

|                    |   |                        |                                  |            |     |
|--------------------|---|------------------------|----------------------------------|------------|-----|
| 品名<br>Product Name | 高壓金屬玻璃釉電阻器<br>Metal Glaze (High Voltage) Resistor |                        |                                  |            |     |
| 版本<br>Version      | B/2 版   | 制定日期<br>Enactment Date | 2017 年 06 月 10 日<br>JUN 30, 2017 | 頁數<br>Page | 9-1 |

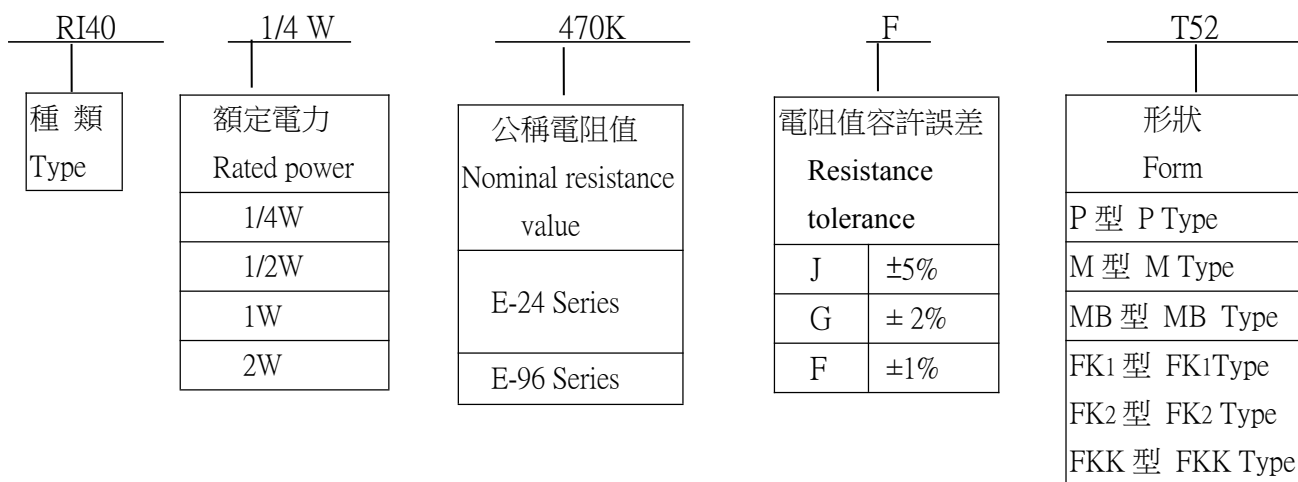
1. 一般事項 General

1.1 適用 Scope 本承認書適用於 [高壓金屬玻璃釉電阻器]，符合環境關聯物質要求之 RoHS 測試。  
This specification is available for **Metal Glaze (High Voltage) Resistor** manufactured, it accords with RoHS test of Environment related substance requirement.

1.2 形名(例) Type designation (example)

依使用種類、額定電力、公稱電阻值、容許誤差及型狀而區別,其構造如下。

The type designation shall be in the following form and as specified.



1.3 額定電力 Rated power

額定電力係應在周圍溫度 70°C 可以連續負載的最大電力，如表-1;但周圍溫度如超過 70°C 時之額定電力則依圖一的電力遞減曲線實施。

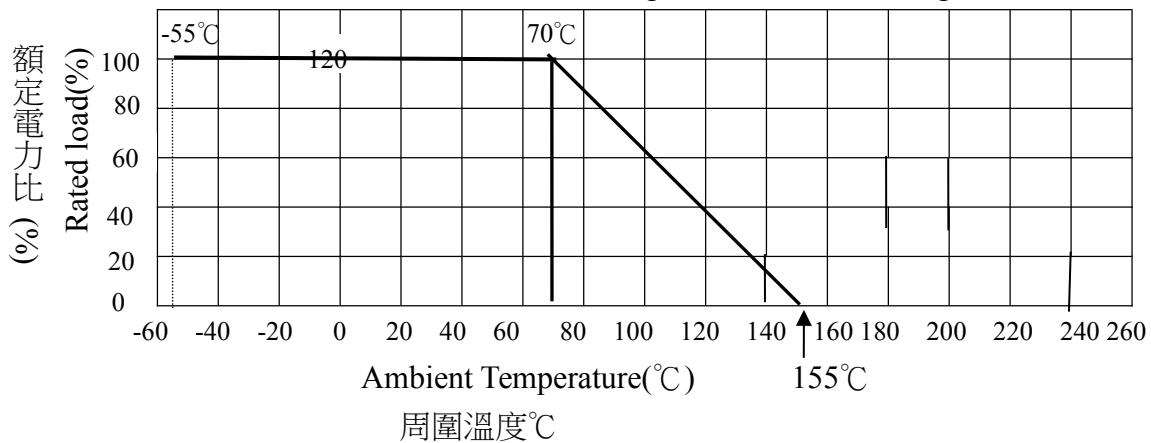
Rated power is maximum power which can be continuously loaded at specified ambient temperature 70°C, as Table-1; however when the ambient temperature exceeds 70°C, rated power should be determined from the derating curve of Fig.1.

