

# 回轉式位元產生器規格書

## ROTATIONAL ENCODER SPECIFICATION

### 一,一般事項 General

#### 1~1 適用範圍 Application

適用於電子機器的微小電流回路用之12mm迴轉式位元產生器

Application: This specification applies to 12mm size rotary encoder(incremental) for microscopic current circuit used electronic equipment.

#### 1~2 標準狀態 Standard atmospheric conditions

若無特別規定限制, 測試時需要在標準狀態範圍下, 此範圍如下:

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows.

溫度 Ambient temperature : 15°C to 35°C

相對濕度 Relative humidity : 25% to 85%

氣壓 Air pressure : 86kpa to 106kpa

但如有疑問時, 依下述基準狀態實施:

If there is any doubt about the results, measurements shall be made within the following:

溫度 Ambient temperature : 20±2°C

相對濕度 Relative humidity : 60% to 70%

氣壓 Air pressure : 86kpa to 106kpa

#### 1~3 使用溫度範圍

Operating temperature range : -10°C to +70°C

#### 1~4 保存溫度範圍

Storage temperature range:-40°C to +85°C

#### 1~5 構造, 尺寸 Construction and dimensions 依組立圖 Refer to attached drawing

#### 1~6 額定 Rating : D.C 5V 0.5mA

|      |      |      |      |      |            |            |            |                                    |             |
|------|------|------|------|------|------------|------------|------------|------------------------------------|-------------|
|      |      |      |      |      | APPD.      | CHKD.      | DSGD.      | DOCUMENT NO. :                     |             |
|      |      |      |      |      |            |            |            | EC12PLBRSDVF-D-25K-24-24C-31/07-6H |             |
|      |      |      |      |      | 余倩         | 余倩         | 鐘學峰        | VERSION :                          | L           |
|      |      |      |      |      |            |            |            | PAGE :                             | 1 OF 11     |
| SYMB | DATE | APPD | CHKD | DSGD | 2011.11.29 | 2011.11.29 | 2011.11.29 | DRAWING NO.:                       | EC12PSD-010 |

# 回轉式位元產生器規格書

## ROTATIONAL ENCODER SPECIFICATION

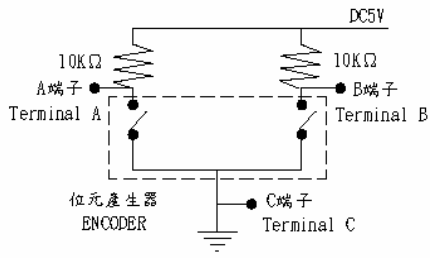
### 二. 電氣性能 Electrical Characteristics

| NO. | 項目<br>item                      | 條件<br>conditions                                    | 規格<br>specifications  |   |
|-----|---------------------------------|---|---|---|
| 2-1 | 輸出信號<br>output signal<br>format | < 圖一 > < fig. 1 >                                   | A . B 二信號的輸出時間相位差, 詳細如<圖一>所示.<br>(圖中虛線表示掣子點定位置)<br>2. Phase-different signals<br>(Signal A. & signal B)<br>Details shown in < fig.1 ><br>(The broken line shows detent position of with detent type.) |   |
|     |                                 | 軸回轉方向<br>Shaft rotational direction                 | 信號<br>Signal  | 輸出波形 Output<br>定速旋轉 constant speed : 360° |
|     |                                 | 順時針方向<br>C. W.                                      | A ( A-C 端子間 )<br>A ( Terminal A-C )<br>B ( B-C 端子間 )<br>B ( Terminal B-C )  |   |
|     |                                 | 反時針方向<br>C. C. W.                                   | A ( A-C 端子間 )<br>A ( Terminal A-C )<br>B ( B-C 端子間 )<br>B ( Terminal B-C )  |   |
| 2-2 | 分解能<br>Resolution               | 旋轉一圈所產生脈波數目.<br>Number of pulses in 360° rotation . | 各相24脈波/360°<br>24 pulses / 360° for each phase<br>( 1掣子點 1 Pulse) (1 click 1 pulse)   |   |

|      |      |      |      |      |            |            |            |                                    |             |
|------|------|------|------|------|------------|------------|------------|------------------------------------|-------------|
|      |      |      |      |      | APPD.      | CHKD.      | DSGD.      | DOCUMENT NO. :                     |             |
|      |      |      |      |      |            |            |            | EC12PLBRSDVF-D-25K-24-24C-31/07-6H |             |
|      |      |      |      |      | 余倩         | 余倩         | 鐘學峰        | VERSION :                          | L           |
|      |      |      |      |      |            |            |            | PAGE :                             | 2 OF 11     |
| SYMB | DATE | APPD | CHKD | DSGD | 2011.11.29 | 2011.11.29 | 2011.11.29 | DRAWING NO.:                       | EC12PSD-010 |

