

IS121



DESCRIPTION

The IS121 series consists of an infrared light emitting diode optically coupled to an NPN silicon photo transistor in a space efficient Mini Flat Package.

FEATURES

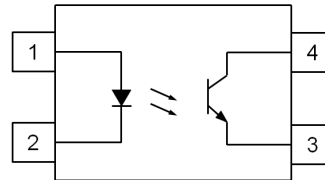
- Low Profile Package
- AC Isolation Voltage 3750V_{RMS}
- Wide Operating Temperature Range -55°C to +110°C
- RoHS Compliant
- UL File E91231 model "FPT1", "FPT2"

APPLICATIONS

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

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
Peak Forward Current (100µs, 100Hz)	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}	6V
Collector Current	50mA
Power Dissipation	150mW
Junction Temperature	125°C

Total Package

Isolation Voltage	3750V _{RMS}
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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IS121

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

INPUT

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

OUTPUT

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C = 0.1\text{mA}, I_F = 0\text{mA}$	80			V
Emitter-Collector Breakdown Voltage	BV_{ECO}	$I_E = 10\mu\text{A}, I_F = 0\text{mA}$	6			V
Collector-Emitter Dark Current	I_{CEO}	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$			100	nA

COUPLED

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Current Transfer Ratio	CTR	$I_F = 5\text{mA}, V_{CE} = 5\text{V}$	50		600	%
		Optional CTR Grades				
		IS121A	80		160	
		IS121B	130		260	
		IS121C	200		400	
IS121D	300		600			
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 20\text{mA}, I_C = 1\text{mA}$			0.2	V
Floating Capacitance	C_f	$V = 0\text{V}, f = 1\text{MHz}$		0.6	1	pF
Output Rise Time	t_r	$V_{CE} = 2\text{V}$ $I_C = 2\text{mA}$ $R_L = 100\Omega$		4	18	μs
Output Fall Time	t_f			3	18	μs

ISOLATION

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Isolation Voltage	V_{ISO}	$RH = 40\% \text{ to } 60\%, t = 1\text{min}$	3750			V_{RMS}
Isolation Resistance	R_{ISO}	$RH = 40\% \text{ to } 60\%$ $V_{L-O} = 500\text{VDC}$	5×10^{10}	1×10^{11}		Ω

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

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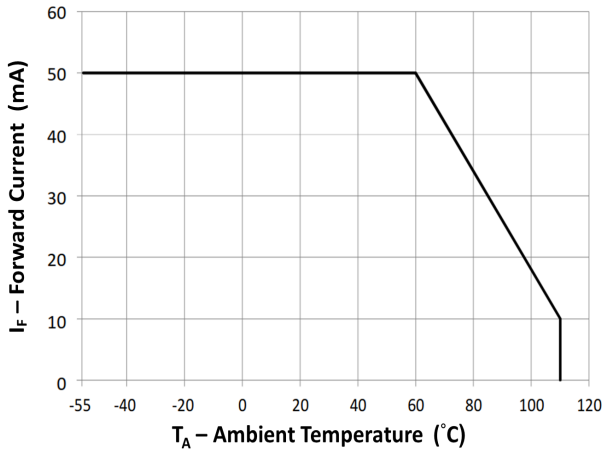


