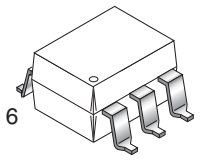
FAIRCHILD
SEMICONDUCTOR®

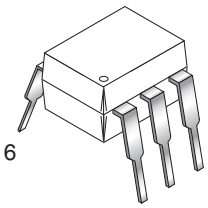
PHOTOTRANSISTOR OPTOCOUPLERS

H11AV1-M H11AV1A-M H11AV2-M H11AV2A-M

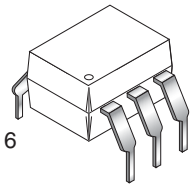
PACKAGE OUTLINE



H11AV1S-M, H11AV2S-M

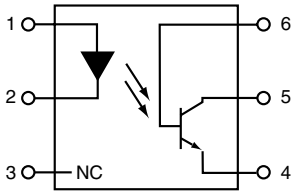


H11AV1-M, H11AV2-M



H11AV1A-M, H11AV2A-M

SCHEMATIC



PIN 1. ANODE
2. CATHODE
3. NO CONNECTION
4. EMITTER
5. COLLECTOR
6. BASE

DESCRIPTION

The general purpose optocouplers consist of a gallium arsenide infrared emitting diode driving a silicon phototransistor in a 6-pin dual in-line white package.

FEATURES

- H11AV1 and H11AV2 feature 0.3" input-output lead spacing
- H11AV1A and H11AV2A feature 0.4" input-output lead spacing
- UL recognized (File #E90700, Vol. 2)
- VDE recognized (File #102497)
  - Add option V (e.g., H11AV1AV-M)

APPLICATIONS

- Power supply regulators
- Digital logic inputs
- Microprocessor inputs

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise specified)			
Parameter	**Symbol**	**Value**	**Units**
TOTAL DEVICE			
Storage Temperature	T_{STG}	-40 to +150	°C
Operating Temperature	T_{OPR}	-40 to +100	°C
Wave solder temperature (see page 9 for reflow solder profiles)	T_{SOL}	260 for 10 sec	°C
Total Device Power Dissipation @ T_A = 25°C	P_D	250	mW
Derate above 25°C		2.94	mW/°C
EMITTER			
DC/Average Forward Input Current	I_F	60	mA
Reverse Input Voltage	V_R	6	V
LED Power Dissipation @ T_A = 25°C	P_D	120	mW
Derate above 25°C		1.41	mW/°C
DETECTOR			
Collector-Emitter Voltage	V_{CEO}	70	V
Collector-Base Voltage	V_{CBO}	70	V
Emitter-Collector Voltage	V_{ECO}	7	V
Detector Power Dissipation @ T_A = 25°C	P_D	150	mW
Derate above 25°C		1.76	mW/°C

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

INDIVIDUAL COMPONENT CHARACTERISTICS

Parameter	Test Conditions	Symbol	Min	Typ*	Max	Unit
EMITTER						
Input Forward Voltage (I_F = 10 mA)	T_A = 25°C	V_F	0.8	1.18	1.5	V
	T_A = -55°C		0.9	1.28	1.7	
	T_A = 100°C		0.7	1.05	1.4	
Reverse Leakage Current	(V_R = 6.0 V)	I_R			10	µA
DETECTOR						
Collector-Emitter Breakdown Voltage	(I_C = 1.0 mA, I_F = 0)	BV_{CEO}	70	100		V
Collector-Base Breakdown Voltage	(I_C = 100 µA, I_F = 0)	BV_{CBO}	70	120		V
Emitter-Collector Breakdown Voltage	(I_E = 100 µA, I_F = 0)	BV_{ECO}	7	10		V
Collector-Emitter Dark Current	(V_{CE} = 10 V, I_F = 0)	I_{CEO}		1	50	nA
Collector-Base Dark Current	(V_{CB} = 10 V)	I_{CBO}		0.5		nA
Capacitance	(V_{CE} = 0 V, f = 1 MHz)	C_{CE}		8		pF

