



## TLP521, TLP521-2, TLP521-4

### 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      | $V_R$  | $I_R = 10\mu\text{A}$               | 6.0 |      |     | V             |
| Reverse Leakage      | $I_R$  | $V_R = 4\text{V}$                   |     |      | 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      | $I_{CEO}$  | $V_{CE} = 20\text{V}$ , $I_F = 0\text{mA}$  |     |      | 100 | nA   |



## TLP521, TLP521-2, TLP521-4

### 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                     | $t_r$         | $V_{CE} = 2\text{V}$ ,<br>$I_C = 2\text{mA}$ ,<br>$R_L = 100\Omega$                           |     | 4    |            | $\mu\text{s}$ |
| Output Fall Time                     | $t_f$         |                                                                                               |     | 3    |            |               |
| Turn-on Time                         | $t_{on}$      |                                                                                               |     | 3    |            |               |
| Turn-off Time                        | $t_{off}$     |                                                                                               |     | 3    |            |               |
| Turn-on Time                         | $t_{ON}$      | $V_{CC} = 5\text{V}$ ,<br>$I_F = 16\text{mA}$ ,<br>$R_L = 1.9\text{k}\Omega$                  |     | 2    |            | $\mu\text{s}$ |
| Turn-off Time                        | $t_{OFF}$     |                                                                                               |     | 25   |            |               |

