

P. C. B. MOUNTING DETAIL

深圳市亦盛电子科技有限公司

Shenzhen Yisheng Electronic Technology Co., Ltd.

品 名

EC28A C15H15P3

图 号

EC28A-001

日 期

修 改 记 录

绘制人

未标注尺寸公差

比 例

3:1

2021/11/16

初始发行受控

黄华

L ≤ 10

±0.3

单 位

mm

核 准

审 核

制 图

10 < L ≤ 100

±0.5

版 本

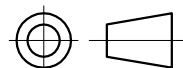
A0

100 ≤ L

±0.8

ANGLE

±5°



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EC28系列规格书

EC28 SERIES SPECIFICATION

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1. 一般事项General

1-1. 适用规格 Scope

本规格书适用于微小电流回路的电子设备, 属28型回转型编码器.

This specification applies to 35mm size low-profile rotary encoder (incremental type) for microscopic current circuits, used in electronic equipment.

1-2. 标准状态Standard atmospheric conditions

除另有规定外, 测量应在以下状态下进行:

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and test is as following limits:

温度 Ambient temperature : 15°C to 35°C

相对湿度 Relative humidity : 25% to 85%

气压 Air pressure : 86kpa to 106kpa

如果对在上述所提到的条件中所做的实测值有疑问的话, 应使用以下条件进行测量:

If doubt arises on the decision based on the measured values under the above-mentioned conditions, the following conditions shall be employed:

温度 Ambient temperature : 20±1°C

相对湿度 Relative humidity : 63% to 67%

气压 Air pressure : 86kpa to 106kpa

1-3. 使用温度范围

Operating temperature range : -30°C to +80°C

1-4. 保存温度范围

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

2. 构造Construction

2-1. 尺寸 Dimensions

见所附成品图 Refer to attached drawing

3. 额定值 Rating

3-1. 额定电压 Rated voltage: DC 5V

3-2. 最大额定电流 (阻抗负载)

Maximum operating current (resistive load)

各相导线 Each lead: 0.5mA (Max 5mA; Min 0.5mA)

公共导线 Common lead: 1mA (Max 10mA; Min 0.5mA)

4. 使用上的事项Application Notes

4-1. 避免储藏于高温潮湿及腐蚀的场所. 产品购入后尽可能在6个月内使用完. 拆包装后未使用完的剩余产品需储藏于防潮防毒的环境下.

Avoid storing the products in a place at high temperature, high humidity and in Corrosive gases. Please use this product as soon as possible with 6 months limitation. If any remainder left after packing is opened, please store it with proper moistureproofing, gasproofing etc.

4-2. 编码器信号的计算方法应将操作的速度, 信号的取样时间及电子回路中的微电脑软体等考虑进去.

The encoder pulses count method should be designed with taking operating speed, sampling time and design of the microcomputer software into consideration.

4-3. 此产品在定位点的输出波形参照 (5-1), 因此在设计软体时请留意其状态, 推荐以A相位为参考基准.

With this products the detent position output consult fig. 5-1. Therefore make the A phase the reference at the software design stage. Recommended that use A output signal for the reference.

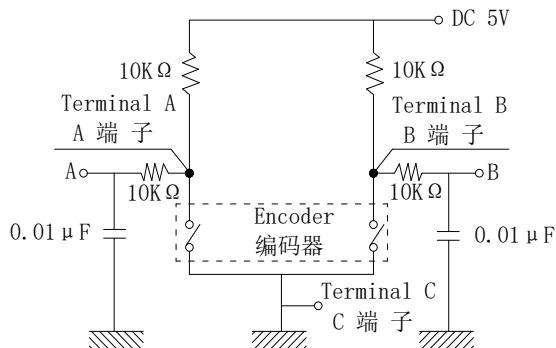
4-4. 在设计时要考虑到杂讯, 建议使用R/C滤波电路, (图1)

At design of the pulse count process. Using the C/R filter circuit is Recommended. (fig. 1)

4-5. 本产品请勿碰触到水, 可能会导致输出波形的异常.

Care must be taken not to expose this product to water or dew to prevent possible problem in pluses output waveform.

