



Datasheet

DMC

TP4525S2F2

12.1" Glass/Glass Type Analog Resistive Touchscreen



TO-05-105R1.2 (with airvent)

The information contained in this document has been carefully researched and is, to the best of our knowledge, accurate. However, we assume no liability for any product failures or damages, immediate or consequential, resulting from the use of the information provided herein. Our products are not intended for use in systems in which failures of product could result in personal injury. All trademarks mentioned herein are property of their respective owners. All specifications are subject to change without notice.

Customer: Distec GmbH

Product Specifications

Revision	1
Date	Jan/12/2016
Product Type	Analog Resistive Touchscreen
Supplier P/N	TP-4525S2F2
Customer P/N	

Approved by	Reviewed by	Prepared by
		

Customer Approval	
Date	
The above signature represents that the product specifications, testing regulation, and warranty in the specifications are accepted.	



Web Site: <http://www.dmccoltd.com>

Head Office: Takanawa Sengakuji Ekimae Building 11F 2-18-10-Takanawa, Minato-ku, Tokyo 108-0074
Japan

Phone: +81-3-6721-6736, Fax: +81-3-6721-6732

1. Product Specifications

1-1. Product Applicable

§ This specification is applied to the glass/glaas tupe analog resistive touchscreen specified on the front page.

1-2. Structure

§ Dimensions, structure, and shape are referred on the drawing attached.

1-3. Environmental Specifications

Specification	Value
Operating Temperature	-20°C to 70°C (no condensation)
Operating Humidity	-20°C to 60°C Less than 90%RH (no condensation) Exceeding 60°C 133.8g/m ³ (no condensation)
Storage Temperature	-40°C to 80°C (no condensation)
Storage Humidity	-40°C to 60°C Less than 95%RH (no condensation) Exceeding 60°C 142.9g/m ³ (no condensation)
Chemical Resistance (top surface)	Toluene, Trichloroethylene, Athetone, Alcohol, Gasoline, Machine Oil, Ammonia, Glass Cleaner, Mayonnaise, Ketchup, Wine, Salad Oil, Vinegar, Lipstick, etc.

1-4. Mechanical Characteristics

Specification	Value
Operating Load	0.2N to 2.0N Shaded area in Fig. 1 is guaranteed
Operating Life	Input (finger) 10,000,000 hits
Light Transitivity	Over 76% (reference value at full wavelength)
Top Surface Hardness	Over 2H (by JIS pencil hardness)

1-5. Electrical Characteristics

Specification	Value
Maximum Voltage	DC6V
Maximum Current	Top Electrode 100mA
	Bottom Electrode 100mA
	Between the Top and Bottom 0.5mA
Linearity	Under ±2.0% (Four point calibration) Shaded area in Fig. 1 is guaranteed
Terminal Resistance	Top Electrode 485Ω to 1131Ω
	Bottom Electrode 229Ω to 535Ω
Insulation Resistance	Neighboring Terminals Over 20MΩ at 25V
	Active Area Electrodes Over 20MΩ at 25V
Chattering	Less than 10msec at ON/OFF.

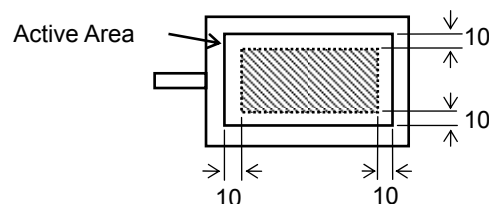


Fig. 1: Linearity and Activation Force guaranteed area (shaded area)

1-6. Appearance

§ Scratch, Dust, Bubble (W = width, L = length, D = average diameter = (longest + shortest) / 2)