# 回轉式位元產生器規格書

## ROTATIONAL ENCODER SPECIFICATION

| NO. | 項 目<br>item                             | 條 件<br>conditions  | 規 格<br>specifications      |
|-----|---|--|----------------------------|
| 2-3 | 切 換 特 性<br>Switching<br>characteristics | <p>切換測定回路如&lt;圖二&gt;所示, 以直流電壓5V, 軸回轉速度為每秒鐘回轉360°測定。<br/>Measurement shall be made under the condition as follows .</p> <p>(1). Shaft rotational speed : 360° / S<br/>(2). Test circuit : &lt; fig. 2 &gt; .</p> <p style="text-align: center;">&lt; 圖 二 &gt; &lt; fig. 2 &gt;</p>   |                            |
| 2-4 | 滑 動 雜 音<br>Sliding noise                | <p>(1) 震顛雜音 Chattering<br/>如 &lt;圖三&gt; 所示, 位元由狀態OFF→ON或ON→OFF變化時,輸出電壓在1.5V~3.5V的切換時間<br/>Details shown in &lt;fig.3&gt; Specified by the signal's passage time from 3.5V to 1.5V or from 1.5V to 3.5V of each switching position ( code OFF→ON or ON→OFF ).</p> <p>注意：針對震顛雜音(t1, t3)部分, 請於訊號<br/>抓取上加以遮蔽, 進行過濾雜訊。<br/>建議追加過濾迴路, 如&lt;圖四&gt;所示。<br/>Note : To avoid chattering( t1 , t3), please consider masking time and adding C/R filters on your circuit for pulse count design, as show in &lt;fig. 4&gt;.</p> | $t_1, t_3 \leq 3\text{ms}$ |

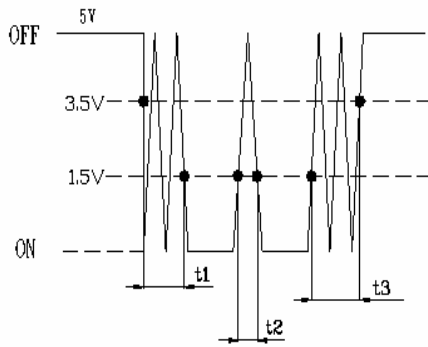
|      |      |      |      |      |            |            |            |                                    |             |
|------|------|------|------|------|------------|------------|------------|------------------------------------|-------------|
|      |      |      |      |      | APPD.      | CHKD.      | DSGD.      | DOCUMENT NO. :                     |             |
|      |      |      |      |      |            |            |            | EC12PLBRSDVF-D-25K-24-24C-31/07-6H |             |
|      |      |      |      |      | 余 倩        | 余 倩        | 鐘學峰        | VERSION :                          | L           |
|      |      |      |      |      |            |            |            | PAGE :                             | 3 OF 11     |
| SYMB | DATE | APPD | CHKD | DSGD | 2011.11.29 | 2011.11.29 | 2011.11.29 | DRAWING NO.:                       | EC12PSD-010 |

# 回轉式位元產生器規格書

## ROTATIONAL ENCODER SPECIFICATION

| NO. | 項目<br>item | 條件<br>conditions   | 規格<br>specifications |
|-----|------------|--|----------------------|
|     |            | <p>(2) 跳躍雜音 Bounce<br/>           如&lt;圖三&gt;所示,位元在ON的狀態時,電壓超過1.5V以上的時間視為.當在位元ON狀態時,與震顛雜音(t<sub>1</sub>或t<sub>3</sub>)時間間隔小于1ms時,則該跳躍雜音視為震顛雜音的一部份.<br/>           當在位元ON狀態時,兩個跳躍雜音間的時間間隔小于1ms時,則視為同一跳躍雜音.<br/>           Details shown in &lt;fig.3&gt; .Specified by the time of voltage change exceed 1.5V in code - ON area .<br/>           When the bounce has code - ON time less than 1ms between chatterings ( t<sub>1</sub> or t<sub>3</sub> ), the voltage change shall be regarded as a part of chattering .<br/>           When the code - ON time between 2 bounces is less than 1ms , they are regarded as 1 linked bounce .</p> | t <sub>2</sub> ≤ 2ms |
|     |            | <p>(3) 滑動雜音 Sliding noise<br/>           位元OFF狀態時的電壓變動.<br/>           The voltage change in code-OFF area</p>   | 3.5V 以上<br>3.5V Min. |

