



**ISOCOM**  
COMPONENTS

## TLP521, TLP521-2, TLP521-4



### DESCRIPTION

The TLP521, TLP521-2 and TLP521-4 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

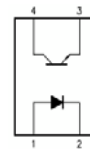
### APPLICATIONS

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

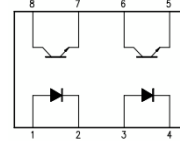
### ORDER INFORMATION

- 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 TLP521SM and TLP521-2SM)
- Optional Order Part No. TLP521-1 for TLP521
- Consult Factory for Tape and Reel version of TLP521-4SM

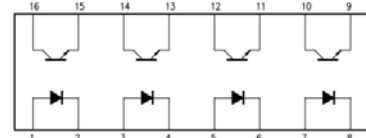
TLP521



TLP521-2



TLP521-4



### 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

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## 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	$V_{CE(sat)}$	$I_F = 8\text{mA}$ , $I_C = 2.4\text{mA}$ GB ( $I_F = 1\text{mA}$ , $I_C = 0.2\text{mA}$ )			0.4 0.4	V
Output Rise Time	$t_r$	$V_{CE} = 2\text{V}$ , $I_C = 2\text{mA}$ , $R_L = 100\Omega$		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	$t_{ON}$	$V_{CC} = 5\text{V}$ , $I_F = 16\text{mA}$ , $R_L = 1.9\text{k}\Omega$		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% Note 1	5300			$V_{RMS}$
Input to Output Isolation Resistance	$R_{ISO}$	$V_{IO} = 500\text{V}$ 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**

