FAIRCHILD
SEMICONDUCTOR®

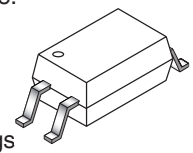
HALF PITCH MINI-FLAT PACKAGE 4-PIN OPTOCOUPLERS

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)
- BSI (File #8611/8612), CSA (File #1201524), UL (File #E90700) and VDE (File #136480) certified

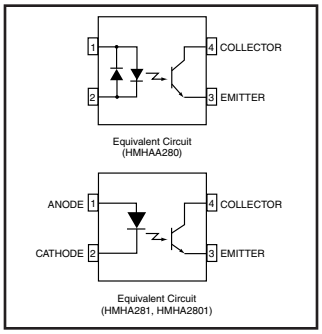
APPLICATIONS

HMHAA series

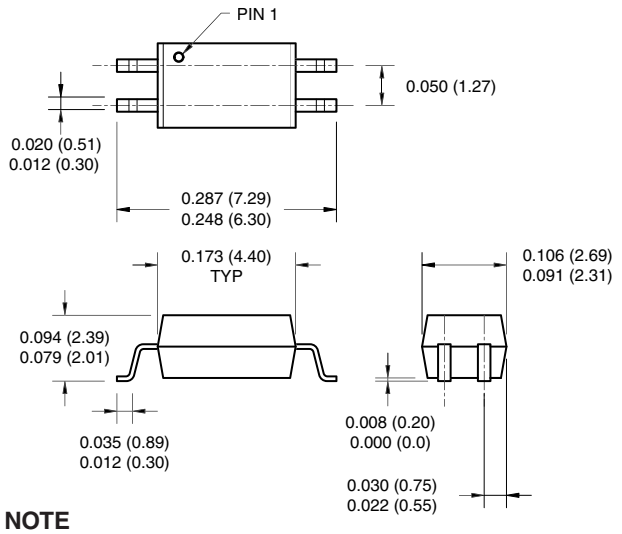
- AC line monitor
- Unknown polarity DC sensor
- Telephone line receiver

HMHA series

- 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°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 (HMA)	V_R	6	V
Power Dissipation	P_D	60	mW
Derate linearly (above 25°C)		0.6	mW/°C
DETECTOR			
Continuous Collector Current		50	mA
Power Dissipation	P_D	150	mW
Derate linearly (above 25°C)		1.5	mW/°C
Collector-Emitter Voltage	V_{CEO}	80	V
Emitter-Collector Voltage	V_{ECO}	7	V

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
EMITTER Forward Voltage	(I_F = 10 mA)	V_F	HMHA281	1.0		1.3	V
			HMHA2801				
	(I_F = ± 5 mA)		HMHAA280			1.4	
Reverse Current	(V_R = 5 V)	I_R	All			5	µA
DETECTOR Breakdown Voltage Collector to Emitter	(I_C = 0.5 mA, I_F = 0)	BV_{CEO}	All	80			V
Emitter to Collector	(I_E = 100 µA, I_F = 0)	BV_{ECO}	All	7			
Collector Dark Current	(V_{CE} = 80 V, I_F = 0)	I_{CEO}	All			100	nA
Capacitance	(V_{CE} = 0 V, f = 1 MHz)	C_{CE}	All		10		pF

TRANSFER CHARACTERISTICS (T_A = 25°C)

Characteristic	Test Conditions	Symbol	Device	Min	Typ**	Max	Unit
DC Current Transfer Ratio	(I_F = ± 5 mA, V_{CE} = 5 V)	CTR	HMHAA280	50		600	%
	(I_F = 5 mA, V_{CE} = 5 V)		HMHA2801	80		600	
	(I_F = 5 mA, V_{CE} = 5 V)		HMHA281	50		600	
CTR Symmetry	(I_F = ± 5 mA, V_{CE} = 5 V)	—	HMHAA280	0.33		3.0	
Saturation Voltage	(I_F = ± 8 mA, I_C = 2.4 mA)	$V_{CE\ (SAT)}$	HMHAA280			0.4	V
	(I_F = 10 mA, I_C = 2 mA)		HMHA2801			0.3	
	(I_F = 8 mA, I_C = 2.4 mA)		HMHA281			0.4	
Rise Time (Non-Saturated)	(I_C = 2 mA, V_{CE} = 5 V) (R_L = 100V)	t_r			3		µs
Fall Time (Non-Saturated)	(I_C = 2 mA, V_{CE} = 5 V) (R_L = 100V)	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 TA = 25°C