#### 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.



## TLP521, TLP521-2, TLP521-4

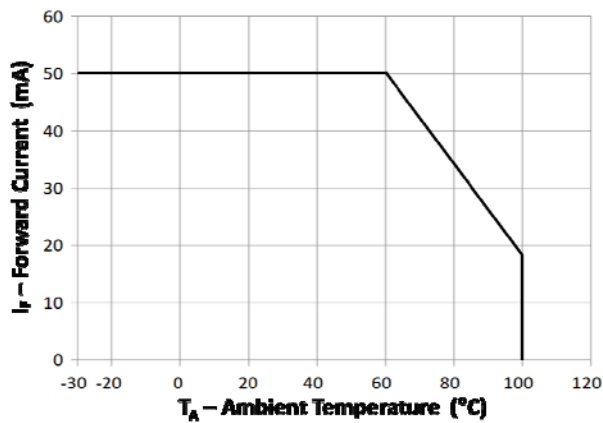


Fig 1 Forward Current vs  $T_A$

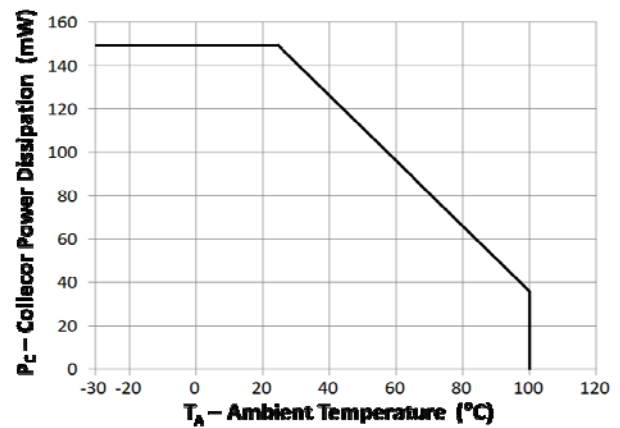


Fig 2 Collector Power Dissipation vs  $T_A$

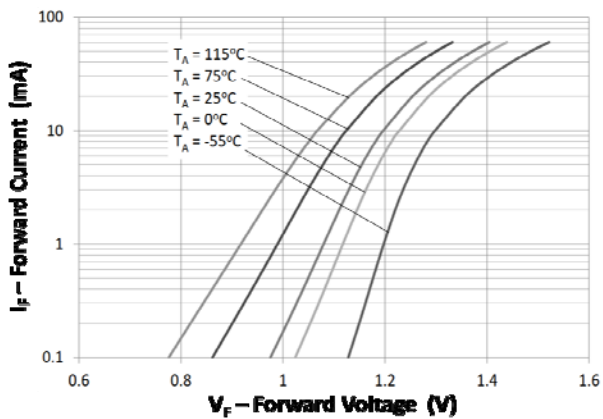


Fig 3 Forward Current vs Forward Voltage

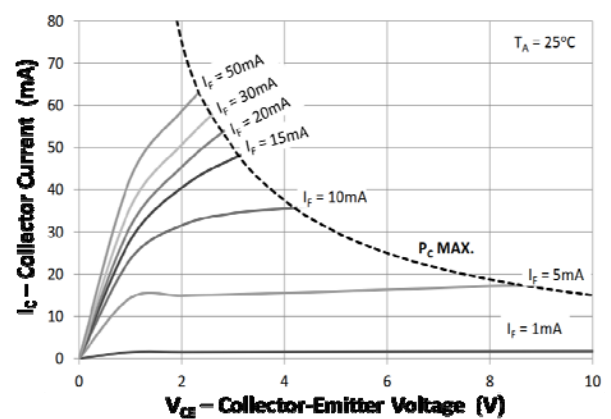


Fig 4 Collector Current vs Collector-Emitter Voltage

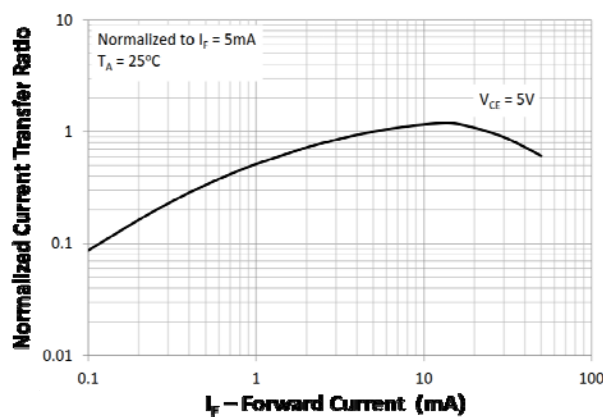


Fig 5 Normalized Current Transfer Ratio vs Forward Current

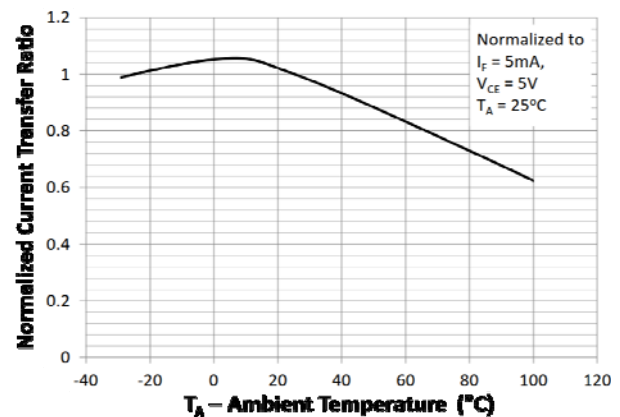


Fig 6 Normalized Current Transfer Ratio vs Ambient Temperature



## TLP521, TLP521-2, TLP521-4

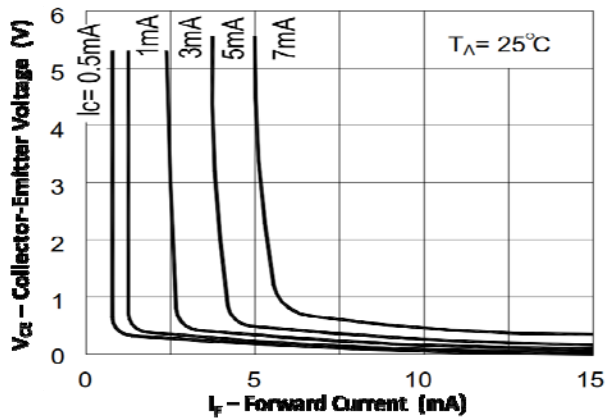


Fig 7 Collector-Emitter Voltage vs Forward Current

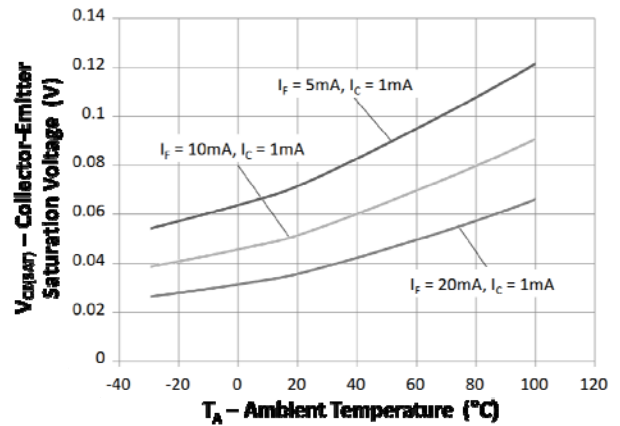


Fig 8 Collector-Emitter Voltage vs Ambient Temperature

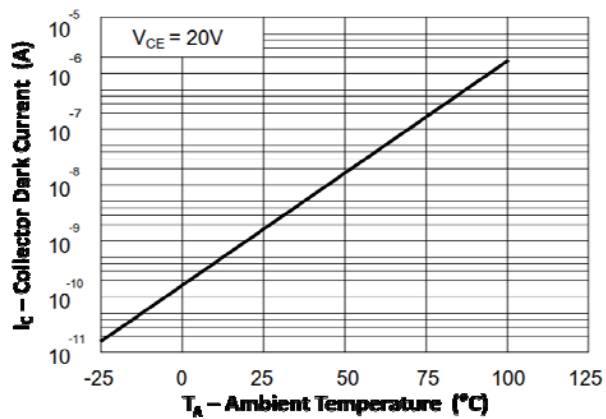


Fig 9 Collector Dark Current vs Ambient Temperature



## TLP521, TLP521-2, TLP521-4

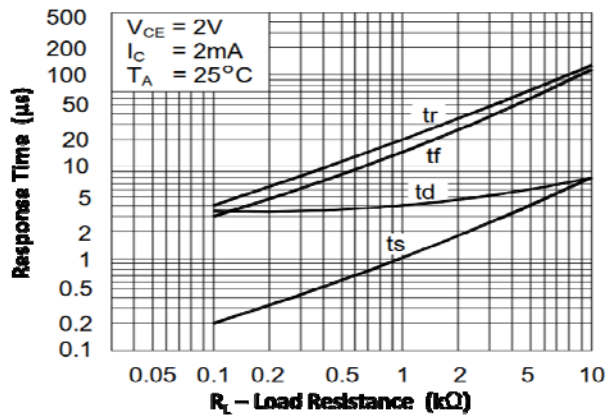
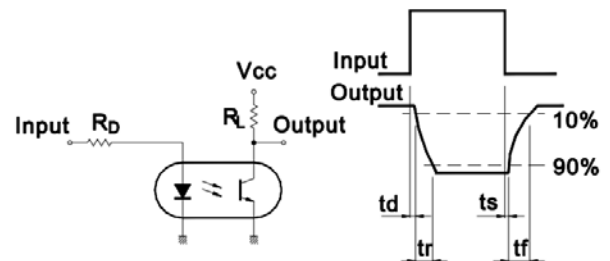


Fig 7 Response Time vs Load Resistance



Response Time Test Circuit

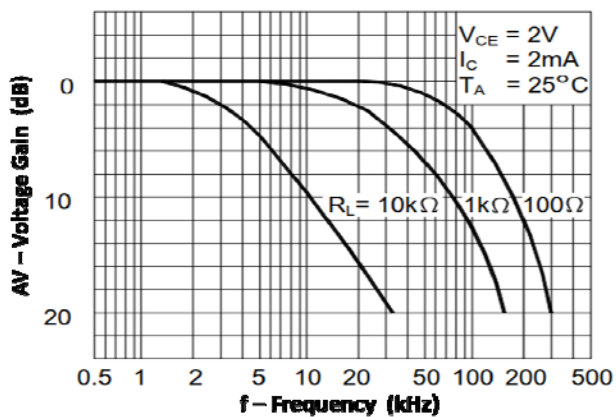
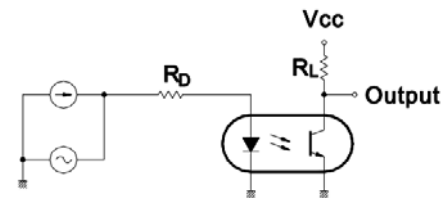


Fig 9 Frequency Response



Frequency Response Test Circuit