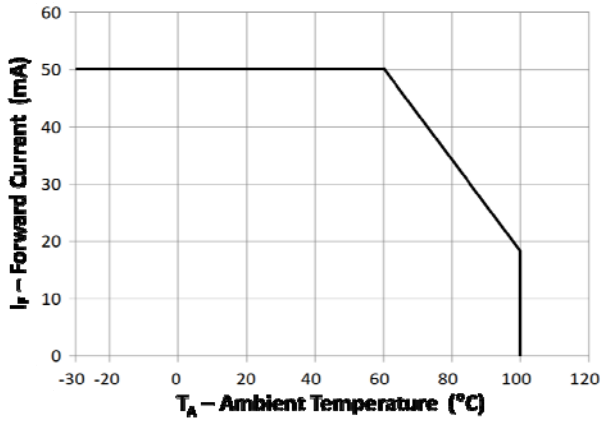


Fig 1 Forward Current vs  $T_A$

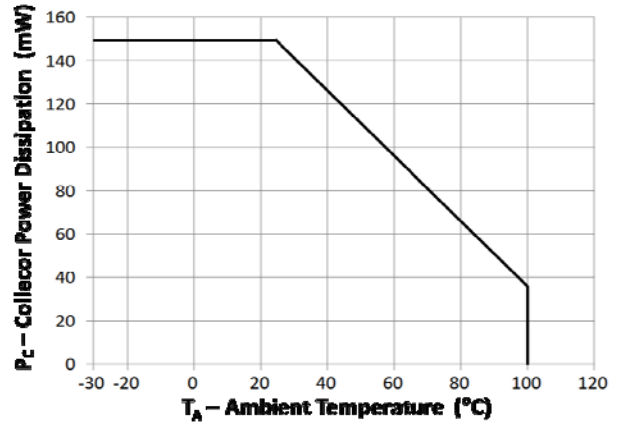


Fig 2 Collector Power Dissipation vs  $T_A$

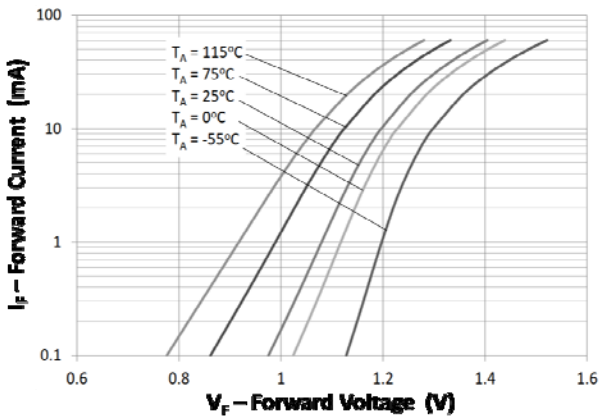


Fig 3 Forward Current vs Forward Voltage

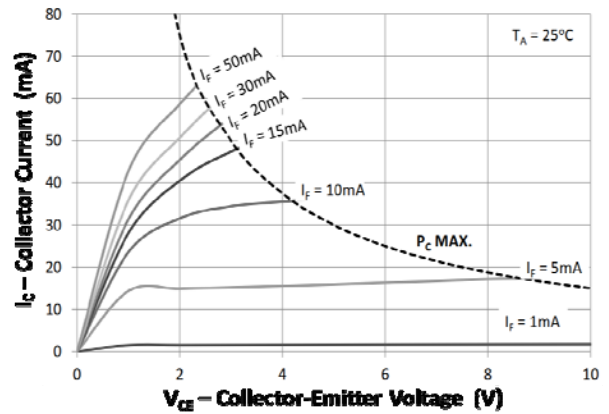


Fig 4 Collector Current vs Collector-Emitter Voltage

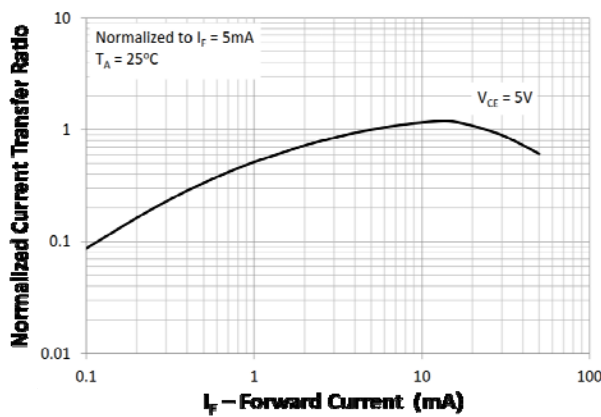


Fig 5 Normalized Current Transfer Ratio vs Forward Current

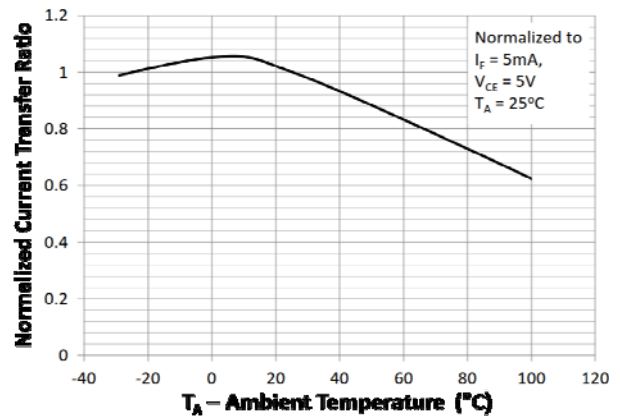


Fig 6 Normalized Current Transfer Ratio vs Ambient Temperature



## TLP521, TLP521-2, TLP521-4

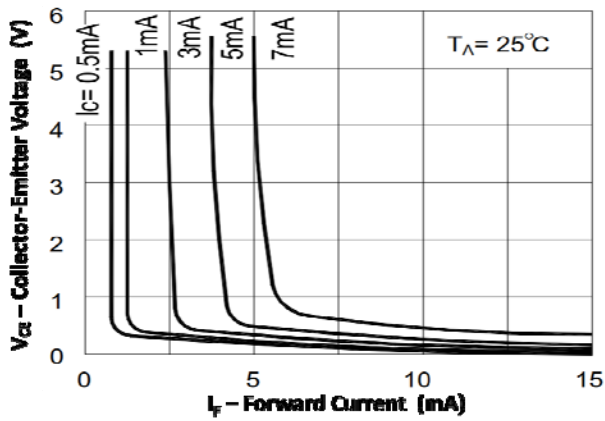


Fig 7 Collector-Emitter Voltage vs Forward Current

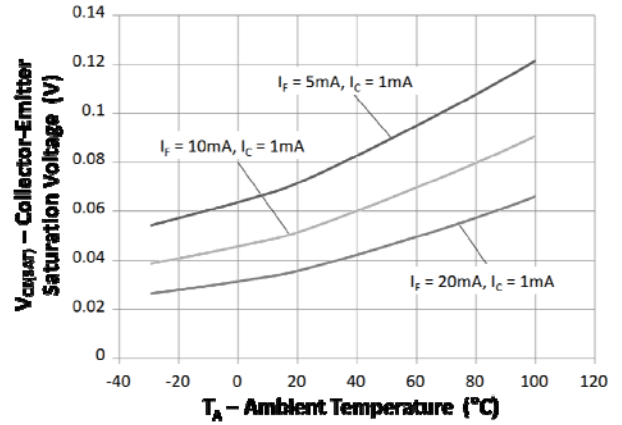


Fig 8 Collector-Emitter Voltage vs Ambient Temperature

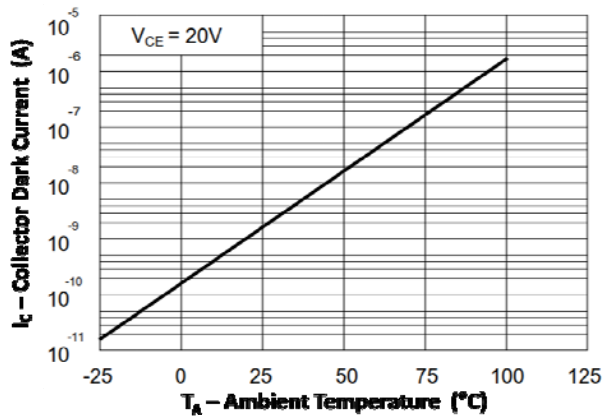


Fig 9 Collector Dark Current vs Ambient Temperature



