ISP281

DESCRIPTION

The ISP281 series optocoupler each consists of an infrared emitting diode optically coupled to an NPN silicon photo transistor.

This device belongs to Isocom Compact Range of Optocouplers.

FEATURES

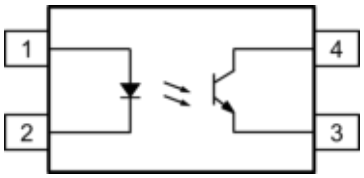
- Half Pitch 1.27mm
- CTR Selections Available
- Wide Operating Temperature Range - 55°C to +110°C
- High AC Isolation voltage 3750V_{RMS}
- Lead Free and RoHS Compliant
- Safety Approvals Pending

APPLICATIONS

- Switching Mode Power Supplies
- Computer Terminals
- Industrial System Controllers
- Measuring Instruments
- Signal Transmission between Systems of Differential Potentials and Impedances

ORDER INFORMATION

- Available in Tape and Reel with 3000 pieces per reel



1 Anode
2 Cathode
3 Emitter
4 Collector

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
Pulse Forward Current	1A
Reverse Voltage	6V
Power Dissipation	70mW
Junction Temperature	125°C

Output

Collector to Emitter Voltage V_{CEO}	80V
Emitter to Collector Voltage V_{ECO}	7V
Collector Current	50mA
Power Dissipation	150mW
Junction Temperature	125°C

Total Package

Isolation Voltage	3750V_{RMS}
Total Power Dissipation	200mW
Operating Temperature	-55 to 110°C
Storage Temperature	-55 to 150°C
Lead Soldering Temperature (10s)	260°C

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e-mail : sales@isocom.com.hk

ELECTRICAL CHARACTERISTICS (T_A = 25°C, unless otherwise specified. Typical Values at T_A = 25°C)

INPUT

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

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector-Emitter Breakdown Voltage	V_{CEO}	I_C = 0.1mA, I_F =0mA	80			V
Emitter-Collector Breakdown Voltage	V_{ECO}	I_E = 0.01mA, I_F = 0mA	7			V
Collector Dark Current	I_{CEO}	V_{CE} = 20V, I_F = 0mA			100	nA

ELECTRICAL CHARACTERISTICS (T_A = 25°C, unless otherwise specified. Typical Values at T_A = 25°C)

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Current Transfer Ratio	CTR	I_F = 5mA, V_{CE} = 5V				%
		ISP281	50		600	
		ISP281A	80		160	
		ISP281B	130		260	
		ISP281C	200		400	
		ISP281D	300		600	
		ISP281E	100		200	
		ISP281GR	100		300	
		ISP281GB	100		600	
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	I_F = 8mA, I_C = 2.4mA			0.4	V
Floating Capacitance	C_f	V = 0V, f = 1MHz		0.6	1	pF
Rise Time	t_r	V_{CC} = 10V, I_C = 2mA, R_L = 100Ω, f = 100Hz		2	18	µs
Fall Time	t_f			3	18	
Turn-On Time	t_{ON}			3		
Turn-Off Time	t_{OFF}			3		
Storage Time	t_S	V_{CC} = 5V, I_F = 16mA, R_L = 1.9kΩ		25		
Turn-On Time	t_{ON}			2		
Turn-Off Time	t_{OFF}			40		

Any grade of the ISP281 will satisfy the base ISP281 specification.
Grade B will satisfy the ISP281GR specification
Grade B / C / D / E will satisfy the ISP281GB specification

ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Isolation Voltage	V_{ISO}	R.H. = 40% to 60 %, t = 1 min	3750			V_{RMS}
Input - Output Resistance	R_{I-O}	V_{I-O} = 500VDC, R.H. = 40% to 60 %	5×10^{10}	1×10^{11}		Ω

Device is considered a two terminal device : pins 1 and 2 are shorted together and pins 3 and 4 are shorted together.

