

**PRODUCT** : CAMERA MODULE  
**MODEL NO.** : CM8069-A200BF-E  
**SUPPLIER** : TRULY SEMICONDUCTORS LTD.  
**DATE** : November 1, 2007



CERT. No. 946535  
ISO9001  
TL9000

# SPECIFICATION

Revision: 0.1

**CM8069-A200BF-E**

preliminary

If there is no special request from customer, TRULY SEMICONDUCTORS Co., Ltd will not reserve the tooling of the product under the following conditions:

1. There is no response from customer in two years after TRULY SEMICONDUCTORS Co., Ltd submit the samples:

2. There is no order in two years after the latest mass production.

And correlated data (include quality record) will be reserved one year more after tooling was discarded.

**TRULY SEMICONDUCTORS LTD:      CUSTOMER:**

Quality Assurance Department: \_\_\_\_\_

Approved by:

Technical Department: \_\_\_\_\_

Approved by:



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WRITTEN BY	CHECKED BY	APPROVED BY
HUANG WEI NA	YAN SI ZHI	LIU TIE NAN

**Key Information**

<b>Module No.</b>		<b>CM8069-A200BF-E</b>
Module Size		8.0mm x 8.0mm x4.9mm
Image Quality		≥600 TV line
Sensor Type		S5K4BAFB
Array Size		1600 X 1200(UXGA)
Power supply	Core	1.5V
	Analog	2.8V
	I/O	1.8V/2.8V
Lens		1/4 inch 3Plastic+IR
Focus(F.NO)		2.8
View Angle		71°
Object distance		80cm-infinity
MAX Frame rate		15fps@UXGA,
Pixel size		2.25um X2.25um
IR Cutter		650+/-10nm
Color filter		RGB Bayer Pattern
Sensor Operation Temperature Range		-20° C to 60° C
Output Formats		8-Bit ITU-R.656/601(4;2;2YCbcr),565RGB,
Image scaling		SXGA,VGA,QVGA,QQVGA,CIF,QCIF
Maximum Pixel(data output) clock		75MHz
ADC resolution		10Bit
IC Package		COB
Substrate		FPC

## Pin Assignment

No.	Name	Pin type	Description
1	NC		
2	AGND	Power	Analog Ground
3	SIO_D	I/O	I2C Clock/Data for backend processor
4	AVDD	Power	Analog Power 2.8V
5	SIO_C	I/O	I2C Clock/Data for backend processor
6	RESET	Input	Master Reset (Active Low)
7	VSYNC	Tri-state Output	Vertical sync Output
8	PWDN	Input	Stand-By Mode (Active low, set to "1" if not used)
9	HREF	Tri-state Output	Horizontal Sync Output
10	DVDD	Power	Regulator Power for Core Digital
11	DOVDD	Power	I/O Digital Power(2.8V-1.8V)
12	Y7	Tri-state Output	Pixer Data Output [7]
13	XCLK	Input	Master Clock
14	Y6	Tri-state Output	Pixer Data Output [6]
15	GND	Power	Ground
16	Y5	Tri-state Output	Pixer Data Output [5]
17	PCLK	Tri-state Output	Pixel Clock Output
18	Y4	Tri-state Output	Pixer Data Output [4]
19	Y0	Tri-state Output	Pixer Data Output [0]
20	Y3	Tri-state Output	Pixer Data Output [3]
21	Y1	Tri-state Output	Pixer Data Output [1]
22	Y2	Tri-state Output	Pixer Data Output [2]
23	NC		
24	NC		

## Electrical Characteristics

### 1. Absolute Maximum Ratings

Characteristics	Symbol	Value	Unit
I/O Digital Power (2.8V ~ 1.8V)	V <sub>DDIO1</sub> <sup>(1)</sup>	-0.3 to 3.8	V
	V <sub>DDIO2</sub> <sup>(2)</sup>	-0.3 to 2.5	
Analog Power (2.8V)	V <sub>DDA</sub>	-0.3 to 3.8	
Regulator Power (1.8V)	V <sub>DD18_REG</sub> <sup>(3)</sup>	-0.3 to 2.5	
Core Digital Power (1.5V)	V <sub>DD15</sub> <sup>(4)</sup>	-0.3 to 2.0	
Input Voltage	V <sub>IN</sub>	-0.3 to 3.8	
Operating Temperature	V <sub>OPR</sub>	-20 to +60	°C
Storage Temperature	V <sub>STG</sub>	-40 to +85	