<圖三> <fig. 3>



(t<sub>1</sub>,t<sub>3</sub>)Masking time to avoid chattering.

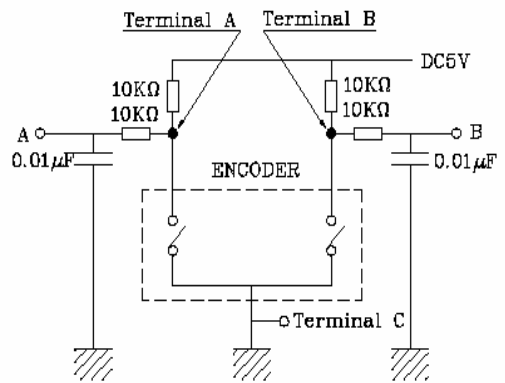
位元OFF狀態：輸出電壓3.5V以上的狀態稱之。

位元ON狀態：輸出電壓1.5V以下的狀態稱之。

Code - OFF area：The area which the voltage is 3.5V or more .

Code - ON area：The area which the voltage is 1.5 V or less .

<圖四> <fig. 4>



|      |      |      |      |      |            |            |            |                                    |             |
|------|------|------|------|------|------------|------------|------------|------------------------------------|-------------|
|      |      |      |      |      | APPD.      | CHKD.      | DSGD.      | DOCUMENT NO. :                     |             |
|      |      |      |      |      | 余倩         | 余倩         | 鐘學峰        | EC12PLBRSDVF-D-25K-24-24C-31/07-6H |             |
|      |      |      |      |      |            |            |            | VERSION :                          | L           |
|      |      |      |      |      |            |            |            | PAGE :                             | 4 OF 11     |
| SYMB | DATE | APPD | CHKD | DSGD | 2011.11.29 | 2011.11.29 | 2011.11.29 | DRAWING NO.:                       | EC12PSD-010 |

# 回轉式位元產生器規格書

## ROTATIONAL ENCODER SPECIFICATION

| NO.   | 項目<br>item                    | 條件<br>conditions   | 規格<br>specifications  |
|---|-------------------------------|--|---|
| 2-5   | 相位差<br>Phase-difference       | <p>以定速每秒鐘旋轉360°測定之。<br/>Measurement shall be made under the condition which the shaft is rotated in 360° /S (constant speed)</p> <div style="text-align: center;"> <p style="text-align: center;">旋轉方向 →<br/>Rotational direction</p> </div> | <p>如圖五所示 in &lt; fig. 5&gt;<br/><math>\Delta T \geq 3.5\text{msec}</math></p>             |
| <p>注意事項:※2.4-2.5之規格，為360°/秒等速下運轉檢測之，與手動旋轉會有所不同。<br/>※與韌體程式之搭配性，請實際使用測試確認之。<br/>Note : ※The test is conducted with equipment at constant speed: 360°/S according to Spec. Item 2.4 &amp; 2.5, and the test result could be different from the result by manual test.<br/>※In order to prove the interoperability between the firmware and the encoder, please test the part in real condition.</p> |                               |  |   |
| 2-6   | 絕緣阻抗<br>Insulation resistance | <p>外加電壓250V D.C 於固定板與任一端子間。<br/>Measurement shall be made under the condition which a voltage of 250V D.C is applied between individual terminals and attaching plate</p>  | <p>固定板與端子間100MΩ 以上。<br/>Between individual terminals and attaching. Plate:100MΩ MIN .</p> |
| 2-7   | 耐電壓強度<br>Dielectric strength  | <p>於固定板與任一端子間外加電壓300VA.C.1分鐘或外加 A.C 360V 2 秒鐘測定<br/>A voltage of 300V A.C. shall be applied for 1 min or a voltage of 360 VA.C. shall be applied for 2 sec between individual terminals and attaching. plate ( Leak current : 1mA )</p>      | <p>無損傷,短路及絕緣破壞現象。<br/>Without arcing or breakdown .</p>                                   |

