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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 5000V_{RMS}
- CTR Selections Available
- Wide Operating Temperature Range
  -55°C to +110°C TLP521
  -40°C to +105°C TLP521-2 / TLP521-4
- RoHS Compliant
- UL File E91231 Package Code “EE”
- VDE Approval Certificate No. 40028086

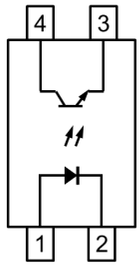
APPLICATIONS

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

ORDER INFORMATION

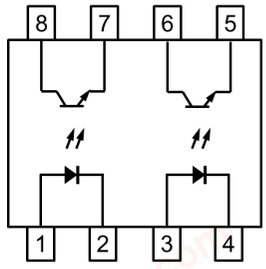
- Add X after PN for VDE Approval
- Add G after PN for 10mm lead spacing
- Add SM after PN for Surface Mount
- Add SMT&R after PN for Surface Mount Tape & Reel
  (Available for TLP521SM and TLP521-2SM)
- Optional Order Part No. TLP521-1 for TLP521
- Consult Factory for Tape and Reel version of TLP521-4SM

TLP521



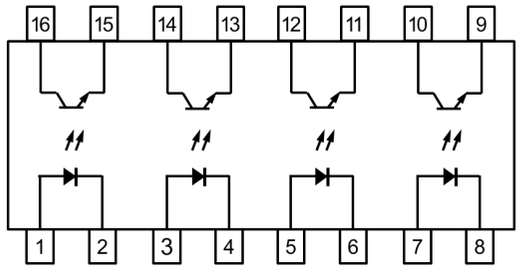
1	Anode
2	Cathode
3	Emitter
4	Collector

TLP521-2



1, 3	Anode
2, 4	Cathode
5, 7	Emitter
6, 8	Collector

TLP521-4



1, 3, 5, 7	Anode
2, 4, 6, 8	Cathode
9, 11, 13, 15	Emitter
10, 12, 14, 16	Collector

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

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ABSOLUTE MAXIMUM RATINGS (T_A = 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
Peak Forward Current (100µs, 100Hz)	1A
Reverse Voltage	6V
Power dissipation	70mW
Junction Temperature	125 °C

Output

Collector to Emitter Voltage V_{CEO}	55V
Emitter to Collector Voltage V_{ECO}	6V
Collector Current	50mA
Power Dissipation	150mW
Junction Temperature	125 °C

Total Package

Isolation Voltage		5000V_{RMS}
Total Power Dissipation		200mW
Operating Temperature	TLP521	-55 to 110 °C
	TLP521-2 / TLP521-4	-40 to 105 °C
Storage Temperature		-55 to 125 °C
Lead Soldering Temperature (10s)		260°C

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e-mail : sales@isocom.com.hk

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

INPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	V_F	I_F = 20mA		1.2	1.4	V
Reverse Leakage	I_R	V_R = 4V			10	µA
Terminal Capacitance	C_t	V = 0V, f = 1KHz		30	250	pF

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector–Emitter Breakdown Voltage	BV_{CEO}	I_C = 0.1mA, I_F = 0mA	55			V
Emitter–Collector Breakdown Voltage	BV_{ECO}	I_E = 10µA, I_F = 0mA	6			V
Collector–Emitter Dark Current	I_{CEO}	V_{CE} = 20V, I_F = 0mA			100	nA

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

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Current Transfer Ratio	CTR	I_F = 5mA, V_{CE} = 5V	50		600	%
		Optional CTR Grades				
		GR	100		300	
		BL	200		600	
		GB	100		600	
Collector−Emitter Saturation Voltage	$V_{CE(sat)}$	I_F = 20mA, I_C = 1mA		0.1	0.2	V
Floating Capacitance	C_f	V = 0V, f = 1MHz		0.6	1	pF
Cut-Off Frequency	f_C	V_{CE} = 5V, I_C = 2mA R_L = 100Ω -3dB		80		kHz
Output Rise Time	t_r	V_{CC} = 5V I_C = 2mA R_L = 100Ω		4	18	µs
Output Fall Time	t_f			3	18	

ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Input to Output Isolation Voltage	V_{ISO}	AC 1 minute, RH = 40% to 60%	5000			V_{RMS}
Input to Output Isolation Resistance	R_{ISO}	V_{IO}= 500VDC RH = 40% to 60%	$5x10^{10}$	$1x10^{11}$		Ω

Measure with input leads shorted together and output leads shorted together.