Fig 1 Forward Current vs Ambient Temperature

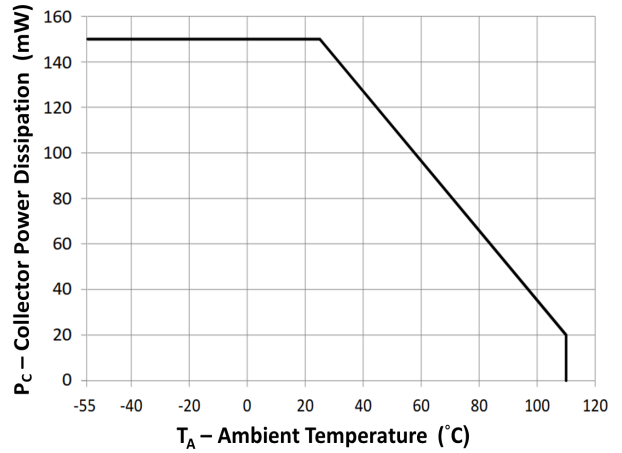


Fig 2 Collector Power Dissipation vs Ambient Temperature

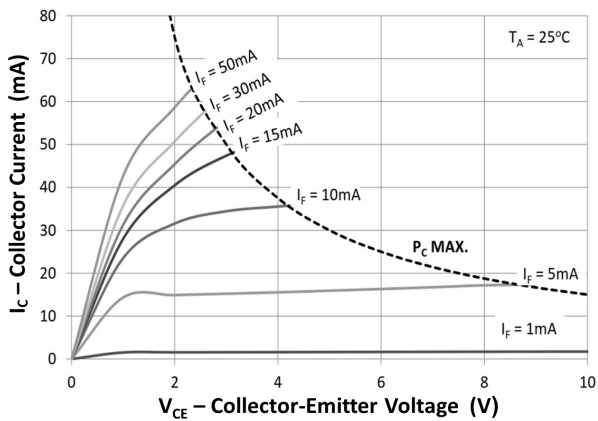


Fig 3 Collector Current vs Collector-Emitter Voltage

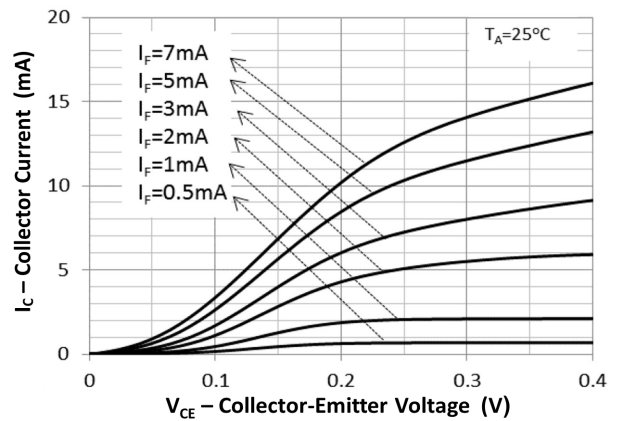


Fig 4 Collector Current vs Collector-Emitter Saturation Voltage

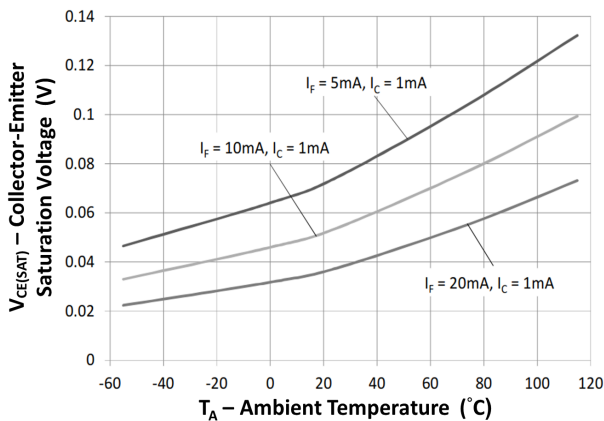


Fig 5 Collector-Emitter Saturation Voltage vs Ambient Temperature

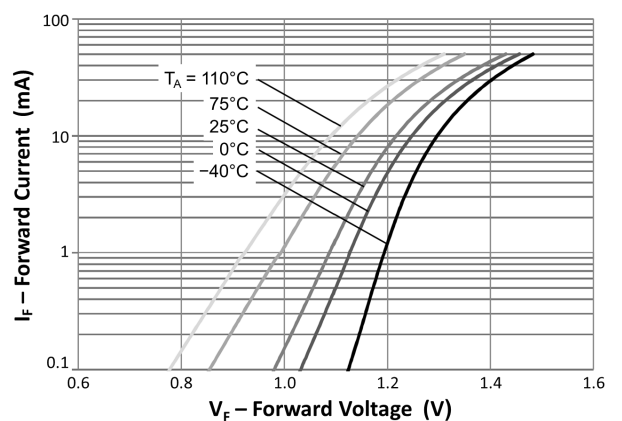


Fig 6 Forward Current vs Forward Voltage