|      |      |      |      |      |            |            |            |                                    |             |
|------|------|------|------|------|------------|------------|------------|------------------------------------|-------------|
|      |      |      |      |      | APPD.      | CHKD.      | DSGD.      | DOCUMENT NO. :                     |             |
|      |      |      |      |      |            |            |            | EC12PLBRSDVF-D-25K-24-24C-31/07-6H |             |
|      |      |      |      |      | 余倩         | 余倩         | 鐘學峰        | VERSION :                          | L           |
|      |      |      |      |      |            |            |            | PAGE :                             | 5 OF11      |
| SYMB | DATE | APPD | CHKD | DSGD | 2011.11.29 | 2011.11.29 | 2011.11.29 | DRAWING NO.:                       | EC12PSD-010 |

# 回轉式位元產生器規格書

## ROTATIONAL ENCODER SPECIFICATION

### 三. 機械性能 Mechanical characteristics

| NO. | 項目<br>item                                | 條件<br>conditions  | 規格<br>specifications   |
|-----|---|---|--|
| 3-1 | 全回轉角度<br>Total rotational angle           |   | 360° 回轉<br>360° ( Endless )  |
| 3-2 | 掣子脫出力<br>Detent torque                    |   | 30~200gf.cm  |
| 3-3 | 掣子點數及位置<br>Number and position of detents |   | 24點掣子 24 detents<br>每點角度: $15^{\circ} \pm 3^{\circ}$<br>Step angle : $15^{\circ} \pm 3^{\circ}$  |
| 3-4 | 端子強度<br>Terminal strength                 | 外加靜重300gf之力于端子前端之任意方向1分鐘.<br>A static load of 300gf shall be applied to the tip of terminals for 1 minute in any direction .  | 端子無損壞或顯著鬆動, 但是端子可允許彎曲 .<br>Without excessive play in terminals or poor contact.  |
| 3-5 | 軸擠壓引張強度<br>Push - pull strength of shaft  | 在軸之方向加壓力或張力之靜負荷5Kgf 10秒 ( 實裝狀態 ) .<br>Push and pull static load of 5Kgf shall be applied to the shaft in the axial direction for 10sec .( After soldering of the PC board ) | 不可有電氣或機械上的異常<br>Without damage to. or excessive play in shaft .No excessive abnormality in rotational feeling.<br>And electrical characteristics shall be satisfied. |
| 3-6 | 軸鬆動<br>Shaft wobble                       | 軸前端5mm處加上500gf.cm之力矩 .<br>A momentary load of 500gf.cm shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axis of shaft .      | 1.0xL/30 mmp-p以下 ( MAX)<br>L : 軸的固定長度。<br>L:Shaft Length   |

|      |      |      |      |      |            |            |            |                                     |             |
|------|------|------|------|------|------------|------------|------------|-------------------------------------|-------------|
|      |      |      |      |      | APPD.      | CHKD.      | DSGD.      | DOCUMENT NO. :                      |             |
|      |      |      |      |      |            |            |            | EC12PLBRSDVVF-D-25K-24-24C-31/07-6H |             |
|      |      |      |      |      | 余倩         | 余倩         | 鐘學峰        | VERSION :                           | L           |
|      |      |      |      |      |            |            |            | PAGE :                              | 6 OF 11     |
| SYMB | DATE | APPD | CHKD | DSGD | 2011.11.29 | 2011.11.29 | 2011.11.29 | DRAWING NO.:                        | EC12PSD-010 |

# 回轉式位元產生器規格書

## ROTATIONAL ENCODER SPECIFICATION

| NO. | 項目<br>item                                     | 條件<br>conditions   | 規格<br>specifications  |
|-----|--|--|---|
| 3-7 | 軸垂直側壓強度<br>Side thrust<br>Strength of shaft    | 軸前端5mm處,加上2Kgf的靜荷重10秒.<br>A load of 2Kgf shall be applied at the point 5mm from the tip of the shaft in a direction perpendicular to the axis of shaft.(After soldering of PC board) | 不可有電氣或機械上的異常<br>Without excessive play or bending in shaft.<br>No mechanical abnormality. |
| 3-8 | 軸回轉方向間隙<br>Rotation Play at the click position | 使用角度板測定之<br>Measure with jig for rotational angle.   | 4° 以內<br>4° MAX.  |