ISOLATION CHARACTERISTICS

Characteristic	Test Conditions	Symbol	Min	Typ*	Max	Units
Input-Output Isolation Voltage	(f = 60 Hz, t = 1 sec)	V_{ISO}	7500			Vac(pk)
Isolation Resistance	(V_{I-O} = 500 VDC)	R_{ISO}	10^{11}			Ω
Isolation Capacitance	(V_{I-O} = 0 V, f = 1 MHz)	C_{ISO}		0.2	2	pF

Note
* Typical values at T_A = 25°C

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

DC Characteristic	Test Conditions	Symbol	Device	Min	Typ*	Max	Unit
Current Transfer Ratio, Collector to Emitter	(I_F = 10 mA, V_{CE} = 10 V)	CTR	H11AV1 H11AV1A	100		300	%
			H11AV2 H11AV2A	50			
Collector-Emitter Saturation Voltage	(I_C = 2 mA, I_F = 20 mA)	$V_{CE\ (SAT)}$	All			0.4	V
AC Characteristic							
Non-Saturated Turn-on Time	(I_C = 2 mA, V_{CC} = 10 V, R_L = 100Ω) (Fig. 11)	T_{ON}	All			15	µs
Non Saturated Turn-off Time	(I_C = 2 mA, V_{CC} = 10 V, R_L = 100Ω) (Fig. 11)	T_{ON}	All			15	µs

* Typical values at T_A = 25°C

TYPICAL PERFORMANCE CURVES

Fig. 1 LED Forward Voltage vs. Forward Current

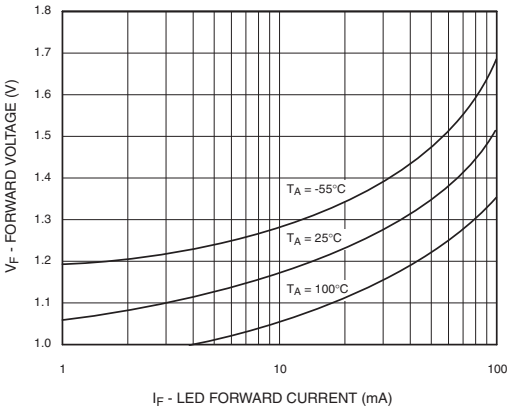


Fig. 2 Normalized CTR vs. Forward Current

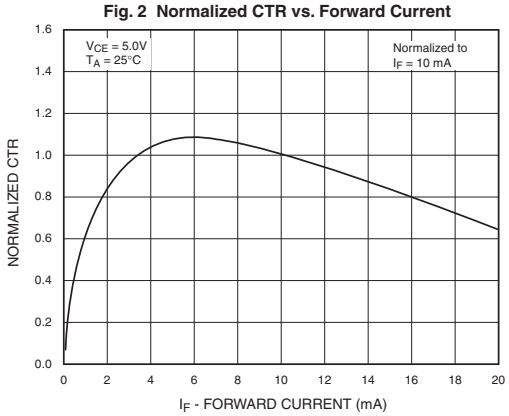


Fig. 3 Normalized CTR vs. Ambient Temperature

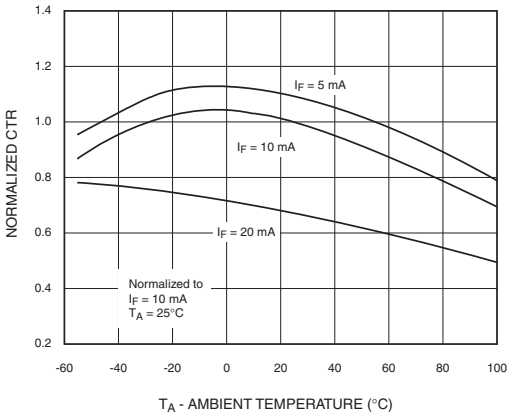


Fig. 4 CTR vs. RBE (Unsaturated)