|                    |   |                        |                                  |            |     |
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表-1 Table-1

| 種類<br>Type | 定格電力<br>Rated power | 最大工作電壓<br>Max Working Voltage | 最大負荷電壓<br>Max Overload Voltage | 耐電壓<br>Dielectric withstanding voltage | 阻值範圍(Ω)<br>Resistance Range(Ω) |
|------------|---------------------|-------------------------------|--------------------------------|--|--------------------------------|
| 1/4W       | 0.25W               | 500V                          | 700V                           | N/A                                    | 100KΩ~39MΩ                     |
| 1/2W       | 0.5W                | 700V                          | 1000V                          | 350V                                   | 100KΩ~39MΩ                     |
| 1W         | 1W                  | 1000V                         | 1400V                          | 500V                                   | 100KΩ~39MΩ                     |
| 2W         | 2W                  | 1000V                         | 1400V                          | 500V                                   | 100KΩ~39MΩ                     |

圖一 電力遞減曲線 Figure 1 Power derating curve



1.4 額定電壓 Rated voltage

額定電壓係指對應於額定電力的直流或交流(商用頻率之有效值)的電壓,由下式求得。

The rated voltage shall be the D.C. or A.C.(R.M.S. at power frequency) voltage which corresponds the rated power and the value of which is calculated from the formula below.

$$E = \sqrt{P \times R}$$

Where E: 定格電壓 Rated voltage(V)  
P: 定格電力 Rated power(W)  
R: 公稱電阻值 Nominal resistance(Ω)

使用溫度 Operating Temperature Range: -55°C ~ +155°C

|                    |   |                        |                                  |            |     |
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## 2. 構造 Construction

### 2.1 外形尺寸 External dimensions

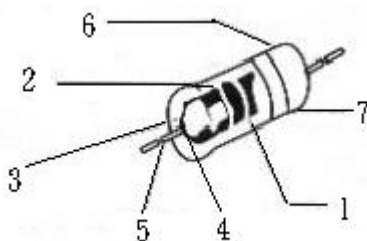
參照本承認書的 [5. 外形尺寸]。

The dimensions shall be satisfied with [5. External dimensions].

### 2.2 構造圖 Structure diagram

高壓金屬玻璃釉電阻器係按下表的材料而構成:

The construction of resistor **Metal Glaze (High Voltage) Resistor** shall be as follows:



| 號碼<br>NO | 構造名稱<br>Item               | 內容<br>Material   |
|----------|----------------------------|--|
| 1        | 基體磁器<br>Ceramic core       | 使用含鋁的磁器棒。<br>High alumina ceramic is used.   |
| 2        | 電阻體<br>Resistor element    | 電阻體的成份係使用高含鋁瓷棒。<br>The resistor element shall consist.   |
| 3        | 端子<br>Terminal             | 鐵帽<br>Tinned iron cap.   |
| 4        | 連接<br>Connection           | 導線對鐵帽須以電氣熔接。<br>The lead wire, which is plated with solder, shall be mounted to the caps by welding process. |
| 5        | 導線<br>Lead wire            | 焊錫或鍍錫銅導線。<br>Soldered or tinned annealed wire.   |
| 6        | 上塗塗裝<br>Finishing painting | 使用矽樹脂塗料。符合 UL-94V-0 不燃性規定。<br>Silicon resin is used. Accord with UL-94V-0 Nonflammable specification.        |
| 7        | 表示<br>Indication           | 色碼。<br>Color code.   |

|                    |   |  |  |  |  |
|--------------------|---|--|--|--|--|
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|--------------------|---|--|--|--|--|

|               |       |                        |                                  |            |     |
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|---------------|-------|------------------------|----------------------------------|------------|-----|

