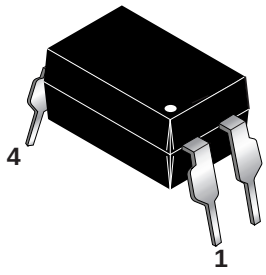
FAIRCHILD
SEMICONDUCTOR®

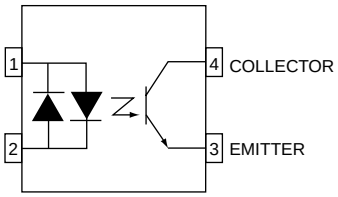
4-PIN PHOTOTRANSISTOR OPTOCOUPLERS

H11AA814 SERIES H11A617 SERIES H11A817 SERIES

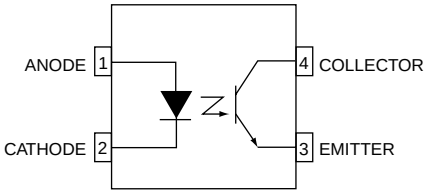
PACKAGE



H11AA814 SCHEMATIC



H11A617 & H11A817 SCHEMATIC



DESCRIPTION

The H11AA814 Series consists of two gallium arsenide infrared emitting diodes, connected in inverse parallel, driving a single silicon phototransistor in a 4-pin dual in-line package.

The H11A617 and H11A817 Series consists of a gallium arsenide infrared emitting diode driving a silicon phototransistor in a 4-pin dual in-line package.

FEATURES

- Compact 4-pin package
- Current transfer ratio in selected groups:

H11AA814:	20-300%	H11A817:	50-600%
H11AA814A:	50-150%	H11A817A:	80-160%
H11A617A:	40%-80%	H11A817B:	130-260%
H11A617B:	63%-125%	H11A817C:	200-400%
H11A617C:	100%-200%	H11A817D:	300-600%
H11A617D:	160%-320%		

- Minimum BV_{CEO} of 70V guaranteed

APPLICATIONS

H11AA814 Series
- AC line monitor
- Unknown polarity DC sensor
- Telephone line interface

H11A617 and H11A817 Series
- Power supply regulators
- Digital logic inputs
- Microprocessor inputs

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Parameter	Symbol	Device	Value	Units
TOTAL DEVICE				
Storage Temperature	T_{STG}	All	-55 to +150	°C
Operating Temperature	T_{OPR}	All	-55 to +100	°C
Lead Solder Temperature	T_{SOL}	All	260 for 10 sec	°C
Total Device Power Dissipation (-55°C to 50 °C)	P_D	All	200	mW
EMITTER				
Continuous Forward Current	I_F	All	50	mA
Reverse Voltage	V_R	H11A617A/B/C/D H11A817/A/B/C/D	6 5	V
Forward Current - Peak (1 µs pulse, 300 pps)	I_F(pk)	All	1.0	A
LED Power Dissipation (25°C ambient) Derate above 25°C	P_D	All	100 1.33	mW mW/°C
DETECTOR				
Collector-Emitter Voltage	V_{CEO}	All	70	V
Emitter-Collector Voltage	V_{ECO}	H11AA814/A H11A617A/B/C/D H11A817/A/B/C/D	6 7 6	V
Continuous Collector Current	I_C	All	50	mA
Detector Power Dissipation (25°C ambient) Derate above 25°C	P_D	All	150 2.0	mW mW/°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C Unless otherwise specified.)

