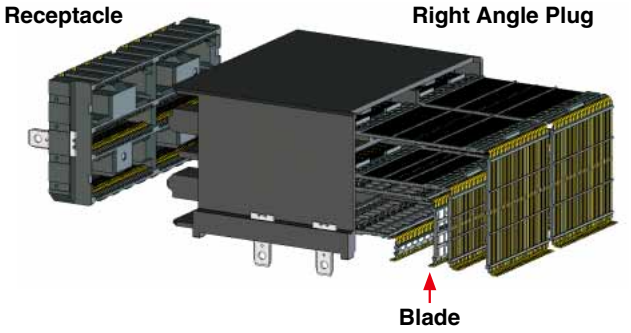
32+Gbps 0.5mm pitch Board to Board Connector

IT9 Series





■Mechanical features

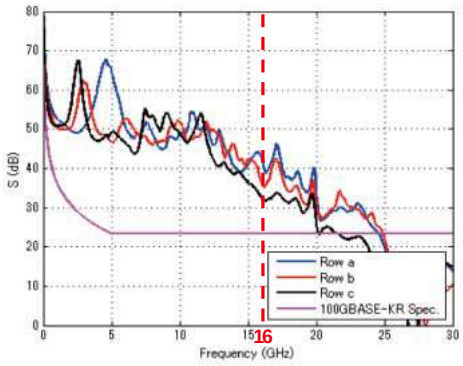
- 3row or 4row 0.5mm pitch SMT array
- Number of contacts : 84pos, 152pos, 224pos.
- Mating length : 2.0mm
- High density
  -50 Differential pairs / linear inch (224pos.)
- Blade variation
  -Differential signal blade (GSSGSSG…)
  -Power & low signal blade (SSSS…)
- Large mating guide ±1.6mm
- Multiple connectors are allowed on the same PCB
- Robustness (Large retention pegs)

■Signal integrity features

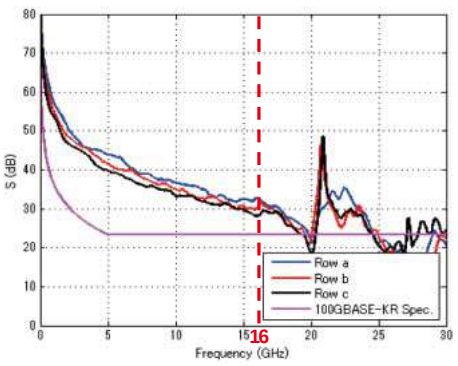
●Insertion Loss-to-Crosstalk-Ratio (ICR)

The insertion loss-to-crosstalk ratio (ICR) with 5-aggressor differential FEXT meets the IEEE802.3ap specification for 32Gbps with plenty of margins.

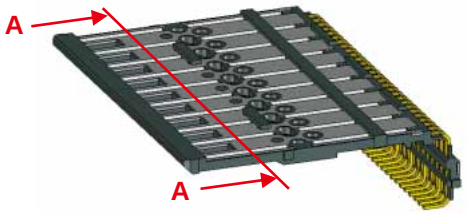
ICR_NEXT



ICR_FEXT



■Transmission blade variation



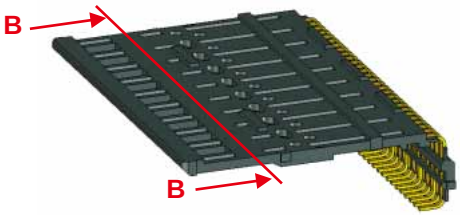
Cross section A-A

Ground Plate

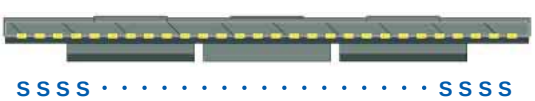


GSSG・・・・・・・・・・・・・・・・・GSSG

Differential Signal Blade



Cross section B-B



SSSS・・・・・・・・・・・・・・・・・SSSS

Power and Low Speed Signal Blade

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■Product Specifications

Rating	Current Rating : 0.3A (Note 3) (Differential signal blade) 0.5A (Power and low speed signal blade) Voltage Rating : AC/DC 50V	Operating Temperature Range : -55～+85˚C (Note 1) Storage Temperature Range : -10～+60˚C (Note 2)

Item	Specification	Conditions
1. Contact Resistance	Row a : 60mΩ max Row b : 70mΩ max Row c : 80mΩ max Row d : 90mΩ max	100mA
2. Insulation Resistance	100MΩ min	100V DC
3. Voltage Proof	No flashover or insulation breakdown	150V AC / 1min
4. Durabirity (mating/unmating)	Contact resistance change : 10mΩ or less No damage, crack or looseness of parts	100 cycles
5. Vibration	No electrical discontinuity of 1μs or more No damage, crack or looseness of parts	Frequency : 20 to 500Hz, Power spectral density : 0.02G²/Hz for 60 min in 3 directions
6. Thermal Shock	Contact resistance change : 10mΩ or less No damage, crack or looseness of parts	Temperature -55˚C→20～35˚C→85˚C→20～35˚C Time(min) 30 → 5MAX → 30 → 5MAX Under 10 cycles
7. Cyclic Temperature and Humidity	Contact resistance change : 10mΩ or less No damage, crack or looseness of parts	25˚C, 90-95% RH : 120 min Dwell time ↑ ↓ 120 min Ramp time 65˚C, 90-95% RH : 120 min Dwell time Under 60 cycles
8. Dry Heat	Contact resistance change : 10mΩ or less No damage, crack or looseness of parts	105˚C, 300 hours
9. Dust	Contact resistance change : 10mΩ or less	Unmated 1 hour
10. Mixed Flow Gas	Contact resistance change : 10mΩ or less No heavy corrosions	30˚C 70% RH, Mated 10days Cl_2 : 10ppb, NO_2 : 200ppb, H_2S : 10ppb, SO_2 : 100ppb

Note 1 : Includes temperature rise caused by current flow.
Note 2 : “Storage” means a long-term storage state for the unused product before assembly to PCB.
Note 3 : The rated current applies to per contact.
Note 4 : Information contained in this catalog represents general requirements for this Series. Contact us for the drawings and specifications for a specific part number shown.

