ICE Connector

TQPACK Technical Information

November 28, 2005

I   TQPACK Instruction for Use

(A)   Combination of [(a)+(d)] + [(c)+(c)]

TQSOCKET-P type(d) and TQPACK(a) are mated by hands, then firmly fixed together with Hexagon Socket Set Screw to protect pins on the (a).   If the pins are broken on the (d) due to the some sort of stress, the (d) must be replaced.   After soldering the TQSOCKET-F type (c) to PWB, tighten the (c) on the other (c) with Hexagon Socket Set Screw.   More than 100 times of mating and unmating will degraded the contact reliability, therefore, the TQSOCKET should be replaced by new one.   When TQSOCKET is removed, use keystone tip screw driver to loosen the 4 corners and remove (or pull) the socket straight upward.   When you pull it not straight, then pins may be damaged


Fig-1

```
EXAMPLE
   (a):TQPACK100RB              (c):TQSOCKET100RBF
   (d):TQSOCKET100RBP
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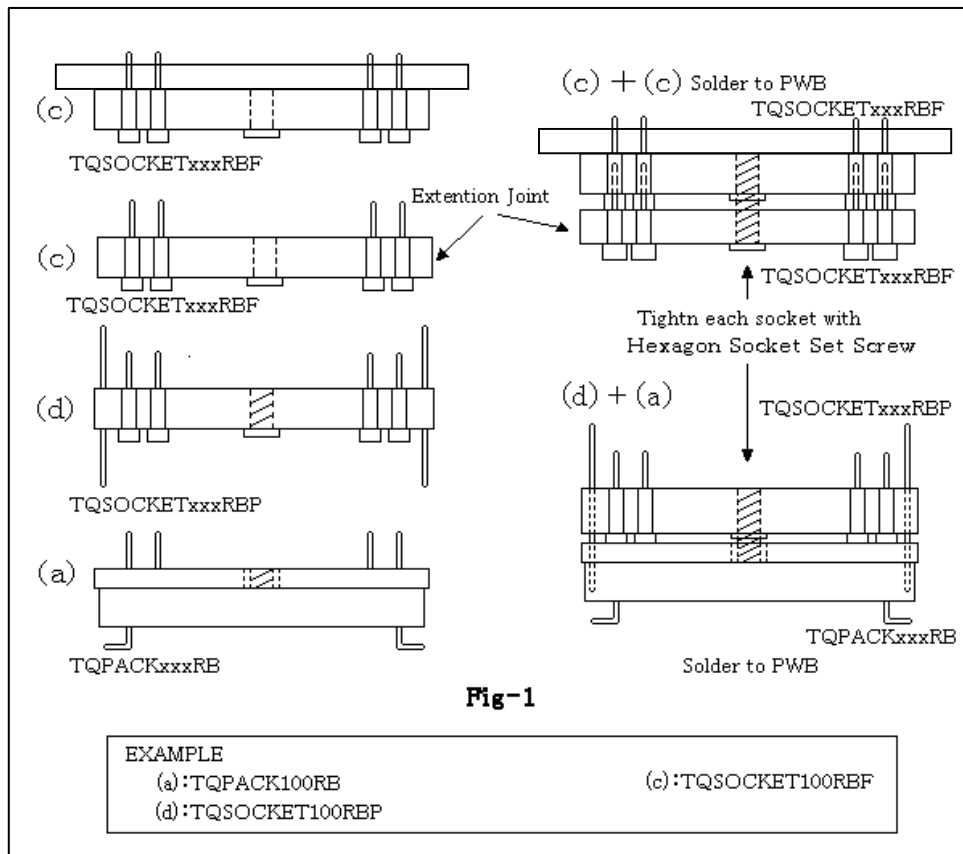
*TQSOCKET pins are extremely fine (0.25mm post).   Even light stress may damage pins.   Therefore, handle with the extreme care.   Also, whenever you mate the socket and pins, make sure the pins are not damaged, and also check if direction of the socket is correct before the mating.

*TQSOCKET mating to TQPACK must be provided with a guide pin type. Header pins of TQPACK might touch to adjacent pins of TQSOCKET, if a TQSOCKET without guide pins (-N or -F type) is used.

