



# 富相科技股份有限公司

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PART NO : GC1602P8SHN1B(LM1180SGR)  
FOR MESSRS : \_\_\_\_\_

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Accepted by : \_\_\_\_\_

Proposed by :   
Date : 08,22,2002

## RECORD OF REVISION

| DATE       | PAGE                              | SUMMARY                                                                                                                                                                                                                                                                                                             |
|------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 84.10.21   | 3                                 | 3.3 MECHANICAL DATA<br>(5) CHARACTER SIZE -----2.96W*4.86H mm<br>—————▶2.96W*5.56H mm                                                                                                                                                                                                                               |
| 86.09.03   | ALL                               | ADDRESS CHANGED                                                                                                                                                                                                                                                                                                     |
| 87.04.20   | ALL                               | PAGES CHANGED<br>(CHANGED TO COMMON BOARD)                                                                                                                                                                                                                                                                          |
| 88.12.02   | 8                                 | PAGE CHANGED                                                                                                                                                                                                                                                                                                        |
| 2002,02,19 | ALL<br><br>04<br><br>05<br><br>09 | CHANGED ADDRESS , FAX , TEL &<br>COMPANY NAME , LOGO<br>4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS.<br>SHOCK STORAGE 490.0m/s <sup>2</sup> (50G)→ 49.0m/s <sup>2</sup> (5G)<br>5.ELECTRICAL CHARACTERISTICS.<br>RECOMMENDED LCD DRIVING VOLTAGE<br>TYP. 4.6 →(4.7) , 4.4→4.2 , 4.2→(3.7)<br>ADD TOLERANCE : ±0.01mm |
| 2002,02,21 | 04<br>08                          | NOTE (3) 95%→90%<br>7. DIMENSION OUTLINE.<br>7.8±0.5→4.8±0.5                                                                                                                                                                                                                                                        |
| 2002,08,08 | ALL                               | CHANGE PART NO.LM1180SGR→GC1602R0SHN1B                                                                                                                                                                                                                                                                              |
| 2002,08,21 | ALL                               | CHANGE PART NO. GC1602R0SHN1B→GC1602P8SHN1B                                                                                                                                                                                                                                                                         |
|            |                                   |                                                                                                                                                                                                                                                                                                                     |

### **3. GENERAL SPECIFICATIONS AND MECHANICAL DATA.**

#### **3.1 GENERAL SPECIFICATIONS.**

PLEASE REFER TO :

”CUSTOMER ACCEPTANCE STANDARD SPECIFICATIONS (SP-10-001)”.

#### **3.2 THIS INDIVIDUAL SPECIFICATIONS IS PRIOR TO GENERAL SPECIFICATIONS.**

#### **3.3 MECHANICAL DATA**

- (1) NUMBER OF CHARACTER ----- 16CH\*2 LINES
- (2) MODULE SIZE ----- 84.0W\*44.0H\*9.5T (MAX) mm
- (3) VIEWING AREA ----- 63.5W\*15.8H mm
- (4) CHARACTER PATTERN ----- 5\*7DOTS +CURSOR
- (5) CHARACTER SIZE ----- 2.96W\*5.56Hmm
- (6) CHARACTER PITCH ----- 3.55W\*5.94Hmm
- (7) DOT SIZE -----0.56W\*0.66H mm
- (8) DOT PITCH ----- 0.60W\*0.70Hmm
- (9) LCD TYPE ----- STN, GRAY, REFLECTIVE  
60'CLOCK

## 4. ABSOLUTE MAXIMUM RATINGS.

### 4.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

| ITEM                                    | SYMBOL  | MIN. | MAX. | UNIT | COMMENT  |
|-----------------------------------------|---------|------|------|------|----------|
| POWER SUPPLY FOR LOGIC                  | VDD-VSS | ——   | 6.0  | V    |          |
| POWER SUPPLY FOR LCD<br>DRIVING VOLTAGE | VDD-VO  | ——   | 6.0  | V    |          |
| INPUT VOLTAGE                           | VI      | VSS  | VDD  | V    |          |
| STATIC ELECTRICITY                      | ——      | ——   | 100  | V    | NOTE (1) |

NOTE(1) : TEST METHOD AND CONDITIONS AFTER CHARGING UP 200PF  
CAPACITOR BY STATED VOLTAGE , THE CAPACITOR IS CONNECTED  
WITH INTERFACE PINS OF THE MODULE.