■Materials / Finish

●Receptacle

Part	Material	Finish & Remarks
Housing	LCP	Black, UL94V-0
Contact	Copper alloy	Contact area : Gold Mount area : Gold
Retention peg	Copper alloy	Tin plating

●Right Angle Plug

Part	Material	Finish & Remarks
Housing	LCP	Black, UL94V-0
Contact	Copper alloy	Contact area : Gold Mount area : Gold
Blade	LCP	Black, UL94V-0
Ground plate	Stainless steel	————
Retention peg	Copper alloy	Tin plating

■Product Number Structure

Refer to the chart below when determining the product specifications from the product number.
Please select from the product numbers listed in this catalog when placing orders.

●Straight Receptacle

IT9M* - *** S - 0.5 SV * (**)
❶ ❷ ❸ ❹ ❺ ❻ ❼

●Right Angle Plug

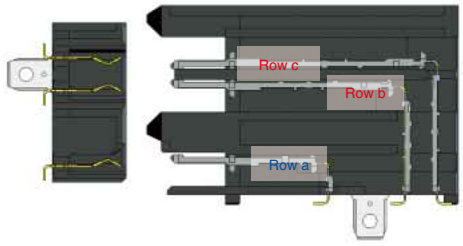
IT9M* - *** P - 0.5 SH * (**)
❶ ❷ ❸ ❹ ❺ ❻ ❼

❶ Series Name : IT9M2, IT9M3
❷ Number of Positions : 84, 224 : IT9M2 152 : IT9M3
❸ Connector Type S : Receptacle P : Plug
❹ Contact Pitch : 0.5 mm
❺ Contact Type SV : Straight Type SH : Right Angle Type
❻ Row Count 3 : 3Rows 4 : 4Rows
❼ Plating Specification Blank : Contact Area : Gold(0.76μm)+Ni(3μm)

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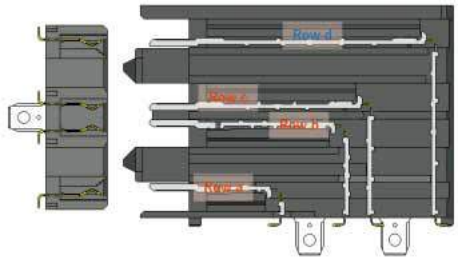
■Pin Assignment

84pos. : IT9M2-84P-0.5SH3 – IT9M2-84S-0.5SV3



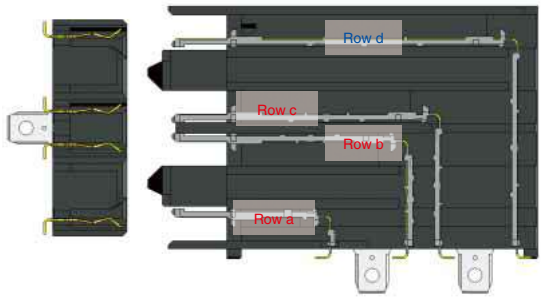
Number of Contacts	Column	Pin Number																											
		28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
84	Row c	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	Row b	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	Row a	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
	Row c : For High Speed Signal Row b : For High Speed Signal Row a : For Power and Low Speed Signal															S : Differential Signal Pin (36 Pins / 18 Pairs) G : Dedicated Ground Pin (20 Pins) U : Universal Pin (28 Pins)												

152pos. : IT9M3-152P-0.5SH4 – IT9M3-152S-0.5SV4



Number of Contacts	Column	Pin Number																											
																				10	9	8	7	6	5	4	3	2	1
152	Row d																			U	U	U	U	U	U	U	U	U	U
	Row c																			U	U	U	U	U	U	U	U	U	U
	Row b																			U	U	U	U	U	U	U	U	U	U
	Row a																			U	U	U	U	U	U	U	U	U	U
	Column	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11
	Row d	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	Row c	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	Row b	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	Row a	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	1 to 10 Pin : For Power and Low Speed Signal 11 to 38 Pin : For High Speed Signal															S : Differential Signal Pin (72 Pins / 36 Pairs) G : Dedicated Ground Pin (40 Pins) U : Universal Pin (40 Pins)												

224pos. : IT9M2-224P-0.5SH4 – IT9M2-224S-0.5SV4

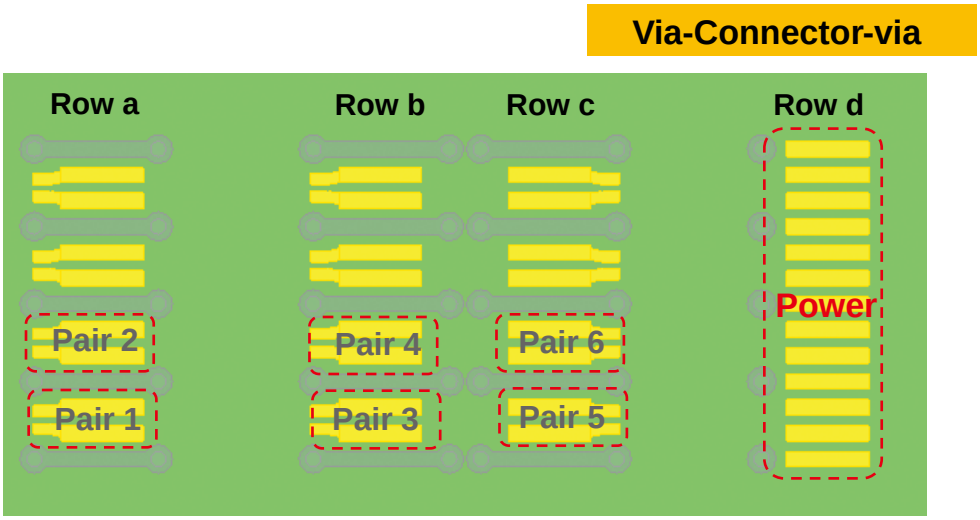


Number of Contacts	Column	Pin Number																											
		28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
224	Row d	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
	Row c	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	Row b	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	Row a	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	Column	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29
	Row d	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
	Row c	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	Row b	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	Row a	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G	S	S	G
	Row d : For Power and Low Speed Signal Row c : For High Speed Signal Row b : For High Speed Signal Row a : For High Speed Signal															S : Differential Signal Pin (108 Pins / 54 Pairs) G : Dedicated Ground Pin (60 Pins) U : Universal Pin (56 Pins)												

