



# THE DATASHEET OF TLP621X



**ISOCOM**  
COMPONENTS

## TLP621, TLP621-2, TLP621-4



### DESCRIPTION

The TLP621, TLP621-2 and TLP621-4 series of optically coupled isolator consist of an infrared light emitting diode and an NPN silicon photo transistor in a space efficient Dual In Line Plastic Package.

### FEATURES

- AC Isolation Voltage 5300V<sub>RMS</sub>
- CTR Selections Available
- Wide Operating Temperature Range -30°C to +100°C
- Lead Free and RoHS Compliant
- UL File E91231 Package Code "EE"
- VDE Approval Certificate No. 40028086

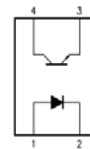
### APPLICATIONS

- Computer Terminals
- Industrial System Controllers
- Measuring Instruments
- Signal Transmission between Systems of Different Potentials and Impedances

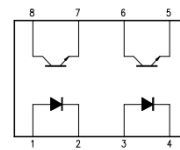
### ORDER INFORMATION

- Add X after PN for VDE Approval
- Add G after PN for 10mm lead spacing
- Add SM after PN for Surface Mount
- Add SMT&R after PN for Surface Mount Tape & Reel  
(Available for TLP621SM and TLP621-2SM)

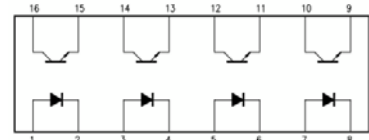
**TLP621**



**TLP621-2**



**TLP621-4**



### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

Stresses exceeding the absolute maximum ratings can cause permanent damage to the device.

Exposure to absolute maximum ratings for long periods of time can adversely affect reliability.

#### Input

|                   |      |
|-------------------|------|
| Forward Current   | 50mA |
| Reverse Voltage   | 6V   |
| Power dissipation | 70mW |

#### Output

|                                                |       |
|------------------------------------------------|-------|
| Collector to Emitter Voltage BV <sub>CEO</sub> | 55V   |
| Emitter to Collector Voltage BV <sub>ECO</sub> | 6V    |
| Collector Current                              | 50mA  |
| Power Dissipation                              | 150mW |

#### Total Package

|                                  |                      |
|----------------------------------|----------------------|
| Isolation Voltage                | 5300V <sub>RMS</sub> |
| Total Power Dissipation          | 200mW                |
| Operating Temperature            | -30 to 100 °C        |
| Storage Temperature              | -55 to 125 °C        |
| Lead Soldering Temperature (10s) | 260°C                |

#### ISOCOM COMPONENTS 2004 LTD

Unit 25B, Park View Road West, Park View Industrial Estate  
Hartlepool, Cleveland, TS25 1PE, United Kingdom  
Tel : +44 (0)1429 863 609 Fax : +44 (0)1429 863 581  
e-mail : sales@isocom.co.uk  
<http://www.isocom.com>

#### ISOCOM COMPONENTS ASIA LTD

Hong Kong Office  
Block A, 8/F, Wah Hing Industrial Mansion  
36 Tai Yau Street, San Po Kong, Kowloon, Hong Kong  
Tel : +852 2995 9217 Fax : +852 8161 6292  
e-mail : sales@isocom.com.hk

## TLP621, TLP621-2, TLP621-4

### ELECTRICAL CHARACTERISTICS (Ambient Temperature = 25°C unless otherwise specified)

#### INPUT

| Parameter            | Symbol | Test Condition                   | Min | Typ. | Max | Unit          |
|----------------------|--------|----------------------------------|-----|------|-----|---------------|
| Forward Voltage      | $V_F$  | $I_F = 10\text{mA}$              | 1.0 | 1.15 | 1.3 | V             |
| Reverse Voltage      | $V_R$  | $I_R = 10\mu\text{A}$            | 5.0 |      |     | V             |
| Reverse Leakage      | $I_R$  | $V_R = 5\text{V}$                |     |      | 10  | $\mu\text{A}$ |
| Terminal Capacitance | $C_t$  | $V = 0\text{V}, f = 1\text{KHz}$ |     | 30   | 250 | pF            |

#### OUTPUT

| Parameter                           | Symbol     | Test Condition                           | Min | Typ. | Max | Unit |
|-------------------------------------|------------|------------------------------------------|-----|------|-----|------|
| Collector—Emitter breakdown Voltage | $BV_{CEO}$ | $I_C = 0.5\text{mA}, I_F = 0\text{mA}$   | 55  |      |     | V    |
| Emitter—Collector breakdown Voltage | $BV_{ECO}$ | $I_E = 100\mu\text{A}, I_F = 0\text{mA}$ | 6   |      |     | V    |
| Collector-Emitter Dark Current      | $I_{CEO}$  | $V_{CE} = 24\text{V}, I_F = 0\text{mA}$  |     |      | 100 | nA   |

