



# 产品规格书

## Specification

品 名 (P/N): 光电耦合器 Photocoupler

型 号 (Mfg P/N): DPC-817S

制 作 日 期 (Date): 2021-03-01

制作人 (producer): 高 康

审 核 (audit): 黄俊民

批 准 (approval): 黄伟鹏

文件编号 (Document No) DP-WI-QC-32-A

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## ● 特点 (Features)

1. 电流转换比 (CTR: 最小. 50% 工作条件  $I_F=5\text{mA}$ ,  $V_{CE}=5\text{V}$ ) Current transfer ratio (Min 50% Working condition  $I_F=5\text{mA}$ ,  $V_{CE}=5\text{V}$ )
2. 绝缘电压: ( $V_{iso}=5,000\text{Vrms}$ ) Isolation Voltage = 5,000Vrms
3. 响应时间 ( $t_r$ : TYP.  $4\mu\text{s}$ ), 工作条件  $V_{CE}=10\text{V}$ ,  $I_C=2\text{mA}$ ,  $R_L=100\ \Omega$   
Response Time ( $t_r$ : TYP.  $4\mu\text{s}$ ), working condition  $V_{CE}=10\text{V}$ ,  $I_C=2\text{mA}$ ,  $R_L=100\ \Omega$ )
4. UL 认可 (NO:E343249) UL approval (NO: E343249)
5. VDE 认可 (NO:40038417) VDE approval (NO: 40038417)
6. 本产品符合 ROHS 及 REACH 相关法规要求。Our products conform to the requirements of the ROHS and REACH the relevant laws and regulations.

## ● 说明 (Description)

1. DPC-817S 系列光耦合器的组成是: 由一个 GaAs 的发射管和一个 NPN 的晶体管组成  
DPC-817S photocoupler consist of one piece of GaAs emitter and one piece of NPN transistor
2. DPC-817S 的引脚中心距是 2.54mm Pin pitch of DPC-817S is 2.54mm

## ● 应用范围 (Applications)

1. 电脑. Computer terminals
2. 器具的应用, 测量仪器. System appliances, measuring instruments
3. 贮存器, 复印机, 自动售货机. Registers, copiers, automatic vending machines
4. 家用电器, 如风扇加热器等. Electric home appliances, such as fan heaters, etc.
5. 信号传输系统. Signal transmission between circuits of different potentials and impedance.

## ● 最大绝对额定值 (常温=25℃) Absolute Maximum Ratings ( $T_a=25^\circ\text{C}$ )

| 参数 Parameter                                        |                                      | 符号 Symbol  | 额定值 Rated Value | 单位 Unit |
|-----------------------------------------------------|--------------------------------------|------------|-----------------|---------|
| 输入<br>Inout                                         | 正向电流 Forward Current                 | $I_F$      | 50              | mA      |
|                                                     | 反向电压 Reverse Voltage                 | $V_R$      | 6               | V       |
|                                                     | 功耗率 Power Dissipation                | P          | 70              | mW      |
| 输出<br>Output                                        | 集极与射极电压<br>Collector-Emitter Voltage | $V_{CE}$   | 85              | V       |
|                                                     | 射极与集极电压 Emitter-Collector Voltage    | $V_{EC}$   | 6               |         |
|                                                     | 集极电流 Collector Current               | $I_C$      | 50              | mA      |
|                                                     | 消耗功率 Collector Power Dissipation     | $P_C$      | 150             | mW      |
| 总功率消耗 Collector Power Dissipation                   |                                      | $P_{tot}$  | 200             | mW      |
| *1 绝缘电压 Insulation Voltage                          |                                      | $V_{iso}$  | 5,000           | Vrms    |
| 最大绝缘电压 Rated impulse isolation voltage              |                                      | $V_{ICM}$  | 5,000           | V       |
| 额定脉冲绝缘电压<br>Rated repetitive peak isolation voltage |                                      | $V_{ICRM}$ | 630             | V       |
| 工作温度 Operating Temperature                          |                                      | $T_{opr}$  | -40 to + 100    | ℃       |
| 存储温度 Storage Temperature                            |                                      | $T_{stg}$  | -55 to + 125    |         |
| *2 焊锡温度 Soldering Temperature                       |                                      | $T_{sol}$  | 260             |         |

