

HMHAA280

HMHA2801

HMHA281

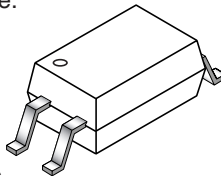
DESCRIPTION

The HMHA 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 1.27 mm.

The HMHAA series consists of two gallium arsenide infrared emitting diodes, connected in inverse parallel, driving a single silicon phototransistor in a compact 4-pin mini-flat package.

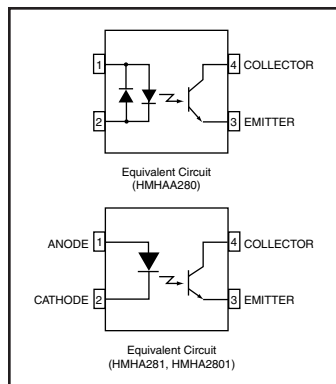
FEATURES

- Compact 4-pin package (2.4 mm maximum standoff height)
- Half pitch leads for optimum board space savings
- Current Transfer Ratio in selected groups
HMHAA280: 50-600% HMHA2801: 80-600%
HMHA281: 50-600%
- Available in tape and reel quantities of 500 and 2500
- Applicable to Infrared Ray reflow (230°C Max, 30 seconds)
- U.L. (File # E90700) and CSA (82858) certified: and *BSI and *VDE certifications pending

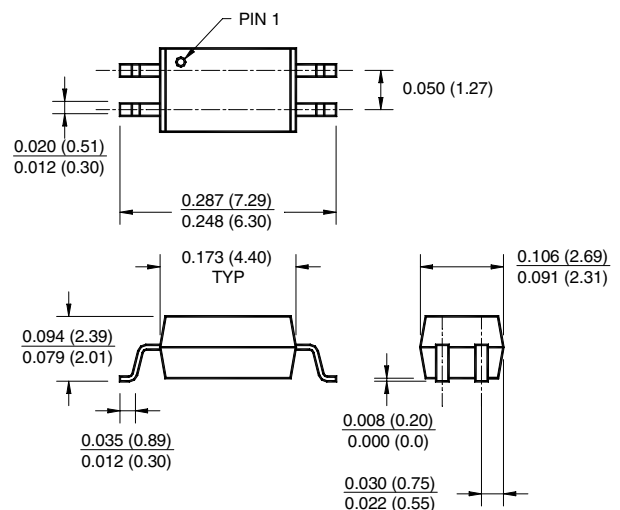


APPLICATIONS

- HMHAA series
- AC line monitor
 - Unknown polarity DC sensor
- HMHA series
- Telephone line receiver
 - 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	$^\circ\text{C}$
Operating Temperature	T_{OPR}	-55 to +100	$^\circ\text{C}$
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 (HMA)	V_R	6	V
Power Dissipation	P_D	60	mW
Derate linearly (above 25°C)		0.6	mW/ $^\circ\text{C}$
DETECTOR			
Continuous Collector Current		50	mA
Power Dissipation	P_D	150	mW
Derate linearly (above 25°C)		1.5	mW/ $^\circ\text{C}$
Collector-Emitter Voltage	V_{CEO}	80	V
Emitter-Collector Voltage	V_{ECO}	7	V