## TLP521, TLP521-2, TLP521-4

### ORDER INFORMATION

| TLP521, TLP521-1 (UL Approval) |                                                                                                                                                |                           |                   |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|
| After PN                       | PN                                                                                                                                             | Description               | Packing quantity  |
| None                           | TLP521, TLP521-1<br>TLP521GR, TLP521-1GR<br>TLP521BL, TLP521-1BL<br>TLP521GB, TLP521-1GB                                                       | Standard DIP4             | 100 pcs per tube  |
| G                              | TLP521G, TLP521-1G,<br>TLP521GRG, TLP521-1GRG,<br>TLP521BLG, TLP521-1BLG<br>TLP521GBG, TLP521-1GBG                                             | 10mm Lead Spacing         | 100 pcs per tube  |
| SM                             | TLP521SM, TLP521-1SM,<br>TLP521GRSM, TLP521-1GRSM,<br>TLP521BLSM, TLP521-1BLSM,<br>TLP521GBSM, TLP521-1GBSM                                    | Surface Mount             | 100 pcs per tube  |
| SMT&R                          | TLP521SMT&R,<br>TLP521-1SMT&R<br>TLP521GRSMT&R,<br>TLP521-1GRSMT&R,<br>TLP521BLSMT&R,<br>TLP521-1BLSMT&R,<br>TLP521GBSMT&R,<br>TLP521-1GBSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

Note : Optional Order Part No. TLP521-1 for TLP521.