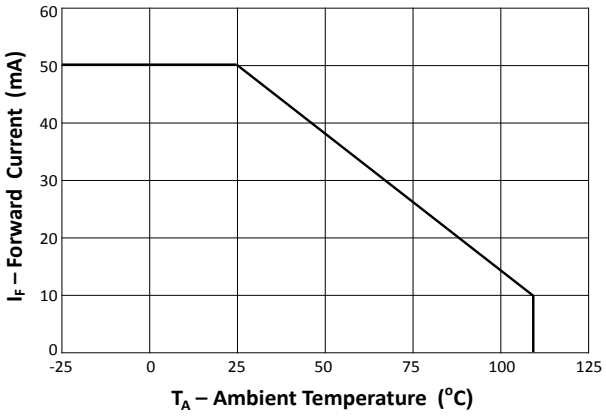


Fig 1 Forward Current vs Ambient Temperature

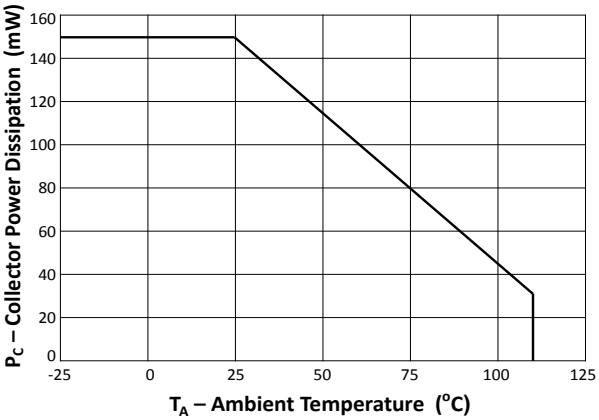


Fig 2 Collector Power vs Ambient Temperature

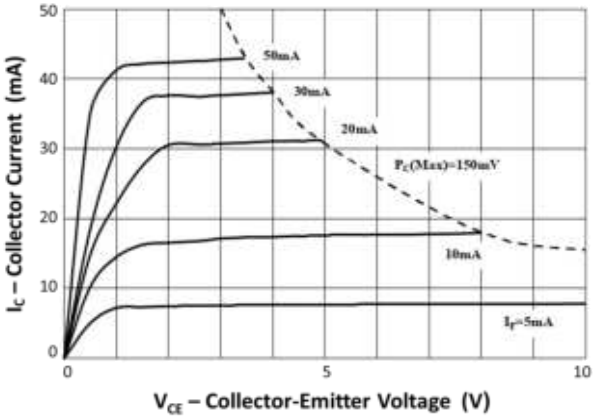


Fig 3 Collector Current vs Collector-Emitter Voltage (1)

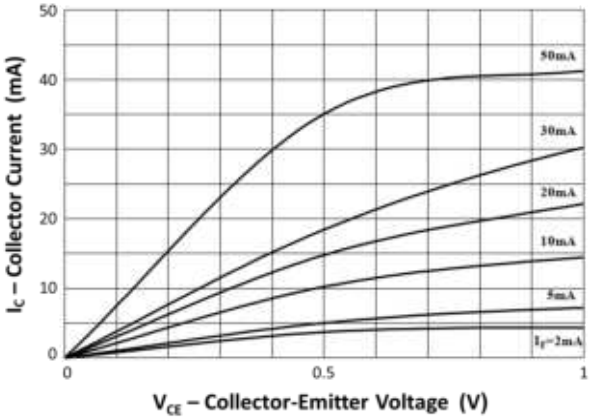


Fig 4 Collector Current vs Collector-Emitter Voltage (2)