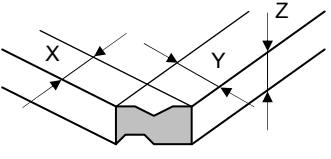
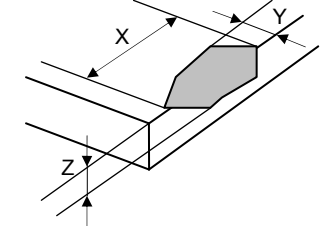
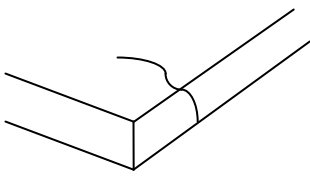
Item	Width (mm)	Length (mm)	Acceptable Numbers	Total
Linear(Scratch/Dust/Bubble) Over 0.1mm in diameter refer to the Circular.	$0.1 \geq W > 0.05$	$4 \geq L$	1pcs in $\phi 30\text{mm}$	Within 5pcs per product.
	$0.05 \geq W > 0.03$	$10 \geq L$	2pcs in $\phi 20\text{mm}$	
	$0.03 \geq W > 0.01$	$20 \geq L$	Acceptable	
	$0.01 \geq W$	Acceptable	Acceptable	
Circular (Scratch/Dust/Bubble)	$0.4 \geq D > 0.2$		2pcs in $\phi 30\text{mm}$	Within 5pcs per product.
	$0.2 \geq D$		More than 3pcs within $\phi 10\text{mm}$ (that can be seen with the naked eye) is unacceptable regardless of the size.	

Applied only in the Viewing Area. Scratches or dusts in the outside of the Viewing Area are acceptable unless the electrical characteristics are affected.

§ Dirt

Acceptable if not noticeable on a black mat.

§ Tip, crack (t = glass thickness) (applicable only for the glass)

Item	Size (mm)		Acceptable Numbers
Corner 	X	≤ 3	2pcs /panel
	Y	≤ 3	
	Z	$\leq t$	
Side 	X	≤ 5	2pcs /side
	Y	≤ 3	
	Z	$\leq t$	
Crack 			Not acceptable

2. Testing Regulation

2-1. Testing Regulation

§ If the regulation is not specified, the test is performed under the supplier's regulation.

§ Tests are performed under the room temperature unless specified. The room temperature is referred as follows:

Temperature: 20°C±5°C

Humidity: 65%±10%RH

2-2. Environmental Specifications

§ Chemical Resistance Test

Condition: Tested after leaving the chemical on the surface for 12 hours being wiped off by cloth.

Judgement: Must be no effect in appearance.

2-3. Mechanical Characteristics

§ Activation Force Test

Condition: Measured by depressing the point between the dots to the conduction by the testing rod (Figure 1).

Judgement: Must satisfy the specification.

§ Operating Life Test (Finger)

Condition: Testing rod: Refer to Figure 1

Voltage: DC5V

Load: 3N

Cycle: 2 hits/sec

Judgement: Must satisfy the following:

Activation Force: Must satisfy the specification.

Linearity: Must satisfy the specification.

Terminal Resistance: Must satisfy the specification.

Insulation Resistance: Must satisfy the specification.

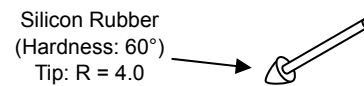


Figure 1. Testing rod 1

2-4. Electrical Characteristics

§ Terminal Resistance Test

Condition: Top and bottom electrodes are measured at the terminal.

Judgement: Must satisfy the specification.

§ Insulation Resistance Test

Neighboring Terminals: Measured by applying the reference voltage to the terminals

Active Area Electrodes: Measured by applying the reference voltage to the top and bottom electrodes.

Judgement: Must satisfy the specification.

2-5. Appearance

§ Appearance Test

Condition: Tested by an examiner with over 1.0 eyesight at 30cm away from the product under the transmittable light at over 60° the surface of the product.

Judgement: Must satisfy the specification.

2-5. Appearance

§ Appearance Test

Condition: Tested by an examiner with over 1.0 eyesight at 30cm away from the product under the transmittable light at over 60° the surface of the product.