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(B)   (a) + [(b)+(c)]   Combination

After soldering the TQSOCKET-F type (c) to PWB, mate TQSOCKET-G type (b) or -P type (d) with the (c), then tighten with Hexagon Socket Set Screw.   When (c) and (d) are mated, there must be the holes on PWB for the guide pins since the guide pins are long. (Refer the individual TQSOCKET specification for the hole location.)   When (c) is mated with (b) then the guide holes are unnecessary.   When the TQSOCEKTS are mated each other, use TQSOCKET-P type (d) because the long guide pins work for not only blind mating but also much less possibility of breaking the pins.
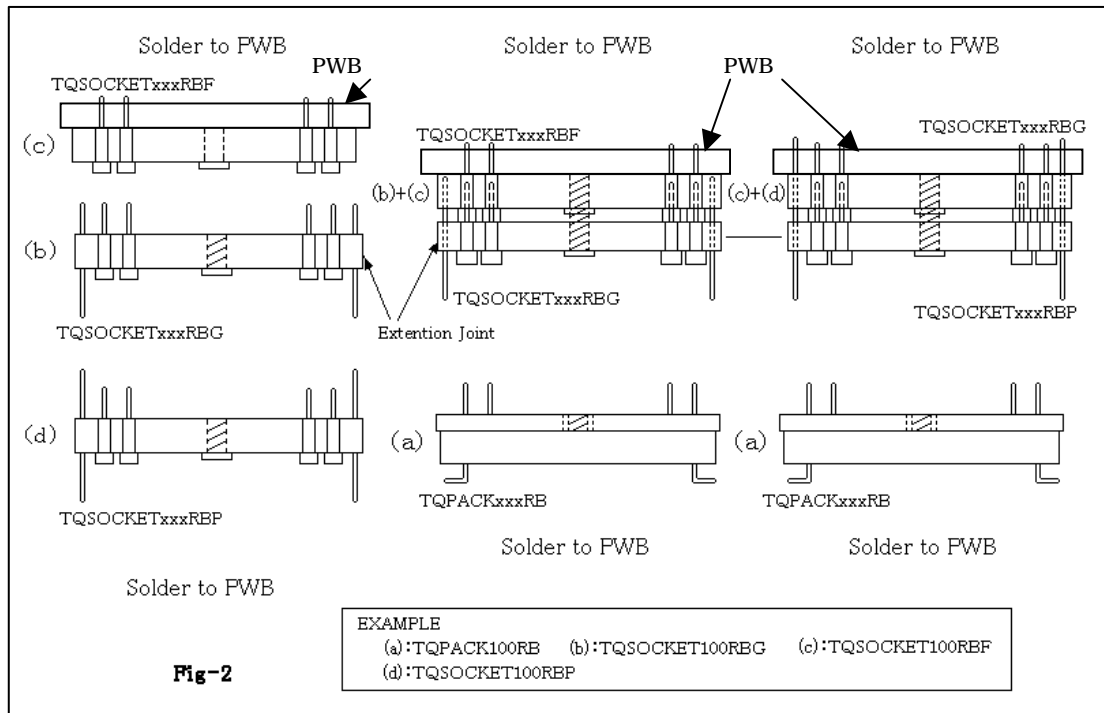

Fig-2

*(Joint) means the extension plug.   More than 100 times of mating and unmating, contact quality of socket will be degraded. Therefore replace with new socket.
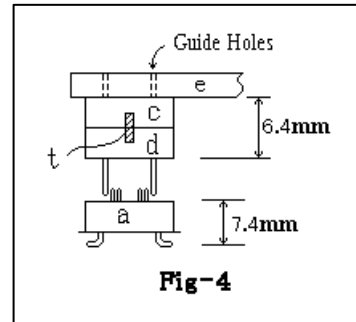*TQSOCKET mating to TQPACK must be a guide pin type. Header pins of TQPACK might touch to adjacent pins of TQSOCKET, if a TQSOCKET without guide pins (-N or -F type) is used.