## TLP621, TLP621-2, TLP621-4

### ELECTRICAL CHARACTERISTICS (Ambient Temperature = 25°C unless otherwise specified)

#### COUPLED

| Parameter                            | Symbol        | Test Condition                                                                                | Min | Typ. | Max        | Unit          |
|--------------------------------------|---------------|-----------------------------------------------------------------------------------------------|-----|------|------------|---------------|
| Current Transfer Ratio               | CTR           | $I_F = 5\text{mA}$ , $V_{CE} = 5\text{V}$                                                     | 50  |      | 600        | %             |
|                                      |               | Optional CTR Grades                                                                           |     |      |            |               |
|                                      |               | GR                                                                                            | 100 |      | 300        |               |
|                                      |               | BL                                                                                            | 200 |      | 600        |               |
|                                      |               | GB                                                                                            | 100 |      | 600        |               |
|                                      |               | GB ( $I_F = 1\text{mA}$ , $V_{CE} = 0.4\text{V}$ )                                            | 30  |      |            |               |
| Collector—Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_F = 8\text{mA}$ , $I_C = 2.4\text{mA}$<br>GB ( $I_F = 1\text{mA}$ , $I_C = 0.2\text{mA}$ ) |     |      | 0.4<br>0.4 | V             |
| Output Rise Time                     | $t_r$         | $V_{CE} = 10\text{V}$ ,<br>$I_C = 2\text{mA}$ ,<br>$R_L = 100\Omega$                          |     | 2    |            | $\mu\text{s}$ |
| Output Fall Time                     | $t_f$         |                                                                                               |     | 3    |            |               |
| Turn-on Time                         | $t_{on}$      |                                                                                               |     | 3    |            |               |
| Turn-off Time                        | $t_{off}$     |                                                                                               |     | 3    |            |               |

#### ISOLATION

| Parameter                            | Symbol    | Test Condition                        | Min                | Typ. | Max | Unit      |
|--------------------------------------|-----------|---------------------------------------|--------------------|------|-----|-----------|
| Input to Output Isolation Voltage    | $V_{ISO}$ | AC 1 minute, RH = 40 to 60%<br>Note 1 | 5300               |      |     | $V_{RMS}$ |
| Input to Output Isolation Resistance | $R_{ISO}$ | $V_{IO} = 500\text{V}$<br>Note 1      | $5 \times 10^{10}$ |      |     | $\Omega$  |

Note 1 : Measure with input leads shorted together and output leads shorted together.



