

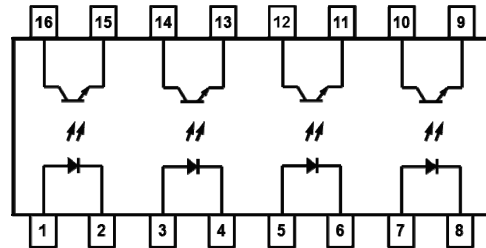
## TLP281- 4, TLP281- 4GB



### DESCRIPTION

The TLP281-4 and TLP281-4GB are four channel optical isolators with each channel consists of an infrared emitting diode optically coupled to an NPN silicon photo transistor.

These devices belong to Isocom Compact Range of Optocouplers.



### FEATURES

- Half Pitch 1.27mm
- High AC Isolation voltage 3000V<sub>RMS</sub>
- Wide Operating Temperature Range -55°C to 110°C
- Pb Free and RoHS Compliant
- UL Approval E91231 Package Code "THP4"

### APPLICATIONS

- Hybrid Substrates with High Density Mounting
- Industrial System Controllers
- Measuring Instruments
- System Appliances

### ORDER INFORMATION

- Available in Tape and Reel with 2000pcs per reel

### 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

Output Current	50mA
Collector to Emitter Voltage BV <sub>CEO</sub>	80V
Emitter to Collector Voltage BV <sub>ECO</sub>	7V
Power Dissipation	100mW

#### Total Package

Isolation Voltage	3000V <sub>RMS</sub>
Total Power Dissipation	170mW
Operating Temperature	-55 to 110 °C
Storage Temperature	-55 to 150 °C
Lead Soldering Temperature (10s)	260°C

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**TLP281- 4, TLP281- 4GB**

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise specified)**

**INPUT**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	V <sub>F</sub>	I <sub>F</sub> = 20mA		1.2	1.4	V
Reverse Current	I <sub>R</sub>	V <sub>R</sub> = 4V			10	μA
Terminal Capacitance	C <sub>t</sub>	V <sub>F</sub> = 0V, f = 1KHz		30	250	pF

**OUTPUT**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	I <sub>F</sub> = 0, I <sub>C</sub> = 0.1mA	80			V
Emitter-Collector Breakdown Voltage	BV <sub>ECO</sub>	I <sub>F</sub> = 0, I <sub>E</sub> = 10μA	7			V
Collector-Emitter Dark Current	I <sub>CEO</sub>	I <sub>F</sub> = 0, V <sub>CE</sub> = 48V			100	nA

**COUPLED**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Current Transfer Ratio	CTR	I <sub>F</sub> = 5mA, V <sub>CE</sub> = 5V TLP281-4 TLP281-4GB	50 100		600 600	%
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>F</sub> = 8mA, I <sub>C</sub> = 2.4mA			0.4	V
Floating Capacitance	C <sub>f</sub>	V <sub>CE</sub> = 0V, f = 1MHz		0.6	1	pF
Output Rise Time	t <sub>r</sub>	V <sub>CE</sub> = 10V, I <sub>c</sub> = 2mA, R <sub>L</sub> = 100Ω		2	18	μs
Output Fall Time	t <sub>f</sub>			3	18	
Turn-On Time	t <sub>ON</sub>			3		
Turn-Off Time	t <sub>OFF</sub>			3		
Turn-On Time	t <sub>ON</sub>	V <sub>CE</sub> = 5V, I <sub>c</sub> = 16mA, R <sub>L</sub> = 1.9kΩ		2		
Turn-Off Time	t <sub>OFF</sub>			40		
Storage Time	t <sub>s</sub>			25		

**ISOLATION**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Input to Output Isolation Voltage	V <sub>ISO</sub>	RH = 40% - 60%, t = 1 min Note 1	3000			V <sub>RMS</sub>
Input to Output Isolation Resistance	R <sub>ISO</sub>	RH = 40% - 60%, V <sub>IO</sub> = 500V Note 1	5x10 <sup>10</sup>	1x10 <sup>11</sup>		Ω