\*1. 交流测试, 时间 1 分钟, 湿度. =40~60% AC Test, 1 minute, humidity = 40~60%

如下是绝缘测试的方法. Isolation voltage shall be measured using the following method.:

- (1) 将产品的两端短路。Short between anode and cathode on the primary side and between collector and emitter on the secondary side
- (2) 测试绝缘电压时无电流通过。The isolation voltage tester with zero-cross circuit shall be used
- (3) 测试时加正弦波形电压。The waveform of applied voltage shall be a sine wave

\*2. 锡焊时间为 10 秒 soldering time is 10 seconds



● 光电特性(常温=25℃) Electro-Optical Characteristics (Ta=25℃)

| 参数 Parameter                            |                                                   | 符号<br>Symbol         | 条件<br>Condition                                                           | 最小<br>Min          | 中. Mid<br>ium      | 最大<br>Max | 单位<br>Unit    |
|-----------------------------------------|---------------------------------------------------|----------------------|---------------------------------------------------------------------------|--------------------|--------------------|-----------|---------------|
| 输入 Input                                | 正向电压 Forward Voltage                              | $V_f$                | $I_f=20\text{mA}$                                                         | ---                | 1.2                | 1.4       | V             |
|                                         | 反向电流 Reverse Current                              | $I_x$                | $V_x=4\text{V}$                                                           | ---                | ---                | 10        | $\mu\text{A}$ |
|                                         | 集极电容<br>Terminal Capacitance                      | $C_t$                | $V=0, f=1\text{MHz}$                                                      | ---                | 30                 | 250       | pF            |
| 输出 Output                               | 集极至射极电流<br>Collector Dark Current                 | $I_{\text{cso}}$     | $V_{\text{ce}}=70\text{V}, I_f=0$                                         | ---                | ---                | 100       | nA            |
|                                         | 集极与射极衰减电压<br>Collector-Emitter Breakdown Voltage  | $BV_{\text{ceo}}$    | $I_c=0.1\text{mA}$<br>$I_f=0$                                             | 85                 | ---                | ---       | V             |
|                                         | 射极与集极衰减电压<br>Emitter-Collector Breakdown Voltage  | $BV_{\text{eco}}$    | $I_e=10\mu\text{A}$<br>$I_f=0$                                            | 6                  | ---                | ---       | V             |
| 传输特性<br>Transforming<br>Characteristics | 集极电流<br>Collector Current                         | $I_c$                | $I_f=5\text{mA}$<br>$V_{\text{CE}}=5\text{V}$                             | 2.5                | ---                | 30        | mA            |
|                                         | *1 电流转换比<br>Current Transfer Ratio                | CTR                  |                                                                           | 50                 | ---                | 600       | %             |
|                                         | 集极与射极饱和电压<br>Collector-Emitter Saturation Voltage | $V_{\text{CE(sat)}}$ | $I_f=20\text{mA}$<br>$I_c=1\text{mA}$                                     | ---                | 0.1                | 0.2       | V             |
|                                         | 绝缘阻抗<br>Isolation Resistance                      | $R_{\text{iso}}$     | DC500V<br>40~60%R. H.                                                     | $5 \times 10^{10}$ | $1 \times 10^{11}$ | ---       | $\Omega$      |
|                                         | 电 容 量 Floating<br>capacitance                     | $C_f$                | $V=0, f=1\text{MHz}$                                                      | ---                | 0.5                | ---       | pF            |
|                                         | 转换频率<br>Cut-off Frequency                         | $f_c$                | $V_{\text{ce}}=5\text{V}, I_c=2\text{mA}$<br>$R_L=100\Omega, -3\text{dB}$ | ---                | 80                 | ---       | kHz           |
|                                         | 上升时间 Rise Time(Rise)                              | $t_r$                | $V_{\text{ce}}=2\text{V}, I_c=2\text{mA}$<br>$R_L=100\Omega$              | ---                | 4                  | 15        | $\mu\text{s}$ |
|                                         | 下降时间 Fall Time(Fall)                              | $t_f$                |                                                                           | ---                | 3                  | 15        | $\mu\text{s}$ |