### 四. 耐久性能 Endurance characteristics

| NO. | 項目<br>item              | 條件<br>conditions  | 規格<br>specifications   |
|-----|-------------------------|---|--|
| 4-1 | 回轉壽命<br>Rotational life | 無任何電氣負荷下,軸以每小時600~1000回轉的速度下,持續進行30,000回轉.<br>(1回轉為360°往返各一次)<br>The shaft of encoder shall be rotated to 30,000cycles at a speed of 600~1000 cycles per hour without electrical load , after which measurement shall be made .<br>(1 cycle : rotate 360°C.C.W. rotate 360° C.W.) | 震顛雜音: $t_1, t_3 \leq 5mS$<br>跳躍滑動雜音: $t_2 \leq 3mS$<br>相位差: $\Delta T \geq 2.5msec$<br>付摺子點機種需有摺子 點的感觸.<br>其它初期值亦需滿足。<br>Chattering: $t_1, t_3 \leq 5ms$<br>Bounce: $t_2 \leq 3ms$<br>Phase-difference: $\Delta T \geq 2.5msec$<br>Detent feeling has to remains.<br>(Applied for detent type)<br>Except above items.<br>specifications in clause<br>2.1~7 and 3.1~8 shall be satisfied. |

|      |      |      |      |      |            |            |            |                                    |             |
|------|------|------|------|------|------------|------------|------------|------------------------------------|-------------|
|      |      |      |      |      | APPD.      | CHKD.      | DSGD.      | DOCUMENT NO. :                     |             |
|      |      |      |      |      | 余倩         | 余倩         | 鐘學峰        | EC12PLBRSDVF-D-25K-24-24C-31/07-6H |             |
|      |      |      |      |      |            |            |            | VERSION :                          | L           |
|      |      |      |      |      |            |            |            | PAGE :                             | 7 OF 11     |
| SYMB | DATE | APPD | CHKD | DSGD | 2011.11.29 | 2011.11.29 | 2011.11.29 | DRAWING NO.:                       | EC12PSD-010 |

# 回轉式位元產生器規格書

## ROTATIONAL ENCODER SPECIFICATION

### 五. 焊錫耐熱性 Soldering condition

| NO. | 項目<br>item                  | 條件<br>conditions   | 規格<br>specifications  |
|-----|-----------------------------|--|---|
| 5-1 | 人工手焊<br>Manual<br>Soldering | 溫度350°C以下, 時間3秒鐘以內。<br>Bit temperature of soldering : 350°C or less<br>Application time of soldering : within 3s.  | 不可發生絕緣體變形, 破損以及感觸異常。<br>There shall be no deformation or cracks in molded part. No excessive abnormality in rotational feeling. |
| 5-2 | 自動焊錫<br>Dip soldering       | 預熱條件: 基板表面溫度100°C以下, 時間2分鐘以內<br>Preheating :<br>* Surface temperature of board : 100°C or less.<br>* Preheating time: within 2 min.<br>焊錫爐條件: 溫度260±5°C, 時間5±1秒。<br>Soldering :<br>* Solder temperature : 260±5°C<br>* Immersion time : 5±1 sec.<br>以上工程以一次或兩次為宜。<br>Apply the above soldering process for 1 or 2 times. |   |

|      |      |      |      |           |            |            |            |                                    |             |
|------|------|------|------|-----------|------------|------------|------------|------------------------------------|-------------|
|      |      |      |      |           | APPD.      | CHKD.      | DSGD.      | DOCUMENT NO. :                     |             |
|      |      |      |      |           | 余倩         | 余倩         | 鐘學峰        | EC12PLBRSDVF-D-25K-24-24C-31/07-6H |             |
|      |      |      |      | VERSION : |            |            |            | L                                  |             |
|      |      |      |      | PAGE :    |            |            |            | 8 OF 11                            |             |
| SYMB | DATE | APPD | CHKD | DSGD      | 2011.11.29 | 2011.11.29 | 2011.11.29 | DRAWING NO.:                       | EC12PSD-010 |