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

## TLP281-4, TLP281-4GB

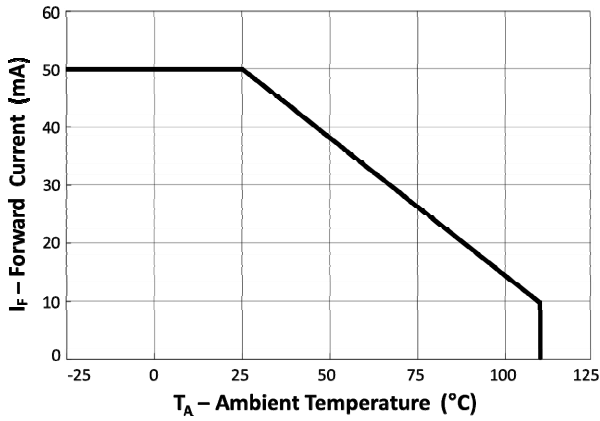


Fig 1 Forward Current vs  $T_A$

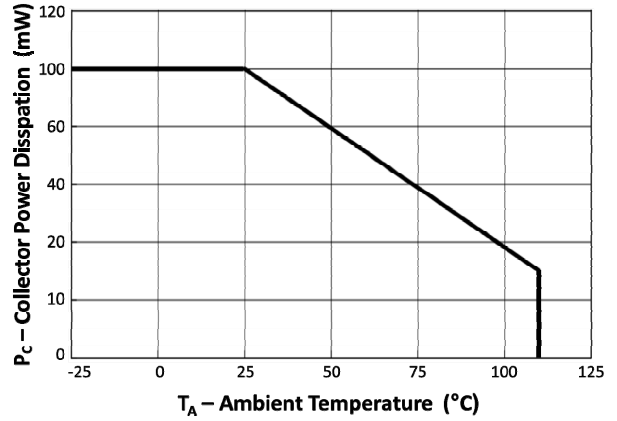


Fig 2 Collector Power Dissipation vs  $T_A$

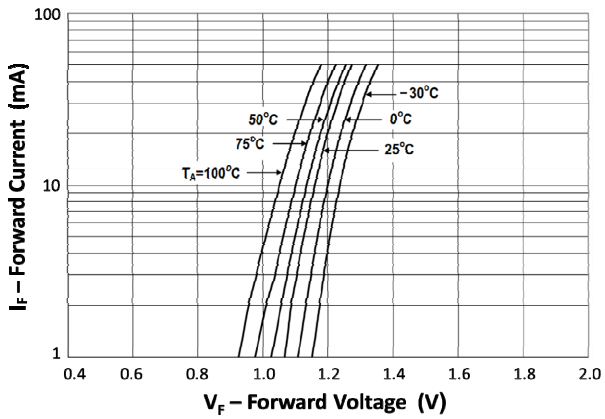


Fig 3 Forward Current vs Forward Voltage

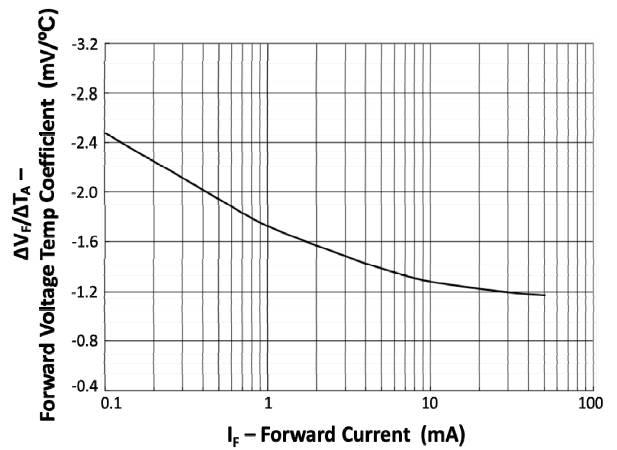


Fig 4 Forward Current Temperature Coefficient vs Forward Current

