

Specification				
Part Number:		MC21605E6W-SPTLYI		
Version:		1		
Date:		18/09/2013		
Revision				
No.	Date	Description	Item	Page

Midas LCD Part Number System

MC	COG	132033	A	*	6	W	*	*	-	S	N	T	L	W	*	*
1	2	3	4	5	6	7	8	9	-	10	11	12	13	14	15	16

1 = **MC:** Midas Components

2 = **Blank:** COB (chip on board) **COG:** chip on glass

3 = **No of dots** (e.g. 240064 = 240 x 64 dots) (e.g. 21605 = 2 x 16 5mm C.H.)

4 = **Series**

5 = **Series Variant:** A to Z – see addendum

6 = **3:** 3 o'clock **6:** 6 o'clock **9:** 9 o'clock **12:** 12 o'clock

7 = **S:** Normal (0 to + 50 deg C) **W:** Wide temp. (-20 to + 70 deg C) **X:** Extended temp (-30 + 80 Deg C)

8 = **Character Set**

Blank: Standard (English/Japanese)

C: Chinese Simplified (Graphic Displays only)

CB: Chinese Big 5 (Graphic Displays only)

H: Hebrew

K: European (std) (English/German/French/Greek)

L: English/Japanese (special)

M: European (English/Scandinavian)

R: Cyrillic

W: European (English/Greek)

U: European (English/Scandinavian/Icelandic)

9 = **Bezel Height** (where applicable /available)

	Top of Bezel to Top of PCB	LED Connection Common (via pins 1 and 2) via pins 15+ 16-	Array or Edge Lit
Blank	9.5mm / not applicable		Array
2	8.9 mm	Common	Array
3	7.8 mm	Separate	Array
4	7.8 mm	Common	Array
5	9.5 mm	Separate	Array
6	7 mm	Common	Array
7	7 mm	Separate	Array
8	6.4 mm	Common	Edge
9	6.4 mm	Separate	Edge
A	5.5 mm	Common	Edge
B	5.5 mm	Separate	Edge
D	6.0mm	Separate	Edge
E	5.0mm	Separate	Edge
F	4.7mm	Common	Edge
G	3.7mm	Separate	EL
H	7 mm	Separate	Edge

10 = **T:** TN **S:** STN **B:** STN Blue **G:** STN Grey **F:** FSTN **F2:** FFSTN **V:** VA (Vertically Aligned)

11 = **P:** Positive **N:** Negative

12 = **R:** Reflective **M:** Transmissive **T:** Transflective

13 = **Backlight:** **Blank:** Reflective **L:** LED

14 = **Backlight Colour:** **Y:** Yellow-Green **W:** White **B:** Blue **R:** Red **A:** Amber **O:** Orange **G:** Green **RGB:** R.G.B.

15 = **Driver Chip:** **Blank:** Standard **I:** I²C **S:** SPI **T:** Toshiba T6963C **A:** Avant SAP1024B **R:** Raio RA6963

16 = **Voltage Variant:** e.g. **3** = 3v

▲1 Please ask for datasheet of the mentioned controller from Midas or Midas's authorized distributors. You can find the related information including AC & DC characteristics, Write & Read Timing diagram, Instruction table and descriptions, DDRAM & CGRAM, Rest Function and so on from the datasheet of controller.

▲1 You can ask for the example of software program (C language) from Midas or Midas's authorized distributors.

MECHANICAL SPECIFICATIONS

OVERALL SIZE	84.0W x 44.0H	mm	THICKNESS	max 10.0	mm
VIEWING AREA	61.0W x 15.8H	mm	HOLE-HOLE	79.0/76.0W x 36.0H	mm
CHARACTER SIZE	2.95W x 5.553H	mm	CHARACTER PITCH	0.6W x 0.394H	mm
DOT SIZE	0.578W x 0.681H	mm	DOT PITCH	0.015W x 0.015H	mm

