

**HMA121A**

**HMA121B**

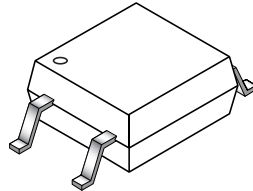
**HMA121C**

**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.

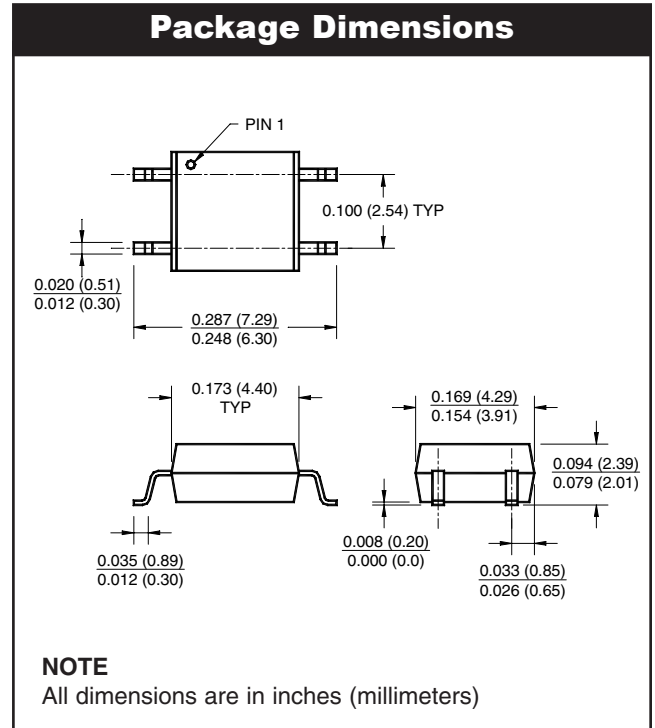
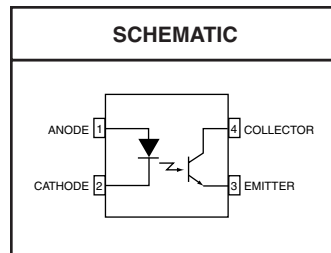
**FEATURES**

- 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 ≥ 5 mm, typical 5.2 mm
- Clearance ≥ 5 mm, typical 5.2 mm



**APPLICATIONS**

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



<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_A = 25^\circ\text{C}$ unless otherwise specified)			
Parameter	Symbol	Value	Units
<b>TOTAL PACKAGE</b>			
Storage Temperature	$T_{STG}$	-55 to +150	°C
Operating Temperature	$T_{OPR}$	-55 to +100	°C
<b>EMITTER</b>			
Continuous Forward Current	$I_F$ (avg)	50	mA
Peak Forward Current (1 $\mu\text{s}$ 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
<b>DETECTOR</b>			
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

**HMA121A**
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ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25°C)							
INDIVIDUAL COMPONENT CHARACTERISTICS							
Parameter	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
<b>EMITTER</b>							
Forward Voltage	(I <sub>F</sub> = 10 mA)	V <sub>F</sub>	ALL	1.0		1.3	V
Reverse Current	(V <sub>R</sub> = 5 V)	I <sub>R</sub>	ALL			5	μA
<b>DETECTOR</b>							
Breakdown Voltage Collector to Emitter	(I <sub>C</sub> = 1 mA, I <sub>F</sub> = 0)	BV <sub>CEO</sub>	ALL	80			V
Emitter to Collector	(I <sub>E</sub> = 100 μA, I <sub>F</sub> = 0)	BV <sub>ECO</sub>	All	7			
Collector Dark Current	(V <sub>CE</sub> = 40 V, I <sub>F</sub> = 0)	I <sub>CEO</sub>	All			100	nA
Capacitance	(V <sub>CE</sub> = 0 V, f = 1 MHz)	C <sub>CE</sub>	All		10		pF