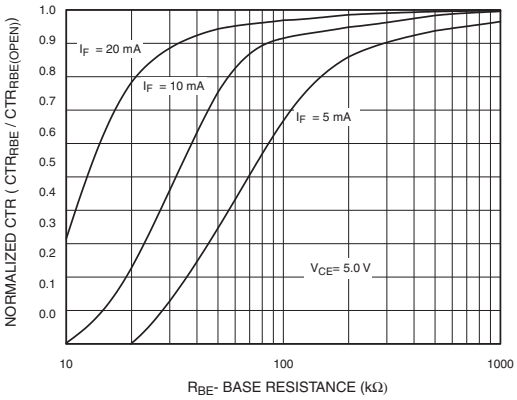


Fig. 5 CTR vs. RBE (Saturated)

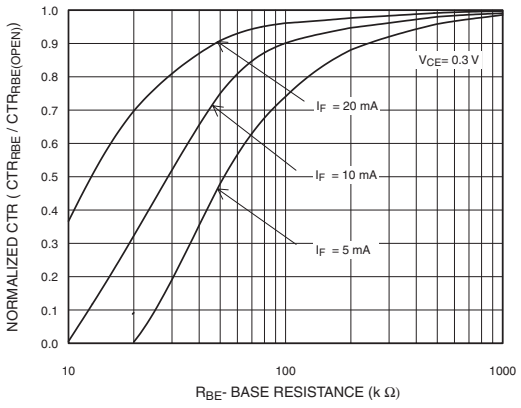


Fig. 6 Collector-Emitter Saturation Voltage vs Collector Current

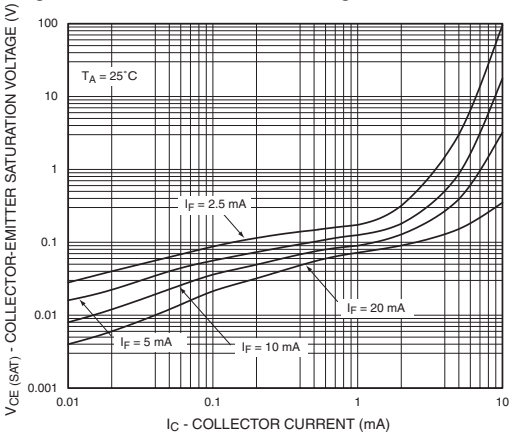


Fig. 7 Switching Speed vs. Load Resistor

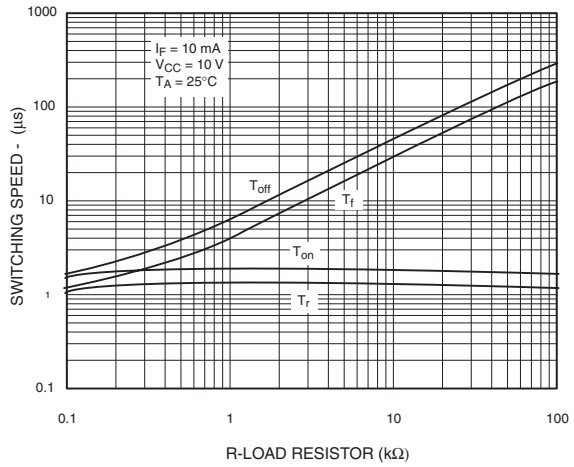