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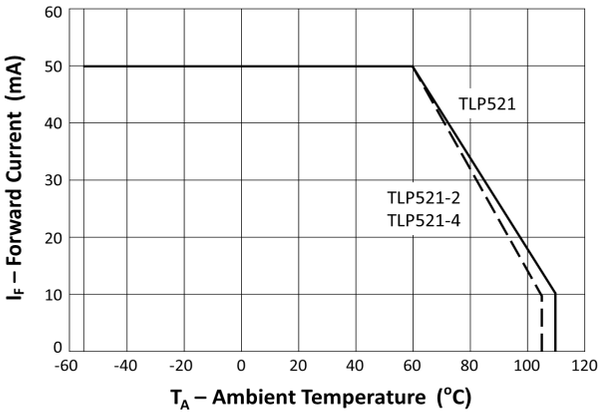


Fig 1 Forward Current vs Ambient Temperature

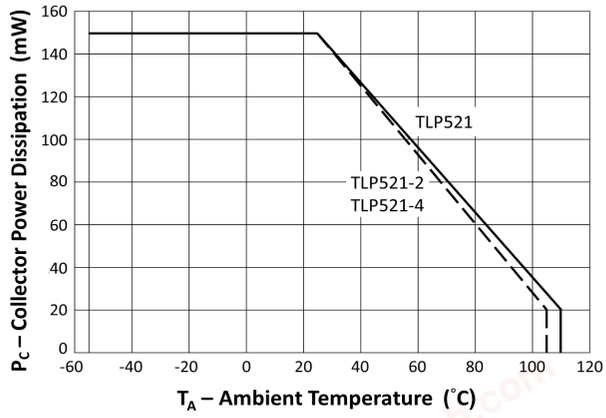


Fig 2 Collector Power Dissipation vs Ambient Temperature

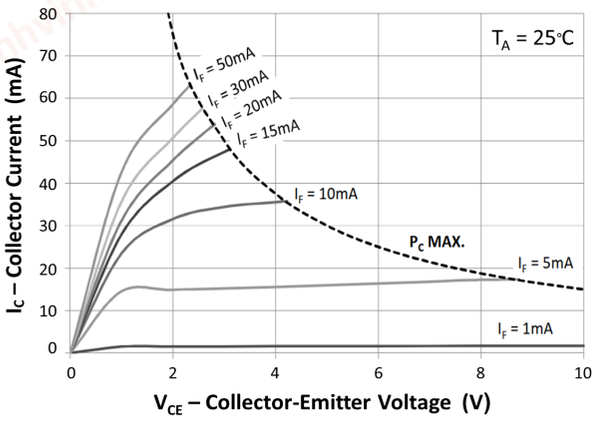


Fig 3 Collector Current vs Collector-Emitter Voltage (1)

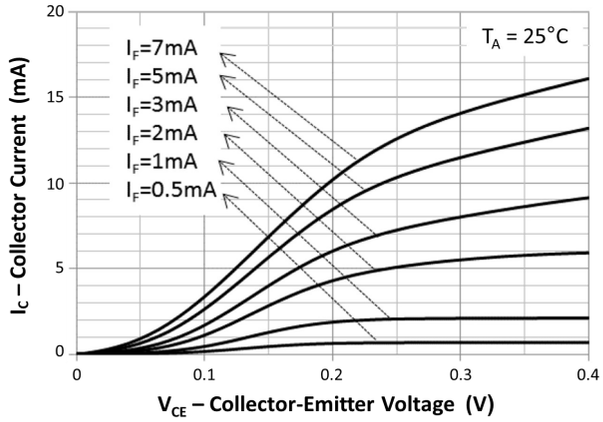


Fig 4 Collector Current Dissipation vs Collector Emitter Voltage (2)

