

HMHAA280, HMHA2801 Series, HMHA281 Half Pitch Mini-Flat Package 4-Pin Optocouplers

Features

- Compact 4-pin package (2.4mm 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

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 1.27mm.

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.

Applications

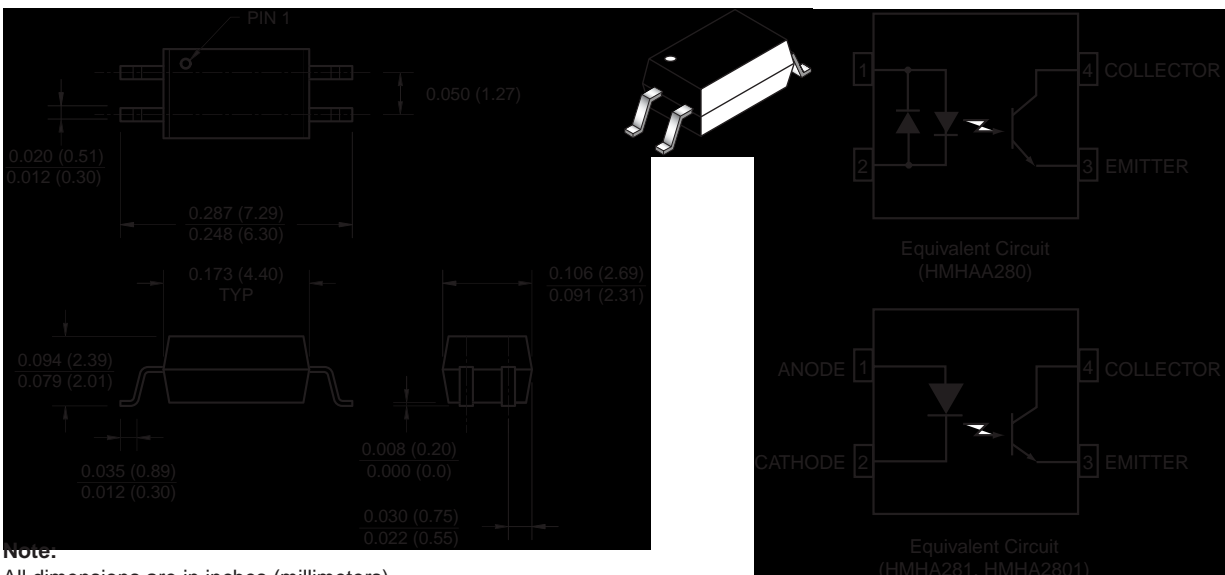
HMHAA280

- 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



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Value	Units
TOTAL PACKAGE			
T_{STG}	Storage Temperature	-55 to +125	$^\circ\text{C}$
T_{OPR}	Operating Temperature	-55 to +100	$^\circ\text{C}$
EMITTER			
I_F (avg)	Continuous Forward Current	50	mA
I_F (pk)	Peak Forward Current (1 μs pulse, 300pps.)	1	A
V_R	Reverse Input Voltage (HMHA)	6	V
P_D	Power Dissipation	60	mW
	Derate linearly (above 25°C)	0.6	mW/ $^\circ\text{C}$
DETECTOR			
	Continuous Collector Current	50	mA
P_D	Power Dissipation	150	mW
	Derate linearly (above 25°C)	1.5	mW/ $^\circ\text{C}$
V_{CEO}	Collector-Emitter Voltage	80	V
V_{ECO}	Emitter-Collector Voltage	7	V

Electrical Characteristics ($T_A = 25^\circ\text{C}$)

