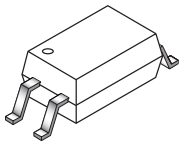
HALF PITCH MINI-FLAT PACKAGE 4-PIN OPTOCOUPLERS

HMHAA280 HMHA2801 SERIES HMHA281

DESCRIPTION

The HMHA281, HMHA2801 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 HMHAA280 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. The lead pitch is 1.27mm.

FEATURES

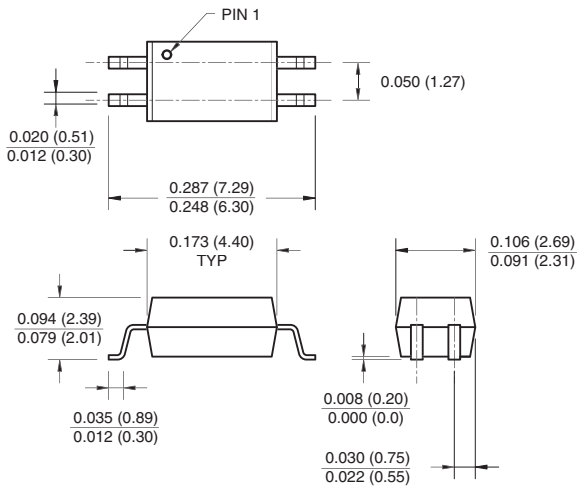
- Compact 4-pin package (2.4 mm maximum standoff height)
- Half pitch leads for optimum board space savings
- Current Transfer Ratio in selected groups
  HMHA2801: 80-600%
  HMHA2801A: 80-160%
  HMHA2801B: 50-150%
  HMHA2801C: 50-100%
  HMHA281: 50-600%
  HMHAA280: 50-600%
- Available in tape and reel 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

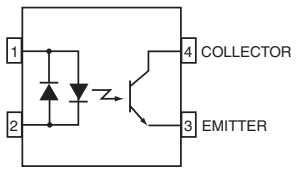
HMHAA280
- AC line monitor
- Unknown polarity DC sensor
- Telephone line receiver

HMHA281, HMHA2801 Series
- Digital logic inputs
- Microprocessor inputs
- Power supply monitor
- Twisted pair line receiver
- Telephone line receiver

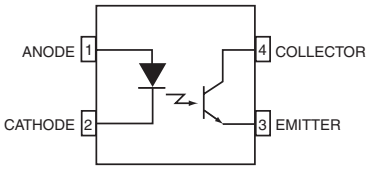
PACKAGE DIMENSIONS



NOTE
All dimensions are in inches (millimeters)



Equivalent Circuit
(HMHAA280)



Equivalent Circuit
(HMHA281, HMHA2801)

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise specified)

Parameter	Symbol	Value	Units
TOTAL PACKAGE			
Storage Temperature	T_{STG}	-40 to +125	°C
Operating Temperature	T_{OPR}	-40 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 (HMHA)	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				
			HMHA2801A	1.0		1.3	
			HMHA2801B				
	(I_F = 20 mA)		HMHA2801C			1.4	
	(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)		HMHA281	50		600	
			HMHA2801	80		600	
			HMHA2801A	80		160	
			HMHA2801B	50		150	
	(I_F = 1 mA, V_{CE} = 5 V)		HMHA2801C	50		100	
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 = 8 mA, I_C = 2.4 mA)		HMHA281			0.4	
	(I_F = 10 mA, I_C = 2 mA)		HMHA2801			0.3	
			HMHA2801A			0.3	
			HMHA2801B				
	(I_F = 20 mA, I_C = 1 mA)		HMHA2801C			0.2	
Rise Time (Non-Saturated)	(I_C = 2 mA, V_{CE} = 5 V) (R_L = 100Ω)	t_r	All except for HMHA2801C		3		µs
	(I_C = 2 mA, V_{CE} = 2V) (R_L = 1 KΩ)		HMHA2801C			9	
Fall Time (Non-Saturated)	(I_C = 2 mA, V_{CE} = 5 V) (R_L = 100Ω)	t_f	All except for HMHA2801C		3		
	(I_C = 2 mA, V_{CE} = 2V) (R_L = 1 KΩ)		HMHA2801C			9	