Judgement: Must satisfy the specification.

2-6. Delivery inspection

§ Terminal Resistance, Insulation Resistance, Linearity, Appearance are All quantity inspection.

3. Reliability Condition

3-1. Temperature Condition

§ Temperature Condition Test

Following test are performed in the condition with no dew condensation:

Cold Test: Tested after leaving the parts in $-40^{\circ}\text{C}\pm 3^{\circ}\text{C}$ for 240 hours and in the room temperature for 2 hours.

Heat Test: Tested after leaving the parts in $80^{\circ}\text{C}\pm 3^{\circ}\text{C}$ for 240 hours and in the room temperature for 2 hours.

Humidity Test: Tested after leaving the parts in the temperature $60^{\circ}\text{C}\pm 3^{\circ}\text{C}$, humidity 90 to 95% for 240 hours and in the room temperature for 2 hours.

Cycle Test: Tested after 5 cycles of leaving the parts in the temperature $-30^{\circ}\text{C}\pm 3^{\circ}\text{C}$ for 1 hour and in the room temperature for 0.5 hours, then leaving the parts in the temperature $70^{\circ}\text{C}\pm 3^{\circ}\text{C}$ for 1 hour and in the room temperature for 0.5 hours.

Judgement: Must satisfy the following:

Activation Force: Must satisfy the specification.

Linearity: Must satisfy the specification.

Terminal Resistance: Must satisfy the specification.

Insulation Resistance: Must satisfy the specification.

Appearance: Must satisfy the specification.

4. Handling Notes

4-1. Precautions

§ This product is intended for use in standard applications (computers, office automation, and other office equipment, industrial, communications, and measurement equipment, personal and household devices, etc.) Please avoid using this product for special applications where failure or abnormal operation may directly affect human lives, or cause physical injury or property damage, or where extremely high levels of reliability are required (such as aerospace systems, vehicle operating control, atomic energy controls, medical devices for life support, etc.).

4-2. Handling Notes

- § Do not depress or scratch the product with any object with a sharp edge or hard end.
- § Do not put this product close to fire.
- § Do not wipe this product with too much load.
- § Do not strongly rub this product locally. It may affect the product's functions.
- § Do not hit the product with a hard object.
- § Do not forcibly bend or fold the product.
- § When the product is stored, make sure it is packed in a packing box and stored in a storage temperature range, eliminating any outside load.
- § Do not use or store the product under a condition where the product will be exposed to water, organic solution or acid.
- § Do not use the product under the direct sunlight.
- § Do not disassemble the product.
- § When you handle the product, Hold the product by its body. Do not hold by the tail.
- § Clean the product with a soft cloth or a soft cloth with neutral detergent or alcohol. When contaminated by chemicals, wipe them off immediately with caution not to cause injury to human body.
- § The edge of the glass is not rounded and may cause injury.

4-3. Construction Notes

- § The environmental specifications, mechanical characteristics, and electrical characteristics are only applied to the Active Area.
- § Do not use the touchscreen when the condensation occurs. The condensation inside of the touchscreen is a natural phenomenon and should disappear after the touchscreen is warmed up.

4-4. Electrical & Software Notice

The best performance can be obtained when used with the original analog resistive touchscreen controller, "TSC-30" Series. If the touchscreen controller or controller software is to be developed by the customer, please note the following:

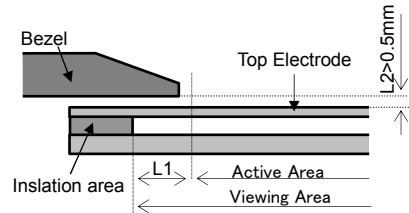
- § There is a contact resistance between the top and bottom electrodes and it changes by the pressure of a finger or a pen. The data must be read after the contact resistance becomes stabilized.
- § The terminal resistance of the analog resistive touchscreen varies by the individual, time, and environment. The controller software must have the calibration function to adjust the input position and the display position.
- § The analog resistive touchscreen outputs 2 point input as 1 point in between the 2 points. The controller software must not be designed to have the 2 point input function.
- § For drawing applications, the line may be intermittent when the pen comes on the dot spacers. A software compensation is needed.