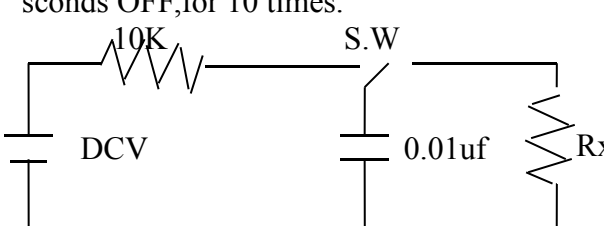
- 2.3 鐵帽端子 Terminal caps  
鐵帽端子須確實地連接(電氣的及機械的)於電阻體上。  
The caps shall be securely connected with the resistor element electrically and mechanically.
- 2.4 外裝色澤 Resistor body color  
以‘灰色’或粉色表示。  
The type in ‘Gray’ color.
- 2.5 表示 Indication  
參照本承認書的 [4. 表示]。  
The indication shall be satisfied with [4. Indication].

### 3. 特性 Characteristics

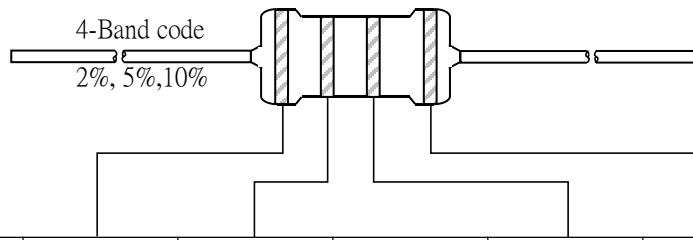
表-2 Table-2

| 項目<br>Item                      | 規格值<br>Performance  | 試驗方法(依據 JIS C 5202)<br>Test methods(Conform to JIS C 5202)  |
|---------------------------------|---|---|
| 溫度係數<br>Temperature Coefficient | ±250PPM/°C  | 5.2 項參照 Comply with 5.2<br>$\frac{R_1 - R_0}{R_0(T_1 - T_0)} \times 10^6 (\text{PPM}/^\circ\text{C})$<br>R <sub>0</sub> :室溫(T <sub>0</sub> )所測量之電阻值。<br>R <sub>1</sub> :室溫+100°C(T <sub>1</sub> )後所測量之電阻值。<br>R <sub>0</sub> :Resistance value at room temp.( T <sub>0</sub> ).<br>R <sub>1</sub> :Resistance value at room temp.plus 100°C (T <sub>1</sub> ) |
| 短時間過負荷<br>Short time overload   | ±(1%+0.05 Ω)以內。<br>不得有機械的損傷。<br>Within ±(1%+0.05 Ω).<br>No evidence of mechanical damage. | 5.5 項參照 Comply with 5.5<br>額定電壓×2.5 倍,5 秒。<br>不可超過最高過負荷電壓(見表-1)<br>Rated voltage×2.5 times,5s<br>But not to exceed maximum overload voltage.<br>(See table-1)   |
| 絕緣電阻<br>Insulation Resistance   | 10 <sup>4</sup> MΩ 以上。<br>10 <sup>4</sup> MΩ or more.                                     | 5.6 項參照 Comply with 5.6<br>置於 V 型槽方法。V-block method<br>施加直流電壓 500V 60 秒。<br>Resistor shall be tested at DC 500V for 60 seconds.   |
| 焊錫附著性<br>Solderability          | 導線至少 95%以上新錫覆蓋。<br>Covered with new solder by 95% at least.                               | 6.5 項參照 Comply with 6.5<br>焊錫溫度：255±5°C。<br>浸錫時間：3±1.0 秒。<br>Test temperature of solder: 255±5°C<br>Dipping time in solder:3±1.0 s  |