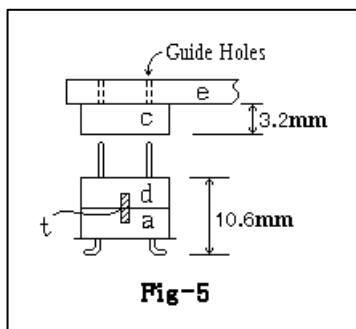
II Combination Example of TQPACK

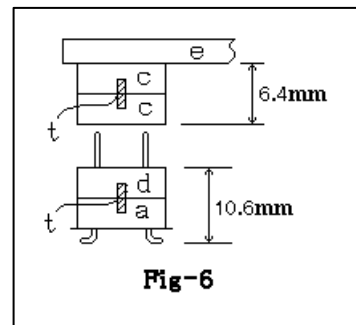**A.** Holes on the emulator board is necessary.
(Stacking Height=10.6 mm)

Fig-3
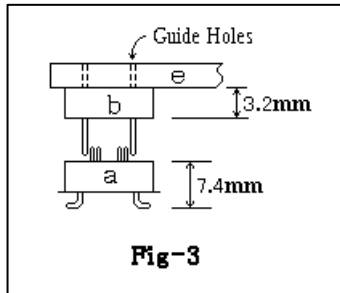
B. Holes on the emulator board is necessary.
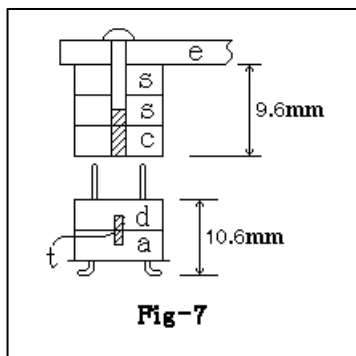(Stacking Height=13.8 mm)

Fig-4

C. TQSOCKET is the top cover for TQPACK.
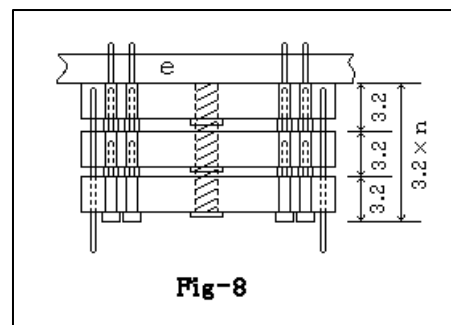(Stacking Height=13.8 mm)

Fig-5

D. TQSOCKET is the top cover for TQPACK
(The most recommended case)
(Stacking Height=17.0 mm)

Fig-6

E. When the space is required between Target board and emulator board, stacking TQSOCKET-N type to create the distance.
(See F)
(Stacking Height=20.2 mm)

Fig-7

F. The example of TQSOCKET stacking. One TQSOCKET base thickness is 3.2 mm.


Fig-8

a: TQPACK   **b:** TQSOCKET-G type   **c:** TQSOCKET-F type   **d:** TQSOCKET-P type
e: Emulator Board (PWB)   **s:** TQSOCKET-N type   **t:** Hexagon Socket Set Screw   **u:** Screw

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III TQPACK assembly onto PWB

*Mounting by mounter

Step 1   Use (hexagon) wrench (M2 : 0.89mm, M3 : 1.5mm) for fastening TQPACK with Hexagon Set Screw**.**

Step 2   Spread paste on soldering pads.

Step 3   Put the flux on the soldering area on leads of TQPACK. (on the connector lead)

Step 4   Mounting by mounter**.**

Step 5   Reflow in heat chamber at 240 °C for 20 seconds.
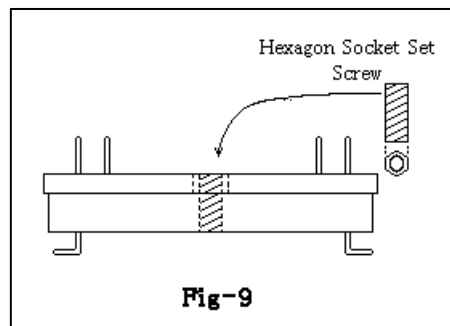
*Screw holes on the Main board (2.6mm or 3.6mm)

Screw head and screw holes on the board are shown under. The location must be the wiring restriction area.
