



REG. DATE : 2014.10.14

SPECIFICATION

REV.NO : 1.4

REV. DATE : 2015.11.18

MODEL NAME : TSGC-DL01A

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SPECIFICATIONS FOR APPROVAL

PRODUCT NAME : 21.5” Touch Sensor Module

LGIT MODEL NAME : TSGC-DL01A

Customer P/N :

APPROVAL		
LG Innotek Co., Ltd.		
Drafter	Quality Team Agreement	Final Approver
		
S. H. Jeong	G. W. Koo	J. W. Jo

Appendix



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◆ Caution & Warranty

- ▶ Storage
- ▶ Protection Film
- ▶ Electrostatic Discharge Control
- ▶ Installation in Assembling

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Change History of Revision

[illegible]



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1. General Description

This specification of **TSGC-DL01A** applies to Projected Capacitive touch screen.

This touch screen consists of electrode pattern traces on two layers films and cover glass laminated, which is a sensor detecting proximity touch by the humans's capacitance through the front surface of the sensor.

2. General Feature

Item	Spec	Remark
Type	21.5" Projected Capacitive Touch Screen	
Support points	10 Points multi-touch	
Input Mode	Finger	
Structure	Window + Film + Film (GFF)	
Dimension	Cover glass Viewing Area : 478.3mm x 270.0mm Out Dimension : 541.0mm x 296.6mm Thickness : 1.8mm	Chemical Strengthened Soda Lime/ Anti-Glare Coating
	Sensor Sensor Size : 492.6mm X 290.33mm Thickness : 0.365mm	Pitch : Rx : 6.17mm Tx : 6.22mm Random Pattern
Thickness	[mm]	
	Glass	1.800
	Top OCA	0.100
	Top PET(OCA 일체형)	0.145
	Bottom PET	0.120
	Total	2.165
	Tolerance ± 0.3	
Number of Channel	Rx(Top) : Ch.78, Tx(Bottom) : Ch.44	Single Routing
FPC	- Size 80Pin : 60.5mm x 128.47mm 55Pin : 36.49mm x 127.61mm - PAD Pitch : 0.5mm - EMI Tape : N/A	Zip Type
Interface Mode	USB	



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3. Electrical Specification

Feature	Specification
Accuracy (@ 9phi touch)	• X axis : $\pm 1.5\text{mm}$ or less • Y axis : $\pm 1.5\text{mm}$ or less

4. Optical Specification

Feature	Specification
Transmittance (%)	Min 83% (Typical)
Haze	Max 7% (Anti-Glare Coating)

5. Mechanical Specification

Feature	Specification
Cover glass	Strengthened glass
Surface Coating	Anti-Glare Coating

6. Operating Environmental Condition

Feature		Specification
Temperature	Operating	5 to 50 °C
	Non-operating	-20 to 60°C
Humidity	Operating:	8 to 85%
	Non-operating	8 to 90%



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7. Function Test

7-1. Sensor Rawdata Check

* For sensor module test, must connect the sensor to C/B before connecting to PC/NB

Feature	Specification	Remark
Connection Test	OK or NG	USB PID 0x01
Firmware Test	OK or NG	(0x)V 3.0.
Micro Short Test	Pass≤7	X_M_Delta & Y_M_Delta
Open Test	NG<200≤Pass	Y Driven Data
All Node Test	105<Pass<155	All node Data

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8-1. Touch Module Confirm Drawing

본 자료를 영수함으로써 본 자료의 내용을 귀사의 사전 승인 없이는 비밀로 취급하겠으며 위반시 손해를 보상한다. 본 자료에 관한 모든 권리는 귀사에 유보되었음을 확인한다.





