



ORIENT

Photo coupler

Product Data Sheet

Part Number: ORPC-825

Customer: _____

Date: _____

SHENZHEN ORIENT COMPONENTS CO., LTD

Block A 3rd Floor No.4 Building, Tian'an Cyber Park, Huangge Rd, LongGang Dist, Shenzhen, GD

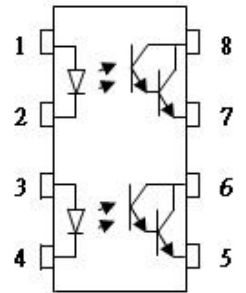
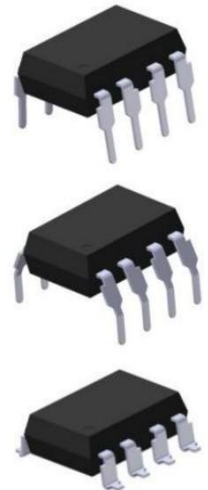
TEL: 0755-29681816

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www.orient-opto.com

1. Features

- (1) Current transfer ratio(CTR: 600~7500% at IF = 1 mA, Vce = 2 V)
- (2) High isolation voltage between input and output (Viso = 5000 V rms)
- (3) Creepage distance > 7.62 mm
- (4) Operating temperature up to + 110°C
- (5) Compact small outline package
- (6) The product itself will remain within RoHS compliant version
- (7) Safety approval
 - UL approved(No.E323844)
 - VDE approved (No.40029733)
 - CQC approved (No.CQC19001231254)
- (8) In compliance with RoHS, REACH standards
- (9) MSL Class I



Pin Configuration

- 1,3. Anode
- 2, 4. Cathode
- 5,7. Emitter
- 6,8. Collector

2. Instructions

- (1). The ORPC-825 series devices each consists of an infrared emitting diodes, optically coupled to a Darlington phototransistor detector. These devices are packaged in an 8-pin DIP package and available in wide-lead spacing and SMD option.
- (2). Pin pitch of ORPC-825 is 2.54mm

3. Application Range

- (1) Telephone set, telephone exchangers
- (2) Sequence controllers
- (3) System appliances, measuring instruments
- (4) Signal transmission between circuits of different potentials and impedances

4. Absolute Maximum Ratings (Ta=25°C)

| Parameter | | Symbol | Rated Value | Unit |
|----------------------------------|---------------------------------|------------|--------------|------|
| Input | Forward Current | I_F | 60 | mA |
| | Peak forward Current(1us pulse) | I_{FP} | 1 | A |
| | Reverse Voltage | V_R | 6 | V |
| | Consume Power | P | 100 | mW |
| Output | Collector and emitter Voltage | V_{CEO} | 40 | V |
| | Emitter and collector Voltage | V_{ECO} | 7 | |
| | Collector Current | I_C | 80 | mA |
| | Consume Power | P_C | 150 | mW |
| Total Consume Power | | P_{tot} | 200 | mW |
| *1 Insulation Voltage | | V_{iso} | 5,000 | Vrms |
| Rated Impulse Insulation Voltage | | V_{IORM} | 630 | V |
| Working Temperature | | T_{opr} | -55 to + 110 | °C |
| Deposit Temperature | | T_{stg} | -55 to + 125 | |
| *2 Soldering Temperature | | T_{sol} | 260 | |

*1. AC Test, 1 minute, humidity = 40~60%

Isolation voltage shall be measured using the following method.

- (1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side.
- (2) The isolation voltage tester with zero-cross circuit shall be used.
- (3) The waveform of applied voltage shall be a sine wave.

*2. soldering time is 10 seconds

5. Electrical optical characteristics at TA=25°C

| Parameter | | Symbol | Min | Typ.* | Max | Unit | Condition |
|-------------------------------------|---|---------------|--------------------|--------------------|------|---------------|--|
| Input | Forward Voltage | V_F | --- | 1.2 | 1.4 | V | $I_F=20\text{mA}$ |
| | Reverse Current | I_R | --- | --- | 5 | μA | $V_R=5\text{V}$ |
| | Collector Capacitance | C_t | --- | 30 | 250 | pF | $V=0, f=1\text{KHz}$ |
| Output | Collector to Emitter Current | I_{CEO} | --- | --- | 1 | μA | $V_{CE}=10\text{V}, I_F=0\text{mA}$ |
| | Collector and Emitter attenuation Voltage | BV_{CEO} | 40 | --- | --- | V | $I_C=0.1\text{mA}$ $I_F=0\text{mA}$ |
| | Emitter and Collector attenuation Voltage | BV_{ECO} | 7 | --- | --- | V | $I_E=0.1\text{mA}$ $I_F=0\text{mA}$ |
| Transforming Characteristics | *1 Current conversion ratio | CTR | 600 | --- | 7500 | % | $I_F=1\text{mA}$ $V_{CE}=2\text{V}$ |
| | Collector Current | I_C | 6 | --- | 75 | mA | |
| | Collector and Emitter Saturation Voltage | $V_{CE(sat)}$ | --- | 0.8 | 1 | V | $I_F=20\text{mA}$ $I_C=5\text{mA}$ |
| | Insulation Impedance | R_{iso} | 5×10^{10} | 1×10^{12} | --- | Ω | DC500V 40~60%R.H. |
| | Floating Capacitance | C_f | --- | 0.6 | 1.0 | pF | $V=0, f=1\text{MHz}$ |
| | Cut-off Frequency | f_c | 1 | 6 | --- | kHz | $V_{CE}=5\text{V}, I_C=2\text{mA}$ $R_L=100\Omega, -3\text{dB}$ |
| | Rise Time | t_r | --- | 60 | 300 | μs | $V_{CE}=2\text{V},$ $I_C=10\text{mA}$ $R_L=100\Omega$ |
| | Descend Time | t_f | --- | 53 | 250 | μs | |