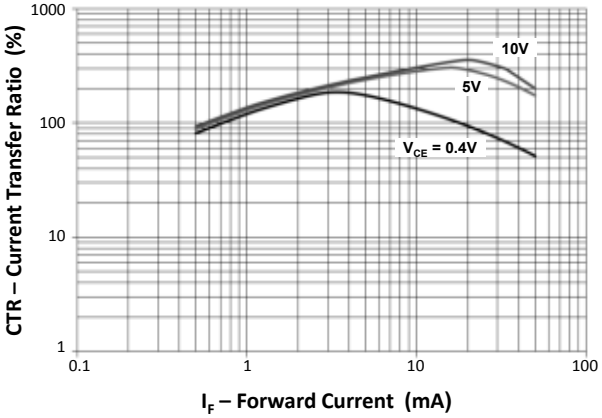


Fig 5 Current Transfer Ratio vs Forward Current

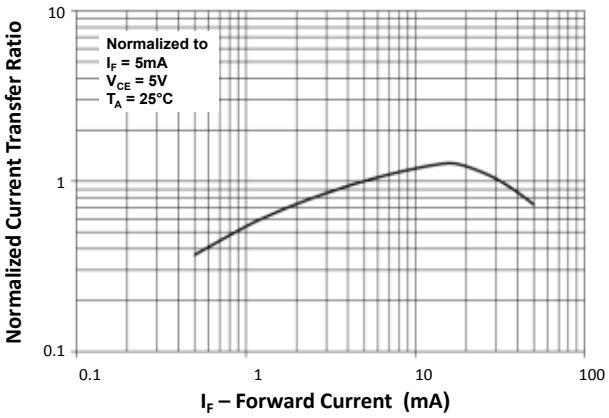


Fig 6 Normalized Current Transfer Ratio vs Forward Current

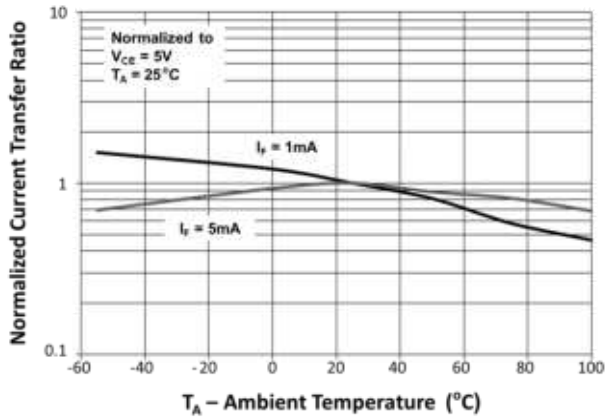


Fig 7 Normalized Current Transfer Ratio vs Ambient Temperature

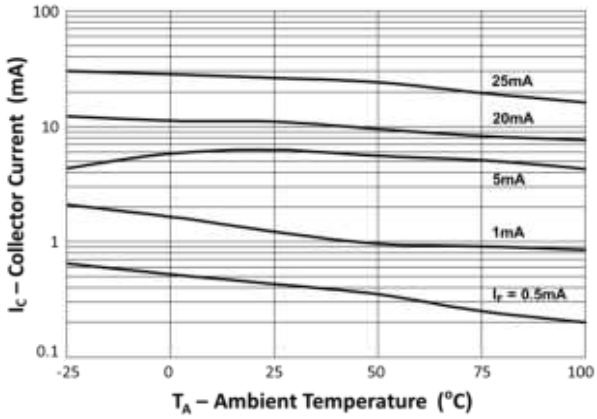


Fig 8 Collector Current vs Ambient Temperature

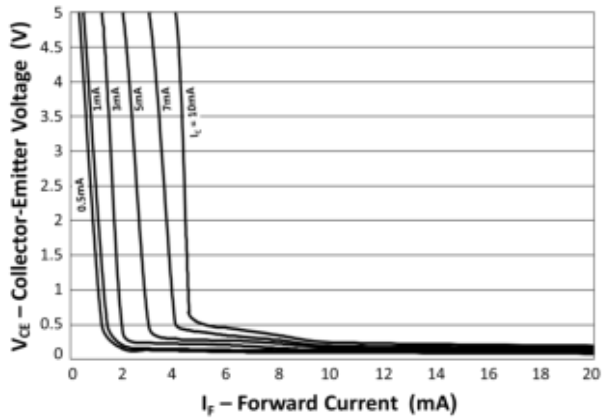


