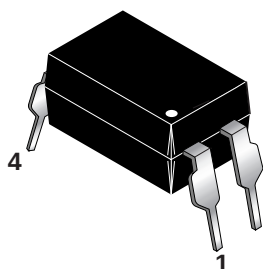


## H11AA814 SERIES

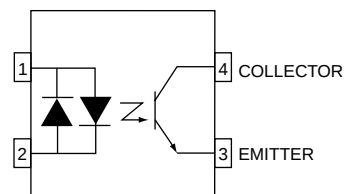
## H11A617 SERIES

## H11A817 SERIES

### PACKAGE



### H11AA814 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.

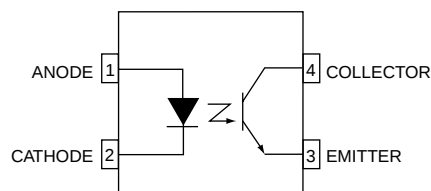
The H11A617 and H11A817 Series consists of a gallium arsenide infrared emitting diode driving a silicon phototransistor in a 4-pin dual in-line package.

### 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

### H11A617 & H11A817 SCHEMATIC



### 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

**H11AA814 SERIES**

**H11A617 SERIES**

**H11A817 SERIES**

| Parameter                                                      | Symbol             | Device                                         | Value          | Units |
|----------------------------------------------------------------|--------------------|------------------------------------------------|----------------|-------|
| TOTAL DEVICE                                                   |                    |                                                |                |       |
| Storage Temperature                                            | T <sub>STG</sub>   | All                                            | -55 to +150    | °C    |
| Operating Temperature                                          | T <sub>OPR</sub>   | All                                            | -55 to +100    | °C    |
| Lead Solder Temperature                                        | T <sub>SOL</sub>   | All                                            | 260 for 10 sec | °C    |
| Total Device Power Dissipation (-55°C to 50 °C)                | P <sub>D</sub>     | All                                            | 200            | mW    |
| EMITTER                                                        |                    |                                                |                |       |
| Continuous Forward Current                                     | I <sub>F</sub>     | All                                            | 50             | mA    |
| Reverse Voltage                                                | V <sub>R</sub>     | H11A617A/B/C/D<br>H11A817A/B/C/D               | 6<br>5         | V     |
| Forward Current - Peak (1 μs pulse, 300 pps)                   | I <sub>F(pk)</sub> | All                                            | 1.0            | A     |
| LED Power Dissipation (25°C ambient)<br>Derate above 25°C      | P <sub>D</sub>     | All                                            | 100            | mW    |
|                                                                |                    |                                                | 1.33           | mW/°C |
| DETECTOR                                                       |                    |                                                |                |       |
| Collector-Emitter Voltage                                      | V <sub>CEO</sub>   | All                                            | 70             | V     |
| Emitter-Collector Voltage                                      | V <sub>ECO</sub>   | H11AA814/A<br>H11A617A/B/C/D<br>H11A817A/B/C/D | 6<br>7<br>6    | V     |
| Continuous Collector Current                                   | I <sub>C</sub>     | All                                            | 50             | mA    |
| Detector Power Dissipation (25°C ambient)<br>Derate above 25°C | P <sub>D</sub>     | All                                            | 150            | mW    |
|                                                                |                    |                                                | 2.0            | mW/°C |

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  Unless otherwise specified.)

