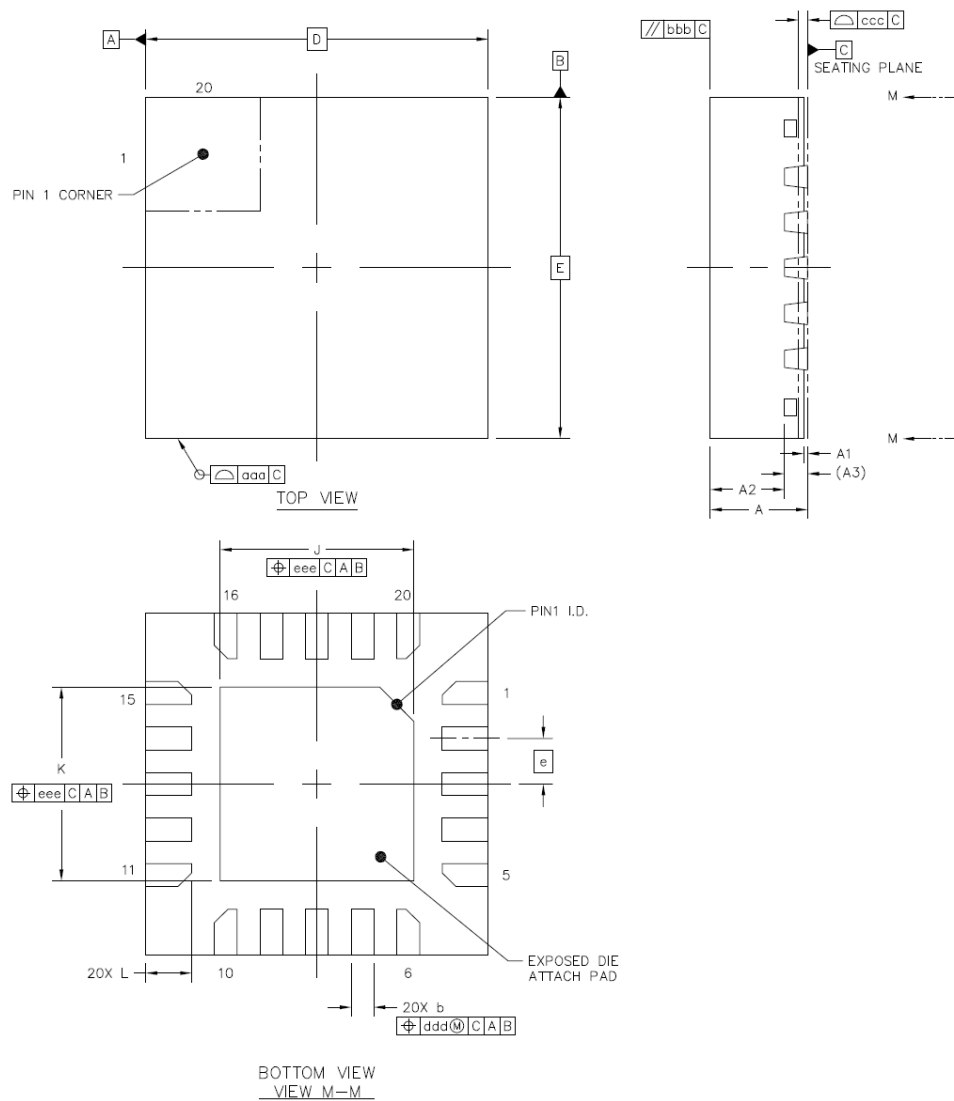


Figure 2: QFN20 3x3 package outline drawings

| Parameter [mm]         | Ref | Min  | Nom   | Max  |
|------------------------|-----|------|-------|------|
| total thickness        | A   | 0,8  | 0,85  | 0,9  |
| stand off              | A1  | 0    | 0,035 | 0,05 |
| mold thickness         | A2  |      | 0,65  | 0,67 |
| lead frame thickness   | A3  |      | 0,203 |      |
| lead width             | b   | 0,15 | 0,2   | 0,25 |
| body size X            | D   |      | 3,0   |      |
| body size Y            | E   |      | 3,0   |      |
| lead pitch             | e   |      | 0,4   |      |
| exposed die pad size X | J   | 1,6  | 1,7   | 1,8  |
| exposed die pad size Y | K   | 1,6  | 1,7   | 1,8  |
| lead length            | L   | 0,35 | 0,4   | 0,45 |
| package edge tolerance | aaa |      |       | 0,1  |
| mold flatness          | bbb |      |       | 0,1  |
| coplanarity            | ccc |      |       | 0,08 |
| lead offset            | ddd |      |       | 0,1  |
| exposed pad offset     | eee |      |       | 0,1  |

