# 2mm PITCH METRIC CONNECTORS FOR PCB CONNECTION

## FCN-086 /087 SERIES

### ■ OVERVIEW

Fujitsu's 2mm hard metric connector F-PACK-3 (FCN-086/087 series) are connectors for connecting boards developed to support high-speed transmission/high density packaging of communication equipment, conforms to IEC 917 (DIN 43355) and IEC 61076-4-101, and supports compact PCI. Product meets Bellcor 1217. To support high-speed transmission, these connectors implement low inductance, low cross-talk, and matching characteristic impedance (50 ohms), exhibiting superb transmission characteristics.

Connection with the PCB is solderless (press fit) for both the plug/socket side, making mounting cost effective. Insertion connections are completely unnecessary since a polarity key is supported.

Plug contact has a four level sequence structure that makes connection/disconnection in an active state possible. Terminals have a five level pin length to support various applications. New customized connectors can be supported by freely combining the pin lengths of contacts and terminals.

For shield plate products, which support high-speed transmission based on standard products, 5 row 55, 95, 110, 110 (with key) and 125 contact, plugs support 77, 133, 154 and 175 contacts. The shield plate corresponds to the respective number of contacts, and the standard is post attachment. Sockets can also be shipped with shields pre-attached.

8 row products are also in the series. Consult factory for your requirements.

Fujitsu has developed a new high density power connector (25% denser) to improve operability.

A double press fit, which can connect two printed boards with one connector, greatly contributes to improved mounting and decreasing cost. Consult factory for details.

## ■ SPECIFICATIONS

| Item | Specification | |
|---|---|---|
| | Standard connector | Power connecto r |
| Operating temperature range | -55˚ C to +125˚ C | -40˚ C to +85˚ C |
| Current rating | 1A DC max. (75˚ C) | 7A DC/contact max. (75˚ C) |
| Voltage rating | 500V AC r.m.s | 56V DC |
| Contact resistance | 20mohms max. (DC 20mV,10mA) | 20mohms max. (DC 20mV, 10mA) |
| Insulation resistance | 10,000 Mohms min. (100V DC) | 10,000 Mohms min. (100V DC) |
| Dielectric strength | 750V AC for 1 minute | 600V AC for 1 minute |
| Insertion/Withdrawl life | 125 times | 250 times |
| Insertion force | 0.75N/pin min. | 20N/connector max. |
| Withdrawl force | 0.15N/pin min. | 1N/connector min. |

## ■ CHARACTERISTICS

| Item | Material |
|---|---|
| Characteristic impedance | 50 ohms |
| Transmission speed | 300 MHz |
| Near end cross talk | 4.3 % max. |

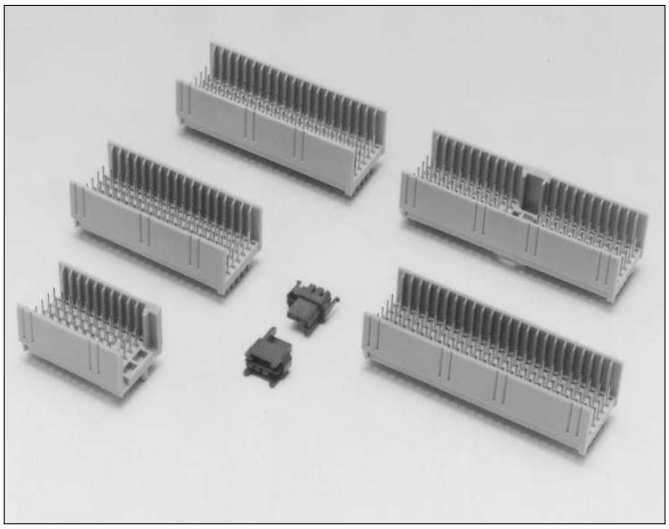
## ■ MATERIALS

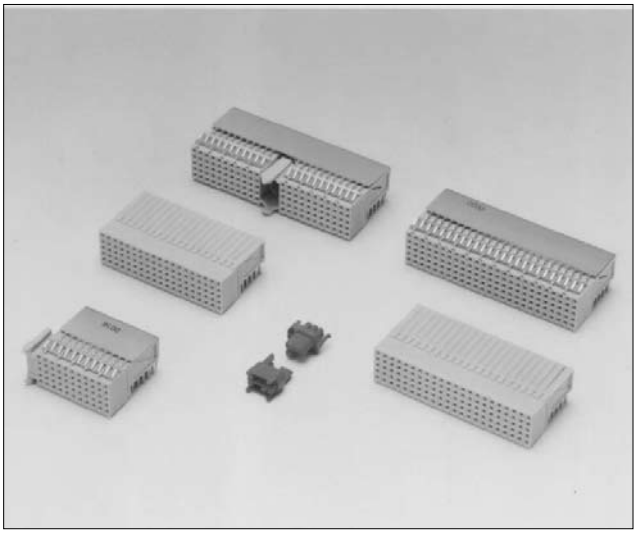
| Item | Material |
|---|---|
| Insulator | Polyester resin (UL94V-0) |
| Conductor | Copper alloy |
| Plating | Press fit: Solder<br>Press fit other: PAGOS<br>Contact area: Gold (PAGOS)<br>Lead / press fit area: Solder |

## ■ CONFIGURATION OF F&T 2 MM H.M. CONNECTOR

1. Basic configuration of socket/plug

There are five types of sockets: three basic types: type A (110 contacts), type B (125 contacts), and type C (55 contacts), and a 110 contact and 95 contact types. Many coding keys are in the series to prevent insertion errors.

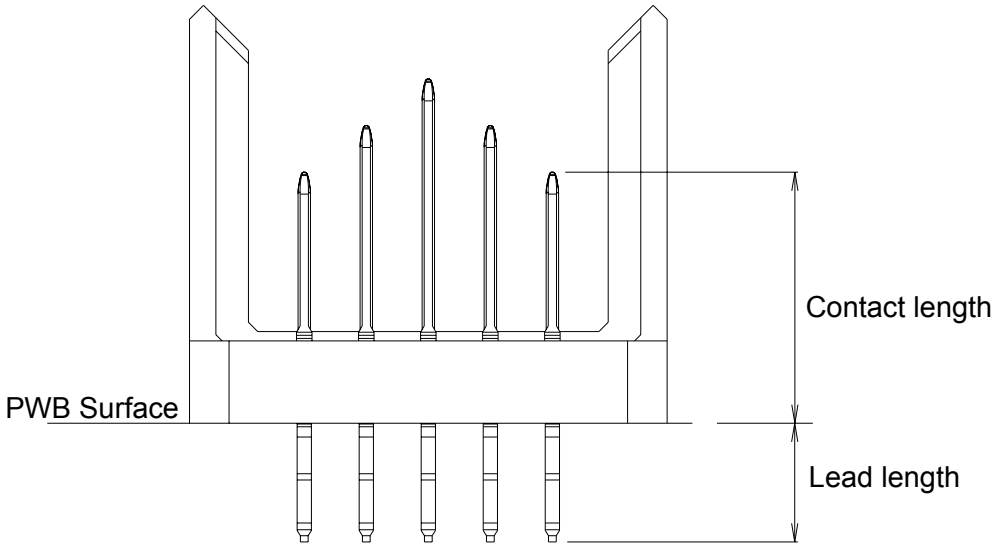




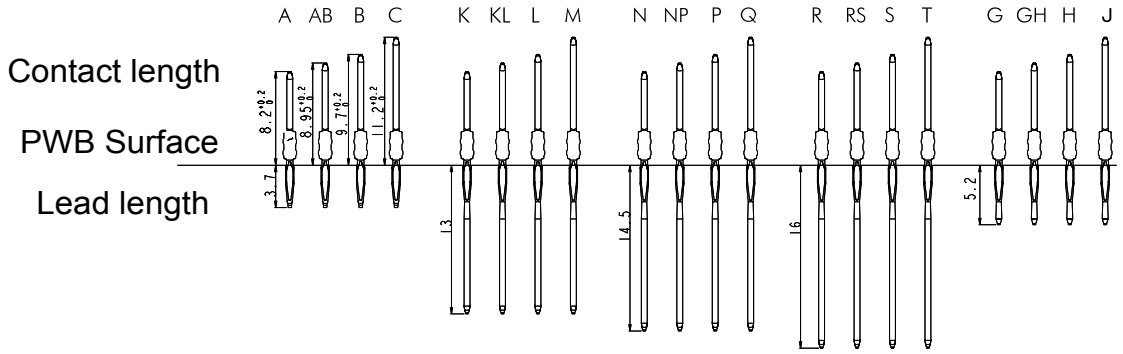
## ■ TERMINAL CONFIGURATION OF PLUG

The contact pins have a three-level sequence structure and can be connected/disconnected in an active state. The terminal side can support various applications with four types of length. These combinations allow 20 types of terminals.