[NOTE]

(1) 2.8V I/O Power Applied to VDDIO pins

(2) 1.8V I/O Power Applied to VDDIO pins

(3) 1.8V Regulator Power Applied to VDD18\_REG pins

(4) Internal Regulator is not used and 1.5V Digital Power Applied to VDD15 pins directly

### 2.DC Characteristics

(V<sub>DDH</sub> = 2.8V ± 0.25V, V<sub>DDL</sub> = 1.5V ± 0.1V, T<sub>a</sub> = -20 to +60 °C)

Characteristics	Symbol	Condition	Min	Typ	Max	Unit
Operating voltage	V <sub>DD28_CIS</sub>	Applied to VDD28_CIS	2.55	2.8	3.05	V
	V <sub>DD18_REG</sub>	Applied to VDD18_REG	1.65	1.8	1.95	
	V <sub>DD15</sub>	Applied to VDD15	1.40	1.5	1.60	
	V <sub>DDIO1</sub>	Applied to VDDIO	2.55	2.8	3.05	
	V <sub>DDIO2</sub>	Applied to VDDIO	1.65	1.8	1.95	
Input voltage <sup>(1)</sup>	V <sub>IH</sub>	-	0.7* V <sub>DDIO</sub>	-	-	
	V <sub>IL</sub>	-	-	-	0.2* V <sub>DDIO</sub>	
Input leakage current <sup>(2)</sup>	I <sub>IL</sub>	V <sub>IN</sub> = V <sub>DDH</sub> to V <sub>SS</sub>	-10	-	10	uA
Input leakage current with pull-down <sup>(3)</sup>	I <sub>ILD</sub>	V <sub>IN</sub> = V <sub>DDH</sub>	5	18	40	
Input leakage current with pull-up <sup>(4)</sup>	I <sub>ILU</sub>	V <sub>IN</sub> = V <sub>SS</sub>	-40	-18	-5	

High level output voltage	V <sub>OH</sub>	I <sub>OH</sub> = -100uA <sup>(4)(5)</sup>	V <sub>DDIO</sub> -0.2	-	-	V
		I <sub>OH</sub> = -4mA <sup>(4)</sup> I <sub>OH</sub> = -2,-4,-6,-8mA <sup>(5)</sup>	0.7*V <sub>DDIO</sub>			
Low level output voltage	V <sub>OL</sub>	I <sub>OL</sub> = 100uA <sup>(4)(5)</sup>	-	-	0.2	
		I <sub>OL</sub> = 4mA <sup>(4)</sup> I <sub>OL</sub> = 2,4,6,8mA <sup>(5)</sup>			0.3*V <sub>DDIO</sub>	
High-Z output leakage current (6)	I <sub>OZ</sub>	V <sub>OUT</sub> = V <sub>SS</sub> or V <sub>DDH</sub>	-10	-	10	uA
Input capacitance <sup>(1)</sup>	C <sub>IN</sub>	-	-	-	4	pF
Supply current	I <sub>STB</sub>	STBYN=Low(Active) All input clocks = Low 0 lux illumination	-	40	150	uA
	I <sub>DD</sub>	f <sub>MCLK</sub> = 27MHz	-	130	180	mA
Operation Power Consumption	P <sub>OP</sub>	-	-	200	300	mW

[NOTE]

- (1) Applied to STRB\_IN, SCL, SDA, CLKSEL, TST, STBYN, SCE, RSTN, MCLK, AF\_SCL, AF\_SDA, IIC\_ID pins
- (2) Applied to SCL, SDA, CLKSEL, STBYN, RSTN, MCLK, AF\_SCL, AF\_SDA pins
- (3) Applied to STRB\_IN, TST, SCE, IIC\_ID pins
- (4) Applied to HSYNC, VSYNC pins
- (5) Applied to SCL, SDA, PCLK, D0 to D9 pins
- (6) Applied to SCL, SDA pins when in High-Z output state  
Applied to HSYNC, VSYNC, PCLK, D0 to D9 pins when in Stand-by Mode

3. Electrical Characteristics

INDEX	Electrostatic Standard			UNIT	Remark
	PIN NO.	Design Target	Reference Product		
Human Body Model	ALL	• 2000V		V	
Machine Model	ALL	• 200V		V	
Latch-up	I-Test	ALL	Positive trigger : +(I <sub>nominal</sub> + 100mA) Negative trigger : -100mA	mA	
	V-Test	Power	1.5X Max V <sub>supply</sub>	V	