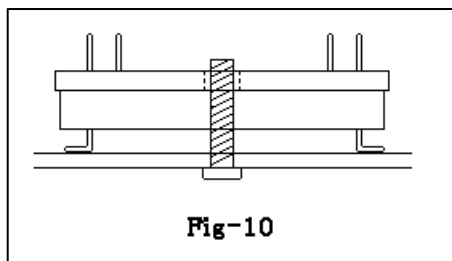

TQPACK	Screw Size	Hole Diameter	Runner Restriction Area
44-184 pins	M2	ø2.4mm	ø3.6mm
204-pins	M3	ø3.4mm	ø5.6mm

If the thickness of PWB is 1.6 mm, M2x10 mm or M3x10 mm can be used.

*Manual Soldering

Step 1   Put the cream solder on the IC package solder lands of PWB. Spread flux on pins of TQPACK.

Step 2   Put epoxy glue or alon alpha on four (4) stand off on the bottom of TQPACK, and then fix the stand off on a target board.
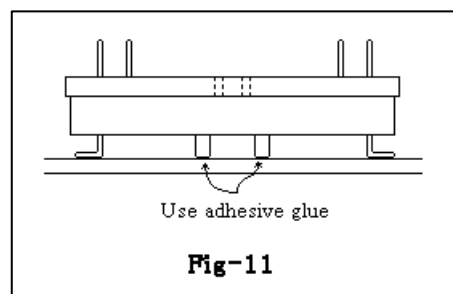
Step 3   Solder on PWB by hand, or in reflow chamber or hot air.

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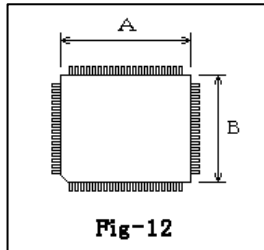# IV TQPACK PWB Design

TQPACK leads and IC Package Sizes

Fig-12

IC Package Size are shown in A and B and the TQPACK leads dimensions should be;

* A mm + 2 mm
* B mm + 2 mm

The above dimensions are standards. Please refer to the list of TQPACK products range. The exceptional lead dimensions are also shown in the list.

Important Note in PWB Designing

Dimensions C, D and e as listed in the table-(a) are recommended foot pattern sizes on PWB for mounting TQPACK. But please confirm the IC package leads dimensions whether the dimension are fit for TQPACK before soldering.
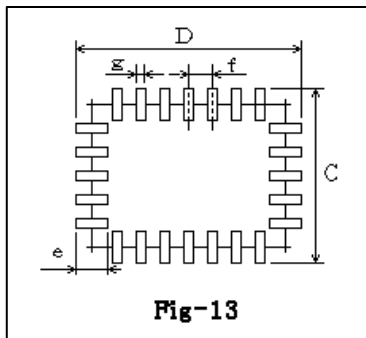

Fig-13

(a)

f : IC Lead Pitch	g : Pad Width
1.0	0.6
0.8	0.5
0.65	0.35
0.635	0.35
0.5	0.25

V TQSOCKET PWB Design   - 0.65 mm pitch
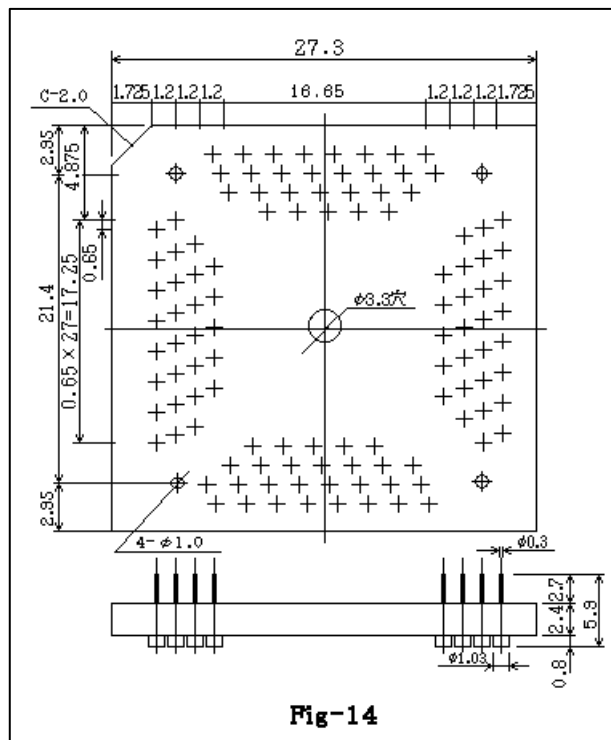
Fig-14

(TQSOCKET112SBF)

Step 1 As pin diameter connecting to TQSOCKET board is 0.3mm. Through hole diameter should be 0.4mm or more.
