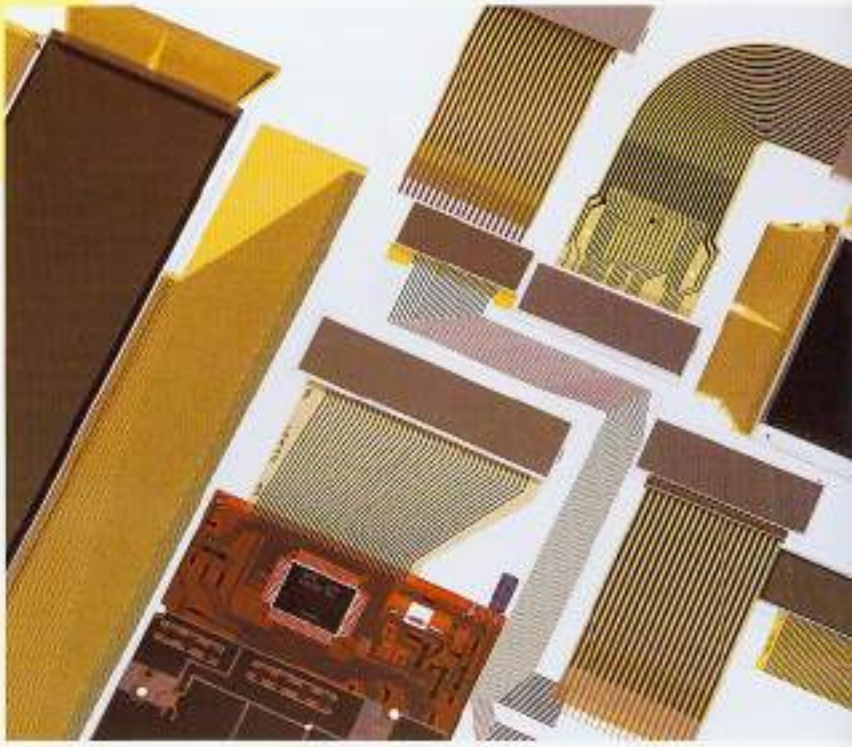
NIPPON GRAPHITE INDUSTRIES, LTD.

MONOSOTROPIC

LINPO TECHNOLOGY LTD.

NIPPON GRAPHITE INDUSTRIES,LTD., CAN COMPLY WITH ALL ENGINEERING REQUIREMENTS FOR THE CIRCUITRIES OF HIGH DENSITY AND PRECISION WITH PRODUCT RELIABILITY AND STABILITY



This connector is designed for fine pitches while maintaining the optimum flex characteristics common to our other types of Heat Seal Connectors.

Through proprietary technologies involving paste formulation in combination with printing processes, Nippon Graphite Industries, Ltd., has made it possible to screen print the micro pitched traces of polymer thick film pastes and hot melt thermoset adhesives on polyester film to make flexible circuitries with heat seal terminations. Electrical terminations are made without solder, clamps or elastomeric connectors.

As the market grows for miniaturization using micro scaled products, the electronic industry is being called upon for further research and development to satisfy these demands. This is particularly true where advanced surface mounting technologies maintain its trends towards higher densities, that in turn require new connector technology.

The Monosotropic Heat Seal Connector redefines the meaning of high density interconnects. The conventional Anisotropic type preceded the Monosotropic type and is in general use for lower density terminations. It has microscopic metal particles within the Hot Melt Adhesive covering the entire area being terminated including the spaces as well as the traces. The Monosotrusic type confines those metal particles exclusively to the conductive trace thereby overcoming problems that fine pitches cause.

Nippon Graphite Industries proudly assures outstanding electrical conduction and insulation with the new connector – the MONOSOTROPIC type.

■SPECIAL FEATURES

1. Lower and stable contact resistance,
2. Higher and stable insulation resistance,
3. No transposition of the metal particles when heat sealed.