4-5. Mounting Notes

Refer to the suggested structure and mounting precautions in this document at mounting the touch screens. Appropriate structure differs according to touch screen side, LCD, chassis design, usage environment and so on. Please conduct the evaluation with actual products at the trial stage, and confirm that your structure is appropriate prior to fixing the structure design.

§ Gap between the Bezel and Touchscreen

A gap between bottom of the bezel and the touch screen surface(L2) needs to be longer than 0.5mm. Otherwise, the bezel edge may cause false input when the bezel is pressed.

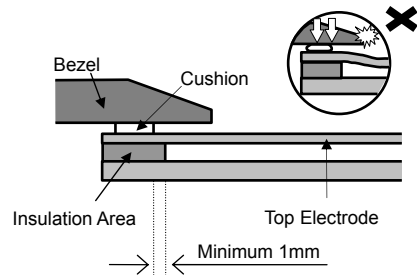


§ Area between Active Area and Viewing Area

If the area between the active area and viewing area(L1) is pressed, false input may be caused. Do not touch this area.

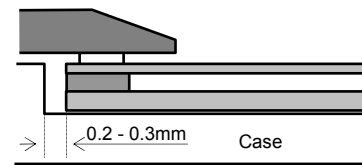
§ Cushion

If a cushion is used between the bezel and the top electrode, the cushion must be free enough to absorb the expansion and contraction difference between the bezel. If the cushion is squashed too hard, the expansion and the contraction difference may cause the distortion to the top electrode. The cushion must be positioned more than 1mm outward from an inside of the insulation area. (Please refer to right figure)



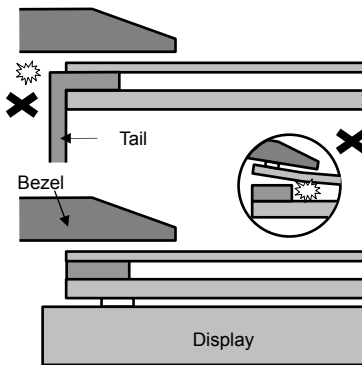
§ Tolerance

There is a tolerance of 0.2 to 0.3mm for the dimensions of the touchscreen and the tail. A gap must be made to absorb the tolerance in the case and the connector.



§ Tail

The tail must not be forcibly stressed or bent too hard to avoid the conduction in the insulated area and wire breaking.



§ Mounting

Touchscreen must be held from the bottom such as the structure gluing the touchscreen onto the display. If the touchscreen is glued to the bezel, the adhesion between the top and bottom electrode is stressed and may come off.

5. Warranty

5-1. Warranty Period

- § The warranty period is limited to 1 year from the date of shipping. The warranty for the initial deflection such as appearance deflection is limited to 1 month.
- § Any defected parts under proper use will be examined by the supplier and replaced by the new parts if the deflection is considered to be caused by the supplier.
- § The replacement is subject to be included in the next lot.

5-2. Warranty Target

- § The warranty only covers the product itself and does not cover any damage to others caused by using this product. Onsite repair or replacement is not supported.
- § We will do our best for delivery problem and product defections, but the warranty for the production line is not covered.
- § Resistive touchscreens are structurally not repairable. All defections are subject to replacement.

5-3. Warranty Exceptions

Following conditions are not covered with the warranty and subject to charge.

- § Any malfunctions and damages during transportation and transfer by the user.
- § Any malfunctions and damages caused by a natural disaster or a fire.
- § Any malfunctions and damages caused by static electricity
- § Any malfunctions and damages caused by the failure of the associated equipment.
- § If the product is remodeled, disassembled or repaired by the user.
- § If the product is glued onto the equipment and uninstalled.
- § Any malfunctions and damages caused by an improper usage and handling against the specifications and notes.

