### 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

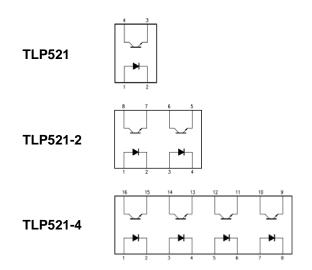
- AC Isolation Voltage 5300V<sub>RMS</sub>
- CTR Selections Available
- Wide Operating Temperature Range -30°C to +100°C
- Lead Free and RoHS Compliant
- UL File E91231 Package Code "EE"
- VDE Approval Certificate No. 40028086

# 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 ( $T_A = 25^{\circ}C$ )

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

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



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

#### INPUT

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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>	$I_{\rm E} = 100 \mu A, I_{\rm F} = 0 {\rm m} A$	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

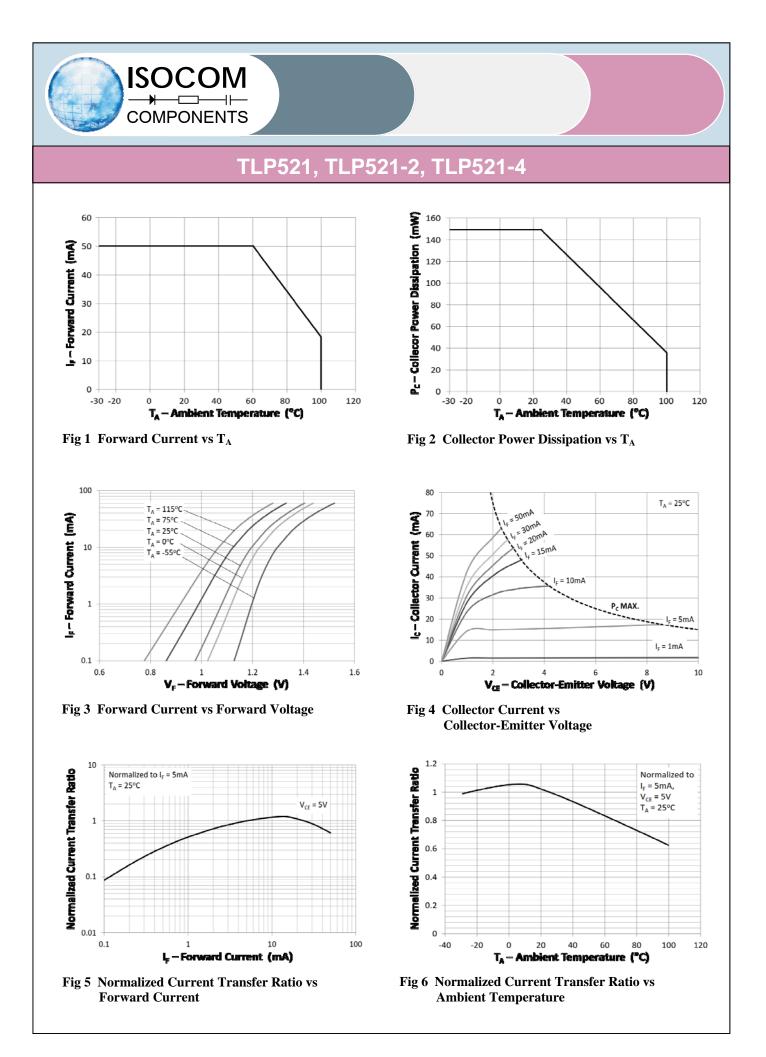
-11--

Parameter	Symbol	Test Condition	Min	Тур.	Max	Unit
Current Transfer Ratio	CTR	$I_F = 5 \text{mA}, V_{CE} = 5 \text{V}$	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		