*Samples submitted for certification

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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	HMHA281	1.0		1.3	V
			HMHA2801				
	$(I_F = \pm 5 \text{ mA})$		HMHAA280			1.4	
Reverse Current	$(V_R = 5 \text{ V})$	I_R	All			5	μA
DETECTOR							
Breakdown Voltage Collector to Emitter	$(I_C = 0.5 \text{ mA}, I_F = 0)$	BV_{CEO}	All	80			V
Emitter to Collector	$(I_E = 100 \mu\text{A}, I_F = 0)$	BV_{ECO}	All	7			
Collector Dark Current	$(V_{CE} = 80 \text{ V}, I_F = 0)$	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	$(I_F = \pm 5 \text{ mA}, V_{CE} = 5 \text{ V})$	CTR	HMHAA280	50		600	%
	$(I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V})$		HMHA2801	80		600	
	$(I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V})$		HMHA281	50		600	
CTR Symmetry	$(I_F = \pm 5 \text{ mA}, V_{CE} = 5 \text{ V})$	—	HMHAA280	0.33		3.0	
Saturation Voltage	$(I_F = \pm 8 \text{ mA}, I_C = 2.4 \text{ mA})$	$V_{CE(SAT)}$	HMHAA280			0.4	V
	$(I_F = 10 \text{ mA}, I_C = 2 \text{ mA})$		HMHA2801			0.3	
	$(I_F = 8 \text{ mA}, I_C = 2.4 \text{ mA})$		HMHA281			0.4	
Rise Time (Non-Saturated)	$(I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V})$ $(R_L = 100\Omega)$	t_r			3		μs
Fall Time (Non-Saturated)	$(I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V})$ $(R_L = 100\Omega)$	t_f			3		

ISOLATION CHARACTERISTICS							
Characteristic	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
Steady State Isolation Voltage	(1 Minute)	V_{ISO}	All	2500			VRMS