Relationship between housing and terminals
Terminal types in the series



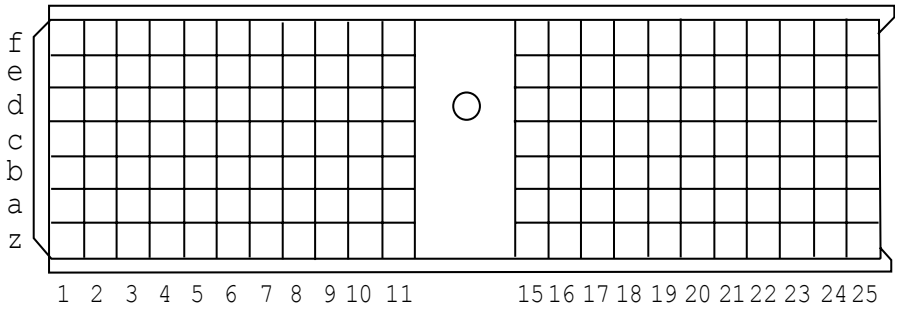

PC Board Face
Contact Types



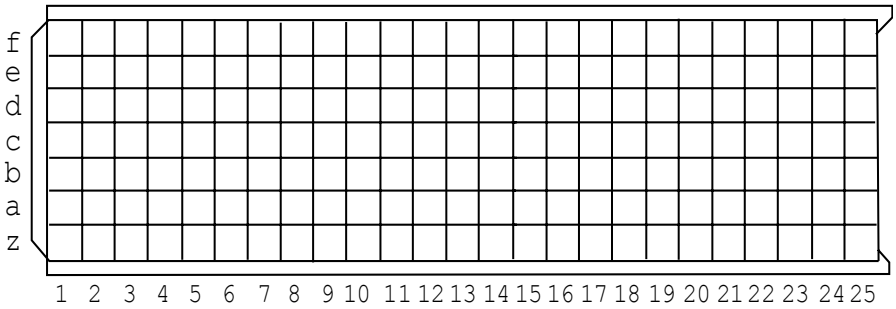
## Request Form for Customer Specific Pin Arrangement for 2mm Connectors

Part of the benefit of using the FCN-086 2mm Backplane connector is the flexibility of creating unique contact loads in the connector body. To define your needs, make a photocopy of the following page(s), select your connector needs, and fill in the blanks with the specific contact designation (see page 5 for available contacts). Forward to Fujitsu for quotation and part number assignment. (Please note that the pin arraignment drawings are "View from the Mating Side").

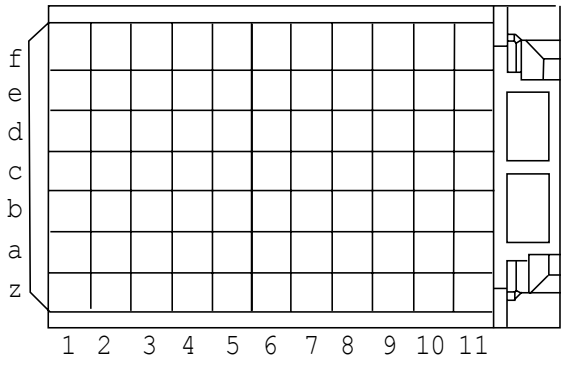
**1. TYPE A (110 pos. with polarization key) (5+2)**



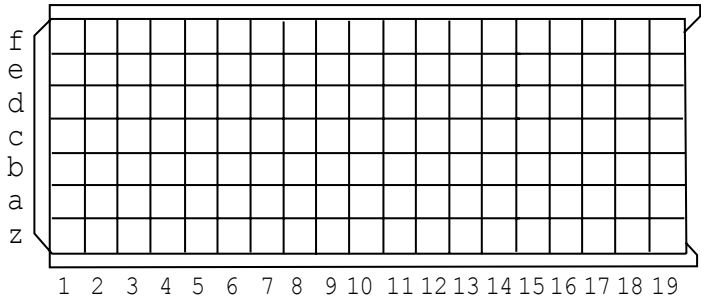

**2. TYPE B (125 pos.) (5+2)**




**3. TYPE C (55 pos.) (5+2)**



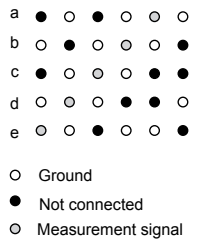

**4. 95 pos. (5+2)**



## ■ TRANSMISSION CHARACTERISTICS

The transmission characteristics were designed to an optimum level by repeating various transmission characteristics simulations when the structure was designed, so as to improve the transmission characteristics of this connector. The characteristic impedance and the measurement device of the connector are shown below.

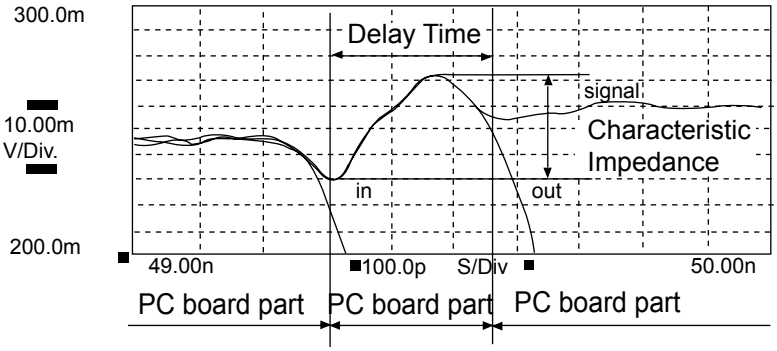
Measurement Point



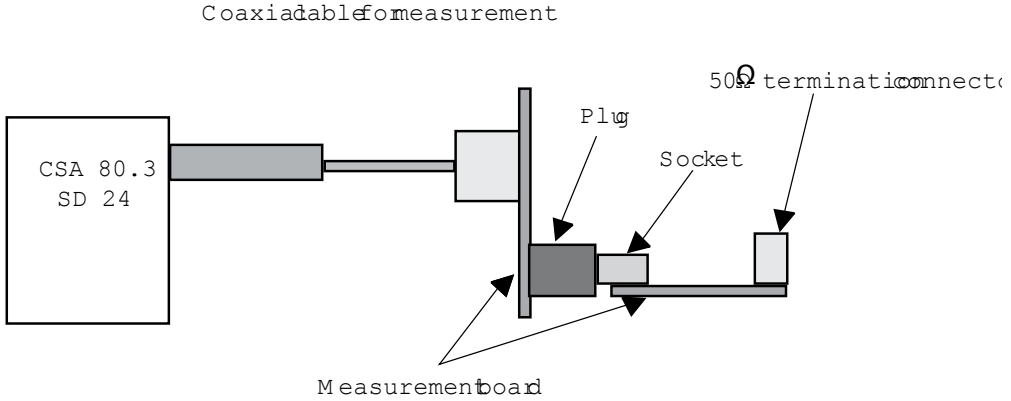

Measurement Result

| | Fujitsu Components | | | |
|---|---|---|---|---|
| At Start | 100 ps | 300 ps | 500 ps | 1 ns |
| Frequency: Hz | 1.75 GHz | 580 MHz | 350 MHz | 175 MHz |
| Characteristic Impedance (Ω) | 45.3 to 64.0 | 48.2 to 56.8 | 49.2 to 54.6 | 49.3 to 52.8 |
| Near/Far end cross talk: % | 1.96/1.14 | 1.49/0.78 | 1.06/0.51 | 0.71/0.27 |

| | Other Supplier | | | |
|---|---|---|---|---|
| At Start | 100 ps | 300 ps | 500 ps | 1 ns |
| Frequency: Hz | 1.75 GHz | 580 MHz | 350 MHz | 175 MHz |
| Characteristic Impedance (Ω) | 47.4 to 66.1 | 48.2 to 56.8 | 49.5 to 59.2 | 47.7 to 53.5 |
| Near/Far end cross talk: % | 2.24/1.41 | 1.57/0.98 | 1.14/0.67 | 0.78/0.35 |




1.Measurement voltage: Vin = 5.0V
2.Rise time: Tr = 100ps, 300ps, 500ps, 1ns
3.Measurement device: TDR measurement device CSA803 and SD24 (Tektronix)
4.Measurement system



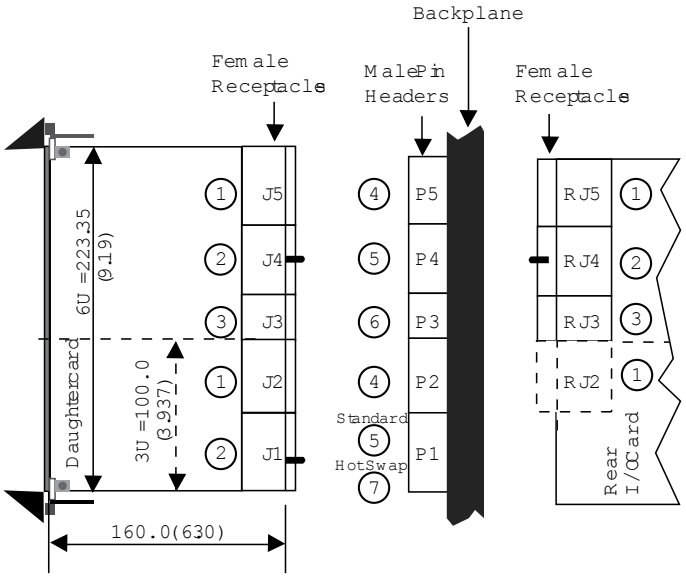
## ■ STANDARD AND HOT SWAP PART NUMBERS

Coding Keys for Daughter Card

FCN-086B1278 - 3.3V
or
FCN-086B2348 - 5.0V
J1

Coding Keys for Midplane/Backplane

FCN-086A3456 - 3.3V
or
FCN-086A2348 - 5.0V
P1




| Reference Number | Part Number | Designations |
|---|---|---|
| 1 | FCN-086J110-G111A-BCR | J5, J2, RJ5, RJ2 |
| 2 | FCN-086J110-G111-BCR | J4, J1, RJ4 |
| 3 | FCN-086J095-G111A-BCR | J3, RJ3 |
| 4 | FCN-086P154-G/111A-BCR | P5, P2 |
| 5 | FCN-086P154-G/104-BCR | P4, P1 |
| 6 | FCN-086P133-G/111A-BCR | P3 |
| 7 | FCN-086P154-G/114-BCR | P1 |
| 8 | Future Products | J4, P5 |
| 9 | FCN-086P154-G/516-BCR | P4 |