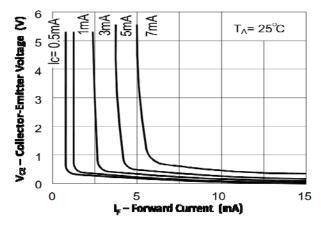
#### **ISOLATION**

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

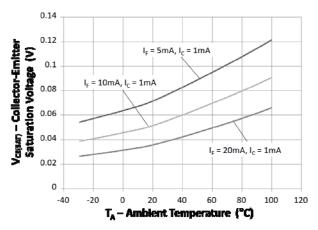


Fig 8 Collector-Emitter Voltage vs **Ambient Temperature** 

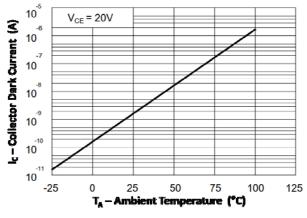


Fig 9 Collector Dark Current vs **Ambient Temperture** 



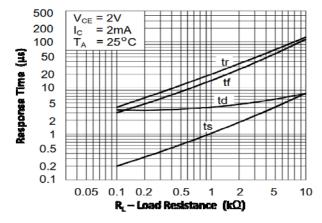


Fig 7 Response Time vs Load Resistance

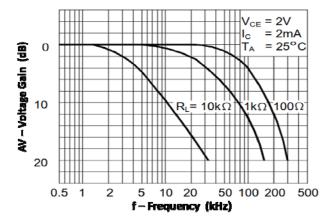
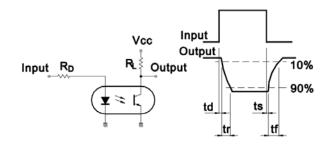
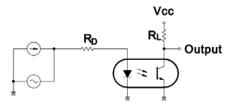


Fig 9 Frequency Response







**Frequency Response Test Circuit** 



#### **ORDER INFORMATION**

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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.



### **ORDER INFORMATION**

	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		



### **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.



### **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 TLP521-2XBLG, 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		

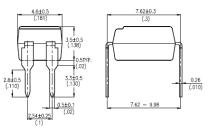


# PACKAGE DIMENSIONS in mm (inch)

DIP

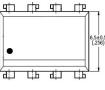
TLP521

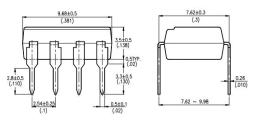


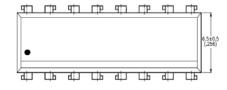


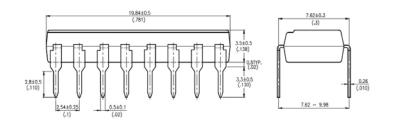
TLP521-2

TLP521-4







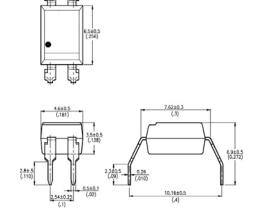




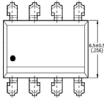
# PACKAGE DIMENSIONS in mm (inch)