■RATED SPECIFICATION & TEST ITEM

TEST CONDITIONS			MEASURING METHODS	
	ITEMS	GIVEN CONDITIONS	Conductive resistance: between the ends of a trace/pattern* Insulation resistance: between traces; between the traces/patterns** voltage applied: 50 V DC Physical Adhesion Strength: Exfoliation test at head speed 100mm/min.	ITEMS
Storage and Humidity Test	Storage, High Temp.	1,000hrs at 85°C ±2°C		Conductive Resistance
	Storage, Low Temp.	1,000hrs at −40°C ±3°C		Insulation Resistance (between traces)
	Storage, High Temp. & High Humidity	1,000hrs at 60°C ±2°C and 90% RH $^{+5}_{-5\%}$		
	Heat Cycle, High ⇔ Low Temp. at High Humidity	12hrs at 60°C ±2°C, 90% RH $^{+5}_{-5\%}$ thence to −40°C ±3°C for 12hrs 10 cycles of the above		Physical Adhesion Strength
	Heat Cycle, High Temp. & Ambient ⇔ Low Temp.	30 min. at 85°C ±2°C, to Ambient Temp. for 5 Min. thence at −40°C ±3°C for 30 min. 100 cycles of the above		
	Voltage Endurance, at High Frequency	Application of 50V, 400KHz for 1 min		
Applied voltage & specimen's subjected to tests	Substrate subjected to be heat sealed	Glass, 1mm thick, coated with Indium Oxide P.C.B. 35 microns thick, Au. Plated over copper clad		Appearance
	Width of Terminal Clearance between Terminals Pitch of Terminals	0.10mm 0.10mm 0.20mm		High Frequency Endurance
	Width, Sealing Edge	2.5mm		
	Heat Sealing Conditions Temp. of sealing face Duration of sealing Pressure applied	130°C over 3 seconds 40kg/cm²		

Measuring device employed:
* Digital Multi-Purpose Meter
** High Resistance Meter

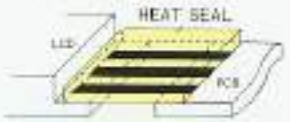
■PRODUCT OUTLINE

Monosotropic Type :

	SILVER only	SILVER/GRAPHITE MIX	GRAPHITE only
Base Fibre (Thickness)	Polyester (25 microns or 38 microns)		
Conductive Resistance	0.1 ohm/Sq	1.0 ohm/Sq	70 ohm/Sq
Minimum Trace Pitch	0.23mm	0.23mm	0.23mm
Minimum Width, Trace Minimum Terminal Clearance	0.115mm	0.115mm	0.115mm
Minimum Width of Sealing Edge	1.5mm		

■PROCEDURES

REGISTRATION MONOSOTROPIC HSC TO CIRCUITRY



Registration of LCD, PCB and Monosotropic HSC

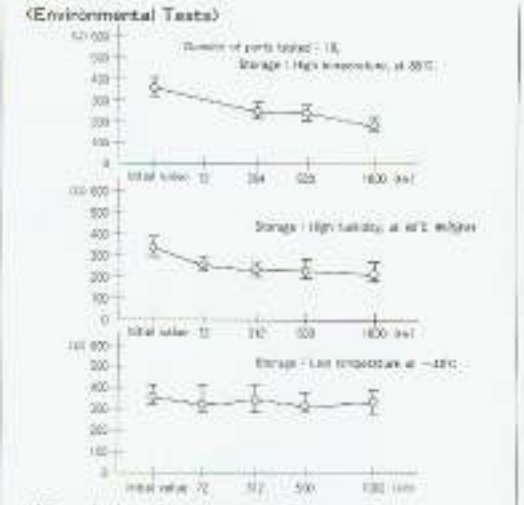
FINAL SEALING (BONDING)

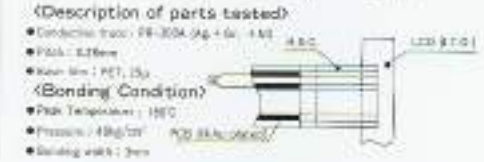
Sealing Duration : 3 seconds
Temperature : at 130°C or higher
Sealing Pressure : 40kg/cm²