## TLP621, TLP621-2, TLP621-4

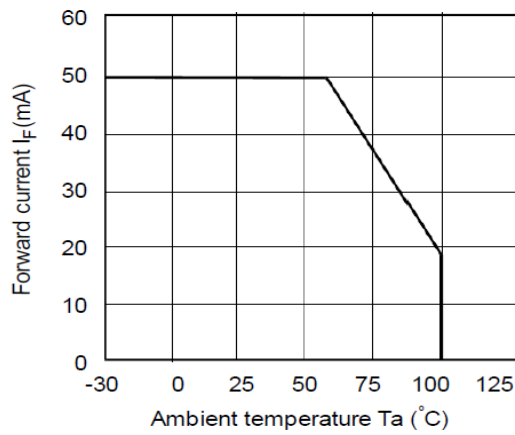


**Fig 1 Forward Current vs  $T_A$**

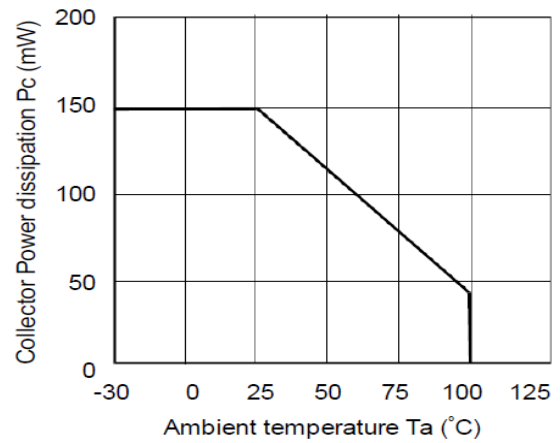


**Fig 2 Collector Power Dissipation vs  $T_A$**

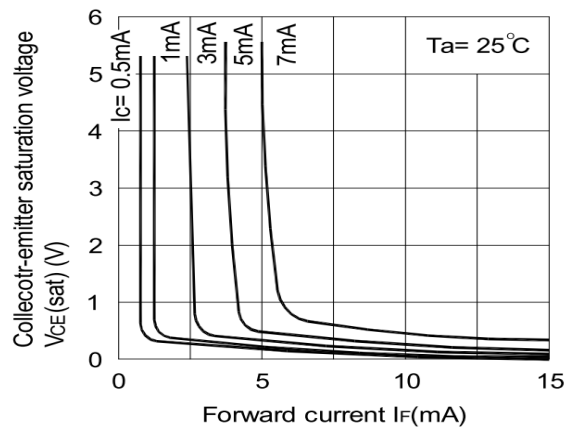


**Fig 3 Collector-emitter Saturation Voltage vs Forward Current**

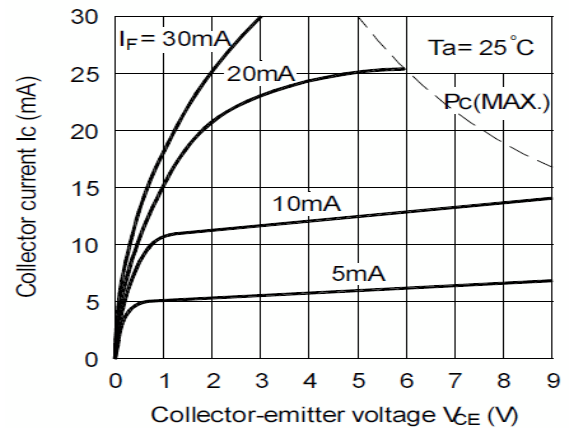


**Fig 4 Collector Current vs Collector-emitter Voltage**

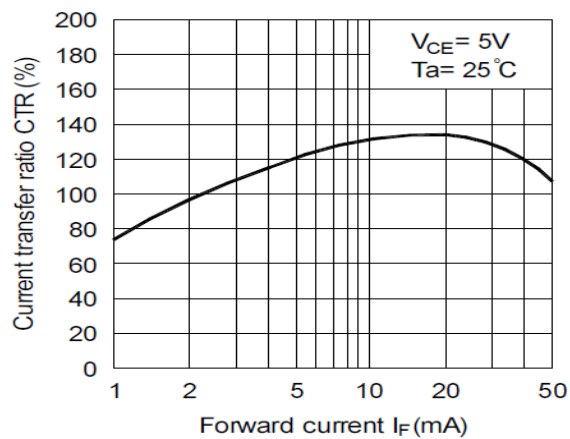


**Fig 5 Current Transfer Ratio vs Forward Current**

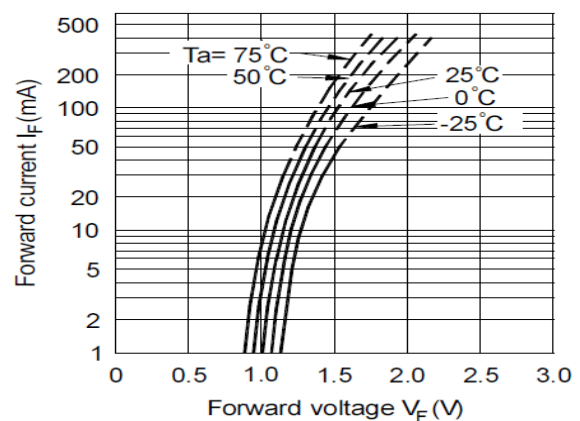


**Fig 6 Forward Current vs Forward Voltage**



## TLP621, TLP621-2, TLP621-4

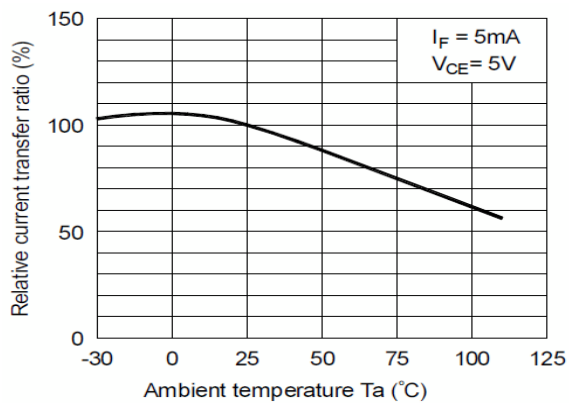


**Fig 7 Relative CTR vs  $T_A$**

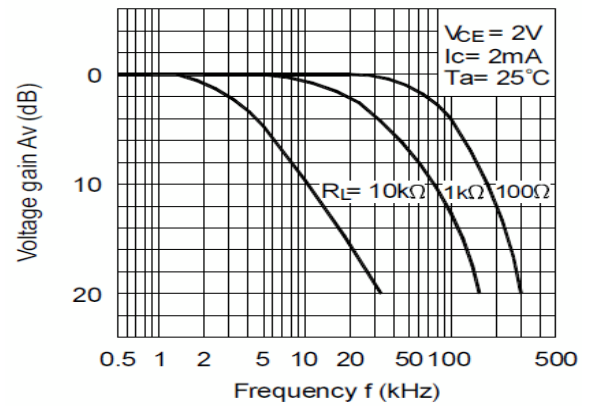


**Fig 8 Frequency Response**

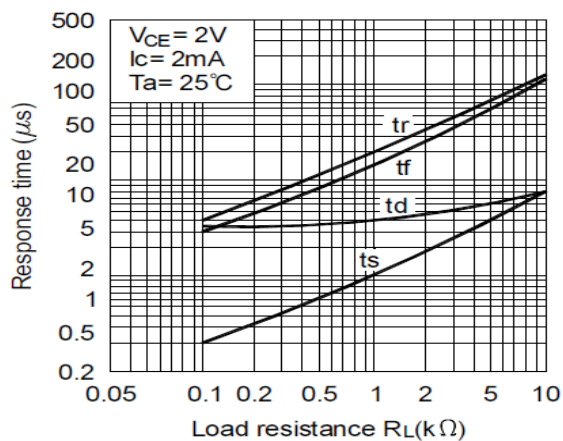
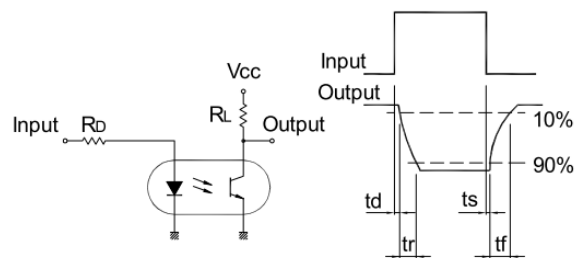