5-4. Tools

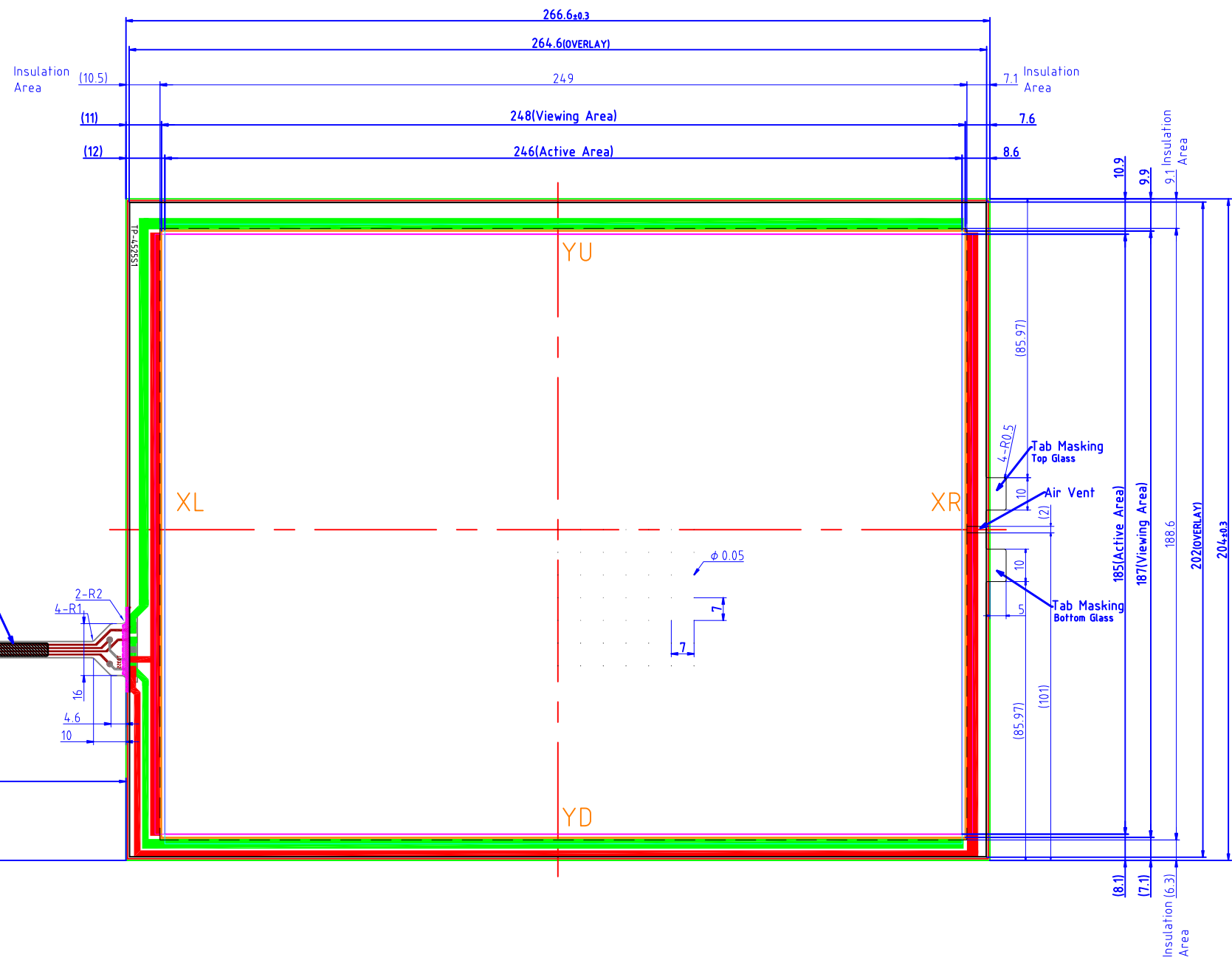
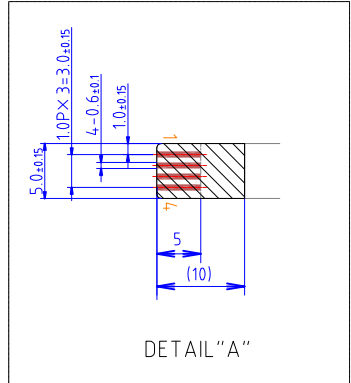
- § To maintain the quality, the printing screens and the die-cut plates are generally limited to use up to 1 year. Reorders after 1 year from the initial order or from the last renewal are subject to the tooling charge for replacing the printing screens and the die-cut plates. Reorders for the discontinued standard parts are also subject to tooling charge.
- § All the tools, such as CAD data, block copies (films), printing screens, and die-cut plates are not to be provided for administrative purpose.