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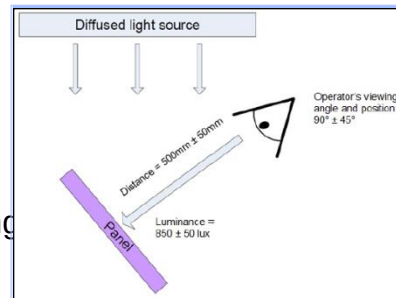
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9. Inspection & Reliability Test Standard

9-1. Cosmetic Inspection Condition

- Luminance : 850 ± 50 lux (diffused light source)
- Distance(With the unaided eye) : 500 ± 50 mm
- Light source : Twin fluorescent lamps
- Measurement method : With the unaided eye or the magnifying
- Viewing Angle : $90 \pm 45^\circ$ (vertical and horizontal)
- Duration : Up to 30 ~ 45sec



9-2. Cosmetic Inspection Standard

Item	Area	Criteria
Circular Particles ($D = (L + W) / 2$)	Active/Print	$D \leq 0.35$: OK $0.35 < D \leq 0.5$ & $N \leq 6$ ea : OK $D > 0.5$ or $N > 6$: NG
Linear Foreign Objects	Active/Print	$W \leq 0.1$: OK $0.1 < W \leq 0.2$ & $L \leq 15.0$ & $N \leq 6$: OK $W > 0.2$ or $L > 15$ or $N > 6$: NG
Scratch	Active/Print	$W \leq 0.1$: OK $0.1 < W \leq 0.2$ & $L \leq 15.0$ & $N \leq 6$: OK $W > 0.2$ or $L > 15$ or $N > 6$ or distance between scratches < 15 : NG
Bubble ($D = (L + W) / 2$)	Active	$D \leq 0.15$: OK $0.15 < D \leq 0.4$, distance ≥ 15 & $N \leq 6$: OK $D > 0.4$ or $N > 6$ or distance < 15 : NG
	Print	$D \leq 0.15$: OK $D > 0.4$: NG
Dent	Active	한도 견본에 준할 것
Smudge (only non-erasable)	Active/Print	$D \leq 1.0$ & $N \leq 4$: OK $D > 1.0$ or $N > 4$: NG Allowed if removable
Pin-holes	Print	≤ 0.2 mm: 허용, > 0.2 mm : Reject → Pen reworking 허용
Polish Defects	Active/Print	1)Glass: Not arrowed 2)Sensor-Single side: $L \leq 10$ & $N \leq 2$: OK $L > 10$ & $N > 2$: NG
Cover Glass Defects	Active/Print	Cracks and chips are not allowed
Paint ($D = (L + W) / 2$) where applicable (Peel, Scratch, Fish eye, Void, etc)	Active/Print	$D \leq 1.2$: OK $D > 1.2$: NG
BM Edge Peel-off	Print	L: Ignore, $W \leq 2.0$: OK → Pen reworking 허용
Chipping (Corner, Side)	Print	$L \leq 0.7$ mm, $W \leq 0.5$ mm, $D < 0.5$ mm



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9. Inspection & Reliability Test Standard

9-3. Reliability Test

			Event 인정시험								정기 신뢰성시험								비고
			평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목				
시험 항목	시험 조건	시험 시간 /Cycle	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목	평가 항목			
보존	고온	80℃	96시간	3	O	O	O	O	O	O	3	O		O	O	O	상온 2시간 방치 후 평가		
	저온	-20℃	96시간	3	O	O	O	O	O	O	3	O		O	O	O			
	고온 고습	60℃, 90%RH	96시간	3	O	O	O	O	O	O	3	O		O	O	O			
	열충격	-30℃(30min) ↔ 65℃(30min)	10Cycle	3	O	O	O	O	O	O	3	O		O	O	O			
ESD		HBM 300Ω 150pF ±15k V@Air	5회	3			O										Center, Corner 4 points		
Ball Drop			1회	3	O														

[Note]

- In this standard condition, there shall be no practical problems that may affect the Touch Screen function.
- Touch Screen Panel should be at room temperature for 2 hours after the reliability test and then measured.