ABSOLUTE MAXIMUM RATINGS

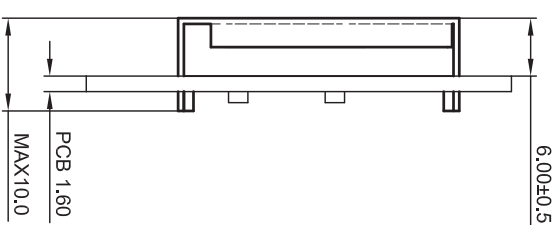
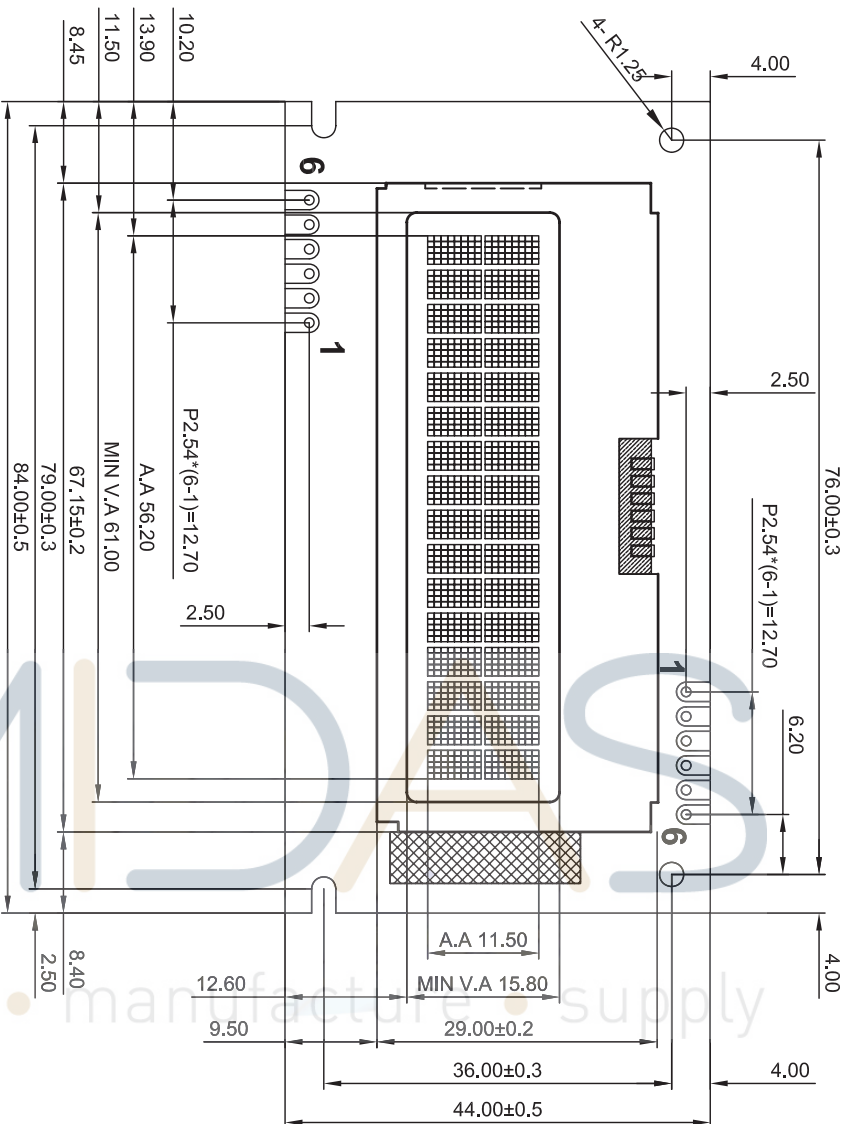
ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
POWER SUPPLY (LOGIC)	Vdd	25°C	-0.3	—	6.5	V
POWER SUPPLY (LCD)	V0	25°C	—	—	—	V
INPUT VOLTAGE	Vin	25°C	-0.3	—	Vdd +0.3	V
OPERATING TEMPERATURE	Vopr	—	-20	—	70	°C
STORAGE TEMPERATURE	Vstg	—	-30	—	80	°C

ELECTRONIC CHARACTERISTICS *

ICONS	ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
	INPUT VOLTAGE	Vlcm = Vdd	—	2.7	3.0	5.5	V
	SUPPLY CURRENT	Idd	Vdd=3V	—	1.0	—	mA
	DRIVING VOLTAGE FOR LCD PANEL	Vlcd	-20 °C	—	—	—	V
			0 °C	—	—	—	
			25 °C	—	—	—	
			50 °C	—	—	—	
			70 °C	—	—	—	