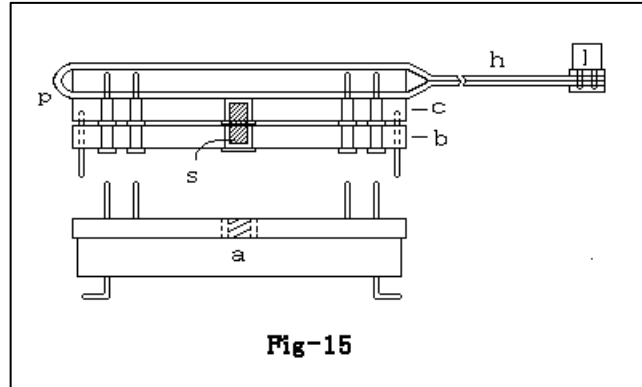
Step 2 Distance between pins is at least 1.36mm. (In the case of IC pin pitch 0.50mm, the distance is 1.30mm.)

Step 3 Provide runner restriction space.

Step 4 Four (4) of 1.0mm non through hole are required at each corner for TQSOCKET-G type, -W type and -P type.

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VI TQPACK Application Example

*Connecting to FPC

Fig-15

*Connecting to PWB

(1) Connector Type

Fig-16
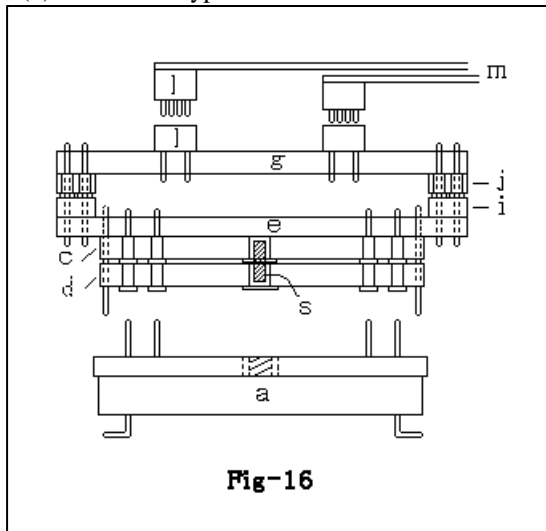
(2) Device Mount Type

Fig-17
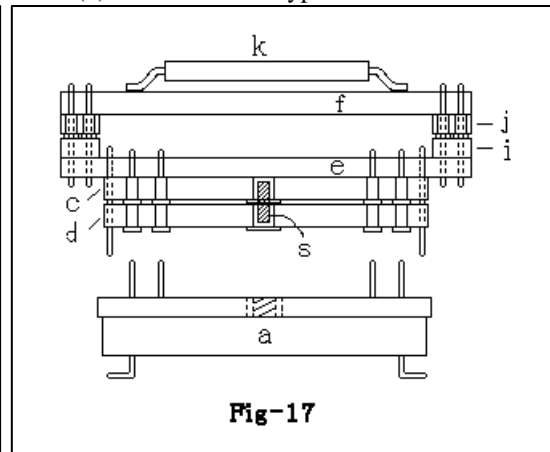
*ICE cable mounting to the board.