*1 Current Conversion Ratio = $I_C / I_F \times 100\%$



6. Order Information

Part Number

ORPC-825T-W-X-Y-Z

Note

T = Lead form option (S, M or none)

W = Tape and reel option (TP, TP1 or none).

X = Lead frame option (F: Iron, C:copper)

Y = 'V' code for VDE safety (This options is not necessary).

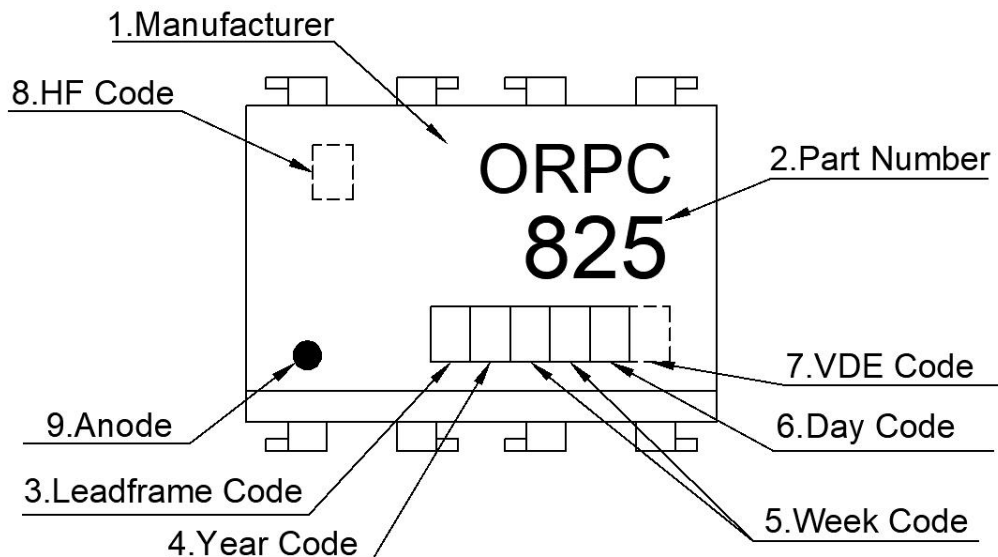
Z = 'G' code for Halogen free (This options is not necessary).

* VDE Code can be selected.

* Halogen Free can be selected.

| Option | Description | Packing quantity |
|--------|--|---------------------|
| None | Standard DIP-8 | 45 units per tube |
| M | Wide lead bend (0.4 inch spacing) | 45 units per tube |
| S(TA) | Surface mount lead form (low profile) + TA tape & reel option | 1000 units per reel |
| S(TA1) | Surface mount lead form (low profile) + TA1 tape & reel option | 1000 units per reel |

7. Naming Rule



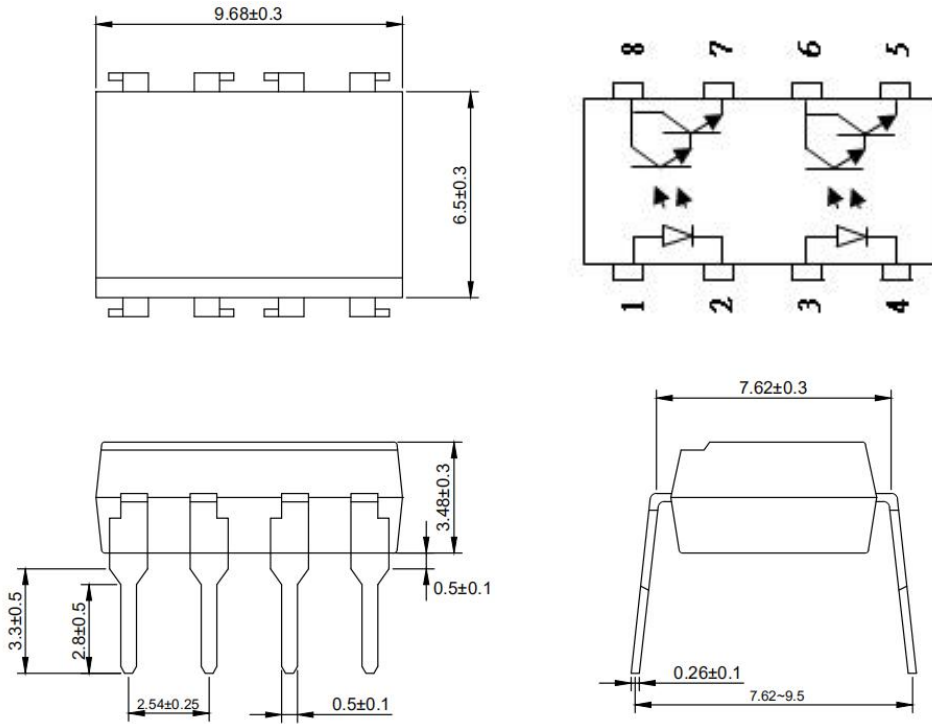
- (1) Manufacturer : ORIENT.
- (2) 825 denotes Part Number.
- (3) Lead frame Code : 'F' means Iron, 'C' means Copper.
- (4) Year Code : '1' means '2021' and so on.
- (5) Week Code : 01 means the first week, 02 means the second week and so on.
- (6) Day Code : "A to G" means "Monday to Sunday"
- (7) VDE Code . (Optional)
- (8) HF Code : Halogen Free. (Optional)
- (9) Anode.