## TLP521, TLP521-2, TLP521-4

### ORDER INFORMATION

| TLP521-2 (UL Approval) |                                                                           |                           |                   |
|------------------------|---------------------------------------------------------------------------|---------------------------|-------------------|
| After PN               | PN                                                                        | Description               | Packing quantity  |
| None                   | TLP521-2, TLP521-2GR,<br>TLP521-2BL, TLP521-2GB                           | Standard DIP8             | 50 pcs per tube   |
| G                      | TLP521-2G, TLP521-2GRG,<br>TLP521-2BLG, TLP521-2GBG                       | 10mm Lead Spacing         | 50 pcs per tube   |
| SM                     | TLP521-2SM, TLP521-2GRSM,<br>TLP521-2BLSM,<br>TLP521-2GBSM                | Surface Mount             | 50 pcs per tube   |
| SMT&R                  | TLP521-2SMT&R,<br>TLP521-2GRSMT&R,<br>TLP521-2BLSMT&R,<br>TLP521-2GBSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

| TLP521-4 (UL Approval) |                                                            |                   |                  |
|------------------------|------------------------------------------------------------|-------------------|------------------|
| After PN               | PN                                                         | Description       | Packing quantity |
| None                   | TLP521-4, TLP521-4GR,<br>TLP521-4BL, TLP521-4GB            | Standard DIP16    | 25 pcs per tube  |
| G                      | TLP521-4G, TLP521-4GRG,<br>TLP521-4BLG, TLP521-4GBG        | 10mm Lead Spacing | 25 pcs per tube  |
| SM                     | TLP521-4SM, TLP521-4GRSM,<br>TLP521-4BLSM,<br>TLP521-4GBSM | Surface Mount     | 25 pcs per tube  |



## TLP521, TLP521-2, TLP521-4

### ORDER INFORMATION

| TLP521X, TLP521-1X (UL and VDE Approvals) |                                                                                                                                                        |                           |                   |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------------------|
| After PN                                  | PN                                                                                                                                                     | Description               | Packing quantity  |
| None                                      | TLP521X, TLP521-1X<br>TLP521XGR, TLP521-1XGR<br>TLP521XBL, TLP521-1XBL,<br>TLP521XGB, TLP521-1XGB                                                      | Standard DIP4             | 100 pcs per tube  |
| G                                         | TLP521XG, TLP521-1XG,<br>TLP521XGRG, TLP521-1XGRG,<br>TLP521XBLG, TLP521-1XBLG<br>TLP521XGBG, TLP521-1XGBG                                             | 10mm Lead Spacing         | 100 pcs per tube  |
| SM                                        | TLP521XSM, TLP521-1XSM,<br>TLP521XGRSM,<br>TLP521-1XGRSM,<br>TLP521XBLSM,<br>TLP521-1XBLSM,<br>TLP521XGBSM,<br>TLP521-1XGBSM                           | Surface Mount             | 100 pcs per tube  |
| SMT&R                                     | TLP521XSMT&R,<br>TLP521-1XSMT&R<br>TLP521XGRSMT&R,<br>TLP521-1XGRSMT&R,<br>TLP521XBLSMT&R,<br>TLP521-1XBLSMT&R,<br>TLP521XGBSMT&R,<br>TLP521-1XGBSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

Note : Optional Order Part No. TLP521-1 for TLP521.





## TLP521, TLP521-2, TLP521-4

### ORDER INFORMATION

| TLP521-2X (UL and VDE Approvals) |                                                                               |                           |                   |
|----------------------------------|-------------------------------------------------------------------------------|---------------------------|-------------------|
| After PN                         | PN                                                                            | Description               | Packing quantity  |
| None                             | TLP521-2X, TLP521-2XGR,<br>TLP521-2XBL, TLP521-2XGB                           | Standard DIP8             | 50 pcs per tube   |
| G                                | TLP521-2XG, TLP521-2XGRG<br>TLP521-2XB LG, TLP521-2XGBG                       | 10mm Lead Spacing         | 50 pcs per tube   |
| SM                               | TLP521-2XSM,<br>TLP521-2XGRSM,<br>TLP521-2XBLSM,<br>TLP521-2XGBSM             | Surface Mount             | 50 pcs per tube   |
| SMT&R                            | TLP521-2XSMT&R,<br>TLP521-2XGRSMT&R,<br>TLP521-2XBLSMT&R,<br>TLP521-2XGBSMT&R | Surface Mount Tape & Reel | 1000 pcs per reel |

| TLP521-4X (UL and VDE Approvals) |                                                                   |                   |                  |
|----------------------------------|-------------------------------------------------------------------|-------------------|------------------|
| After PN                         | PN                                                                | Description       | Packing quantity |
| None                             | TLP521-4X, TLP521-4XGR,<br>TLP521-4XBL, TLP521-4XGB               | Standard DIP16    | 25 pcs per tube  |
| G                                | TLP521-4XG, TLP521-4XGRG,<br>TLP521-4XB LG, TLP521-4XGBG          | 10mm Lead Spacing | 25 pcs per tube  |
| SM                               | TLP521-4XSM,<br>TLP521-4XGRSM,<br>TLP521-4XBLSM,<br>TLP521-4XGBSM | Surface Mount     | 25 pcs per tube  |