Fig-18
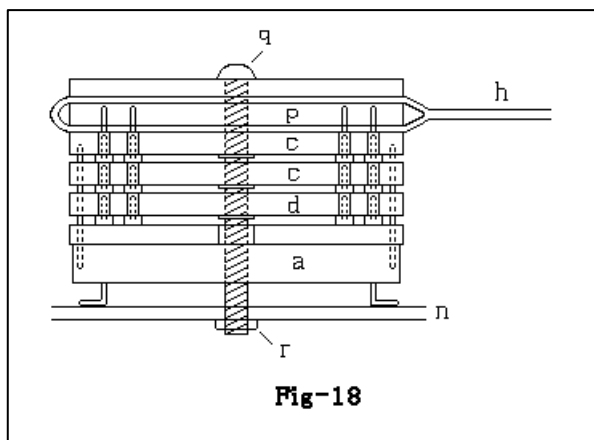
a : TQPACK
b : TQSOCKET-G type
c : TQSOCKET-F type
d : TQSOCKET-P type
e : Conversion PWB
f : IC Mount PWB
g : Convert PWB for Flex Cable
h : Flex Cable
i : Connector (Socket)
j : Connector (Plug)
k : IC
l : Connector
m : Ribbon Cable
n : Target PWB
p : Spacer
q : M=2mm Screw (or 3mm Screw)
r : M=2mm Nut (or 3mm Nut)

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VII   Technical Data and Specifications of TQPACK/TQSOCKET

*TQPACK Specifications

1. Materials
   1-1. Contact :
        Alloy (Fe-Ni)
        Under plating : Nickel
        Plating : Gold
   1-2. Mold :
        Liquid Crystal Polymer (Filled glass fiber : UL94V-0)

2. Electrical Characteristics
   2-1. Contact Resistance :
        70mΩ/pin (Coupled with TQSOCKET)
   2-2. Voltage with stand :
        100V AC for one minutes
   2-3. Insulation Resistance :
        500MΩ min or more at 100V DC
   2-4. Rating Current :
        0.5A/pin max
   2-5. Operating Temperature :
        -25°C to +85°C

3. Mating with TQSOCKET
   3-1. Insertion and Withdrawal Force :
        Withdrawal ; 60g/pin or less
        Insertion ; 10g/pin or more
   3-2. Contact Life : 100 times

4. LEAD FREE Soldering
   4-1. Soldering Temperature :
      Reflow Soldering   : 260 °C for 10 seconds
      Manual Soldering   : 350 °C for 5 seconds (1 pin)
         * TQPACK is in compliance with ROHS.

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*TQSOCKET Specifications

1. Materials
   1-1. Contact :
        Alloy (Be-Cu)
        Under plating : Nickel
        Plating : Gold
   1-2. Sleeve :
        Brass
        Under plating : Nickel
        Plating : Gold
   1-3. Insulator :
        Glass Epoxy Laminate (UL94V-0)

2. LEAD FREE Soldering
    2-1. Soldering Temperature :
      Reflow Soldering   : 260 ℃ for 10 seconds
      Manual Soldering   : 350 ℃ for 5 seconds (1 pin)
       * TQSOCKET is in compliance with ROHS.

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*TQPACK-TQSOCKET Resistance Test Data

[Unit : mΩ]

		Condition	150°C			60°C 90% Rh		
		Measurement Value	X	X Max.	X Min.	X	X Max.	X Min.