Fig. 8 Normalized t_{on} vs. R_{BE}

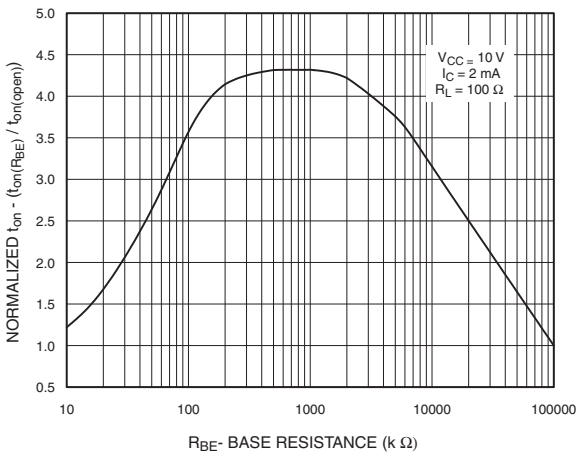


Fig. 9 Normalized t_{off} vs. R_{BE}

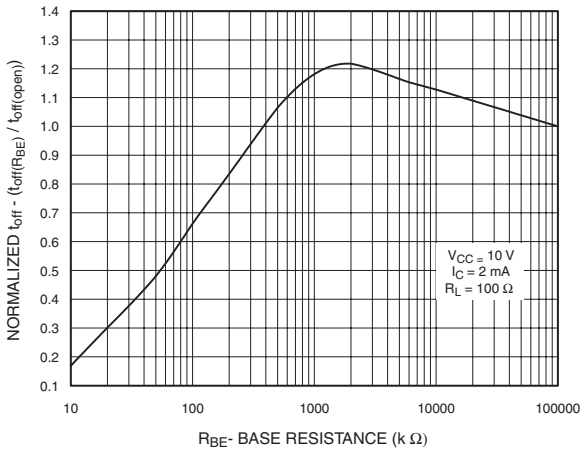
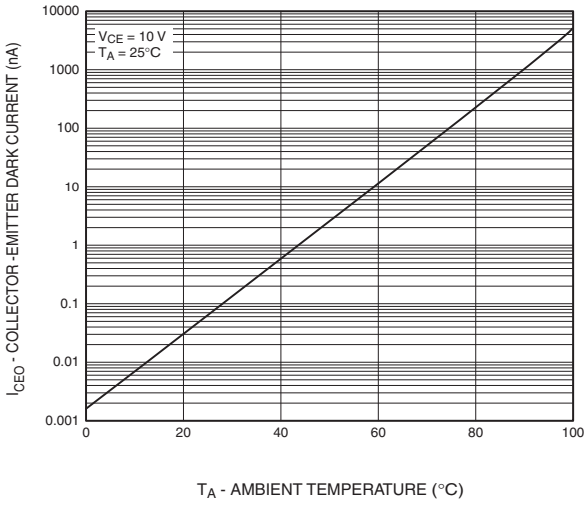


Fig. 10 Dark Current vs. Ambient Temperature



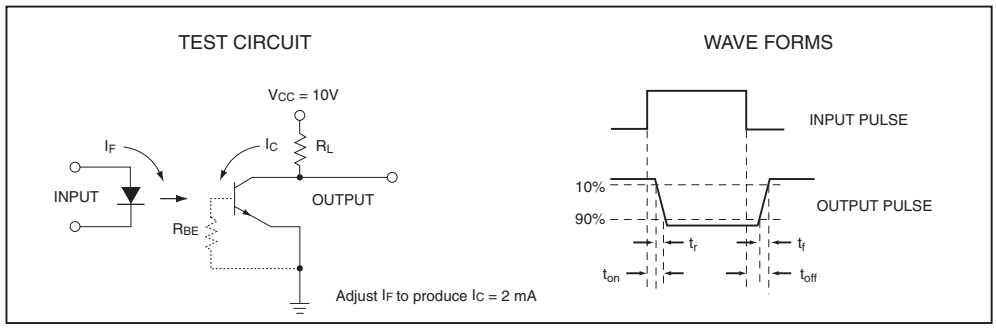
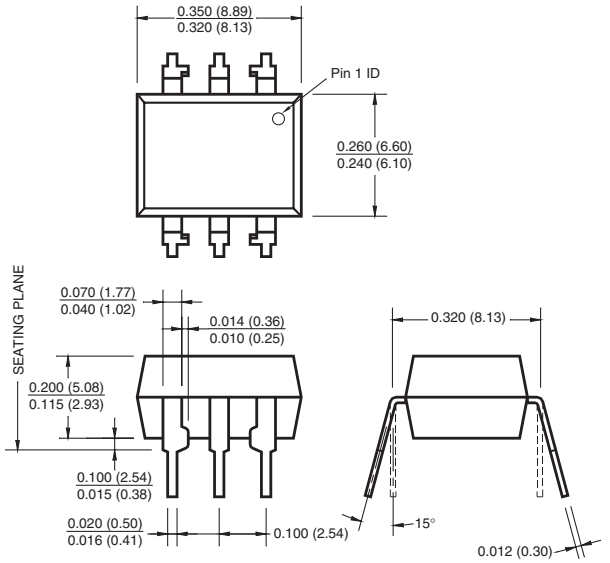