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9. Inspection & Reliability Test Standard

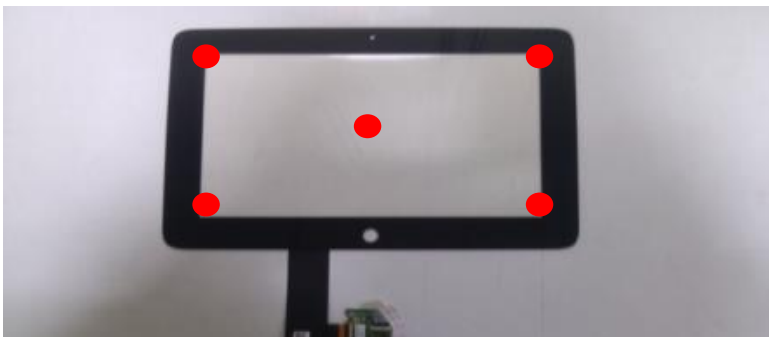
9-4. ESD Test

Item	Test Condition	Remarks
ESD	HBM Air Contact ($\pm 15\text{kV}$) Center 1point Corner 4points (5 times at each points)	-

* Test Condition

구 분	조 건
Discharge Imp.	330 Ω /150pF
방전 회수	전압 별 $\pm$ 각 10회
Discharge Speed	1초 이상 간격
온습도 및 기압	15~35 $^{\circ}\text{C}$ /30~60%/ 860~1,060mbar
방전방식 (시료배분: 각50%)	Only 기중(Air) 방전
기중(Air) 방전 방법	약 20Cm에서 빠르게 접근

Voltage	판정 항목	판정 제외 항목
Air $\pm 15\text{kV}$ 이상	▪ 기능손실 및 성능 저하	▪ 외관 불량발생 - Pattern Burnt (기능 및 성능은 정상) - ESD로 인한 관련 외관 불량



● Test Point
(5 times at each points)



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9. Inspection & Reliability Test Standard

9-5. Ball Drop Test

Item	Test Condition	Remarks
Ball Drop	500g/ 1m No breakage when 500g/Φ50mm steel ball is dropped on the touch panel supported with the display module from 1m height at 1 time.	1.8T Chemical Strengthened

* Test Condition

1) Jig Material : Acrylic

2) Jig Shape

① Jig Thickness : Typical 15mm (Min 10~20mm)