* All data are recorded from TEST REPORT #FWQC001662

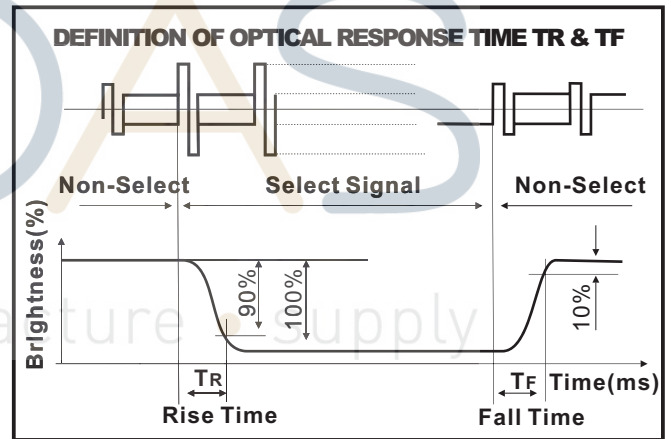
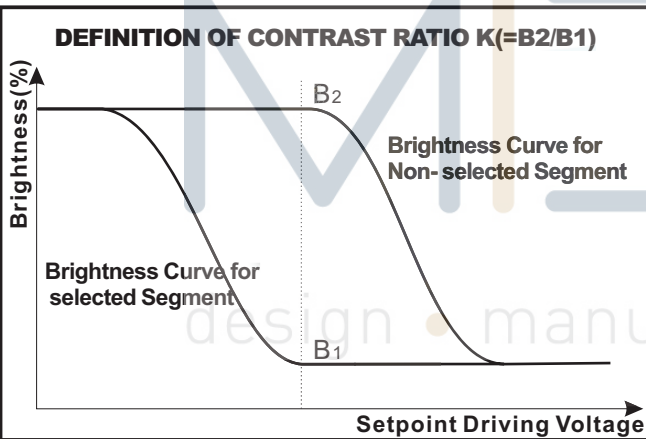
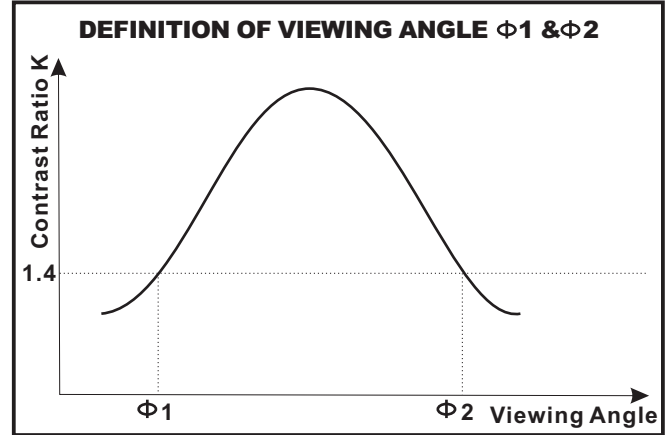
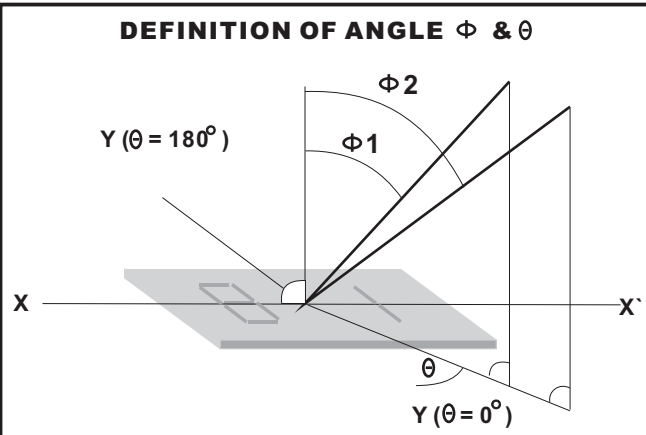
design • manufacture • supply



DOTS DETAIL
SCALE:1.5/1

FOR STN TYPE LCD MODULE (TA=25 °C, Vdd=3.0V ± 0.25V)

ICONS	ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
	VIEWING ANGLE	$\Phi 2 - \Phi 1$	K=4	40	—	—	deg
		θ		60			
	CONTRAST RATIO	K	—	—	6	—	—
	RESPONSE TIME(RISE)	TR	—	—	150	250	ms
	RESPONSE TIME(FALL)	TF	—	—	150	250	ms