**Fig 9 Response Time vs Load Resistance**



**Response Time Test Circuit**

## TLP621, TLP621-2, TLP621-4

### ORDER INFORMATION

| TLP621 (UL Approval) |                                                                   |                           |                   |
|----------------------|-------------------------------------------------------------------|---------------------------|-------------------|
| After PN             | PN                                                                | Description               | Packing quantity  |
| None                 | TLP621, TLP621GR,<br>TLP621BL, TLP621GB                           | Standard DIP4             | 100 pcs per tube  |
| G                    | TLP621G, TLP621GRG,<br>TLP621BLG, TLP621GBG                       | 10mm Lead Spacing         | 100 pcs per tube  |
| SM                   | TLP621SM, TLP621GRSM,<br>TLP621BLSM, TLP621GBSM                   | Surface Mount             | 100 pcs per tube  |
| SMT&R                | TLP621SMT&R,<br>TLP621GRSMT&R,<br>TLP621BLSMT&R,<br>TLP621GBSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

| TLP621-2 (UL Approval) |                                                                           |                           |                   |
|------------------------|---------------------------------------------------------------------------|---------------------------|-------------------|
| After PN               | PN                                                                        | Description               | Packing quantity  |
| None                   | TLP621-2, TLP621-2GR,<br>TLP621-2BL, TLP621-2GB                           | Standard DIP8             | 50 pcs per tube   |
| G                      | TLP621-2G, TLP621-2GRG,<br>TLP621-2BLG, TLP621-2GBG                       | 10mm Lead Spacing         | 50 pcs per tube   |
| SM                     | TLP621-2SM, TLP621-2GRSM,<br>TLP621-2BLSM,<br>TLP621-2GBSM                | Surface Mount             | 50 pcs per tube   |
| SMT&R                  | TLP621-2SMT&R,<br>TLP621-2GRSMT&R,<br>TLP621-2BLSMT&R,<br>TLP621-2GBSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

| TLP621-4 (UL Approval) |                                                               |                   |                  |
|------------------------|---------------------------------------------------------------|-------------------|------------------|
| After PN               | PN                                                            | Description       | Packing quantity |
| None                   | TLP621-4, TLP621-4GR,<br>TLP621-4BL, TLP621-4GB               | Standard DIP16    | 25 pcs per tube  |
| G                      | TLP621-4G, TLP621-4GRG,<br>TLP621-4BLG, TLP621-4GBG           | 10mm Lead Spacing | 25 pcs per tube  |
| SM                     | TLP621-4SM,<br>TLP621-4GRSM,<br>TLP621-4BLSM,<br>TLP621-4GBSM | Surface Mount     | 25 pcs per tube  |

## TLP621, TLP621-2, TLP621-4

### ORDER INFORMATION

| TLP621X (UL and VDE Approvals) |                                                                        |                           |                   |
|--------------------------------|------------------------------------------------------------------------|---------------------------|-------------------|
| After PN                       | PN                                                                     | Description               | Packing quantity  |
| None                           | TLP621X, TLP621XGR,<br>TLP621XBL, TLP621XGB                            | Standard DIP4             | 100 pcs per tube  |
| G                              | TLP621XG, TLP621XGRG,<br>TLP621XBLG, TLP621XGBG                        | 10mm Lead Spacing         | 100 pcs per tube  |
| SM                             | TLP621XSM, TLP621XGRSM,<br>TLP621XBLSM, TLP621XGBSM                    | Surface Mount             | 100 pcs per tube  |
| SMT&R                          | TLP621XSMT&R,<br>TLP621XGRSMT&R,<br>TLP621XBLSMT&R,<br>TLP621XGBXSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

| TLP621-2X (UL and VDE Approvals) |                                                                               |                           |                   |
|----------------------------------|-------------------------------------------------------------------------------|---------------------------|-------------------|
| After PN                         | PN                                                                            | Description               | Packing quantity  |
| None                             | TLP621-2X, TLP621-2XGR,<br>TLP621-2XBL, TLP621-2XGB                           | Standard DIP8             | 50 pcs per tube   |
| G                                | TLP621-2XG, TLP621-2XGRG,<br>TLP621-2XBLG, TLP621-2XGBG                       | 10mm Lead Spacing         | 50 pcs per tube   |
| SM                               | TLP621-2XSM,<br>TLP621-2XGRSM,<br>TLP621-2XBLSM,<br>TLP621-2XGBSM             | Surface Mount             | 50 pcs per tube   |
| SMT&R                            | TLP621-2XSMT&R,<br>TLP621-2XGRSMT&R,<br>TLP621-2XBLSMT&R,<br>TLP621-2XGBSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

| TLP621-4X (UL and VDE Approvals) |                                                                   |                   |                  |
|----------------------------------|-------------------------------------------------------------------|-------------------|------------------|
| After PN                         | PN                                                                | Description       | Packing quantity |
| None                             | TLP621-4X, TLP621-4XGR,<br>TLP621-4XBL, TLP621-4XGB               | Standard DIP16    | 25 pcs per tube  |
| G                                | TLP621-4XG, TLP621-4XGRG,<br>TLP621-4XBLG, TLP621-4XGBG           | 10mm Lead Spacing | 25 pcs per tube  |
| SM                               | TLP621-4XSM,<br>TLP621-4XGRSM,<br>TLP621-4XBLSM,<br>TLP621-4XGBSM | Surface Mount     | 25 pcs per tube  |