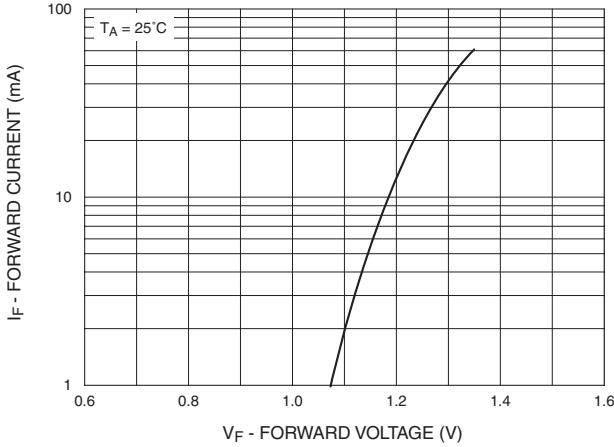
TRANSFER CHARACTERISTICS (T <sub>A</sub> = 25°C)							
Characteristic	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
DC Current Transfer Ratio	(I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V)	CTR	HMA121A	100		300	%
			HMA121B	50		150	
			HMA121C	100		200	
Saturation Voltage	(I <sub>F</sub> = 8 mA, I <sub>C</sub> = 2.4 mA)	V <sub>CE (SAT)</sub>	ALL			0.4	V
Rise Time (Non-Saturated)	(I <sub>C</sub> = 2 mA, V <sub>CE</sub> = 5 V) (R <sub>L</sub> = 100Ω)	t <sub>r</sub>	ALL		3		μs
Fall Time (Non-Saturated)	(I <sub>C</sub> = 2 mA, V <sub>CE</sub> = 5 V) (R <sub>L</sub> = 100Ω)	t <sub>f</sub>	ALL		3		

ISOLATION CHARACTERISTICS							
Characteristic	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
Steady State Isolation Voltage	(1 Minute)	V <sub>ISO</sub>	All	3750			VRMS

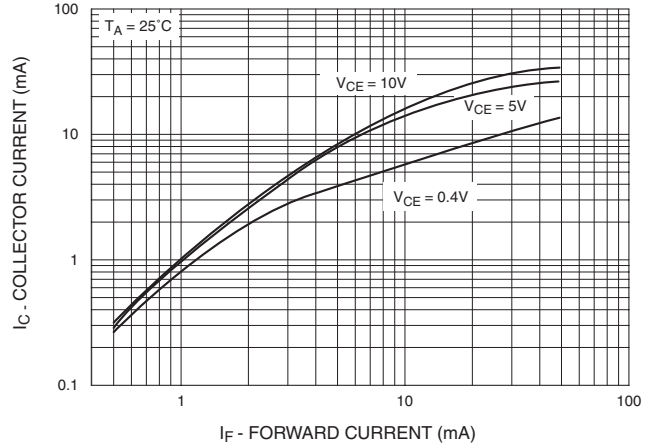
 \*\* All typicals at T<sub>A</sub> = 25°C

**TYPICAL PERFORMANCE CURVES**

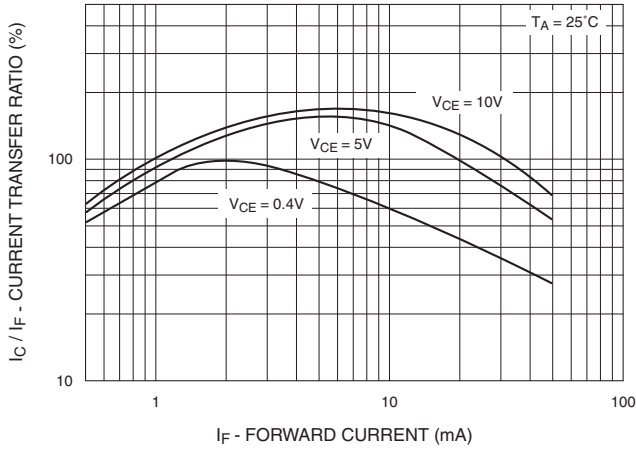
**Fig. 1 Forward Current vs. Forward Voltage**