5-5. Changes

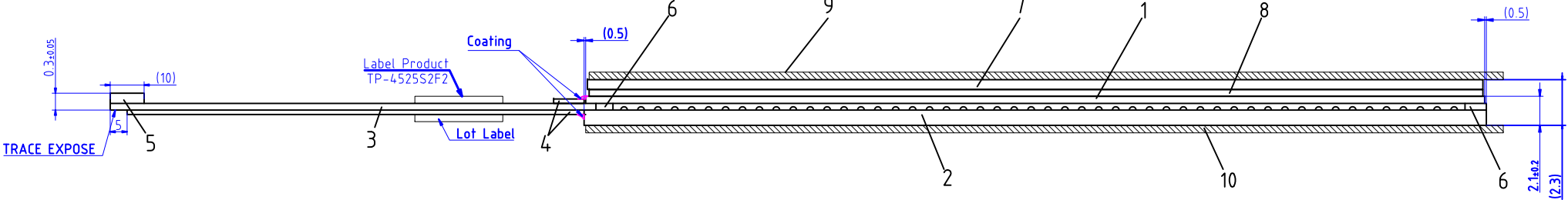
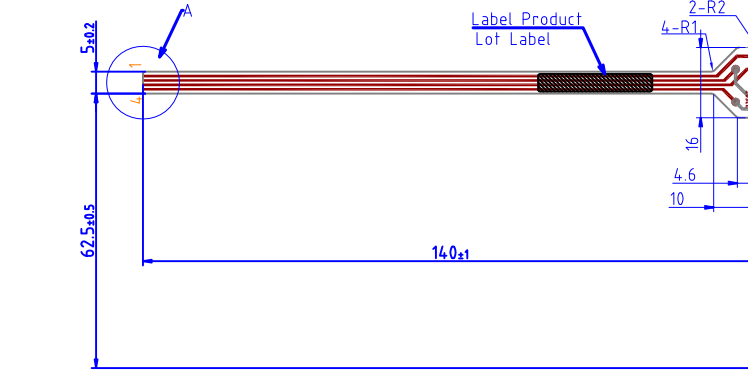
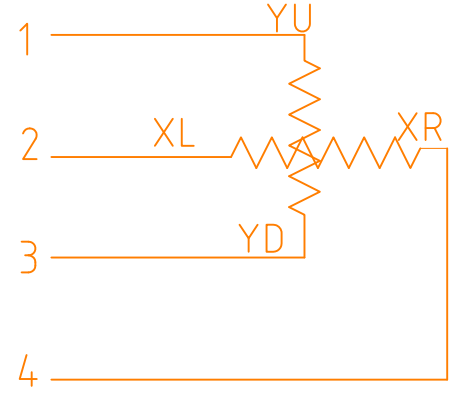
- § Because of the manufacturing process, changing the dimensions, circuit pattern, and the tail position requires replacing most of the tools and is subject to high tooling charge. Please be careful when ordering and approving the drawing.
- § Circuit pattern and the materials that does not affect the environmental, electrical, and mechanical characteristics such as film, glass, ink and glue are subject to change for the supplier's reason or for improvement within the specifications.