**INDIVIDUAL COMPONENT CHARACTERISTICS**

| Parameter                           | Test Conditions                               | Symbol            | Device                                 | Min | Typ* | Max  | Unit |
|-------------------------------------|-----------------------------------------------|-------------------|----------------------------------------|-----|------|------|------|
| <b>EMITTER</b>                      |                                               |                   |                                        |     |      |      |      |
| Input Forward Voltage               | (I <sub>F</sub> = 60 mA)                      | V <sub>F</sub>    | H11A617A/B/C/D                         |     | 1.35 | 1.65 | V    |
|                                     | (I <sub>F</sub> = 20 mA)                      |                   | H11A817A/B/C/D                         |     | 1.2  | 1.5  |      |
|                                     | (I <sub>F</sub> = ±20 mA)                     |                   | H11AA814/A                             |     | 1.2  | 1.5  |      |
| Reverse Leakage Current             | (V <sub>R</sub> = 6.0 V)                      | I <sub>R</sub>    | H11A617A/B/C/D                         |     | .001 | 10   | μA   |
|                                     | (V <sub>R</sub> = 5.0 V)                      |                   | H11A817A/B/C/D                         |     |      |      |      |
| <b>DETECTOR</b>                     |                                               |                   |                                        |     |      |      |      |
| Collector-Emitter Breakdown Voltage | (I <sub>C</sub> = 1.0 mA, I <sub>F</sub> = 0) | BV <sub>CEO</sub> | ALL                                    | 70  | 100  |      | V    |
| Emitter-Collector Breakdown Voltage | (I <sub>E</sub> = 100 μA, I <sub>F</sub> = 0) | BV <sub>ECO</sub> | H11AA814/A                             | 6   | 10   |      | V    |
|                                     |                                               |                   | H11A617A/B/C/D                         | 7   |      |      |      |
|                                     |                                               |                   | H11A817A/B/C/D                         | 6   |      |      |      |
| Collector-Emitter Dark Current      | (V <sub>CE</sub> = 10V, I <sub>F</sub> = 0)   | I <sub>CEO</sub>  | H11AA814/A, H11A817A/B/C/D, H11A617C/D |     | 1    | 100  | nA   |
|                                     |                                               |                   | H11A617A/B                             |     |      | 50   |      |
| Collector-Emitter Capacitance       | (V <sub>CE</sub> = 0 V, f = 1 MHz)            | C <sub>CE</sub>   | ALL                                    |     | 8    |      | pF   |

\*Typical values at  $T_A = 25^\circ\text{C}$ .

**H11AA814 SERIES**

**H11A617 SERIES**

**H11A817 SERIES**

| TRANSFER CHARACTERISTICS (T <sub>A</sub> = 25°C Unless otherwise specified.) |                                                                                                                                                          |                       |                                                         |         |      |     |      |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------|---------|------|-----|------|
| DC Characteristic                                                            | Test Conditions                                                                                                                                          | Symbol                | Device                                                  | Min     | Typ* | Max | Unit |
| Current Transfer Ratio                                                       | (I <sub>F</sub> = ±1 mA, V <sub>CE</sub> = 5 V) (note 1)                                                                                                 | CTR                   | H11AA814                                                | 20      |      | 300 | %    |
|                                                                              | (I <sub>F</sub> = ±1 mA, V <sub>CE</sub> = 5 V) (note 1)                                                                                                 |                       | H11AA814A                                               | 50      |      | 150 | %    |
|                                                                              | (I <sub>F</sub> = 10 mA, V <sub>CE</sub> = 5 V) (note 1)                                                                                                 |                       | H11A617A                                                | 40      |      | 80  | %    |
|                                                                              |                                                                                                                                                          |                       | H11A617B                                                | 63      |      | 125 | %    |
|                                                                              |                                                                                                                                                          |                       | H11A617C                                                | 100     |      | 200 | %    |
|                                                                              |                                                                                                                                                          |                       | H11A617D                                                | 160     |      | 320 | %    |
|                                                                              |                                                                                                                                                          |                       | (I <sub>F</sub> = 5 mA, V <sub>CE</sub> = 5 V) (note 1) | H11A817 | 50   |     | 600  |
|                                                                              | H11A817A                                                                                                                                                 |                       |                                                         | 80      |      | 160 | %    |
|                                                                              | H11A817B                                                                                                                                                 |                       |                                                         | 130     |      | 260 | %    |
|                                                                              | H11A817C                                                                                                                                                 |                       |                                                         | 200     |      | 400 | %    |
|                                                                              | H11A817D                                                                                                                                                 |                       |                                                         | 300     |      | 600 | %    |
|                                                                              | (I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 5 V) (note 1)                                                                                                  |                       | H11A617A                                                | 13      |      |     | %    |
|                                                                              |                                                                                                                                                          |                       | H11A617B                                                | 22      |      |     | %    |
|                                                                              |                                                                                                                                                          |                       | H11A617C                                                | 34      |      |     | %    |
|                                                                              |                                                                                                                                                          |                       | H11A617D                                                | 56      |      |     | %    |
| Collector-Emitter Saturation Voltage                                         | (I <sub>C</sub> = 1 mA, I <sub>F</sub> = ±20 mA)<br>(I <sub>C</sub> = 2.5 mA, I <sub>F</sub> = 10 mA)<br>(I <sub>C</sub> = 1 mA, I <sub>F</sub> = 20 mA) | V <sub>CE (SAT)</sub> | H11AA814/A                                              |         |      | 0.2 | V    |
|                                                                              |                                                                                                                                                          |                       | H11A617A/B/C/D                                          |         |      | 0.4 |      |
|                                                                              |                                                                                                                                                          |                       | H11A817A/B/C/D                                          |         |      | 0.2 |      |
| AC Characteristic                                                            |                                                                                                                                                          |                       |                                                         |         |      |     |      |
| Rise Time                                                                    | (I <sub>C</sub> = 2 mA, V <sub>CE</sub> = 2 V, R <sub>L</sub> = 100Ω) (note 2)                                                                           | t <sub>r</sub>        | ALL                                                     |         | 2.4  | 18  | μs   |
| Fall Time                                                                    | (I <sub>C</sub> = 2 mA, V <sub>CE</sub> = 2 V, R <sub>L</sub> = 100Ω) (note 2)                                                                           | t <sub>f</sub>        | ALL                                                     |         | 2.4  | 18  | μs   |