Table 1: QFN20 3x3 dimensions

### 4.3 Land Pattern

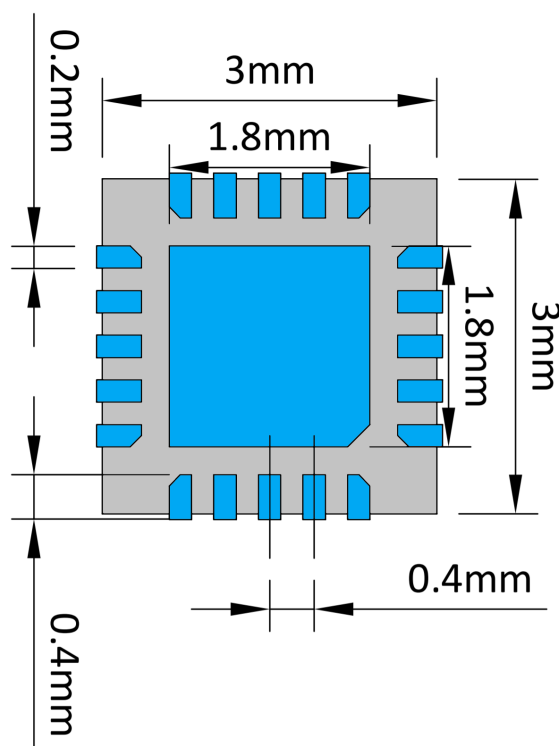


Figure 3: QFN20 3x3 example land patterns (unit: mm)

## 5 General PCB Footprint and Packaging Information Resources

These guidelines and information are proposals and suggestions as they are proven and work well with TRINAMIC modules. Some ICs are available in Tape & Reel and in IC trays.

### 5.1 QFN Packages

These are basic guidelines for Quad Flat No Leads Packages (QFNs). They are derived from the Technical Brief TB389 from Renesas ([TB389](#)).

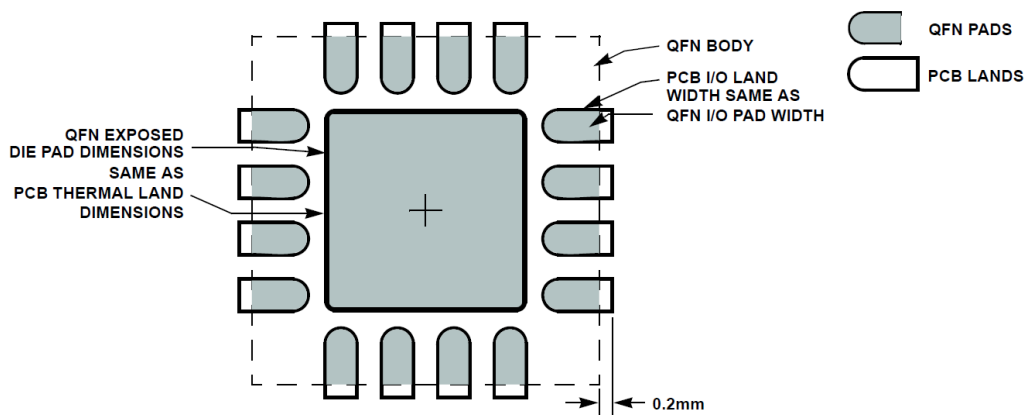


Figure 4: Board Layout of Soldered Pad for QFN Devices according to Renesas TB389

## 5.2 Tape & reel

Tape & Reel are dependent on the package and will have the following dimensions like shown in Table 2.