* Halogen Free Mark can be selected.

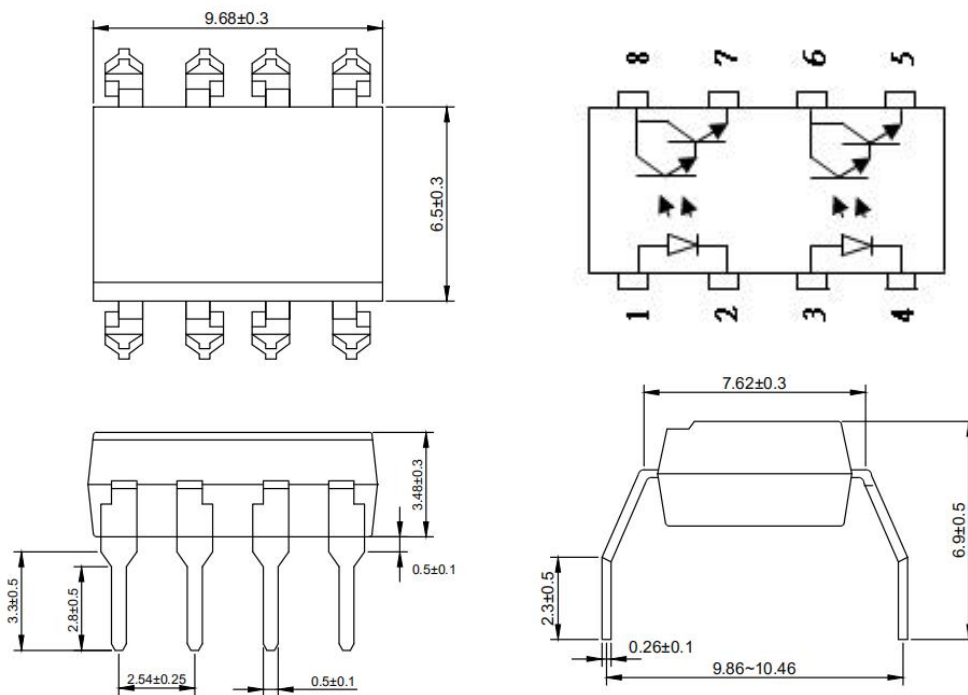
* VDE Mark can be selected.