ICON	ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
	LED FORWARD VOLTAGE	Vf	25℃ If = 30mA	—	4.1	—	V
	LED FORWARD CURRENT ▲2	If	25℃	—	30	40	mA
	LED REVERSE CURRENT	Ir	25℃ Vr=5V	—	—	10	μA/LED
	LED PEAK WAVE LENGTH	λp	25℃ If = 30mA	569	—	575	nm
	LED BRIGHTNESS (WITHOUT LCD)	Lv	25℃ If = 30mA	180	300	—	cd/m ²
	LED BRIGHTNESS UNIFORMITY	Lvmin/Lvmax	25℃ If = 30mA	75	—	—	Ratio
	LED LIFE TIME	—	25℃ If = 30mA	90k-100k	—	—	Hours

Built in internal resistor in the backlight to protect the LEDs

It should be noted that lifetime can be effected by environmental and driving conditions (clearly operating the display at the extremes of the spec will have an adverse effect on lifetime)

▲2 请注意, 驱动背光考虑的是恒流而不是恒压. 所以, 这个数值非常重要!

Please notice that it is constant current (not constant voltage) that should be applied when driving LED backlight. Therefore, this data is very important!

* 当工作温度高于25℃时, Ifm, Ifp和Pd必须降低; 电流降低率是 -0.36*2mA/℃ (直流驱动), 或-0.86*2 mA/℃ (脉冲驱动), 功率降低率是-75*2mW/℃. 产品工作电流不能大于对应的工作条件温度Ifm或Ifpr的60%.

For operation above 25℃, The Ifm Ifp & Pd must be derated, the Current derating is -0.36*2mA/℃ for DC drive and -0.86*2 mA/℃ for Pulse drive, the power dissipation is -75*2 mW/℃ The product working current must not be more than 60% of the Ifm or Ifp according to the working temperature.

注意: 保存条件不好时, 会降低反光膜(扩散膜)导光片(反射壳)的粘附力. 推荐保存条件: 温度 25℃ ± 10℃ 湿度: 65%RH ± 20%RH

Wrong storage condition will decrease the adhesive power of film and shell. Suggested Storage Condition: Temperature (25℃ ± 10℃) and Humidity (65%RH ± 20%RH)

LED BACKLIGHT COMPARASION

PRODUCT VERSION *2	DESCRIBED VERSION	SUBSTITUTED VERSION
PRODUCT CODE	Issue 2	Issue 1
LED manufacturer *3	Midas	Midas
BRIGHTNESS (cd / m ²)	338	26
UNIFORMITY *4(ratio)	89	76
Suggested CURRENT (mA)	30	15

备注 Remark*1

以上表格是本款背光与其它供应商提供的背光的参数对比. 从该表格对比您可以看出, 与其它供应商的背光相比, 福德电子自己生产的LED背光具有亮度更高, 均匀度更好, 且功耗更低的特点.

Above table shows the parameter contrasts of LED backlight between this described module's and the substituted module's. Viewing from the listed contrasts, you can draw the conclusion that the LED backlight produced by Midas has the features of higher brightness, better uniformity and lower power consumption.

备注 Remark*2

DESCRIBED VERSION 指本规格书所提的模块产品. 该模块产品采用福德电子自己生产的背光

SUBSTITUTED VERSION 指福德电子的原模块产品. 该模块产品采用福德电子的原背光供应商生产的背光

DESCRIBED VERSION refers to the described module in this datasheet which adopts LED BKL made by Midas.

SUBSTITUTED VERSION refers to the old version module (made by Midas too) which adopts LED BKL produced by Midas's former LED vendors.

备注 Remark*3

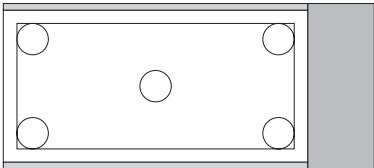
福德电子原来的背光供应商同样提供好品质的背光. 实际上, 福德电子采用这些供应商的背光的模块产品已超过十年获得市场的高度认可. 因此, 这张表格的比较不是为了说明他们的背光质量不好. 只是为了说明福德电子生产的背光的品质更好.

The former LED vendors of Midas also provide high quality backlight. Actually, Midas's original LCD modules adopting these vendors' backlights have received high recognition in the market for more than 10 years. Therefore, the comparison in this table does not mean that the quality of their backlight is poor, but to illustrate that the backlight produced by Midas has a better quality with some better features

备注 Remark*4

该均匀度的数据是将左边图纸中相关点的亮度进行平均而得出的. 在LED行业, 70%均匀度被认为是合格的均匀度. 换句话说, Midas 产的LED 可以保证超高的均匀度.