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

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TYPICAL PERFORMANCE CURVES

Fig. 1 Forward Current vs. Forward Voltage

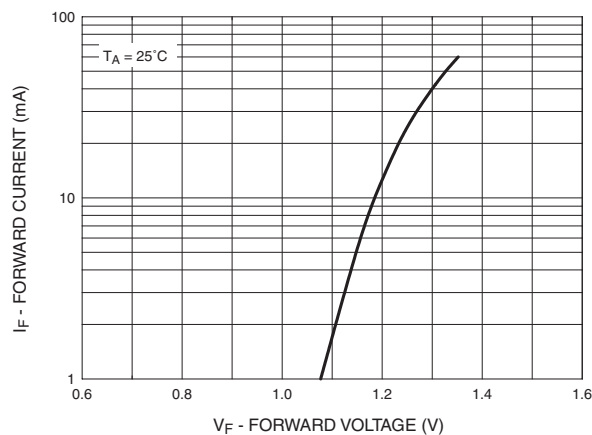


Fig. 2 Collector Current vs. Forward Current

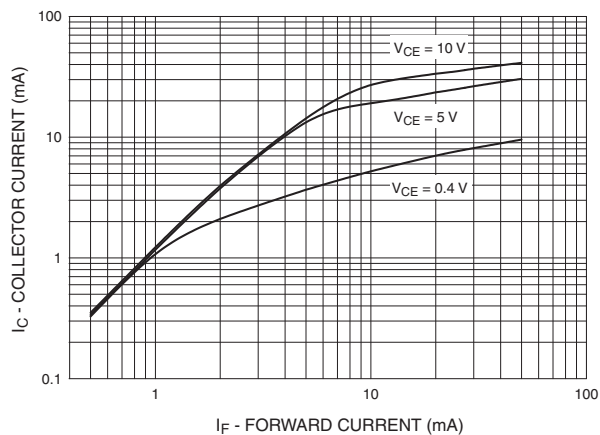


Fig. 3 Current Transfer Ratio vs. Forward Current

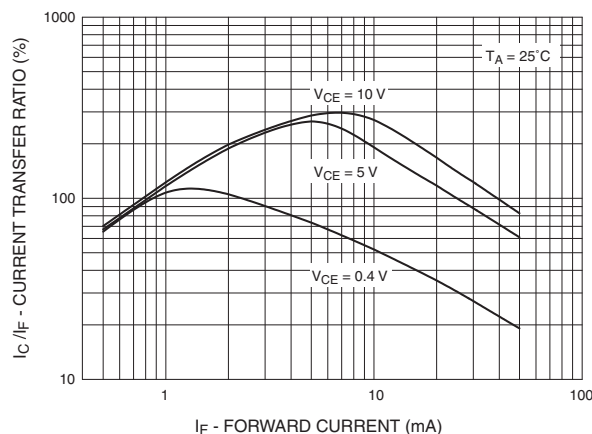


Fig. 4 Normalized CTR vs. Temperature

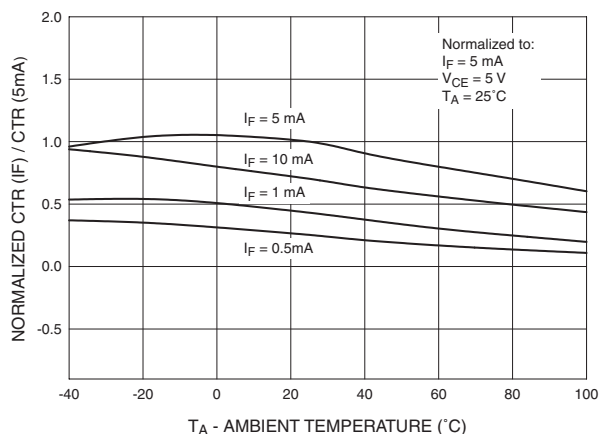
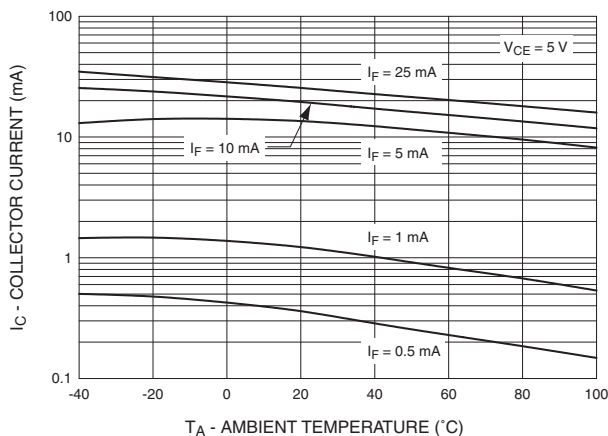


Fig. 5 Collector Current vs. Temperature



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Fig. 6 Collector Current vs. Collector-Emitter Voltage