Symbol	Parameter	Test Conditions	Device	Min.	Typ.*	Max.	Unit
INDIVIDUAL COMPONENT CHARACTERISTICS							
Emitter							
V_F	Forward Voltage	$I_F = 10\text{mA}$	HMHA281	1.0		1.3	V
			HMHA2801				
			HMHA2801A	1.0		1.3	
			HMHA2801B				
		$I_F = 20\text{mA}$	HMHA2801C			1.4	
$I_F = \pm 5\text{mA}$	HMHAA280			1.4			
I_R	Reverse Current	$V_R = 5\text{V}$	All			5	μA
Detector							
BV_{CEO}	Breakdown Voltage Collector to Emitter	$I_C = 0.5\text{mA}$, $I_F = 0$	All	80			V
BV_{ECO}	Emitter to Collector	$I_E = 100\mu\text{A}$, $I_F = 0$	All	7			
I_{CEO}	Collector Dark Current	$V_{CE} = 80\text{V}$, $I_F = 0$	All			100	nA
C_{CE}	Capacitance	$V_{CE} = 0\text{V}$, $f = 1\text{MHz}$	All		10		pF

Electrical Characteristics ($T_A = 25^\circ\text{C}$) (Continued)

Symbol	Characteristic	Test Conditions	Device	Min.	Typ.*	Max.	Unit
TRANSFER CHARACTERISTICS							
CTR	DC Current Transfer Ratio	$I_F = \pm 5\text{mA}, V_{CE} = 5\text{V}$	HMHAA280	50		600	%
		$I_F = 5\text{mA}, V_{CE} = 5\text{V}$	HMHA281	50		600	
			HMHA2801	80		600	
			HMHA2801A	80		160	
			HMHA2801B	50		150	
		$I_F = 1\text{mA}, V_{CE} = 5\text{V}$	HMHA2801C	50		100	
	CTR Symmetry	$I_F = \pm 5\text{mA}, V_{CE} = 5\text{V}$	HMHAA280	0.33		3.0	
$V_{CE(SAT)}$	Saturation Voltage	$I_F = \pm 8\text{mA}, I_C = 2.4\text{mA}$	HMHAA280			0.4	V
		$I_F = 8\text{mA}, I_C = 2.4\text{mA}$	HMHA281			0.4	
			HMHA2801			0.3	
			HMHA2801A			0.3	
		$I_F = 10\text{mA}, I_C = 2\text{mA}$	HMHA2801B				
			HMHA2801C			0.2	
t_r	Rise Time (Non-Saturated)	$I_C = 2\text{mA}, V_{CE} = 5\text{V}, R_L = 100\Omega$	All except for HMHA2801C		3		μs
		$I_C = 2\text{mA}, V_{CE} = 2\text{V}, R_L = 1\text{K}\Omega$	HMHA2801C			9	
t_f	Fall Time (Non-Saturated)	$I_C = 2\text{mA}, V_{CE} = 5\text{V}, R_L = 100\Omega$	All except for HMHA2801C		3		
		$I_C = 2\text{mA}, V_{CE} = 2\text{V}, R_L = 1\text{K}\Omega$	HMHA2801C			9	
ISOLATION CHARACTERISTICS							
V_{ISO}	Steady State Isolation Voltage	1 Minute	All	2500			VRMS