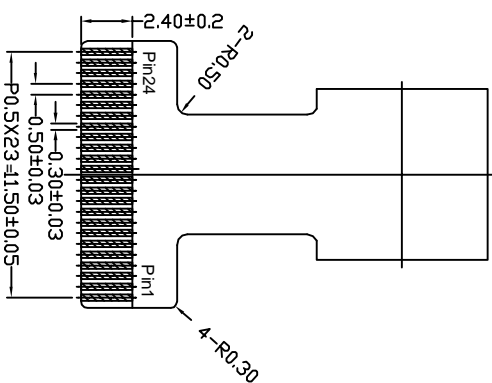
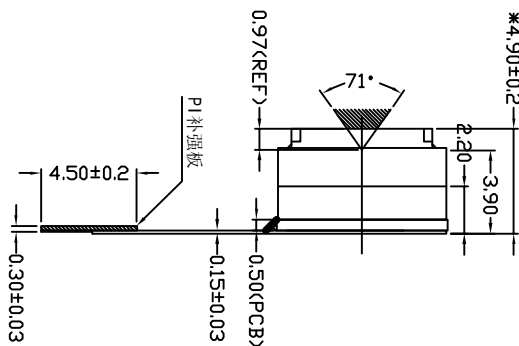
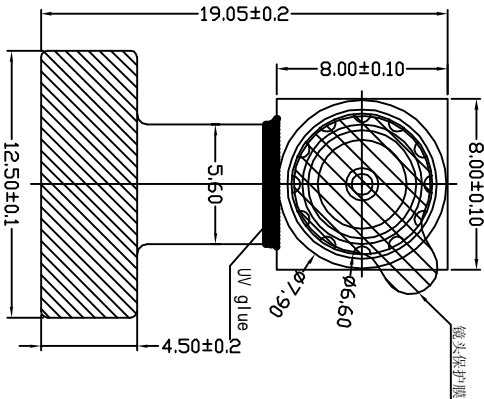
**Note:** For more information of sensor please refer to the S5K4BAFB specification.

**Mechanical Drawing**

# ROHS

## CM8069-A200BF-E Camera Module

Customer No.:



24PIN DESCRIPTION

PIN NO.	SIGNAL
1	NC
2	AGND
3	S10D
4	AVDD
5	S10C
6	RESET
7	VSVMC
8	PWDN
9	HREF
10	DVDD
11	DOVDD
12	Y7
13	XCLK
14	Y6
15	GND
16	Y5
17	PCLK
18	Y4
19	Y0
20	Y3
21	Y1
22	Y2
23	NC
24	NC

### 主要参数 (Module Specification)

焦距 (EFL)	3.39mm
光圈 (F.NO)	2.8
视场角 (View Angle)	71°
畸变 (Distortion)	< 1 %
解象力 (Image Quality)	≥ 600 TV line
景深 (Focusing Range)	80 cm~Infinity
感光芯片 (Chip Type)	SSK4BAFB
像素 (Array Size)	2.0M
镜头类型 (Lens Size)	1/4INCH 3P+1R

**F**  
 DVDD: 1.5V  
 AVDD: 2.8V  
 DOVDD: 1.8V/2.8V

光电感应模组

**TRULY SEMICONDUCTORS LTD.**

CUSTOMER	APPROVE	AMEND	DATE	CONTENT
Mechanical	Electrical			
		Modify Height	2007.10.27	
		Change Lens	2007.10.04	
				CONTENT

TOLERANCE  
 DECIMAL  
 \* ± .30  
 \*\* ± .20  
 < ± 1/4

PRODUCT NO.  
**CM8069-A200BF-E**  
 DRAW NO.  
 REV  
**C**

D/WN 严思志 20071027 DSN 严思志 20071027  
 CHKD 马亮 20071027 APPD 刘铁楠 20071027  
 NDT IN SCALE UNIT SHEET