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Device	Min	Typ*	Max	Unit
EMITTER	(I_F = 60 mA)	V_F	H11A617A/B/C/D		1.35	1.65	V
Input Forward Voltage	(I_F = 20 mA)		H11A817/A/B/C/D		1.2	1.5	
	(I_F = ±20 mA)		H11AA814/A		1.2	1.5	
Reverse Leakage Current	(V_R = 6.0 V)	I_R	H11A617A/B/C/D		.001	10	µA
	(V_R = 5.0 V)		H11A817/A/B/C/D				
DETECTOR Collector-Emitter Breakdown Voltage	(I_C = 1.0 mA, I_F = 0)	BV_{CEO}	ALL	70	100		V
Emitter-Collector Breakdown Voltage	(I_E = 100 µA, I_F = 0)	BV_{ECO}	H11AA814/A	6	10		V
			H11A617A/B/C/D	7			
			H11A817/A/B/C/D	6			
Collector-Emitter Dark Current	(V_{CE} = 10V, I_F = 0)	I_{CEO}	H11AA814/A, H11A817/A/B/C/D, H11A617C/D		1	100	nA
			H11A617A/B			50	
Collector-Emitter Capacitance	(V_{CE} = 0 V, f = 1 MHz)	C_{CE}	ALL		8		pF

*Typical values at T_A = 25°C.

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TRANSFER CHARACTERISTICS (T_A = 25°C Unless otherwise specified.)

DC Characteristic	Test Conditions	Symbol	Device	Min	Typ*	Max	Unit
Current Transfer Ratio	(I_F = ±1 mA, V_{CE} = 5 V) (note 1)	CTR	H11AA814	20		300	%
	(I_F = ±1 mA, V_{CE} = 5 V) (note 1)		H11AA814A	50		150	%
	(I_F = 10 mA, V_{CE} = 5 V) (note 1)		H11A617A	40		80	%
			H11A617B	63		125	%
			H11A617C	100		200	%
			H11A617D	160		320	%
	(I_F = 5 mA, V_{CE} = 5 V) (note 1)		H11A817	50		600	%
			H11A817A	80		160	%
			H11A817B	130		260	%
			H11A817C	200		400	%
			H11A817D	300		600	%
	(I_F = 1 mA, V_{CE} = 5 V) (note 1)		H11A617A	13			%
			H11A617B	22			%
			H11A617C	34			%
			H11A617D	56			%
Collector-Emitter Saturation Voltage	(I_C = 1 mA, I_F = ±20 mA) (I_C = 2.5 mA, I_F = 10 mA) (I_C = 1 mA, I_F = 20 mA)	$V_{CE\ (SAT)}$	H11AA814/A			0.2	V
			H11A617A/B/C/D			0.4	
			H11A817/A/B/C/D			0.2	
AC Characteristic							
Rise Time	(I_C = 2 mA, V_{CE} = 2 V, R_L = 100Ω) (note 2)	t_r	ALL		2.4	18	µs
Fall Time	(I_C = 2 mA, V_{CE} = 2 V, R_L = 100Ω) (note 2)	t_f	ALL		2.4	18	µs

ISOLATION CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Min	Typ*	Max	Units
Input-Output Isolation Voltage (note 3)	f = 60Hz, t = 1 min	V_{ISO}	5300			Vac(rms)
Isolation Resistance	(V_{I-O} = 500 VDC)	R_{ISO}	10^{11}			Ω
Isolation Capacitance	(V_{I-O} = 0, f = 1 MHz)	C_{ISO}		0.5		pf

*Typical values at T_A = 25°C.

NOTES

1. Current Transfer Ratio (CTR) = I_C/I_F x 100%.
2. For test circuit setup and waveforms, refer to Figure 8.
3. For this test, Pins 1 and 2 are common, and Pins 3 and 4 are common.

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Fig. 1 Normalized CTR vs. Forward Current

