

HMA121A

HMA121B

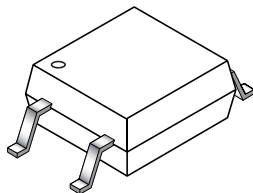
HMA121C

DESCRIPTION

The HMA121X series consists of a gallium arsenide infrared emitting diode driving a silicon phototransistor in a compact 4-pin mini-flat package. The lead pitch is 2.54 mm.

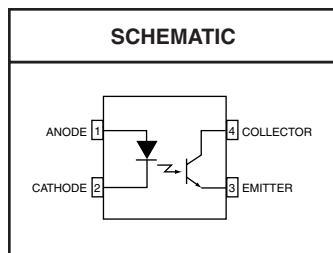
FEATURES

- Compact 4-pin package (2.4 mm maximum standoff height)
- Current Transfer Ratio: in selected groups
HMA121A: 100-300%
HMA121B 50-150%
HMA121C: 100-200%
- Available in tape and reel quantities of 500 and 2500.
- Applicable to Infrared Ray reflow (230°C max, 30 seconds.)
- U.L. (File # E90700), CSA (82858) and BSI (8611/8612) certified
- VDE certified (option V)
- Creepage $\geq$ 5 mm, typical 5.2 mm
- Clearance $\geq$ 5 mm, typical 5.2 mm

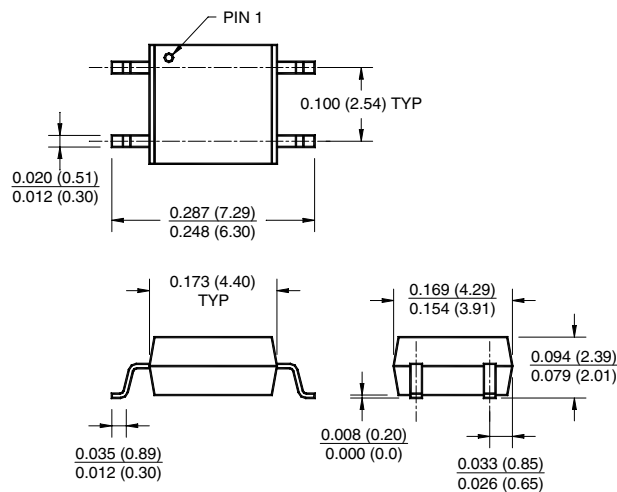


APPLICATIONS

- Digital logic inputs
- Microprocessor inputs
- Power supply monitor
- Twisted pair line receiver
- Telephone line receiver



Package Dimensions



NOTE

All dimensions are in inches (millimeters)

ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Value	Units
TOTAL PACKAGE			
Storage Temperature	T _{STG}	-55 to +150	°C
Operating Temperature	T _{OPR}	-55 to +100	°C
EMITTER			
Continuous Forward Current	I _F (avg)	50	mA
Peak Forward Current (1 μs pulse, 300 pps.)	I _F (pk)	1	A
Reverse Input Voltage	V _R	6	V
Power Dissipation	P _D	70	mW
Derate linearly (above 25°C)		0.65	mW/°C
DETECTOR			
Continuous Collector Current		80	mA
Power Dissipation	P _D	150	mW
Derate linearly (above 25°C)		2.0	mW/°C
Collector-Emitter Voltage	V _{CEO}	80	V
Emitter-Collector Voltage	V _{ECO}	7	V

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)							
INDIVIDUAL COMPONENT CHARACTERISTICS							
Parameter	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
EMITTER							
Forward Voltage	($I_F = 10\text{ mA}$)	V_F	ALL	1.0		1.3	V
Reverse Current	($V_R = 5\text{ V}$)	I_R	ALL			5	μA
DETECTOR							
Breakdown Voltage Collector to Emitter	($I_C = 1\text{ mA}$, $I_F = 0$)	BV_{CEO}	ALL	80			V
Emitter to Collector	($I_E = 100\text{ }\mu\text{A}$, $I_F = 0$)	BV_{ECO}	All	7			
Collector Dark Current	($V_{CE} = 40\text{ V}$, $I_F = 0$)	I_{CEO}	All			100	nA
Capacitance	($V_{CE} = 0\text{ V}$, $f = 1\text{ MHz}$)	C_{CE}	All		10		pF