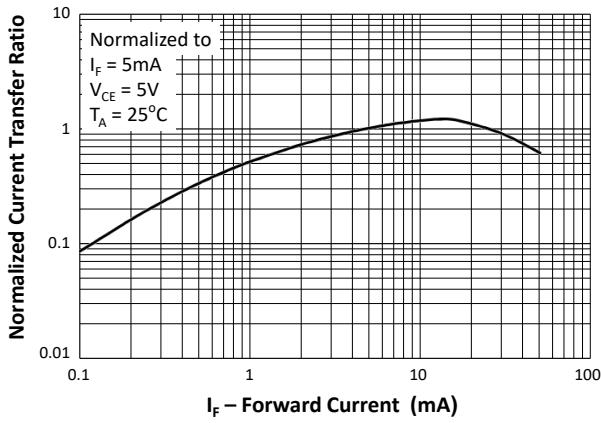


Fig 7 Normalized Current Transfer Ratio vs Forward Current

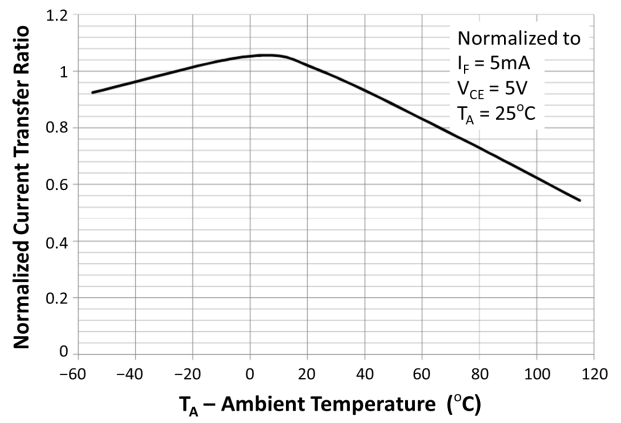


Fig 8 Normalized Current Transfer Ratio vs Ambient Temperature

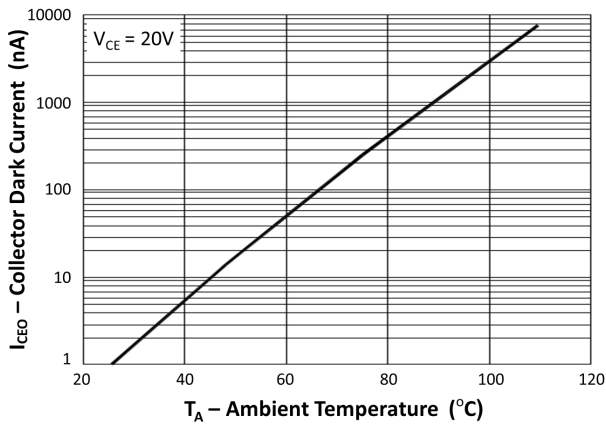


Fig 9 Collector Dark Current vs Ambient Temperature

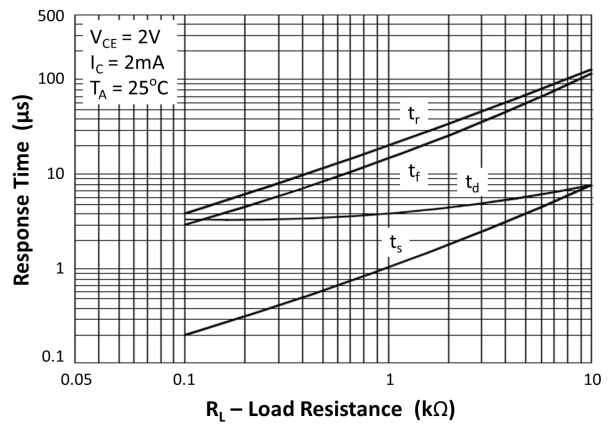


Fig 10 Response Time vs Load Resistance

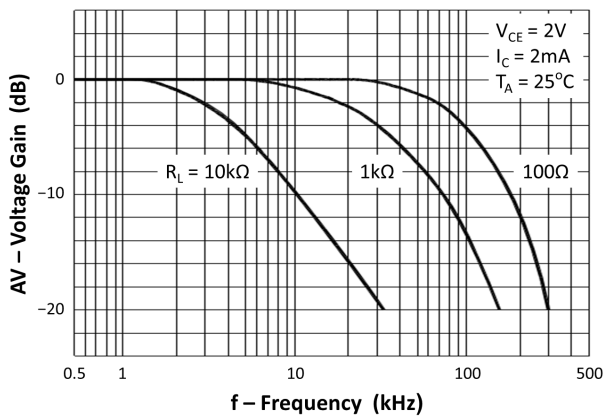
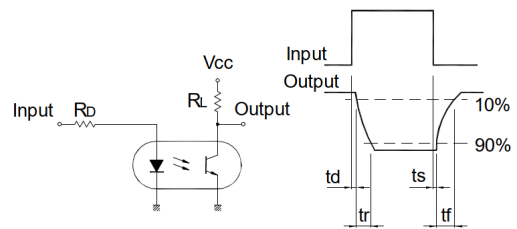
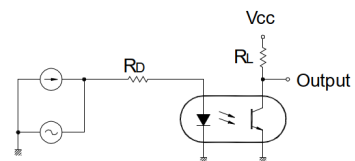