② Jig Out-line : Window Size + 15.5mm

③ Jig Depth : 1.5mm

④ Distance between window and Jig : 0.5mm

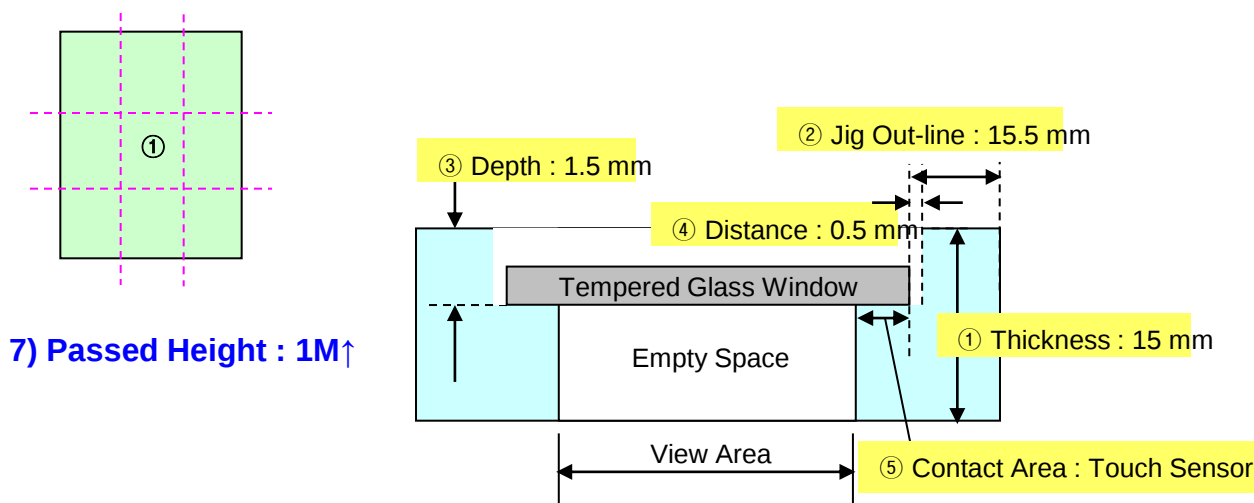
⑤ Contact Area : Touch Sensor

3) Ball Material : Steel

4) Ball Diameter : 50Φ

5) Ball Weight : 500g

6) Ball Drop Point : 1-time for Center point



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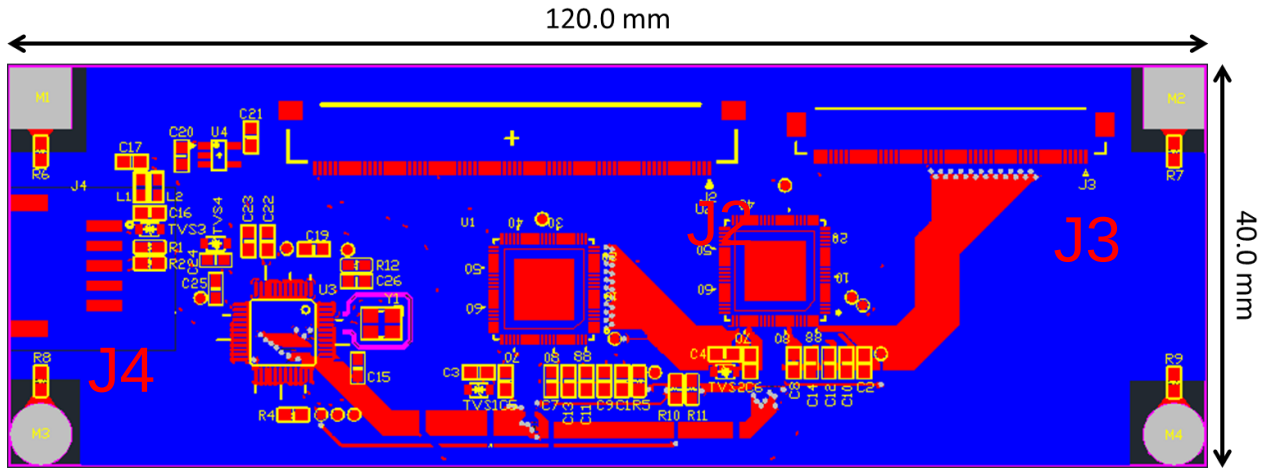
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10. Control Board

10-1. Outline Dimension



10-1-1. Connector Description & Pin Name

J2		J3		J4	
Rx		Tx		USB connector	
Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
1	GND	1	NC	1	VBUS
2	Rx0	2	NC	2	DN
3	Rx1	3	NC	3	DP
~		~		4	GND
19	Rx17	8	NC	5	EGND
20	Rx18	9	NC		
21	Rx19	10	GND		
22	Rx20	11	Tx0		
23	Rx21	12	Tx1		
24	Rx22	13	Tx2		
~		~			
77	Rx75	52	Tx41		
78	Rx76	53	Tx42		
79	Rx77	54	Tx43		
80	GND	55	GND		



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10-2. Touch controller support OS(via USB)

	OS	Support	Driver	Remark
Windows	Window XP	○	Available with custom HID driver provided by ILITEK	1 point Touch
	Windows 7	○	Windows USB/HID driver	
	Windows 8/8.1	X	Windows USB/HID driver	
Linux	Ubuntu 12.04	○	Linux USB/HID driver	-Kernel version 3.8 or above
	Ubuntu 13.04	○	Linux USB/HID driver	-Kernel version 3.8 or above
	Others			Contact us
Android	Gingerbread(2.3)	○	Available with custom HID driver provided by ILITEK	
	Ice Cream Sandwich (4.0)	○	Available with custom HID driver provided by ILITEK	
	Jelly Bean (4.3)	○	Available with custom HID driver provided by ILITEK	
	KitKat (4.4)	○	Available with custom HID driver provided by ILITEK	