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

\*Typical values at  $T_A = 25^\circ\text{C}$ .

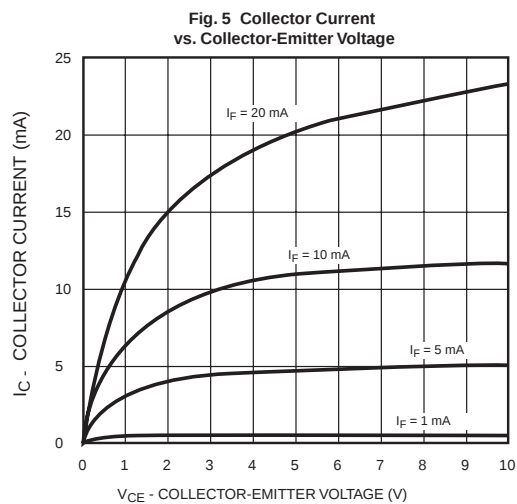
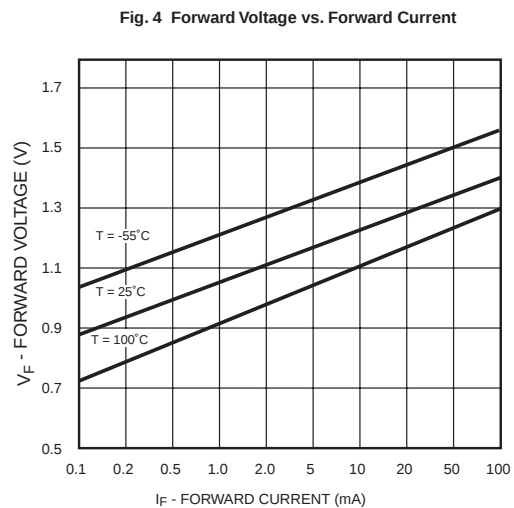
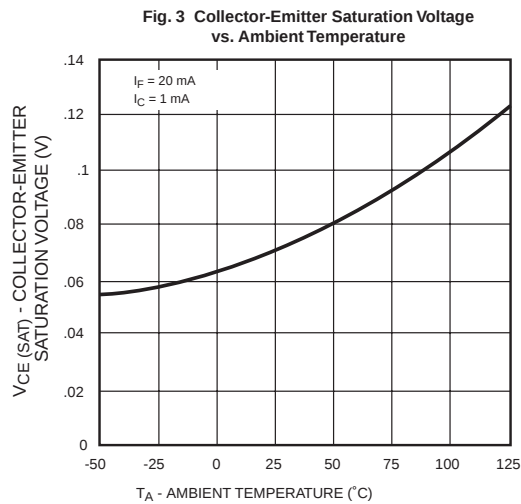
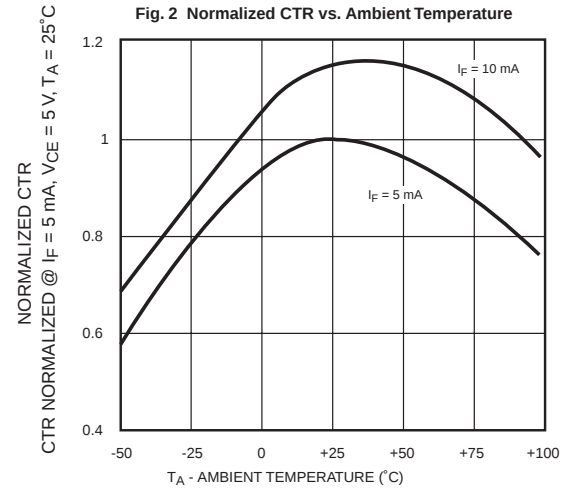
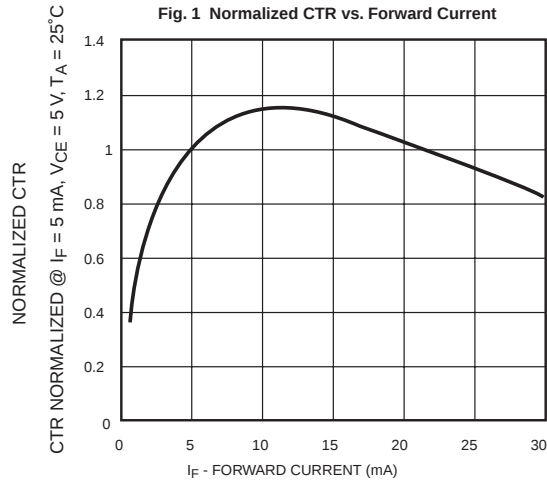
**NOTES**