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

Typical Performance Characteristics

Fig. 1 Forward Current vs. Forward Voltage

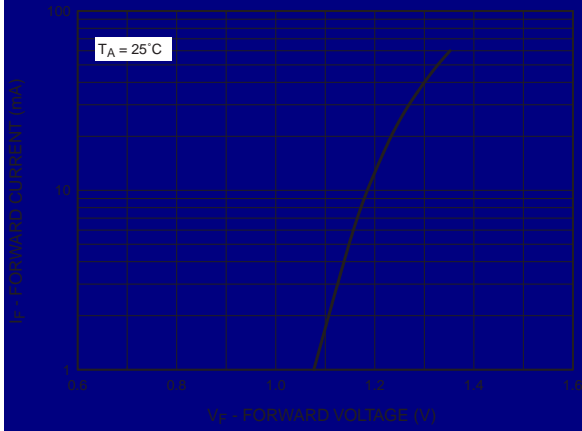


Fig. 2 Collector Current vs. Forward Current

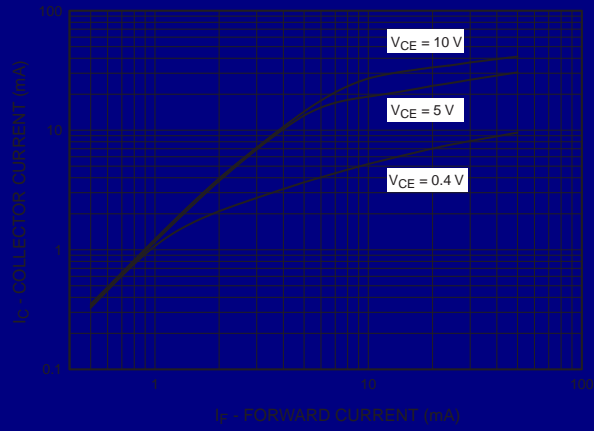


Fig. 3 Current Transfer Ratio vs. Forward Current

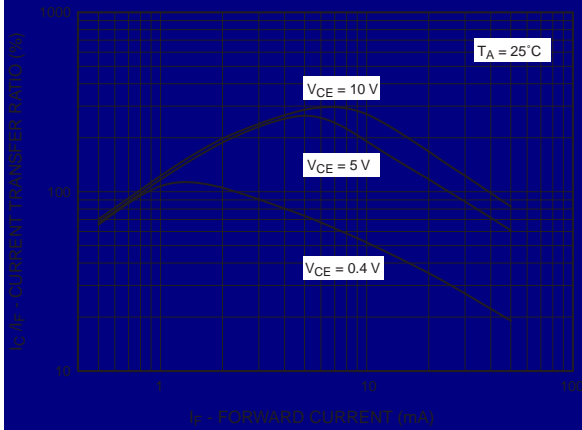


Fig. 4 Normalized CTR vs. Temperature

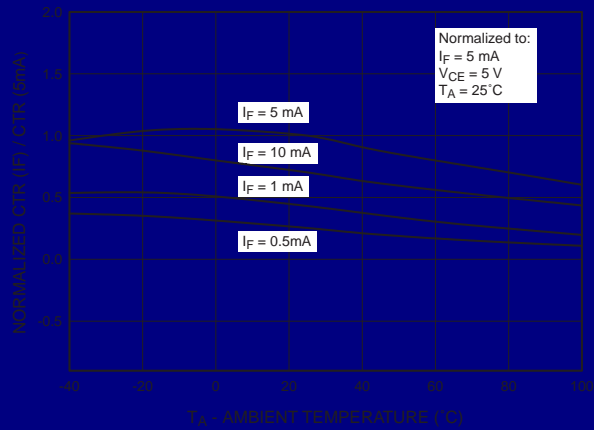
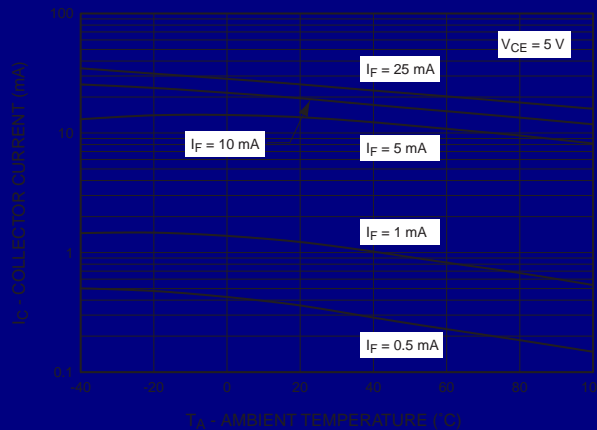


Fig. 5 Collector Current vs. Temperature



Typical Performance Characteristics (Continued)