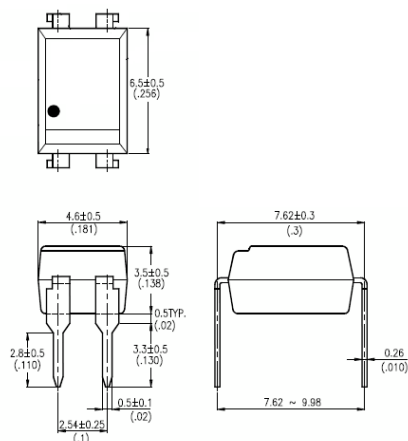
**ISOCOM**  
COMPONENTS

## TLP621, TLP621-2, TLP621-4

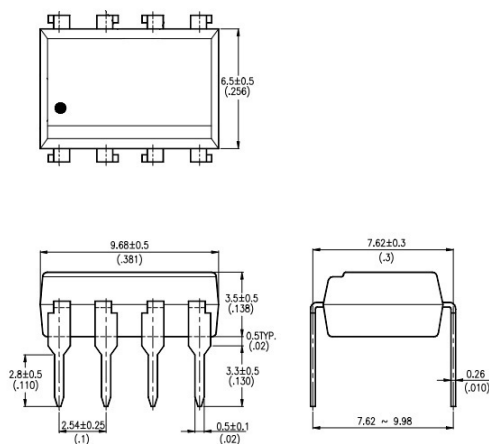
### PACKAGE DIMENSIONS in mm (inch)

#### DIP

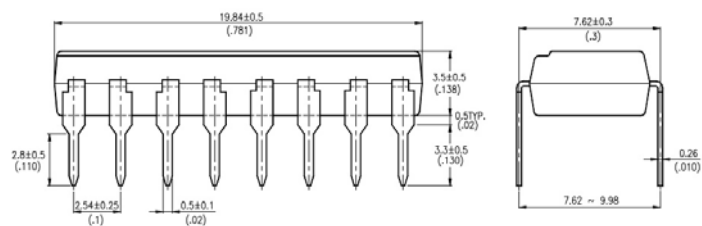
##### TLP621



##### TLP621-2



##### TLP621-4





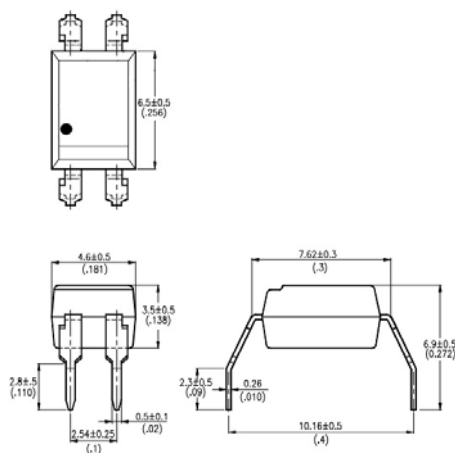
**ISOCOM**  
COMPONENTS

## TLP621, TLP621-2, TLP621-4

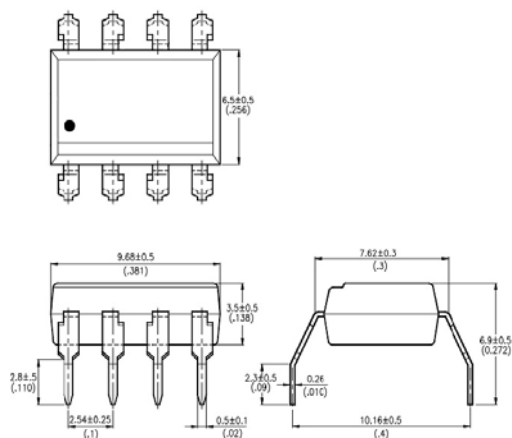
### PACKAGE DIMENSIONS in mm (inch)