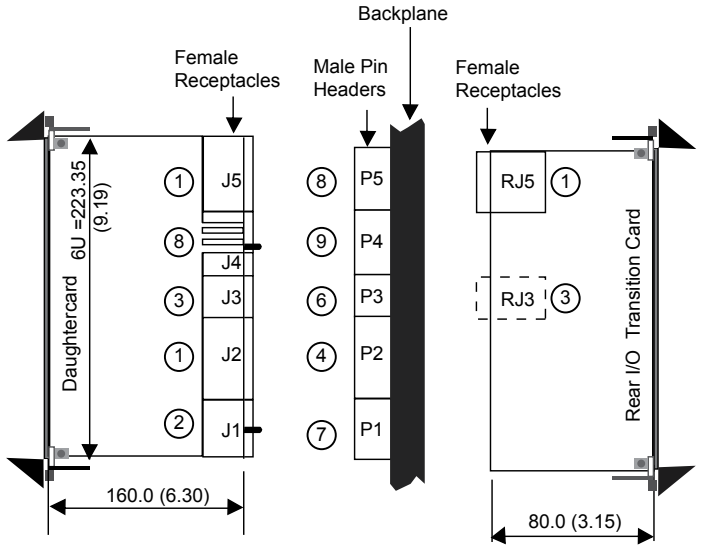
## ■ COMPUTER TELEPHONY PART NUMBERS

Coding Keys for Daughter Card

FCN-086B1278 - 3.3V
or
FCN-086B2348 - 5.0V
FCN-086B3567 - J4
J1

Coding Keys for Midplane/ Backplane

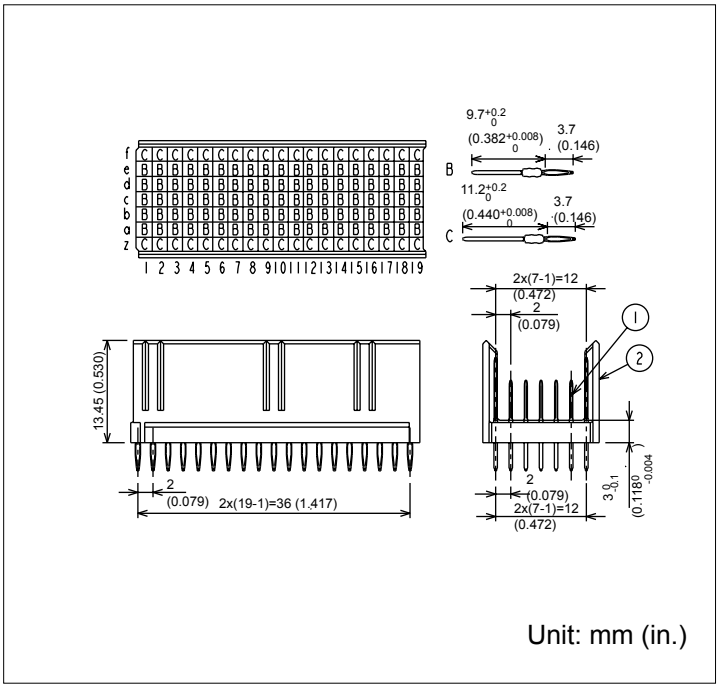
FCN-086A3456 - 3.3V
or
FCN-086A2348 - 5.0V
FCN-086B1248 - P4
P1



## P3 TYPE 3

## STRAIGHT PLUG (133 POSITIONS)

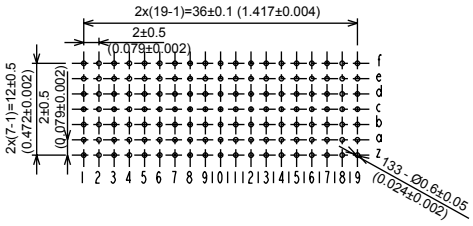
### ■ DIMENSIONS




Unit: mm (in.)

### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)
Drill hole Diameter: $\phi 0.7^{\pm 0.025}$ mm (.028 in.)
Through hole diameter (after plating): $\phi 0.6^{\pm 0.05}$ mm (.024)



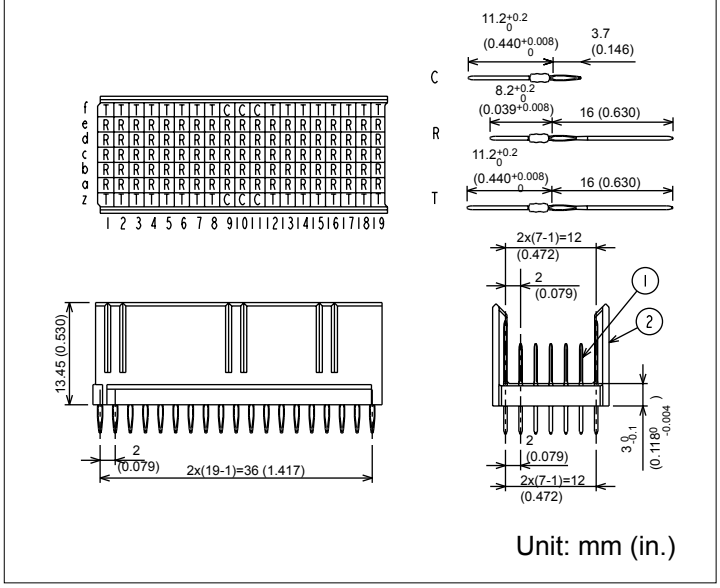

Unit: mm (in.)

### ■ ORDERING PART NUMBER: FCN-086P133-G/111A-BCR

## P3 TYPE B MALE FEED THROUGH

## STRAIGHT PLUG (133 POSITIONS)

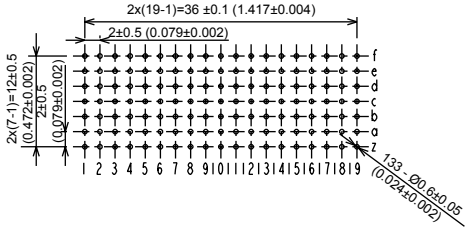
### ■ DIMENSIONS




Unit: mm (in.)

### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)
Drill hole Diameter: $\phi 0.7^{\pm 0.025}$ mm (.028 in.)

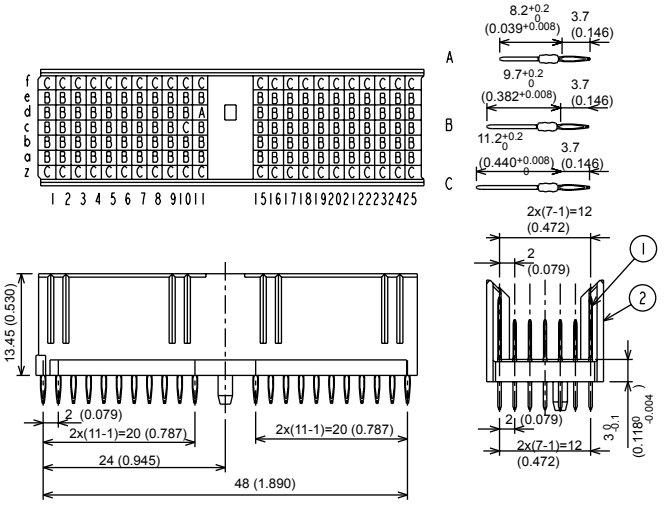



Unit: mm (in.)

### ■ ORDERING PART NUMBER: FCN-086P133-G/502A-BCR

## P1/P4 TYPE A
## STRAIGHT PLUG (154 POSITIONS)

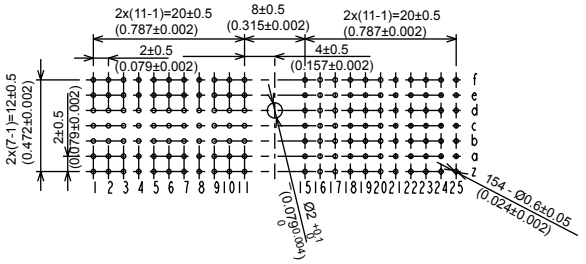
### ■ DIMENSIONS




Unit: mm (in.)

### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)
Drill hole Diameter: Ø0.7±0.025 mm (.028 in.)
Through hole diameter (after plating): Ø0.6±0.05 mm (.024)

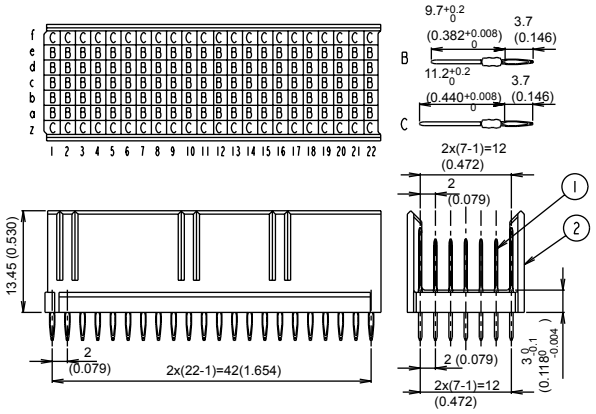



Unit: mm (in.)

■ **ORDERING PART NUMBER:** FCN-086P154-G/104-BCR

## P2/P5 TYPE B
## STRAIGHT PLUG (154 POSITIONS)

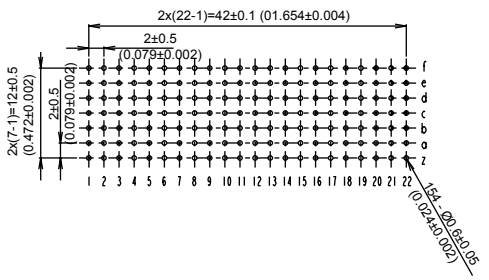
### ■ DIMENSIONS




Unit: mm (in.)

### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)
Drill hole Diameter: Ø0.7±0.025 mm (.028 in.)
Through hole diameter (after plating): Ø0.6±0.05 mm (.024)

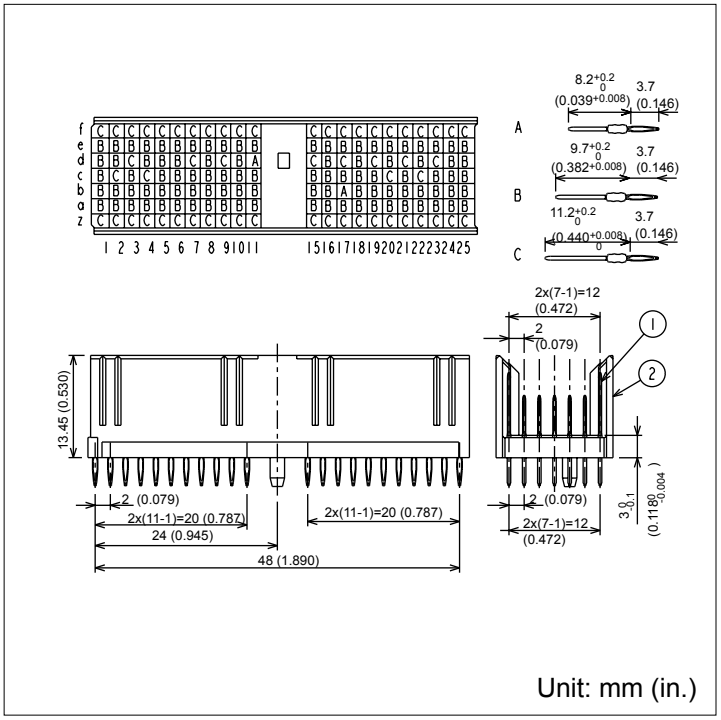



Unit: mm (in.)

■ **ORDERING PART NUMBER:** FCN-086P154-G/111A-BCR

## P1 TYPE A HOT SWAP 110 SIGNAL CONNECTOR
## STRAIGHT PLUG (154 POSITIONS)

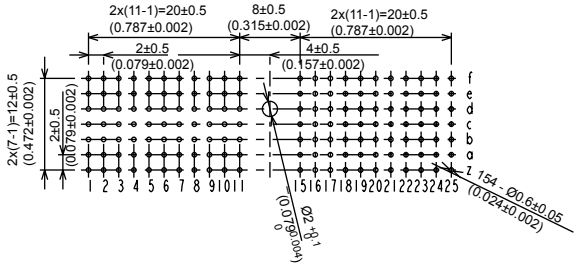
### ■ DIMENSIONS




Unit: mm (in.)

### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)
Drill hole Diameter: Ø0.7±0.025 mm (.028 in.)
Through hole diameter (after plating): Ø0.6±0.05 mm (.024)

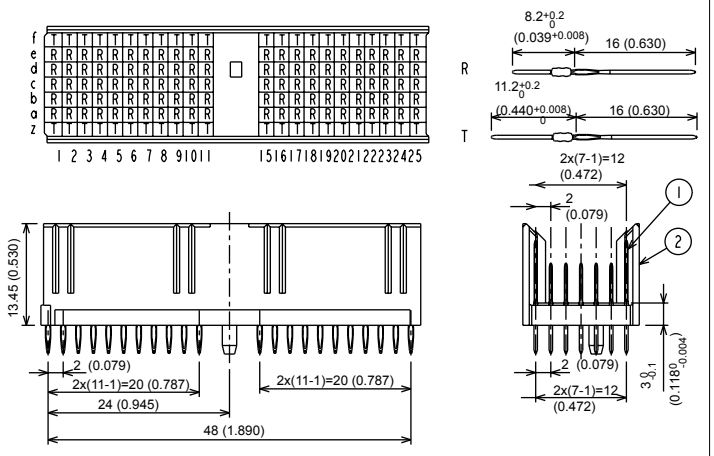



Unit: mm (in.)

■ **ORDERING PART NUMBER:** FCN-086P154-G/114-BCR

## P4 TYPE A MALE FEED THROUGH
## STRAIGHT PLUG (154 POSITIONS)

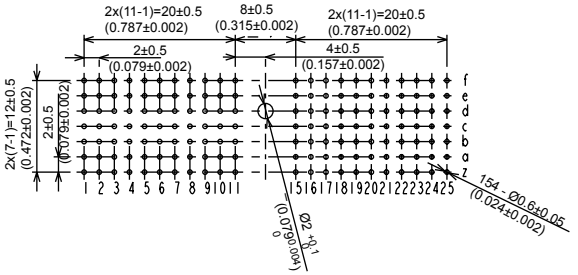
### ■ DIMENSIONS




Unit: mm (in.)

### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)
Drill hole Diameter: Ø0.7±0.025 mm (.028 in.)
Through hole diameter (after plating): Ø0.6±0.05 mm (.024)

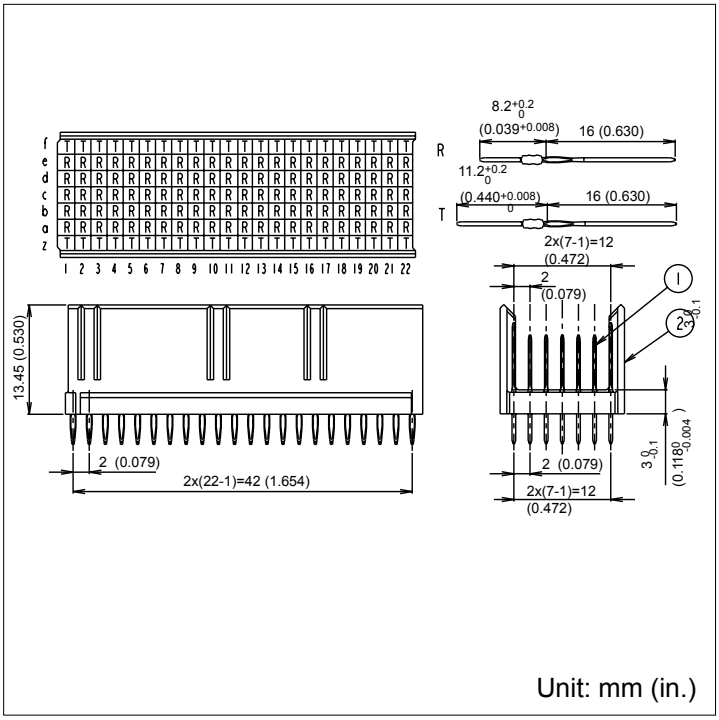



Unit: mm (in.)

■ **ORDERING PART NUMBER:** FCN-086P154G/401-BCR

## TYPE 2 FEED THROUGH
## STRAIGHT PLUG (154 POSITIONS)

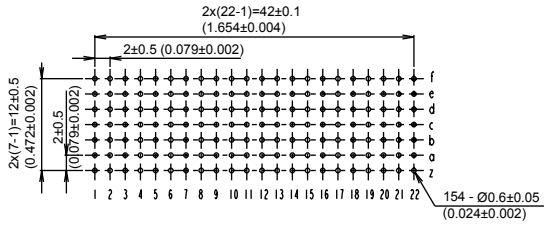
### ■ DIMENSIONS




Unit: mm (in.)

### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)
Drill hole Diameter: Ø0.7±0.025 mm (.028 in.)
Through hole diameter (after plating):
Ø0.6±0.05 mm (.024)

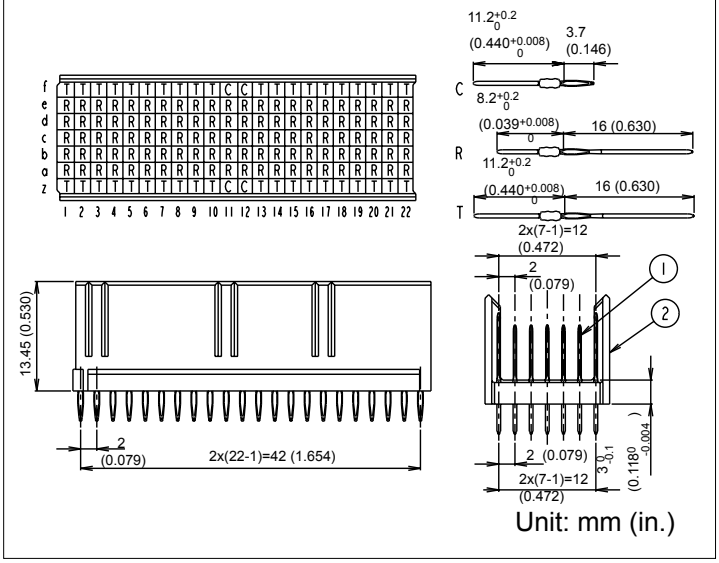



Unit: mm (in.)

■ **ORDERING PART NUMBER:** FCN-086P154-G/401A-BCR

## TYPE 2 FEED THROUGH
## STRAIGHT PLUG (154 POSITIONS)

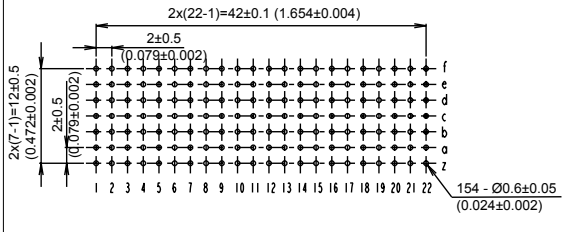
### ■ DIMENSIONS




Unit: mm (in.)

### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)
Drill hole Diameter: Ø0.7±0.025 mm (.028 in.)
Through hole diameter (after plating):
Ø0.6±0.05 mm (.024)



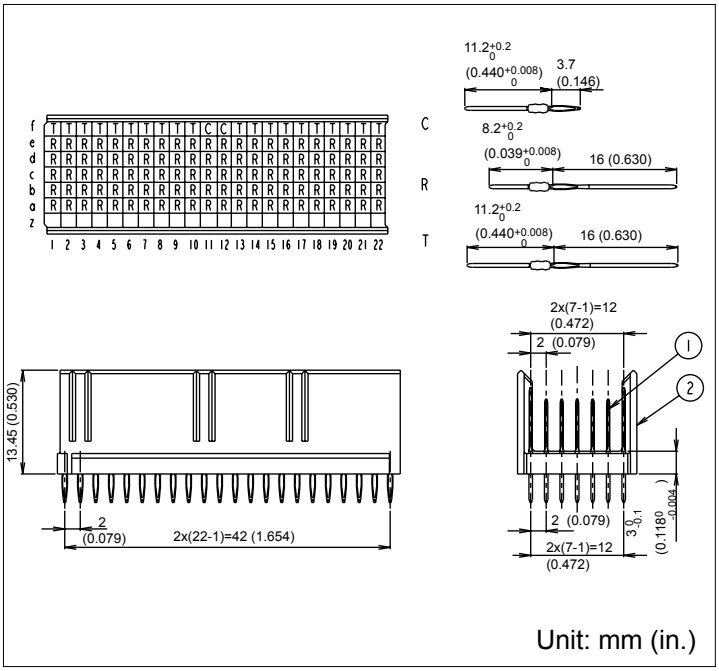

Unit: mm (in.)