Fig 9 Collector-Emitter Voltage vs Forward Current

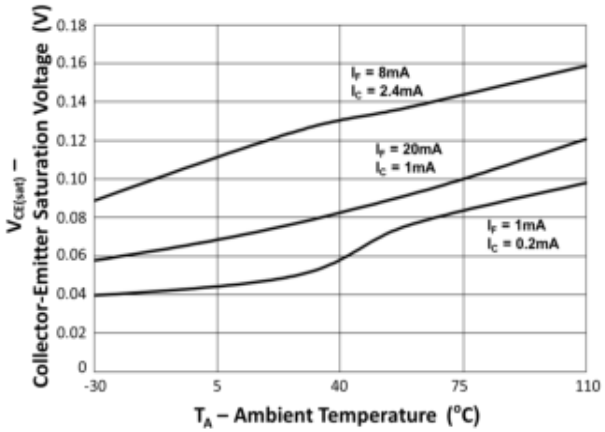


Fig 10 Collector-Emitter Saturation Voltage vs Ambient temperature

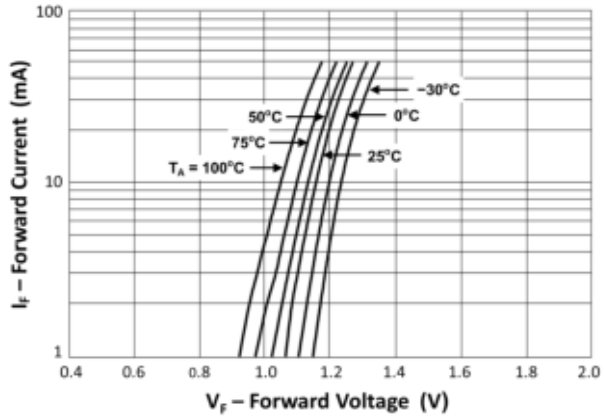


Fig 11 Forward Current vs Forward Voltage

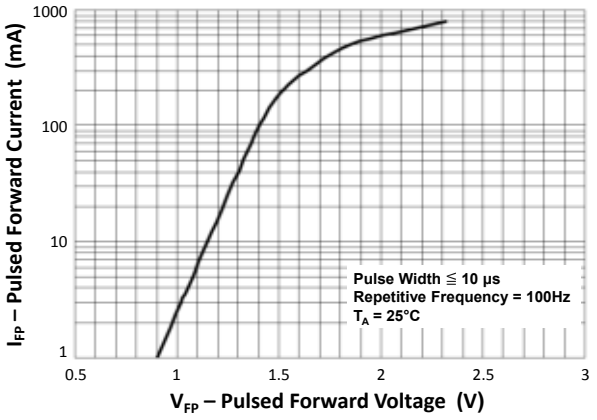


Fig 12 Pulsed Forward Current vs Pulsed Forward Voltage

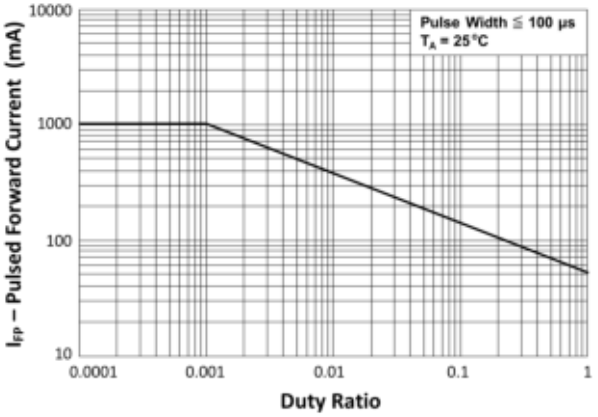


Fig 13 Pulsed Forward Current vs Duty Ratio