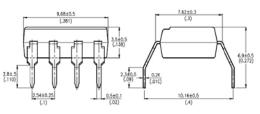
G Form

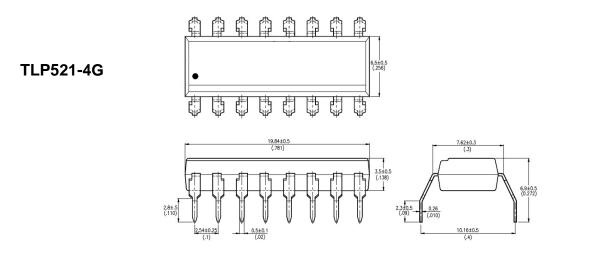
TLP521G

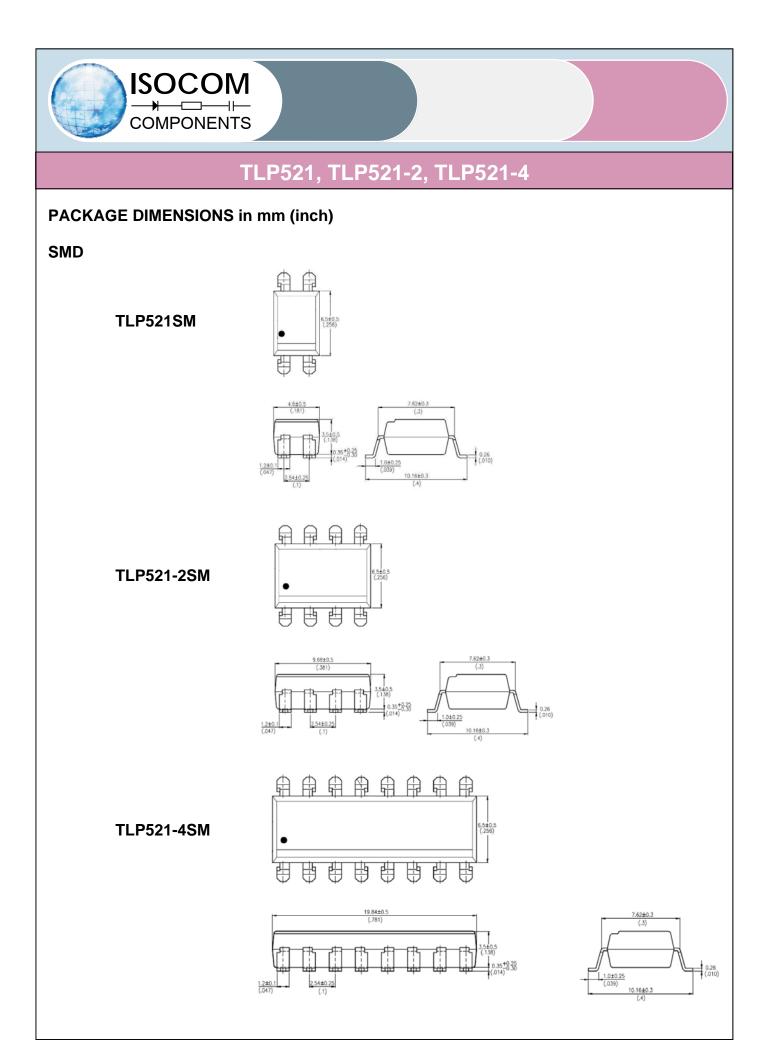


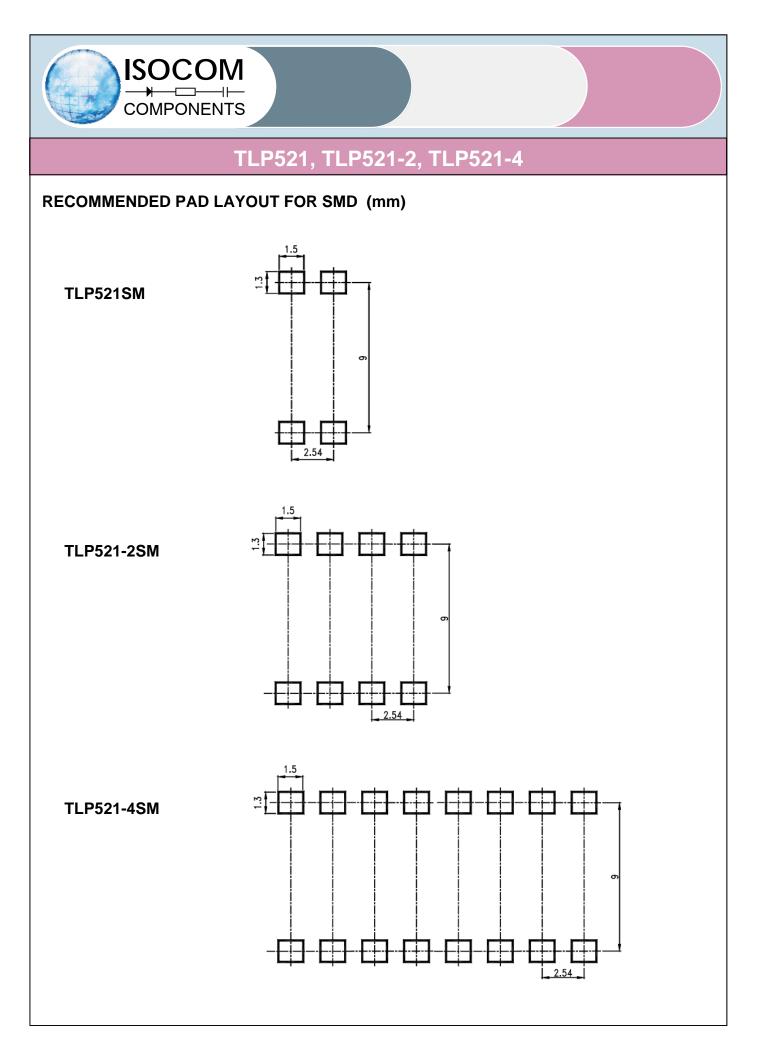
TLP521-2G





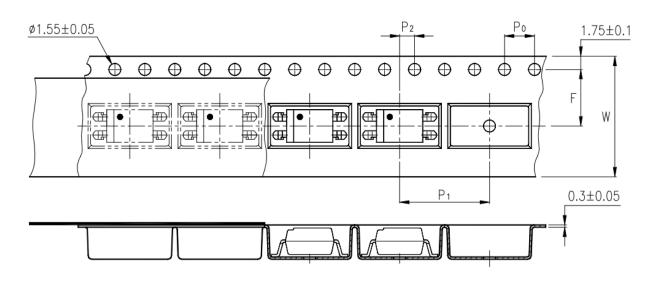




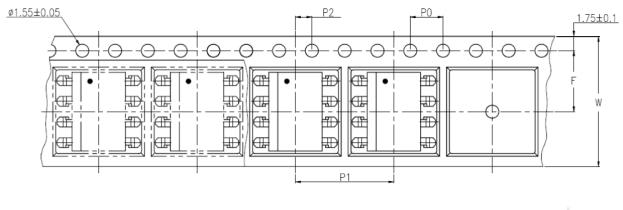


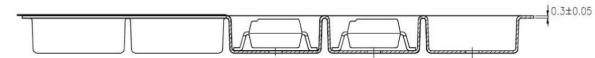


# TAPE AND REEL PACKAGING



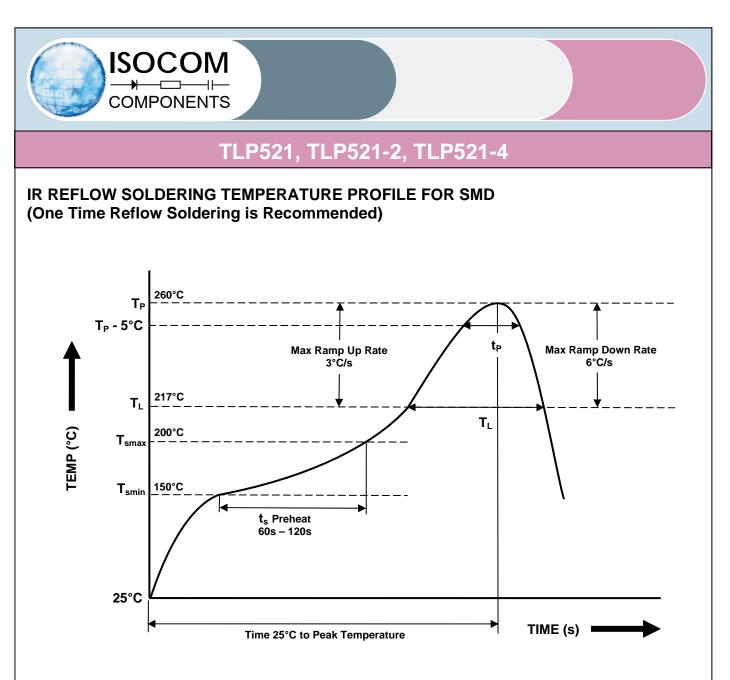
# TLP521SMT&R





# 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 comportment	F	7.5 ± 0.1 ( .295 )
Distance of compartment	P2	$2 \pm 0.1$ ( .079 )
Distance of compartment to compartment	P1	12 ± 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
$\label{eq:solution} \begin{array}{l} \textbf{Soldering Zone} \\ & - \text{Peak Temperature } (T_{\text{P}}) \\ & - \text{Time at Peak Temperature} \\ & - \text{Liquidous Temperature } (T_{\text{L}}) \\ & - \text{Time within 5°C of Actual Peak Temperature } (T_{\text{P}} - 5^{\circ}\text{C}) \\ & - \text{Time maintained above } T_{\text{L}} \left( t_{\text{L}} \right) \\ & - \text{Ramp Up Rate } (T_{\text{L}} \text{ to } T_{\text{P}}) \\ & - \text{Ramp Down Rate } (T_{\text{P}} \text{ to } T_{\text{L}}) \end{array}$	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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- The contents described herein are subject to change without prior notice.
- Do not immerse device body in solder paste.



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