Test Hours	*1	Initial	60.8	68.0	52.0	61.0	68.0	53.0
		240H	60.2	66.0	52.0	62.7	69.0	56.0
		360H	63.3	68.0	55.0	63.8	71.0	54.0
	*2	Initial	55.5	62.0	51.0	55.8	63.0	50.0
		360H	58.6	63.0	51.0	59.0	66.0	51.0

X = Average Value

Combinations : TQPACK112SB + TQSOCKET112SBG + TQSOCKET112SBF   (*1)
TQPACK112SB + TQSOCKET112SBG   (*2)

Fig-19

a: TQPACK112SB   b: TQSOCKET112SBG   c: TQSOCKET112SBF
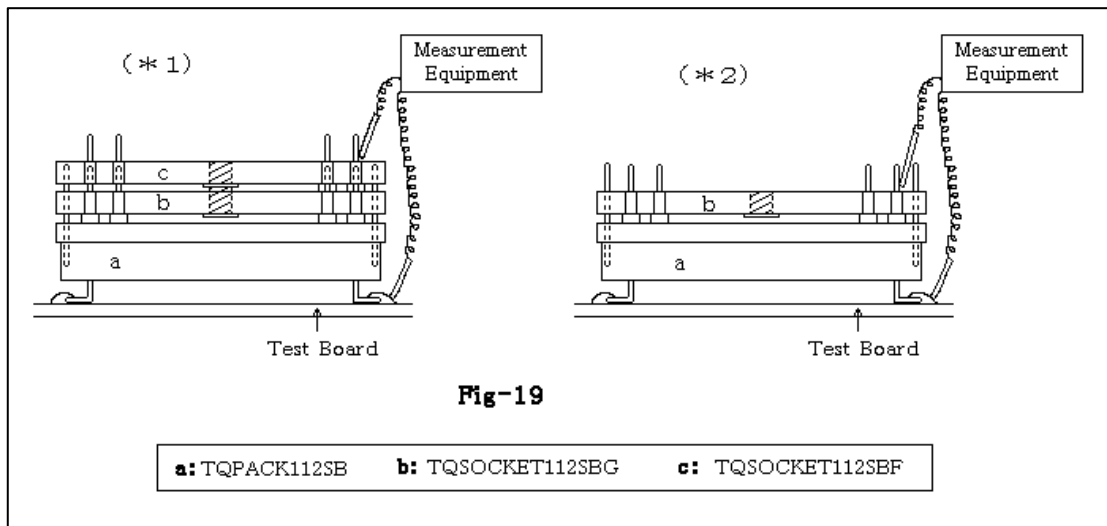
Test Points : n = 16 (lines) x 3 (connectors)
Measurement Equipment : HP 3446A digital multimeter

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*TQPACK-TQSOCKET-Insertion and Withdrawal Test

| Test Cycle	Insertion Force (10g Min./pin)		Withdrawal Force (60g Max./pin)		Contact Resistance (70mΩ Max./pin)	
	X(g)	σn	X(g)	σn	X(mΩ)	σn
1	51.6	5.0	39.4	3.9	49.2	1.2
10	36.8	6.6	29.0	5.3	51.4	1.5
50	33.5	6.1	25.8	4.1	54.9	2.1
100	30.8	6.0	24.2	3.7	55.7	1.6
150	29.2	5.0	23.0	2.5	56.6	1.3
200	27.4	4.5	21.6	2.9	57.0	1.3

X = Average Value

σn = Standard Division

Number of Sample   n = 20 pcs

Measurement Equipment : Force ; push-pull gage

Contact Resistance ; milli-ohm meter

*TQPACK-TQSOCKET Durability of Contacts

Fig-20
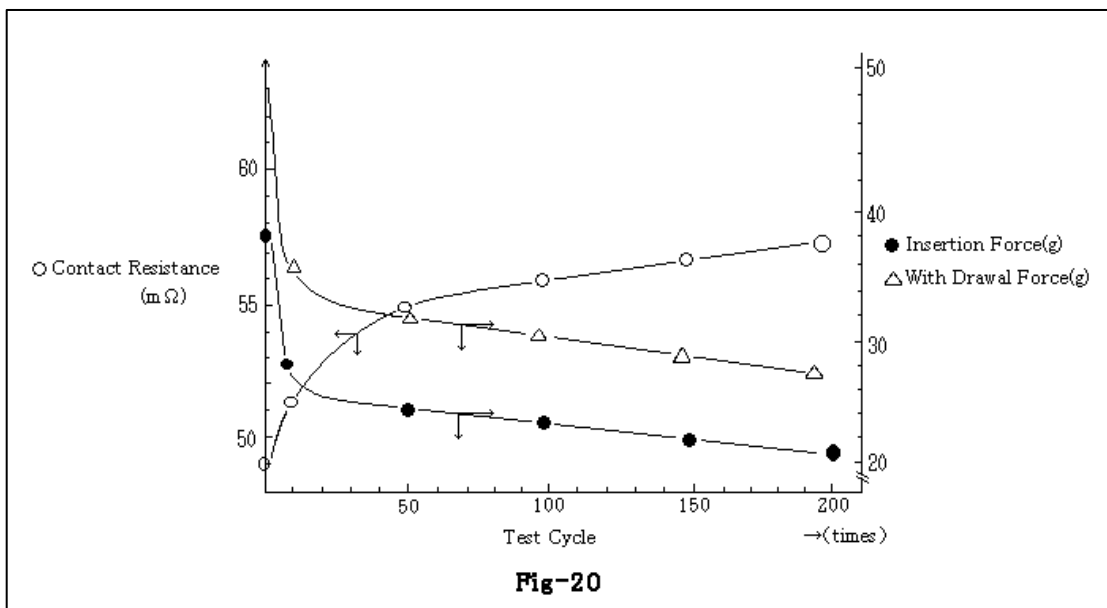
VIII Important Notes for TQPACK