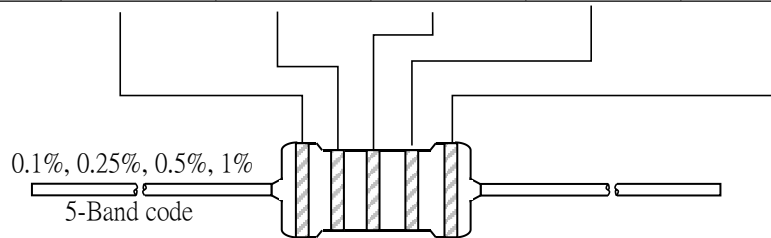
| 品 名<br>Product Name                            |   | 高壓金屬玻璃釉電阻器<br>Metal Glaze (High Voltage) Resistor  |  |                                  |             |
|--|---|--|--|----------------------------------|-------------|
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| 項 目<br>Item                                    | 規 格 值<br>Performance  | 試 驗 方 法 (依 據 JIS C 5202)<br>Test methods (Conform to JIS C 5202)   |  |                                  |             |
| 耐 電 壓<br>Dielectric<br>Withstanding<br>Voltage | 無電弧放電、燒損及絕緣破壞等異狀。<br>No evidence of flashover mechanical damage, arcing or insulation breakdown.            | 5.7 項參照 Comply with 5.7<br>常壓, 置於 V 型槽方法。<br>施加個別規定之交流電壓 60 秒。(見表-1)<br>Constant pressure, V-block method<br>Resistor shall be tested at AC potential respectively for 60 seconds.<br>(See table-1)  |  |                                  |             |
| 斷 續 過 負 荷<br>Pulse overload                    | $\pm(3\%+0.05\Omega)$ 以內。<br>within $\pm(3\%+0.05\Omega)$   | 5.8 項參照 Comply with 5.8<br>額定電壓 X 4 倍, 10000 回(1 秒 ON, 25 秒 OFF)。<br>不可超過最高斷續電壓(見表-1)<br>Rated voltage X 4 times, 10000 cyc.(1s ON, 25s OFF)<br>But not to exceed maximum pulse voltage.(See table-1)  |  |                                  |             |
| 端 子 強 度<br>Terminal<br>strength                | 端 子 不 得 斷 裂 及 鬆 弛。<br>No evidence of mechanical damage.   | 6.1 項參照 Comply with 6.1  |  |                                  |             |
|  |   | 引 張 強 度<br>Tensile strength  | 線 徑 mm<br>Diameter                     | 引 張 力<br>Tensile force<br>N(kgf) | 時 間<br>Time |
|  |   |  | $\Phi 0.38\text{mm}\sim 0.50\text{mm}$ | 5(0.51)                          | 10 $\pm$ 1  |
|  |   |  | $\Phi 0.50\text{mm}\sim 0.70\text{mm}$ | 10(1.02)                         | second      |
|  |   | 扭 轉 強 度：自電阻體起約 6mm~6.5mm 處之端子線，以約 0.75mm 曲率半徑彎曲 90 度，其次由彎曲處向端子線先端 1.2 $\pm$ 0.4mm 處挾定端子引出軸，作回轉軸，以約 5 秒時間沿直面回轉 360°再逆轉 360°，如此施行回逆轉 2 次，不可發生折斷及鬆動現象。<br>Torsional strength：To bend the lead wire at the point of about 6mm~6.5mm from resistor body. about 0.75mm curvature radii to 90° then catch the wire at 1.2 $\pm$ 0.4mm apart from the bend point end and turn it ( clockwise ) by 360 degrees perpendicular to the resistor axis at speed of same 5 seconds per turn, and do the same counterclockwise again which constitute a whole turn. Repeat the turn for 2 times without causing any break and looseness. |  |                                  |             |
| 焊 錫 耐 熱 性<br>Resistance to<br>soldering heat   | $\pm(1\%+0.05\Omega)$ 以內。<br>不得有機械的損傷。<br>Within $\pm(1\%+0.05\Omega)$<br>No evidence of mechanical damage. | 6.4 項參照 Comply with 6.4<br>350 $\pm$ 10°C, 3 $\pm$ 1 秒, 試驗後放置半小時。<br>350 $\pm$ 10°C, 3 $\pm$ 1s<br>After test leave for 0.5h.  |  |                                  |             |