Fig 11 Frequency Response



Response Time Test Circuit



Frequency Response Test Circuit

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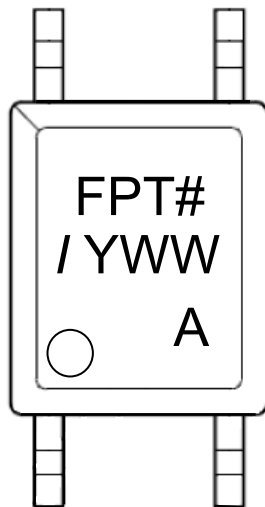
ORDER INFORMATION

IS121			
After PN	PN	Description	Packing quantity
None	IS121	Surface Mount Tape & Reel	3000 pcs per reel
Any CTR Grade	IS121A, IS121B IS121C, IS121D	Surface Mount Tape & Reel	3000 pcs per reel

NOTE : Multiple Grades may be supplied to meet the requested specification.

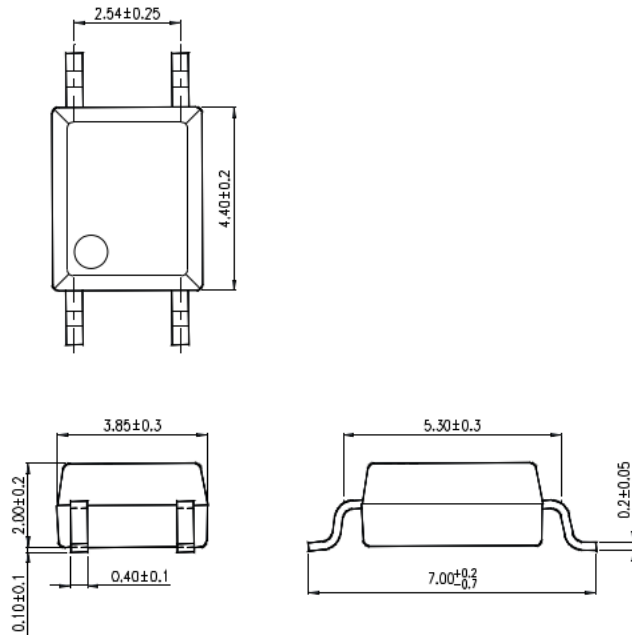
DEVICE MARKING

Example : IS121A

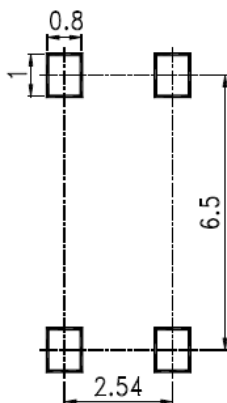


- FPT# Device Part Number where “#” is internal control number which can be “1” or ‘2”
- A CTR Grade
- / Isocom
- Y 1 digit Year code
- WW 2 digit Week code

PACKAGE DIMENSIONS (mm)