8. Outer Dimension (Unit: mm)

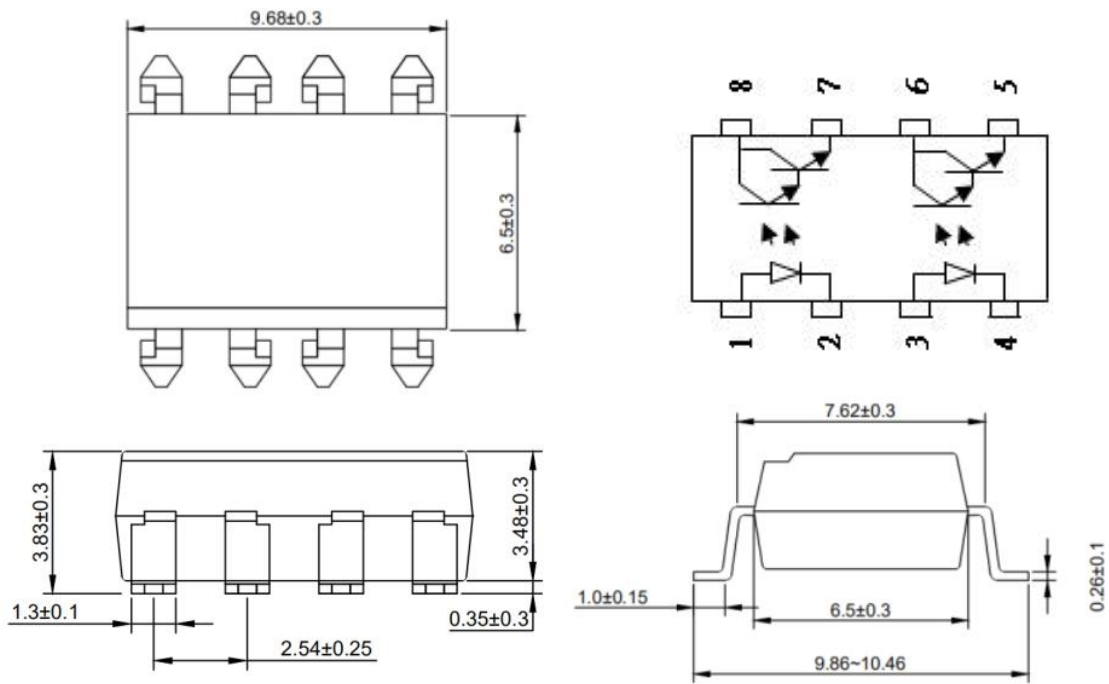
1. ORPC-825



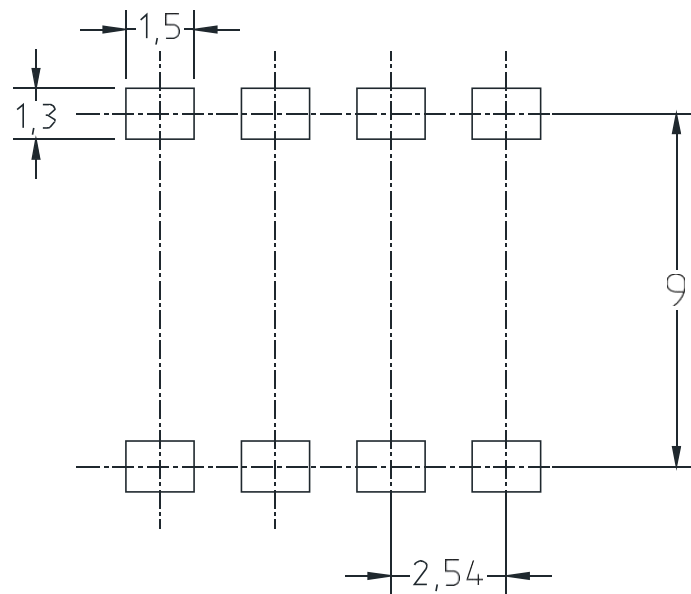
2. ORPC-825M



3.ORPC-825S



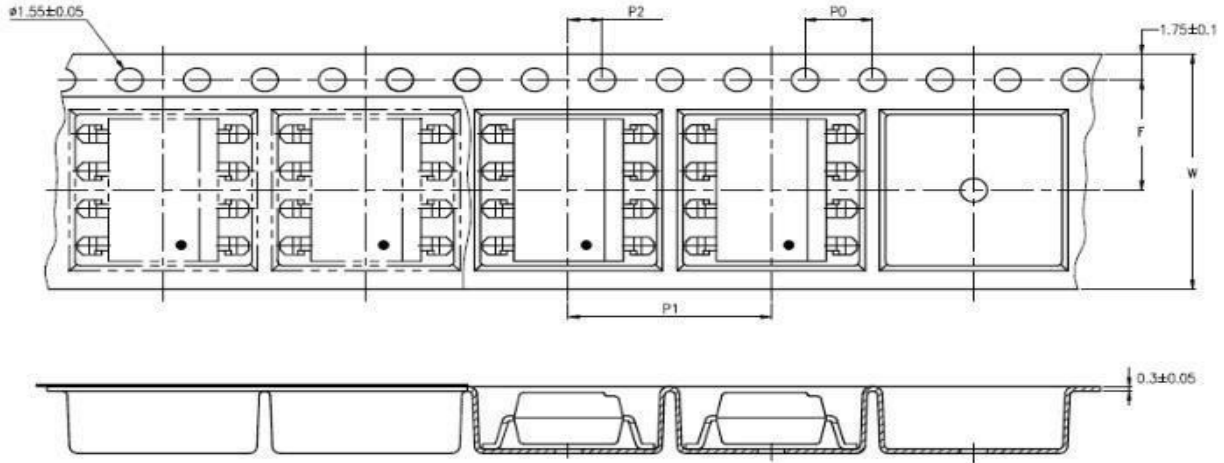
9. RECOMMENDED FOOT PRINT PATTERNS (MOUNT PAD)