|                                    |  |  |                                  |            |     |
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| 項目<br>Item                         | 規格值<br>Performance   | 試驗方法(依據 JIS C 5202)<br>Test methods(Conform to JIS C 5202)   |                                  |            |     |
| 耐溶劑性<br>Resistance to solvent      | 塗裝及色碼不得脫落。<br>No deterioration of protective coating and markings.                     | 6.9 項參照 Comply with 6.9<br>放入酒精溶劑之超音波機內，保持 3 分鐘。<br>Specimens shall be immersed in a bath of isoproalcohol completely for 3 minutes with ultrasonic.   |                                  |            |     |
| 溫度循環<br>Temperature cycle          | ±(1%+0.05Ω)以內。<br>不得有機械的損傷。<br>Within ±(1%+0.05Ω)<br>No evidence of mechanical damage. | 7.4 項參照 Comply with 7.4<br>低溫側：-55°C/30 分，室溫：10~15 分鐘<br>高溫側：+80°C/30 分，室溫：10~15 分鐘<br>5 回<br>Low side：-55°C/30min, Room temp.：10 to 15min<br>High side：80°C/30min, Room temp.：10 to 15min<br>5 cycles |                                  |            |     |
| 耐濕負荷壽命<br>Load life in humidity    | ±(5%+0.1Ω)以內。<br>Within ±(5%+0.1Ω)   | 7.9 項參照 Comply with 7.9<br>40±2°C，濕度 90~95%，1000 小時<br>定格電壓(90 分鐘 ON, 30 分鐘 OFF)<br>40±2°C，90 to 95%RH, 1000h<br>Rated voltage (90 min ON, 30 min OFF)   |                                  |            |     |
| 負荷壽命<br>Load life                  | ±(5%+0.1Ω)以內。<br>Within ±(5%+0.1Ω)   | 7.10 項參照 Comply with 7.10<br>70±3°C，1000 小時<br>定格電壓(90 分鐘 ON, 30 分鐘 OFF)<br>70±3°C，1000h<br>Rated voltage (90 min ON, 30 min OFF)  |                                  |            |     |
| 衝擊耐壓<br>Surge Withstanding Voltage | 無燒損或絕緣性破壞<br>No flashover or Insulation damage.  | 加入適當電壓 2.5 秒 ON,2.5 秒 OFF.循環 10 次<br>Add to suitable voltage 2.5 seconds ON,2.5 sconds OFF,for 10 times.<br>       |                                  |            |     |

4. 表示 Indication  
色碼 Color Code



| 顏色 Color | 第 1 數字<br>1 <sup>st</sup> figure | 第 2 數字<br>2 <sup>nd</sup> figure | 第 3 數字<br>3 <sup>rd</sup> figure | 倍 率<br>Multiplier | 誤差率<br>Tolerance |
|----------|----------------------------------|----------------------------------|----------------------------------|-------------------|------------------|
| 黑 Black  | 0                                | 0                                | 0                                | 10 <sup>0</sup>   |                  |
| 棕 Brown  | 1                                | 1                                | 1                                | 10 <sup>1</sup>   | ±1% (F)          |
| 紅 Red    | 2                                | 2                                | 2                                | 10 <sup>2</sup>   | ±2% (G)          |
| 橙 Orange | 3                                | 3                                | 3                                | 10 <sup>3</sup>   |                  |
| 黃 Yellow | 4                                | 4                                | 4                                | 10 <sup>4</sup>   | ±5% (J)          |
| 綠 Green  | 5                                | 5                                | 5                                | 10 <sup>5</sup>   | ±0.5% (D)        |
| 藍 Blue   | 6                                | 6                                | 6                                | 10 <sup>6</sup>   | ±0.25% (C)       |
| 紫 Violet | 7                                | 7                                | 7                                | 10 <sup>7</sup>   | ±0.1% (B)        |
| 灰 Gray   | 8                                | 8                                | 8                                |                   | ±0.05% (A)       |
| 白 White  | 9                                | 9                                | 9                                |                   |                  |
| 金 Gold   |                                  |                                  |                                  | 10 <sup>-1</sup>  |                  |
| 銀 Silver |                                  |                                  |                                  | 10 <sup>-2</sup>  | ±10% (K)         |
| 無 Plain  |                                  |                                  |                                  |                   | ±20% (M)         |