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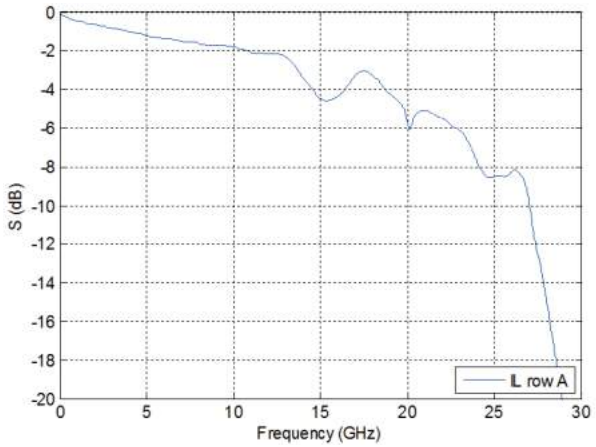
■Signal Integrity

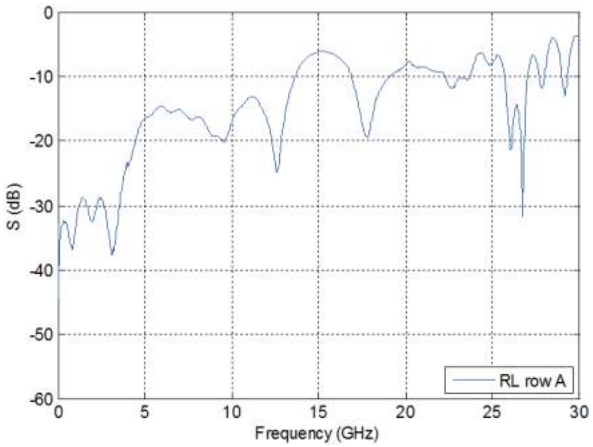
●Pin assignment



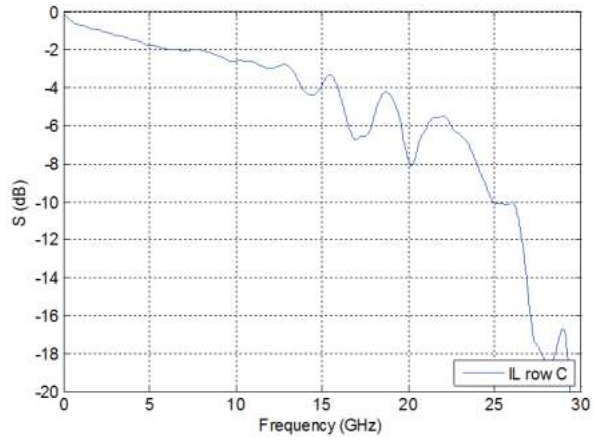
●Insertion Loss and Return Loss

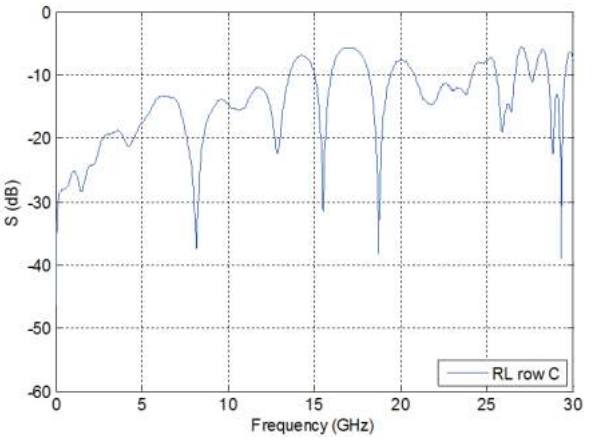
Row a





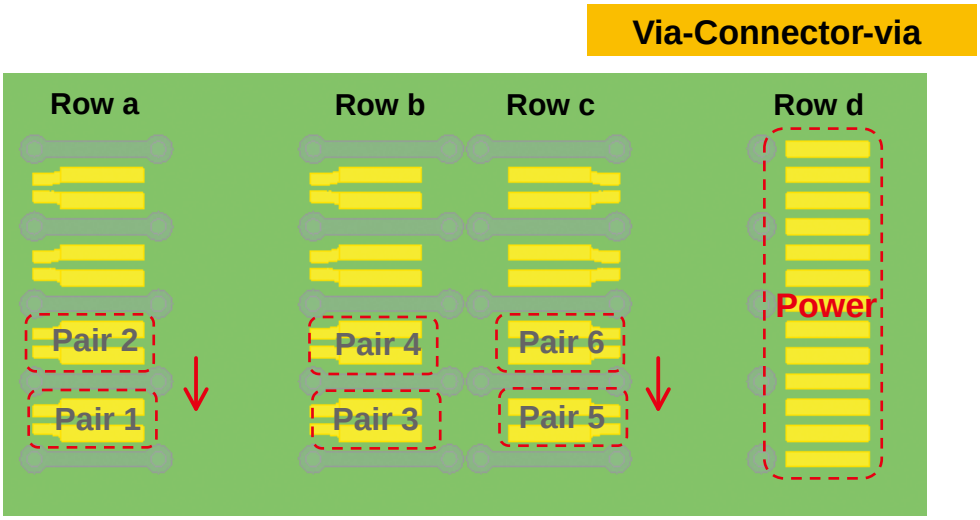
Row c





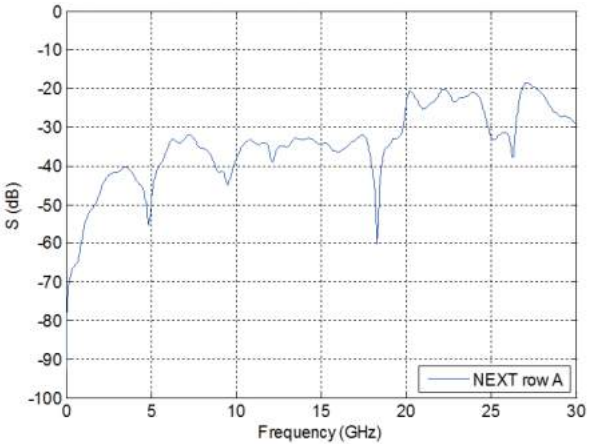
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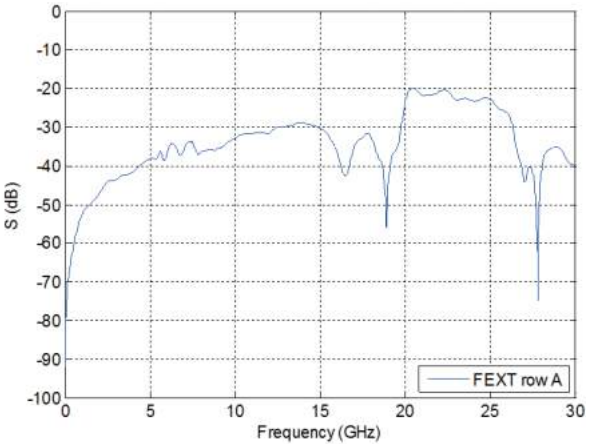
●Pin assignment