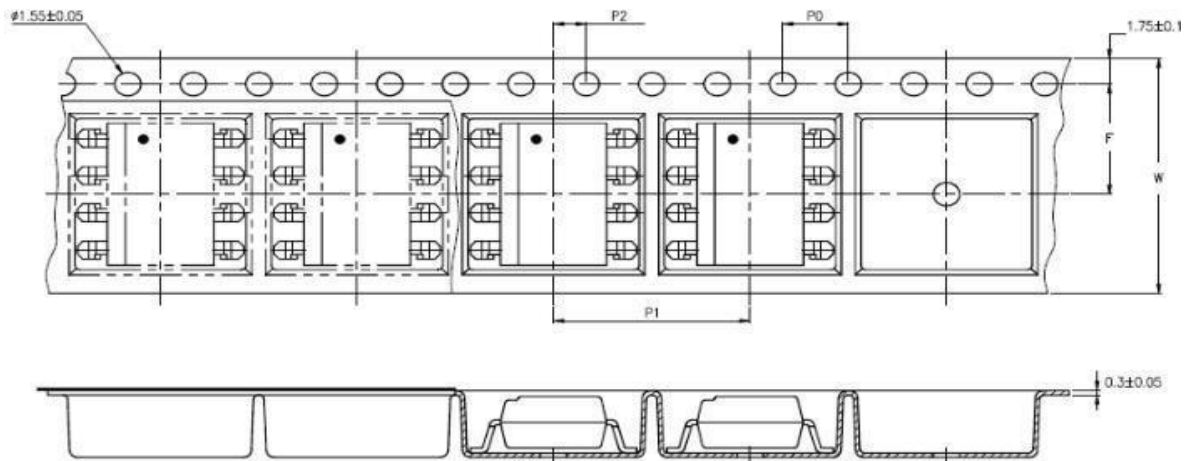
Unit: mm

10. Taping Dimensions

(1) ORPC-825S-TA



(2) ORPC-825S-TA1



| Description | Symbol | Dimension in mm(inch) |
|--|--------|-----------------------|
| Tape wide | W | 16±0.3(0.63) |
| Pitch of sprocket holes | P0 | 4±0.1(0.15) |
| Distance of compartment | F | 7.5±0.1(0.295) |
| | P2 | 2±0.1(0.079) |
| Distance of compartment to compartment | P1 | 12±0.1(0.472) |

| Package Type | TA/TA1 |
|-----------------|--------|
| Quantities(pcs) | 1000 |

11. Package Dimension

(1) package dimension


DIP Type




| Packing Information | |
|-----------------------------|---------------|
| Packing type | Tube |
| Qty per Tube | 45pcs |
| Small box (Inner) Dimension | 525*128*60mm |
| Large box (Outer) Dimension | 545*290*335mm |
| The Amount per Inner Box | 2,250pcs |
| The Amount per Outer Box | 22,500pcs |

SOP Type


| Packing Information | |
|-----------------------------|----------------|
| Packing type | Reel type |
| Tape Width | 16mm |
| Qty per Reel | 1,000pcs |
| Small box (inner) Dimension | 345*345*58.5mm |
| Large box (Outer) Dimension | 620x360x360mm |
| Max qty per small box | 2,000pcs |
| Max qty per large box | 20,000pcs |


(2)Packing Label Sample









Material Code : 120PCXXXXXX


P/N : OR-XXXXXX


Lot No. : XXXXXX-XXXXX-TX-X


D/C : XXXX


Qty : XXXX PCS


内箱码

外箱码

“XXXXXXXXXXXXXXXXXX” (一体机序列码)

Made in China

Note:

1. Material Code :Product ID.
2. P/N :Contents with "Order Information" in the specification.
3. Lot No. :Product data.
4. D/C :Product weeks.
5. Quantity :Packaging quantity.