TRANSFER CHARACTERISTICS ($T_A = 25^\circ\text{C}$)							
Characteristic	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
DC Current Transfer Ratio	($I_F = 5\text{ mA}$, $V_{CE} = 5\text{ V}$)	CTR	HMA121A	100		300	%
			HMA121B	50		150	
			HMA121C	100		200	
Saturation Voltage	($I_F = 8\text{ mA}$, $I_C = 2.4\text{ mA}$)	$V_{CE(SAT)}$	ALL			0.4	V
Rise Time (Non-Saturated)	($I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$) ($R_L = 100\Omega$)	t_r	ALL		3		μs
Fall Time (Non-Saturated)	($I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$) ($R_L = 100\Omega$)	t_f	ALL		3		

ISOLATION CHARACTERISTICS							
Characteristic	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
Steady State Isolation Voltage	(1 Minute)	V_{ISO}	All	3750			VRMS

** All typicals at $T_A = 25^\circ\text{C}$

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TYPICAL PERFORMANCE CURVES

Fig. 1 Forward Current vs. Forward Voltage

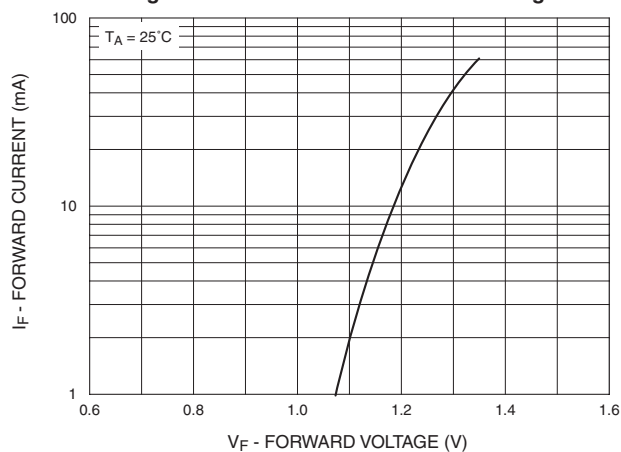


Fig. 2 Collector Current vs. Forward Current

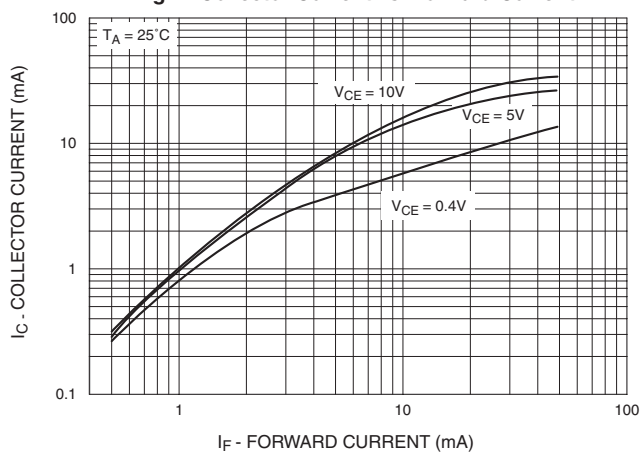


Fig. 3 Current Transfer Ratio vs. Forward Current

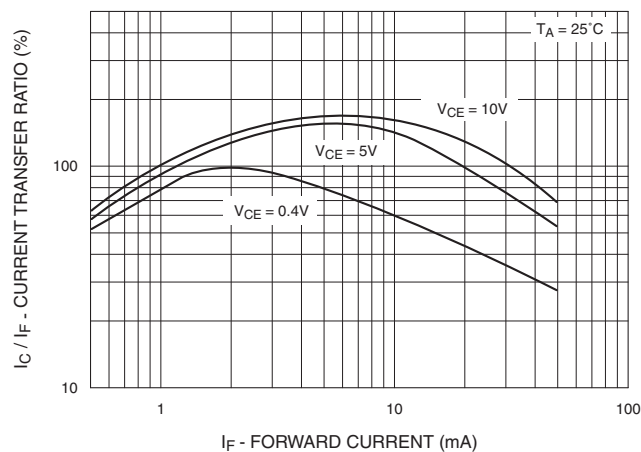


Fig. 4 Collector Current vs. Temperature

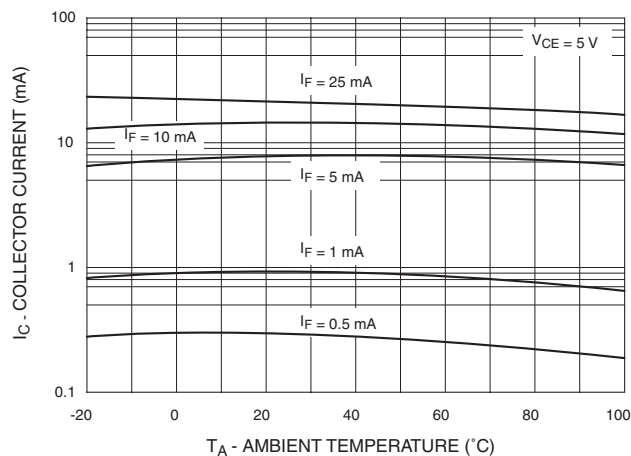
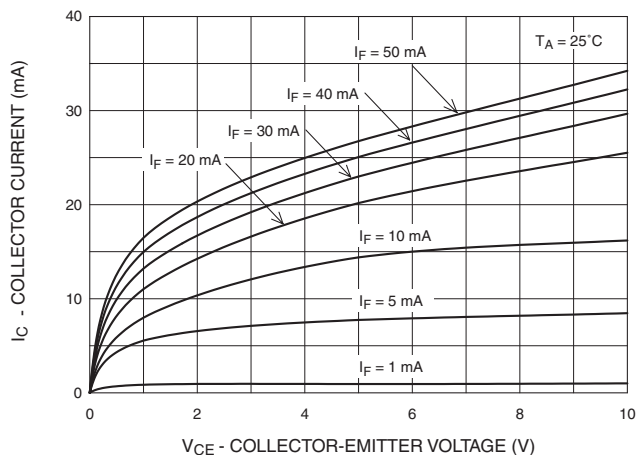


Fig. 5 Collector Current vs. Collector-Emitter Voltage



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Fig. 6 Collector Current vs. Collector-Emitter Voltage