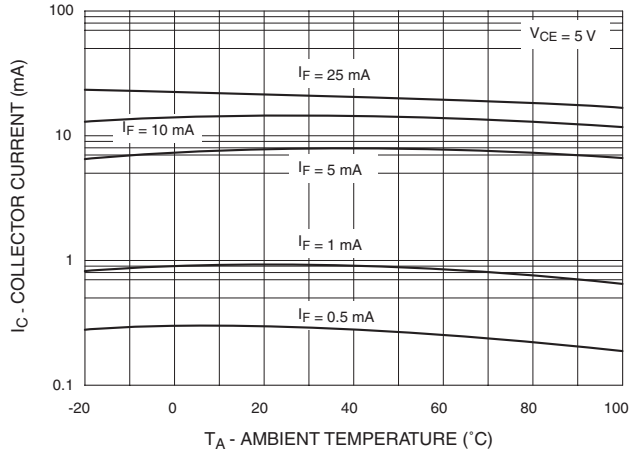
**Fig. 2 Collector Current vs. Forward Current**



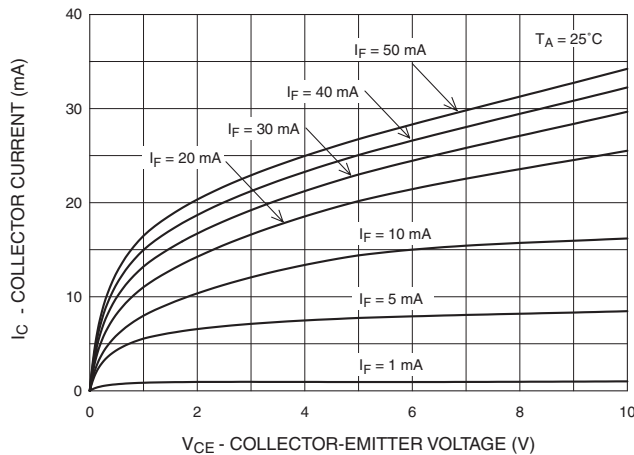
**Fig. 3 Current Transfer Ratio vs. Forward Current**