1. Current Transfer Ratio (CTR) =  $I_C/I_F \times 100\%$ .
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.

**H11AA814 SERIES**

**H11A617 SERIES**

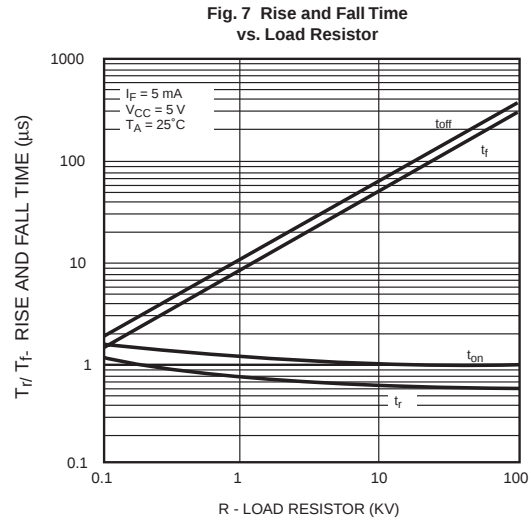
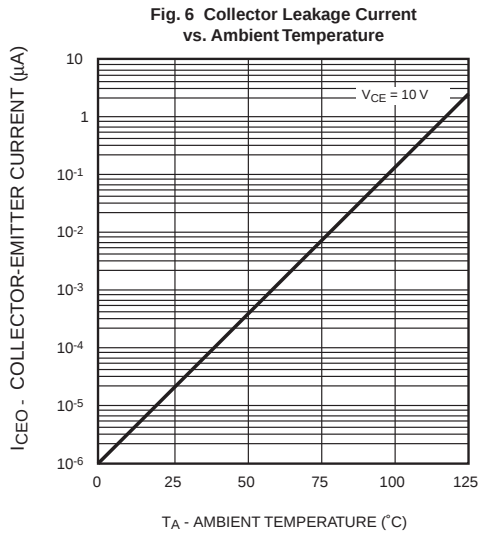
**H11A817 SERIES**