Fig. 6 Collector Current vs. Collector-Emitter Voltage

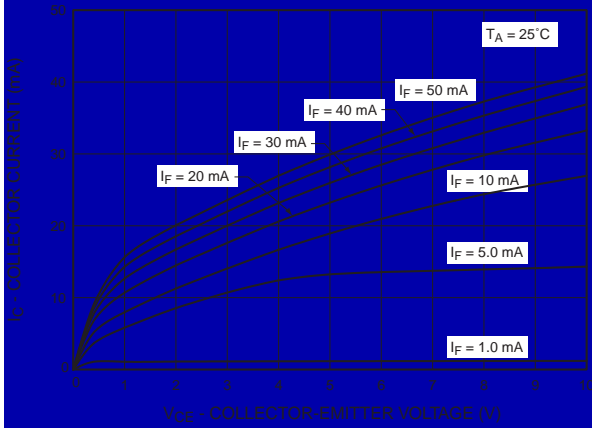


Fig. 7 Collector Current vs. Collector-Emitter Voltage

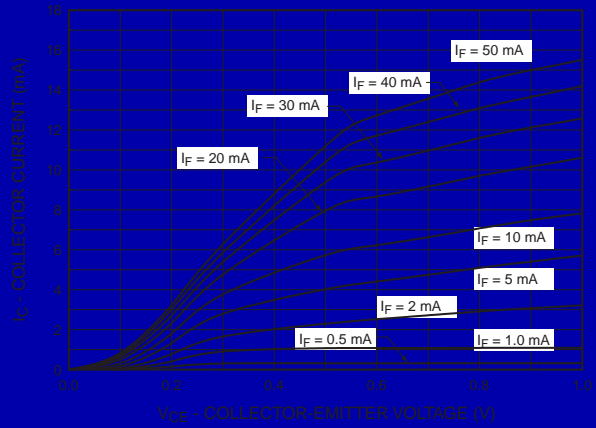


Fig. 8 Collector Dark Current vs. Temperature

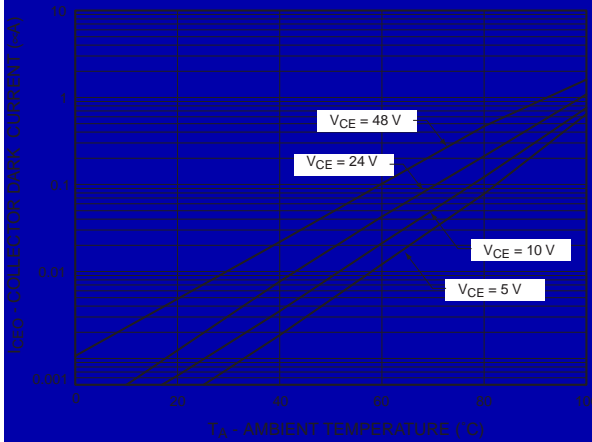


Fig. 9 Switching Time vs. Load Resistance

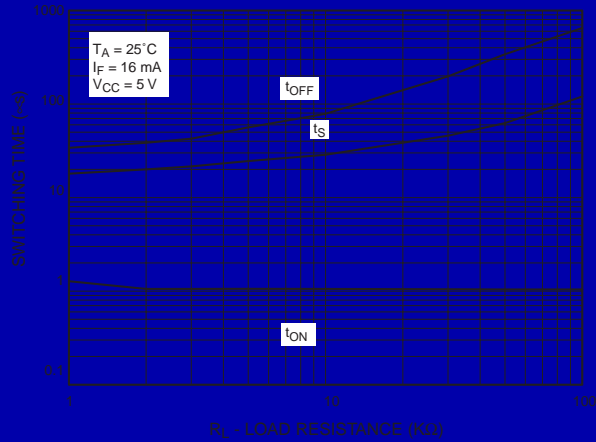
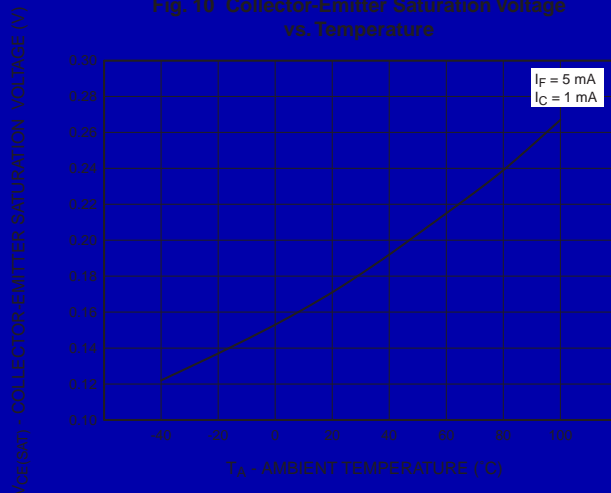