注：电流转换比 Current Conversion Ratio =  $I_c / I_f \times 100\%$



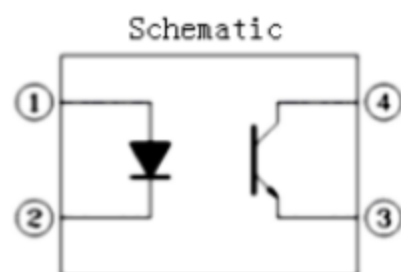
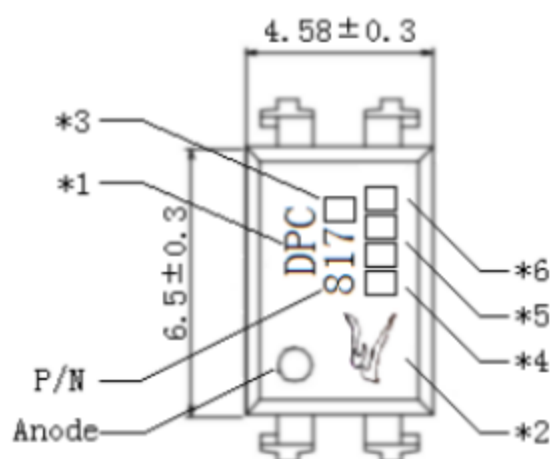
● 电流转换比的等级分类 Rank table of current transfer ratio

| 等级标示 Rank Mark   | 最小.Min (%) | 最大.Max (%) |
|------------------|------------|------------|
| L                | 50         | 100        |
| A                | 80         | 160        |
| B                | 130        | 260        |
| C                | 200        | 400        |
| D                | 300        | 600        |
| A or B or C or D | 50         | 600        |

说明：工作条件： $I_F=5\text{mA}$ ,  $V_{CE}=5\text{V}$ ,  $T_a=25^\circ\text{C}$ .

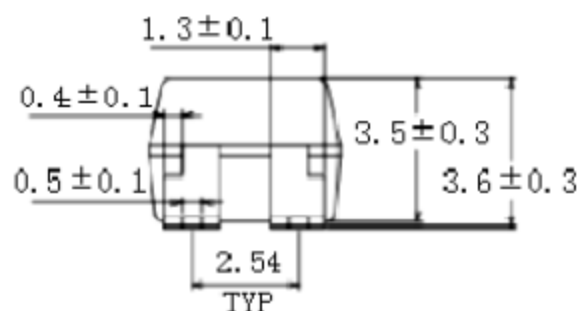
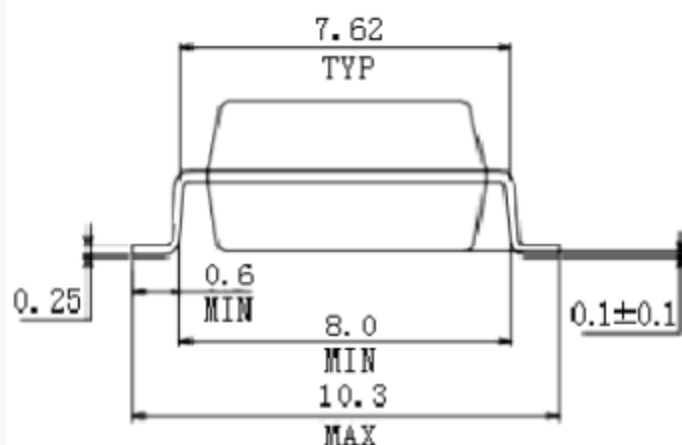
Note: Working condition:  $I_F=5\text{mA}$ ,  $V_{CE}=5\text{V}$ ,  $T_a=25^\circ\text{C}$ .