**Fig. 4 Collector Current vs. Temperature**



**Fig. 5 Collector Current vs. Collector-Emitter Voltage**

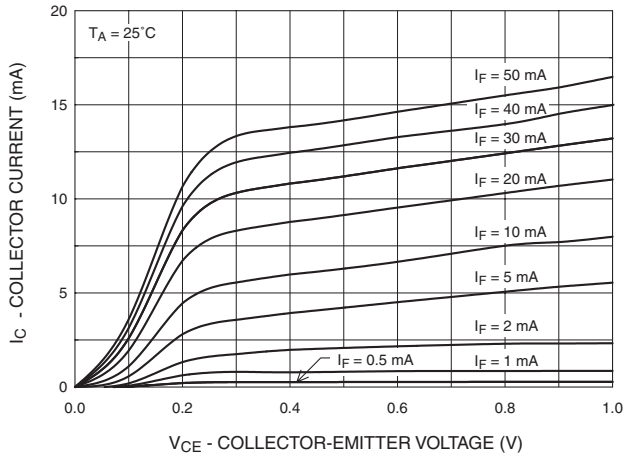


HMA121A

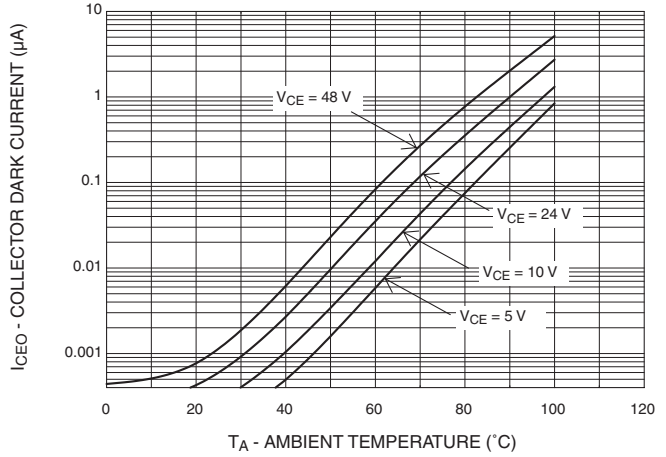
HMA121B

HMA121C

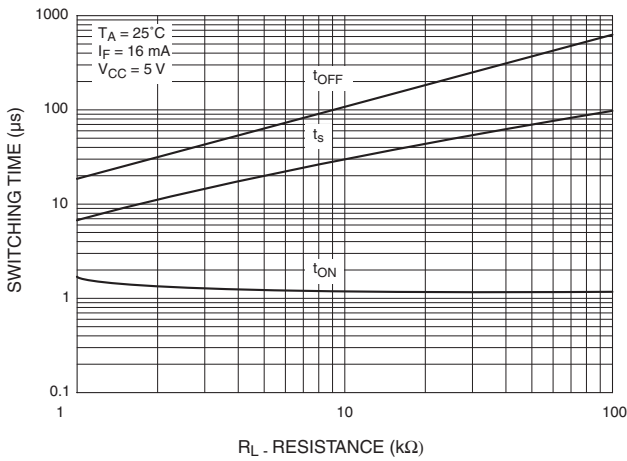
**Fig. 6 Collector Current vs. Collector-Emitter Voltage**



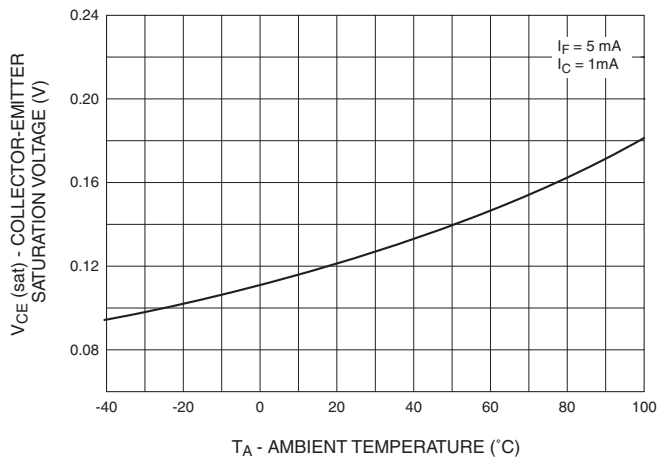
**Fig. 7 Collector Dark Current vs. Temperature**