### 4.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS.

| ITEM                | OPERATING      |                                | STORAGE        |                               | COMMENT                               |
|---------------------|----------------|--------------------------------|----------------|-------------------------------|---------------------------------------|
|                     | MIN.           | MAX.                           | MIN.           | MAX.                          |                                       |
| AMBIENT TEMPERATURE | 0℃             | 50℃                            | -20℃           | 60℃                           | NOTE (2)                              |
| HUMIDITY            | NOTE (3)       |                                | NOTE (3)       |                               | WITHOUT CONDENSATION                  |
| VIBRATION           | — —            | 4.9 m/s <sup>2</sup><br>(0.5G) | — —            | 19.6 m/s <sup>2</sup><br>(2G) | 10~300HZ XYZ<br>DIRECTIONS 1 Hr.EACH  |
| SHOCK               | — —            | 29.4 m/s <sup>2</sup><br>(3G)  | — —            | 49.0 m/s <sup>2</sup><br>(5G) | 10 mSEC XYZ<br>DIRECTIONS 1 TIME EACH |
| CORROSIVE GAS       | NOT ACCEPTABLE |                                | NOT ACCEPTABLE |                               |                                       |

NOTE(2) : Ta AT -20℃ : 48HR MAX.  
60℃ : 168HR MAX.

NOTE(3) : Ta ≤ 40℃ :90% RH MAX.  
Ta > 40℃ : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE  
HUMIDITY OF 90%RH AT 40℃ .

## 5. ELECTRICAL CHARACTERISTICS.

Ta = 25°C

VDD = 5.0±10%

| ITEM                                          | SYMBOL                       | CONDITION    | MIN. | TYP.  | MAX. | UNIT |
|-----------------------------------------------|------------------------------|--------------|------|-------|------|------|
| INPUT VOLTAGE<br>(H LEVEL)                    | VIH                          | — — — —      | 2.2  | — —   | — —  | V    |
| INPUT VOLTAGE<br>(L LEVEL)                    | VIL                          | — — — —      | — —  | — —   | 0.6  | V    |
| OUTPUT VOLTAGE<br>(H LEVEL)                   | VOH                          | -I0H = 0.2mA | 2.4  | — —   | — —  | V    |
| OUTPUT VOLTAGE<br>(L LEVEL)                   | VOL                          | I0L = 1.2mA  | — —  | — —   | 0.4  | V    |
| POWER SUPPELY<br>CURRENT (LOGIC)              | IDD                          | VDD = 5.0 V  | — —  | 1.0   | 3.0  | mA   |
| RECOMMENDED LCD<br>DRIVING VOLTAGE<br>NOTE(1) | VDD-VO<br>DUTY=1/16<br>φ=10° | Ta = 0 °C    | — —  | (4.7) | — —  | V    |
|                                               |                              | Ta = 25 °C   | — —  | 4.2   | — —  | V    |
|                                               |                              | Ta = 50 °C   | — —  | (3.7) | — —  | V    |

NOTE(1) : RECOMMENDED LCD DRIVING VOLTAGE

MAY FLUCTUATE ABOUT ± 0.5V BY EACH MODULE.

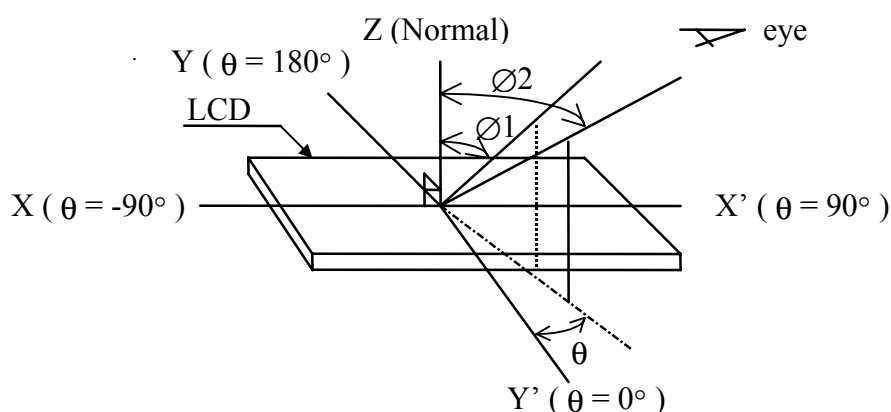
## 6. OPTICAL CHARACTERISTICS.