● 外形尺寸 Outer Dimension



Pin Configuration

- 1. Anode
- 2. Cathode
- 3. Emitter
- 4. Collector



- \*1. Brand
- \*2. Company trademark
- \*3. Rank mark

- \*4. Year code
- \*5. Week code
- \*6. Process code



● 特性曲线 Characteristics Curves

Fig.1 Forward Current  
vs. Ambient Temperature

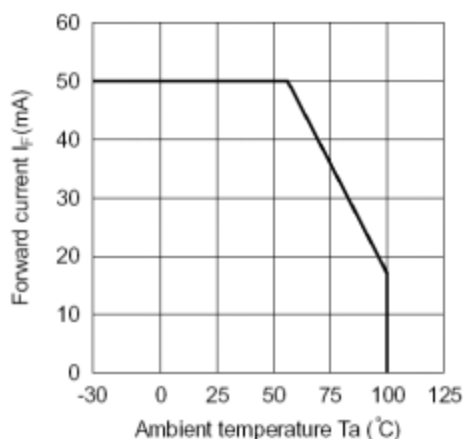


Fig.2 Collector Power Dissipation  
vs. Ambient Temperature

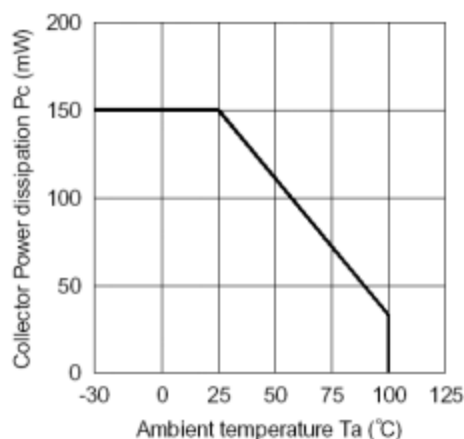


Fig.3 Collector-emitter Saturation  
Voltage vs. Forward Current

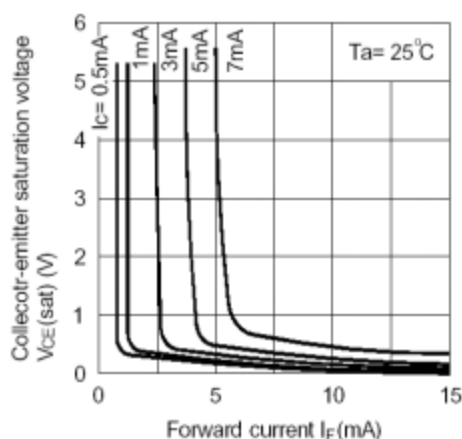


Fig.4 Forward Current vs. Forward  
Voltage

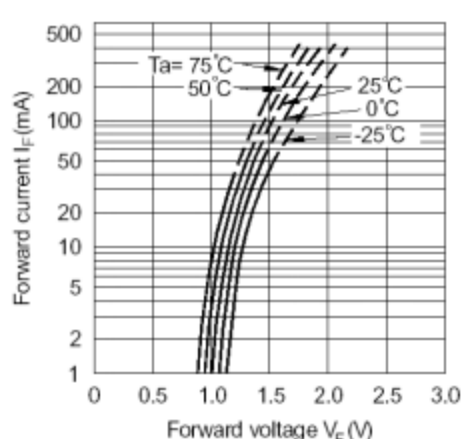


Fig.5 Current Transfer Ratio vs.  