**Appearance Specification**

NO.	Item	Standard	Importance Class
1	Top side of Lens	No obvious impurity and oil impurity on the front of lens within the half area; The defect(unfeeling) limitation: width $\leq$ 1mm, length $\leq$ 2mm, the defect number $\leq$ 2; No feeling defect; The width of defects and gaps on the outside of Lens $\leq$ 0.3mm. Others are unlimited.	A
2	Screw glue	Normally screw glue shall be symmetrical distributed around lens circle side. Particular circs, glue distribution must not disturb customer's assembly operation.	A
3	L1 Glass	No defect and dust check from 45° angle under the reflexing light and from 0° under the highlight	A
4	Holder	No obvious impurity and distortion of outline. The width and length of defect is unlimited, the depth $\leq$ 0.1mm and $\leq$ 1/4 of the thickness of Holder.	B
5	Sealed glue	Sealed glue distributing between holder and FPC must be symmetrical and smooth. Not allow glue leakage and asymmetric thickness. After holder assembly, the thickness distance between one side and its opposite side shall be less than 0.2mm. Excess glue over the holder shall not make the outside dimension be out of control.	A
6	FPC/PCB	Edge defect limitation: width $\leq$ 1/2H (H is minimum.)、 length $\leq$ 1mm、 defect numbers per edge $\leq$ 2(No tearing gap inby edge for FPC); Edge outshoot limitation (width $\leq$ 0.3mm, length $\leq$ 1mm). No obvious impurity and crease on the surface. If there was shield film on the surface, the spot size of the film shall be less than 0.3mm $\times$ 1mm and no line is exposed. If it was not be cleaned and did not influence the total thickness, it would be permitted. Label and mark shall be clear enough to be discerned.	A
7	Connector	No dust, fingerprint, and not allows to turning colors, distortion; Solder must be well; No open circuit or short circuit	A

8	Gold finger	No dust, fingerprint, and not allows to turning colors, burned, unsmoothed and peeled; No open circuit or short circuit; The defect width shall be smaller than 20% of gold finger's width. No copper/nickel exposed in defect. Numbers of defected pin shall be less than 3. The defect limitation:width $\leq$ 0.08mm,length $\leq$ 5mm.	A
9	Stiffener	Holder anchor pole length overtopping the steel plate shall be less than 0.2mm. No dust, rust and deep scratch on the steel surface without Double coated tapes.	B
10	Double coated tapes	Adhered direction shall be right. Not allows to excess steel plate edge. No alveoli and stick. Not allows to peel glue and rip protective paper when tear the protective paper.	B
11	Protective film	No dust in the glue side. Not allows to float or drop. Adhered direction shall be right.	B

Remark:

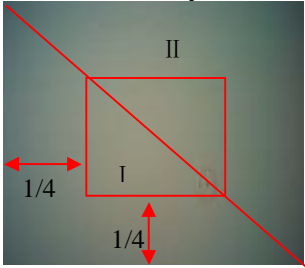
1. The definition of the appearance importance class

- A: The defect can be found in the finished product, or have obvious visual differences from good products, such as crack, defect and dust, or influence image quality, or are appointed by the customer. We will emphasize these items and check all products.
- B: The defect can be found in the finished product and has visual difference from the good one, but will not affect customer's aesthetic judgement. Or the defect can not be found in the finished product and will not generate functional problem, but will slightly influence sequential manufacture process or condition. We will supervise these items in the manufacturing process and check products selectively.

2. Sampling standard

Referenced standard: GB/T 2828.1-2003/ISO 2859-1:1999 and ANSI/ASQC.4-1993 II

### Image Specification

NO.	Item	Standard	Important Class
1	TV Line	Center $\geq 700$ 8 point of 0.7 viewing field $\geq 600$	A
2	Shading	The lightness of 90% viewing area $\geq 40\%$ of center lightness(Lens correction Shading [Turn off]); The lightness of 90% viewing area $\geq 60\%$ of center lightness(Lens correction Shading [Turn on])	A
3	Dust	No dust in the center viewing area; Border area according to the limit samples	A
4	Dead pixel	No in the viewing area.	A
5	Wound pixel 	I area: Blemish number $\leq 1$ II area: Blemish number $\leq 4$	B
6	Color	Color distortion ratio of center $\pm 15\%$	B
7	Gray Scale	Margin of two near scales' brightness $\geq 6$	B
8	Distortion	$< 1\%$	B
9	Flare	No flare in $45^\circ$ viewing angle; No ghost in full viewing angle	B