Ta = 25°C

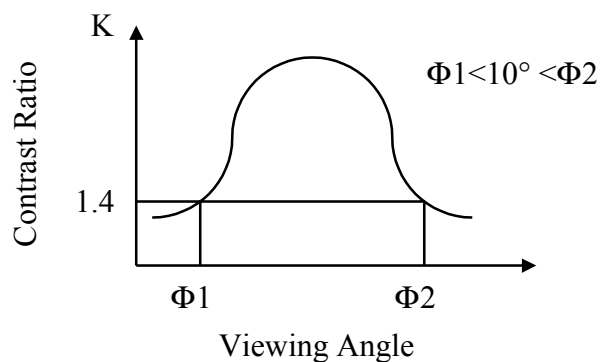
VDD = 5.0V

| ITEM           | SYMBOL          | CONDITION                               | MIN. | TYP. | MAX. | UNIT | NOTE |
|----------------|-----------------|-----------------------------------------|------|------|------|------|------|
| VIEWING AREA   | $\Phi 2-\Phi 1$ | K = 1.4                                 | ---- | 40   | ---- | deg. |      |
| CONTRAST RATIO | K               | $\Phi = 10^\circ$<br>$\theta = 0^\circ$ | ---- | 2    | ---- | ---- |      |
| RESPONSE TIME  | tr(rise)        | $\Phi = 10^\circ$<br>$\theta = 0^\circ$ | ---- | 250  | 400  | ms   |      |
|                | tf(fall)        | $\Phi = 10^\circ$<br>$\theta = 0^\circ$ | ---- | 350  | 450  | ms   |      |

NOTE(1) : DEFINITION OF  $\theta$  AND  $\Phi$



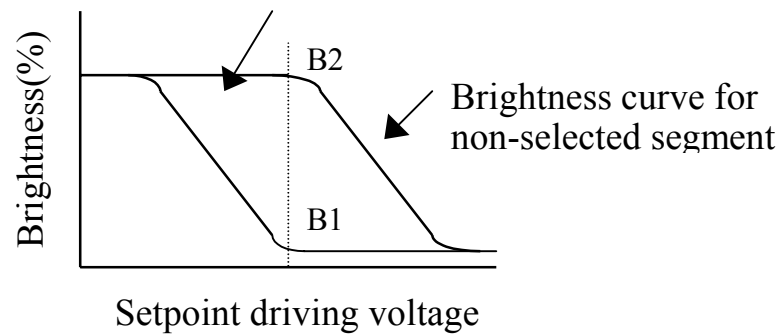
NOTE(2) : DEFINITION OF VIEWING ANGLE  $\Phi 1$  AND  $\Phi 2$