## TLP521, TLP521-2, TLP521-4

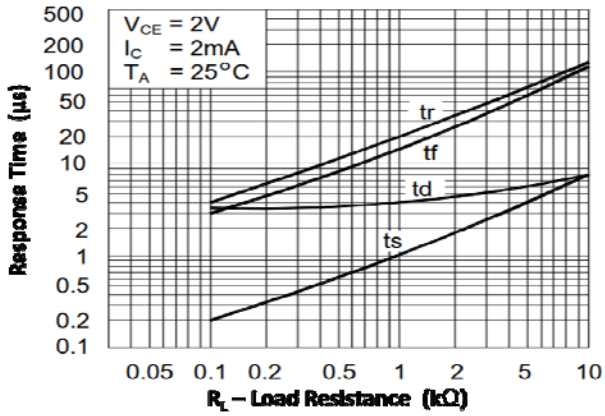
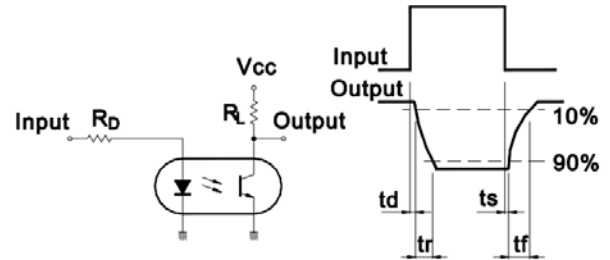


Fig 7 Response Time vs Load Resistance



Response Time Test Circuit

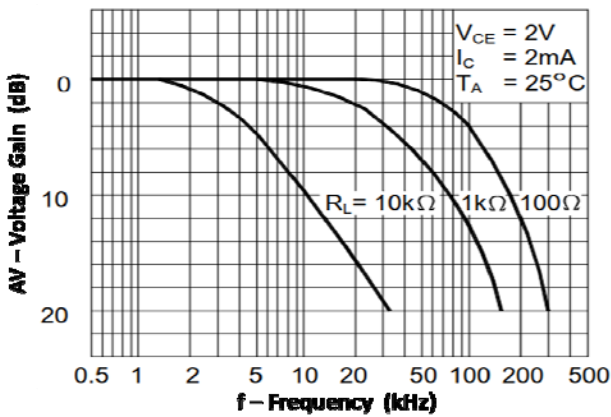
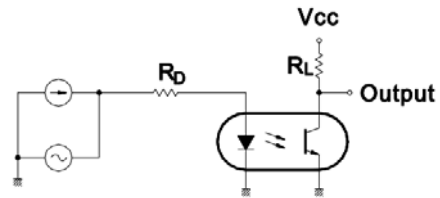


Fig 9 Frequency Response



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 TLP521GR, TLP521-1GR TLP521BL, TLP521-1BL, TLP521GB, TLP521-1GB	Standard DIP4	100 pcs per tube
G	TLP521G, TLP521-1G, TLP521GRG, TLP521-1GRG, TLP521BLG, TLP521-1BLG TLP521GBG, TLP521-1GBG	10mm Lead Spacing	100 pcs per tube
SM	TLP521SM, TLP521-1SM, TLP521GRSM, TLP521-1GRSM, TLP521BLSM, TLP521-1BLSM, TLP521GBSM, TLP521-1GBSM	Surface Mount	100 pcs per tube
SMT&R	TLP521SMT&R, TLP521-1SMT&R TLP521GRSMT&R, TLP521-1GRSMT&R, TLP521BLSMT&R, TLP521-1BLSMT&R, TLP521GBSMT&R, 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**