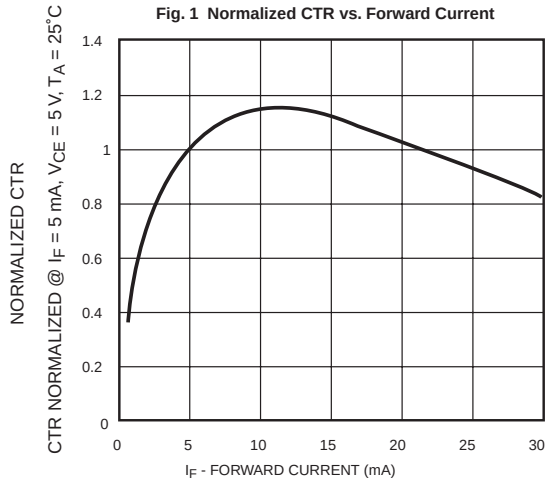

Fig. 2 Normalized CTR vs. Ambient Temperature

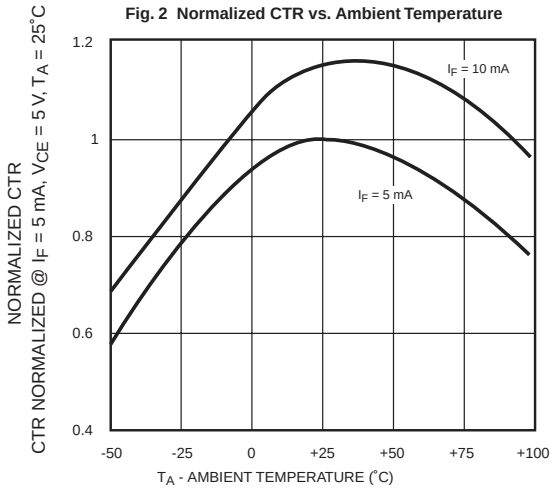

Fig. 3 Collector-Emitter Saturation Voltage vs. Ambient Temperature

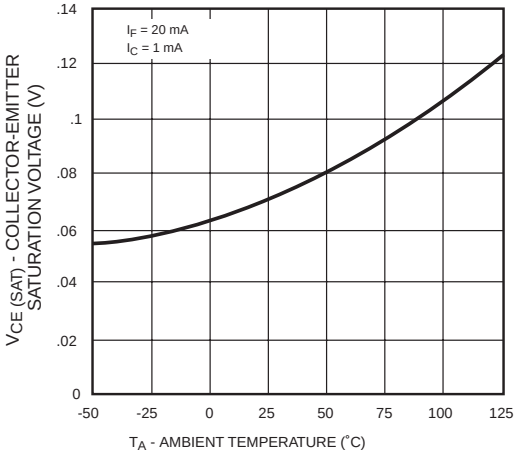

Fig. 4 Forward Voltage vs. Forward Current

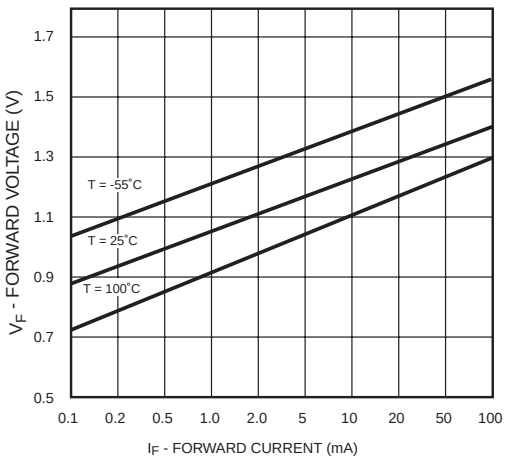

Fig. 5 Collector Current vs. Collector-Emitter Voltage

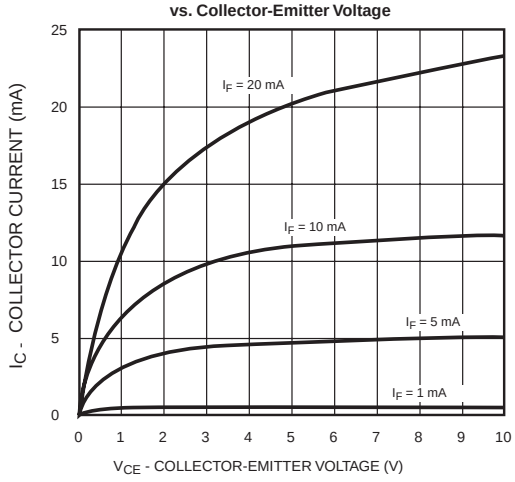

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Fig. 6 Collector Leakage Current vs. Ambient Temperature