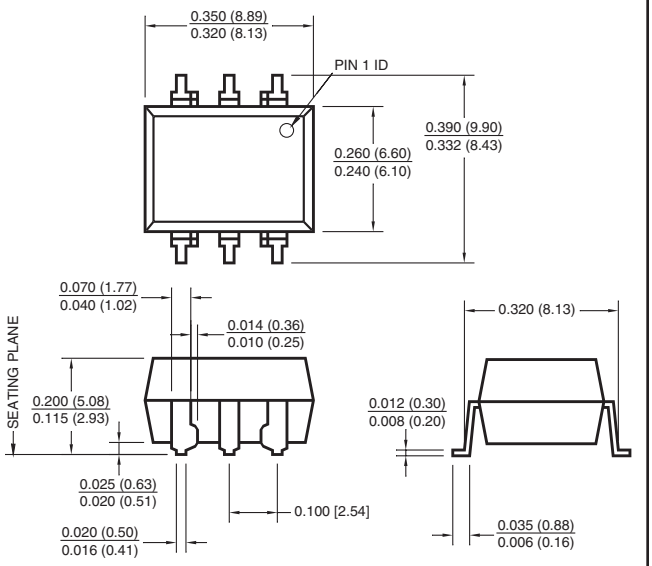
Figure 11. Switching Time Test Circuit and Waveforms

H11AV1-M H11AV1A-M H11AV2-M H11AV2A-M

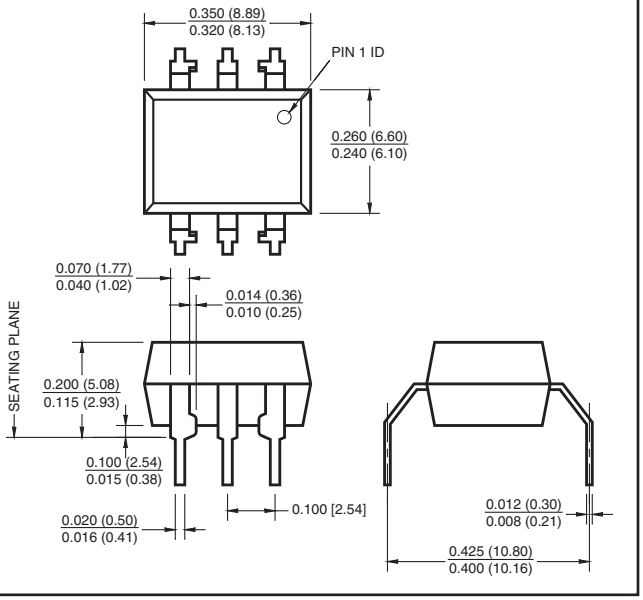
Package Dimensions (Through Hole)



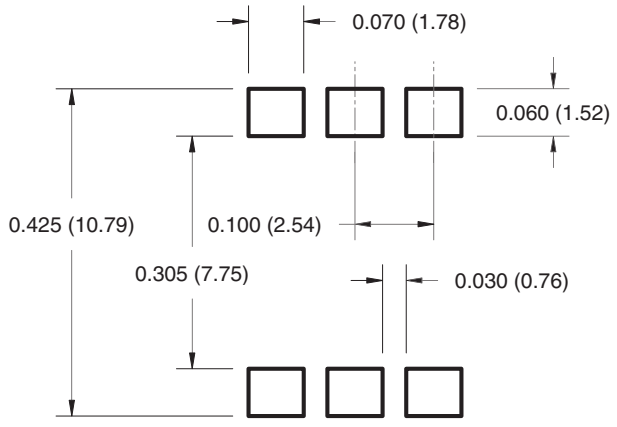
Package Dimensions (Surface Mount)