**QA Plan**

NO.	Item	Sampling frequency	Measure	Remark
Image and reliability item				
1	TV Line	AQL 0.65 II Class	Same as production	100% Inspection
2	Shading	AQL 0.65 II Class	Same as production	100% Inspection
3	Dust	AQL 0.65 II Class	Same as production	100% Inspection
4	Dead pixel	AQL 0.65 II Class	Same as production	100% Inspection
5	Wound pixel	AQL 1.5 II Class	Same as production	100% Inspection
6	Color	AQL 1.5 II Class	Same as production	100% Inspection
7	Gray Scale	AQL 1.5 II Class	Same as production	100% Inspection
8	Distortion	N=5,c=0 per batch	Same as production	Sampling by QA
9	Flare	N=5,c=0 per batch	Same as production	Sampling by QA
Appearance Check Items				
1	Top side of Lens	AQL 1.0 II Class	Same as production	100% Inspection
2	Screw glue	AQL 1.0 II Class	Same as production	100% Inspection
3	L1 Glass	AQL 1.0 II Class	Same as production	100% Inspection
4	Holder	AQL 1.5 II Class	Same as production	100% Inspection
5	Sealed glue	AQL 1.0 II Class	Same as production	100% Inspection
6	FPC/PCB	AQL 1.0 II Class	Same as production	100% Inspection
7	Connector	AQL 1.0 II Class	Same as production	100% Inspection
8	Gold finger	AQL 1.0 II Class	Same as production	100% Inspection
9	Stiffener	AQL 1.5 II Class	Same as production	100% Inspection
10	Double coated tapes	AQL 1.5 II Class	Same as production	100% Inspection
11	Protective film	AQL 1.5 II Class	Same as production	100% Inspection

Sample:

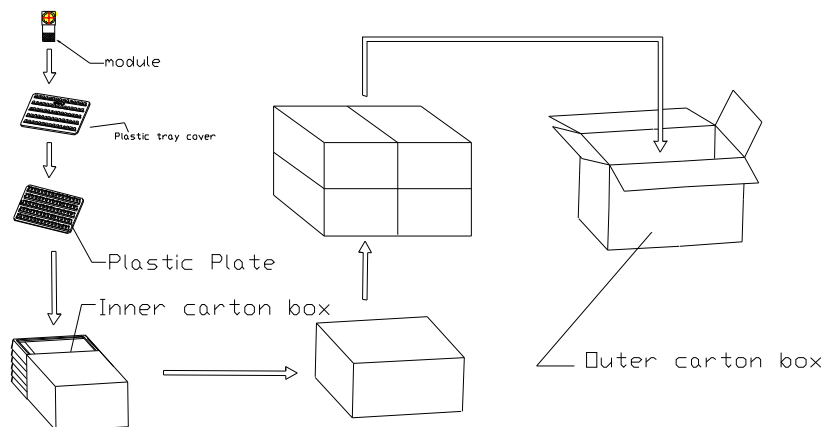
Referenced standard: GB/T 2828.1-2003/ISO 2859-1:1999 and ANSI/ASQC.4-1993 II

## Package Specification

### Packaging Design One

Product No.	CM8069-A200BF-E	Release date							
Product name	Compact Camera Module	Releaser							
Supplier	TRULY SEMI CONDUCTORS LTD	Recycle	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO						
Quantity/ each box	TBD	Material for box	<input checked="" type="checkbox"/> paper <input type="checkbox"/> plastic						
Outer carton box size	405mm*290mm*290mm	Box type	<input checked="" type="checkbox"/> new <input type="checkbox"/> update						
Quantity / inner box * Quantity / outer box	TBD	Weight	<table border="1"> <tr> <td>g / pcs</td> <td>BOX=TYPE</td> <td>TBD</td> </tr> <tr> <td>Kg / outer box</td> <td>Record of SRF Dept.</td> <td>Kg(Max)</td> </tr> </table>	g / pcs	BOX=TYPE	TBD	Kg / outer box	Record of SRF Dept.	Kg(Max)
g / pcs	BOX=TYPE	TBD							
Kg / outer box	Record of SRF Dept.	Kg(Max)							

#### Packing Standards:



There are TBD modules each plastic plate.

There are TBD modules each inner carton box..

There are 4 each outer carton box.

