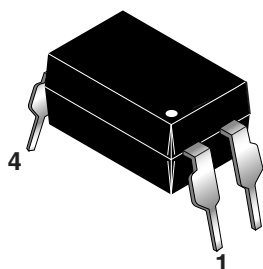


## H11AA814 SERIES

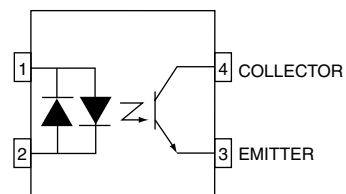
## H11A617 SERIES

## 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.

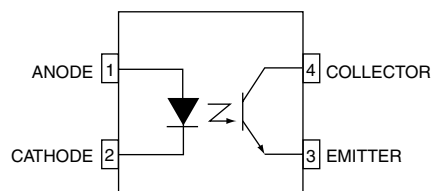
The H11A617 and H11A817 Series consists of a gallium arsenide infrared emitting diode driving a silicon phototransistor in a 4-pin dual in-line package.

### 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>H11A817/A/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>H11A817/A/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)                      |                   | H11A817/A/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)                      |                   | H11A817/A/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   |      |      |      |
|                                     |                                               |                   | H11A817/A/B/C/D                         | 6   |      |      |      |
| Collector-Emitter Dark Current      | (V <sub>CE</sub> = 10V, I <sub>F</sub> = 0)   | I <sub>CEO</sub>  | H11AA814/A, H11A817/A/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> = 100V) (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> = 100V) (note 2)                                                                           | t <sub>f</sub>        | ALL                                                     |         | 2.4  | 18  | μs   |

| <b>ISOLATION CHARACTERISTICS</b>        |                                         |           |           |      |     |          |
|-----------------------------------------|-----------------------------------------|-----------|-----------|------|-----|----------|
| 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  $T_A = 25^\circ\text{C}$ .