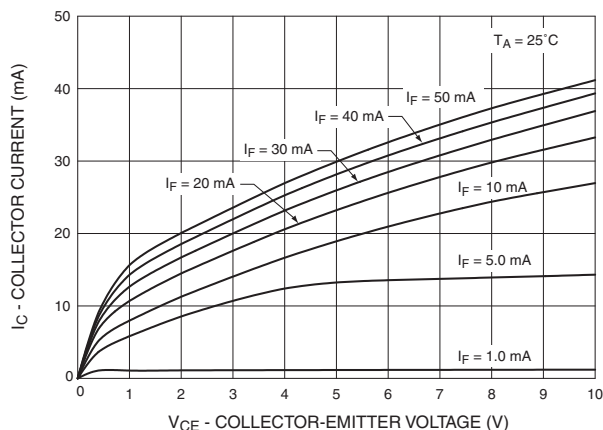


Fig. 7 Collector Current vs. Collector-Emitter Voltage

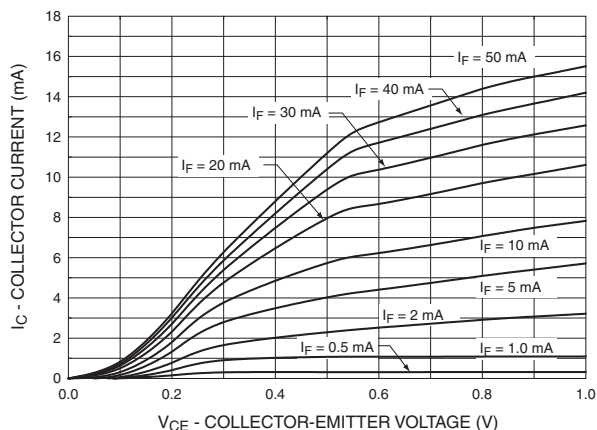


Fig. 8 Collector Dark Current vs. Temperature

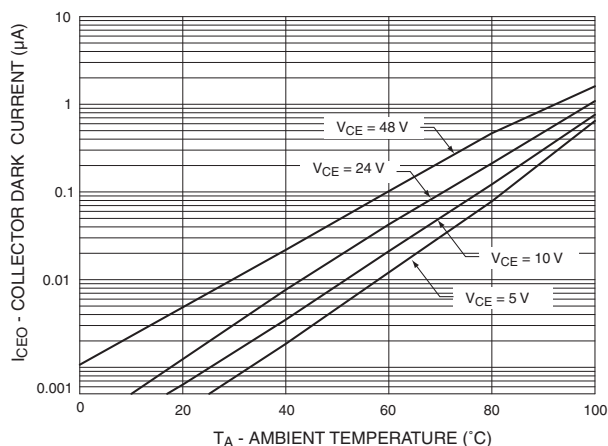


Fig. 9 Switching Time vs. Load Resistance

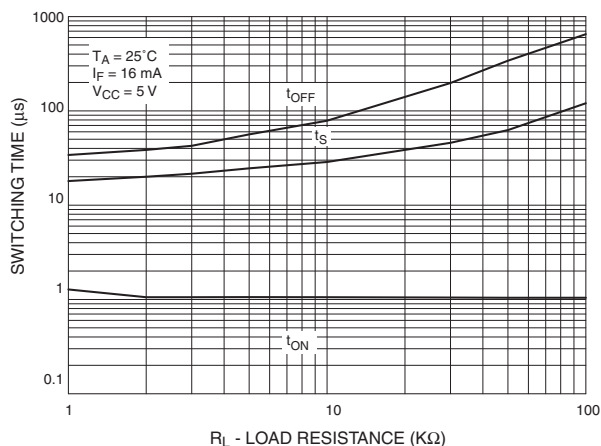
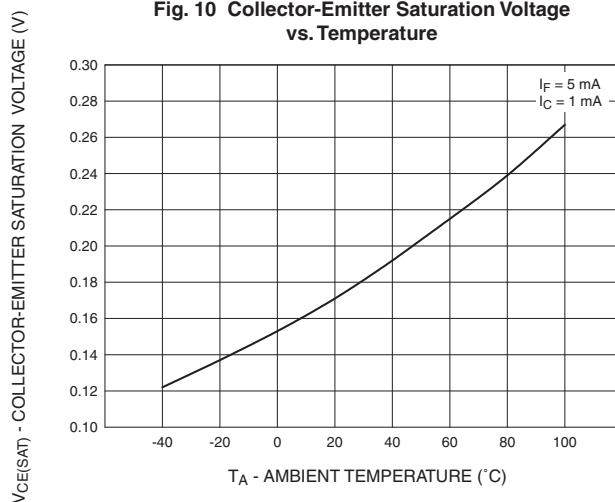


