# imall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from, Europe, America and south Asia, supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts, Customers Priority, Honest Operation, and Considerate Service", our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip, ALPS, ROHM, Xilinx, Pulse, ON, Everlight and Freescale. Main products comprise IC, Modules, Potentiometer, IC Socket, Relay, Connector. Our parts cover such applications as commercial, industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

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### 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.

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### 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

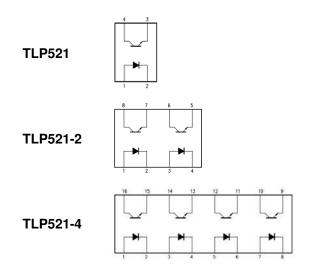
### **APPLICATIONS**

- 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





#### 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	$5300V_{RMS}$
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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### ELECTRICAL CHARACTERISTICS (Ambient Temperature = 25°C unless otherwise specified)

#### INPUT

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COMPONENTS

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Parameter	Symbol	Test Condition	Min	Тур.	Max	Unit
Forward Voltage	$\mathbf{V}_{\mathrm{F}}$	$I_F = 10 mA$	1.0	1.15	1.3	V
Reverse Voltage	V <sub>R</sub>	$I_R = 10 \mu A$	6.0			V
Reverse Leakage	I <sub>R</sub>	$V_R = 4V$			10	μΑ
Terminal Capacitance	Ct	V = 0V, f = 1KHz		30	250	pF

### OUTPUT

Parameter	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector—Emitter breakdown Voltage	BV <sub>CEO</sub>	$I_{\rm C} = 0.5 {\rm mA}, I_{\rm F} = 0 {\rm mA}$	55			V
Emitter—Collector breakdown Voltage	BV <sub>ECO</sub>	$I_{E} = 100 \mu A, I_{F} = 0 m A$	6			V
Collector-Emitter Dark Current	I <sub>CEO</sub>	$V_{CE} = 20V, I_F = 0mA$			100	nA

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

#### COUPLED

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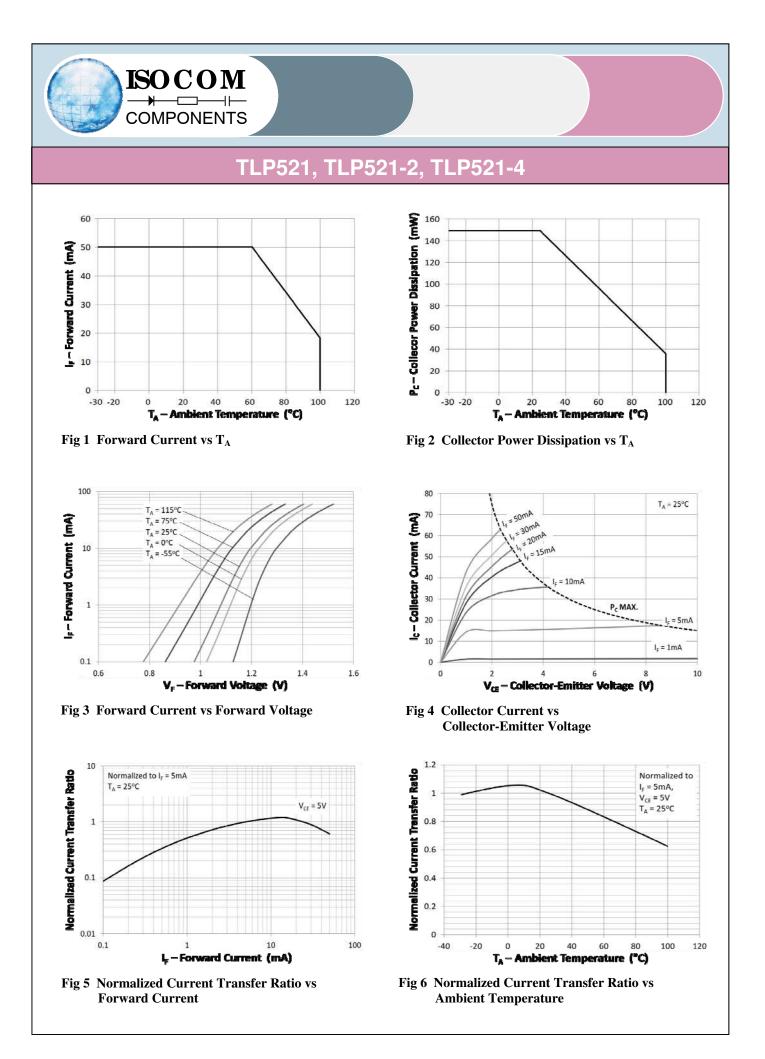
COMPONENTS