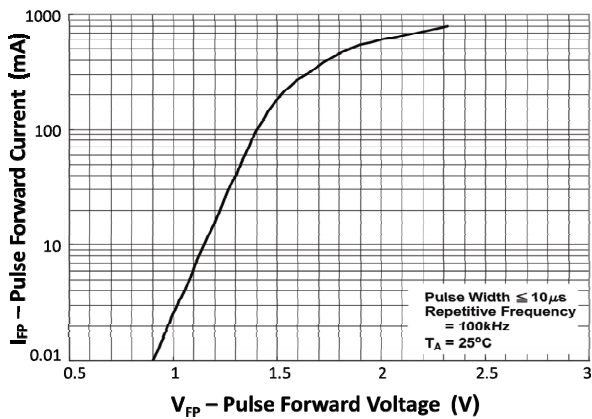


Fig 5 Pulse Forward Current vs Pulse Forward Voltage

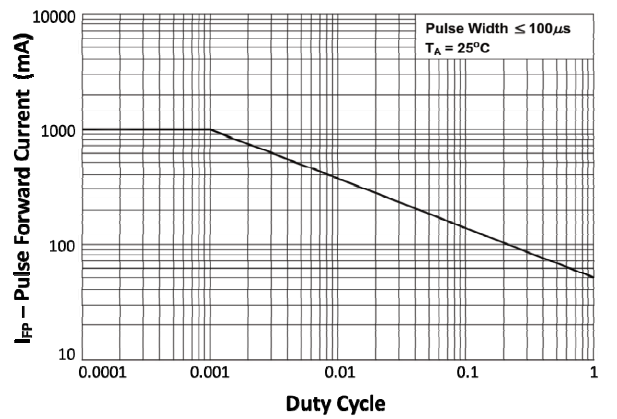


Fig 6 Pulse Forward Current vs Duty Cycle

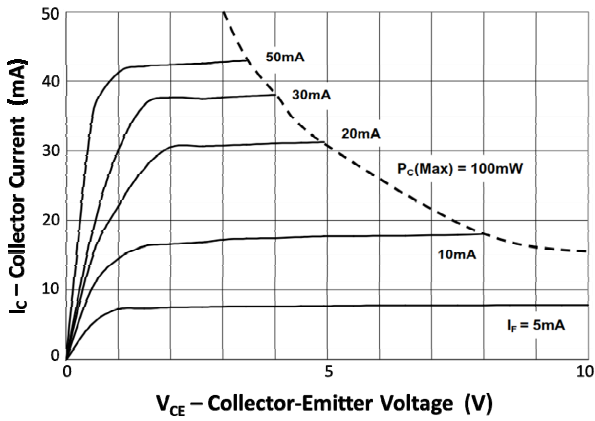


Fig 7 Collector Current vs Collector-Emittor Voltage

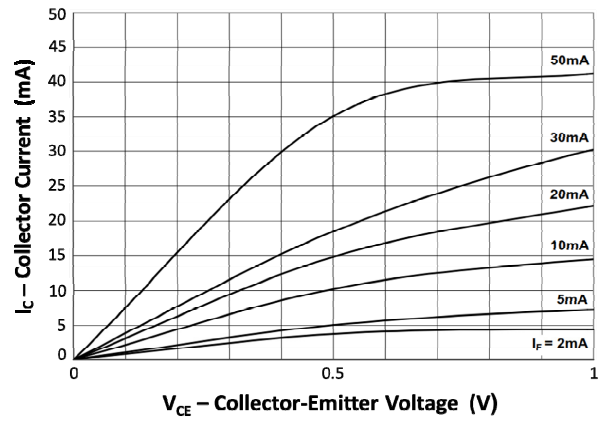


Fig 8 Collector Current vs Low Collector-Emittor Voltage

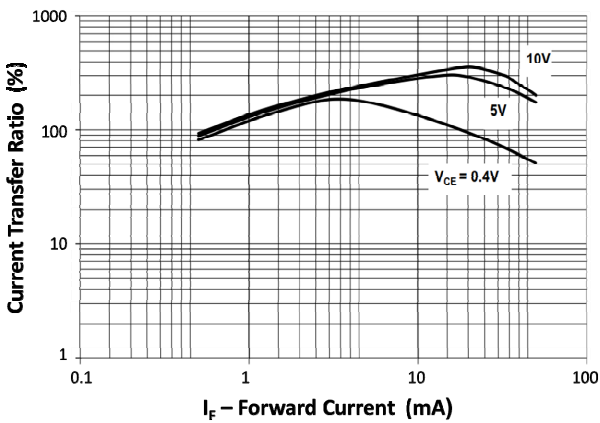