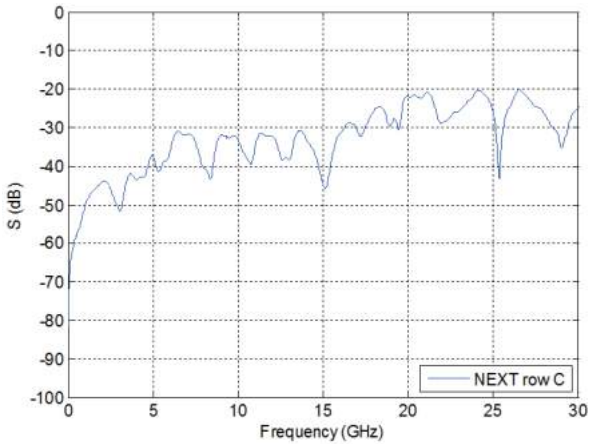
●Crosstalk

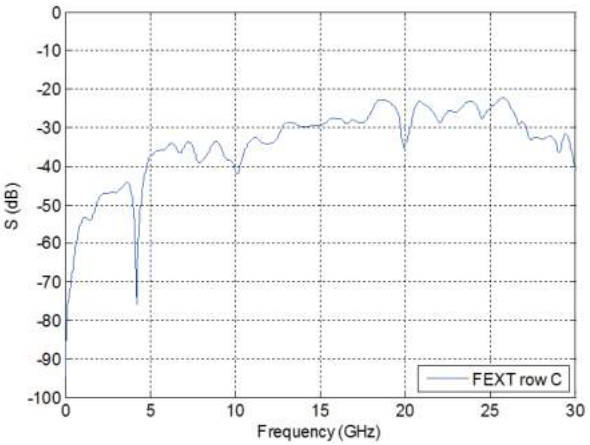
Row a





Row c

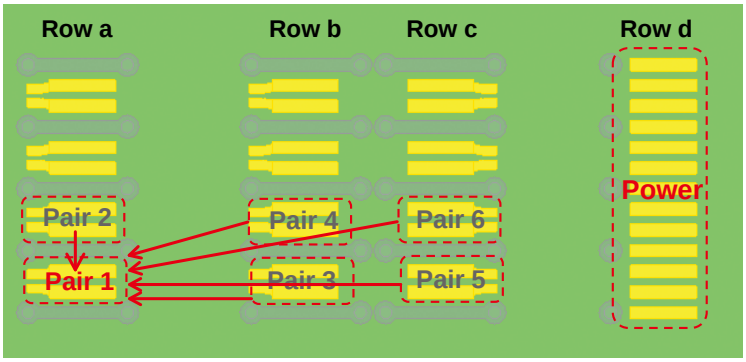


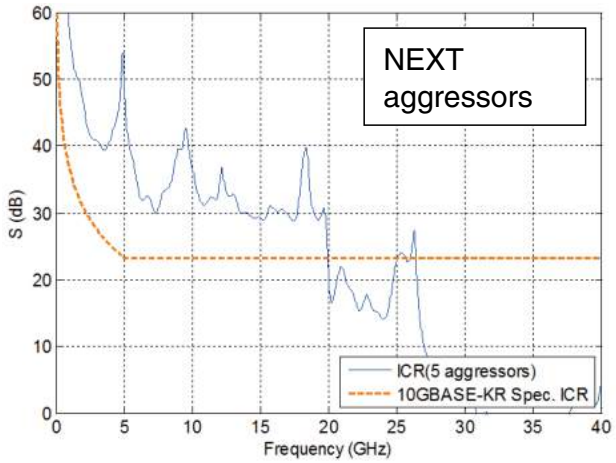


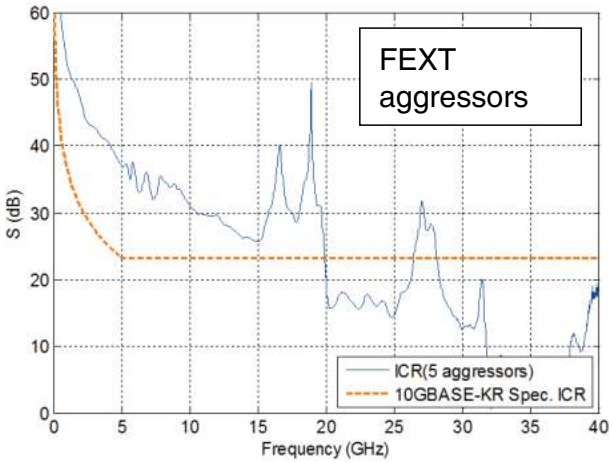
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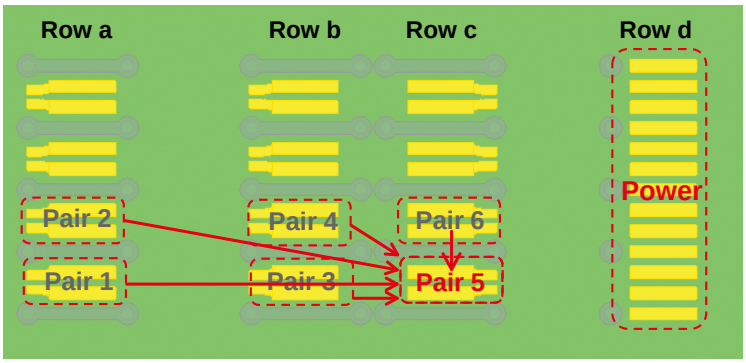
●Insertion-loss-to-crosstalk ratio (ICR)

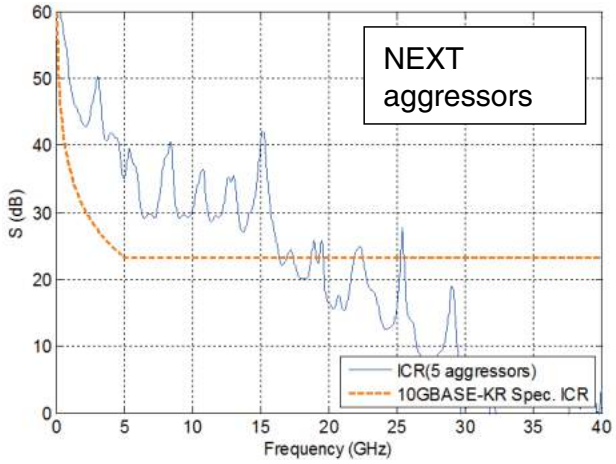
The insertion-loss-to-crosstalk ratio (ICR) with 5-aggressor meets the extrapolated IEEE 802.3ap specification to 16GHz with plenty of margins.