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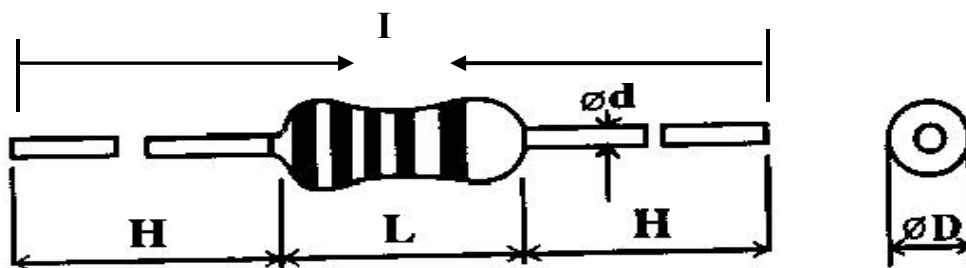
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5. 外形寸法 External dimensions

5.1 散裝 P 型 P type

P Type



單位：mm

Unit：mm

| 種類 Type            |                   | 尺寸 Dimensions |    |                |               |                   |             |
|--------------------|-------------------|---------------|----|----------------|---------------|-------------------|-------------|
| 普通型<br>Normal Size | 小型化<br>Small Size |               | I  | $L \pm 1.0$    | $\phi D$      | $\phi d \pm 0.05$ | $H \pm 2.0$ |
| 1/4W               | 1/2WS             |               | 60 | $6.5 \pm 1.0$  | $2.3 \pm 0.5$ | 0.50              | 28          |
| 1/2W               | 1WS               |               | 60 | $9.0 \pm 1.5$  | $3.3 \pm 0.5$ | 0.55              | 25          |
| 1W                 | 2WS               |               | 60 | $11.5 \pm 1.5$ | $4.0 \pm 0.5$ | 0.70              | 25          |
| 2W                 | 3WS               |               | 70 | $15.5 \pm 1.5$ | $5.2 \pm 0.5$ | 0.70              | 28          |



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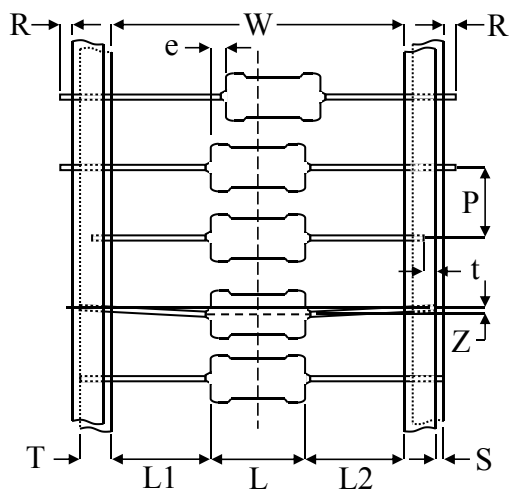
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5.2 帶裝 Axial Lead Taping

Txx Type



單位：mm  
Unit：mm

| 額定功率<br>Power Rating | 帶狀<br>Taping | 尺寸 Dimensions |                                |        |               |       |           |           |           |           |           |
|----------------------|--------------|---------------|--------------------------------|--------|---------------|-------|-----------|-----------|-----------|-----------|-----------|
|                      |              | L             | W                              | P      | L1-L2<br>Max. | T     | Z<br>Max. | R<br>Max. | t<br>Max. | e<br>Max. | S<br>Max. |
| 1/4W                 | T26          | 6.5±1.0       | 26 <sup>+1</sup> <sub>-0</sub> | 5±0.5  | 0.5           | 6±0.5 | 1.2       | 0         | 3.0       | 1.5       | 0.5       |
|                      | T52          | 6.5±1.0       | 52±1.0                         | 5±0.5  | 1.0           | 6±0.5 | 1.2       | 0         | 3.0       | 1.5       | 0.5       |
| 1/2W                 | T52          | 9.0±1.5       | 52±1.0                         | 5±0.5  | 1.0           | 6±0.5 | 1.2       | 0         | 3.0       | 1.5       | 0.5       |
| 1W                   | T52          | 11.5±1.5      | 52±1.0                         | 5±0.5  | 1.0           | 6±0.5 | 1.2       | 0         | 3.0       | 1.5       | 0.5       |
| 2W                   | T62          | 15.5±1.5      | 62±1.0                         | 10±0.5 | 1.0           | 6±0.5 | 1.2       | 0         | 3.0       | 1.5       | 0.5       |