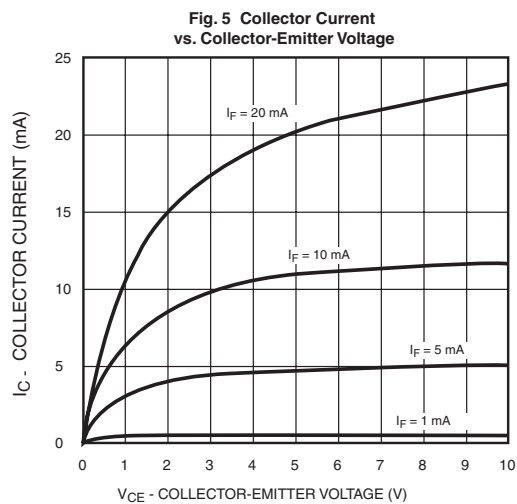
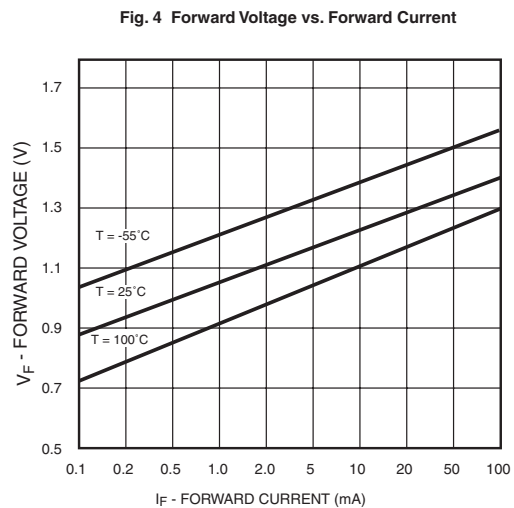
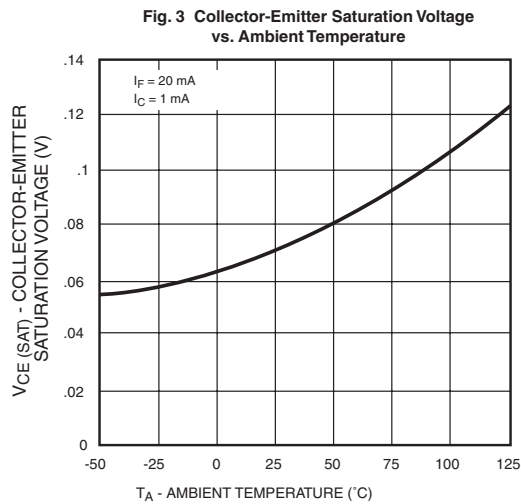
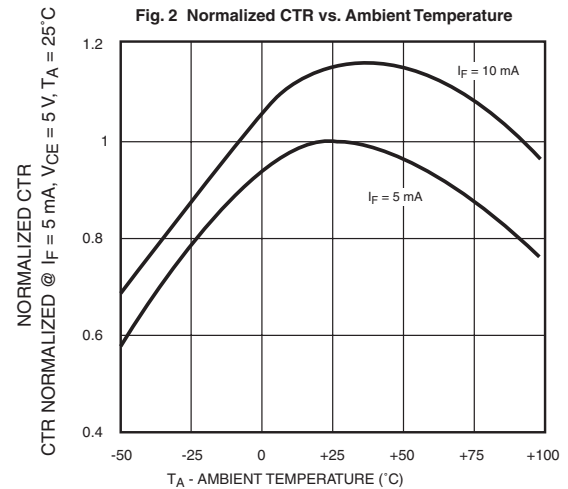
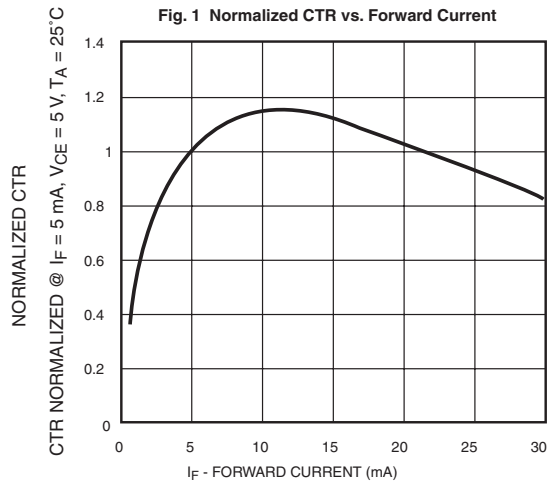
**NOTES**

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

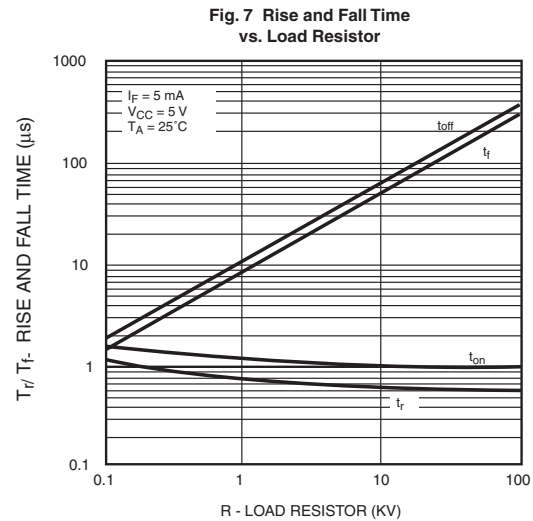
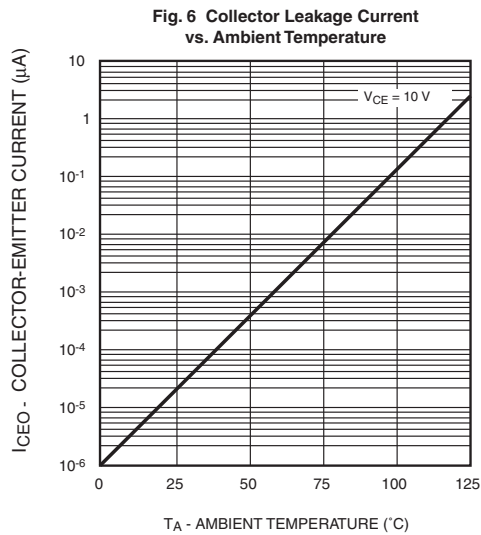
## H11A817 SERIES