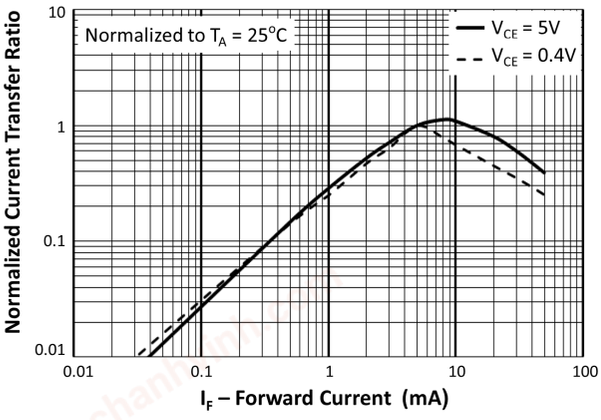


Fig 5 Normalized Current Transfer Ratio vs Forward Current

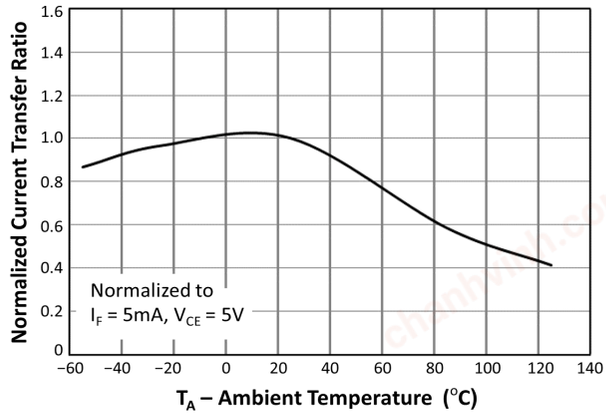


Fig 6 Normalized Current Transfer Ratio vs Ambient Temperature

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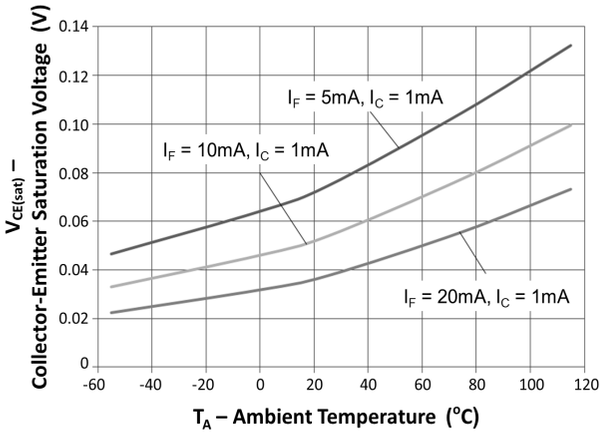