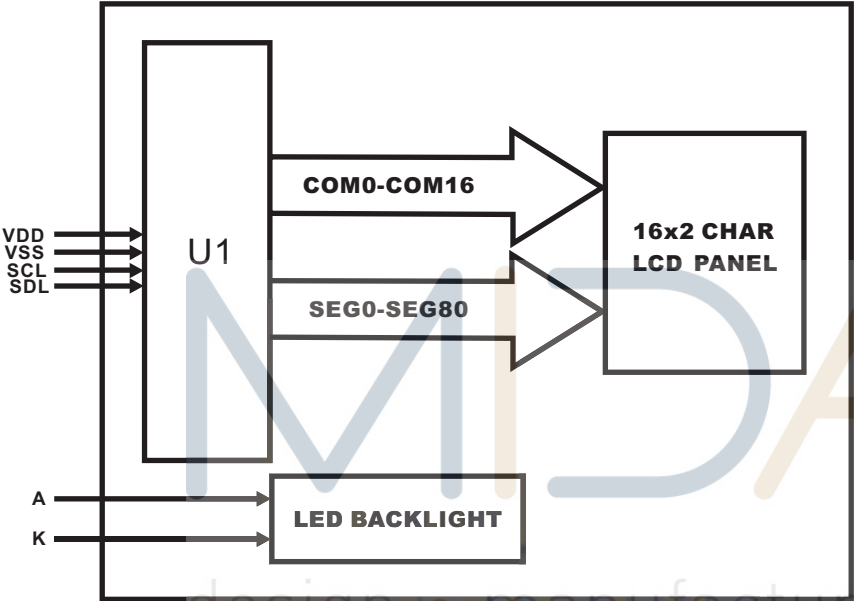
The data of uniformity is obtained by averaging the brightness of relevant dots on left drawing. In LED industry, 70% is acknowledged to be a qualified uniformity. In other words, The LED produced by Midas can promise a super high uniformity.



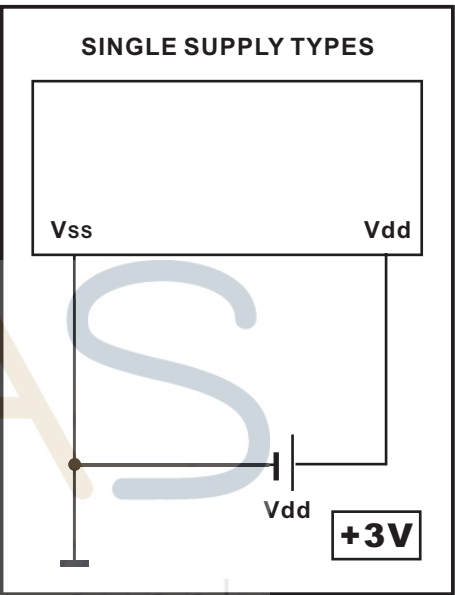
PIN ASSIGNMENT

PIN	SYMBOL	DESCRIPTION	REMARKS
1	Vss	GND	0V
2	Vdd	Power supply for LCM	3.0V
3	SCL	I2C serial clock input	
4	SDL	I2C serial data input/output	
5	LED+	Power supply for BKL	4.1V
6	LED-	Power supply for BKL	0V