#### G Form

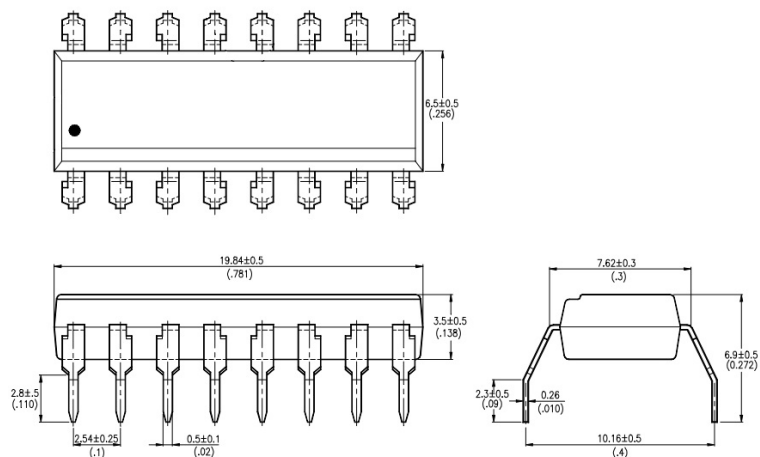
##### TLP621G



##### TLP621-2G



##### TLP621-4G





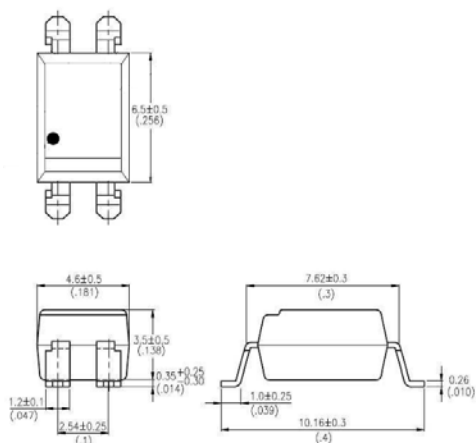
**ISOCOM**  
COMPONENTS

## TLP621, TLP621-2, TLP621-4

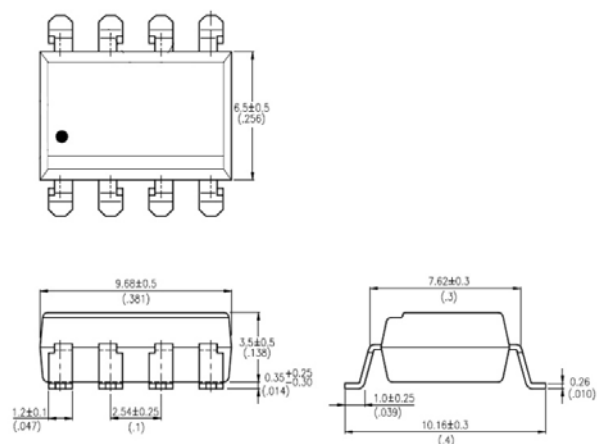
### PACKAGE DIMENSIONS in mm (inch)