Fig Collector-Emitter Saturation Voltage vs Ambient Temperature

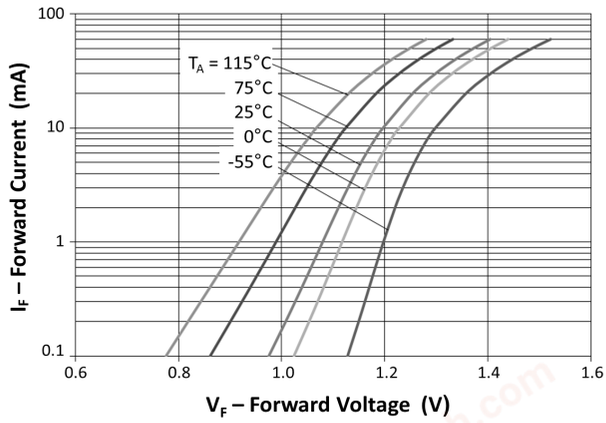


Fig 8 Forward Current vs Forward Voltage

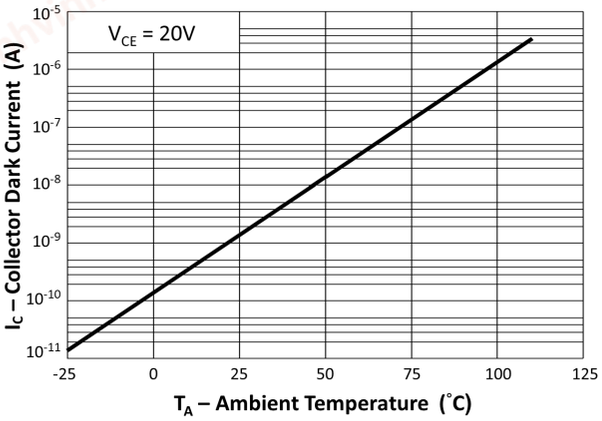


Fig 9 Collector Dark Current vs Ambient Temperature

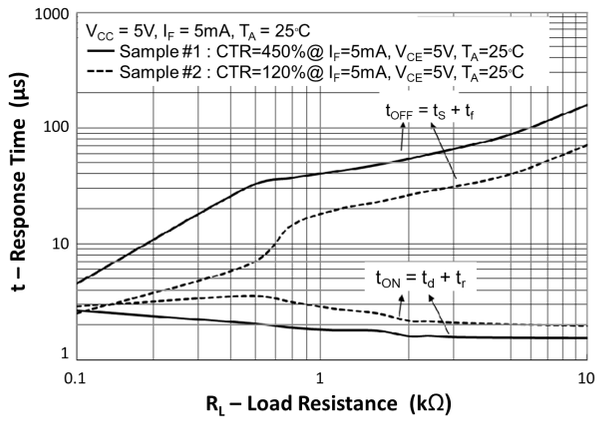


Fig 10 Switching Time vs Load Resistance

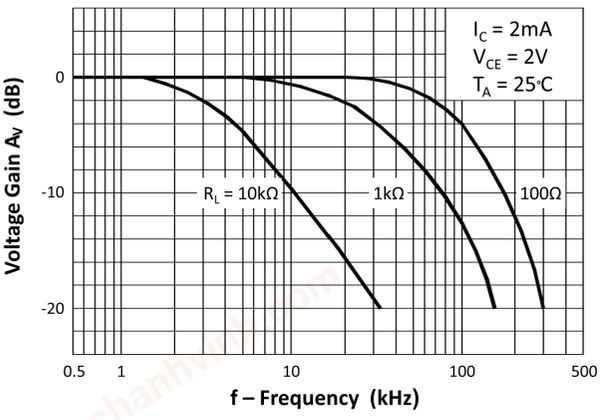
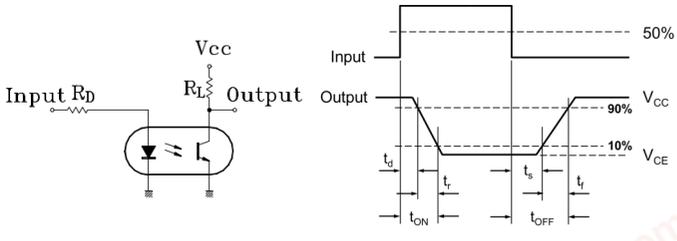
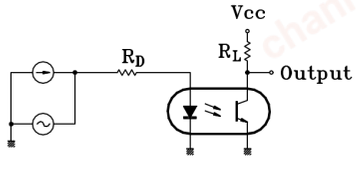


Fig 11 Frequency Response



Response Time Test Circuit



Frequency Response Test Circuit

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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.

Devices with suffix “X” (UL and VDE approvals) may be supplied when ordering the above Part Numbers (UL approval only).

Multiple grades may be provided to meet the requested specification

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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

Note : Devices with suffix “X” (UL and VDE approvals) may be supplied when ordering the above Part Numbers (UL approval only).

Multiple grades may be provided to meet the requested specification

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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. TLP521-1X for TLP521X.

Multiple grades may be provided to meet the requested specification

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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

Note : Multiple grades may be provided to meet the requested specification

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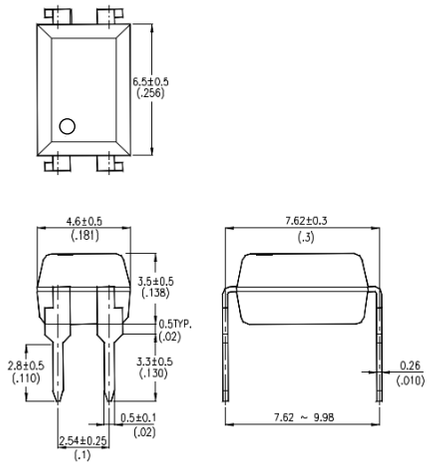
ISOCOM COMPONENTS

TLP521, TLP521-2, TLP521-4

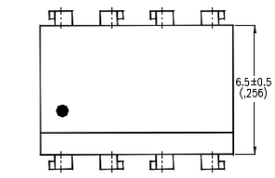
PACKAGE DIMENSIONS in mm (inch)