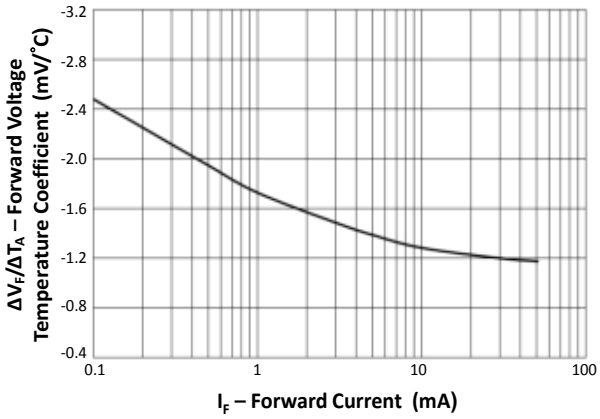


Fig 14 Forward Voltage Temperature Coefficient vs Forward Current

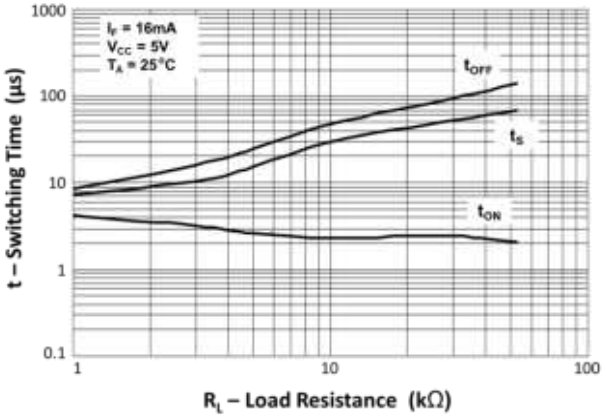


Fig 15 Switching Time vs Load Resistance

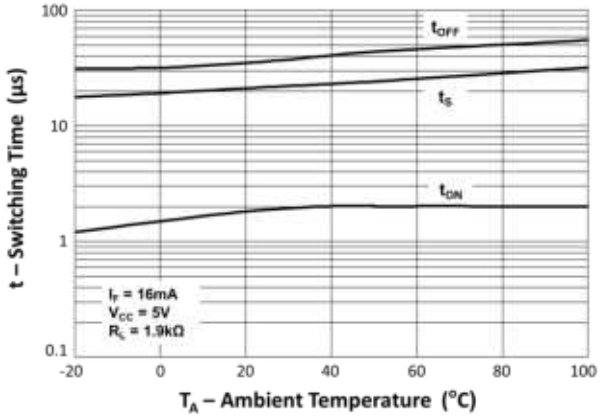


Fig 16 Switching Time vs Ambient temperature

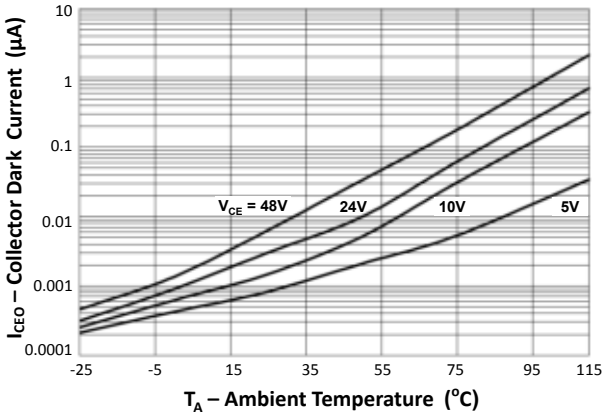


Fig 17 Collector Dark Current vs Ambient Temperature

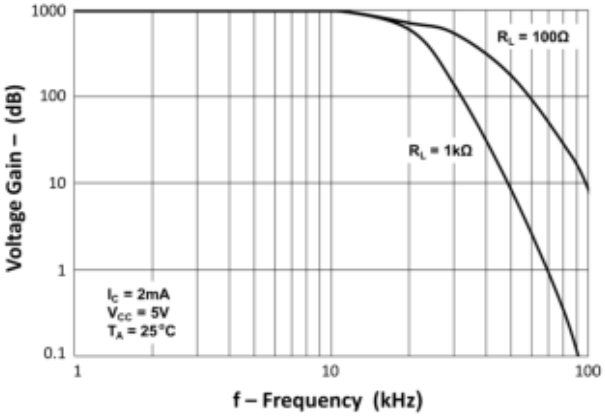
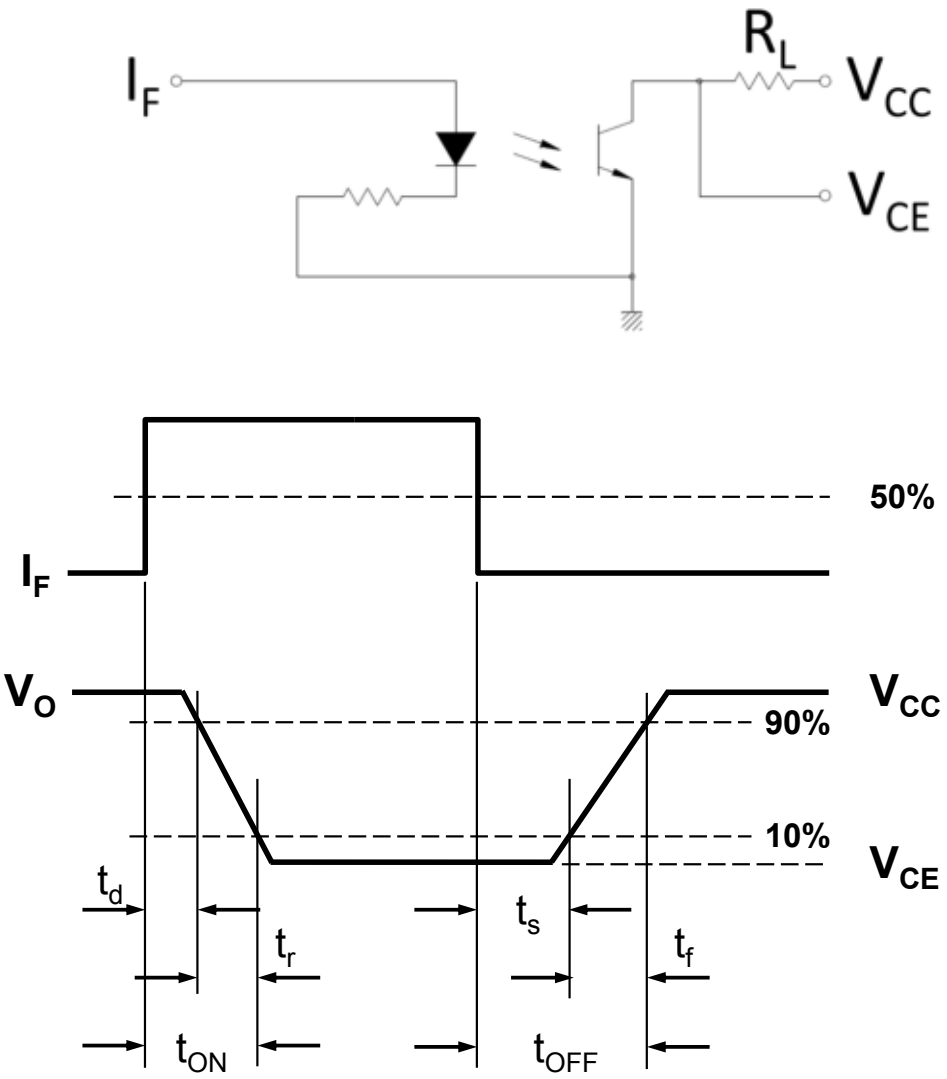