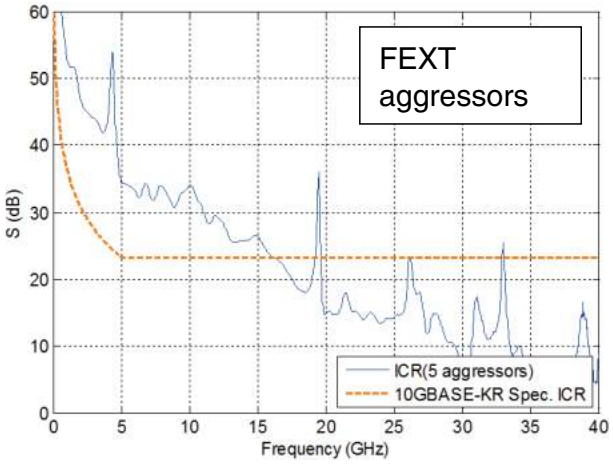








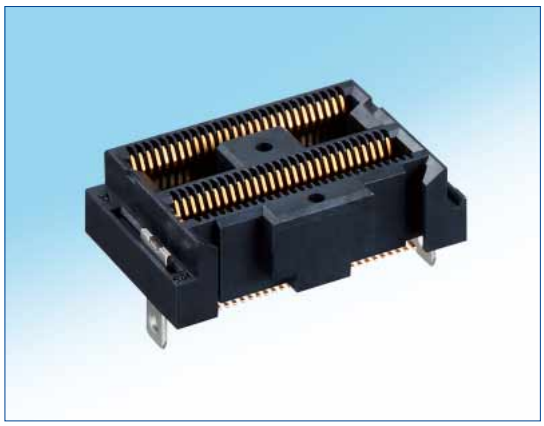


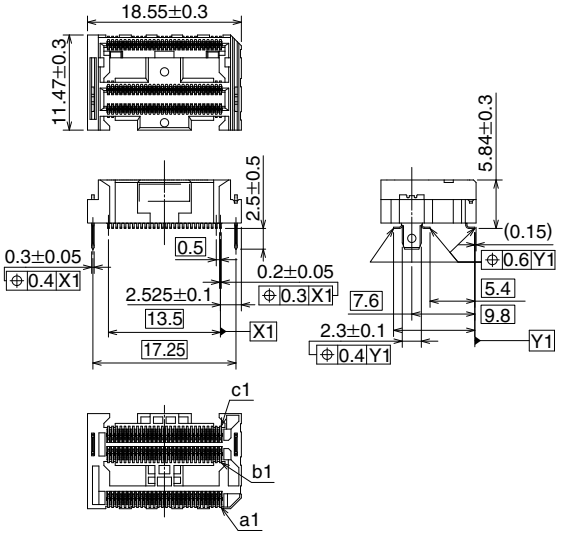


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■Receptacle

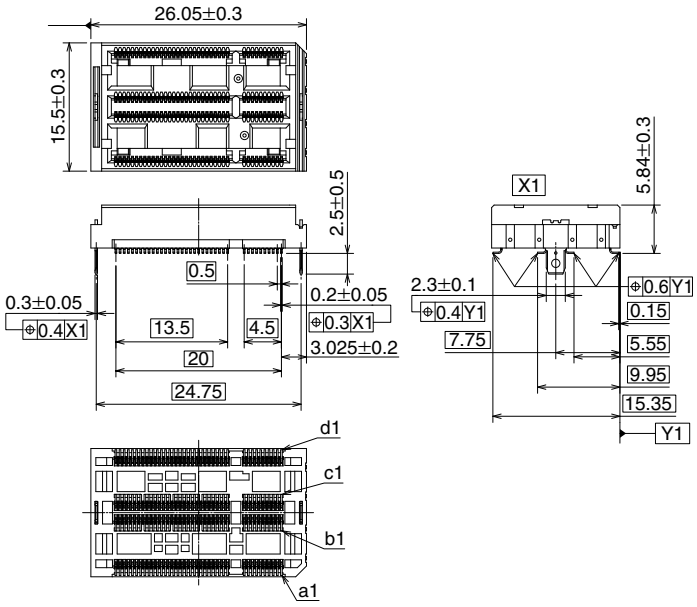
●3row type : IT9M2-84S-0.5SV3



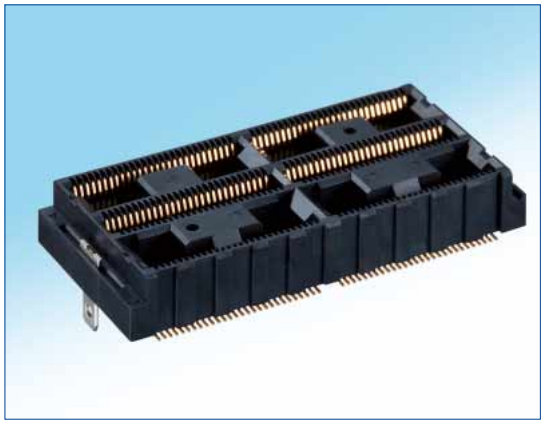


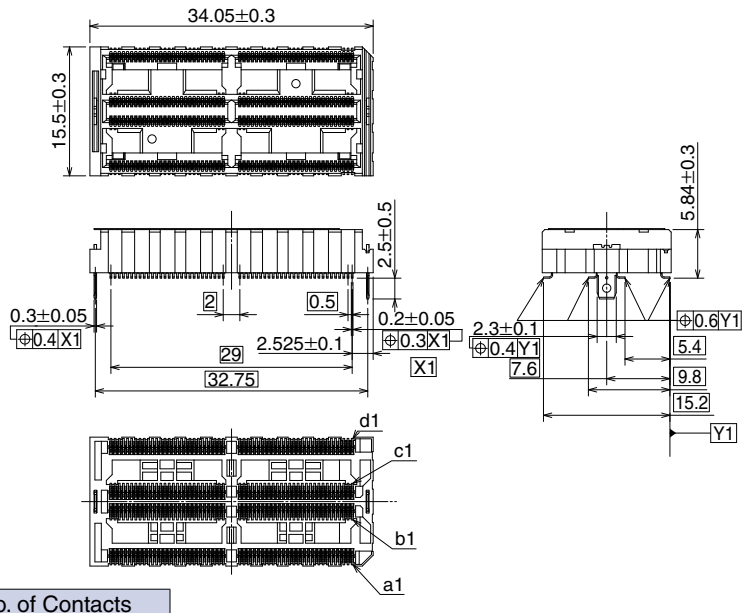
●4row type : IT9M3-152S-0.5SV4





●4row type : IT9M2-224S-0.5SV4





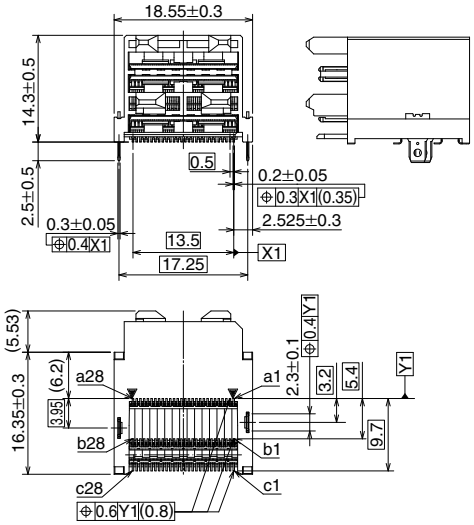
Part No.	HRS No.	No. of Contacts