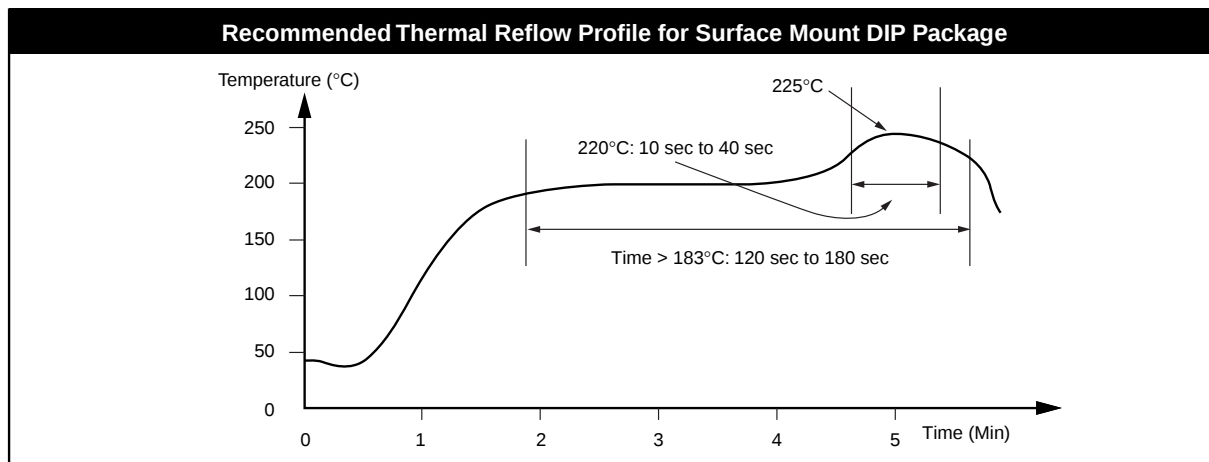
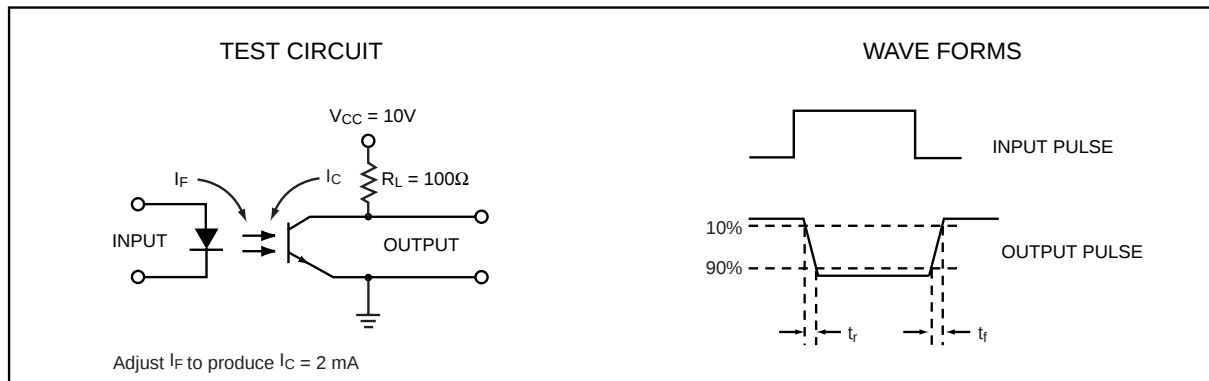
## H11AA814 SERIES