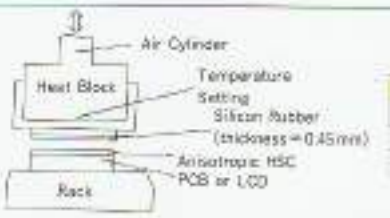
■HEAT SEALING MACH

Special instruction for perfect
In order to obtain a perfect result h
It is critically important to observe
a. The surface of PCB, LCD and HSC
of silicon family remaining on any
sealing area clean.
b. Coordination and leveling of the h
and sealing jack must be kept wel
operation in order to ascertain ac
Use of FUJI PRESCALE FILM (pre
recommendable.
Your inquiry will always be welco

TEST RESULTS		
DESCRIPTION	Ag. Cr. M/K	Ag. only
Ambient Environment	1.0ohms/sq	0.1ohms/sq
Room Temp & Humidity	0.6ohms/sq	0.08ohms/sq
Ambient Environment Rated Temp. & Humidity	more than 100M ohms ditto	more than 100M ohms ditto
Initial Strength X-direction Y-direction	more than 500gms more than 200gms	more than 500gms more than 200gms
Rated Temp. Humidity X-direction Y-direction	more than 400gms more than 180gms	more than 400gms more than 180gms
Ambient Environment	No abnormalities observed	
Rated Temp. & Humidity	ditto	
Cumulative Resistance	0.8ohms/sq	0.08ohms/sq
Insulation Resistance (between leads)	more than 100M ohms	more than 100M ohms
Appearance	No abnormalities observed	







STANDARD SEALING CONDITION	
Sealing time	Type 1 ~ 6sec.

sealing :
electrical performance and physical adhesion strength at the heat sealed area as well,
to following procedures.
to be sealed must be maintained free from all foreign objects. Particularly, the particles
part of the sealing area can very often be a decisive cause for imperfect sealing. Keep

at block and sealing rack are another point to be observed. The surface of heater block
leveled and evenly contacted. This leveling must be thoroughly examined prior to the
al and even pressure distribution over the entire sealing area.
one low pressure) provided for visual examination of pressure to be applied is highly

e by us.

H.S. MACHINE, SPECIFICATIONS

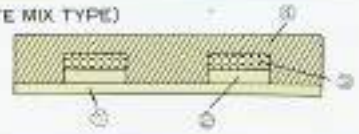
Electrical requirements	100 ~ 220 V.AC. 50/60Hz
Temperature range	0 ~ 350°C
Duration of pressure	0 ~ 60sec
Pressure	10 ~ 60kg/Sq.Cm
Pressing stroke	50㎜/m
Width of heater blade	380mm Max.

■APPLICATIONS

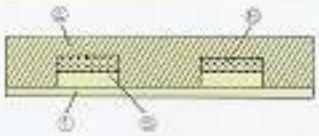
- To the display devices on automobile dashboard, HSC with reinforced terminals specifically designed for the purpose is available.
- To the terminals of all type of electronic displays, i.e., LCD, LED, EL and plasma display, to the drivers.
- To the terminals on flexible circuitries.
- To multiple flexible circuit layers or to make the layers eligible for stacking.
- To the terminals on membrane swithes.
- To connect parts, i.e., LSI and chip resistors, etc., onto the P.C.B..
- To replace other connecting methods, i.e. soldering, bonding and pipe connecting, etc..

■STRUCTURE OF PRODUCT

[SILVER TYPE] (SILVER/GRAPHITE MIX TYPE)



[GRAPHITE TYPE]



	LAYERS	MATERIALS	THICKNESS
①	Base Film	polyester	25μ or 38μ
②	Conductive	Silver or Silver/Graphite Mix	8~13μ
③	Conductive	Metal Microsphere + Silver or Silver/Graphite Mix.	20~30μ
④	Adhesive	Hot Melt Adhesive Resin	7~13μ
⑤	Conductive	Graphite	8~13μ
⑥	Conductive	Metal Microsphere + Graphite	20~30μ