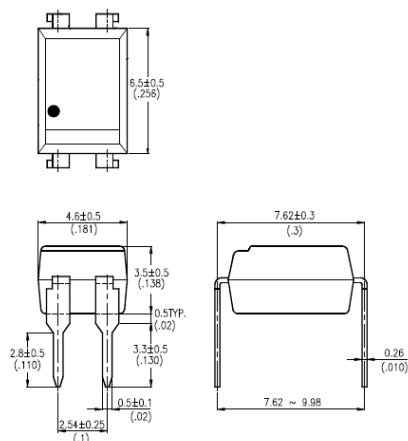
**ISOCOM**  
COMPONENTS

## TLP521, TLP521-2, TLP521-4

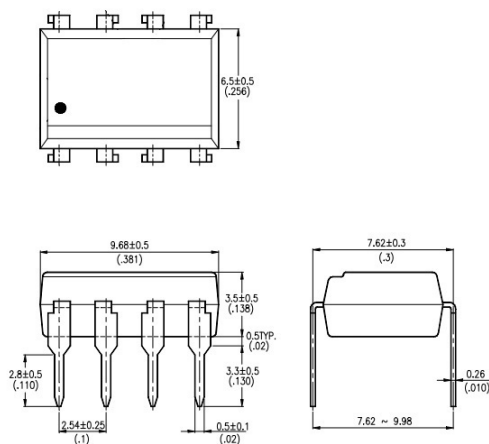
### PACKAGE DIMENSIONS in mm (inch)

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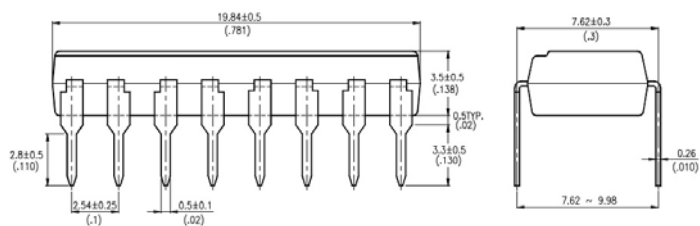
##### TLP521



##### TLP521-2



##### TLP521-4





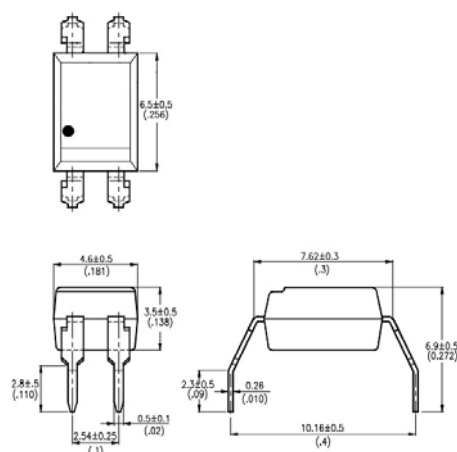
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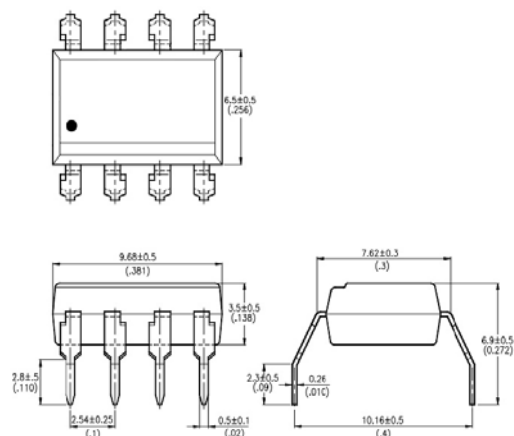
### PACKAGE DIMENSIONS in mm (inch)