■ **ORDERING PART NUMBER:** FCN-086P154-G/502A-BCR

## P5 TYPE B FEED THRU COMPUTER TELEPHONY CONNECTOR

## STRAIGHT PLUG (154 POSITIONS)

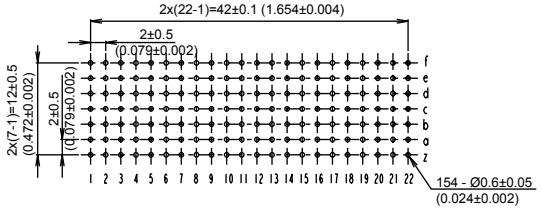
### ■ DIMENSIONS




Unit: mm (in.)

### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)
Drill hole Diameter: Ø0.7±0.025 mm (.028 in.)
Through hole diameter (after plating): Ø0.6±0.05 mm (.024)



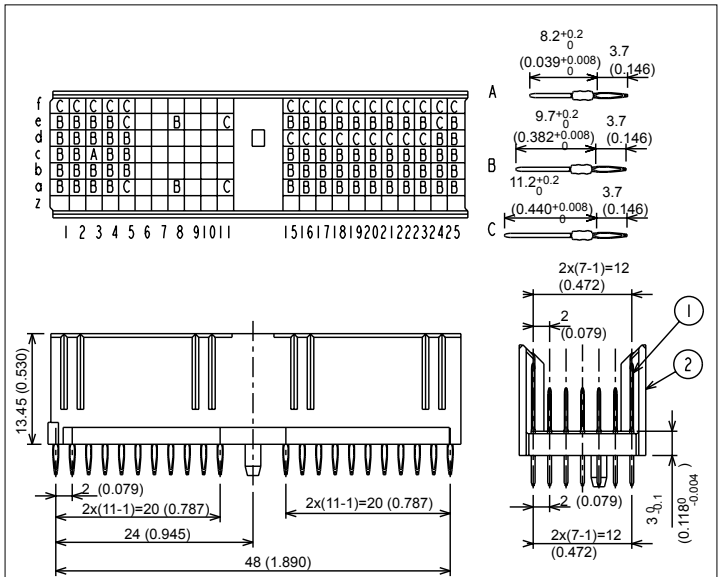

Unit: mm (in.)

### ■ ORDERING PART NUMBER: FCN-086P154-G/503A-BCR

## P4 TYPE A COMPUTER TELEPHONY CONNECTOR

## STRAIGHT PLUG (154 POSITIONS)

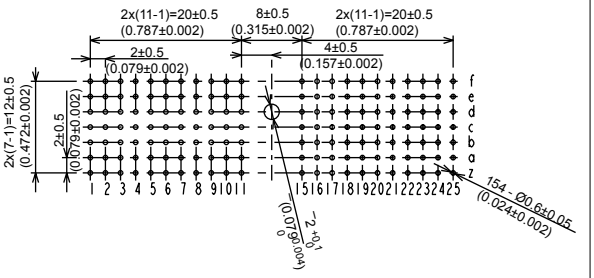
### ■ DIMENSIONS




Unit: mm (in.)

### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 5.6 mm (.055 to .220 in.)
Drill hole Diameter: Ø0.7±0.025 mm (.028 in.)
Through hole diameter (after plating): Ø0.6±0.05 mm (.024)

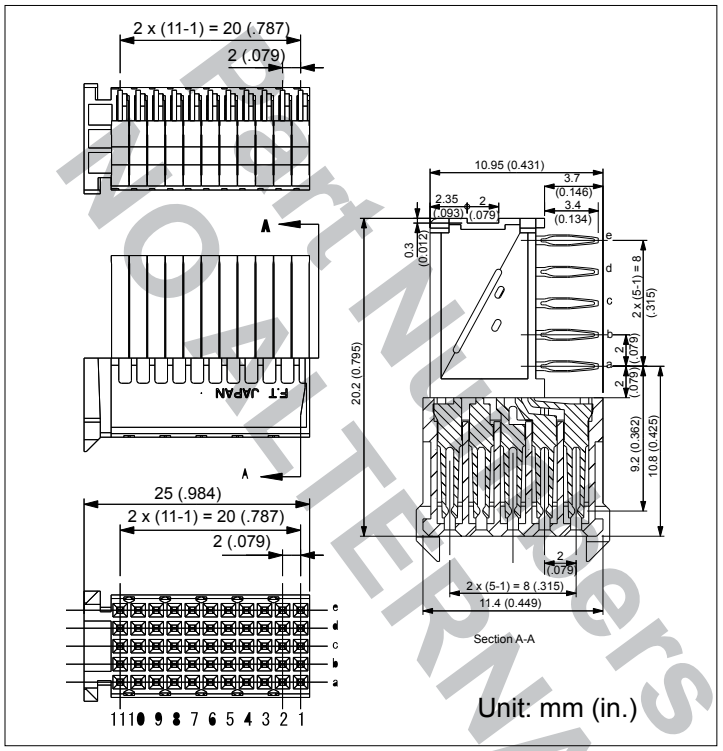


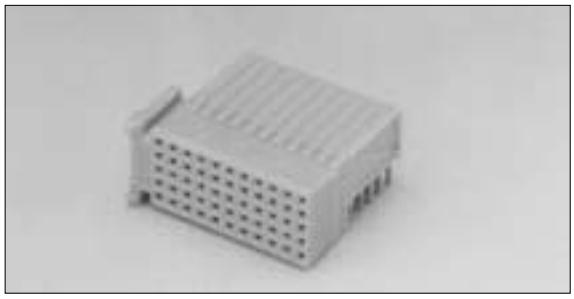

Unit: mm (in.)

### ■ ORDERING PART NUMBER: FCN-086P154-G/516-BCR

## SOCKET: 55 CONTACTS

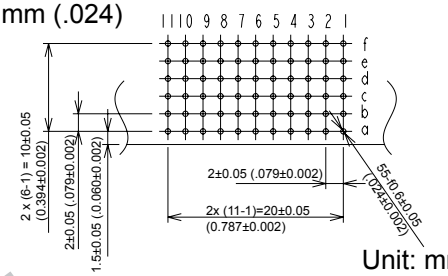
### ■ DIMENSIONS



### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 2.0 mm (.055 to .220 in.)
Drill hole Diameter: Ø0.7$^{\pm 0.025}$ mm (.028 in.)
Through hole diameter (after plating): Ø0.6$^{\pm 0.05}$ mm (.024)

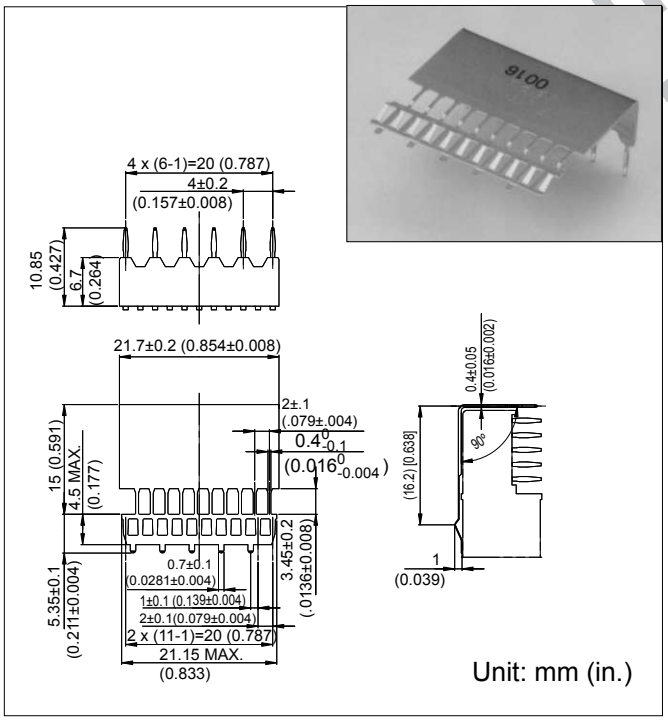



### ■ ORDERING PART NUMBER: FCN-086J055-G/101-BCR

FCN-086J055-G/111-BCR (with pre-attached upper shield)

## SHIELD PLATE

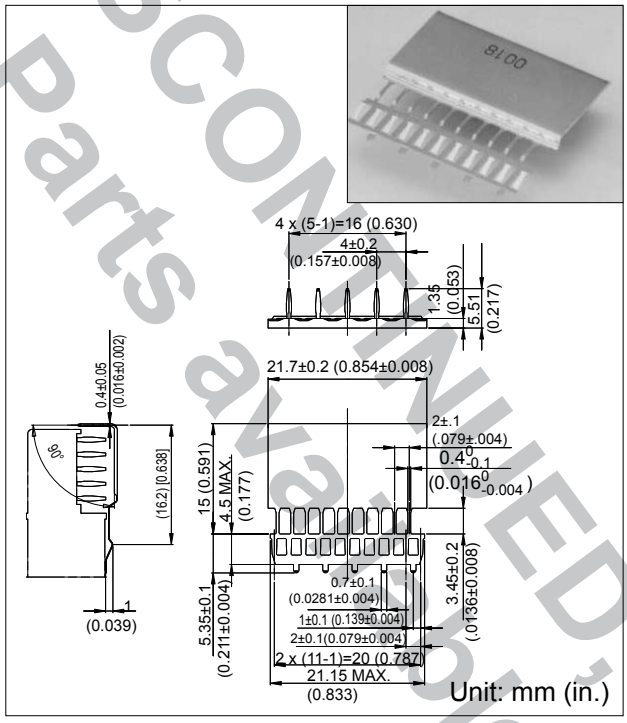
### ■ DIMENSIONS




### ■ ORDERING PART NUMBER:

FCN-086J055-G/USD-BCR (top shield plate)