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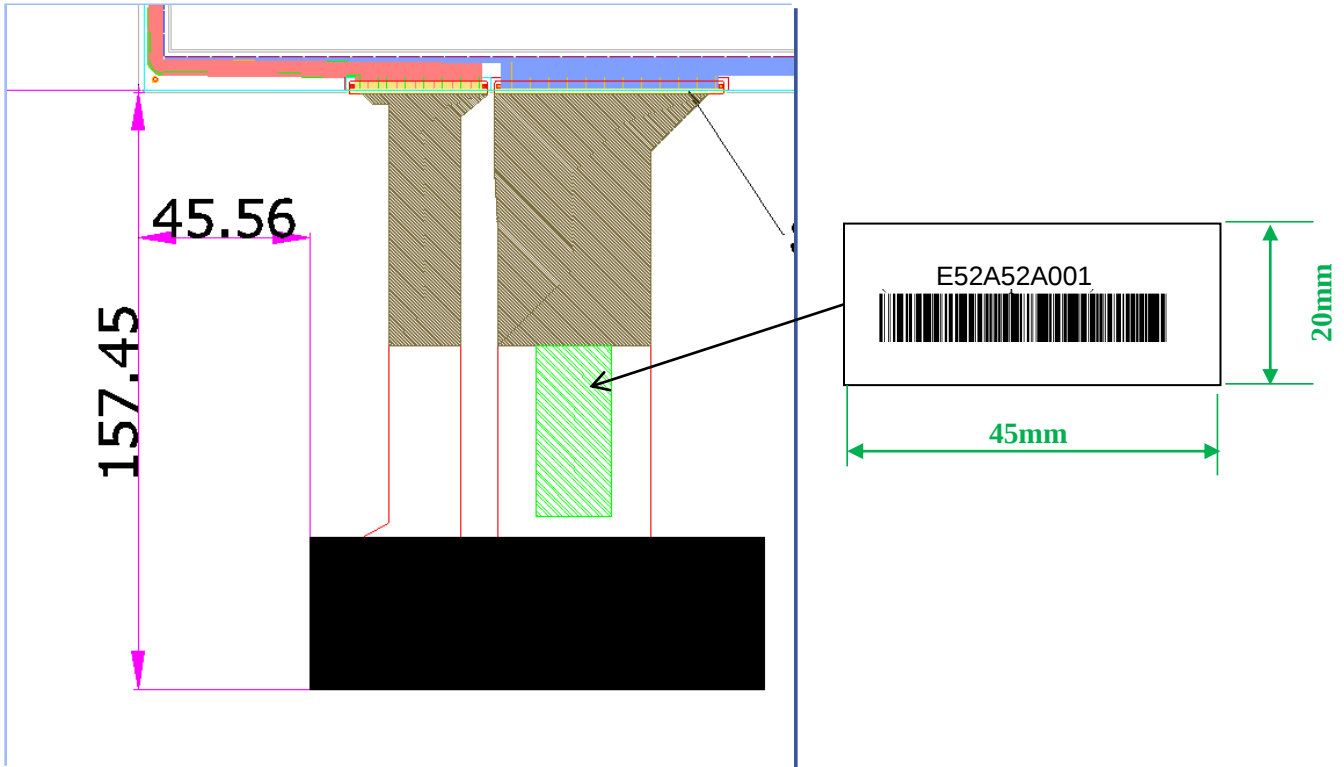
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11. Packing, Barcode & Lot marking