#### G Form

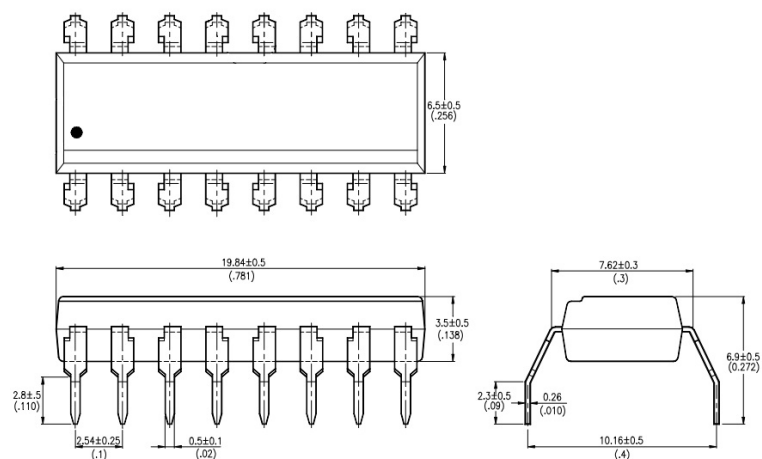
##### TLP521G



##### TLP521-2G



##### TLP521-4G





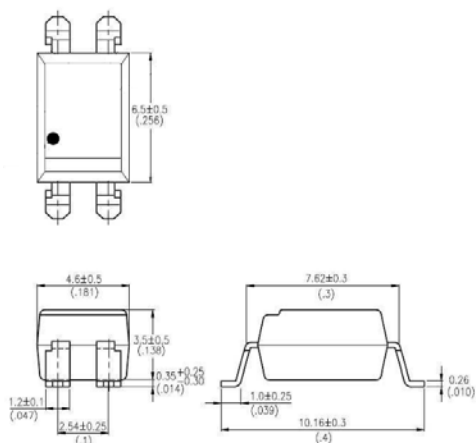
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## TLP521, TLP521-2, TLP521-4

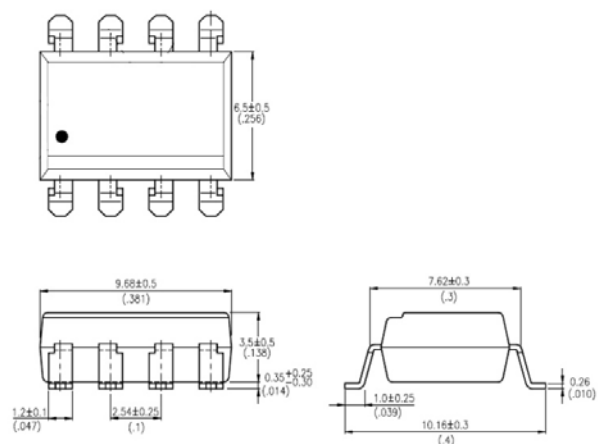
### PACKAGE DIMENSIONS in mm (inch)