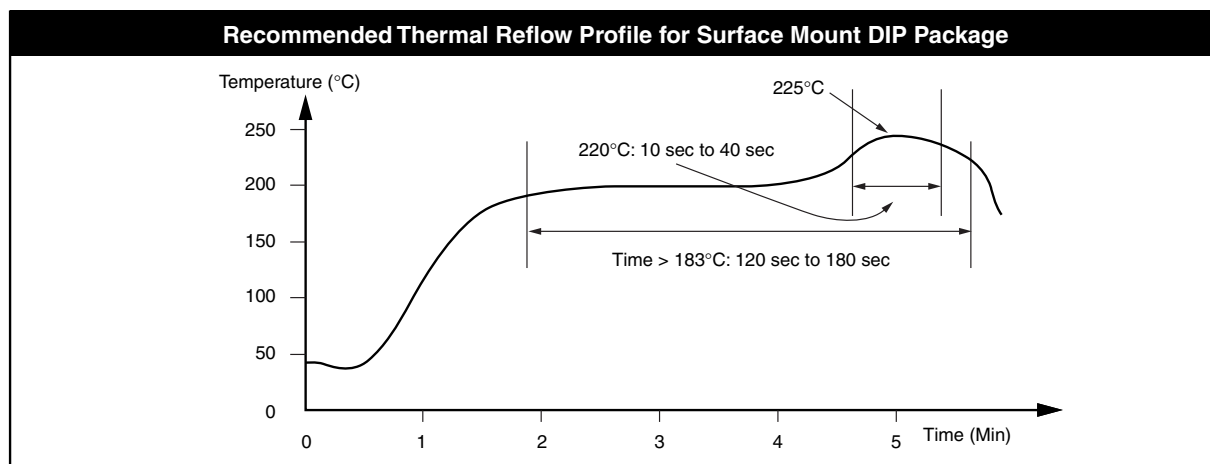
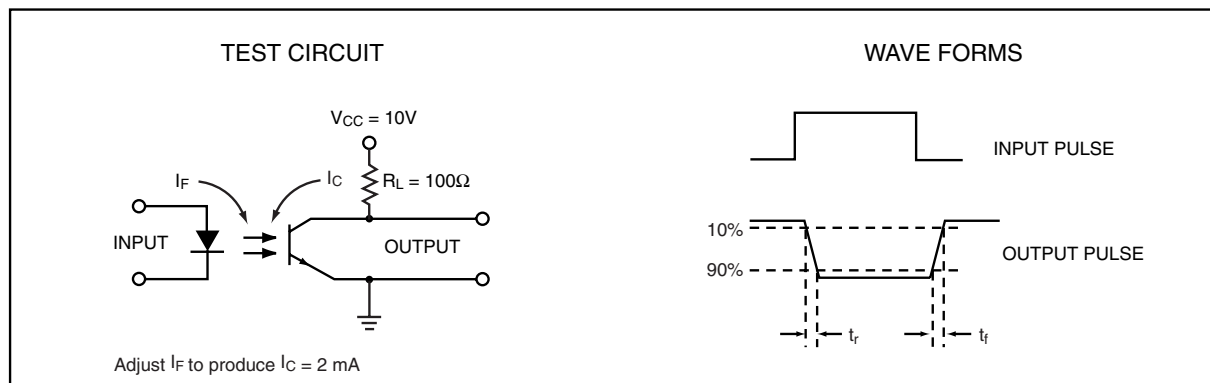
## H11AA814 SERIES