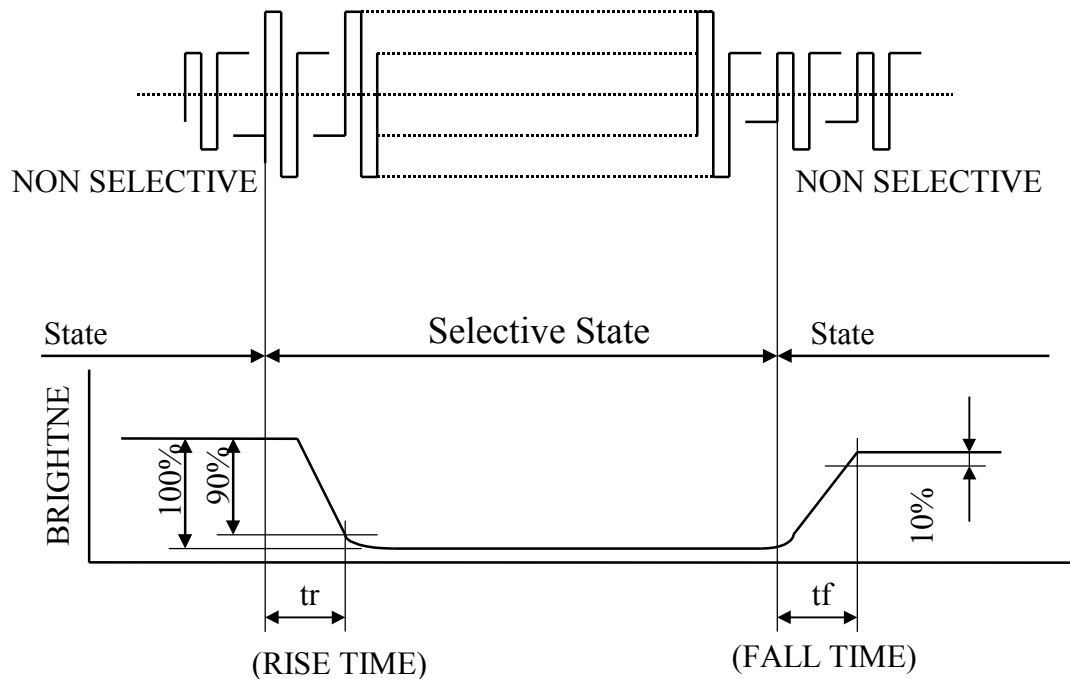
NOTE (3) : DEFINITION OF CONTRAST“K”.

$$K = \frac{\text{Brightness of non-selected segment (B2)}}{\text{Brightness of selected segment (B1)}}$$