#### SMD

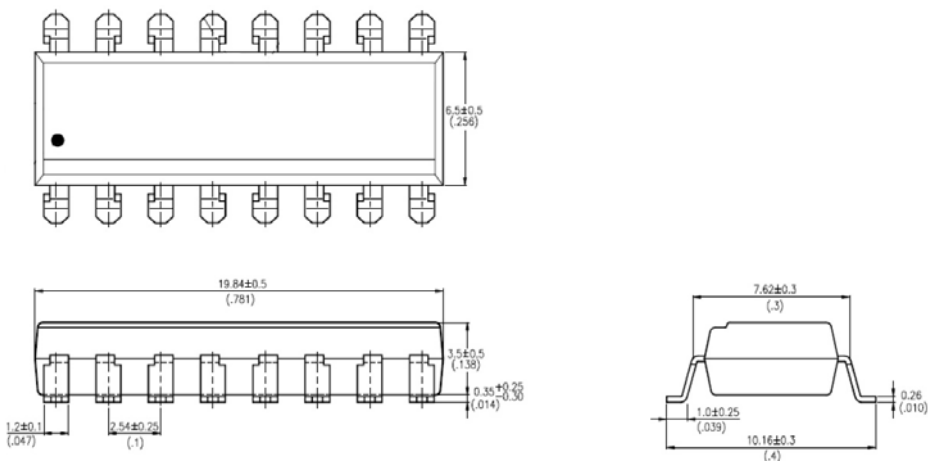
##### TLP521SM



##### TLP521-2SM



##### TLP521-4SM

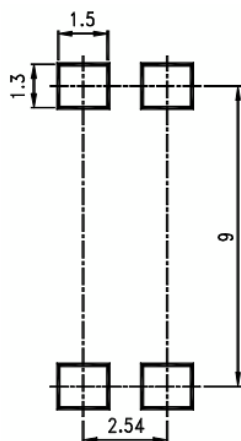




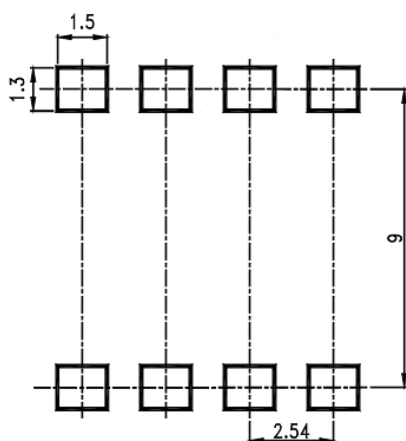
## TLP521, TLP521-2, TLP521-4

### RECOMMENDED PAD LAYOUT FOR SMD (mm)

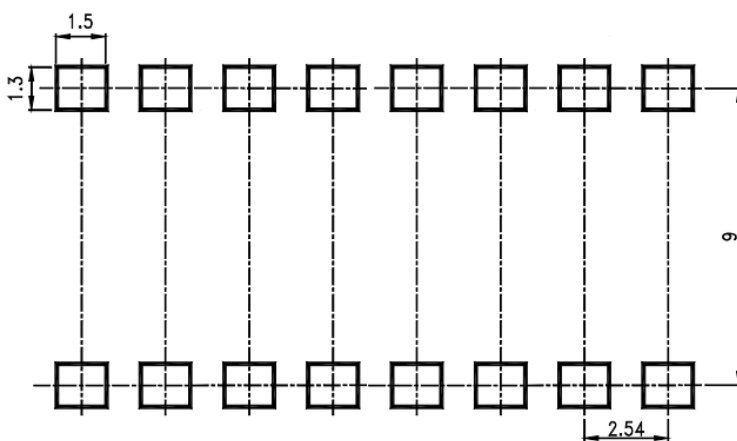
**TLP521SM**



**TLP521-2SM**



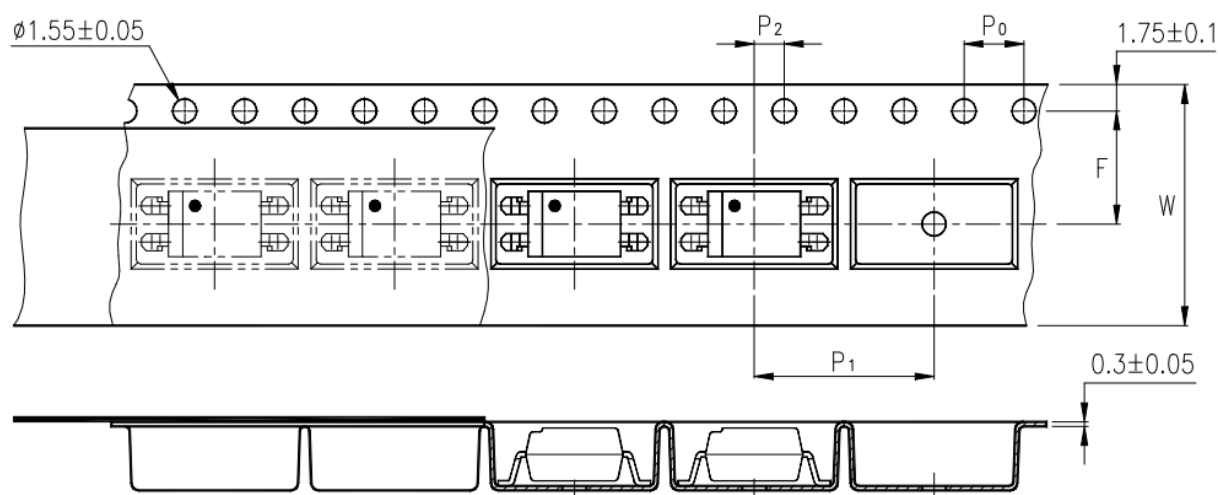
**TLP521-4SM**



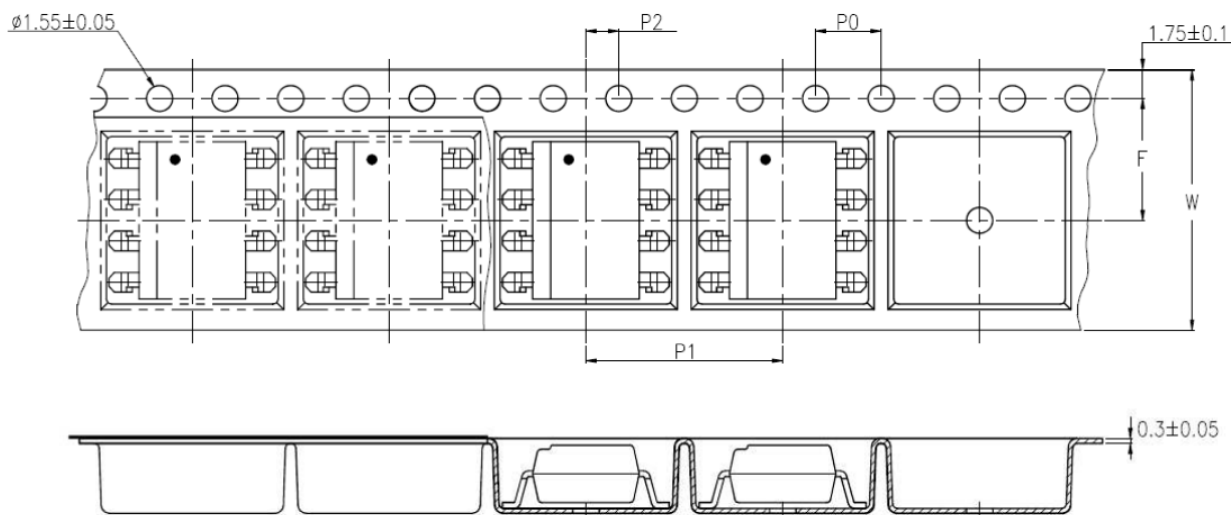