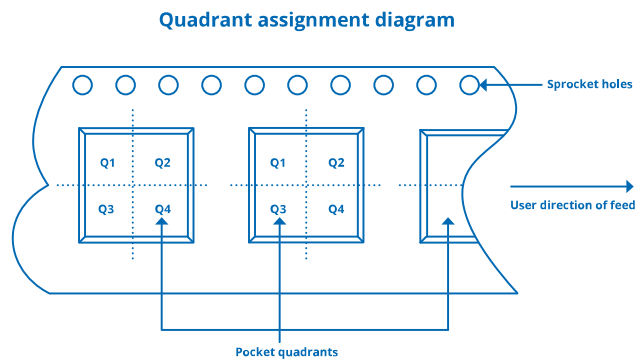


Figure 5: Quadrant assignment within the tape

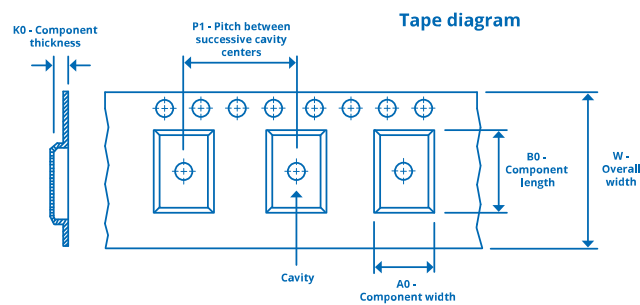


Figure 6: Tape diagram. The pin1 orientation of a IC is in the upper left (Q1).

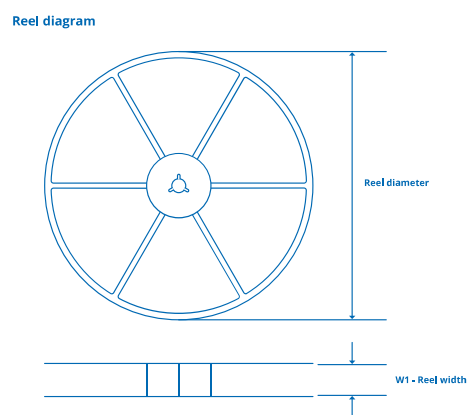


Figure 7: Reel diagram

Table 2: Dimensions and properties of Tape (left) and Reel (right) (unit: mm)

| K0 | P1 | A0  | B0  | W  | Cover Tape width | Tape Mat. | W1 | Reel dia. | Reel Hub dia. | Color |
|----|----|-----|-----|----|------------------|-----------|----|-----------|---------------|-------|
| 1  | 8  | 3.3 | 3.3 | 12 | 9.2              | PS        | 12 | 330       | 100           | blue  |

### 5.3 Reel Box

A reel is packed in boxes like shown in the following figure 8.

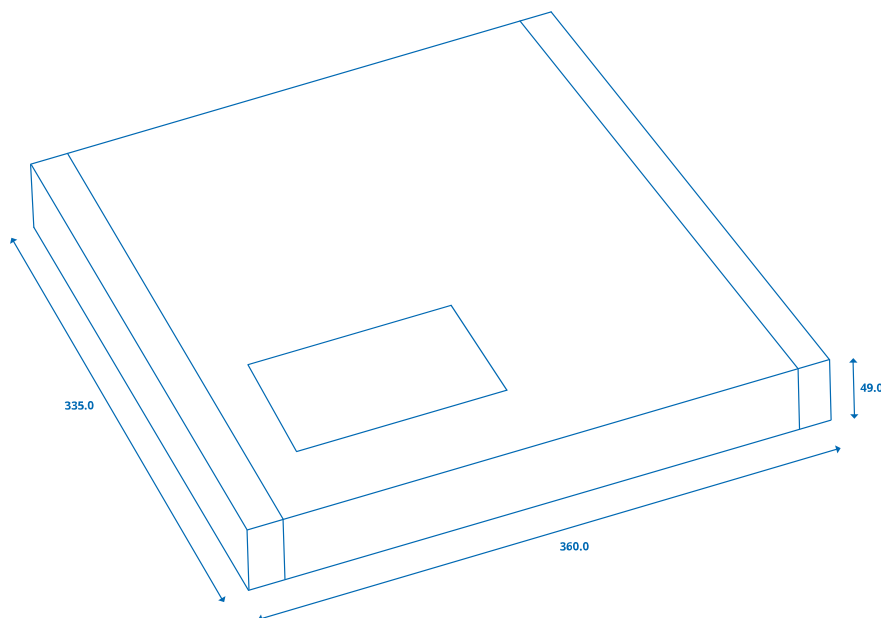


Figure 8: Box for reel with dimensions (unit: mm).



## 5.4 Tray

The following figure 9 shows common QFN 3x3 mm<sup>2</sup> trays with their corresponding dimensions. It is capable of a total cell count of 490 (14 x 35). Cells marked with a cross are for vacuum pickup area. The pin1 orientation of a IC is in the lower left of each cell.