6. Change History

Rev.	Date	Change No.	Description	Reason	Prepared by
1	Jan/12/2016		First Issue		Mochizuki



PIN ASSIGNMENT



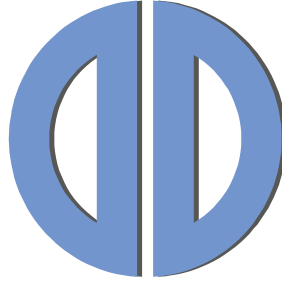
REMARKS		
TAIL PATTERN PITCH		1.0mm
TAIL PATTERN WIDTH	Ag	0.6~0.8mm
	-	- mm
CIRCUIT PATTERN WIDTH	Ag	2~3.5mm
	-	- mm
○ TOP CIRCUIT IS RED, BOTTOM CIRCUIT IS GREEN		
○ PURPLE: TOP CIRCUIT, LIGHT BLUE: BOTTOM CIRCUIT.		
○ 0.05φ PITCH 7.0 DOT SPACER PRINTED ON BOTTOM SHEET		
○ TOLERANCE=0.5mm EXCEPT WHERE INDICATED.		

ITEM	MATERIAL	REMARKS
1 TOP ITO GLASS	t=0.2mm	
2 BOTTOM ITO GLASS	t=1.8mm	
3 TAIL	POLYESTER	38μm
4 REINFORCEMENT FILM	POLYESTER	25μm
5 STIFFENER	POLYESTER	250μm
6 ADHESIVE SHEET	ACRYLIC	125μm
7 OVERLAY	POLYESTER	188μm ANTI-GLARE-KB188
8 DOUBLE SIDE	ACRYLIC	70μm
9 MASKING TOP SIDE		
10 MASKING BOTTOM SIDE		

CUSTOMER APPROVAL
DATE: / /

						PART No.	APPROVED	CHECKED	CHECKED	TRACED	DESIGNED
						TP-4525S2F2	Aug/20/15		Aug/20/15	Aug/20/15	
						TYPE	Komang		Rangga	Subhana	Subhana
						Liebherr					
1	Aug/20/15	FIRST EDITION			Subhana	CIRCUIT DRAWING					DMC Co., Ltd.
Rev.No	DATE	REVISION			NAME						

Our company network supports you worldwide with offices in Germany, Great Britain, Turkey and the USA.
For more information please contact:



DATA DISPLAY GROUP

Distec GmbH

Augsburger Str. 2b
82110 Germering
Germany

Phone: +49 (0)89 / 89 43 63-0
Fax: +49 (0)89 / 89 43 63-131
E-Mail: info@datadisplay-group.de
Internet: www.datadisplay-group.de

Display Technology Ltd.

5 The Oaks Business Village
Revenge Road, Lordswood
Chatham, Kent, ME5 8LF
United Kingdom

Phone: +44 (0)1634 / 67 27 55
Fax: +44 (0)1634 / 67 27 54
E-Mail: info@datadisplay-group.co.uk
Internet: www.datadisplay-group.co.uk

Apollo Display Technologies, Corp.

87 Raynor Avenue, Unit 1 Ronkonkoma, NY
11779
United States of America

Phone: +1 631 / 580-43 60
Fax: +1 631 / 580-43 70
E-Mail: info@datadisplay-group.com
Internet: www.datadisplay-group.com

Sales Partner:

DATA DISPLAY BİLİŞİM TEKNOLOJİLERİ İÇ VE DIŞ TİCARET LİMİTED ŞİRKETİ

Barbaros Mh. Ak Zambak Sk. A Blok D:143
34376 Ataşehir / İstanbul
Turkey

Phone: +90 (0)216 / 688 04 68
Fax: +90 (0)216 / 688 04 69
E-Mail: info@data-display.com.tr
Internet: www.data-display.com.tr