Parameter	Symbol	Test Condition	Min	Тур.	Max	Unit
Current Transfer Ratio	CTR	$I_F = 5mA, V_{CE} = 5V$	50		600	%
		Optional CTR Grades GR BL GB GB (I <sub>F</sub> = 1mA, V <sub>CE</sub> = 0.4V)	100 200 100 30		300 600 600	
Collector—Emitter Saturation Voltage	V <sub>CE(sat)</sub>	$I_F = 8mA, I_C = 2.4mA$ GB ( $I_F = 1mA, I_C = 0.2mA$ )			0.4 0.4	V
Output Rise Time	t <sub>r</sub>	$V_{CE} = 2V,$ Ic = 2mA,		4		μs
Output Fall Time	t <sub>f</sub>	$R_{L} = 100\Omega$		3		
Turn-on Time	t <sub>on</sub>			3		
Turn-off Time	$t_{\rm off}$			3		
Turn-on Time	t <sub>ON</sub>	$V_{CC} = 5V,$ $I_F = 16mA,$		2		μs
Turn-off Time	t <sub>OFF</sub>	$R_{\rm L} = 1.9 {\rm k}\Omega$		25		

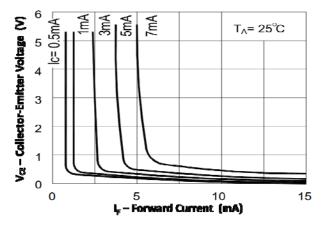
#### **ISOLATION**

Parameter	Symbol	Test Condition	Min	Тур.	Max	Unit
Input to Output Isolation Voltage	V <sub>ISO</sub>	AC 1 minute, RH = 40 to 60% Note 1	5300			V <sub>RMS</sub>
Input to Output Isolation Resistance	R <sub>ISO</sub>	$V_{IO} = 500V$ Note 1	5x10 <sup>10</sup>			Ω

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







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Fig 7 Collector-Emitter Voltage vs Forward Current

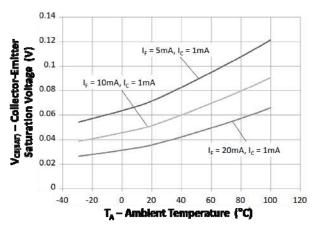


Fig 8 Collector-Emitter Voltage vs **Ambient Temperature** 

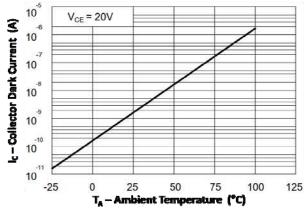


Fig 9 Collector Dark Current vs **Ambient Temperture** 



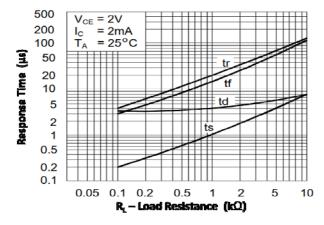


Fig 7 Response Time vs Load Resistance

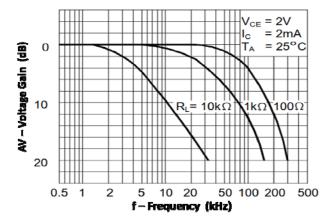
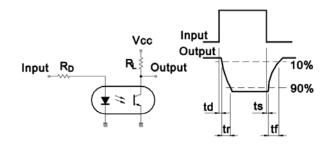
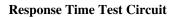
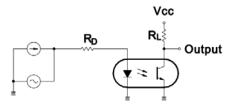


Fig 9 Frequency Response







**Frequency Response Test Circuit** 



COMPONENTS

	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.