#### SMD

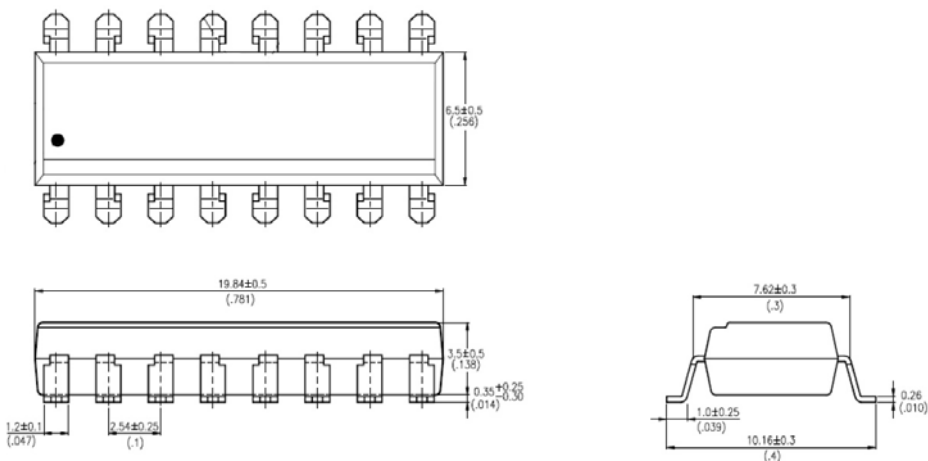
##### TLP621SM



##### TLP621-2SM



##### TLP621-4SM

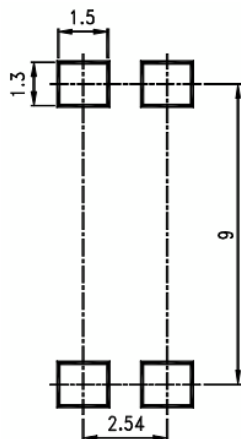




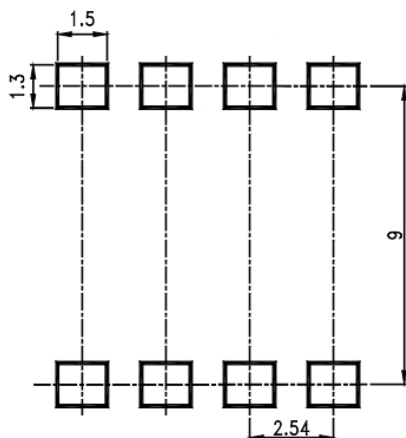
## TLP621, TLP621-2, TLP621-4

### RECOMMENDED PAD LAYOUT FOR SMD (mm)

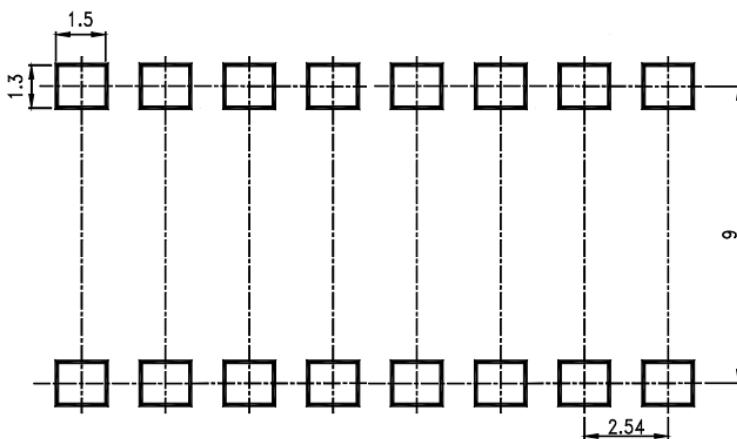
**TLP621SM**



**TLP621-2SM**



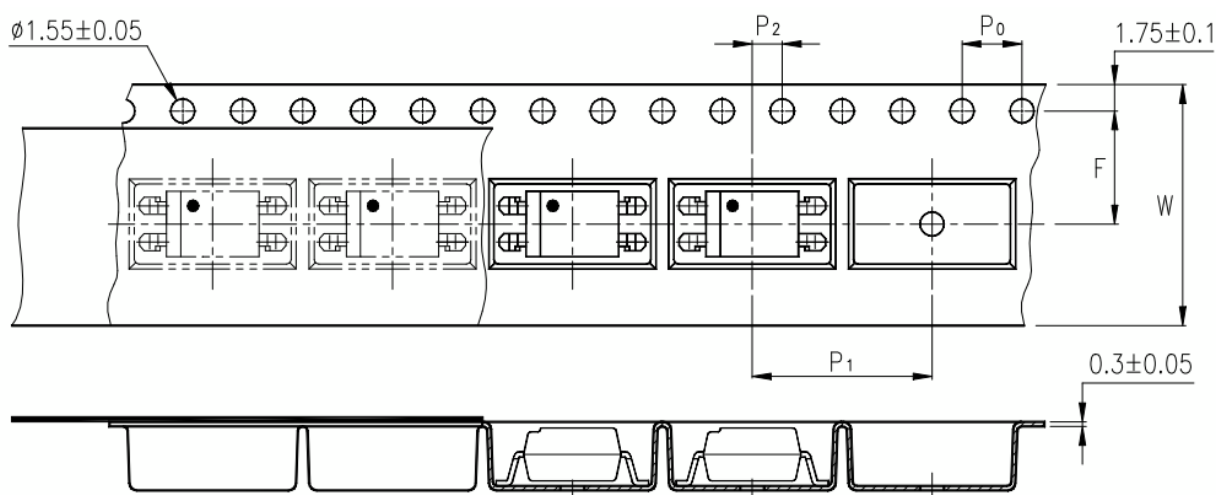
**TLP621-4SM**



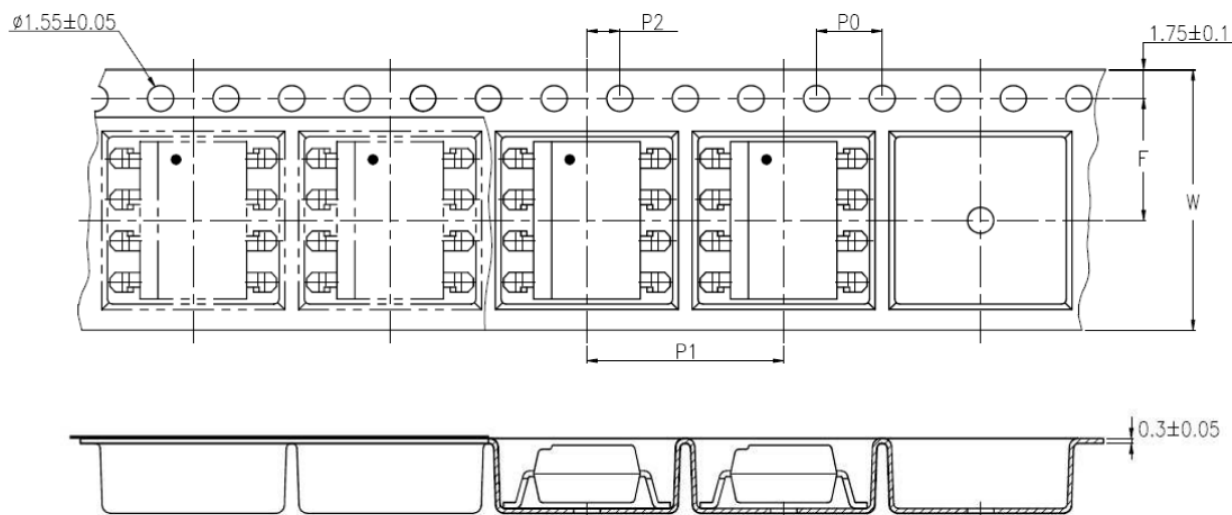


## TLP621, TLP621-2, TLP621-4

### TAPE AND REEL PACKAGING



### TLP621SMT&R



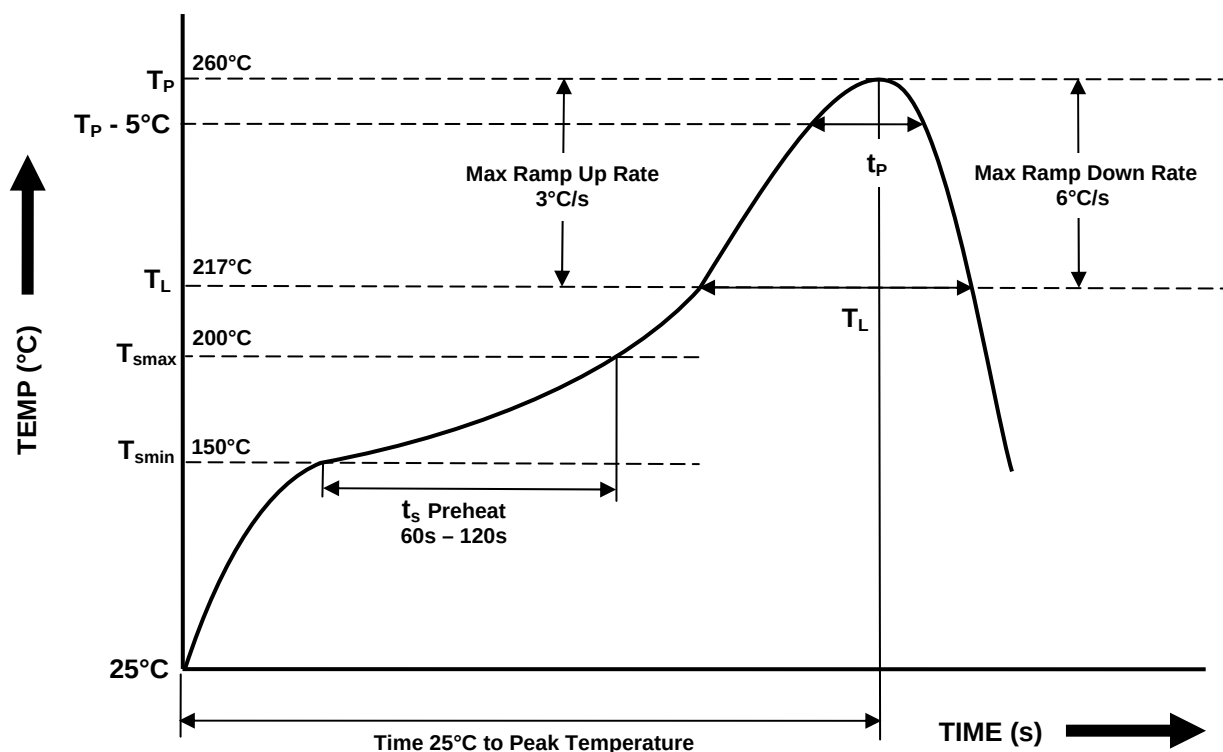
### TLP621-2SMT&R

| Description                            | Symbol | Dimensions in mm ( inches ) |
|----------------------------------------|--------|-----------------------------|
| Tape wide                              | W      | $16 \pm 0.3$ ( .63 )        |
| Pitch of sprocket holes                | $P_0$  | $4 \pm 0.1$ ( .15 )         |
| Distance of compartment                | F      | $7.5 \pm 0.1$ ( .295 )      |
| Distance of compartment to compartment | $P_2$  | $2 \pm 0.1$ ( .079 )        |
| Distance of compartment to compartment | $P_1$  | $12 \pm 0.1$ ( .472 )       |



## TLP621, TLP621-2, TLP621-4

### IR REFLOW SOLDERING TEMPERATURE PROFILE FOR SMD (One Time Reflow Soldering is Recommended)



| Profile Details                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Conditions                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>Preheat</b> <ul style="list-style-type: none"><li>- Min Temperature (<math>T_{SMIN}</math>)</li><li>- Max Temperature (<math>T_{SMAX}</math>)</li><li>- Time <math>T_{SMIN}</math> to <math>T_{SMAX}</math> (<math>t_s</math>)</li></ul>                                                                                                                                                                                                                                                   | 150°C<br>200°C<br>60s - 120s                                                 |
| <b>Soldering Zone</b> <ul style="list-style-type: none"><li>- Peak Temperature (<math>T_P</math>)</li><li>- Time at Peak Temperature</li><li>- Liquidous Temperature (<math>T_L</math>)</li><li>- Time within 5°C of Actual Peak Temperature (<math>T_P - 5^\circ\text{C}</math>)</li><li>- Time maintained above <math>T_L</math> (<math>t_L</math>)</li><li>- Ramp Up Rate (<math>T_L</math> to <math>T_P</math>)</li><li>- Ramp Down Rate (<math>T_P</math> to <math>T_L</math>)</li></ul> | 260°C<br>10s max<br>217°C<br>30s max<br>60s - 100s<br>3°C/s max<br>6°C/s max |
| Average Ramp Up Rate ( $T_{smax}$ to $T_P$ )                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3°C/s max                                                                    |