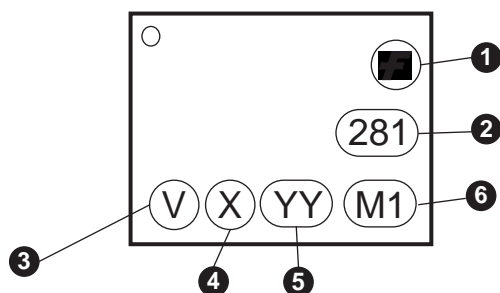
Fig. 10 Collector-Emitter Saturation Voltage vs. Temperature



Ordering Information

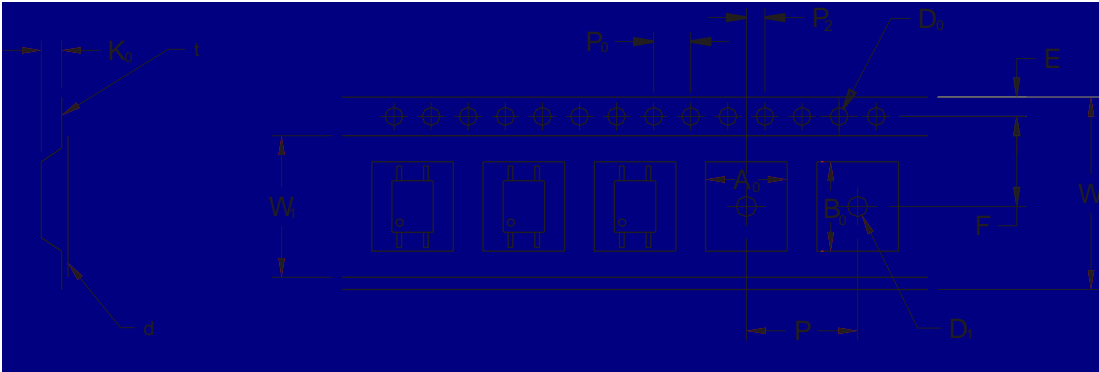
Option	Description
V	VDE Approved
R1	Tape and Reel (500 units)
R2	Tape and Reel (2500 units)
R3	Tape and Reel (500 units; unit 180° rotated)
R4	Tape and Reel (2500 units; unit 180° rotated)
R1V	Tape and Reel (500 units) and VDE Approved
R2V	Tape and Reel (2500 units) and VDE Approved
R3V	Tape and Reel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

Marking Information



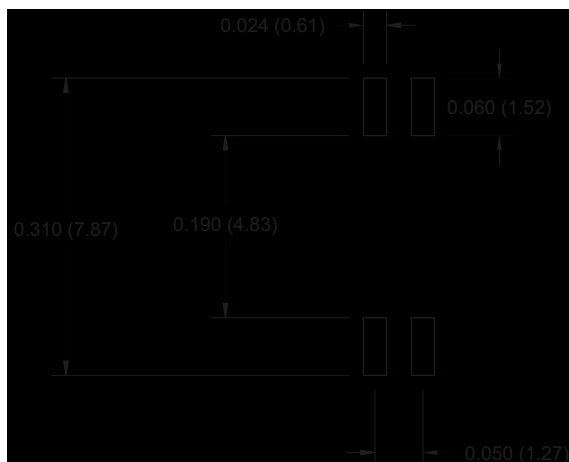
Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

Tape and Reel Dimensions



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	4.00±0.20
Sprocket Hole Dia		D ₁	1.55±0.20
Sprocket Hole Location		E	1.75±0.20
Pocket Location		F	5.50±0.20
		F ₁	2.00±0.20
Pocket Pitch		P	6.00±0.20
Pocket Dimension		F ₂	4.40±0.20
		F ₃	7.30±0.20
		F ₃	2.30±0.20
Pocket Hole Dia		D ₁	1.55±0.20
Cover Tape Width		H	9.20
Cover Tape Thickness		d	0.065±0.02
Max. Component Rotation or Tilt			30° 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