11-1. Lot marking

※ Lot Marking 위치 : FPCB 배면



LGIT		
구분	적용	설명
(1)	업체 코드	Ex) 희성전자 : H, EKD : E, Trais : T
(2)	투입 年	해당 년의 뒷 1자리 표기, Ex) 2013 → 3
(3)	투입 月	제 조 월 표기, Ex) 1월: 1, 10월: A, 11월: B 12월: C
(4)	투입 日	제 조 일 표기, Ex) 1일: 1, 10일: A, 31일: X (o,i 는 제외)
(5)	Window 제작일	해당 년의 뒷 1자리 표기, Ex) 2013 → 3
(6)		제 조 월 표기, Ex) 1월: 1, 10월: A, 11월: B 12월: C
(7)		제 조 일 표기, Ex) 1일: 1, 10일: A, 31일: X (o,i 는 제외)
(8)	S/N	TSM Serial Number
(9)		
(10)		

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11. Packing, Barcode & Lot marking

11-2. Packing & Box Label

Packing Information

- Box Size : 650 x 440 x 470mm
- Pallet size : 1,100 x 1,100mm
- 16Box on 1 Pallet
- 1 Box = 20pcs

Box Label

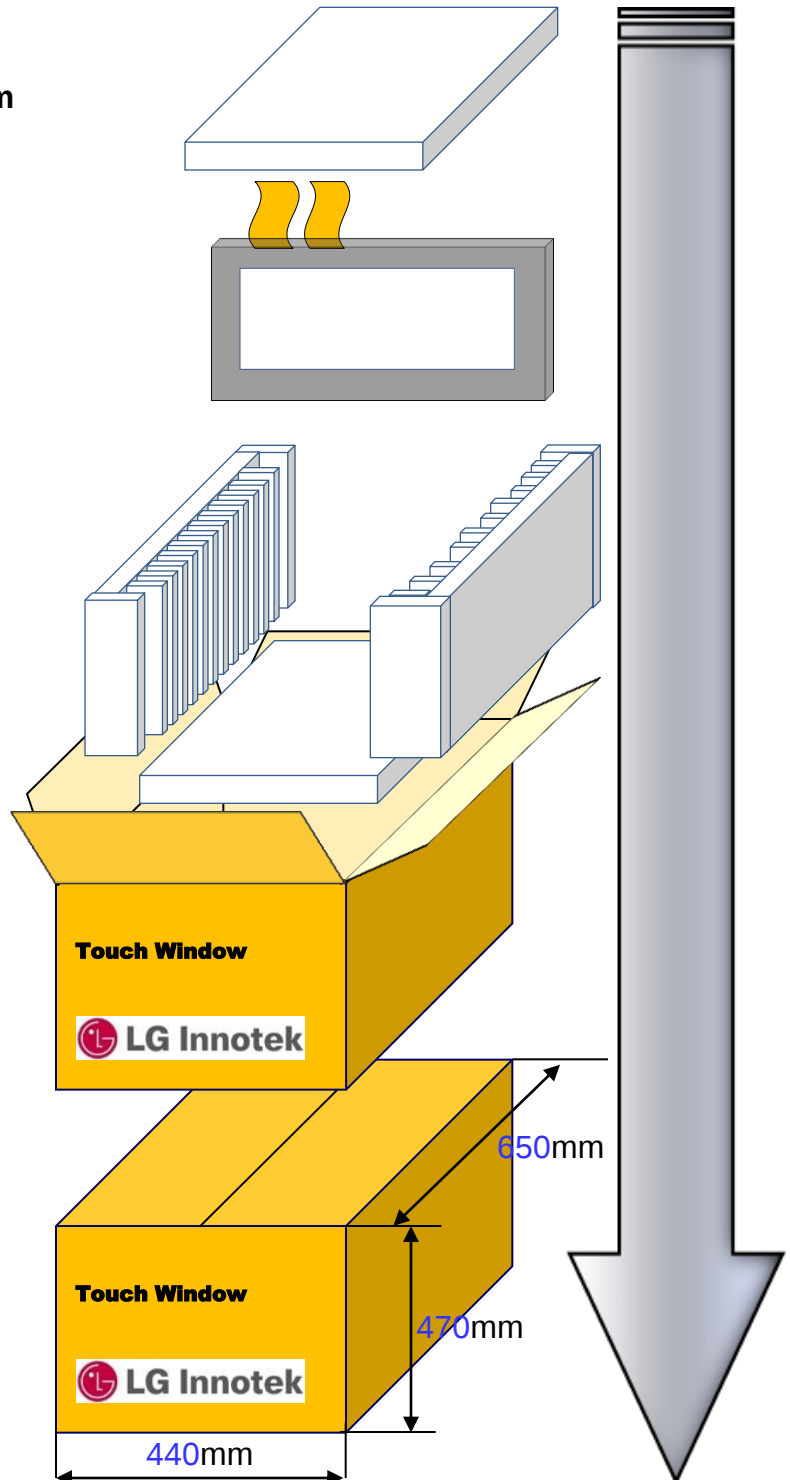
1. Model :