Package Dimensions (0.4” Lead Spacing)



Recommended Pad Layout for Surface Mount Leadform

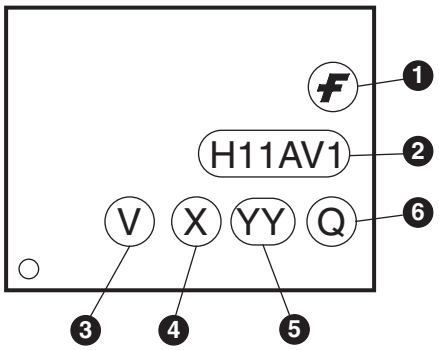


NOTE
All dimensions are in inches (millimeters)

ORDERING INFORMATION

Order Entry Identifier		
Order Entry Identifier	**Option**	**Example**
S	Surface Mount Lead Bend	H11AV1S-M
SR2	Surface Mount; Tape and reel	H11AV1SR2-M
N/A	0.4" Lead Spacing	H11AV1A-M
V	VDE 0884	H11AV1V-M
N/A	VDE 0884, 0.4" Lead Spacing	H11AV1AV-M
SV	VDE 0884, Surface Mount	H11AV1SV-M
SR2V	VDE 0884, Surface Mount, Tape & Reel	H11AV1SR2V-M

MARKING INFORMATION

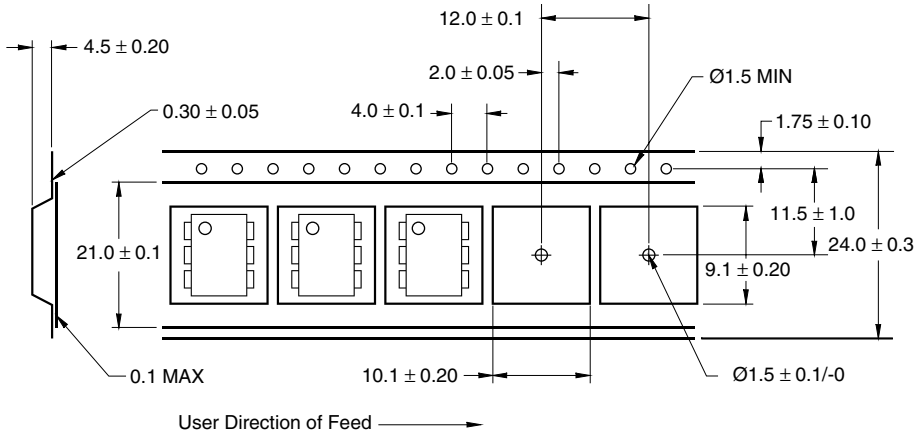


White Package

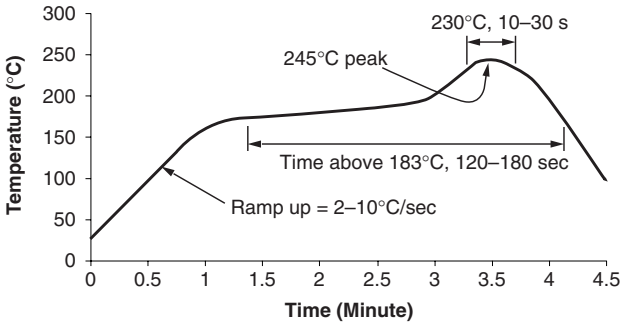
Definitions	
1	Fairchild logo
2	Device number
3	VDE mark (Note: Only appears on parts ordered with VDE option – See order entry table)
4	One digit year code • One digit for white package parts, e.g., '3'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

*Note – Parts built in the white package (M suffix) that do not have the 'V' option (see definition 3 above) that are marked with date code '325' or earlier are marked in the portrait format.

Carrier Tape Specifications



Reflow Profile



- Peak reflow temperature: 245°C (package surface temperature)
- Time of temperature higher than 183°C for 120–180 seconds
- 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.

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