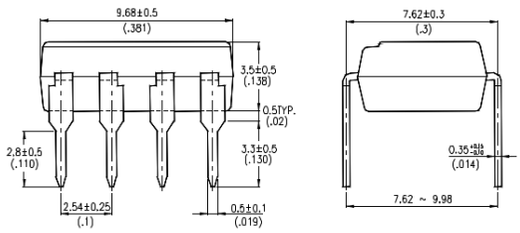
DIP

TLP521

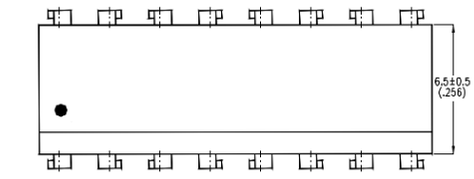


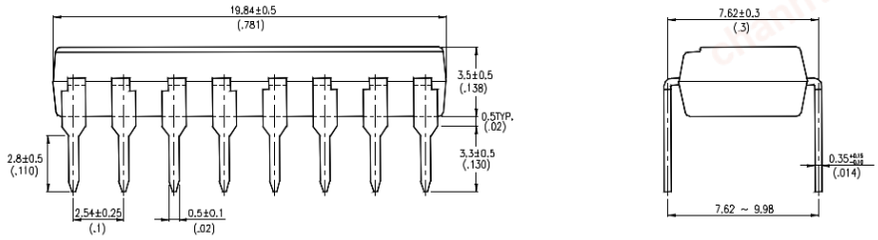
TLP521-2





TLP521-4





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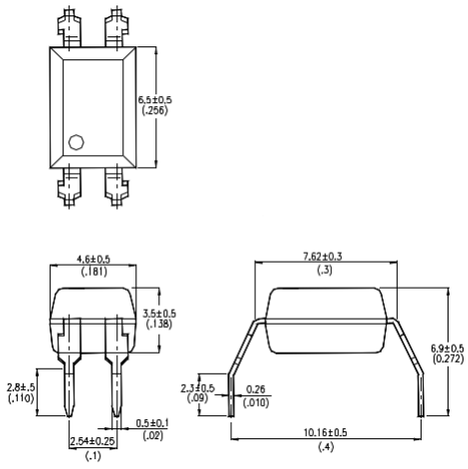
ISOCOM COMPONENTS

TLP521, TLP521-2, TLP521-4

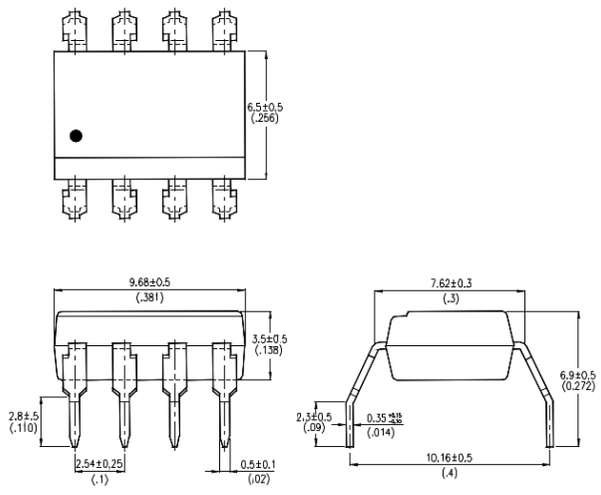
PACKAGE DIMENSIONS in mm (inch)