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

<b>TLP521-4 (UL Approval)</b>			
<b>After PN</b>	<b>PN</b>	<b>Description</b>	<b>Packing quantity</b>
None	TLP521-4, TLP521-4GR, TLP521-4BL, TLP521-4GB	Standard DIP16	25 pcs per tube
G	TLP521-4G, TLP521-4GRG, TLP521-4BLG, TLP521-4GBG	10mm Lead Spacing	25 pcs per tube
SM	TLP521-4SM, TLP521-4GRSM, TLP521-4BLSM, 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 TLP521XGR, TLP521-1XGR TLP521XBL, TLP521-1XBL, TLP521XGB, TLP521-1XGB	Standard DIP4	100 pcs per tube
G	TLP521XG, TLP521-1XG, TLP521XGRG, TLP521-1XGRG, TLP521XBLG, TLP521-1XBLG TLP521XGBG, TLP521-1XGBG	10mm Lead Spacing	100 pcs per tube
SM	TLP521XSM, TLP521-1XSM, TLP521XGRSM, TLP521-1XGRSM, TLP521XBLSM, TLP521-1XBLSM, TLP521XGBSM, TLP521-1XGBSM	Surface Mount	100 pcs per tube
SMT&R	TLP521XSMT&R, TLP521-1XSMT&R TLP521XGRSMT&R, TLP521-1XGRSMT&R, TLP521XBLSMT&R, TLP521-1XBLSMT&R, TLP521XGBSMT&R, 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, TLP521-2XBL, TLP521-2XGB	Standard DIP8	50 pcs per tube
G	TLP521-2XG, TLP521-2XGRG TLP521-2XB LG, TLP521-2XGBG	10mm Lead Spacing	50 pcs per tube
SM	TLP521-2XSM, TLP521-2XGRSM, TLP521-2XBLSM, TLP521-2XGBSM	Surface Mount	50 pcs per tube
SMT&R	TLP521-2XSMT&R, TLP521-2XGRSMT&R, TLP521-2XBLSMT&R, 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, TLP521-4XBL, TLP521-4XGB	Standard DIP16	25 pcs per tube
G	TLP521-4XG, TLP521-4XGRG, TLP521-4XB LG, TLP521-4XGBG	10mm Lead Spacing	25 pcs per tube
SM	TLP521-4XSM, TLP521-4XGRSM, TLP521-4XBLSM, TLP521-4XGBSM	Surface Mount	25 pcs per tube

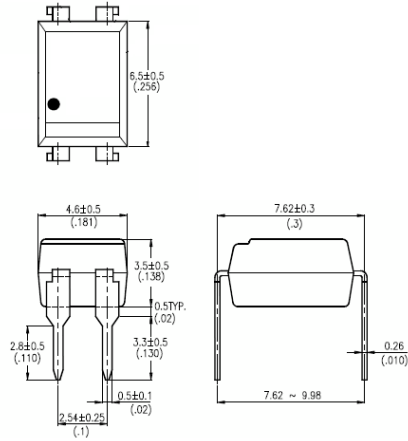


## TLP521, TLP521-2, TLP521-4

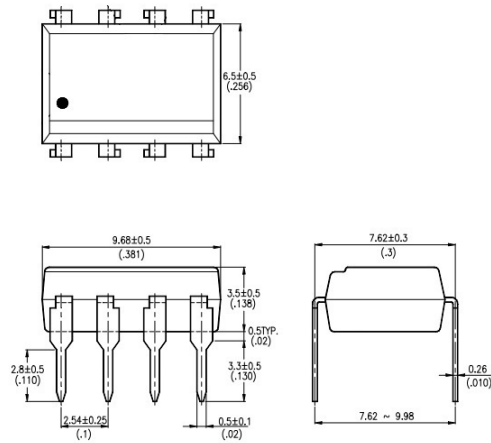
### PACKAGE DIMENSIONS in mm (inch)