### ■ DIMENSIONS




### ■ ORDERING PART NUMBER:

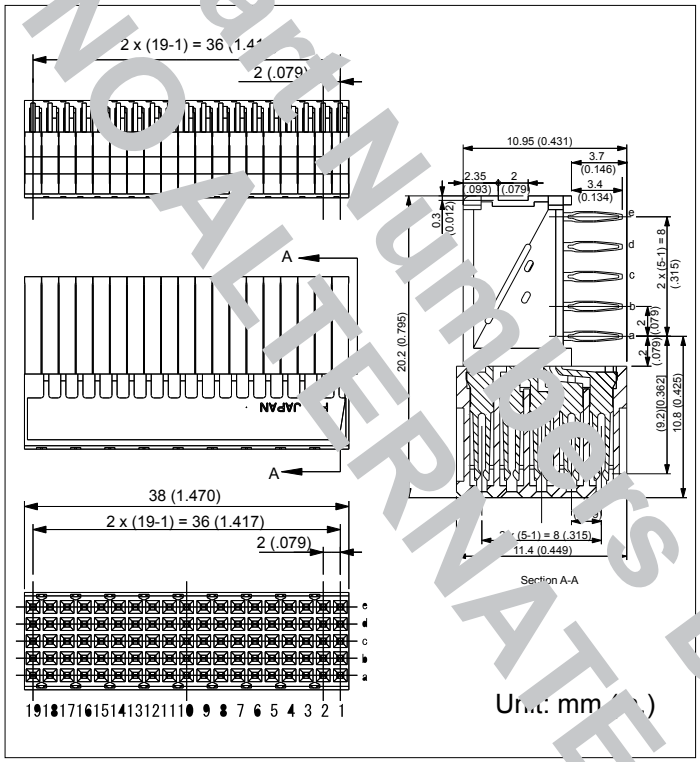
FCN-086J055-G/LSD-BCR (bottom shield plate)

Part Numbers DISCONTINUED
NOT FOR NEW DESIGN
Parts available

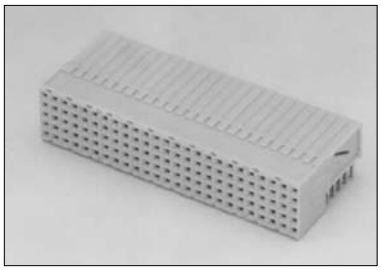
Part Numbers Discontinued, NO ALTERNATE Parts available

## SOCKET: 95 CONTACTS

### ■ DIMENSIONS

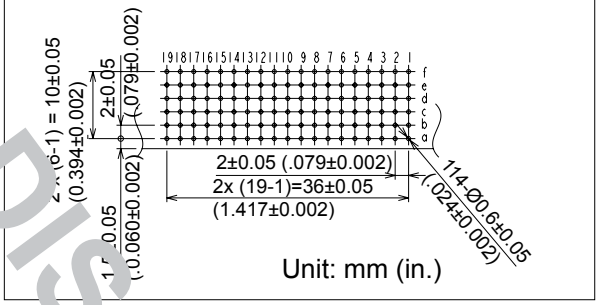



Unit: mm (in.)



### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 2.0 mm (.055 to .220 in.)
Drill hole Diameter: Ø0.7$^{\pm 0.025}$ mm (.028 in.)
Through hole diameter (after plating): Ø0.6$^{\pm 0.05}$ mm (.024)



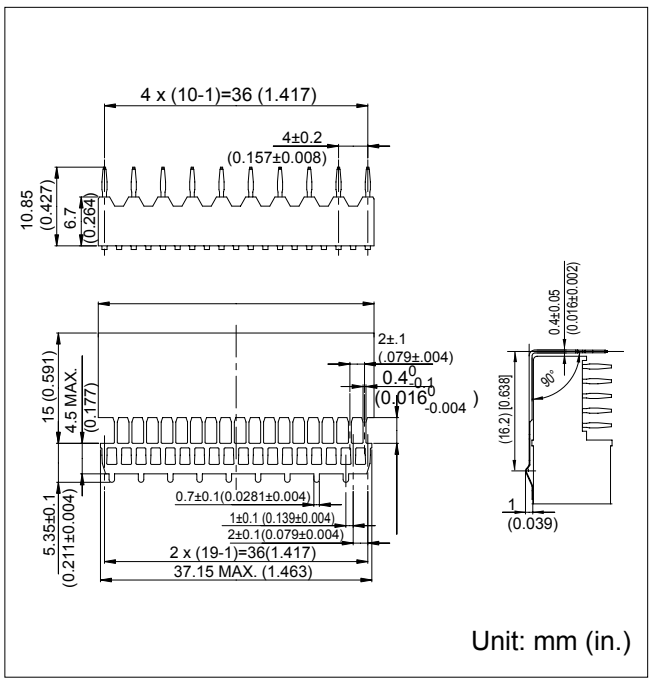

Unit: mm (in.)

### ■ ORDERING PART NUMBER:

FCN-086J095-G/[illegible]-BCR
FCN-086J095-G/11[illegible]A-BCR (with pre-attached upper shield)

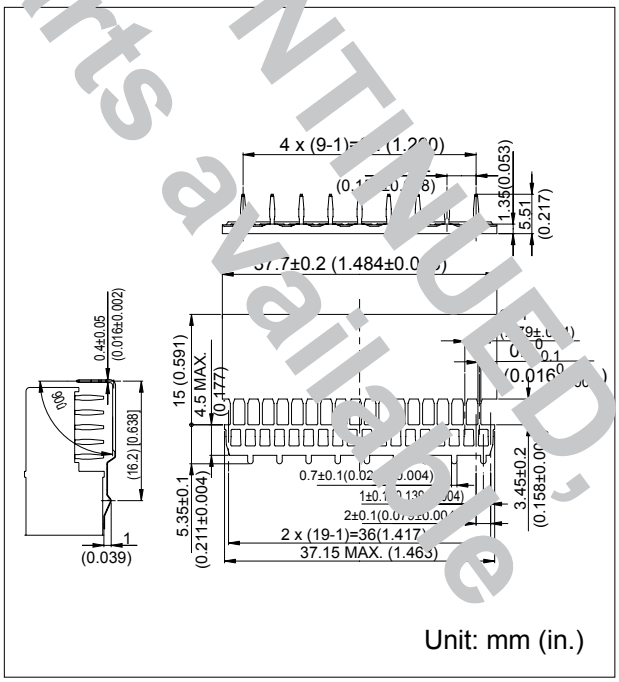
## SHIELD PLATE

### ■ DIMENSIONS




Unit: mm (in.)

### ■ DIMENSIONS




Unit: mm (in.)

### ■ ORDERING PART NUMBER:

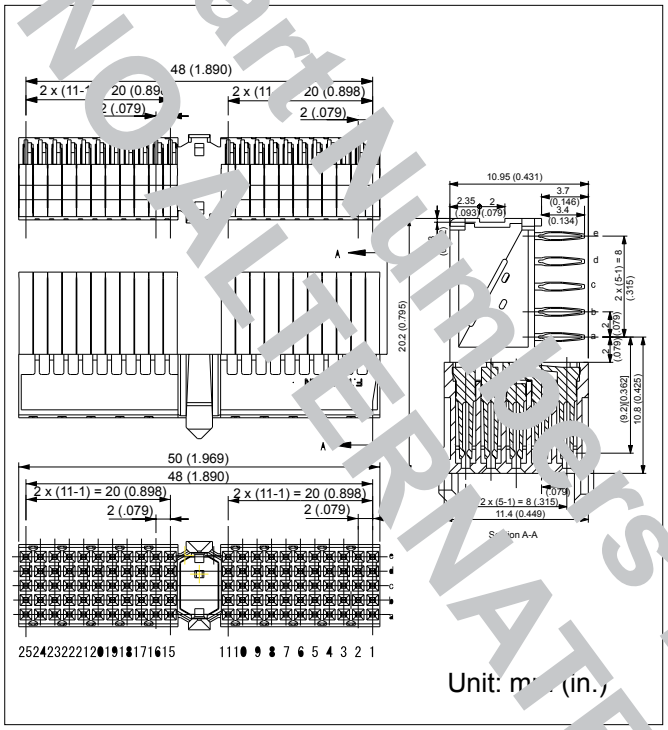
FCN-086J095-G/VSD-BCR (top shield plate)

### ■ ORDERING PART NUMBER:

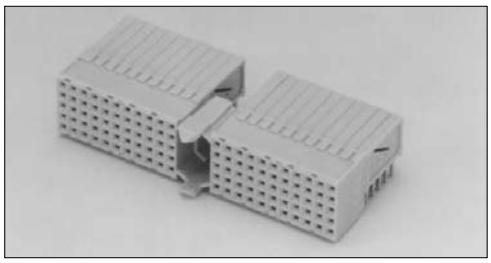
FCN-086J095-G/MSD-BCR (bottom shield plate)

**SOCKET: 110 CONTACTS**

■ **DIMENSIONS**

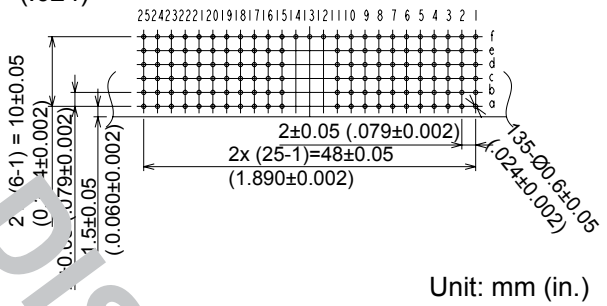



Unit: mm (in.)