G Form

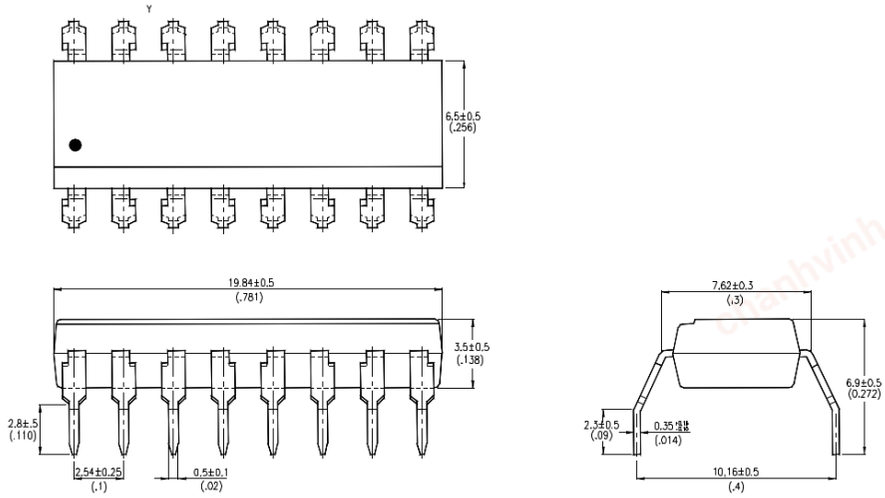
TLP521G



TLP521-2G



TLP521-4G



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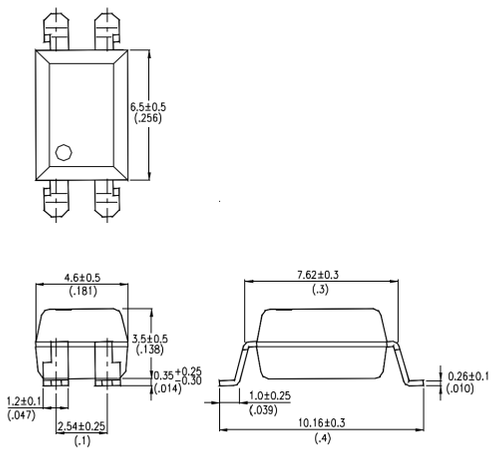
ISOCOM COMPONENTS

TLP521, TLP521-2, TLP521-4

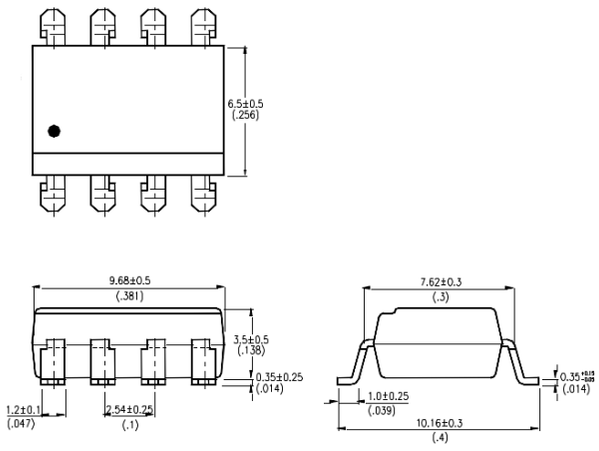
PACKAGE DIMENSIONS in mm (inch)

SMD

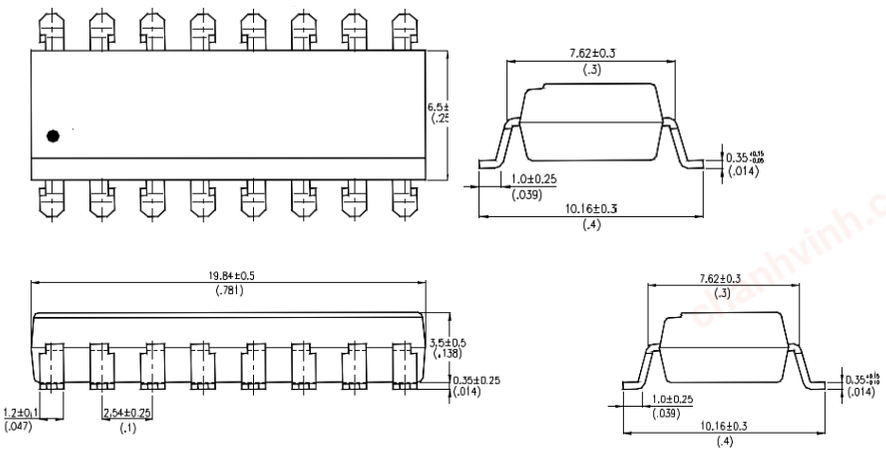
TLP521SM



TLP521-2SM



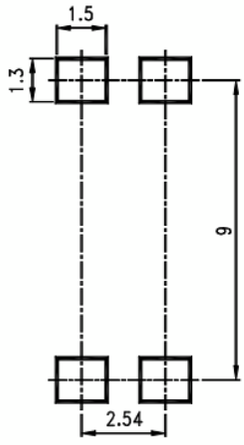
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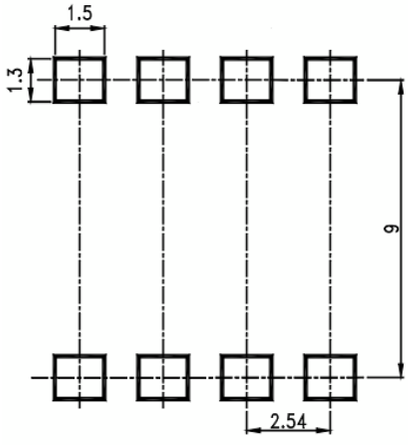
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RECOMMENDED PAD LAYOUT FOR SMD (mm)