IT9M2-84S-0.5SV3	636-1610-0	84
IT9M3-152S-0.5SV4	636-1801-0	152
IT9M2-224S-0.5SV4	636-1611-0	224

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■Right angle plug

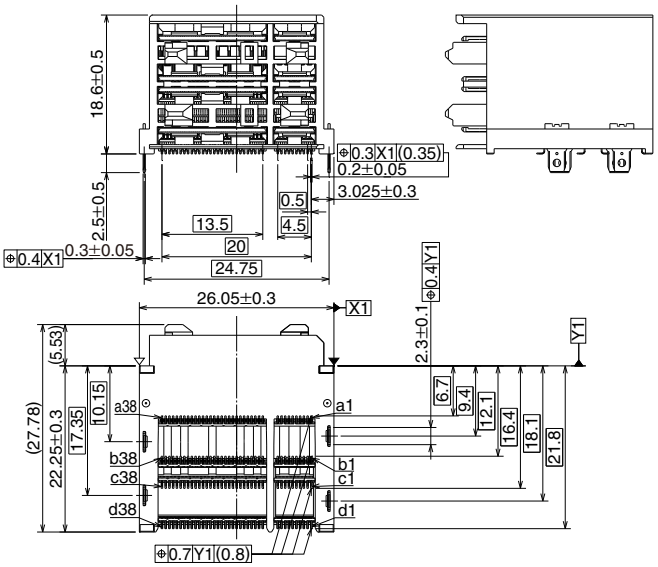
●3row type : IT9M2-84P-0.5SH3





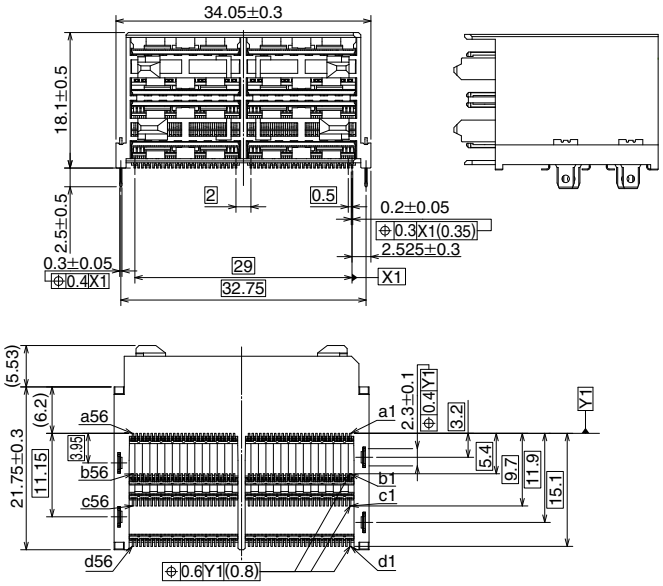
●4row type : IT9M3-152P-0.5SH4





●4row type : IT9M2-224P-0.5SH4





Part No.	HRS No.	No. of Contacts
IT9M2-84P-0.5SH3	636-1606-0	84
IT9M3-152P-0.5SH4	636-1800-0	152
IT9M2-224P-0.5SH4	636-1607-0	224