Forward Current

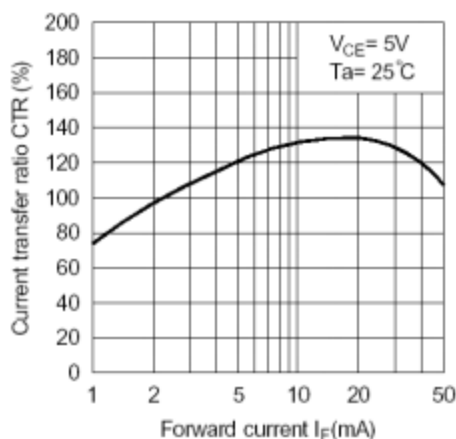
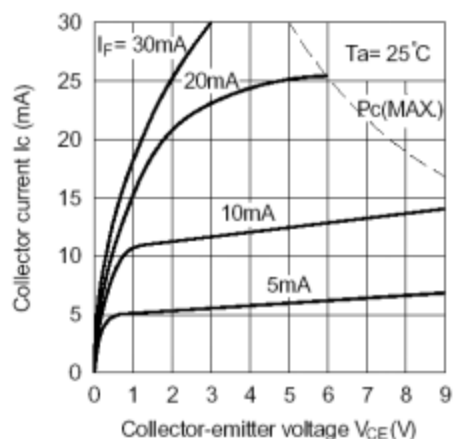


Fig.6 Collector Current vs.  
Collector-emitter Voltage





## ● 特性曲线 Characteristics Curves

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

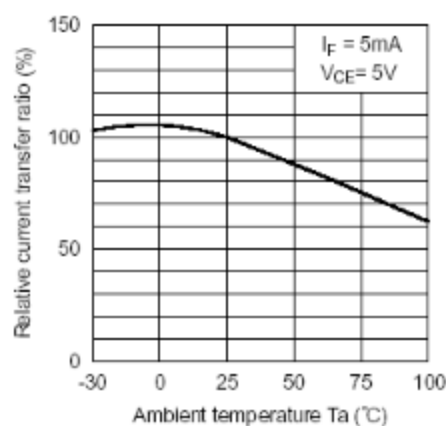


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

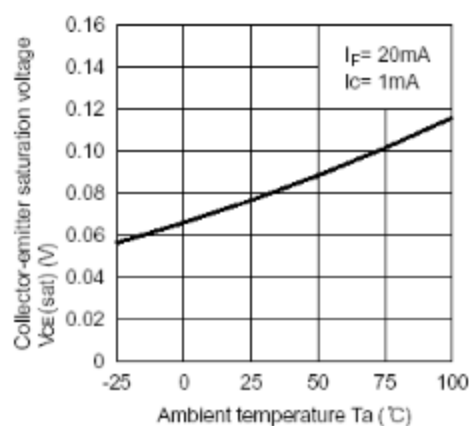


Fig.9 Collector Dark Current vs. Ambient Temperature

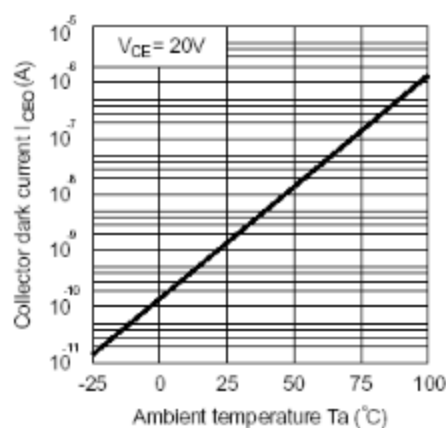


Fig.10 Response Time vs. Load Resistance

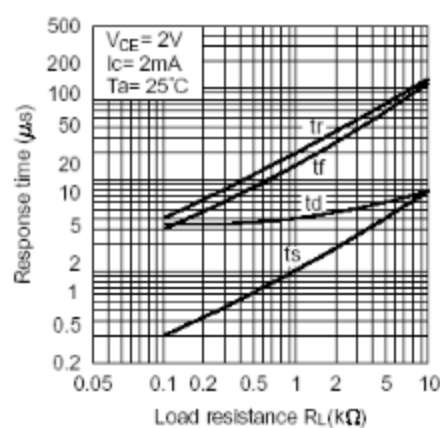
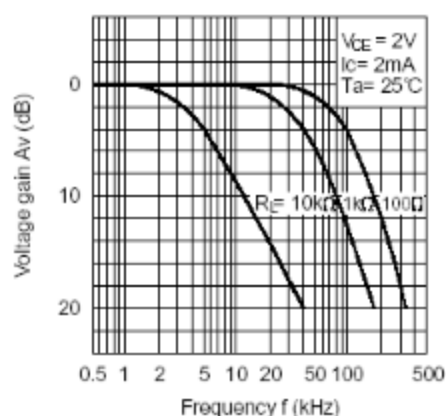
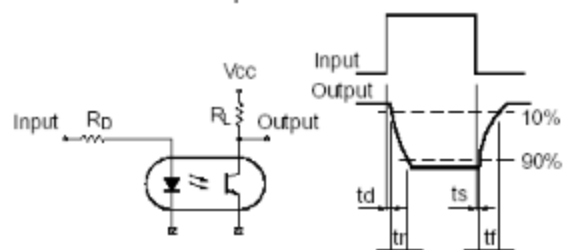