Fig 9 Current Transfer Ratio vs Forward Current

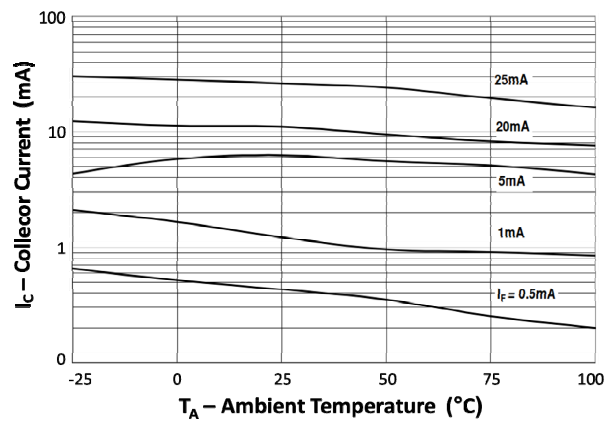


Fig 10 Collector Current vs TA

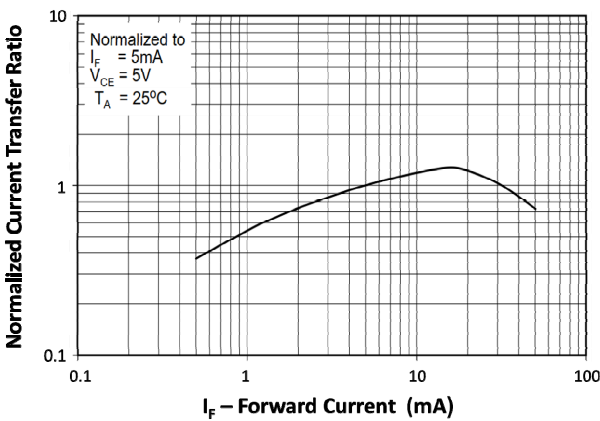


Fig 11 Normalized Current Transfer Ratio vs Forward Current

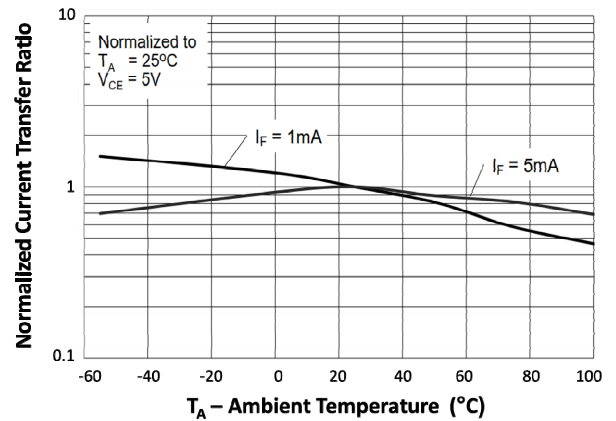


Fig 12 Normalized Current Transfer Ratio vs TA

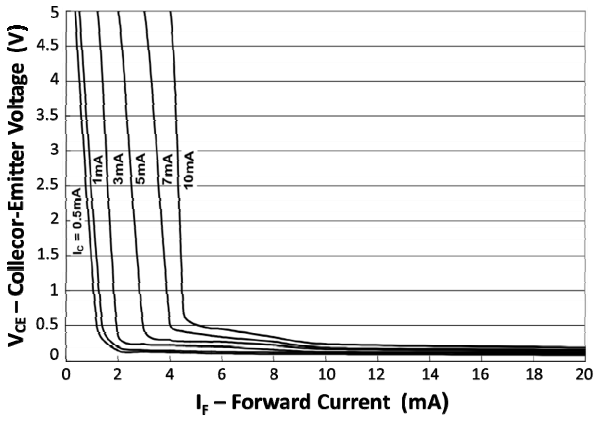


Fig 13 Collector-Emitter Voltage vs Forward Current

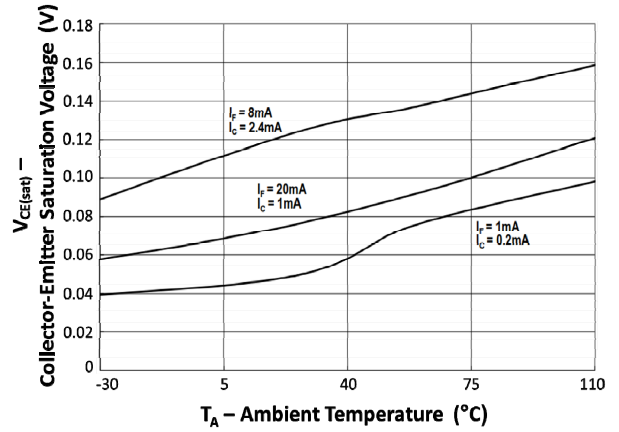