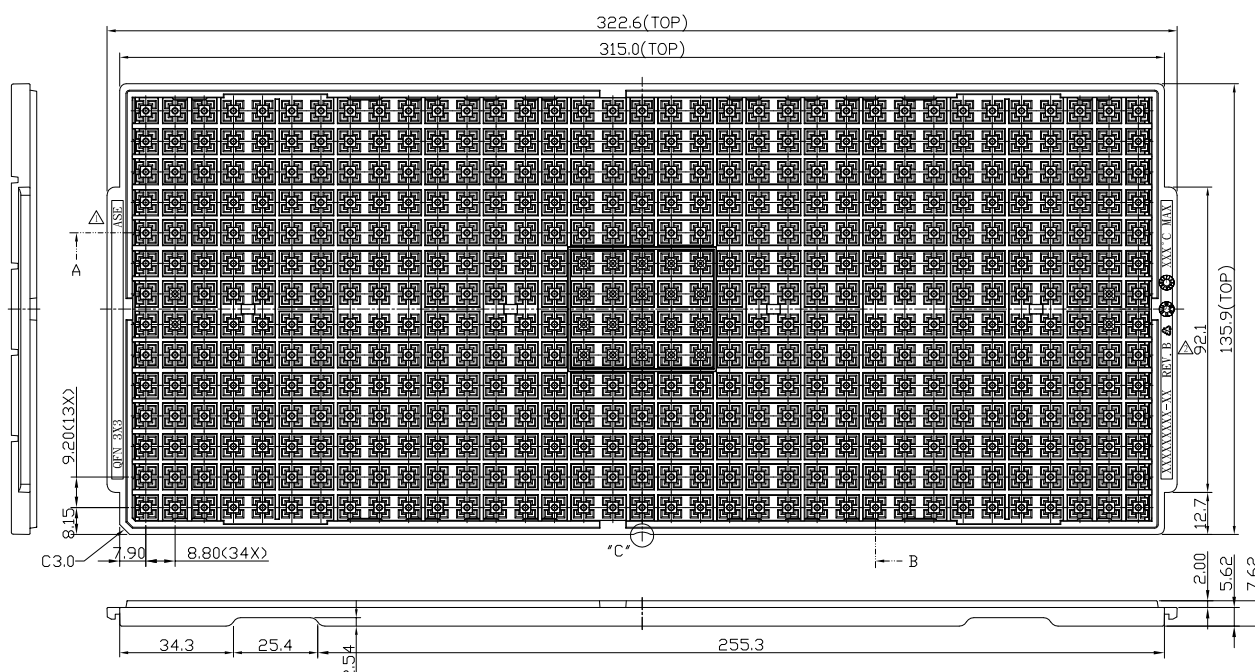


Figure 9: Tray with dimensions (unit: mm). The pin1 orientation of a IC is in the lower left of each cell.

## 5.5 Tray Box

Trays are packed in boxes like shown in the following figure 10.

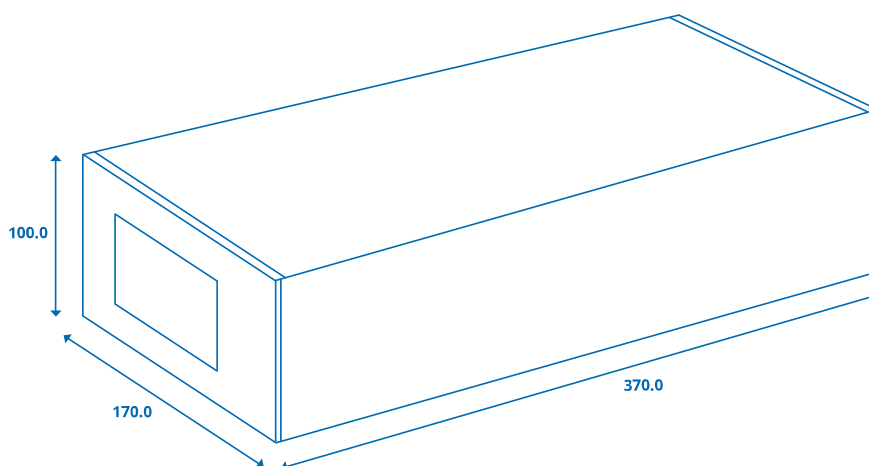


Figure 10: Box for tray with dimensions (unit: mm).

## 6 Disclaimer

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## 7 Revision History

*Table 3: Document Revision*

| Version | Date       | Author | Description           |
|---------|------------|--------|-----------------------|
| V1.00   | 07.02.2022 | FV     | V1.00 release version |