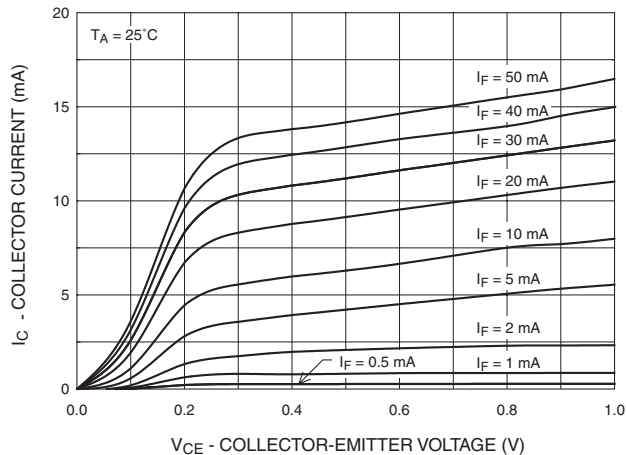


Fig. 7 Collector Dark Current vs. Temperature

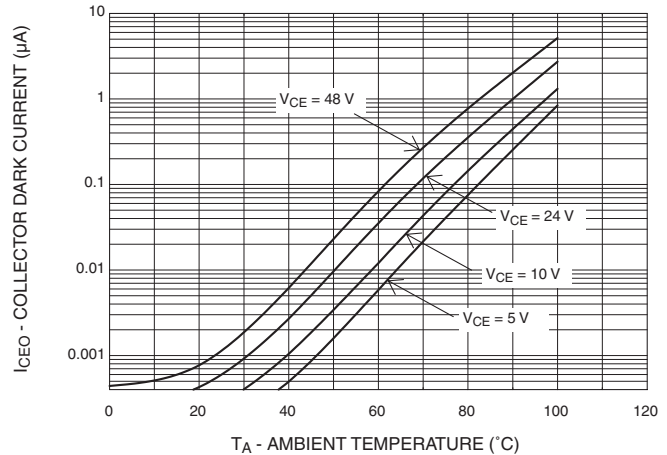


Fig. 8 Switching Time vs. Load Resistance

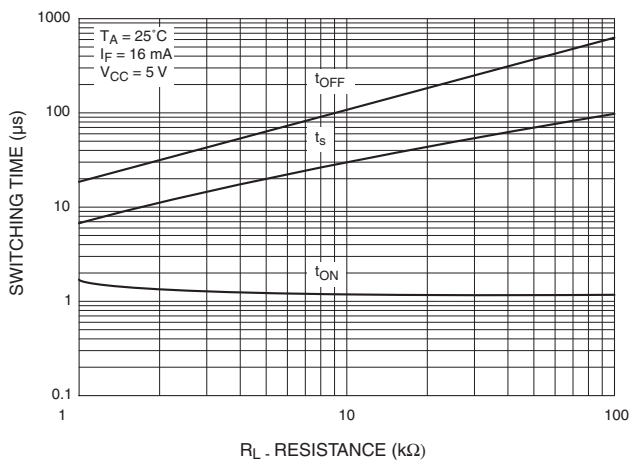
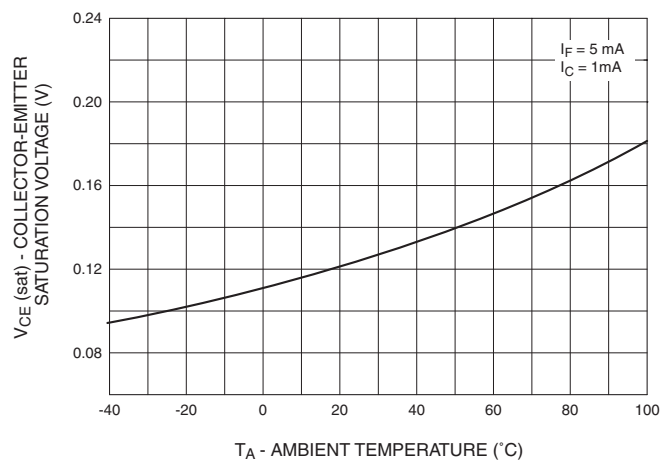


Fig. 9 Collector-Emitter Saturation Voltage vs. Temperature



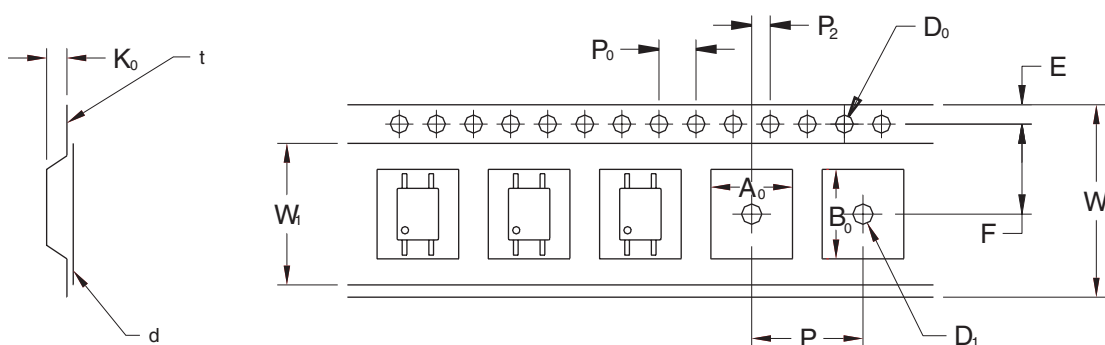
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ORDERING INFORMATION

Option	Description
R1	Tape and Reel (500 Units)
R2	Tape and Reel (2500 Units)