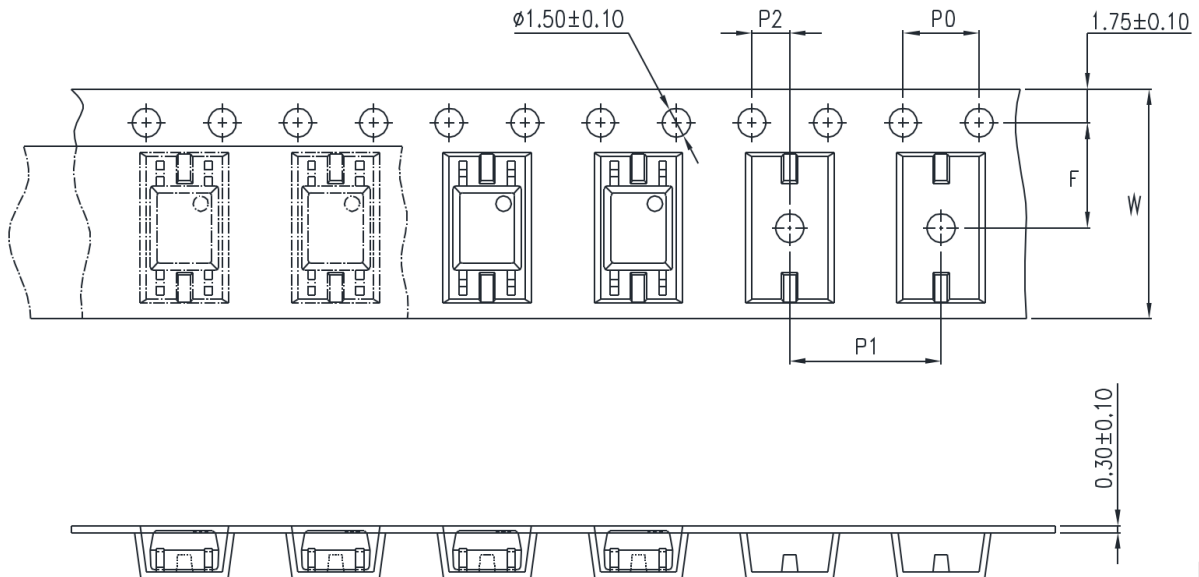


RECOMMENDED SOLDER PAD LAYOUT (mm)



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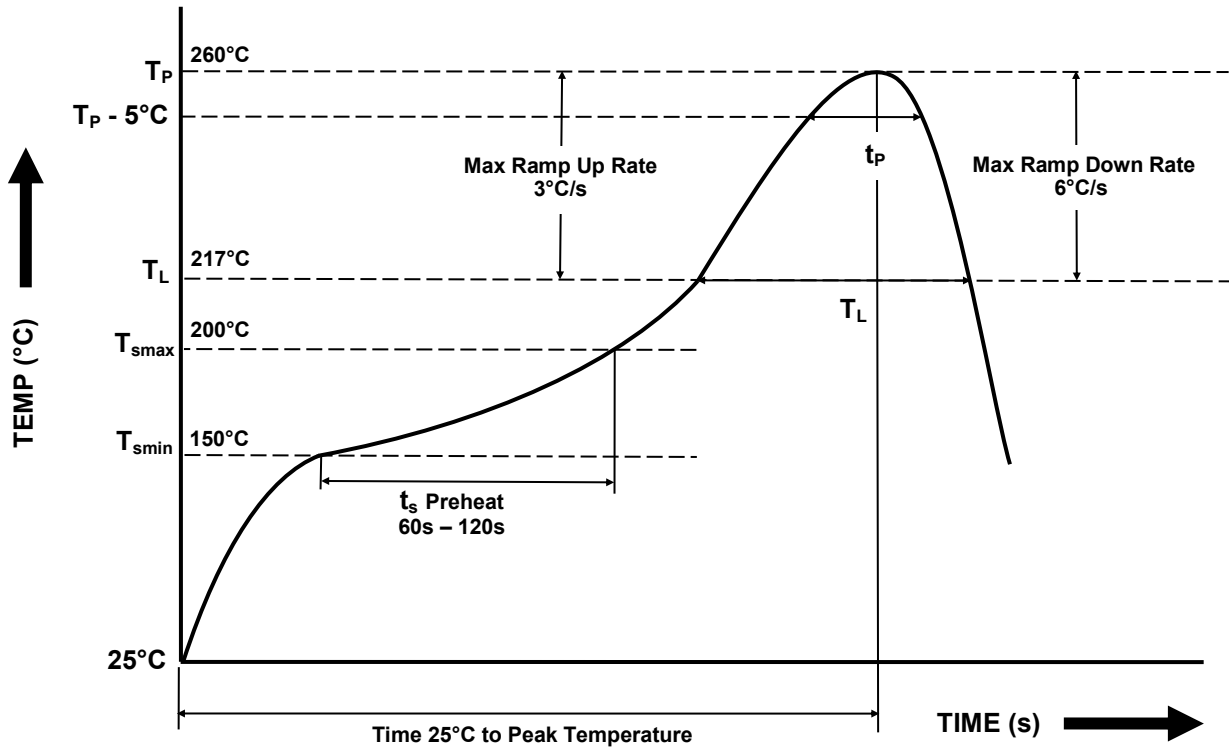
TAPE AND REEL PACKAGING



Description	Symbol	Dimension mm (inch)
Tape Width	W	12 ± 0.3 (0.47)
Pitch of Sprocket Holes	P ₀	4 ± 0.1 (0.157)
Distance of Compartment to Sprocket Holes	F	5.5 ± 0.1 (0.217)
	P ₂	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P ₁	8 ± 0.1 (0.315)



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 ($T_P - 5^\circ C$) - 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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