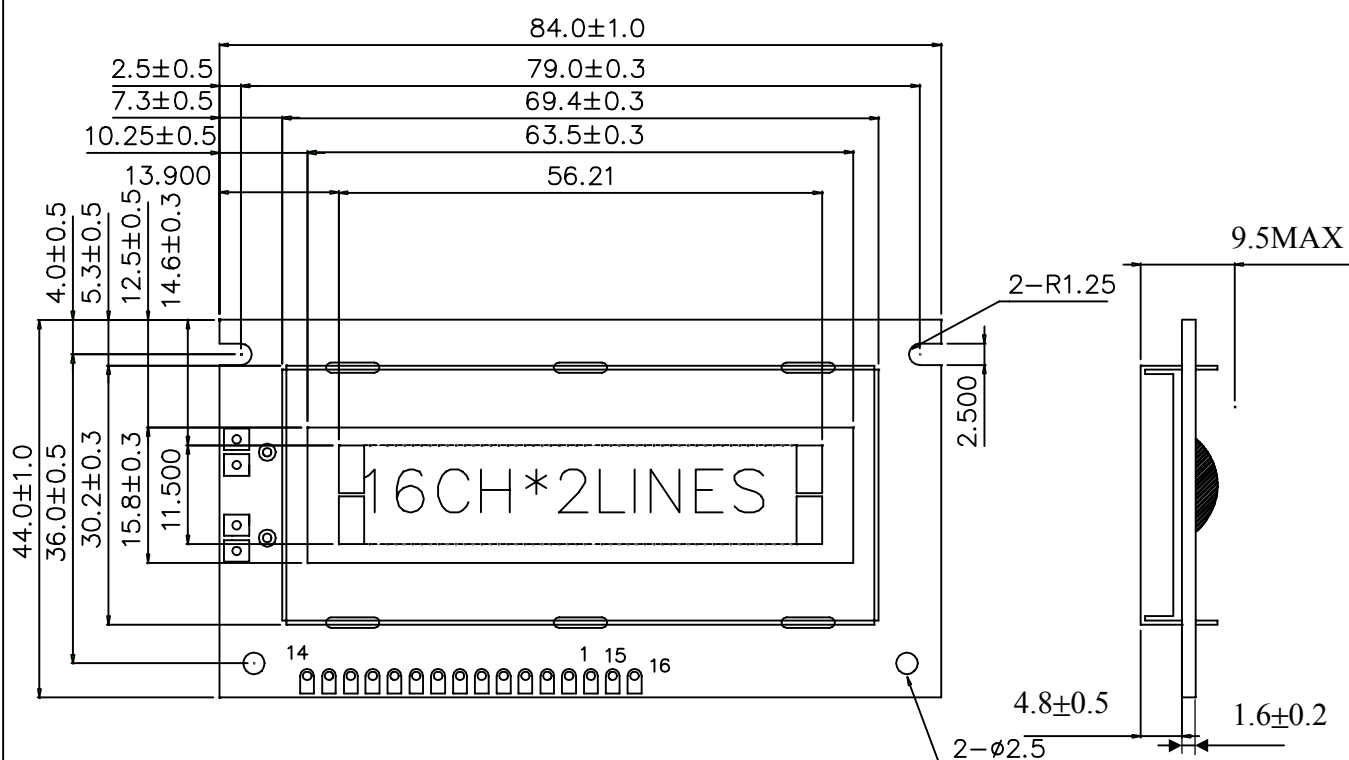
Brightness curve for selected segment



NOTE(4) : DEFINITION OF OPTICAL RESPONSE.