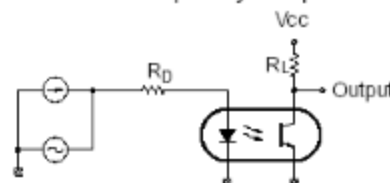
Fig.11 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response





● 可靠性测试 Reliability test

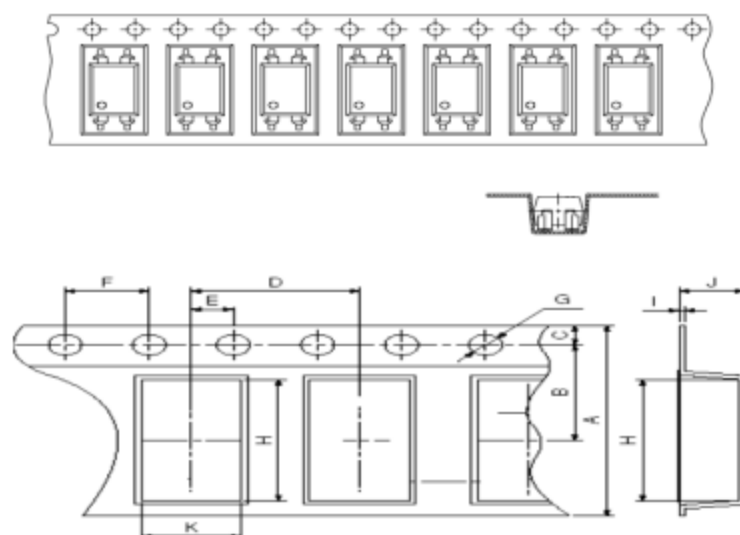
| 分类<br>Classification         | 测试项目<br>Test Item                                             | 参考标准<br>Reference Standard                              | 测试条件<br>Test Conditions                                                                                                                                                      | 结果<br>Result |
|------------------------------|---------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| 耐性测试<br>Endurance<br>Test    | 寿命测试<br>Operation Life                                        | MIL-STD-750:1026<br>MIL-STD-883:1005<br>JIS C 7021 :B-1 | 连接功率是 $I_f=5mA$ , $V_{CE}=5V$<br>测试时间为 1000 小时<br>Connect with a power<br>$I_f=5mA$ , $V_{CE}=5V$<br>Test time=1,000hrs                                                      | 0/20         |
|                              | 高温寿命测试<br>High Temperature<br>Operation Life                  | JESD22-A108                                             | 连接功率是 $I_f=5mA$ , $V_{CE}=5V$ ,<br>$T_a=110\pm 2^\circ C$ , 测试时间为 1000 小时<br>Connect with a power<br>$I_f=50mA$ , $V_{CE}=5V$ , $T_a=110\pm 2^\circ C$<br>Test time=1,000hrs | 0/20         |
|                              | 高温高湿反偏试验<br>High Temperature<br>High Humidity<br>Reverse Bias | JESD22-A101                                             | $T_a=+85^\circ C\pm 5^\circ C$ , RH=85%<br>PTR= $V_{CE}$ 绝对最大额定值*80%<br>测试时间=1000hrs<br>PTR= $V_{CE}$ absolute max rating*80%<br>Test time=1000hrs                           | 0/20         |
|                              | 高温反偏试验<br>High Temperature<br>Reverse Bias                    | JESD22-A108                                             | $T_a=+105^\circ C\pm 5^\circ C$<br>PTR= $V_{CE}$ 绝对最大额定值<br>测试时间=1000hrs<br>PTR= $V_{CE}$ absolute max rating<br>Test time=1000hrs                                           | 0/20         |
|                              | 高温存贮<br>High Temperature<br>Storage                           | JESD22-A103                                             | 高温= $+125^\circ C\pm 5^\circ C$<br>测试时间=1,000hrs<br>High $T_a=+125^\circ C\pm 5^\circ C$<br>Test time=1,000hrs                                                               | 0/20         |
|                              | 低温存贮<br>Low Temperature<br>Storage                            | JESD22-A119                                             | 低温= $-55^\circ C\pm 5^\circ C$<br>测试时间=1,000hrs<br>Low $T_a=-55^\circ C\pm 5^\circ C$<br>Test time=1,000hrs                                                                  | 0/20         |
|                              | 高压加速寿命试验<br>Autoclave                                         | JESD 22-A102-B                                          | P=15PSIG, $T_a=121^\circ C$<br>条件. =100%RH, 96hrs<br>Humi. =100%RH, 96hrs                                                                                                    | 0/20         |
| 环境测试<br>Environmental<br>Tes | 高温高湿<br>High Temperature<br>High Humidity                     | JESD22-A101                                             | $T_a=+85^\circ C\pm 5^\circ C$ , RH=85%<br>测试时间=96hrs<br>Test time=96hrs                                                                                                     | 0/20         |
|                              | 冷热冲击<br>Thermal Shock                                         | JESD22-A104                                             | $125^\circ C \sim 25^\circ C \sim -55^\circ C \sim 25^\circ C$<br>30min 5min 30min 5min<br>测试时间=20cycle<br>Test Time=20cycle                                                 | 0/20         |
|                              | 焊锡实验<br>Solder Resistance                                     | JESD22-B106                                             | 工作温度: $260^\circ C$ , 在 $10\pm 1$ 秒内<br>$T_a = 260 \pm 3^\circ C$<br>$t(\text{dwell}) = 10 \pm 1 \text{ sec}$                                                                | 0/20         |
|                              | 沾锡实验<br>Solder Ability                                        | MIL-S-883:2003<br>JIS C 7021 :A-2                       | $260^\circ C$ , 在 $5\pm 1$ 秒之内 $T_a = 260 \pm 3^\circ C$ , $t(\text{dwell}) = 5 \pm 1 \text{ sec}$                                                                           | 0/20         |