COMPONENTS

	TLP521-2 (UL Approval)				
After PN	PN	Description	Packing quantity		
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		

	TLP521-4 (UL Approval)				
After PN	PN	Description	Packing quantity		
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		



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COMPONENTS

	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, TLP521XBLSM, TLP521XGBSM, 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.



COMPONENTS

	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 TLP521-2XBLG, 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, TLP521-4XBLG, TLP521-4XGBG	10mm Lead Spacing	25 pcs per tube		
SM	TLP521-4XSM, TLP521-4XGRSM, TLP521-4XBLSM, TLP521-4XGBSM	Surface Mount	25 pcs per tube		

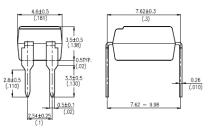


### PACKAGE DIMENSIONS in mm (inch)

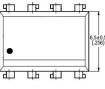
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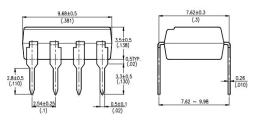
**TLP521** 

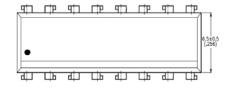


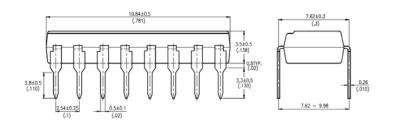


TLP521-2









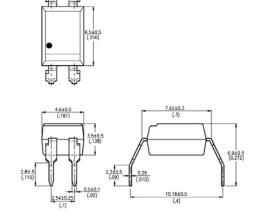
TLP521-4



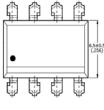
### PACKAGE DIMENSIONS in mm (inch)