TYPICAL PERFORMANCE CURVES

Fig. 1 Forward Current vs. Forward Voltage

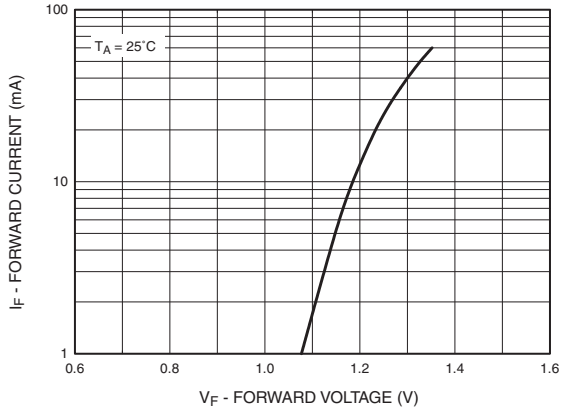


Fig. 2 Collector Current vs. Forward Current

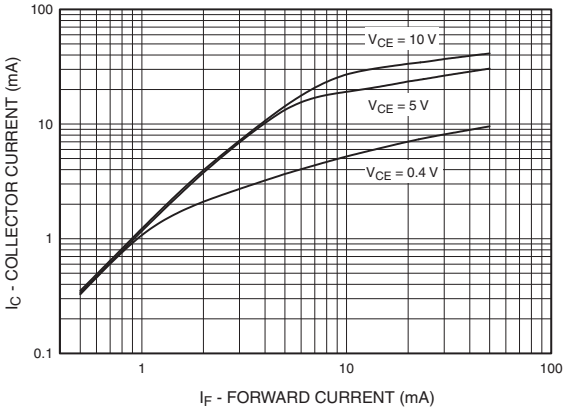


Fig. 3 Current Transfer Ratio vs. Forward Current

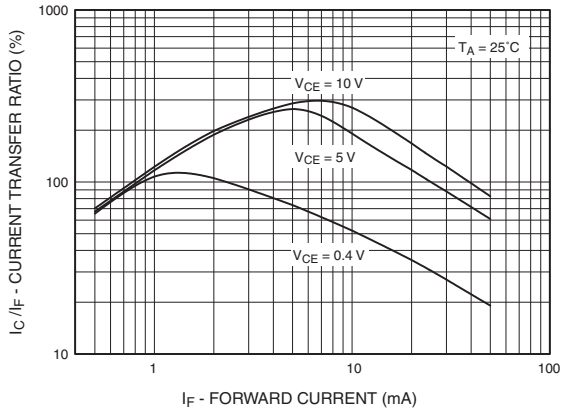


Fig. 4 Normalized CTR vs. Temperature

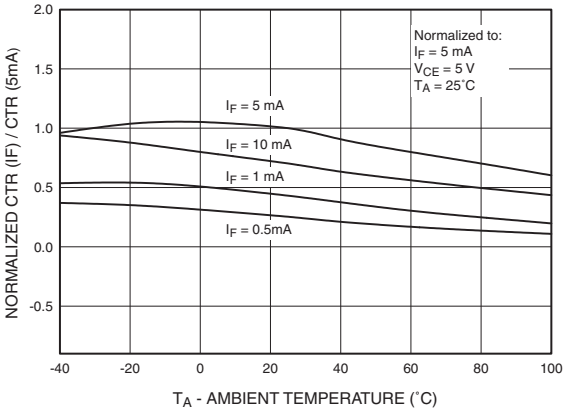


Fig. 5 Collector Current vs. Temperature

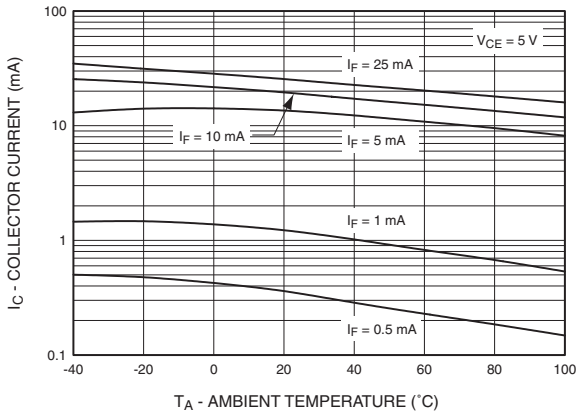