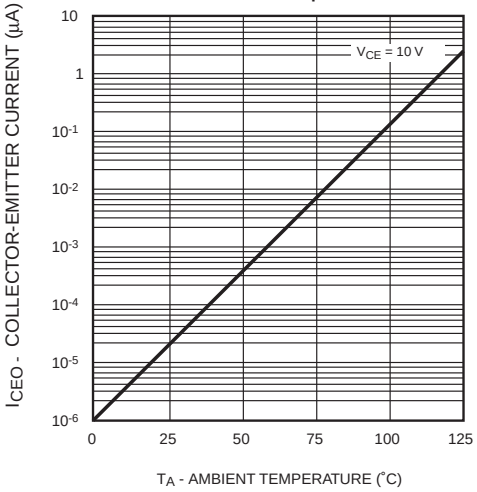


Fig. 7 Rise and Fall Time vs. Load Resistor

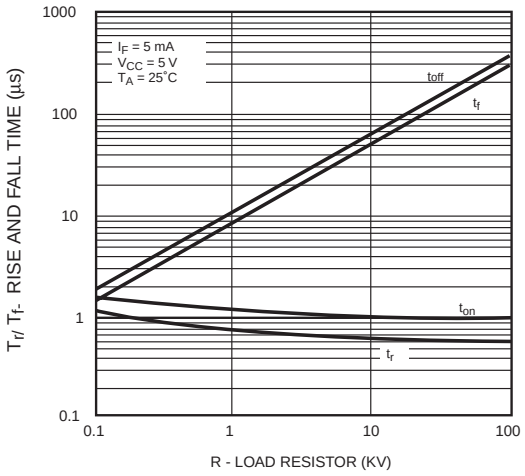
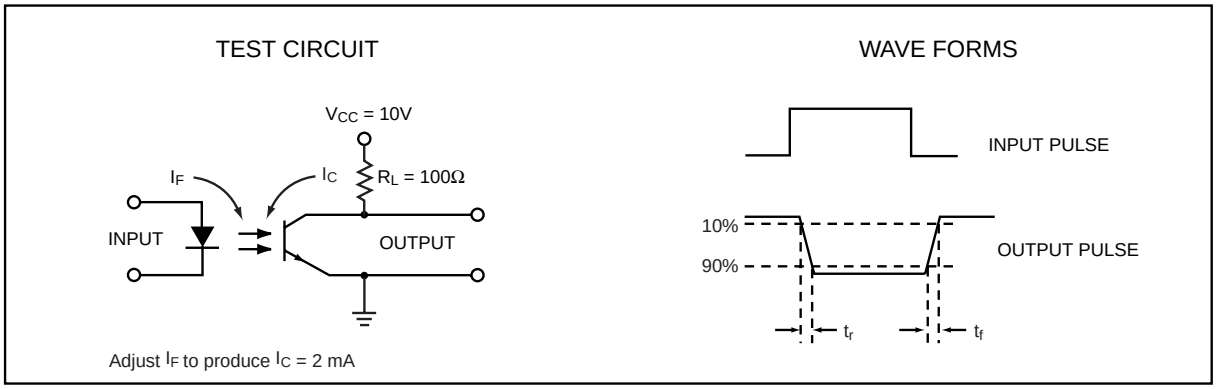
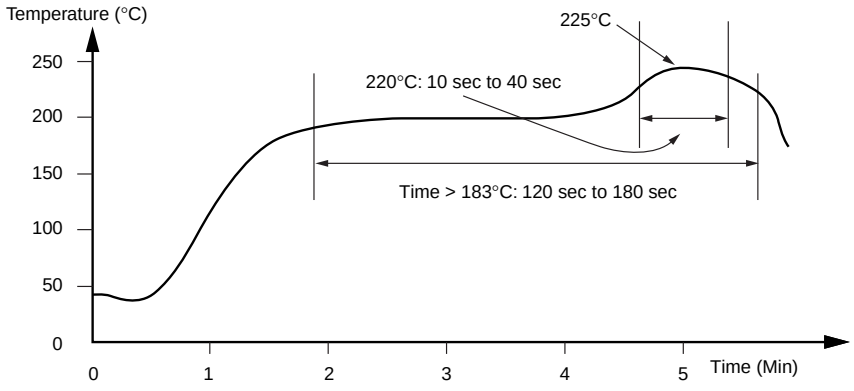