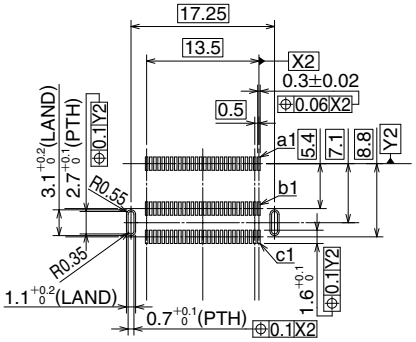
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■Recommended PCB Mouting Pattern

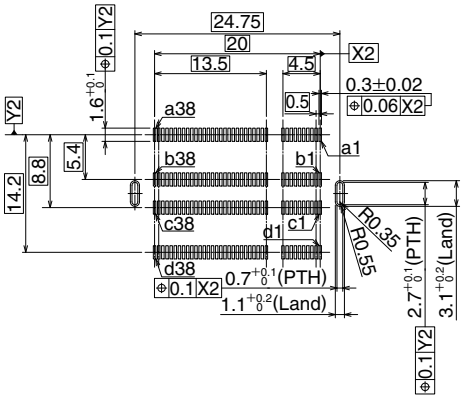
(Stencil thickness : t=0.13mm)

●Receptacle

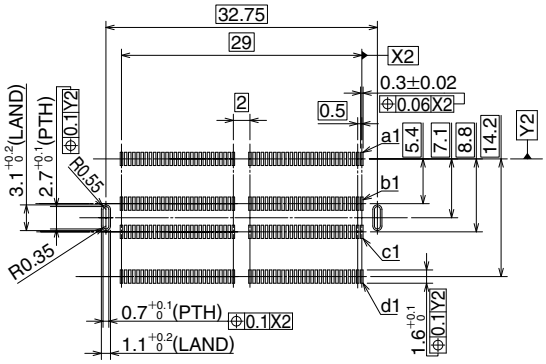
IT9M2-84S-0.5SV3



IT9M3-152S-0.5SV4

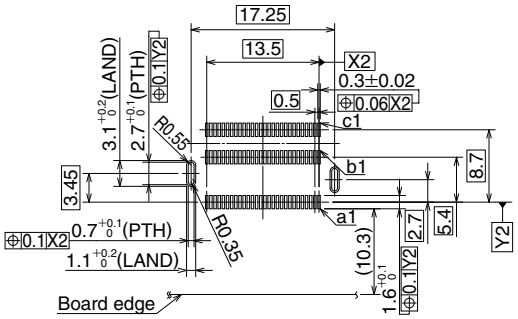


IT9M2-224S-0.5SV4

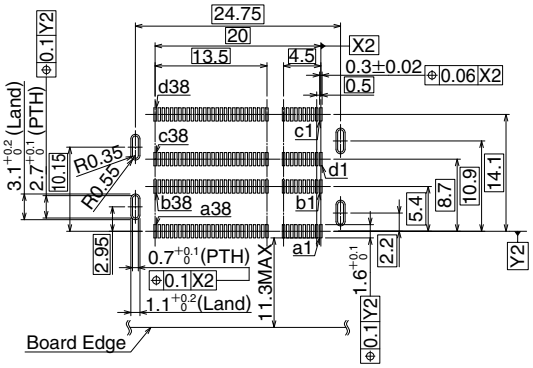


●Right angle plug

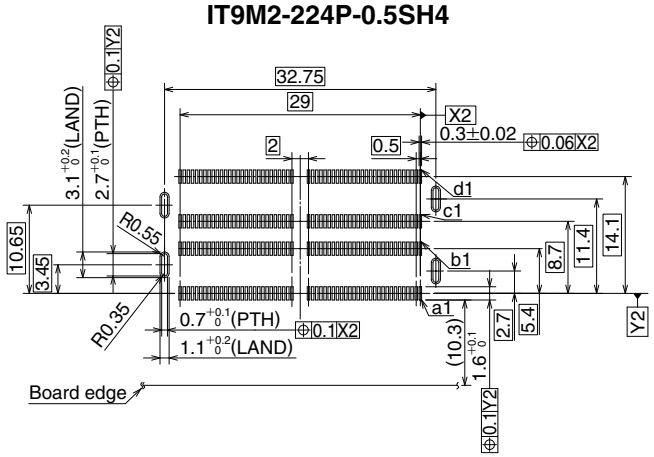
IT9M2-84P-0.5SH3



IT9M3-152P-0.5SH4



IT9M2-224P-0.5SH4

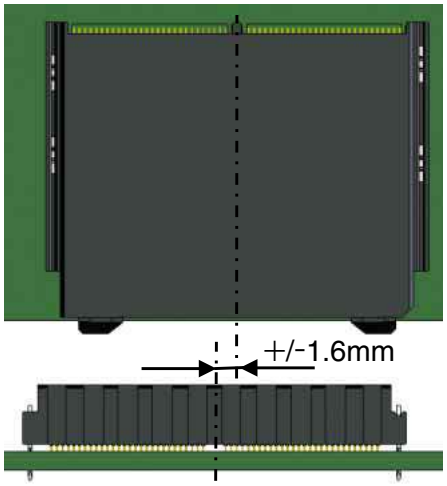


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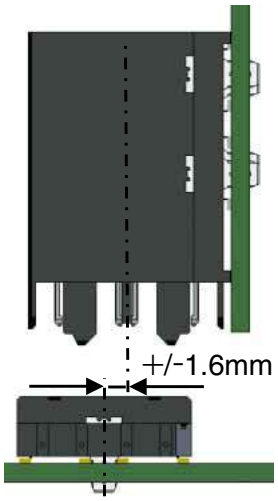
■Processing recommendations

●Mating Alignment Requirements

Maximum mating guidance is up to ±1.6mm in both longitudinal and lateral directions.