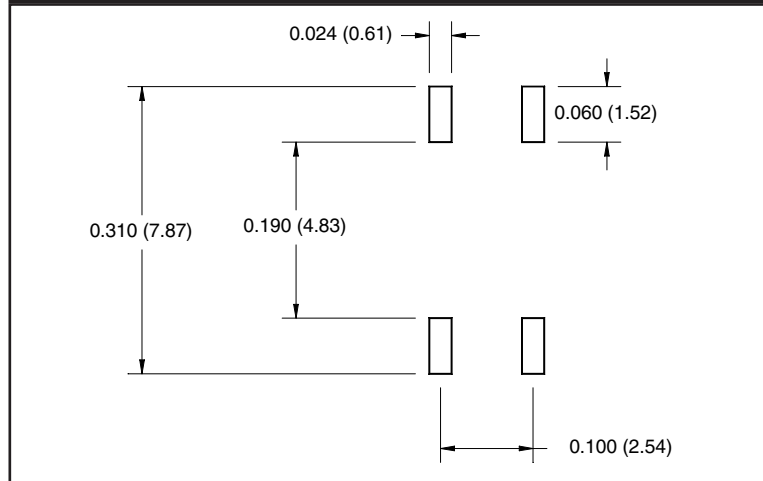
		2.54 Pitch
Description	Symbol	Dimensions (mm)
Tape Width	W	12.00±0.4
Tape Thickness	t	0.30±0.20
Sprocket Hole Pitch	P ₀	4.00±0.20
Sprocket Hole Dia.	D ₀	1.55±0.20
Sprocket Hole Location	E	1.75±0.20
Pocket Location	F	5.50±0.20
	P ₂	2.00±0.20
Pocket Pitch	P	8.00±0.20
Pocket Dimension	A ₀	4.40±0.20
	B ₀	7.30±0.20
	K ₀	2.30±0.20
Pocket Hole Dia.	D ₁	1.55±0.20
Cover Tape Width	W _t	9.20
Cover Tape Thickness	d	0.065±0.02
Max. Component Rotation or Tilt		20° max
Devices Per Reel	R1	500
	R2	2500
Reel Diameter	R1	178 mm (7")
	R2	330 mm (13")

HMA121A

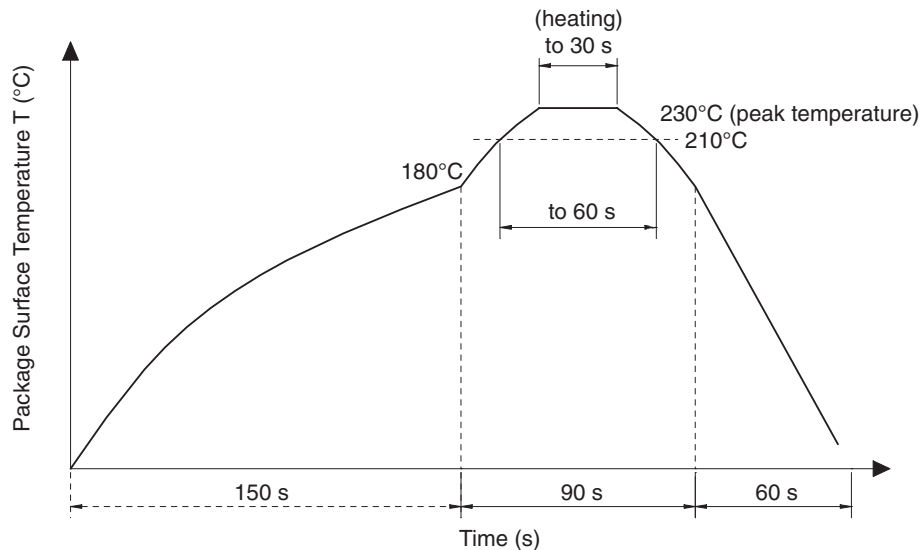
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Footprint Drawing for PCB Layout



Recommended Infrared Reflow Soldering Profile



- Peak reflow temperature: 230°C (package surface temperature) for 30 seconds
- Time of temperature higher than 210°C: 60 seconds or less
- One time soldering reflow is recommended

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