Fig. 10 Collector-Emitter Saturation Voltage vs. Temperature



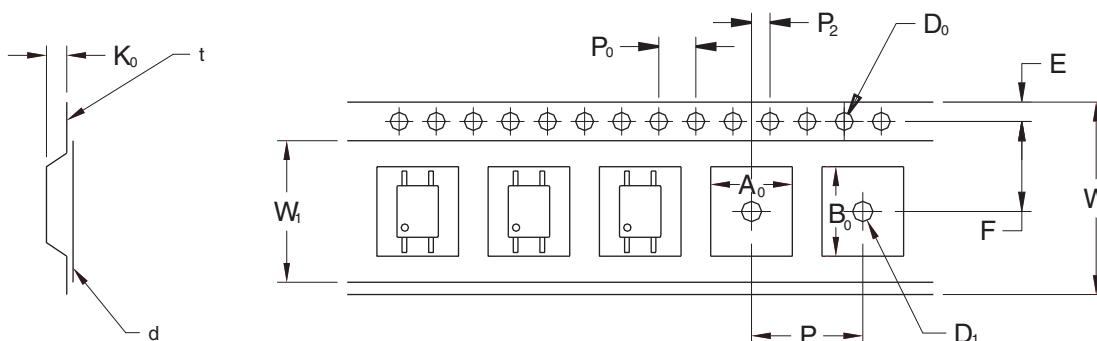
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ORDERING INFORMATION

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



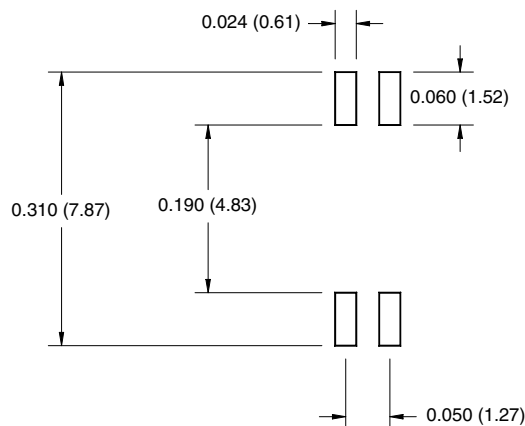
		1.27 Pitch
Description	Symbol	Dimensions (mm)
Tape Width	W	12.00±0.4
Tape Thickness	t	0.30±0.20
Sprocket Hole Pitch	P_0	4.00±0.20
Sprocket Hole Dia.	D_0	1.55±0.20
Sprocket Hole Location	E	1.75±0.20
Pocket Location	F	5.50±0.20
	P_2	2.00±0.20
Pocket Pitch	P	8.00±0.20
Pocket Dimension	A_0	4.40±0.20
	B_0	7.30±0.20
	K_0	2.30±0.20
Pocket Hole Dia.	D_1	1.55±0.20
Cover Tape Width	W_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")

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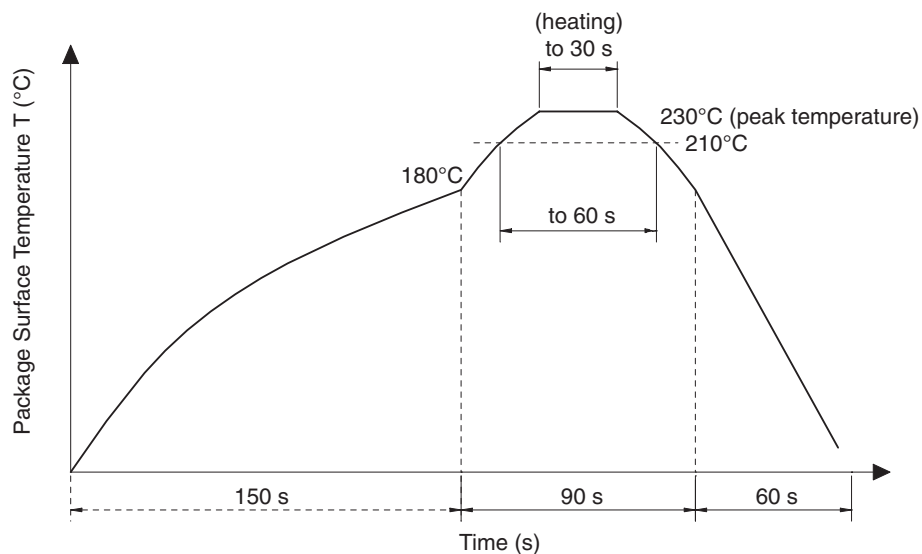
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Footprint Drawing for PCB Layout



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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