## TLP521, TLP521-2, TLP521-4

### TAPE AND REEL PACKAGING



### TLP521SMT&R



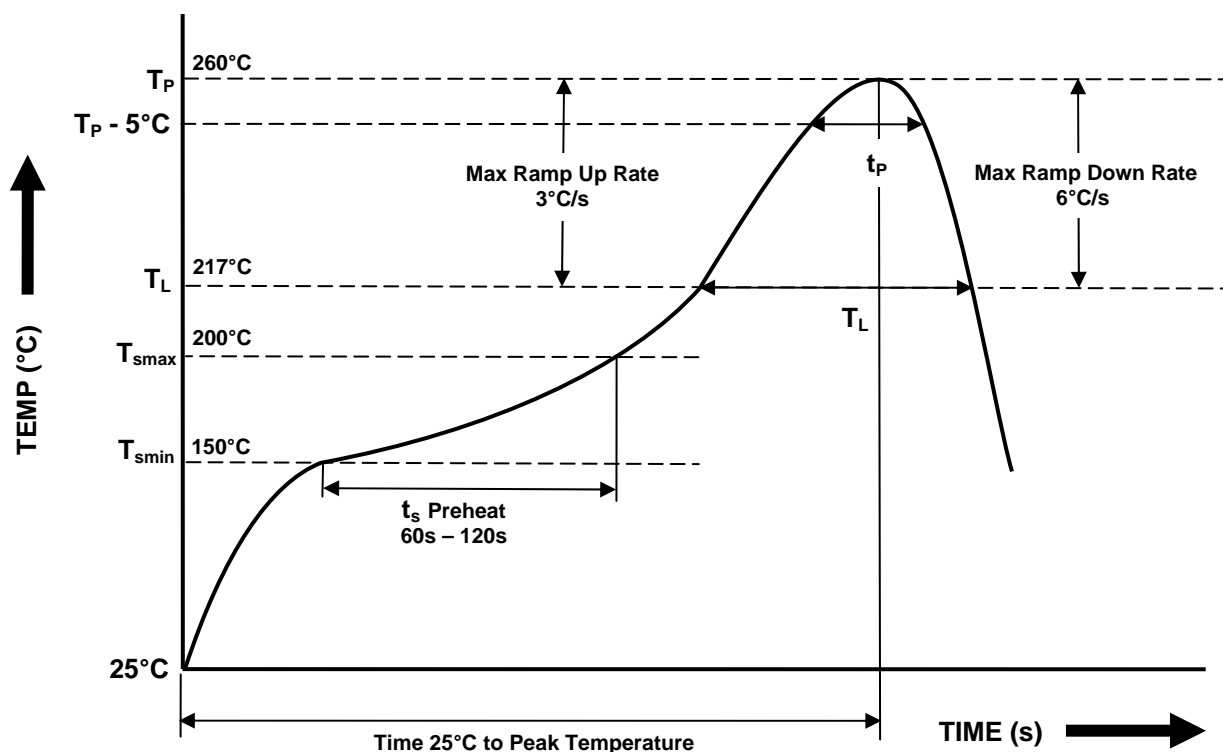
### TLP521-2SMT&R

| 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 )       |

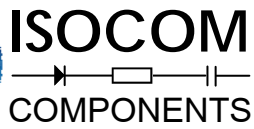


## TLP521, TLP521-2, TLP521-4

### 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                                                                |



# TLP521, TLP521-2, TLP521-4

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