● 可靠性判定标准 Reliability decision criteria

| 符号<br>Symbol | 测试条件<br>Measuring conditions | 失效标准判定<br>Measuring conditions |
|--------------|------------------------------|--------------------------------|
| VF (V)       | If=20mA                      | Over Ux1.0                     |
| Ir (uA)      | Vr=4V                        | Over Ux1.0                     |
| CTR (%)      | If=5mA, VCE=5V               | Shift>1.2                      |
| VCE(sat)     | IF=20mA, IC= 1mA             | Over Ux1.0                     |
| BVCEO        | IC=0.1mA, IF=0               | Over Lx1.0                     |
| BVECO        | IE=10 μA, IF=0               | Over Lx1.0                     |

● 编带包装规格 Ribbon packing specification



| Dimension No.  | A           | B           | C           | D          | E          | F          |
|----------------|-------------|-------------|-------------|------------|------------|------------|
| Dimension (mm) | 16.0 ± 0.30 | 7.5 ± 0.10  | 1.75 ± 0.10 | 8.0 ± 0.10 | 2.0 ± 0.10 | 4.0 ± 0.10 |
| Dimension No.  | G           | H           | I           | J          | K          |            |
| Dimension (mm) | 1.5 ± 0.10  | 10.4 ± 0.10 | 0.4 ± 0.05  | 4.3 ± 0.10 | 5.1 ± 0.10 |            |

注: Notes:

- 1、每盘装 2000PCS 2000 PCS per disc.
- 2、每箱装 15 盘 15 discs per box.
- 3、包装若有调整，恕不另行通知 Specifications are subject to change without notice.