Fig. 6 Collector Current vs. Collector-Emitter Voltage

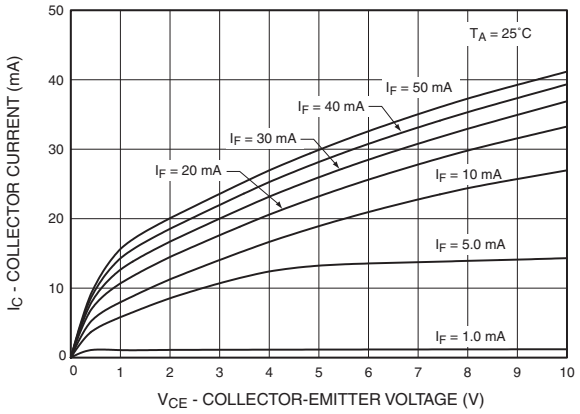


Fig. 7 Collector Current vs. Collector-Emitter Voltage

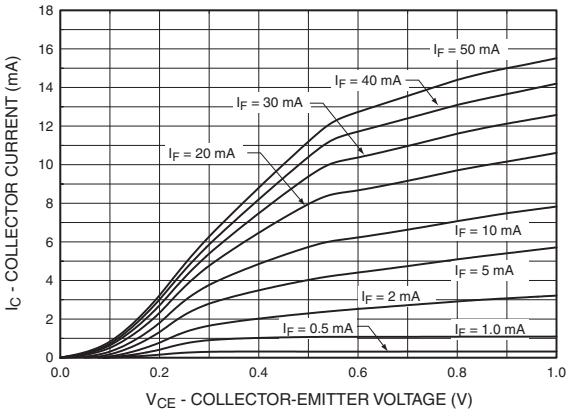


Fig. 8 Collector Dark Current vs. Temperature

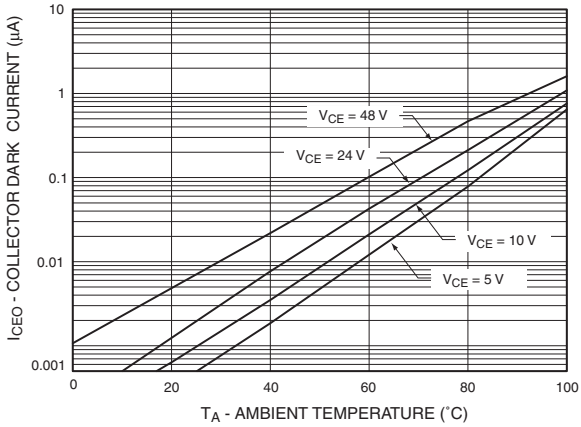


Fig. 9 Switching Time vs. Load Resistance

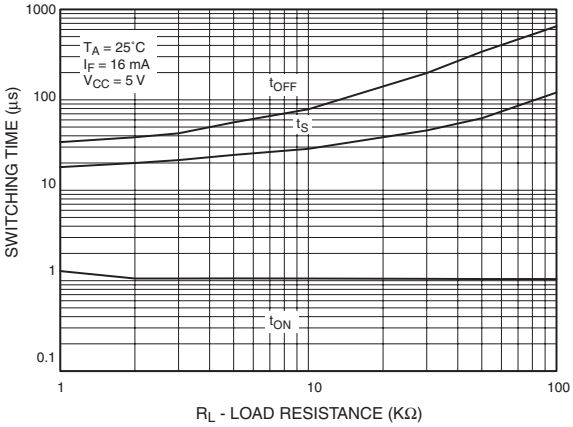
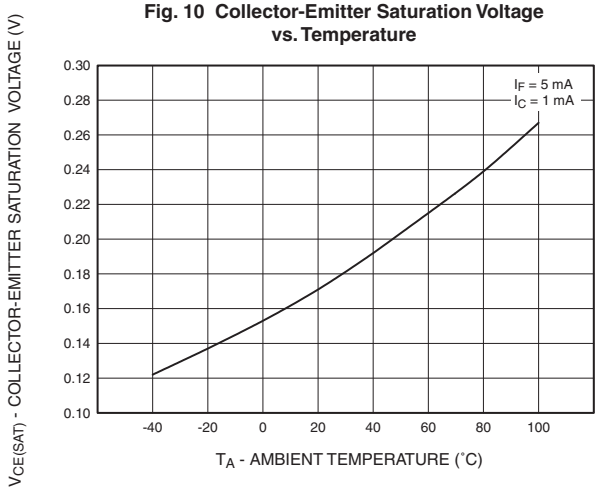
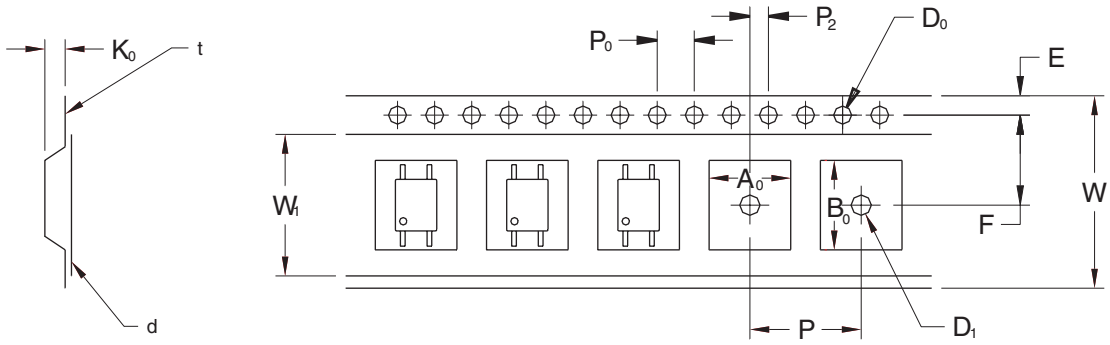