■ **MOUNTING HOLE LAYOUT**

Thickness: 1.4 to 2.0 mm (.055 to .220 in.)
Drill hole Diameter: Ø0.7$^{\pm 0.025}$ mm (.028 in.)
Through hole diameter (after plating): Ø0.6$^{\pm 0.05}$ mm (.024)



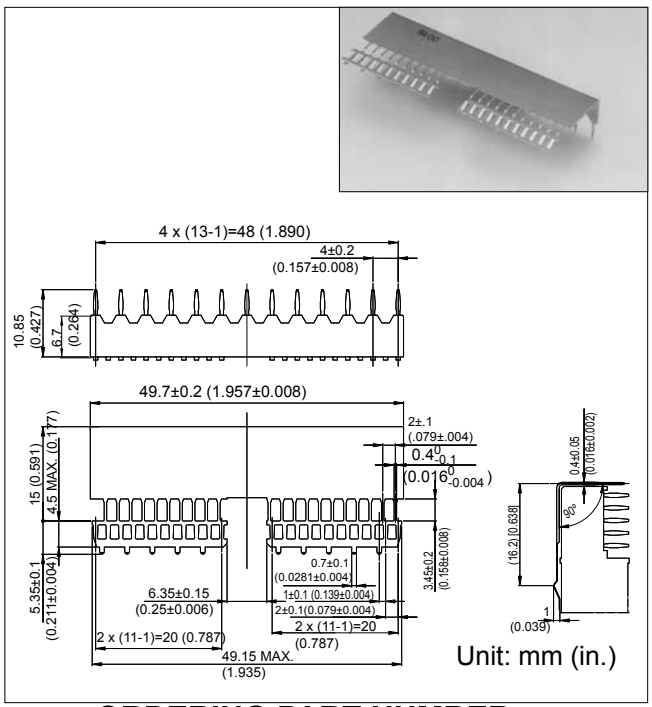

Unit: mm (in.)

■ **ORDERING PART NUMBER:** FCN-086J110-G/111-BCR

FCN-086J110-G/111-BCR (with pre-attached upper shield)

**SHIELD PLATE**

■ **DIMENSIONS**

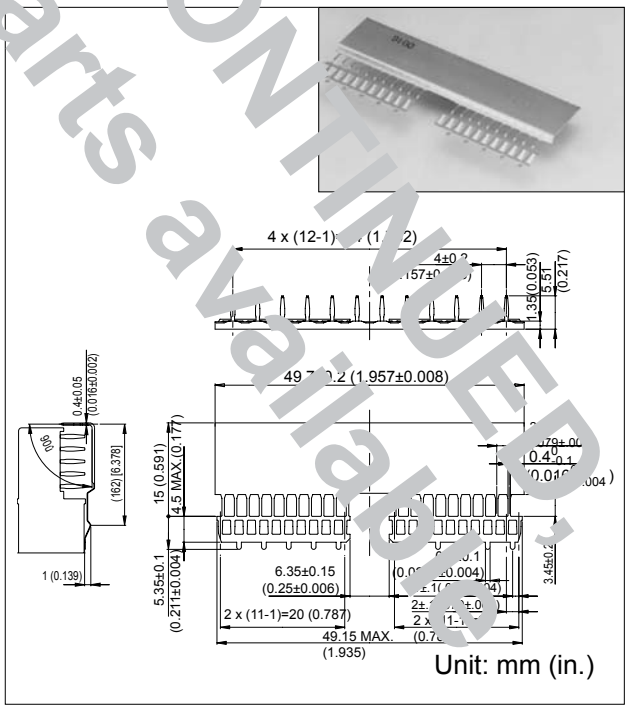



Unit: mm (in.)

■ **ORDERING PART NUMBER:**

FCN-086J110-G/USD-BCR (with key, top shield plate)

■ **DIMENSIONS**




Unit: mm (in.)

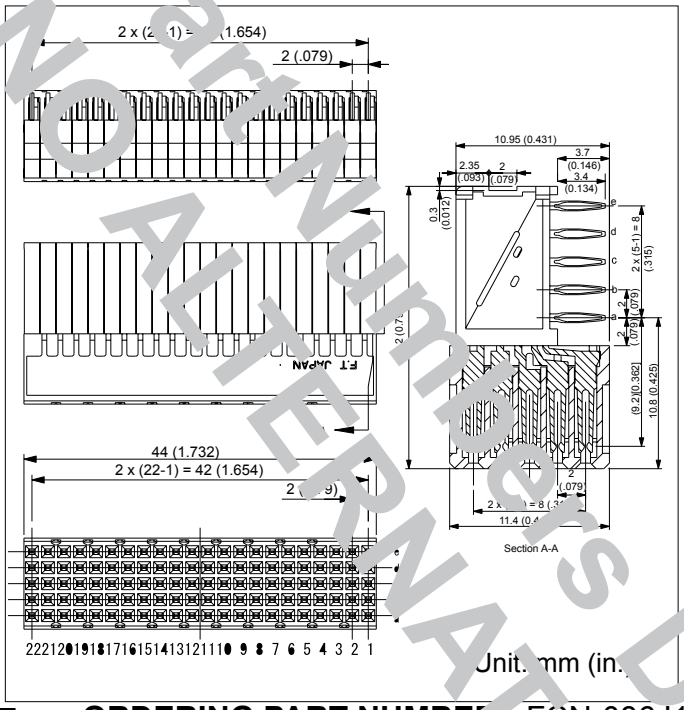
■ **ORDERING PART NUMBER:**

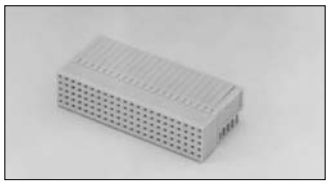
FCN-086J110-G/LSD-BCR (with key, bottom, shield plate)

Part Numbers Discontinued.
NO ALTERNATE Parts available

## SOCKET: 10 CONTACTS WITHOUT KEY

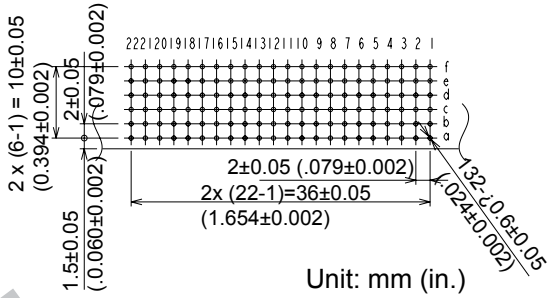
### ■ DIMENSIONS



### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 2.0 mm (.055 to .220 in.)
Drill hole Diameter: ∅0.7$^{\pm 0.025}$ mm (.028 in.)
Through hole diameter (after plating):
∅0.6$^{\pm 0.05}$ mm (.024)

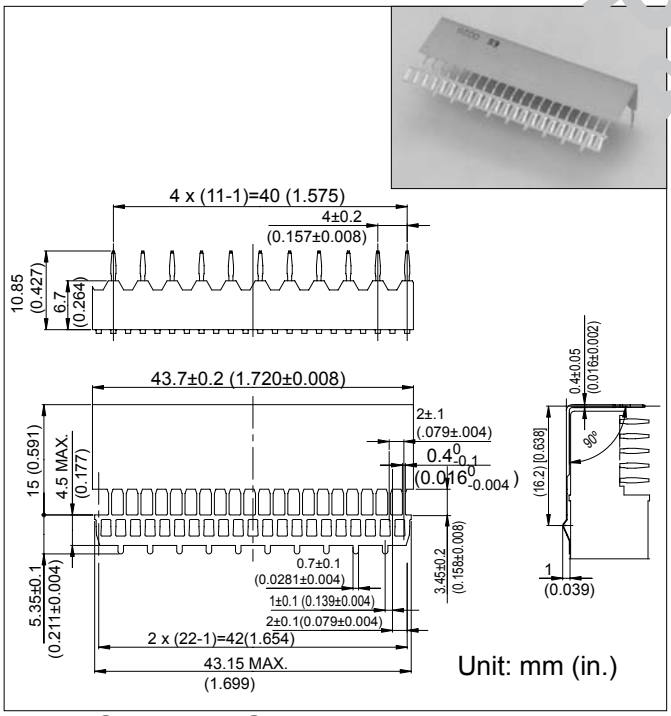



### ■ ORDERING PART NUMBER: FCN-086J110-G/101A-BCR

FCN-086J110-G/101A-BCR (with pre-attached upper shield)

## SHIELD PLATE

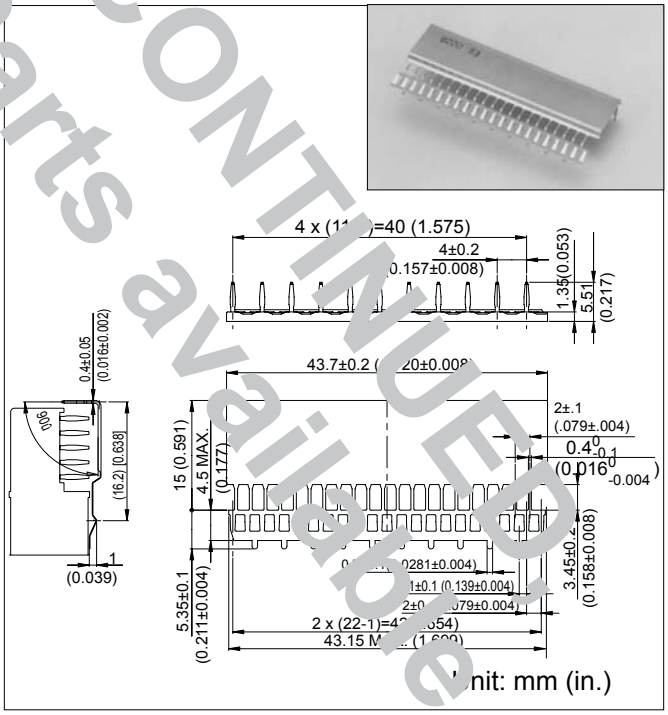
### ■ DIMENSIONS




### ■ ORDERING PART NUMBER:

FCN-086J110-G/VSD-BCR (without key, top shield plate)