## H11A617 SERIES

## H11A817 SERIES



**Figure 8. Switching Time Test Circuit and Waveforms**

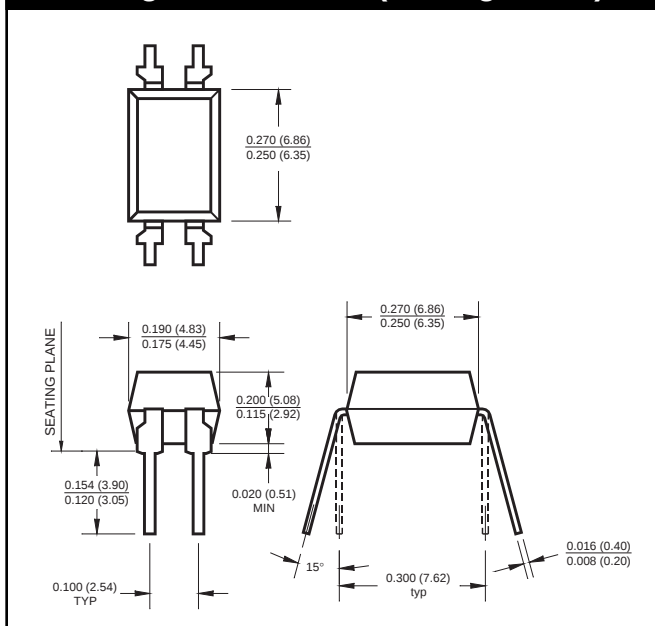


## H11AA814 SERIES

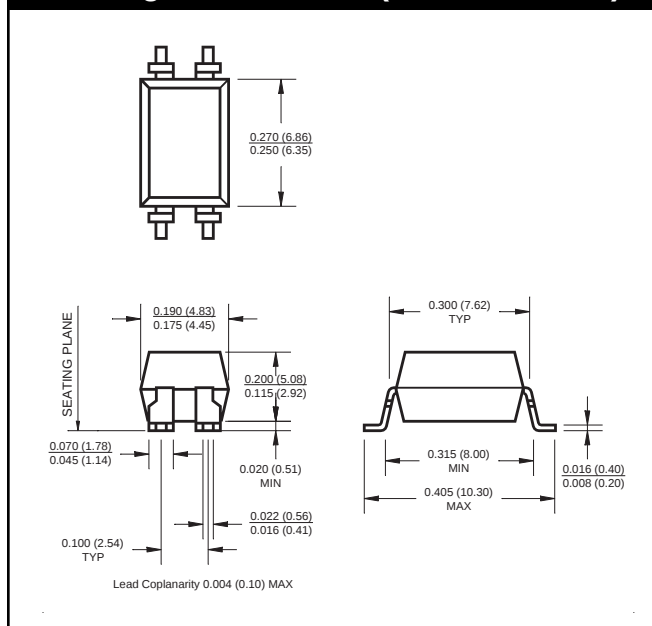
## H11A617 SERIES

## H11A817 SERIES

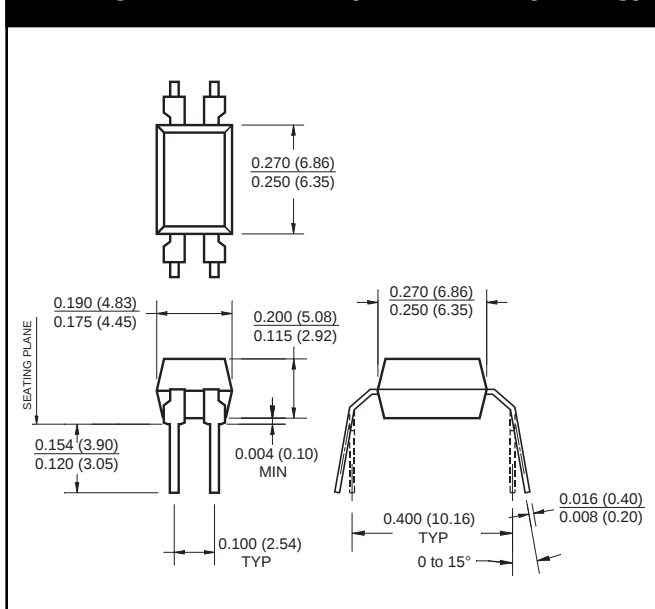
### Package Dimensions (Through Hole)