## 7. DIMENSION OUTLINE.



NO SPECIFIED TOLERANCE:±0.3

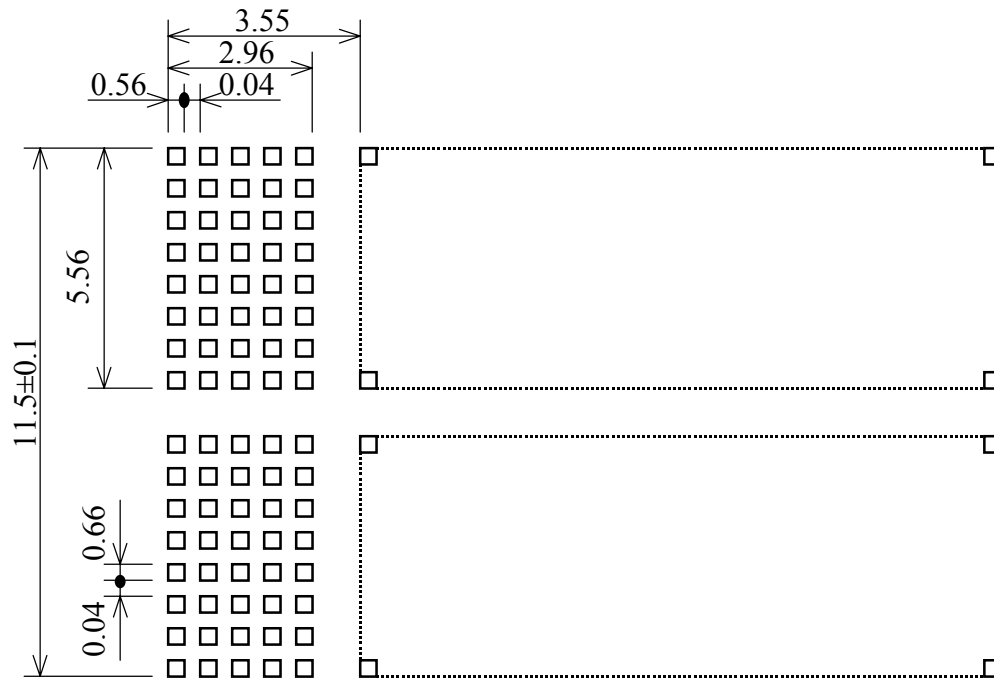
SCALE : NTS

UNIT : mm

### INTERFACE PIN CONNECTION.

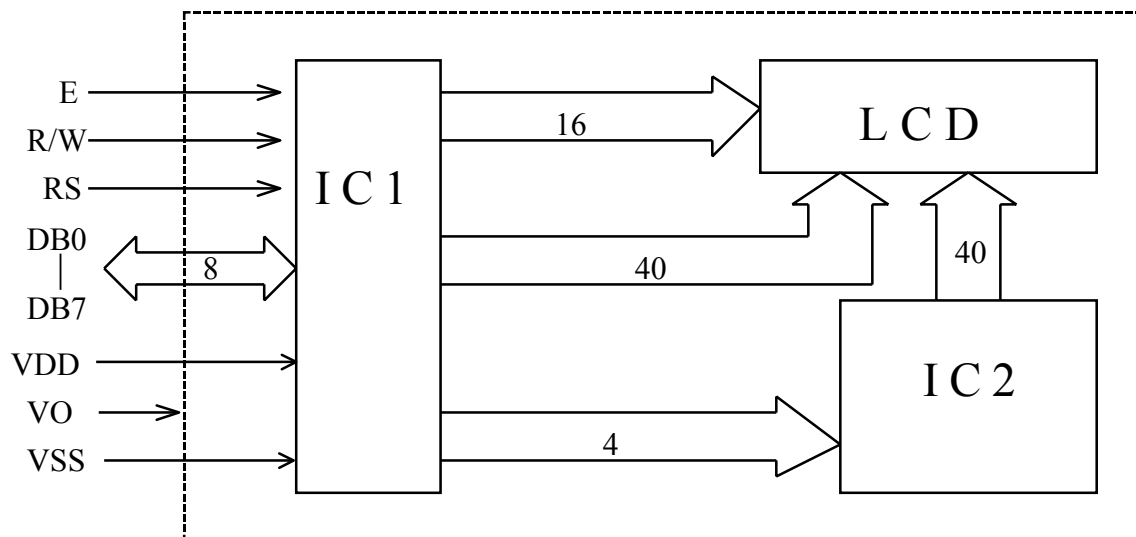
| PIN NO | 1   | 2   | 3   | 4   | 5   | 6  | 7   | 8   | 9   | 10  |
|--------|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|
| SYMBOL | VSS | VDD | VO  | RS  | R/W | E  | DB0 | DB1 | DB2 | DB3 |
| PIN NO | 11  | 12  | 13  | 14  | 15  | 16 |     |     |     |     |
| SYMBOL | DB4 | DB5 | DB6 | DB7 | NC  |    |     |     |     |     |

## 7.1 DETAIL DRAWING OF MATRIX PATTERN.



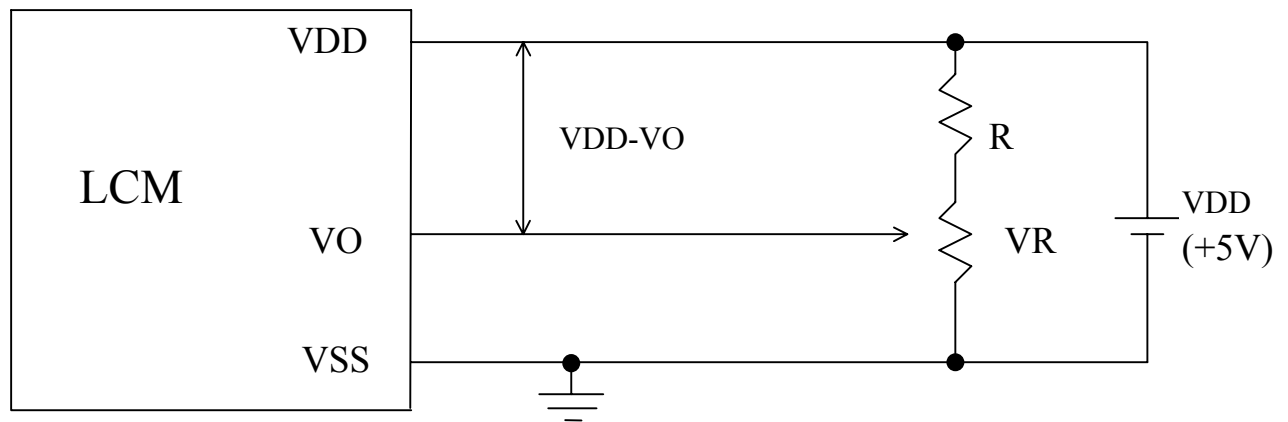
NOT SPECIFIED TOLERANCE:  $\pm 0.01\text{mm}$

## 7.2 BLOCK DIAGRAM.



## 8. POWER SUPPLY.

### 8.1 POWER SUPPLY FOR LCM.



VDD-VO : LCD DRIVING VOLTAGE

VR :  $10\text{K}\Omega \sim 20\text{K}\Omega$

RECOMMEND RESISTOR R:  $1\text{K}\Omega$