| Time 25°C to Peak Temperature                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 8 minutes max                                                                |

## TLP621, TLP621-2, TLP621-4

### NOTES :

- Isocom is continually improving the quality, reliability, function or design and Isocom reserves the right to make changes without further notices.
- The products shown in this publication are designed for the general use in electronic applications such as office automation equipment, communications devices, audio/visual equipment, electrical application and instrumentation.
- For equipment/application where high reliability or safety is required, such as space applications, nuclear power control equipment, medical equipment, etc., please contact our sales representatives.
- When requiring a device for any "specific" application, please contact our sales for advice.
- The contents described herein are subject to change without prior notice.
- Do not immerse device body in solder paste.



**ISOCOM**  
COMPONENTS

## DISCLAIMER

\_\_\_ ISOCOM is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing ISOCOM products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such ISOCOM products could cause loss of human life, bodily injury or damage to property.

In developing your designs, please ensure that ISOCOM products are used within specified operating ranges as set forth in the most recent ISOCOM products specifications.

\_\_\_ The ISOCOM products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These ISOCOM products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation Instruments, traffic signal instruments, combustion control instruments, medical Instruments, all types of safety devices, etc.. Unintended Usage of ISOCOM products listed in this document shall be made at the customer's own risk.

\_\_\_ Gallium arsenide (GaAs) is a substance used in the products described in this document. GaAs dust and fumes are toxic. Do not break, cut or pulverize the product, or use chemicals to dissolve them. When disposing of the products, follow the appropriate regulations. Do not dispose of the products with other industrial waste or with domestic garbage.

\_\_\_ The products described in this document are subject to the foreign exchange and foreign trade laws.

\_\_\_ The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by ISOCOM Components for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of ISOCOM Components or others.

\_\_\_ The information contained herein is subject to change without notice.

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- ⊖ View [TLP621X](#) on WIN SOURCE
- ⊖ [Isocom Components 2004 LTD](#) Information

## Optimize Your Supply Chain with WIN SOURCE Solutions

- ✓ Global Sourcing Solution
- ✓ Obsolete Management
- ✓ Cost Control Management
- ✓ Shortage Management
- ✓ Alternative Solution
- ✓ Excess Inventory Management