12. Reliability Test

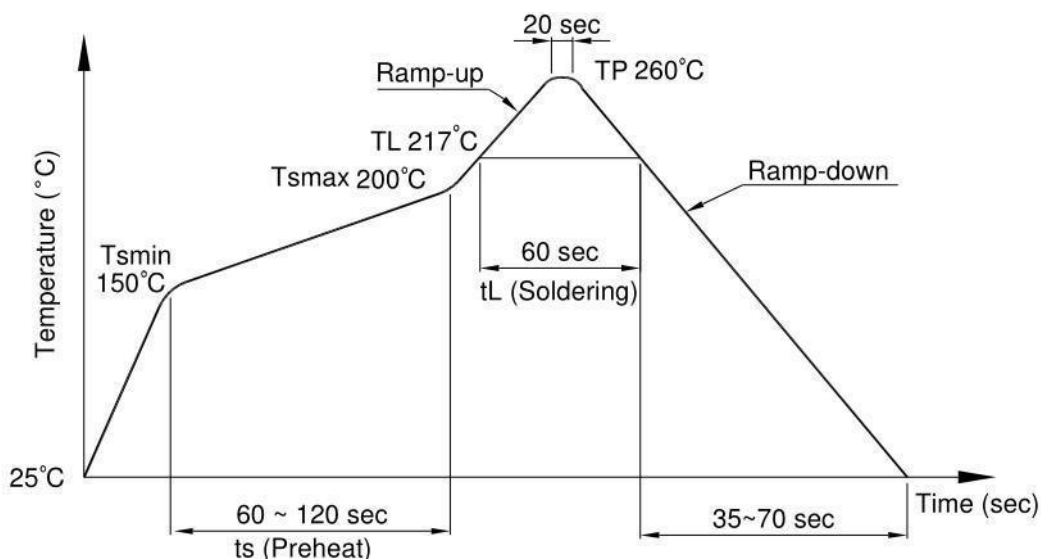
| NO. | ITEMS | Reliability Testing | | | | |
|-----|----------------------------|---------------------|--|--------------|-----------------------|-------------|
| | | QTY. (Pcs) | Condition | Process | Device | Standard |
| 1 | RSH 耐焊接热 | 22 | 260±5℃ | 10s/3 次 | 锡炉 | JESD22-A106 |
| 2 | HTSL 高温存储 | 77 | 125℃ | 168 hrs | 高温烤箱 测试仪 | JESD22-A103 |
| | | | | 500 hrs | | |
| | | | | 1000 hrs | | |
| 3 | LTSL 低温存储 | 77 | -55℃ | 168 hrs | 低温箱 测试仪 | JESD22-A119 |
| | | | | 500 hrs | | |
| | | | | 1000 hrs | | |
| 4 | TC 温度循环 | 77 | H:125℃ 15min ∫ 5min L:-55℃ 15min | 300 cycle | 冷热冲击机 | JESD22-A104 |
| 5 | TS 温度冲击 | 77 | H:100℃ 5min ∫ 15s L:-40℃ 5min | 300 cycle | 冷热冲击机 | JESD22-A106 |
| 6 | HTOL 高温操作 | 77 | 110℃ IF=10mA Vce=5V | 168 hrs | 高温烤箱 测试仪、老 化电路板 | JESD22-A108 |
| | | | | 500 hrs | | |
| | | | | 1000 hrs | | |
| 7 | ESD-HBM 人体模式 | 22 | ≥8KV 1Cycle | 1次 | ESD静电测 试仪 | JESD22-A114 |
| 8 | SD 可焊性 | 22 | Pb-free 245±5℃ | 5S/1次 | 锡炉 | JESD22-B102 |
| 9 | HTRB 高温反向偏压 | 77 | HTRB @125℃ Vce=80v | 168 hrs | 高温烤箱 , 测试仪 | JESD22-A103 |
| | | | | 500 hrs | | |
| | | | | 1000 hrs | | |
| 10 | H3TRB 温湿度反向偏 压, 寿命试验 | 77 | H3TRB 85℃,85%RH Vce=80v | 168 hrs | 恒温恒湿 机, 测试仪 | JESD22-A101 |
| | | | | 500 hrs | | |
| | | | | 1000 hrs | | |
| 11 | Autoclave 压力锅 | 77 | Ta=121 ℃,100%RH,2atm | 96hrs | 压力锅 | JESD22-A102 |

13. Temperature Profile Of Soldering

(1) IR Reflow soldering (JEDEC-STD-020C compliant)

One time soldering reflow is recommended within the condition of temperature and time profile shown below. Do not solder more than three times.

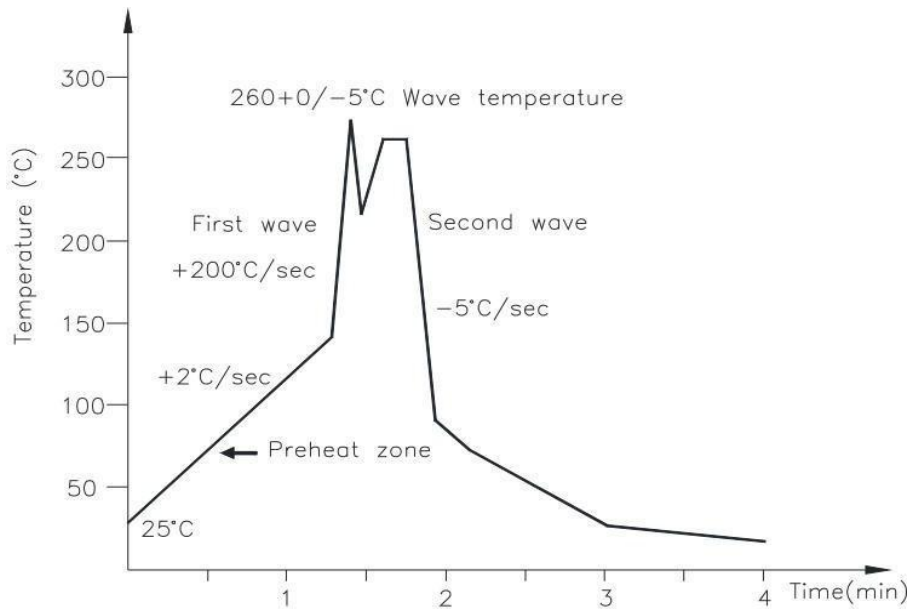
| Profile item | Conditions |
|--------------------------------------|----------------|
| Preheat | |
| - Temperature Min (T Smin) | 150°C |
| - Temperature Max (T Smax) | 200°C |
| - Time (min to max) (ts) | 90±30 sec |
| Soldering zone | |
| - Temperature (TL) | 217°C |
| - Time (t L) | 60 sec |
| Peak Temperature | 260°C |
| Peak Temperature time | 20 sec |
| Ramp-up rate | 3°C / sec max. |
| Ramp-down rate from peak temperature | 3~6°C / sec |
| Reflow times | ≤3 |