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°C

TYPICAL PERFORMANCE CURVES

Fig. 1 Forward Current vs. Forward Voltage

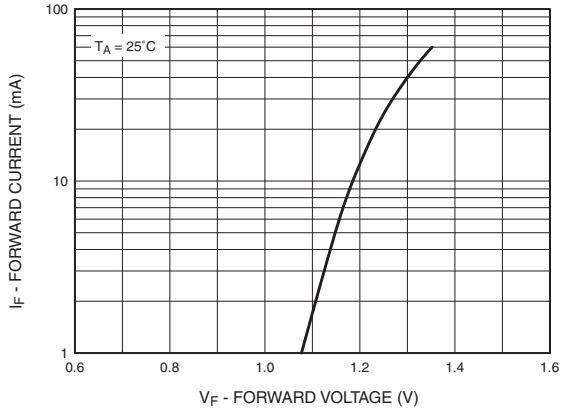


Fig. 2 Collector Current vs. Forward Current

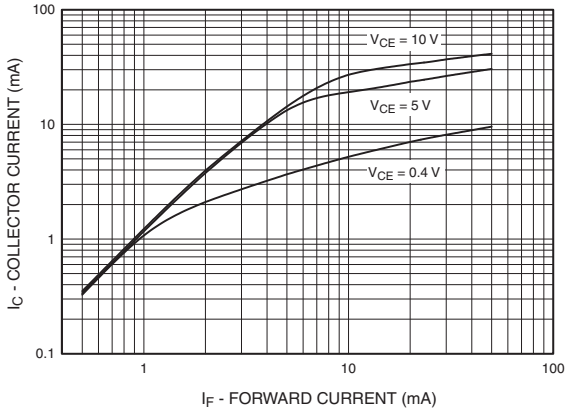


Fig. 3 Current Transfer Ratio vs. Forward Current

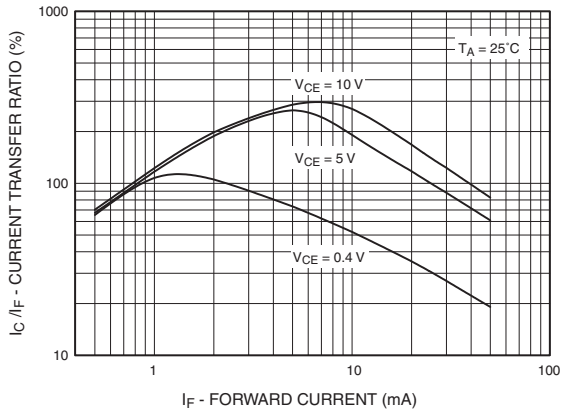


Fig. 4 Normalized CTR vs. Temperature

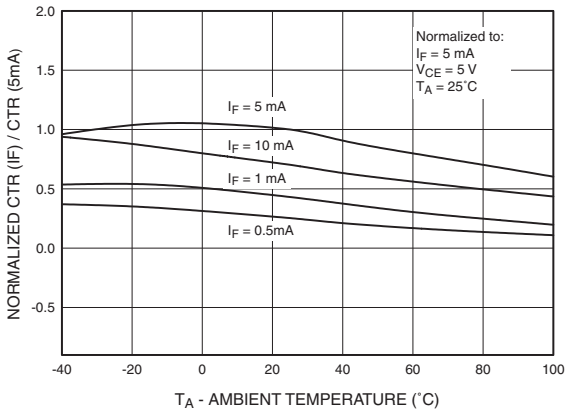


Fig. 5 Collector Current vs. Temperature