Figure 8. Switching Time Test Circuit and Waveforms



Recommended Thermal Reflow Profile for Surface Mount DIP Package



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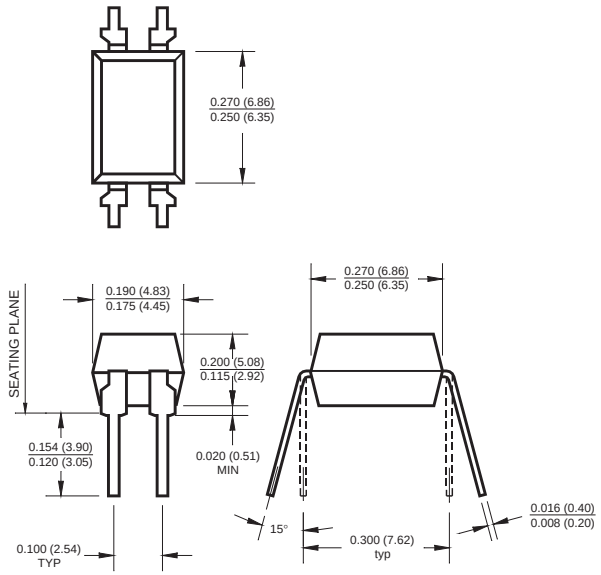
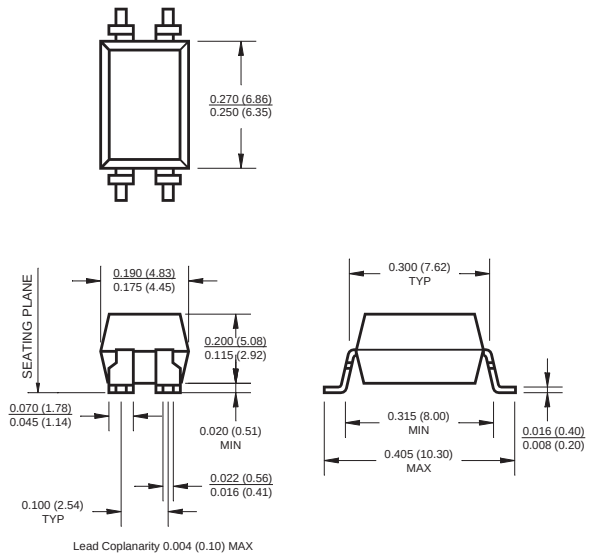
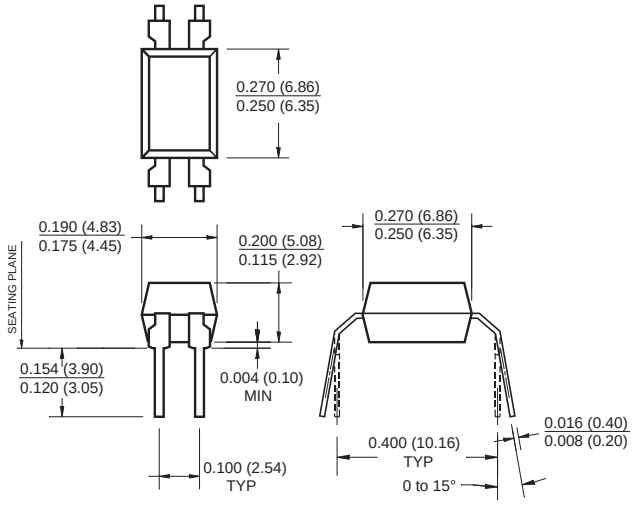
Package Dimensions (Through Hole)