图1 fig.1



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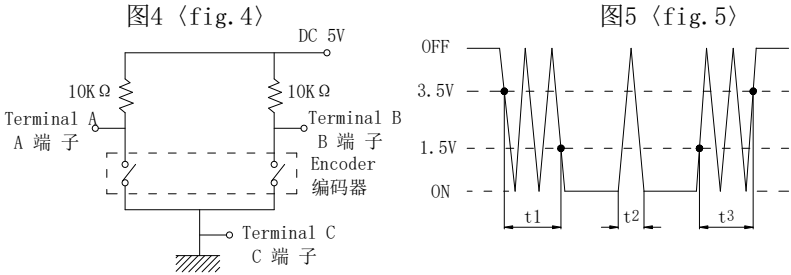
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5. 电气性能 Electrical Characteristics

项目 ITEM	条件 CONDITIONS	规格 SPECIFICATIONS
5-1. 输出信号 Output signal format	A、B两信号输出相位差，输出波形详见（图2/3）（虚线表示带卡点装置的上擎子处位置） 2 Phase-different signals (signal A, signal B) Details shown in<fig.2/3> (The broken line shows detent position.)	
	轴回转方向 Shaft rotational direction	信号 Signal
	顺时针方向 C. W	A(A-C端子间) A(TerminalA-C) B(B-C端子间) B(TerminalB-C)
	逆时针方向 C. C. W	A(A-C端子间) A(TerminalA-C) B(B-C端子间) B(TerminalB-C)
	输出波形 Output 图2 fig.2	
5-2. 分解能力 Resolution	回转360° 的输出脉冲数. Number of pulses in 360° rotation.	15 个脉冲/360° (图2) 15pulses/360° (fig.2)
5-3. 开关特性 Switching characteristics	下（图4）所示回路，轴以360° /S的速度转动测定。 Measurement shall be made under the condition as follows. Shaft rotational speed : 360° /S Test circuit : (fig.4) 图4 (fig.4) 图5 (fig.5)  （注）编码OFF指输出电压3.5V以上的状态 (fig.5). Code-OFF area :The area which the voltage is 3.5V or more (fig.5). 编码ON指输出电压1.5V以下的状态 (fig.5). Code-ON area : The area which the voltage is 1.5V or less (fig.5).	
5-3-1. 振荡 Chattering	编码从OFF→ON或ON→OFF时，输出1.5V~3.5V的通过时间. 应符合规定Specified by the signal's passage time from 1.5V to 3.5V of each switching position(code OFF~ON or ON~OFF)	$t_1, t_3 \leq 3\text{mS}$
5-3-2. 滑动杂讯 (突跳)Sliding noise (Bounce)	编码ON部份的1.5V以上的电压变动时间在振荡 t_1, t_3 之间会产生1mS以上, 1.5V以下的ON部份. 另外, 如果各突跳1.5V以下的范围在1mS以上时, 则判定为另一个突跳. Specified by the time of voltage change exceed 1.5V in code-ON area . When the bounce has code-ON time less than 1mS between chattering (t_1 or t_3) the voltage change shall be regarded as a part of chattering. When the code-ON time between 2 bounces is less than 1mS, they are regarded as 1 linked bounce.	$t_2 \leq 2\text{mS}$
5-3-3. 滑动噪音 Sliding noise	编码OFF部份的电压变动。 The voltage change in code-OFF area.	3.5V以上 3.5Vmin