Fig 14 Collector-Emitter Saturation Voltage vs  $T_A$

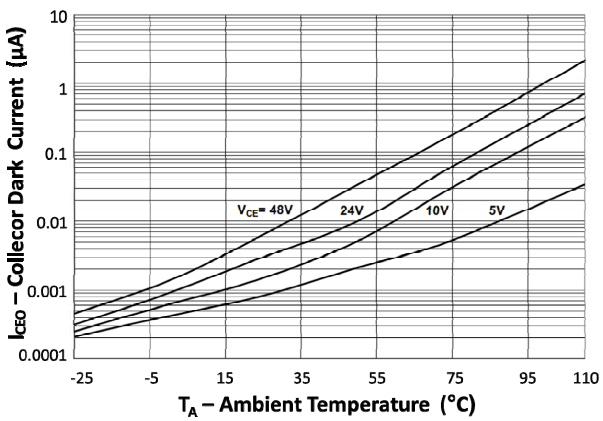


Fig 15 Collector Dark Current vs  $T_A$

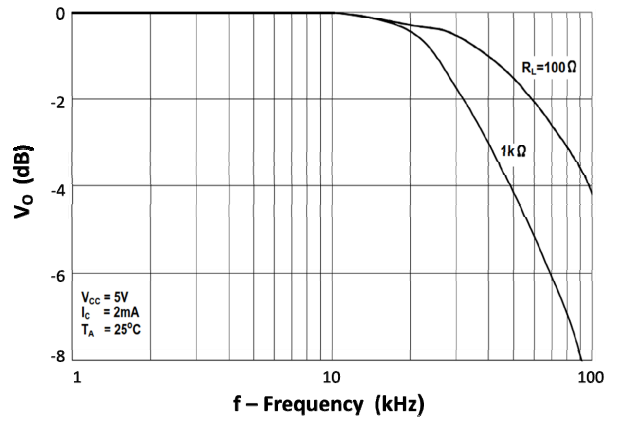


Fig 16 Frequency Response

## TLP281-4, TLP281-4GB

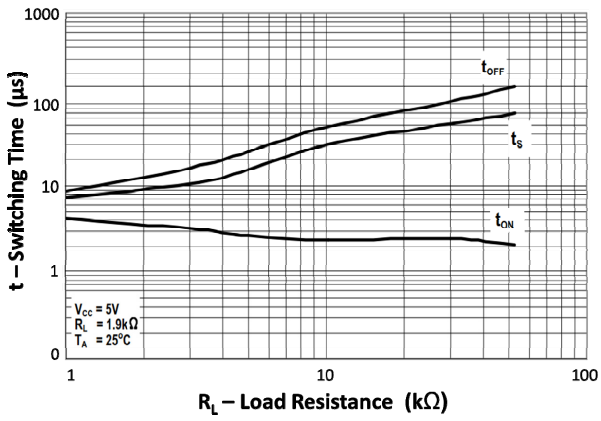


Fig 17 Switching Time vs Load Resistance

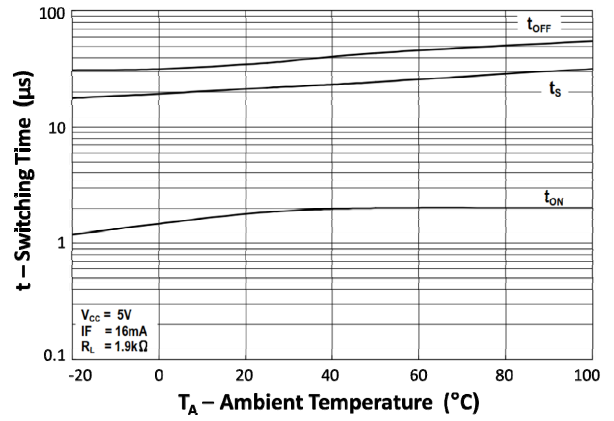
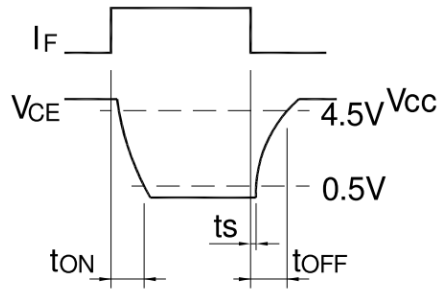
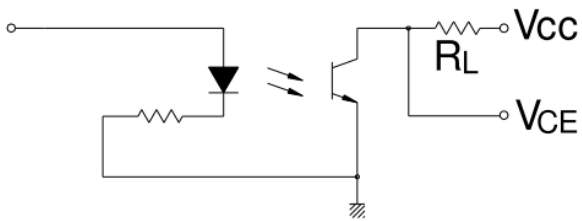