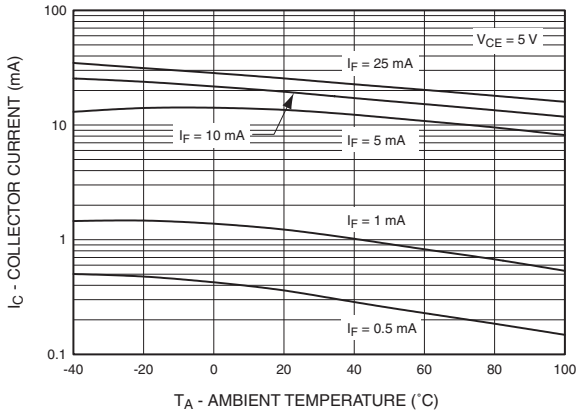


Fig. 6 Collector Current vs. Collector-Emitter Voltage

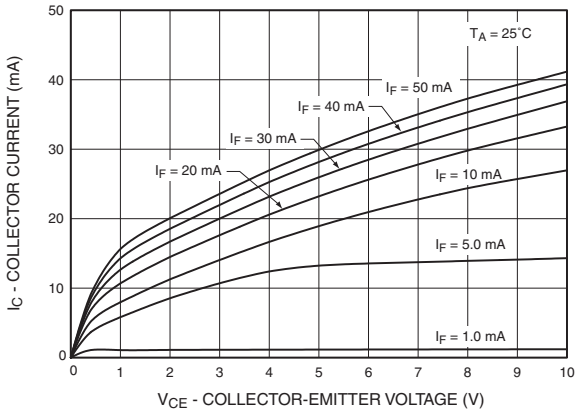


Fig. 7 Collector Current vs. Collector-Emitter Voltage

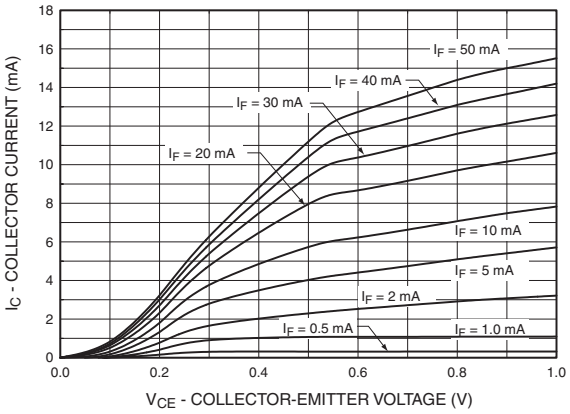


Fig. 8 Collector Dark Current vs. Temperature

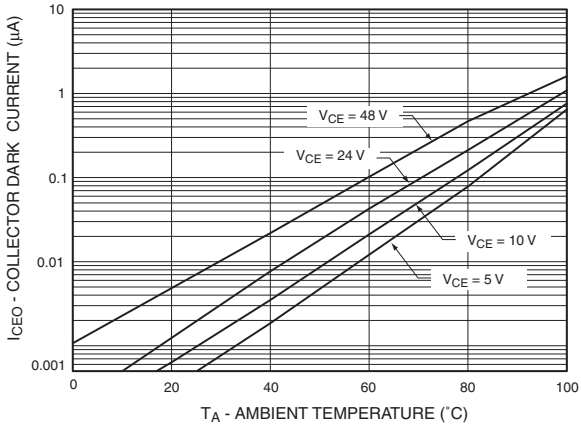


Fig. 9 Switching Time vs. Load Resistance

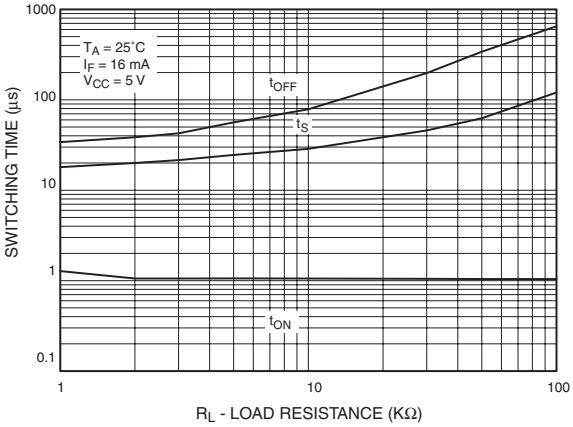
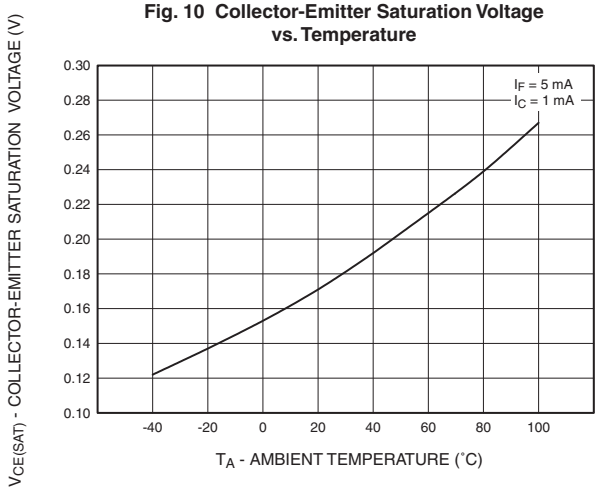
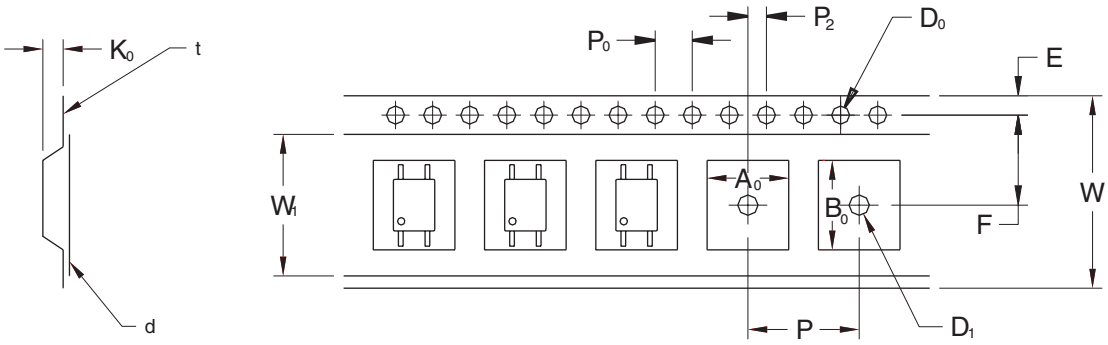