BLOCK DIAGRAM



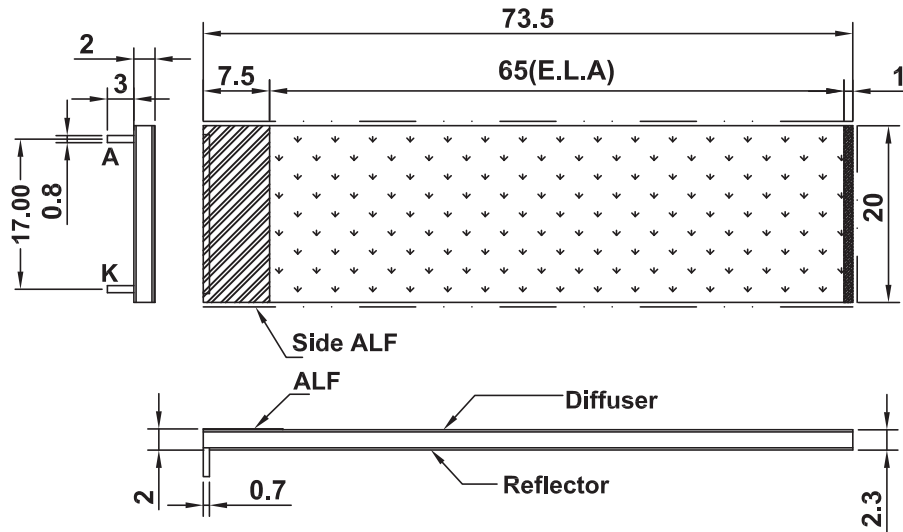
POWER SUPPLY DIAGRAM



结构图 MECHANICAL DRAWING

结构尺寸MECHANICAL OUTLINE

(未注尺寸公差Unspecified Tolerances is ± 0.3)

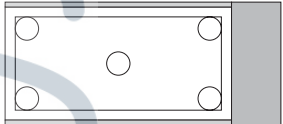


颜色 COLOR: Yellow - Green 灯芯数 LED QUANTITY: 1*2=2(SMT) 电路 CIRCUIT: A K

■ All the data are recorded from the test report #FSYP00020126

* 请注意, 驱动背光考虑的是恒流而不是恒压所以, 这个数值非常重要! YOUR ATTENTION: it is constant current (not constant voltage) that should be applied when driving LED BKL. Therefore, this data is very important!

● Test Diagram: BM-7 $\varnothing 5$ 1°



极限参数 ABSOLUTE MAXIMUM RATINGS (除非特别说明, 环境温度Ta = 25°C. Unless specified, the Ambient temperature Ta = 25°C)

项目 ITEM	符号 SYMBOL	条件 CONDITIONS	值 RATING	单位 UNIT
极限直流正向电流 ABSOLUTE MAXIMUM FORWARD CURRENT*	Ifm		20*2	mA
脉冲驱动时极限正向电流 PEAK FORWARD CURRENT*	Ifp	1 msec Plus 10% Duty Cycle	—	mA
反向电压 REVERSE VOLTAGE	Vr		0.8	V
极限功耗 POWER DISSIPATION*	Pd		75*2	mW
工作温度 OPERATING TEMPERATURE RANGE	Topr		-20~+70 °C	°C
贮存温度 STORAGE TEMPERATURE RANGE	Tstg		-30~+80 °C	°C

* 当工作温度高于25°C时, Ifm, Ifp和Pd必须降低; 电流降低率是 -0.36*2mA/°C (直流驱动), 或 -0.86*2 mA/°C (脉冲驱动), 功率降低率是 -75*2mW/°C. 产品工作电流不能大于对应的工作条件温度Ifm或Ifpr的60%.

For operation above 25°C, The Ifm Ifp & Pd must be derated, the Current derating is -0.36*2mA/°C for DC drive and -0.86*2 mA/°C for Pulse drive, the power dissipation is -75*2 mW/°C The product working current must not be more than 60% of the Ifm or Ifp according to the working temperature.

● 推荐焊接条件: 温度 260°C + 5°C, 焊接时间小于3秒, 烙铁功率小于30W. 焊接点应离焊接实体大于1.6mm. Suggested Soldering Temperature is 260 ± 5°C and Soldering Time should be less than 3sec, and soldering iron power should be less than 30W. The soldering point should be farther than 1.6mm (1/10") from body.

▲ 注意: 保存条件不好时, 会降低反光膜(扩散膜)导光片(反射壳)的粘附力. 推荐保存条件: 温度 25°C ± 10°C 湿度: 65%RH ± 20%RH Wrong storage condition will decrease the adhesive power of film and shell. Suggested Storage Condition: Temperature (25°C + 10°C) and Humidity (65%RH ± 20%RH)

FULL-SIZED PACKAGE
45 PCS/BOX
10 BOXES/CARTON
450 PCS/CARTON
13.00 KGS/CTN(G.W.)
0.054 M ³ /CARTON

HALF-SIZED PACKAGE
45PCS/BOX
5 BOXES/CARTON
225 PCS/CARTON
6.00 KGS/CTN(G.W.)
0.027 M ³ /CARTON

PACKING DECLARATION
1. This packaging information is for reference only. The actual information is subject to the actual packaging. Especially for packaging of LCL, tolerances may exist.
2. Midas will not be responsible for quality problems caused by unnormal transportation conditions (including but not limited to climate factors or human factors, such as improper handling).