Fig 18 Switching Time vs  $T_A$



Switching Time Test Circuit

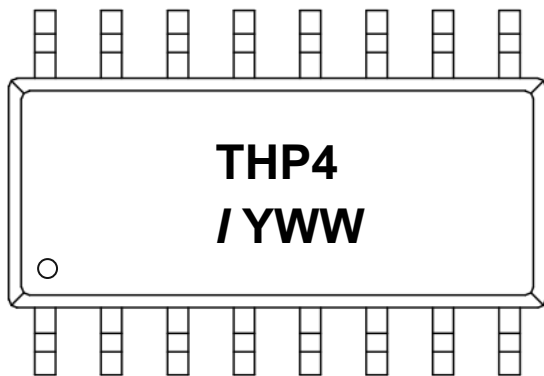
**TLP281- 4, TLP281- 4GB**

**ORDER INFORMATION**

UL Approval			
After PN	PN	Description	Packing quantity
None	TLP281-4, TLP281-4GB	Surface Mount Tape & Reel	2000 pcs per reel

**DEVICE MARKING**

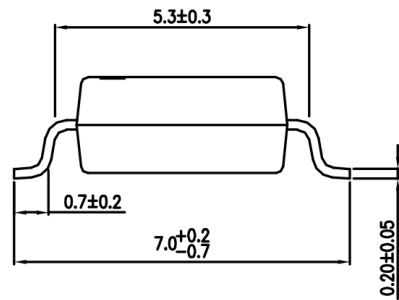
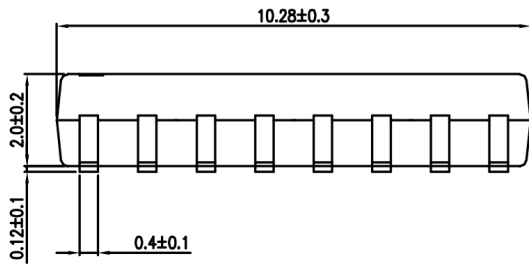
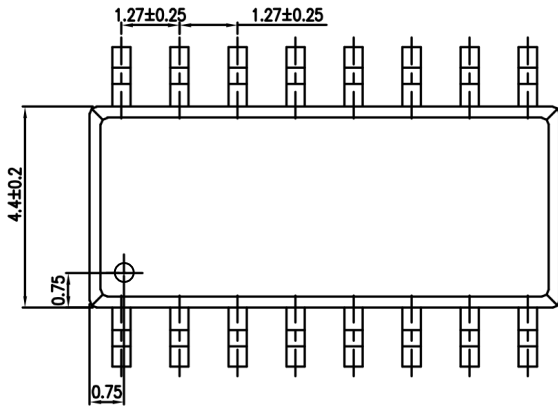
**Example : TLP281-4**