(2) Wave soldering (JEDEC22A111 compliant)

One time soldering is recommended within the condition of temperature.

| | |
|---------------------|--------------|
| Temperature | 260+0/-5°C |
| Time | 10 sec |
| Preheat temperature | 5 to 140°C |
| Preheat time | 30 to 80 sec |



(3) Hand soldering by soldering iron

Allow single lead soldering in every single process. One time soldering is recommended.

| | |
|-------------|------------|
| Temperature | 380+0/-5°C |
| Time | 3 sec max |

14. Characteristics Curve

Fig.1 Forward Current vs. Ambient Temperature

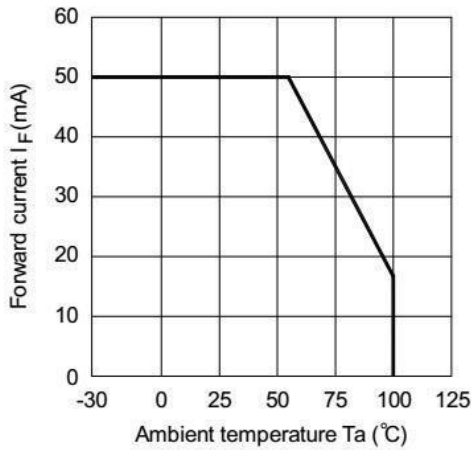


Fig.2 Collector Power Dissipation vs. Ambient Temperature

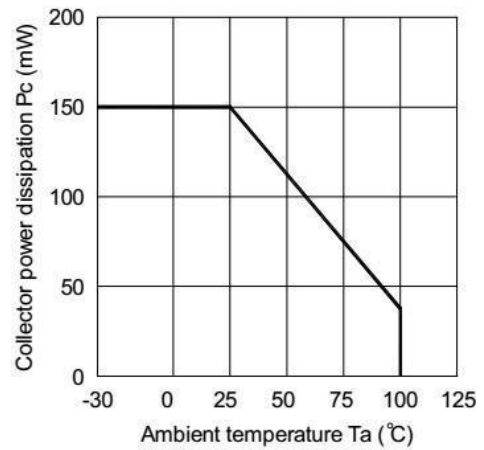


Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

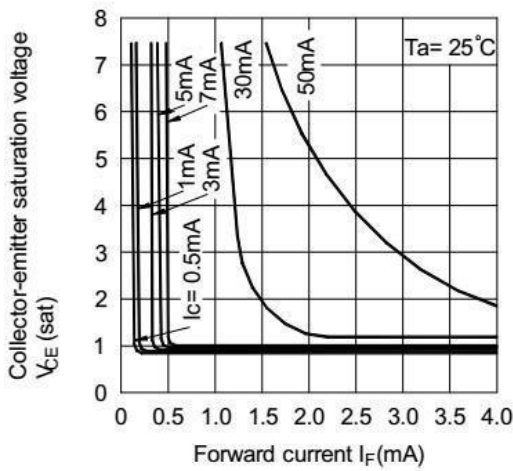