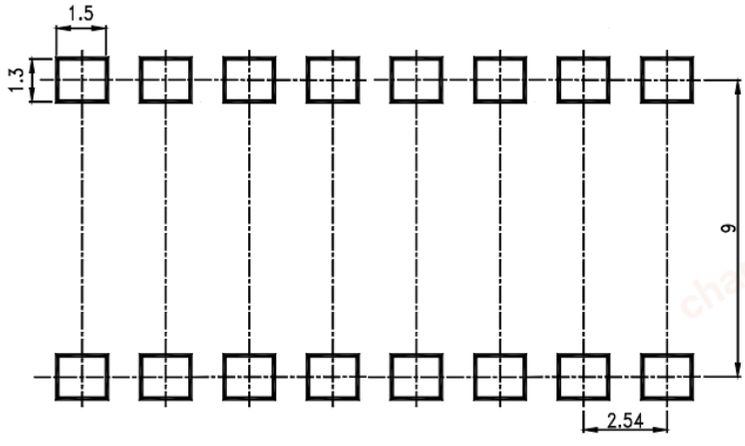
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TLP521-2SM



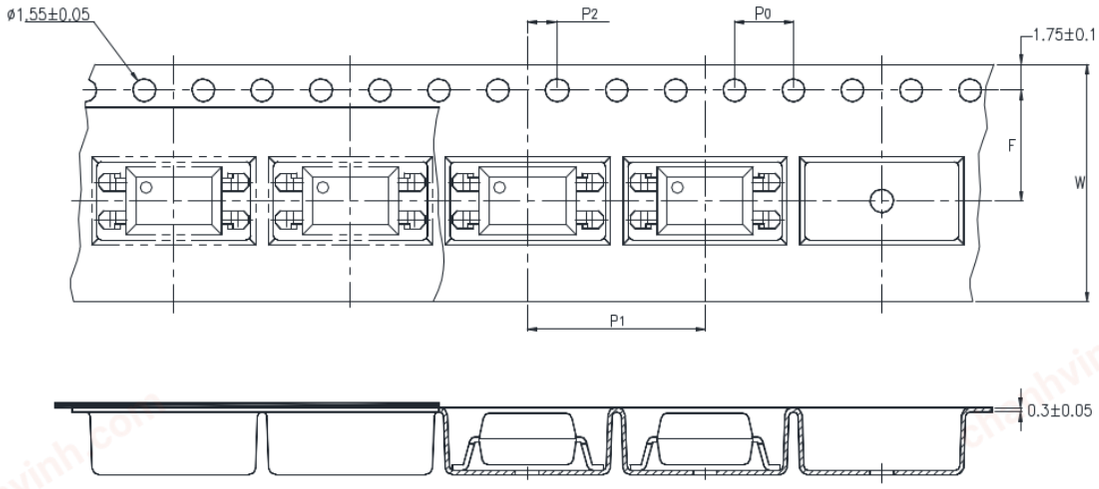
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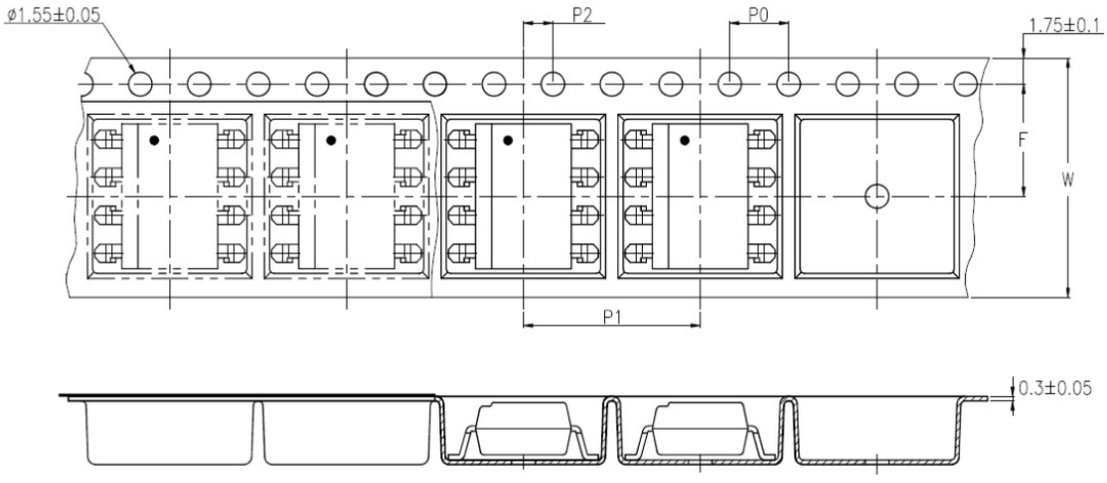
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TAPE AND REEL PACKAGING