### ■ DIMENSIONS




### ■ ORDERING PART NUMBER:

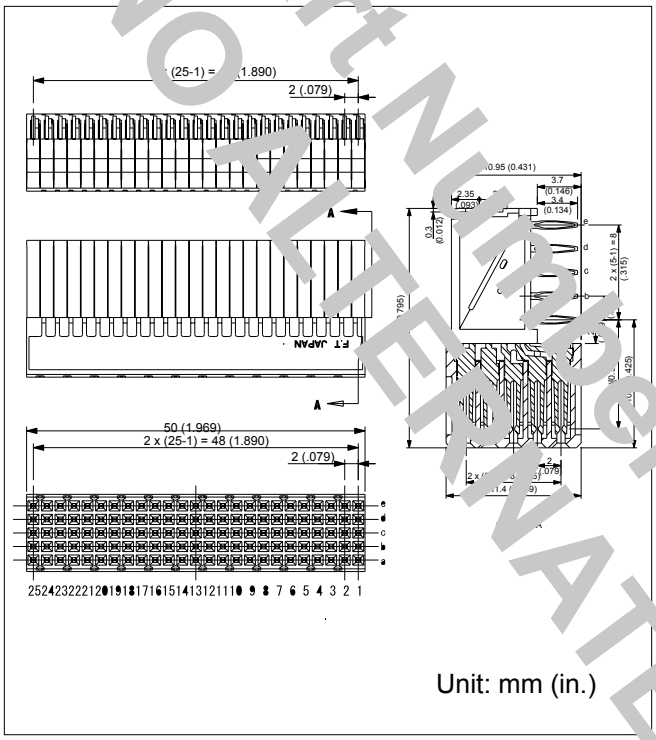
FCN-086J110-G/MSD-BCR (without key, bottom shield plate)

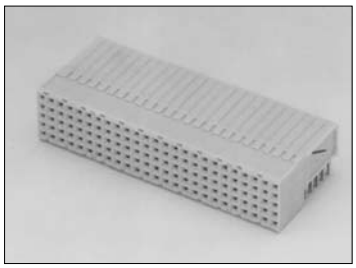
Part Numbers Discontinued
NO ALTERNATE Parts available

Part Numbers DISCONTINUED, NO ALTERNATE Parts available

## SOCKET: 125 CONTACTS

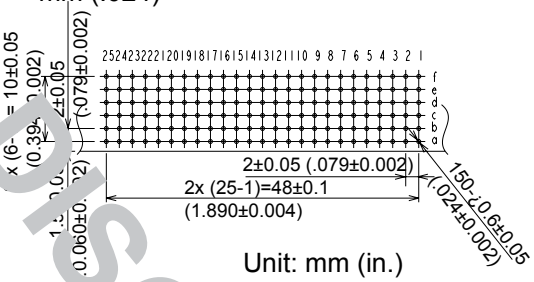
### ■ DIMENSIONS



### ■ MOUNTING HOLE LAYOUT

Thickness: 1.4 to 2.0 mm (.055 to .220 in.)
Drill hole Diameter: ∅$0.7^{\pm 0.025}$ mm (.028 in.)
Through hole diameter (after plating):
∅$0.6^{\pm 0.05}$ mm (.024)

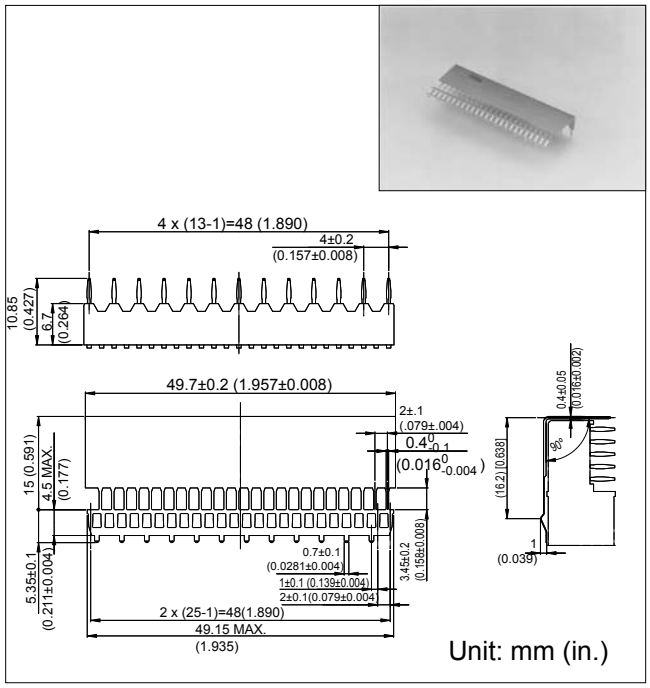



### ■ ORDERING PART NUMBER: FCN-086J125-G/101-BCR

FCN-086J125-G/111-BCR (with pre-attached upper shield)

## SHIELD PLATE

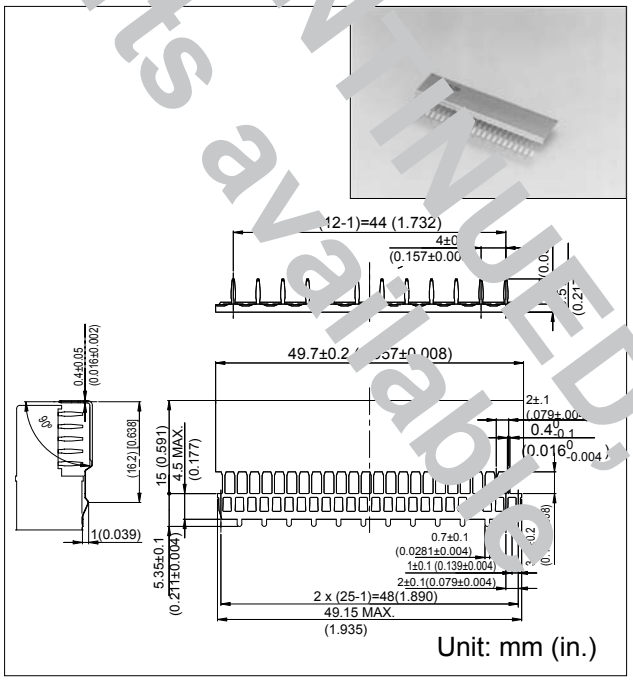
### ■ DIMENSIONS




### ■ ORDERING PART NUMBER:

FCN-086J125-G/USD-BCR (top shield plate)

### ■ DIMENSIONS

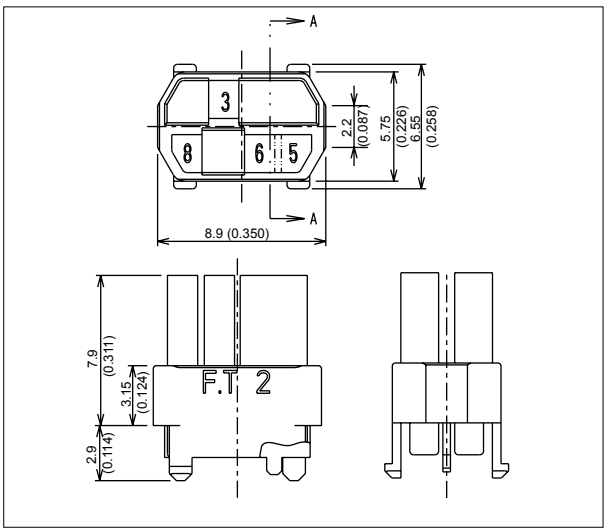



### ■ ORDERING PART NUMBER:

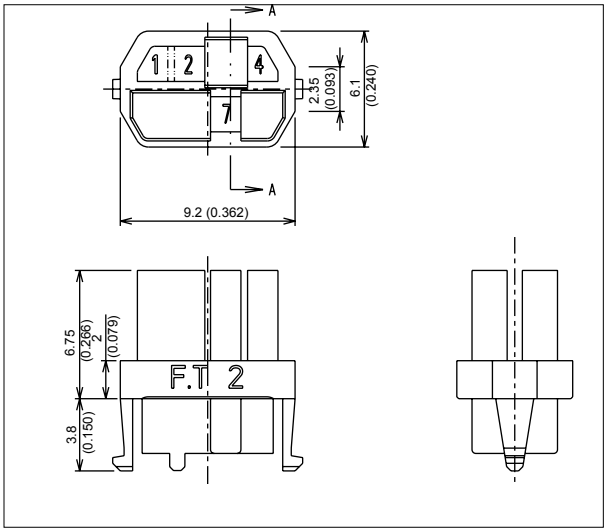
FCN-086J125-G/LSD-BCR (bottom shield plate)

## CODING KEY

### ■ DIMENSIONS




### ■ DIMENSIONS




### ■ ORDERING PART NUMBER:

FCN-086A3568

Quanties: 50 pieces/package; minium order quanity: 500 piecs

### ■ ORDERING PART NUMBER:

FCN-086B1247

### ■ COMBINATION OF CODING KEYS

| Plug | Jack | Color |
|---|---|---|
| 1236 | 4578 | Nut brown |
| 1238 | 4567 | Ultramarine blue |
| 1248 | 3567 | Strawberry red |
| 1268 | 3457 | Olive yellow |
| 1567 | 2348 | Brilliant blue |

| Plug | Jack | Color |
|---|---|---|
| 2578 | 1346 | Reseda green |
| 3467 | 1258 | Slate gray |
| 3567 | 1248 | Antique pink |
| 3568 | 1247 | Pastel orange |

### ■ ORDERING PART NUMBERs:

Plug Coding Key: FCN-086A****

Jack Coding Key: FCN-086B****

****: Add Coding Key number: eg: FCN-086A1268

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