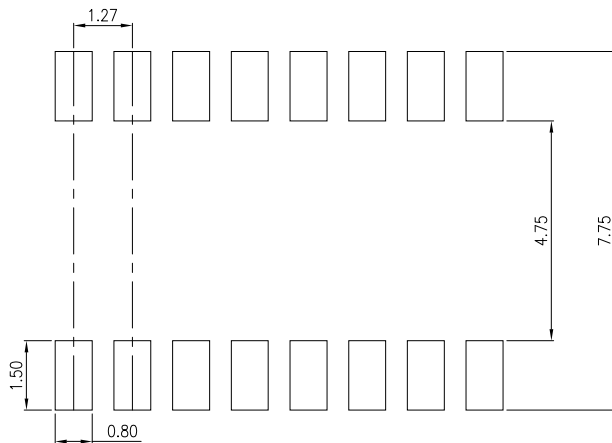
- THP4        denotes Device Part Number
- /            denotes Isocom
- Y            denotes 1 digit Year code
- WW         denotes 2 digit Week code

TLP281- 4, TLP281- 4GB

PACKAGE DIMENSIONS (mm)



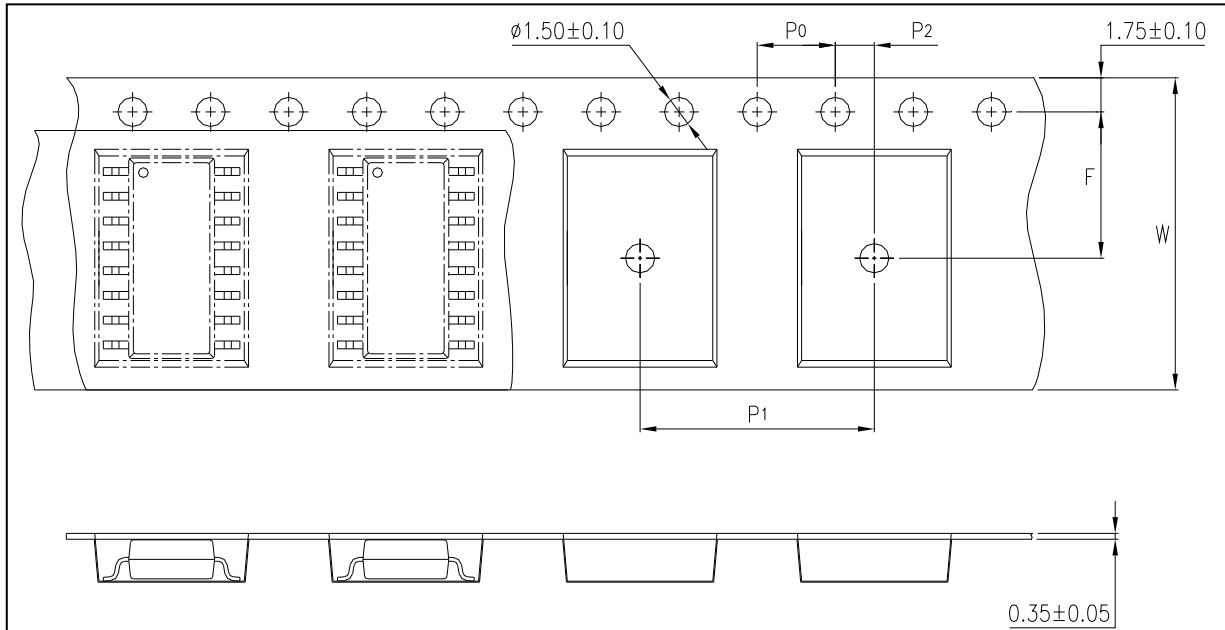
RECOMMENDED SOLDER PAD LAYOUT (mm)