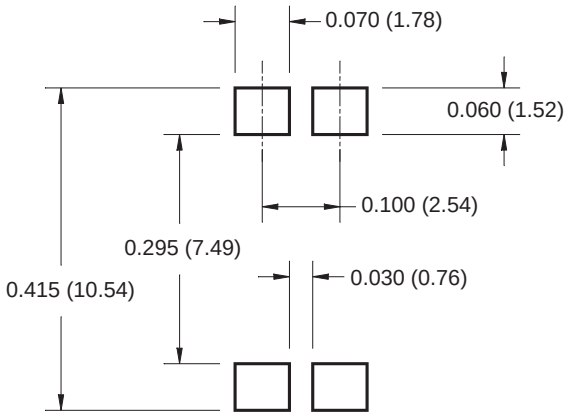
Package Dimensions (Surface Mount)



Package Dimensions (0.4” Lead Spacing)



Footprint Dimensions (Surface Mount)



NOTE
All dimensions are in inches (millimeters)

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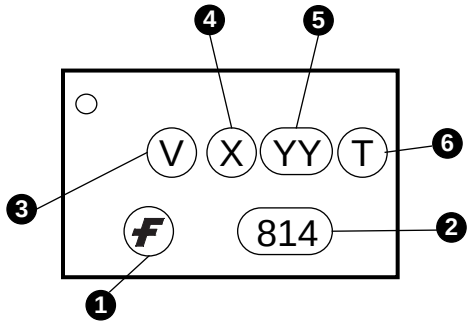
ORDERING INFORMATION

Option	Order Entry Identifier	Description
S	.S	Surface Mount Lead Bend
SD	.SD	Surface Mount; Tape and reel
W	.W	0.4" Lead Spacing
300	.300	VDE 0884
300W	.300W	VDE 0884, 0.4" Lead Spacing
3S	.3S	VDE 0884, Surface Mount
3SD	.3SD	VDE 0884, Surface Mount, Tape & Reel

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

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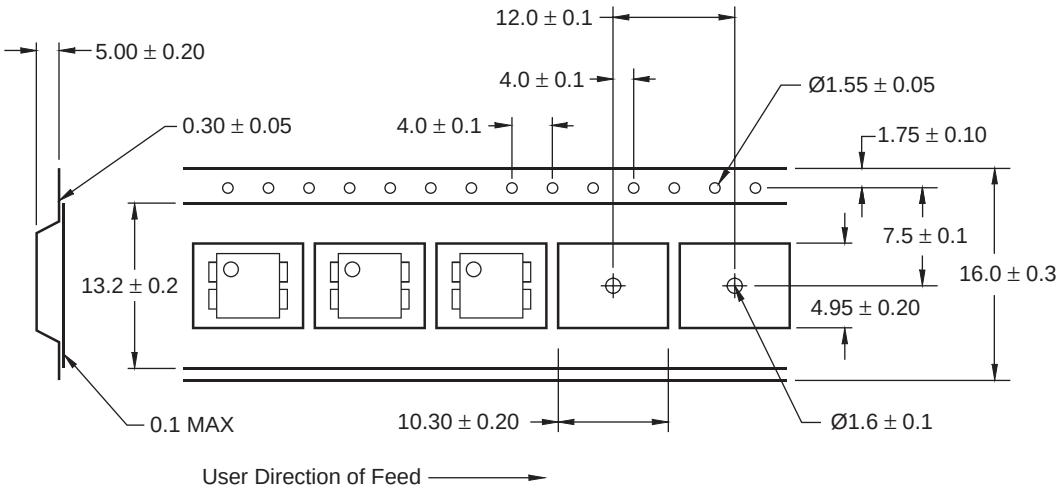
Carrier Tape Specifications



NOTE
All dimensions are in millimeters

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