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<p>5-4. 相位差 Phase difference</p>	<p>下（图6）所示回路，轴以360° /S的速度转动测定。 Measurement shall be made under the condition which the shaft is rotated at 60r/min</p>  <p>图6 fig.6</p>	<p>T1、T2、T3、T4≥0.08T 见图6（fig.6）</p>
<p>5-5. 绝缘阻抗 Insulation resistance</p>	<p>在端子和支架间施加电压 250V DC。 Measurement shall be made under the condition which a voltage of 250V DC is applied between individual terminals and frame.</p>	<p>100MΩ 以上 100MΩ Min</p>
<p>5-6. 耐电压 Dielectric strength</p>	<p>在端子和支架间施加AC300V电压1分钟 A voltage of 300V AC shall be applied for 1 minute between individual terminals and frame.</p>	<p>不得有绝缘破坏 Without arcing or breakdown.</p>
<p>5-7. 端子间接触阻抗 Contact resistance</p>	<p>输出信号处于ON时安定状态条件下测定。 Measurement shall be stable condition which a output signal is ON.</p>	<p>1Ω 以下 1Ω Max</p>
<p>6. 机械性能 Mechanical Characteristics</p>		
<p>6-1. 全回转角度 Total rotational angle</p>		<p>360°（无止档点） 360°（Endless）</p>
<p>6-2. 定位点力矩 Detent torque</p>	<p>只适用于附卡点装置 Only suitable for C.C, equipment.</p>	<p>5~25mN. m. (50~250gf. cm)</p>
<p>6-3. 定位点数及位置 Number and position of detent</p>	<p>只适用于附卡点装置 Only suitable for C.C, equipment.</p>	<p>30点定位间隔角度12° ±2° 30detents Step angle:12° ±2°</p>
<p>6-4. 轴的回转方向摆动 Shaft play in rotational wobble</p>	<p>用角度板测定。 Testing by angle board.</p>	<p>5° 以下 5° Max</p>
<p>7 耐久性能 Endurance Characteristics</p>		
<p>项目 ITEM</p>	<p>条件 CONDITIONS</p>	<p>规格 SPECIFICATIONS</p>
<p>7-1. 回转寿命 Rotational life</p>	<p>在无负荷条件下轴以600~1000周/小时速度回转，一日连续5000~8000次。 The shaft of encoder shall be rotated at a speed of 600~1000cycles/H without electrical load, after with measurements shall be made. (5000 to 8000 continuous cycles for 24 hours.)</p>	<p>30,000±200周 30,000±200cycles 振荡 t1, t3≤5mS. 突跳 t2≤3mS. 尚余有轻微定位感。 端子间接触阻抗200Ω 以下 Chattering t1, t3≤5mS. Bounce t2≤3mS. Detent feeling has to remains Contact resistance 200Ω Max</p>

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7-2. 耐湿性 Damp heat	温度40±2℃, 湿度90~95%的恒温恒湿槽中放置96±4小时后, 在常温、常湿中放置1.5小时后测试. The encoder shall be stored at temperature of40 ±2℃ with relative humidity of 90% to95% for96±4H in a thermostatic chamber.And the encoder shall be subjected to standard atmospheric conditions for 1.5H,After which measurements shall be made.	所有项应满足初期规格 Specifications in clause all items is shall be satisfied.			
7-3. 耐热性 Dry heat	温度85±3℃的恒温箱中放置96±4小时, 常温、常湿放置1.5小时后测试. The encoder shall be stored at a temperature of 85±3℃for 96±4H in a thermostatic chamber.And then the encoder.shall be subjected to standard atmospheric conditions for 1.5H,After which measurements shall be made.	所有项应满足初期规格。 Specifications in clause all items is shall be satisfied.			
7-4. 低温特性 Cold	温度-40±3℃的恒温箱中放置96±4小时, 常温、常湿放置1.5小时后测试. The encoder shall be stored at a temperature of -40±3℃for 96±4H in a thermostatic chamber.And then the encoder.shall be subjected to standard atmospheric conditions for 1.5H,After which measurements shall be made.	所有项应满足初期规格。 Specifications in clause all items is shall be satisfied.			
7-5. 焊锡耐热性 Resistance to Soldering heat	槽焊 Dip soldering. 使用基板:t=1.6mm的单面覆铜板. Printed wiring board:single-sided copper clad laminate board with thickness of 1.6mm. 预热:基板表面温度100℃以下, 时间1分钟以内. Preheating:1.Surface temperature of board:100℃. or less 2.Preheating time:within 1 minute. 焊接:温度230±5℃或以下, 时间3秒以内. Soldering:Solder temperature:230±5℃ or less Immersion time:within 3S 手焊 Manual soldering. 温度300℃以下, 时间3秒以内. Bit temperature of soldering iron:300℃less than Application time of soldering iron:within 3S	不得有绝缘体的破损、变形、接触无异常. Electrical characteristics shall be satisfied No mechanical abnormality.			
7-6. 焊锡性 Solderability	端子在230℃±5℃温度的焊锡槽内浸锡3秒±0.5秒. The terminals shall be immersed into solder bath at 230℃for 3S±0.5S.	浸渍面须有75%以上焊锡附着 A new uniform coating of solder shall cover75% minimum of the surface being immersed.			
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