# 觸壓式瞬間開關規格書

## PUSH MOMENTARY SWITCH SPECIFICATION

### 六. 開關電氣性能 (Switch Electrical characteristics)

| NO. | 項目<br>item   | 條件<br>conditions  | 規格<br>specifications  |
|-----|--|---|---|
| 6-1 | 接觸阻抗<br>Contact resistance                         | 以D.C. 定電壓降下法測定之。<br>Measured by decides the electric current D.C. voltage drop method.  | 100 mΩ 以下<br>100 mΩ MAX.  |
| 6-2 | 震顛雜音<br>Chattering                                 | 一周期動作 (OFF - ON - OFF) 為1秒鐘。<br>Switch is operated at the rate of 1 cycle 1 sec.<br>The 1 cycle shall be OFF - ON - OFF .   | 10msec 以下<br>Less than 10 msec .  |
| 6-3 | 絕緣阻抗<br>Insulation resistance                      | 外加D.C. 250V 于端子與固定板間。<br>Measurement shall be made under the condition which a voltage of 250V D.C. is applied between individual terminals and attaching plate .   | 端子與固定板間100MΩ 以上<br>Between individual terminals and attaching plate 100MΩ MIN . |
| 6-4 | 耐電壓<br>Dielectric strength                         | 端子與取付板間外加A.C. 300V 1分鐘或外加A.C. 360V 2秒鐘測定, (Leak 電流: 1mA)<br>A voltage of 300V A.C. shall be applied for 1 min or a voltage of 360V A.C. shall be applied for 2 sec between individual terminals and bushing .<br>(Leak current : 1mA) | 無損傷, 變形或絕緣破壞現象。<br>Without damage to parts arcing or breakdown .                |
| 6-5 | 定格容量<br>(抵抗負荷)<br>Switch rating<br>(Resistor load) |   | D.C.5V 10mA   |
|     | 備注<br>Note   | 軸與開關端子間絕緣。<br>Shaft is insulated from switch terminal .   |   |

### 七. 開關機械性能 (Switch Mechanical characteristics)

| NO. | 項目<br>item                       | 條件<br>conditions | 規格<br>specifications                |
|-----|----------------------------------|------------------|-------------------------------------|
| 7-1 | 開關回路, 接點數<br>Contact arrangement |                  | 單極單投 (PUSH ON)<br>S.P.S.T (PUSH ON) |

|      |      |      |      |      |            |            |            |                                    |             |
|------|------|------|------|------|------------|------------|------------|------------------------------------|-------------|
|      |      |      |      |      | APPD.      | CHKD.      | DSGD.      | DOCUMENT NO. :                     |             |
|      |      |      |      |      |            |            |            | EC12PLBRSDVF-D-25K-24-24C-31/07-6H |             |
|      |      |      |      |      | 余倩         | 余倩         | 鐘學峰        | VERSION :                          | L           |
|      |      |      |      |      |            |            |            | PAGE :                             | 9 OF 11     |
| SYMB | DATE | APPD | CHKD | DSGD | 2011.11.29 | 2011.11.29 | 2011.11.29 | DRAWING NO.:                       | EC12PSD-010 |

# 觸壓式瞬間開關規格書

## PUSH MOMENTARY SWITCH SPECIFICATION

| NO. | 項 目<br>item               | 條 件<br>conditions | 規 格<br>specifications |
|-----|---------------------------|-------------------|-----------------------|
| 7-2 | 開關移動量<br>Switching stroke |                   | +0<br>0.5 -0.3 mm     |
| 7-3 | 開關作動力<br>Switch strength  |                   | 450 ± 200gf           |

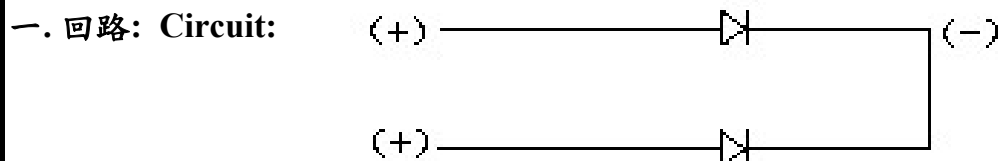
### 八. 開關耐久性能 (Switch Endurance characteristics)