#### DIP

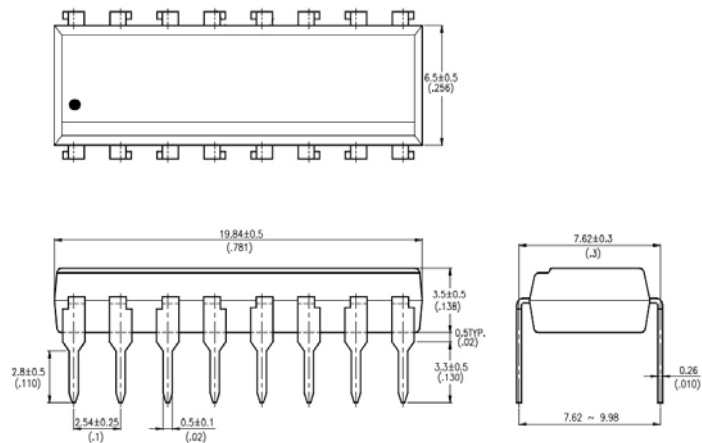
**TLP521**



**TLP521-2**



**TLP521-4**



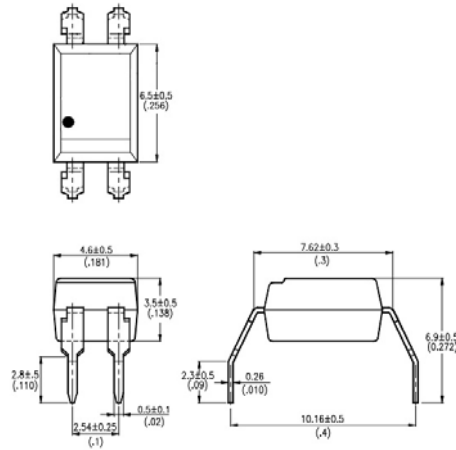


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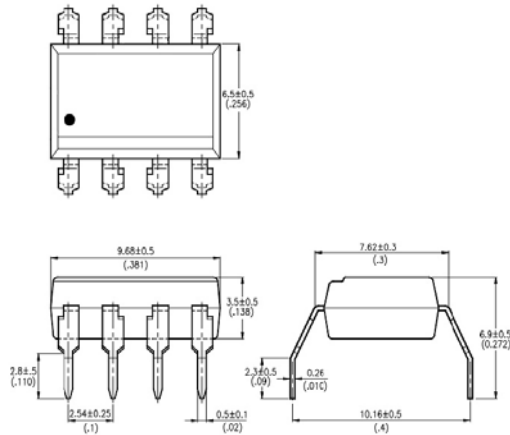
### PACKAGE DIMENSIONS in mm (inch)

#### G Form

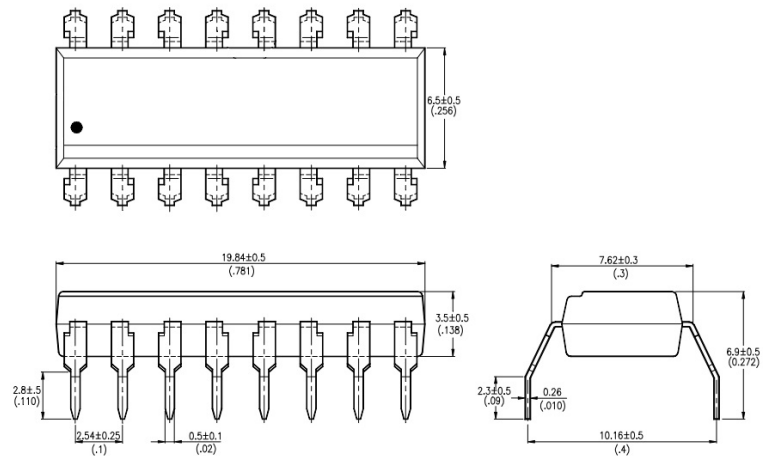
**TLP521G**



**TLP521-2G**



**TLP521-4G**



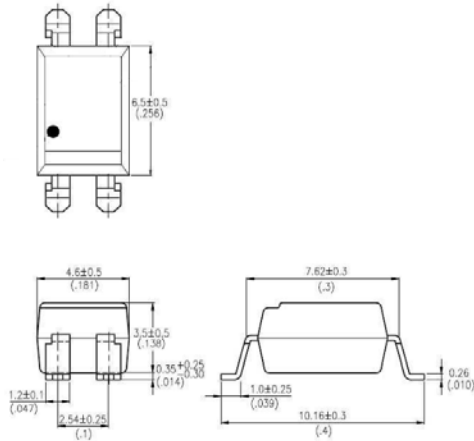


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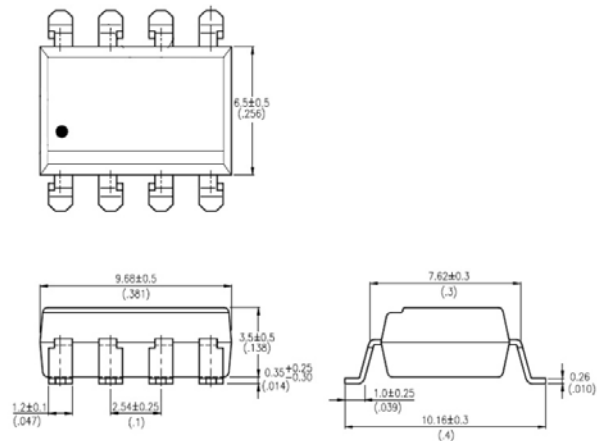
### PACKAGE DIMENSIONS in mm (inch)