#### Requirements of outer carton box :

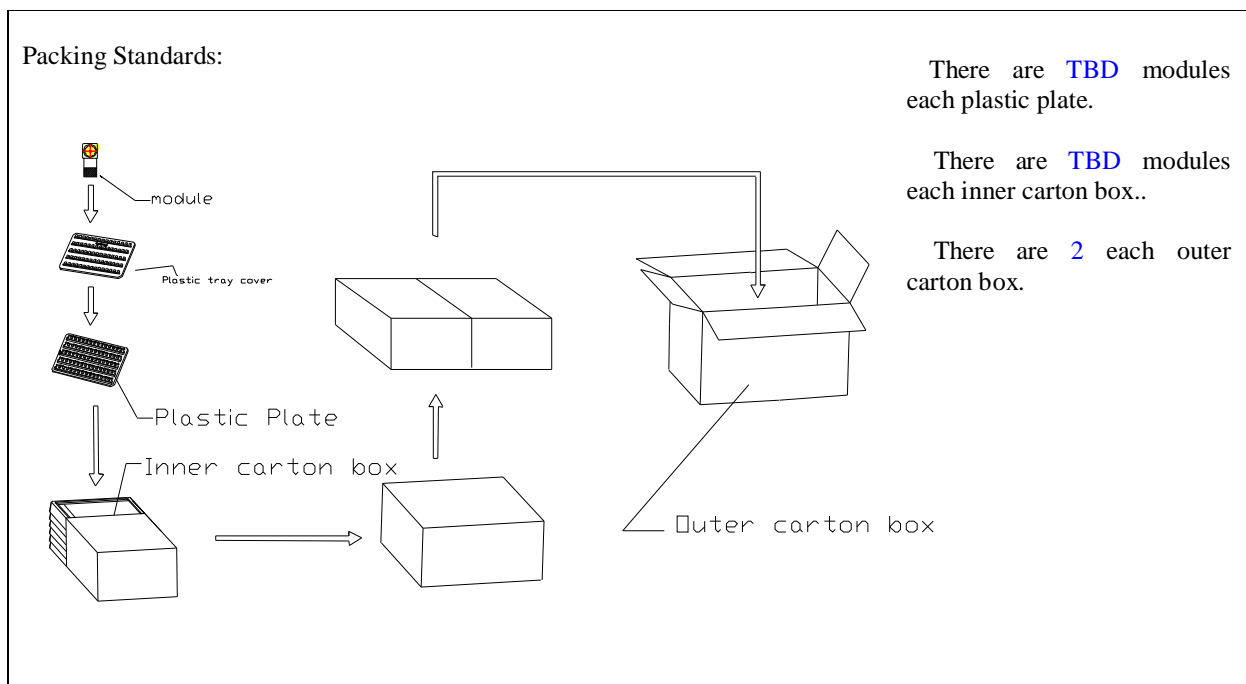
1. Weight(Max): TBD Kg
2. Height (Max): 0.29 M
3. Prohibition: Box made by log

#### Material for Plastic tray

It is made of antistatic polystyrene which has no chemical pollution. Surface resistivity :  $10^6$  ohm/sq

## Packaging Design Two

Product No.	CM8069-A200BF-E	Release date	
Product name	Compact Camera Module	Releaser	
Supplier	TRULY SEMI CONDUCTORS LTD	Recycle	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
Quantity/ each box	TBD	Material for box	<input checked="" type="checkbox"/> paper <input type="checkbox"/> plastic
Outer carton box size	405 mm *280 mm *170 mm	Box type	<input checked="" type="checkbox"/> new <input type="checkbox"/> update
Quantity / inner box * Quantity / outer box	TBD	Weight	
		ht	
		g / pcs	BOX-TYPE
		Kg / outer box	Record of SRF Dept.
			TBD Kg(Max)



### Requirements of outer carton box :

4. Weight(Max): TBD Kg
5. Height (Max): 0.17 M
6. Prohibition: Box made by log

### Material for Plastic tray

It is made of antistatic polystyrene which has no chemical pollution. Surface resistivity :  $10^6$  ohm/sq

**PRIOR CONSULT MATTER**

- 1.①For Truly standard products, we keep the right to change material, process for improving the product property without notice on our customer.  
②For OEM products, if any change needed which may affect the product property, we will consult with our customer in advance.
2. If you have special requirement about reliability condition, please let us know before you start the test on our samples.

**FACTORY CONTACT INFORMATION**

**FACTORY NAME:** TRULY SEMICONDUCTORS LTD.

**FACTORY ADDRESS:** Truly Industrial Area, ShanWei City, GuangDong, China

**FACTORY PHONE:** 86-0660-3380061    **FAX:** 86-0660-3371772