Fig. 10 Collector-Emitter Saturation Voltage vs. Temperature



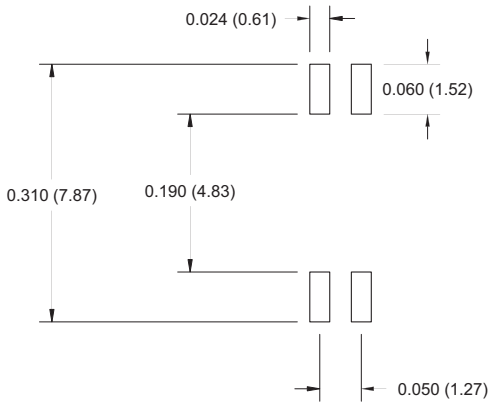
ORDERING INFORMATION

Option	Description
V	VDE Approved
R1	Tape and Reel (500 units)
R2	Tape and Reel (2500 units)
R3	Tape and Reel (500 units; unit 180° rotated)
R4	Tape and Reel (2500 units; unit 180° rotated)
R1V	Tape and Reel (500 units) and VDE Approved
R2V	Tape and Reel (2500 units) and VDE Approved
R3V	Tape and Reel (500 units; unit 180° rotated) and VDE Approved
R4V	Tape and Reel (2500 units; unit 180° rotated) and VDE Approved

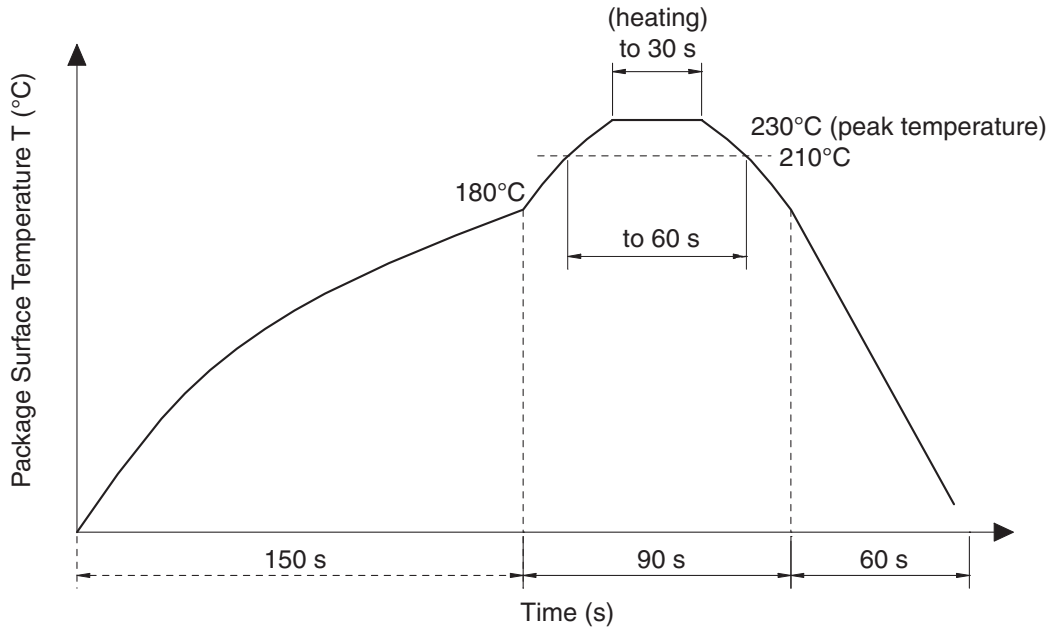


Description		Symbol	1.27 Pitch Dimensions (mm)
Tape Width		W	12.00±0.4
Tape Thickness		t	0.30±0.20
Sprocket Hole Pitch		P_0	4.00±0.20
Sprocket Hole Dia.		D_0	1.55±0.20
Sprocket Hole Location		E	1.75±0.20
Pocket Location		F	5.50±0.20
		P_2	2.00±0.20
Pocket Pitch		P	8.00±0.20
Pocket Dimension		A_0	4.40±0.20
		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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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.