Fig 18 Frequency Response

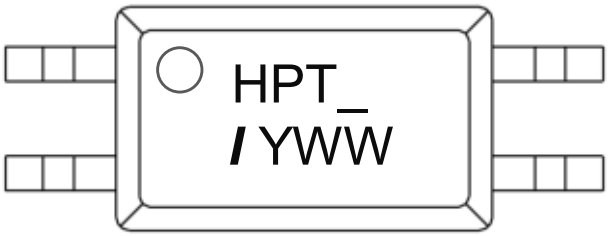


Switching Time Test Circuit and Waveform

ORDER INFORMATION

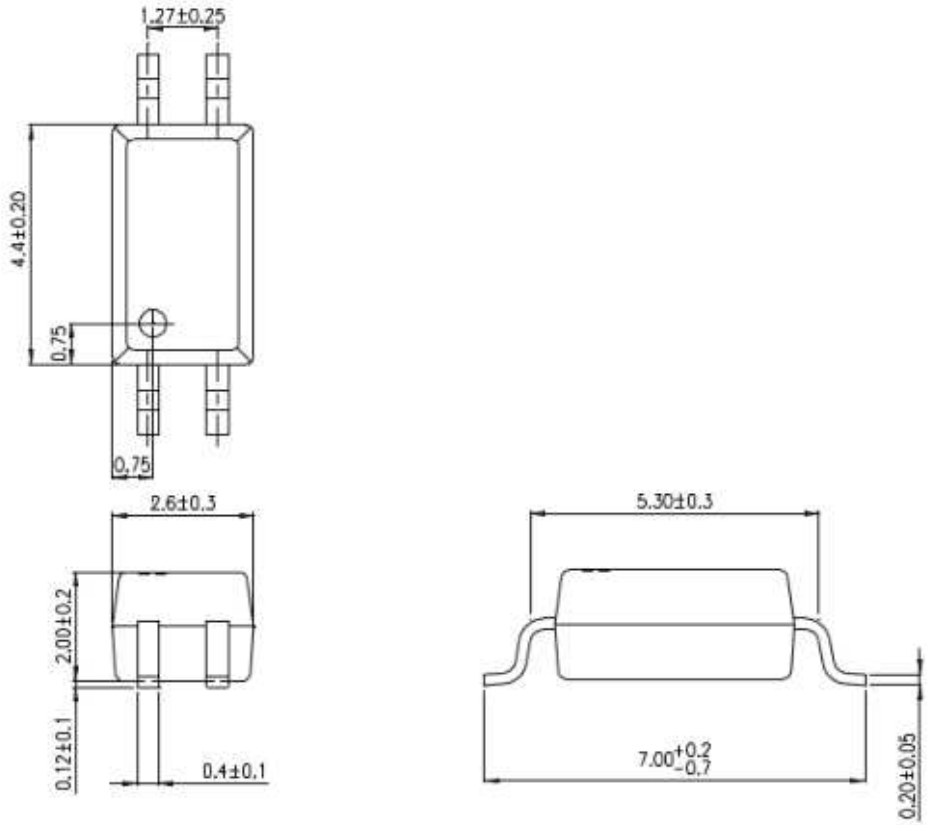
ISP281			
After PN	**PN**	**Description**	**Packing quantity**
None	ISP281	Surface Mount Tape and Reel	3000 pcs per reel
Any CTR Grades	ISP281A, ISP281B, ISP281C ISP281D, ISP281E ISP281GR, ISP281GB	Surface Mount Tape and Reel	3000 pcs per reel
NOTE : Multiple Grades may be supplied to meet the requested specification			