## TLP281- 4, TLP281- 4GB

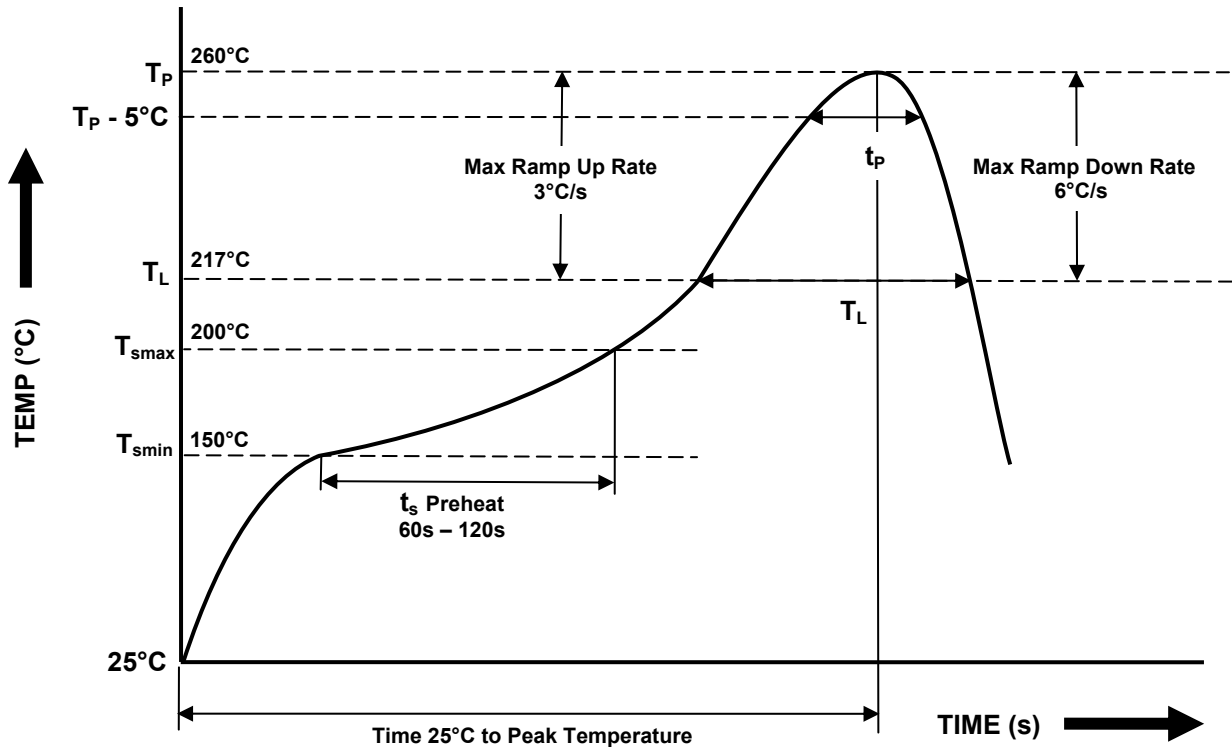
### TAPE AND REEL PACKAGING



Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	P <sub>0</sub>	4 ± 0.1 (0.15)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.295)
	P <sub>2</sub>	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P <sub>1</sub>	12 ± 0.1 (0.47)

## TLP281- 4, TLP281- 4GB

**IR REFLOW SOLDERING TEMPERATURE PROFILE**  
**One Time Reflow Soldering is Recommended.**  
**Do not immerse device body in solder paste.**



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 ( $T_P - 5^\circ\text{C}$ ) - 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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