1. Connector pins of TQPACK and TQSOCKT are extremely fragile.   Handle them carefully.

2. When TQPACK is removed from packing box, press the center of TQPACK lightly, and remove the packing material with the tool of pointy end.   Then take the TQPACK out of the box.   Leads are get damaged by the packing material easily if you take the TQPACK roughly.

3. The simplest soldering procedure is to apply cream solder paste on IC pad on the PWB and put a glue on the four (4) projected points of TQPACK for temporarily mounting.
Then have it go through the reflow chamber for soldering or have it solder manually.   Important part of the procedure is to mount the TQPACK leads to IC pad precisely. (It is extremely difficult to remove the TQPACK and soldering again.)   Reflow condition is 260°C, within 10 seconds for lead free soldering.

4. Assure that there is no bent pins on both TQPACK and TQSOCKET. TQSOCKET guide pins and TQPACK guide holes must be aligned slowly and then mate them carefully.   When it is removed, move vertically from the surface of PWB.
When TQPACK removal is difficult, then use small keystone screw driver and gradually loose mating from 4 corners

5. Pay extra attention to prevent any force or shock on the ICE cables, ICE extension connectors or both connectors.

6. Keep the TQSOCKET in the box with packing material for carrying or storage.

7. TQSOCKET mating to TQPACK must be a guide pin type. Header pins of TQPACK might touch to adjacent pins of TQSOCKET, if a TQSOCKET without guide pins (-N or -F type) is used.

8. When TQSOCKET is assembled on TQPACK with a screw of enameled, do not extract TQSOCKET since the fastener of TQPACK would be damaged.

9. TQPACK and TQSOCKET are in compliance with RoHS.

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IX TQPACK Individual Packing Box

Fig-21
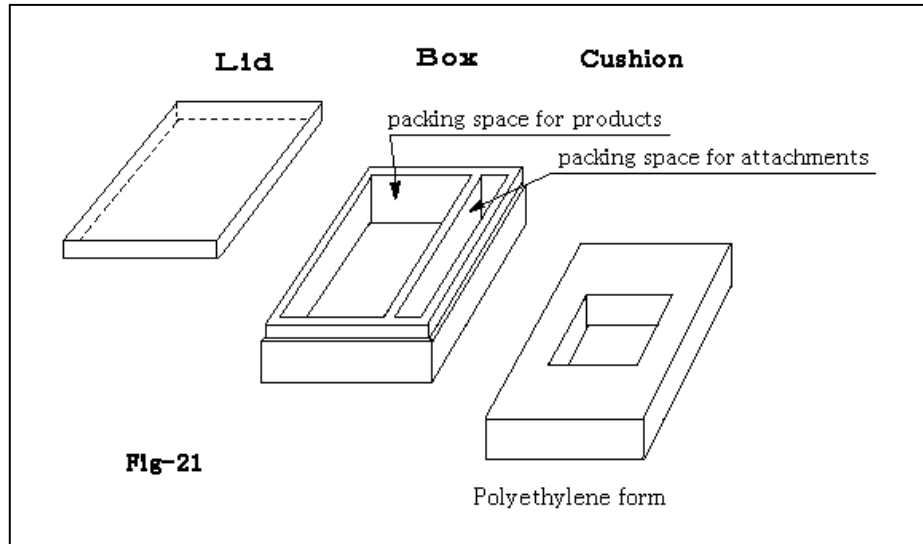
*Box Dimensions

External (42 x 60 x 18 mm)
Internal (37 x 56 x 13 mm)
Material (Polystyrene)

Note **:** Box is made of the biodegradable plastic. Please stock them under sun light free room.