Fig. 10 Collector-Emitter Saturation Voltage vs. Temperature



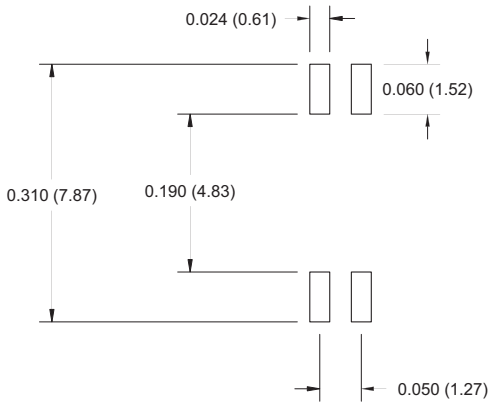
ORDERING INFORMATION

Option	Description
V	VDE Approved
R1	Tape and Reel (500 units)
R2	Tape and Reel (2500 units)
R1V	Tape and Reel (500 units) and VDE Approved
R2V	Tape and Reel (2500 units) and VDE Approved

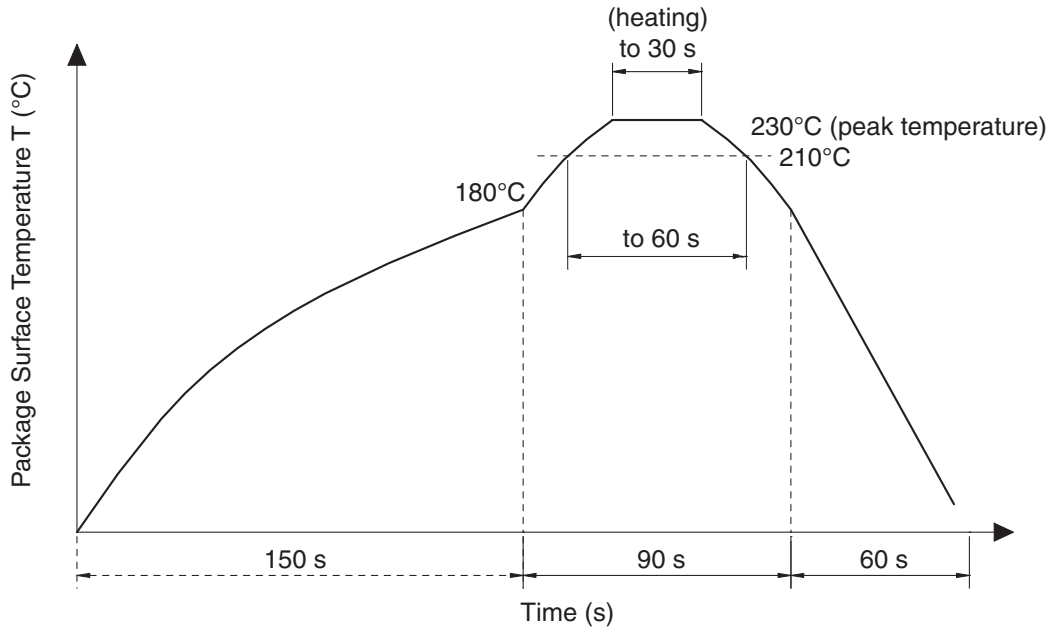


Description		Symbol	1.27 Pitch Dimensions (mm)
Tape Width		W	12.00±0.4
Tape Thickness		t	0.30±0.20
Sprocket Hole Pitch		P_0	4.00±0.20
Sprocket Hole Dia.		D_0	1.55±0.20
Sprocket Hole Location		E	1.75±0.20
Pocket Location		F	5.50±0.20
		P_2	2.00±0.20
Pocket Pitch		P	8.00±0.20
Pocket Dimension		A_0	4.40±0.20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

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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HMHAA280 HMHA2801 HMHA281

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