2. Quantity : (e.g. 500pcs)



3. Shipment Date :

4. 제작업체 :





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PAGE : **16****12. RoHS****Warranty for Non-Inclusion of Hazardous**

Date of submission : 2015 . 03 . 11 .

LGIT hereby warrants and guarantees that all of or part of products comply with the standard for EU RoHS Directive.

Supplier Information			
Customer	-	Supplier name	LG Innotek
Guaranteed Parts List	21.5"	Presenter	Kim YoungHun
E-Mail	qlgodrl1@lginnotek.com		
Contact number	054-479-0334		

Restrictions on Hazardous substances in Electrical and Electronic Equipment(RoHS) Directive, 2011/65/EU

Substance	Threshold level (unit : ppm)
Cadmium(Cd) and cadmium compounds	100 ppm
Lead(Pb) and lead compound	1000 ppm
Mercury(Hg) and mercury compounds	1000 ppm
Hexavalent chromium(Cr+6) compound	1000 ppm
PBBs - Polybrominated biphenyls	1000 ppm
PBDEs - Polybrominated Diphenyl ethers	1000 ppm

Signature : Name : **KimYoungHun**Position : **Assistant**



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S P E C I F I C A T I O N

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Cautions & Warranty

⚠ Please pay attention to the following when you use this Touch Screen Module.

1) Storage

When storing the TSM(Touch Sensor Module)s as spares for a long time, the following precautions are necessary.

- Store the TSMs in a dark place. Do not expose the TSMs to sunlight. Keep the temperature between 5℃ and 30℃ at normal humidity.

2) Protection Film

- When the protection film is peeled off, static electricity is generated between the protection film and the TSM's transparent electrical film(Ag Mesh PET film). This should be peeled off slowly and carefully by people who are electrically grounded and the well ion-blower equipment or in such a condition, etc.
- When the TSM with protection film attached is stored for a long time, sometimes there remains a small amount of glue still on the TSM's transparent electrical film(Ag Mesh PET film) after the protection film is peeled off.
- You can remove the glue easily. When the glue remains on the TSM's transparent electrical film(Ag Mesh PET film) surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with ethyl-acetate.

3) Electrostatic Discharge Control

- Since the TSM is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wrist band etc.

4) Installing and Assembling

- Do not touch, push or rub the exposed TSM's film with glass, tweezers or anything harder than 3H pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of film for bare hand or greasy cloth. (Some cosmetics deteriorate the film.)
- When the surface becomes dusty, please wipe gently with absorbent cotton or other soft material like chamois soaked with ethyl-acetate. Do not use acetone and toluene.
- Do not put a heavy, hard or sharp objects on the TSM.
- Do not apply excessive forces to the FPCB.



Warranty

Touch Screen Panel products shall be warranted for one year after shipping from LG Innotek Co. Ltd.
(Storage condition : Between 5℃ and 30℃ at normal humidity)