| NO. | 項 目<br>item            | 條 件<br>conditions   | 規 格<br>specifications   |
|-----|------------------------|---|---|
| 8-1 | 操作壽命<br>Operating life | 無負荷狀態下動作 20,000 回<br>The shaft of switch shall be 20,000 times without electronically load, after which measurements shall be made. | 接觸阻抗：200mΩ 以下<br>開關作動力：需滿足初期規格值之+10% / -30%<br>其它項目均需滿足初期<br>Switch contact resistance：200mΩ MAX.<br>Switch strength:<br>Relative to the previously Specified value +10% / -30%.<br>Except above items .<br>specification in clause 6.1~4 and 7.1~3 shall be satisfied. |

|      |      |      |      |      |            |            |            |                                    |  |          |  |
|------|------|------|------|------|------------|------------|------------|------------------------------------|--|----------|--|
|      |      |      |      |      | APPD.      | CHKD.      | DSGD.      | DOCUMENT NO. :                     |  |          |  |
|      |      |      |      |      | 余 倩        | 余 倩        | 鐘學峰        | EC12PLBRSDVF-D-25K-24-24C-31/07-6H |  |          |  |
|      |      |      |      |      |            |            |            | VERSION :                          |  | L        |  |
|      |      |      |      |      |            |            |            | PAGE :                             |  | 10 OF 11 |  |
| SYMB | DATE | APPD | CHKD | DSGD | 2011.11.29 | 2011.11.29 | 2011.11.29 | DRAWING NO.: EC12PSD-010           |  |          |  |

# L. E. D. 共通規格書

## L. E. D. COMMON SPECIFICATIONS



### 二. LED 特性

#### LED Characteristic

1. 反轉電壓 Reverse Voltage: 5V

2

| 發光色<br>Emitted color   |              | 功率消耗<br>Power dissipation | 直流正向電流<br>DC Forward Current | 試驗條件 Test conditions IF=20 mA |        |
|------------------------|--------------|---------------------------|------------------------------|-------------------------------|--------|
|                        |              |                           |                              | 直流順電壓 Forward voltage(V)      |        |
|                        |              |                           |                              | 標準值 Typ                       | 以下 MAX |
| 藍色/橙色<br>Blue /Orange  | 藍色<br>Blue   | 105mW                     | 30mA                         | 3.3                           | 4      |
|                        | 橙色<br>Orange | 75mW                      | 30mA                         | 2.1                           | 2.5    |
| 綠色/紅色<br>Green / Red   | 綠色<br>Green  | 120mW                     | 30mA                         | 3.2                           | 4      |
|                        | 紅色<br>Red    | 75mW                      | 30mA                         | 1.95                          | 2.5    |
| 藍色/綠色<br>Blue/Green    | 藍色<br>Blue   | 120mW                     | 30mA                         | 3.3                           | 4      |
|                        | 綠色<br>Green  | 120mW                     | 30mA                         | 3.2                           | 4      |
| 紅色/綠色<br>Red /Green    | 紅色<br>Red    | 75mW                      | 30mA                         | 1.95                          | 2.5    |
|                        | 綠色<br>Green  | 120mW                     | 30mA                         | 3.2                           | 4      |
| 綠色/橙色<br>Green /Orange | 綠色<br>Green  | 102.5mW                   | 25mA                         | 3.3                           | 4.1    |
|                        | 橙色<br>Orange | 75mW                      | 30mA                         | 2.1                           | 2.5    |
| 藍色/紅色<br>Blue/ Red     | 藍色<br>Blue   | 120mW                     | 30mA                         | 3.3                           | 4      |
|                        | 紅色<br>Red    | 75mW                      | 30mA                         | 1.95                          | 2.5    |

### ROHS COMPLIANCE

| SYMB | DATE | APPD | CHKD | DSGD | APPD.      | CHKD.      | DSGD.      | DOCUMENT NO. :                     |             |
|------|------|------|------|------|------------|------------|------------|------------------------------------|-------------|
|      |      |      |      |      |            |            |            | EC12PLBRSDVF-D-25K-24-24C-31/07-6H |             |
|      |      |      |      |      | 余倩         | 余倩         | 鐘學峰        | VERSION :                          | L           |
|      |      |      |      |      |            |            |            | PAGE :                             | 11 OF 11    |
|      |      |      |      |      | 2011.11.29 | 2011.11.29 | 2011.11.29 | DRAWING NO.:                       | EC12PSD-010 |