TLP521SMT&R



TLP521-2SMT&R



Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	P_0	4 ± 0.1 (0.15)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.295)
	P_2	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P_1	12 ± 0.1 (0.472)

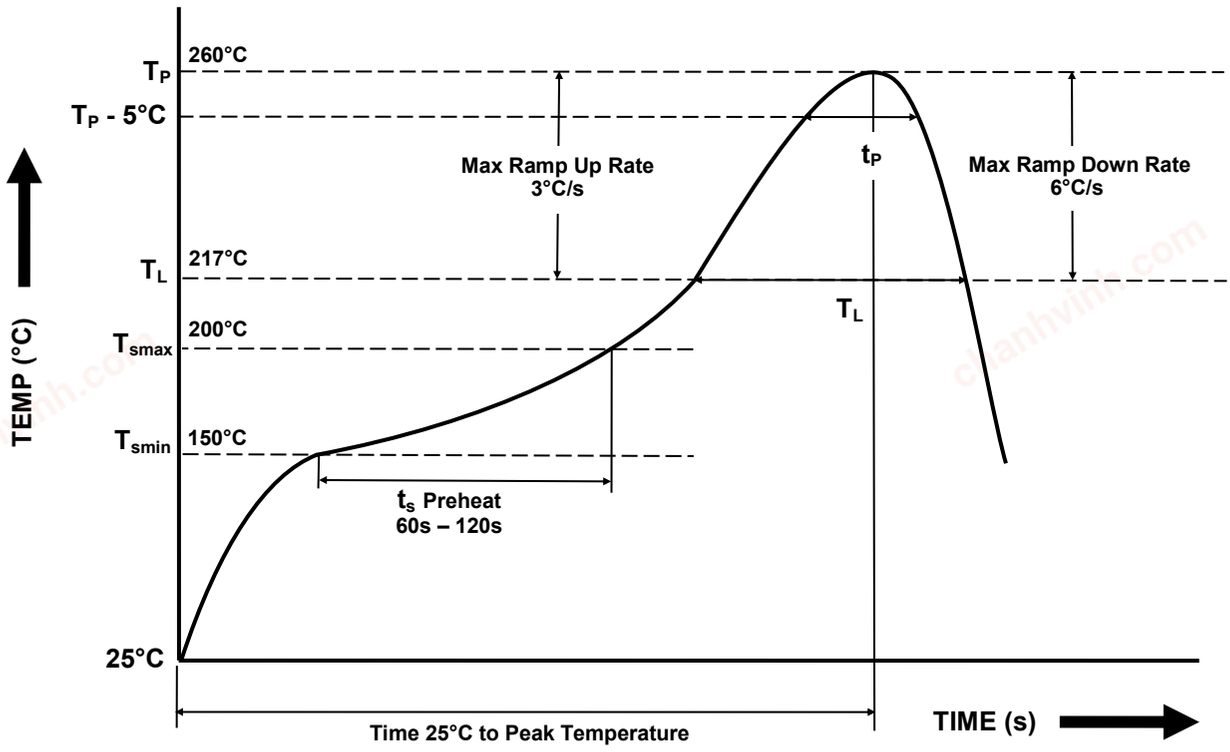
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TLP521, TLP521-2, TLP521-4

IR REFLOW SOLDERING TEMPERATURE PROFILE FOR SMD

One Time Reflow Soldering is Recommended.
Do Not Immerse Device Body in Solder Paste.



Profile Details	Conditions
Preheat - Min Temperature (T_{SMIN}) - Max Temperature (T_{SMAX}) - Time T_{SMIN} to T_{SMAX} (t_s)	 150°C 200°C 60s - 120s
Soldering Zone - Peak Temperature (T_P) - Time at Peak Temperature - Liquidous Temperature (T_L) - Time within 5°C of Actual Peak Temperature (T_P – 5°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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