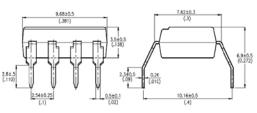
G Form

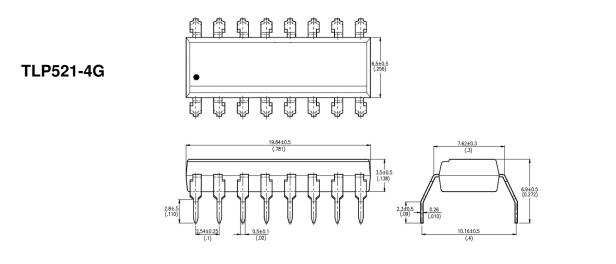
TLP521G

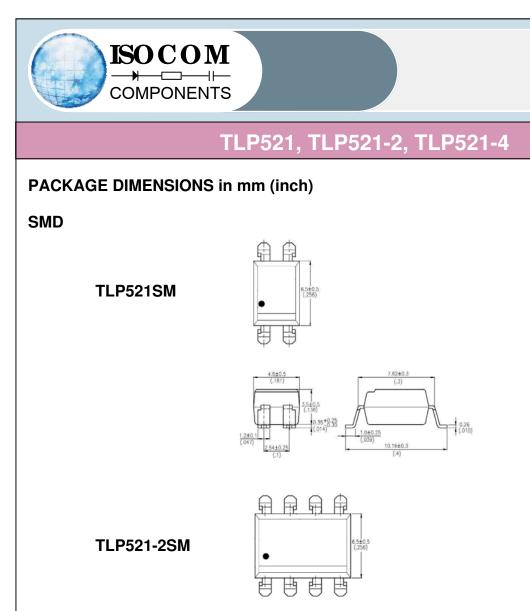


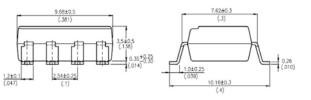
TLP521-2G

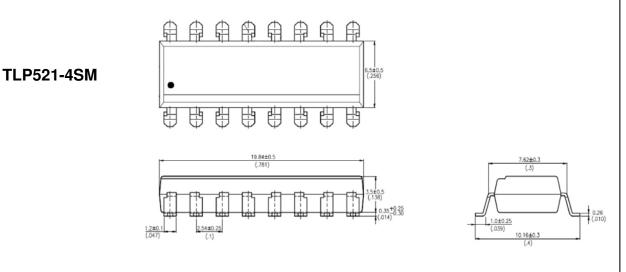


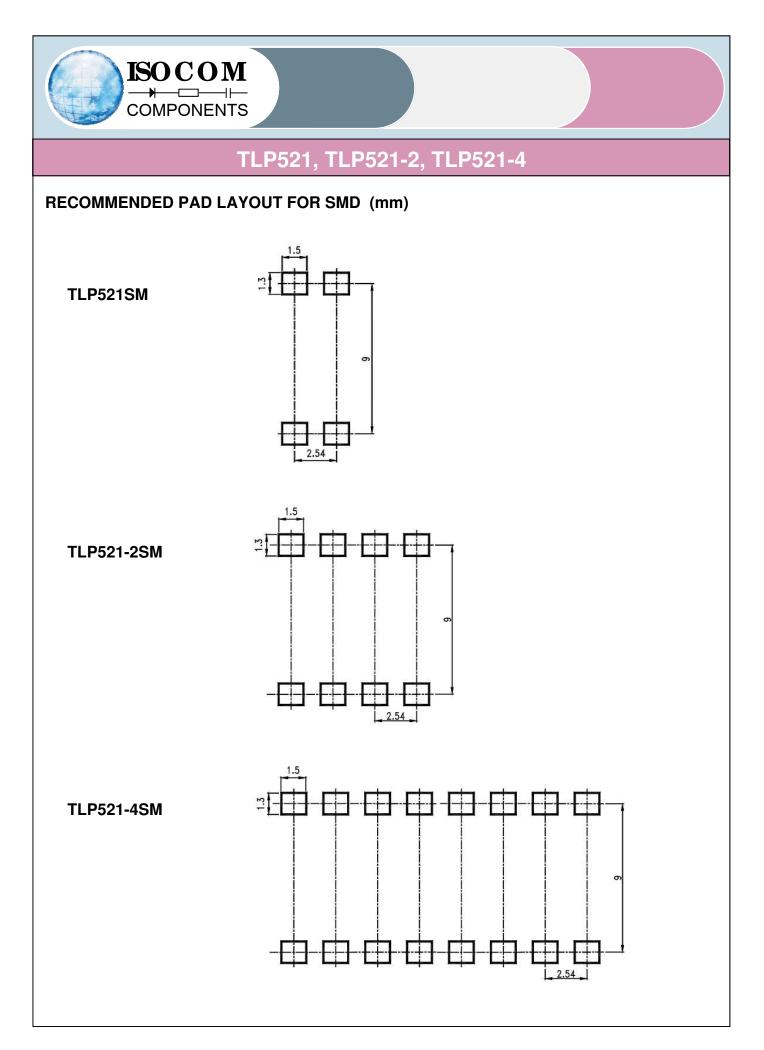






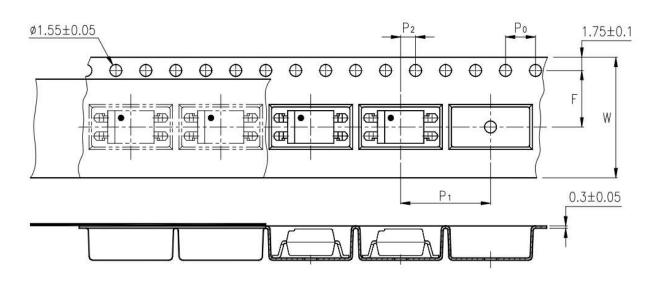




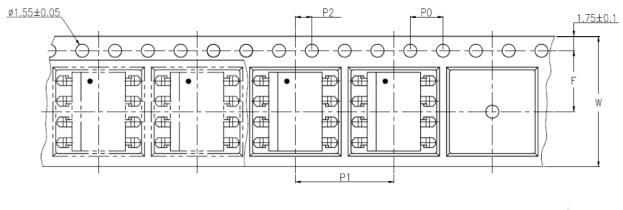


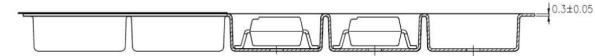


### TAPE AND REEL PACKAGING



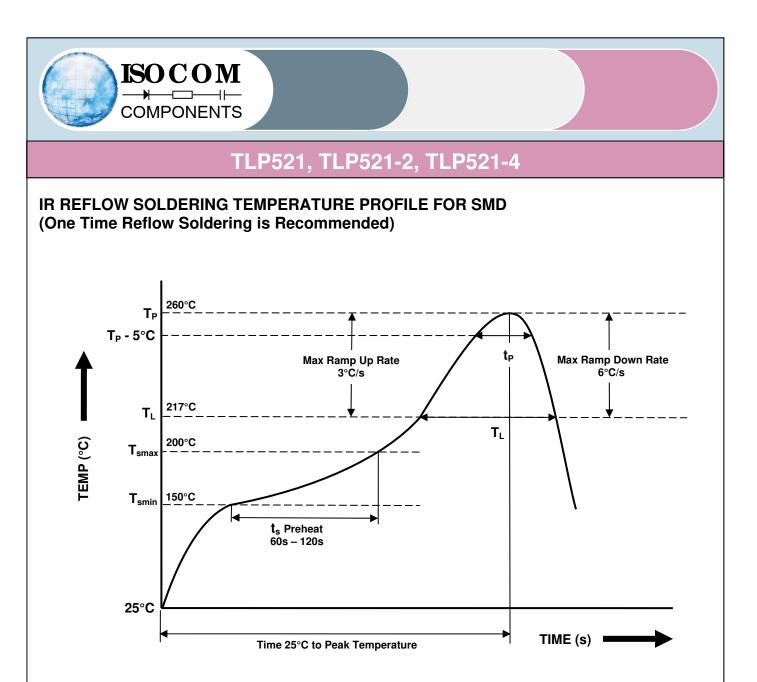
### TLP521SMT&R





### TLP521-2SMT&R

Description	Symbol	Dimensions in mm (inches)
Tape wide	W	16 ± 0.3 ( .63 )
Pitch of sprocket holes	Po	4 ± 0.1 ( .15 )
Distance of compartment	F	7.5 ± 0.1 ( .295 )
Distance of compartment	P2	$2 \pm 0.1$ ( .079 )
Distance of compartment to compartment	P1	$12 \pm 0.1 (.472)$



Profile Details	Conditions
Preheat - Min Temperature (T <sub>SMIN</sub> ) - Max Temperature (T <sub>SMAX</sub> ) - Time T <sub>SMIN</sub> to T <sub>SMAX</sub> (t <sub>s</sub> )	150°C 200°C 60s - 120s
$\label{eq:solution} \begin{array}{l} \textbf{Soldering Zone} \\ & \ \mbox{-} Peak Temperature (T_P) \\ & \ \ \mbox{-} Time at Peak Temperature \\ & \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	260°C 10s max 217°C 30s max 60s - 100s 3°C/s max 6°C/s max
Average Ramp Up Rate $(T_{smax} \text{ to } T_P)$	3°C/s max
Time 25°C to Peak Temperature	8 minutes max



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- 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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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.

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\_\_\_\_ 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.

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