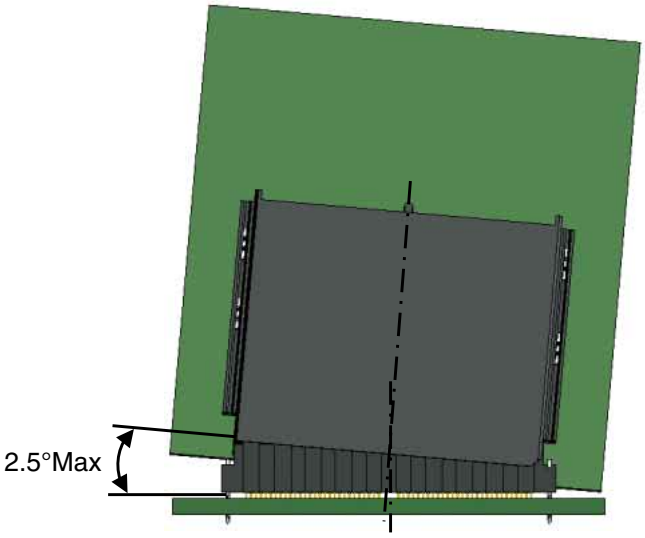
Longitudinal



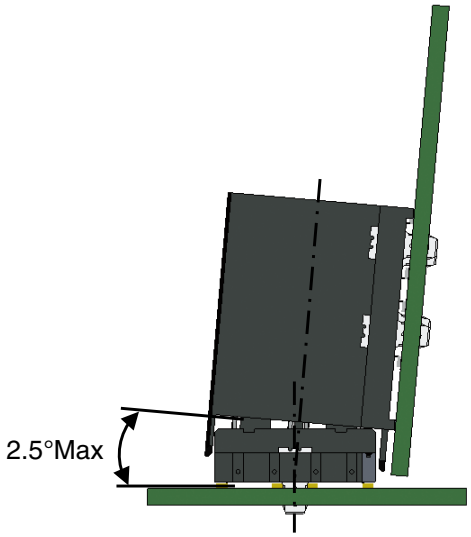
Lateral

These values do not include the influence of misalignment in other axis nor rotation / inclination in the same time, except for the misalignment in the single axis shown in each figure.

●Mating Angle Requirements



Longitudinal



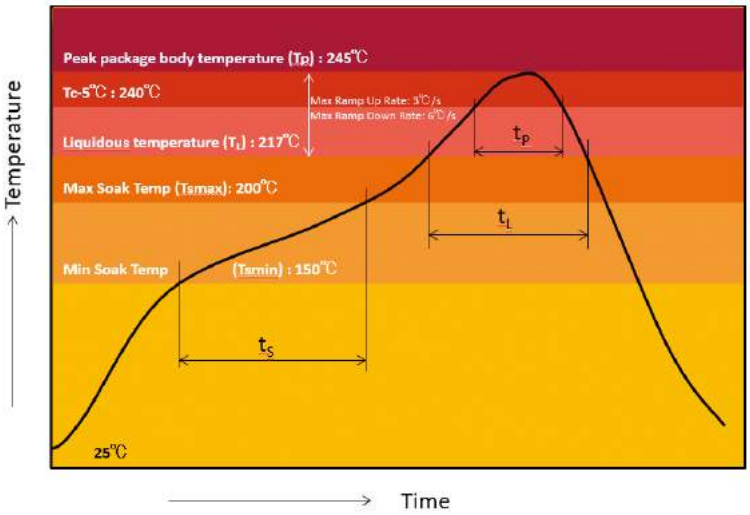
Lateral

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■Mounting Temperature Profile (Reference)

Profile Feature	Condition	Note
Preheat/Soak Temperature Min (Tsmin) Temperature Max (Tsmax) Time (ts) from (Tsmin to Tsmax)	150˚C 200˚C 60-120 seconds	Soak requirements should be determined by board design, oven capability, and paste activation requirements. Caution- “oversoaking” may exhaust flux and affect soldering.
Ramp-up rate (TL to Tp)	3˚C/second max.	Other components may limit ramp rate to 2˚C/sec.
Liquidous temperature (TL) Time (tL) maintained above TL	217˚C 60-150 seconds	Shorter t_L may require higher peak temperature.
Peak package body temperature (Tp)	245˚Cmax.	Cooler peak temperatures may require longer t_L. For users Tp must not exceed the classification temp (TC) of 250˚C.
Time (tp)* within 5˚C of the specified classification temperature (Tc)	30 seconds max.	
Ramp-down rate (Tp to TL)	6˚C/second max.	
Package Body Exposure Limit at Maximum Temperature	5 seconds	Adjust profile if maximum exposure limits approached or exceeded.

All temperatures refer to the center of the connector body, measured on the connector body surface that is facing up during assembly reflow. Reflow profiles in this document are based according to IPC/JEDEC J-STD-020D.1 and are for preconditioning. Actual board assembly profiles should be developed based on specific process needs and board designs and should not exceed the parameters in the table above.



Different solder pastes have different thermal performance characteristics. Consult with paste manufacturer for optimum profile setting.

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MEMO :

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https://www.hirose.com/

The characteristics and the specifications contained herein are for reference purpose. Please refer to the latest customer drawings prior to use.
The contents of this catalog are current as of date of 12/2022. Contents are subject to change without notice for the purpose of improvements.