#### SMD

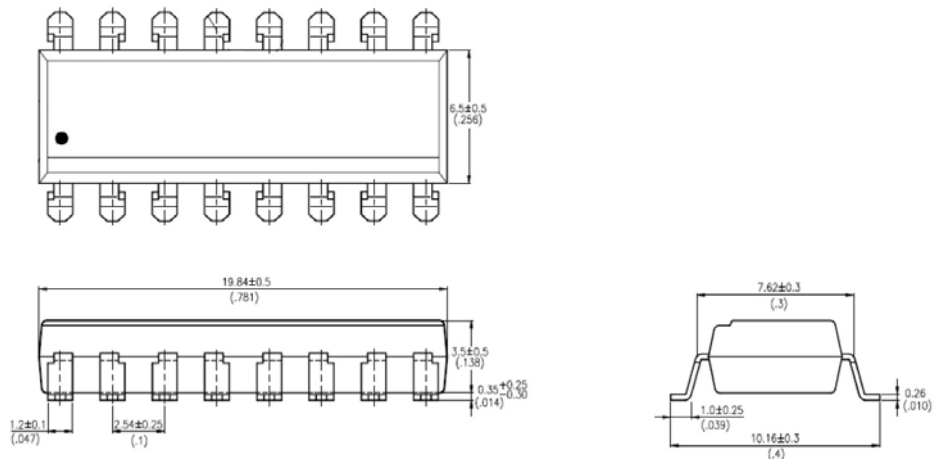
**TLP521SM**



**TLP521-2SM**



**TLP521-4SM**

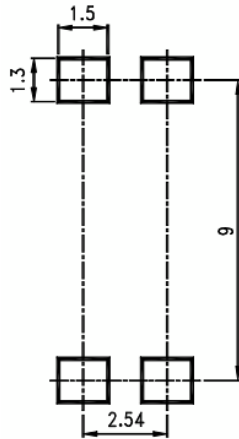




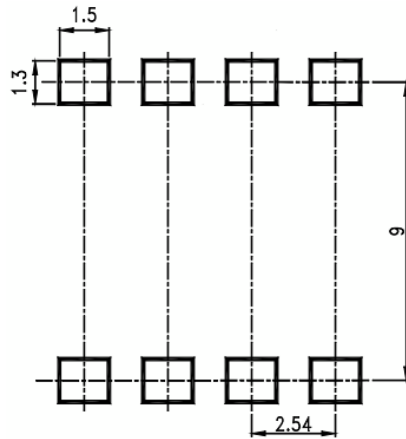
## TLP521, TLP521-2, TLP521-4

### RECOMMENDED PAD LAYOUT FOR SMD (mm)

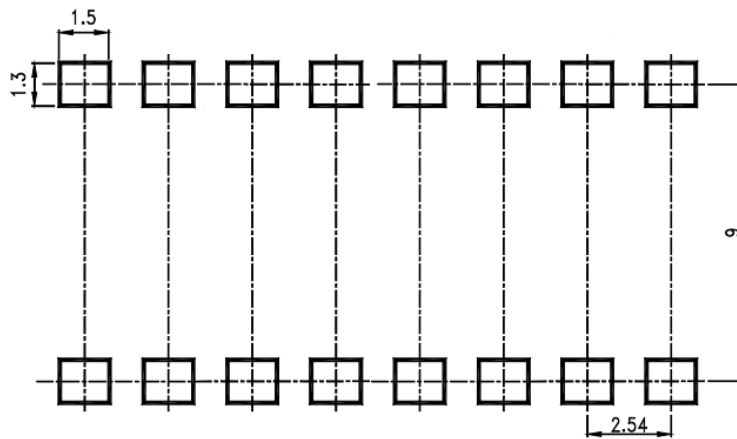
**TLP521SM**



**TLP521-2SM**



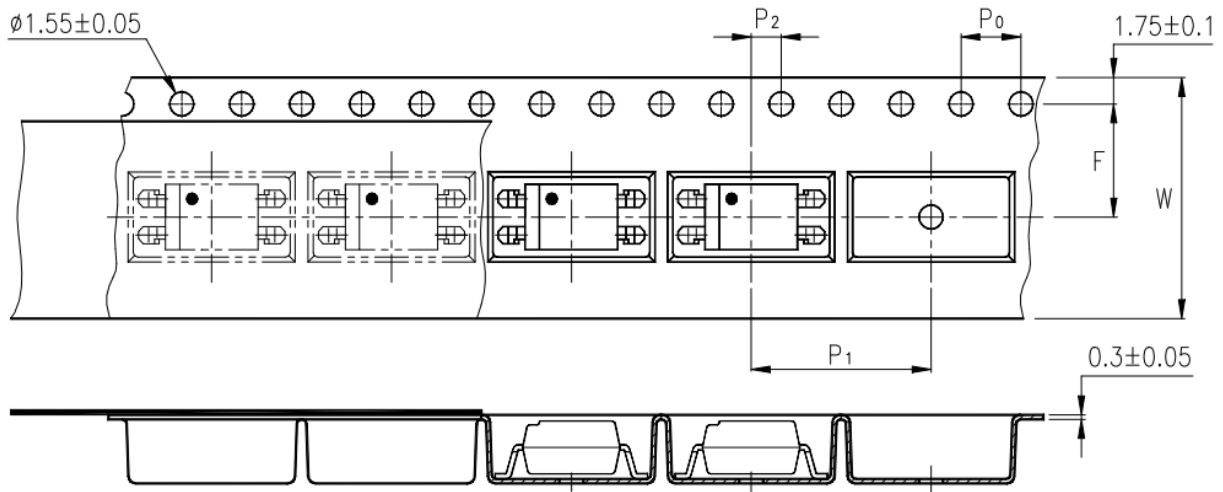
**TLP521-4SM**



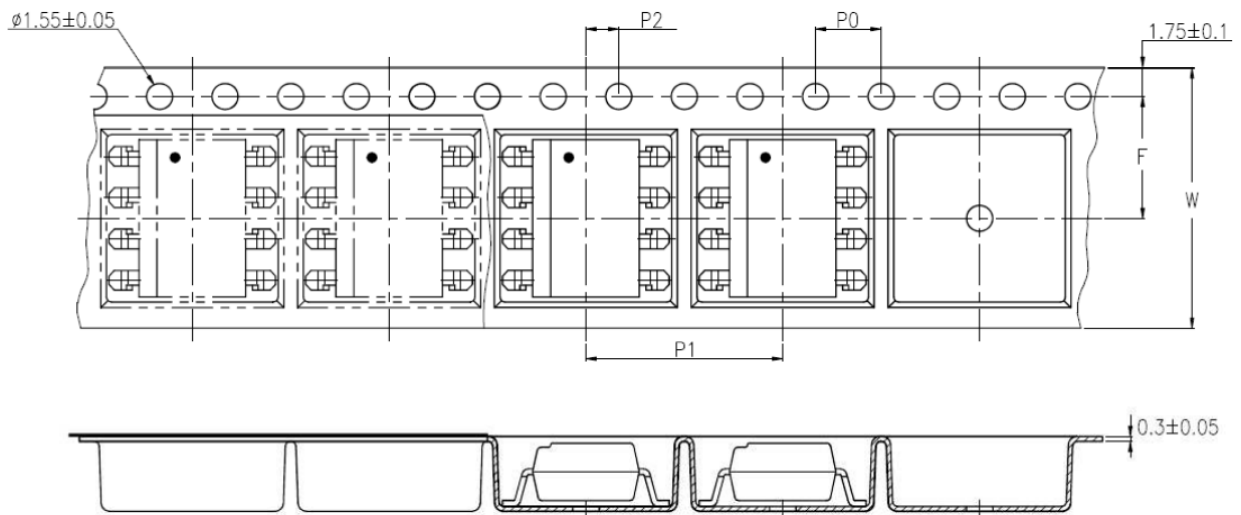


## TLP521, TLP521-2, TLP521-4

### TAPE AND REEL PACKAGING



### TLP521SMT&R



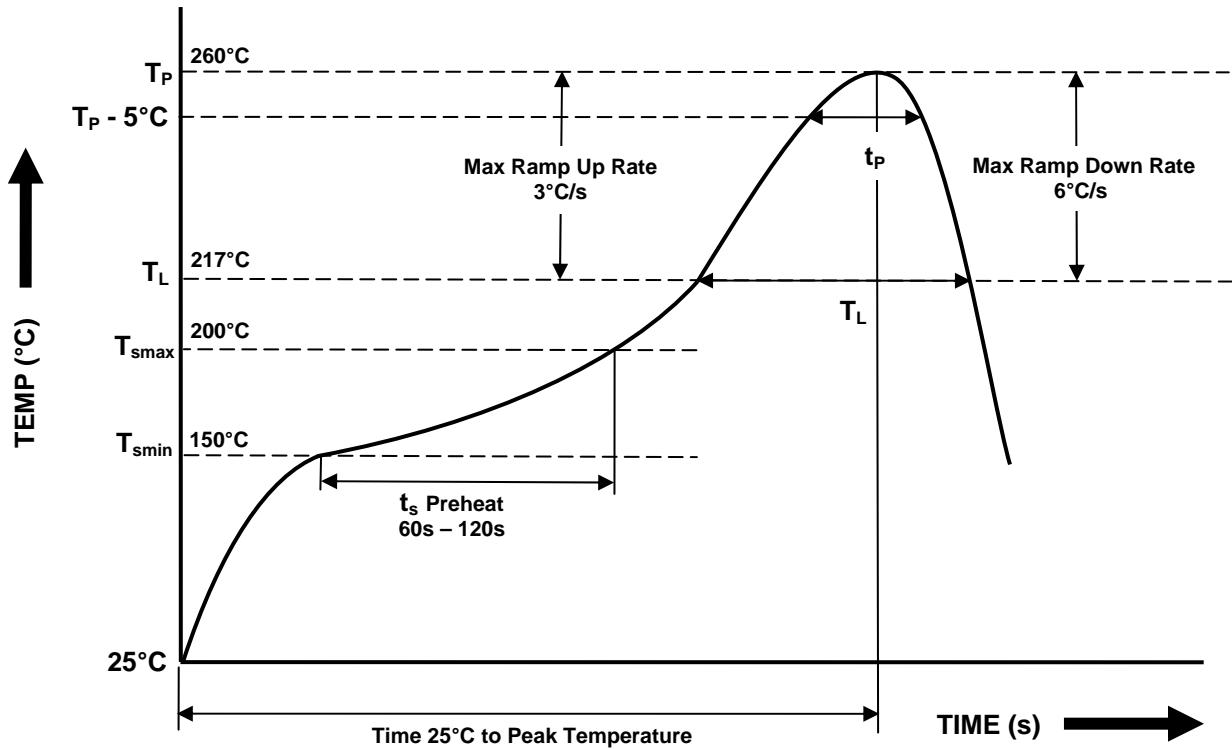
### TLP521-2SMT&R

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> - Min Temperature ( $T_{SMIN}$ ) - Max Temperature ( $T_{SMAX}$ ) - Time $T_{SMIN}$ to $T_{SMAX}$ ( $t_s$ )	150°C 200°C 60s - 120s
