DIN Signal male connector straight - THR (CTI>400)

General information

Design	IEC 60603-2	types: Q, 2Q, 3Q, R, 2R, 3R, R (HE11) male
No. of contacts	max. 96	
Contact spacing	2,54mm	
Test voltage	1000V	
Contact resistance	≤ 15mOhm	
Insulation resistance	≥ 10^{12}Ohm	
Working current	max. 2A at 20°C (see derating diagram)	
Temperature range	-55°C ... +125°C max. 15s at 240°C for reflow soldering	
Termination technology	THR with solder pins, press-in	
Clearance & creepage distance	min. 1,2mm each	
Insertion and withdrawal force	20-pole ≤ 20N 30-pole ≤ 30N 32-pole ≤ 30N	48-pole ≤ 45N 64-pole ≤ 60N 96-pole ≤ 90N
Mating cycles	acc. to performance level, see table below	
UL file	E102079	
RoHS - compliant	Yes	
Leadfree	Yes	
Hot plugging	No	

Insulator material

Material	PCT (thermoplastics, glass fiber reinforcement 30%)
Colour	natural coloured, colour deviations and speckles permitted
UL classification	UL 94-V0
Material group acc. IEC 60664-1	II (400 ≤ CTI < 600)
NFF classification	I3, F3

Contact material

Contact material	Copper alloy
Plating termination zone	Sn over Ni for solder, Ni for press-in
Plating contact zone	acc. to performance level, see table below

performance level	mating cycles		plating contact zone
	acc. to IEC 60603-2	complementary acc. to IEC 60603-2	
1	*500*		*Au over PdNi over Ni*
2	*400*		*Au over PdNi over Ni*
3	*50*		*Au over PdNi over Ni*
NM30 (S4)		500	min. 0,76µm (30µinch) noble metal (alloy) over Ni
Au30		500	min. 0,76µm (30µinch) Au over Ni
Au50		500	min. 1,27µm (50µinch) Au over Ni

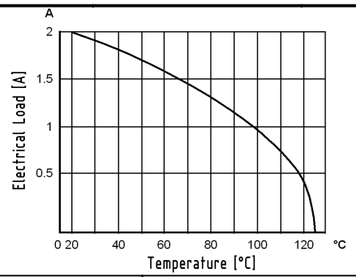
Standard plating options highlighted in *italic*, other plating options are available on request.

Derating diagram acc. to IEC 60512-5 (current carrying capacity)

The current carrying capacity is limited by maximum temperature of materials for inserts and contacts including terminals.

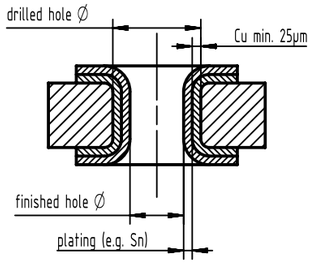
The current capacity curve is valid for continuous, non interrupted current loaded contacts of connectors when simultaneous power on all contacts is given, without exceeding the maximum temperature.

Control and test procedures according to DIN IEC 60512-5



Recommended configuration of plated through holes for press-in termination

In addition to the hot-air-level (HAL), other PCB surfaces are getting more important. Due to their different properties - such as mechanical strength and coefficient of friction - we recommend the following configuration of PCB through holes.



Tin plated PCB (HAL) acc. to EN 60352-5	Drilled hole Ø	1,15±0,025mm
	Sn	max. 15µm
	plated hole Ø	0,94 - 1,09mm
Chemical tin plated PCB	Drilled hole Ø	1,15±0,025mm
	Sn	min. 0,8µm
	plated hole Ø	1,00 - 1,10mm
Gold /Nickel plated PCB	Drilled hole Ø	1,15±0,025mm
	Ni	3 - 7µm
	Au	0,05 - 0,12µm
	plated hole Ø	1,00 - 1,10mm
Silver plated PCB	Drilled hole Ø	1,15±0,025mm
	Ag	0,1 - 0,3µm
	plated hole Ø	1,00 - 1,10mm
Copper plated PCB (OSP)	Drilled hole Ø	1,15±0,025mm
	plated hole Ø	1,00 - 1,10mm

Assembly instructions

It is highly recommended to use HARTING press-in tools to ensure a reliable press-in process.
Please refer to the catalogue for tools, machines and further information about the press-in process.

Soldering instructions

THR (Through Hole Reflow) connectors are designed to be used in a reflow oven together with other SMD (Surface Mount Device) components.
In this process, called as well „Pin in Hole Intrusive Reflow", the connectors are inserted into plated through holes in a comparable way to conventional component mounting.
All other components can be assembled on the pcb surface.

The length of the connector contacts should be such that they protrude by no more than 1.5 millimetres after insertion to the pcb. Each contact collects solder on its tip as it penetrates the solder paste in the hole. So if the contact is too long, this solder would no longer be able to reflow back into the plated through hole by capillary action during the soldering process, therefore the quality of the soldered connection would suffer as a result.

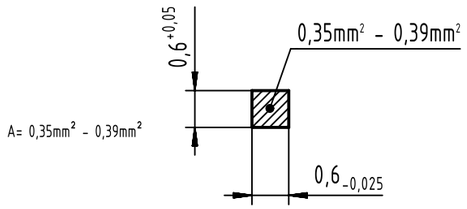
Quantity of solder paste

Before the components are assembled, solder paste must be applied to all the solder pads (for connecting surface-mount components) and the plated through holes.
To ensure that the plated through holes are completely filled, significantly more solder paste must be applied than traditional solder pads on the pcb surface.
There are numerous calculation methods available which are complicated to apply.
The following rule of thumb has proved valuable in practice:

VPaste = 2(VH - VP)
in which:
VPaste = Required volume of solder paste
VH = Volume of the plated through hole
VP = Volume of the connector termination in the hole

Comment: the multiplier "2" compensates for solder paste shrinkage during soldering. For this purpose, it was assumed that 50 % of the paste consists of the actual solder, the other 50 % being soldering aids.

Cross section of solder termination



All Dimensions in mm Original Size DIN A3	Scale 1:1	Free size tol.		Ref. Sub.	
All rights reserved Department EC PD - DE	Created by STORCK	Inspected by LEHNERT	Standardisation HOFFMANN	Date 2018-05-15	State Final Release
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Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
moschip.ru_4
moschip.ru_6
moschip.ru_9