DEVICE MARKING

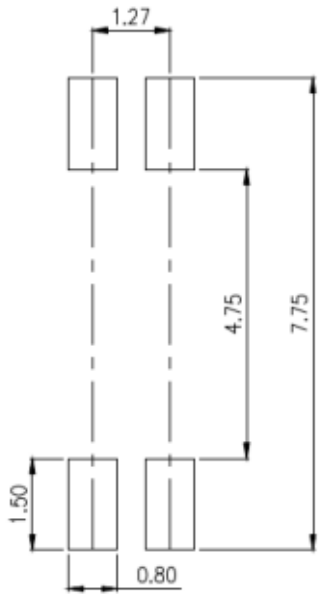


HPT_	denotes Device Part Number where "_" denotes CTR Grade
I	denotes Isocom
Y	denotes 1 digit Year code J = 2019, K = 2020 etc.
WW	denotes 2 digit Week code

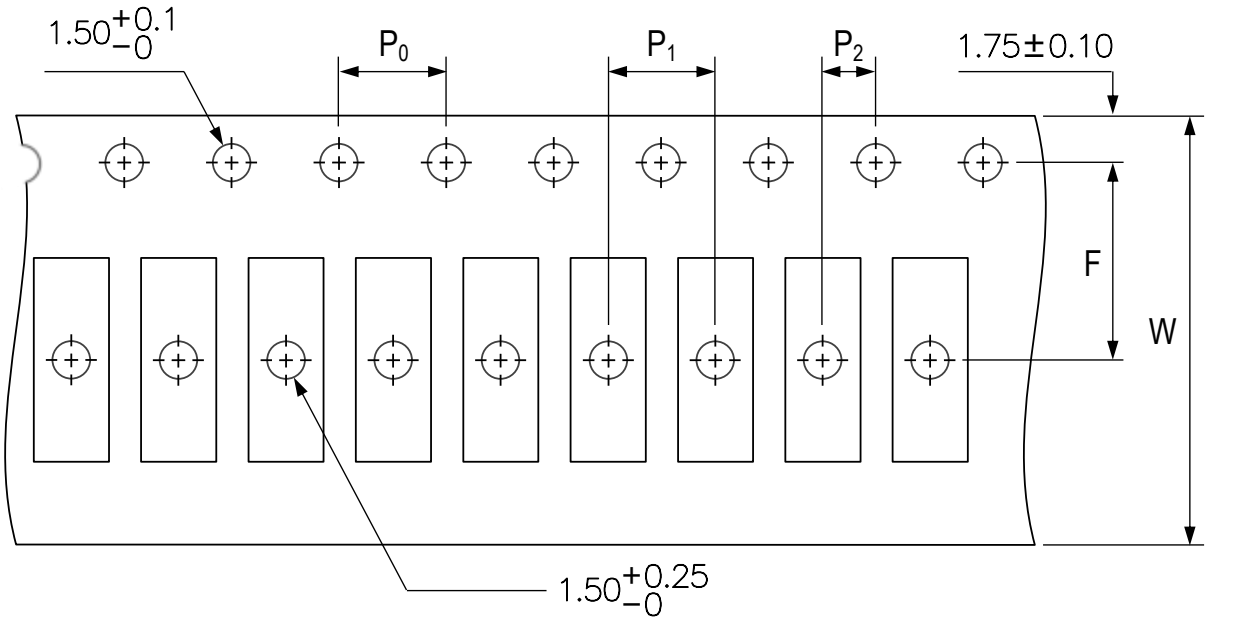
PACKAGE DIMENSIONS in mm

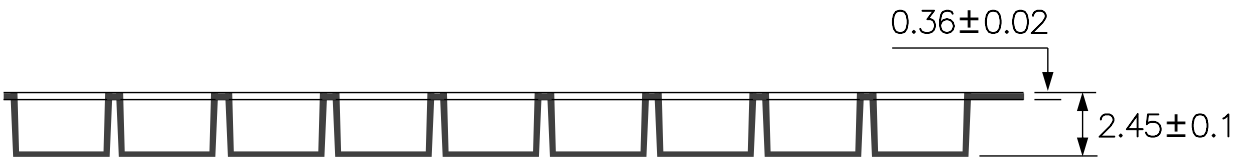


RECOMMENDED PAD LAYPUT FOR SMD (mm)



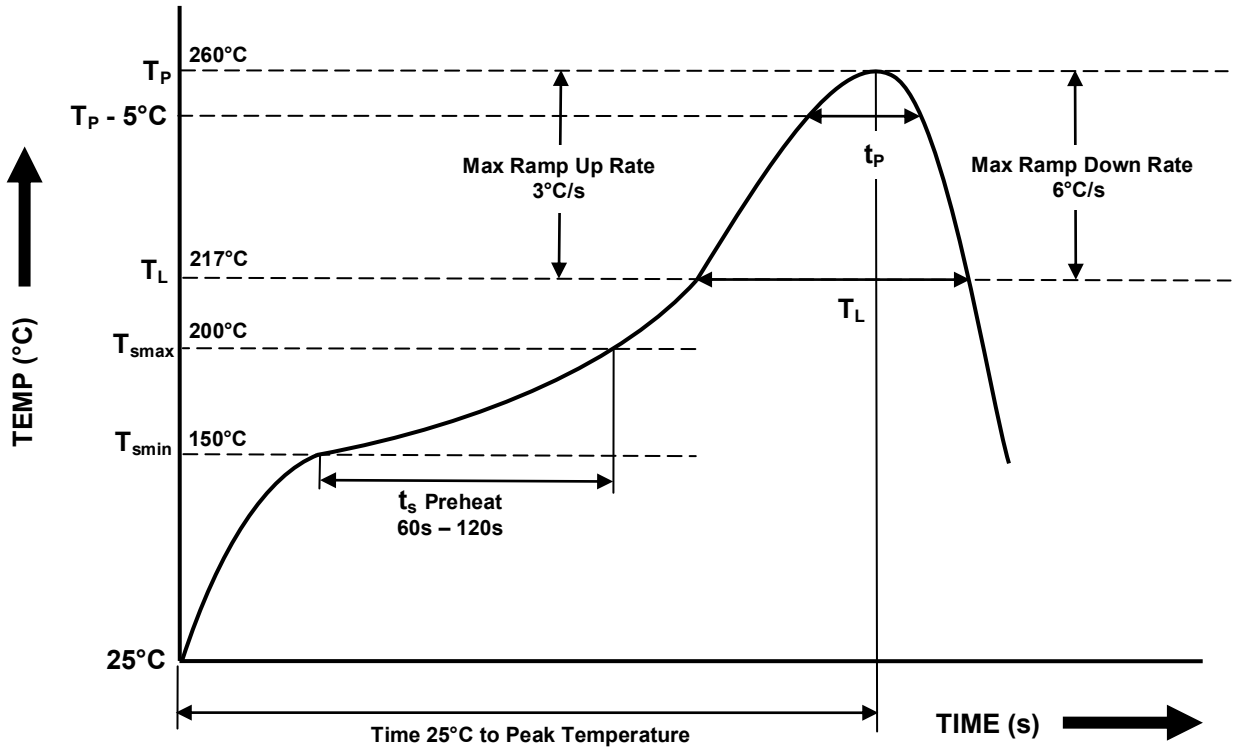
TAPE AND REEL PACKAGING (mm)





Description	Symbol	Dimension mm (inch)
Tape Width	W	16.00 ± 0.30 (0.63)
Pitch of Sprocket Holes	P_0	4.00 ± 0.10 (0.16)
Distance of Compartment to Sprocket Holes	F	7.50 ± 0.10 (0.30)
	P_2	2.00 ± 0.05 (0.079)
Distance of Compartment to Compartment	P_1	4.00 ± 0.10 (0.16)

IR REFLOW SOLDERING TEMPERATURE PROFILE
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

ISOCOM COMPONENTS

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