<b>Soldering Zone</b> - Peak Temperature ( $T_P$ ) - Time at Peak Temperature - Liquidous Temperature ( $T_L$ ) - Time within 5°C of Actual Peak Temperature ( $T_P - 5^\circ C$ ) - Time maintained above $T_L$ ( $t_L$ ) - Ramp Up Rate ( $T_L$ to $T_P$ ) - Ramp Down Rate ( $T_P$ to $T_L$ )	260°C 10s max 217°C 30s max 60s - 100s 3°C/s max 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





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**COMPONENTS**

## TLP521, TLP521-2, TLP521-4

### 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.



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\_\_ 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.

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[OR-357B-S-TP-G](#) [OR-3H4-4GB-TA1-GK](#) [OR-3H7-4GB-TA1-GK](#) [OR-M501-TP-G](#) [OR-3H5-TP-G](#) [OR-3H4B-TP-G](#) [OR-357C-S-TP-G](#)  
[PC817X3NIPW](#) [PC817X2YSZW](#) [SL-1008](#) [SL-1009](#) [PC817C](#) [LTV-354T](#) [PC817C](#) [PC357C](#) [LTV-356T-C](#) [SL-1007](#) [PC817X2YIPW](#)  
[PC817C-S](#) [ORPC-815-C](#) [ORPC-852](#) [OR-M611-TP-G](#) [PS2701-1-L](#) [UPC817XG-D04-T](#) [LTV2301GB-V-G](#) [TLP621GB-1S](#) [KPC452 0E](#)  
[EL817\(D\)-FG](#) [EL817S1B\(F\)](#) [EL817M\(C\)\(TH\)-F](#) [TLP521-1XGB](#) [IS281](#) [APV2111V](#) [APV1121SX](#) [APV2111VY](#) [TLP3906\(TPL,E](#)  
[TLP591B\(C,F\)](#) [TLP3905\(E](#) [IS281GR](#) [APS1241S](#) [APS2241S](#) [APV1122AJ](#)