Fig.4 Forward Current vs. Forward Voltage

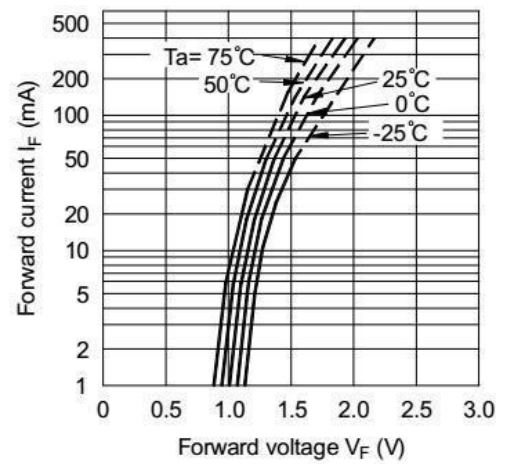


Fig.5 Current Transfer Ratio vs. Forward Current

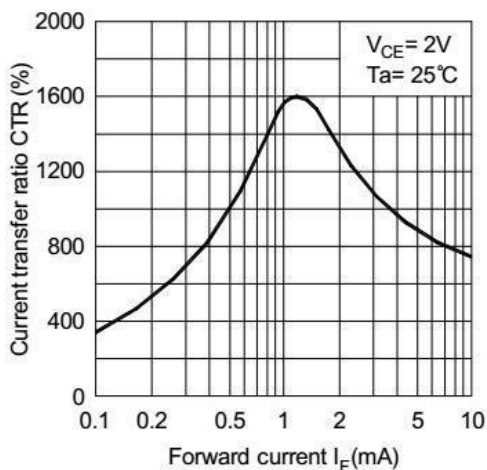


Fig.6 Collector Current vs. Collector-emitter Voltage

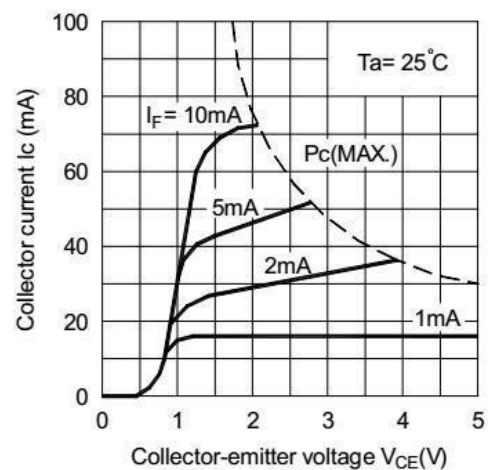


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

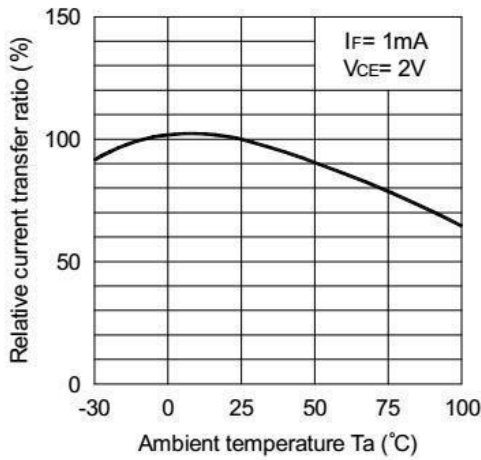


Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

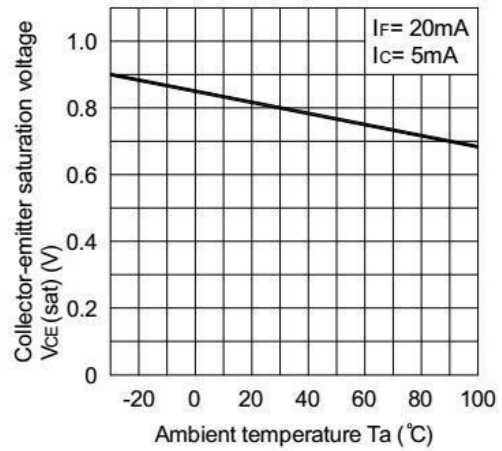


Fig.9 Collector Dark Current vs. Ambient Temperature

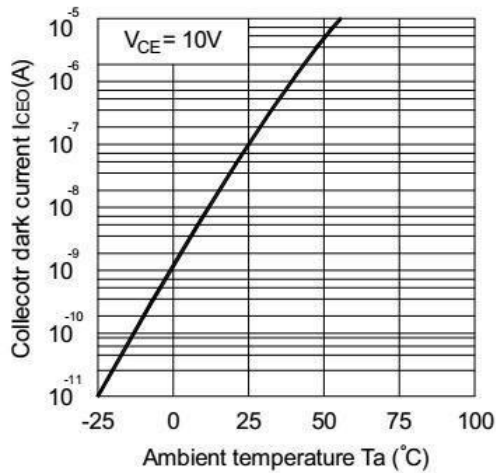


Fig.10 Response Time vs. Load Resistance

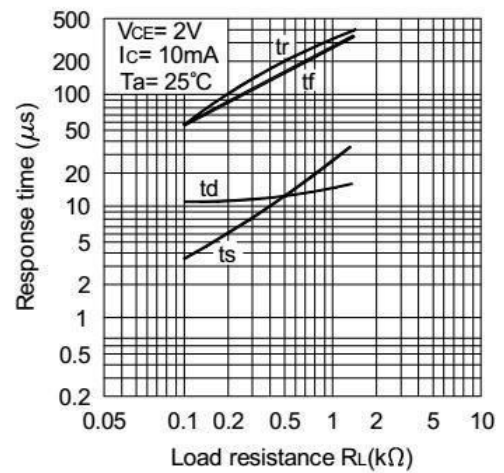
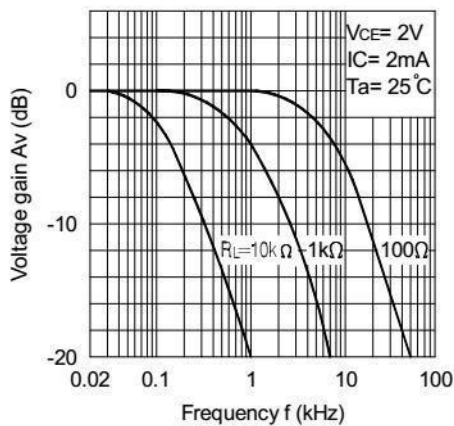
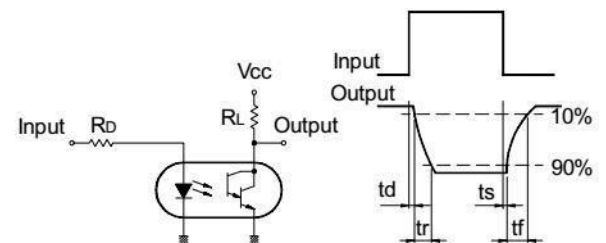


Fig.11 Frequency Response



Test Circuit for Response Time



Test Circuit for Frequency Response