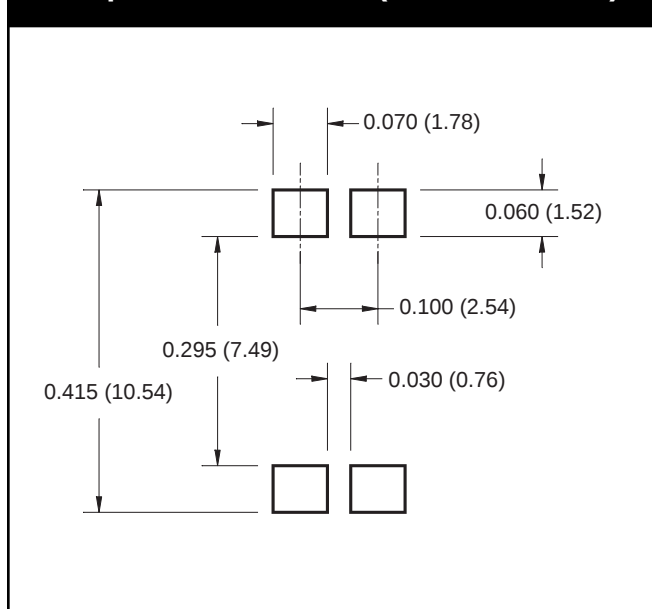
### Package Dimensions (Surface Mount)



### Package Dimensions (0.4" Lead Spacing)



### Footprint Dimensions (Surface Mount)



#### NOTE

All dimensions are in inches (millimeters)

**H11AA814 SERIES**

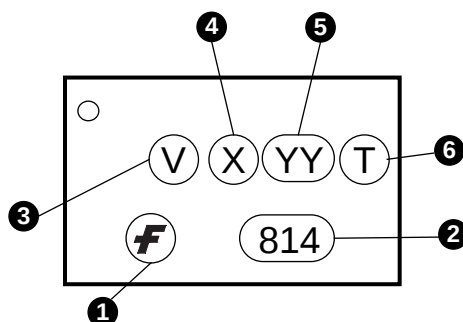
**H11A617 SERIES**

**H11A817 SERIES**

**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**



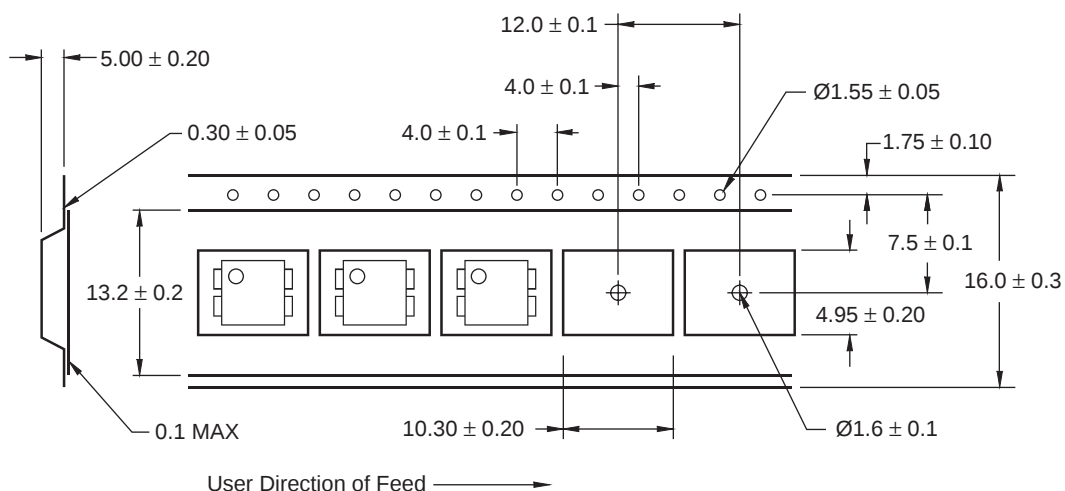
| Definitions |                                                                                        |
|-------------|----------------------------------------------------------------------------------------|
| 1           | Fairchild logo                                                                         |
| 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                                                                  |

**H11AA814 SERIES**

**H11A617 SERIES**

**H11A817 SERIES**

**Carrier Tape Specifications**



**NOTE**

All dimensions are in millimeters

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**H11AA814 SERIES**

**H11A617 SERIES**

**H11A817 SERIES**

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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.