**Fig. 8 Switching Time vs. Load Resistance**



**Fig. 9 Collector-Emitter Saturation Voltage vs. Temperature**



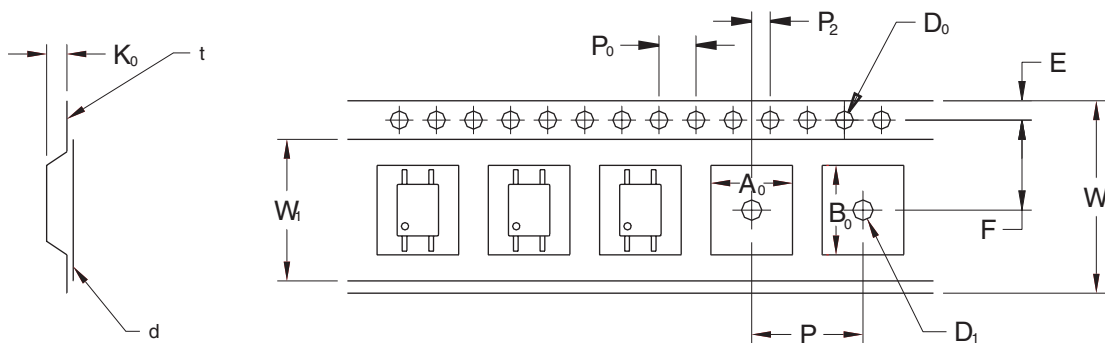
HMA121A

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**ORDERING INFORMATION**

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

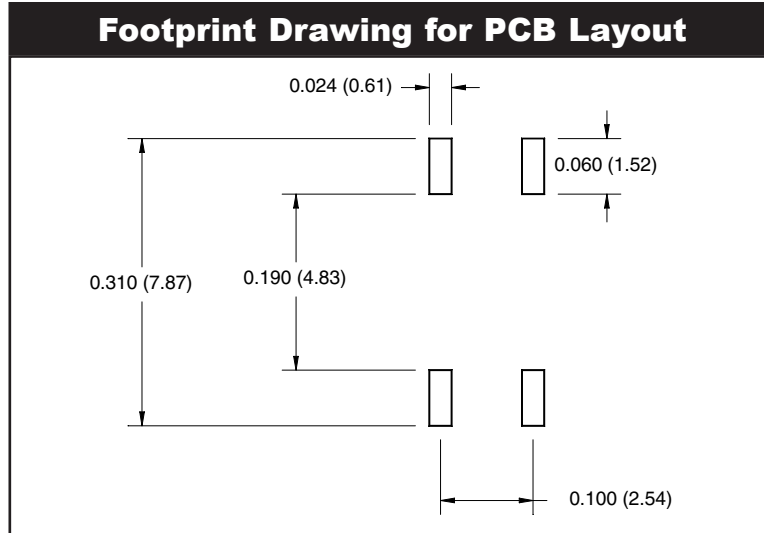


Description		Symbol	2.54 Pitch Dimensions (mm)
Tape Width		W	12.00±0.4
Tape Thickness		t	0.30±0.20
Sprocket Hole Pitch		$P_0$	4.00±0.20
Sprocket Hole Dia.		$D_0$	1.55±0.20
Sprocket Hole Location		E	1.75±0.20
Pocket Location		F	5.50±0.20
		$P_2$	2.00±0.20
Pocket Pitch		P	8.00±0.20
Pocket Dimension		$A_0$	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		$W_1$	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")

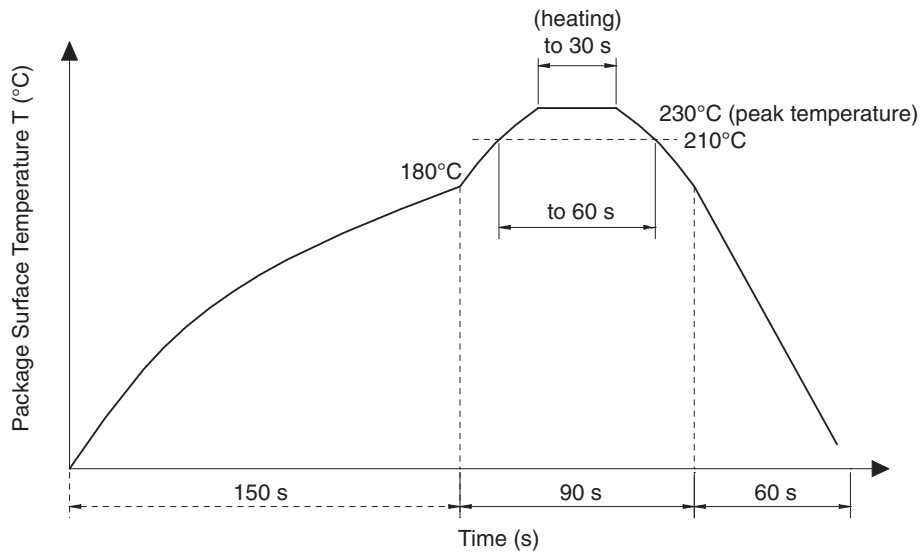
HMA121A

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HMA121C



**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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