## H11A617 SERIES

## H11A817 SERIES



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

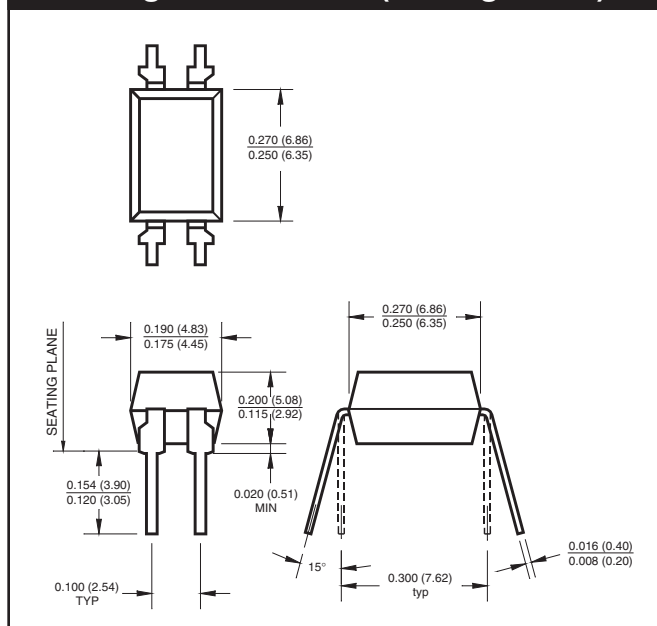


## H11AA814 SERIES

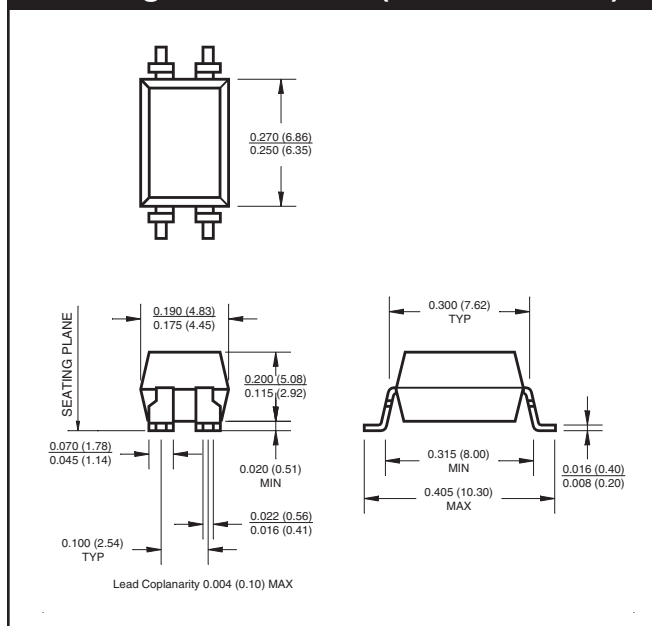
## H11A617 SERIES

## H11A817 SERIES

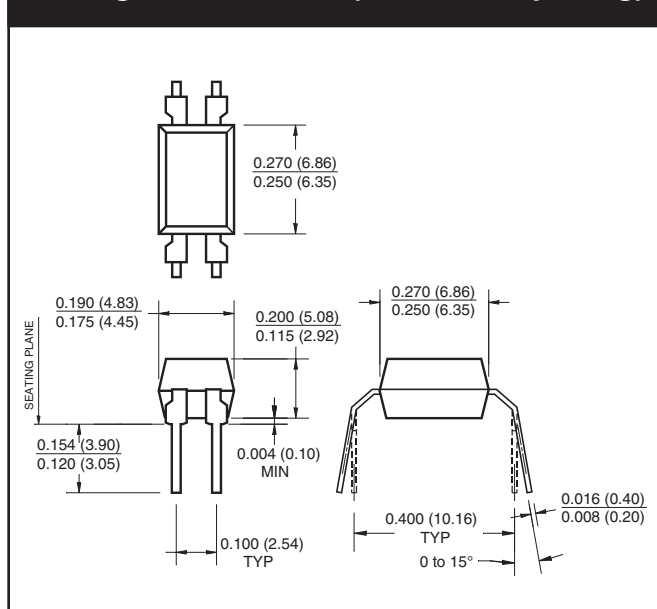
### Package Dimensions (Through Hole)



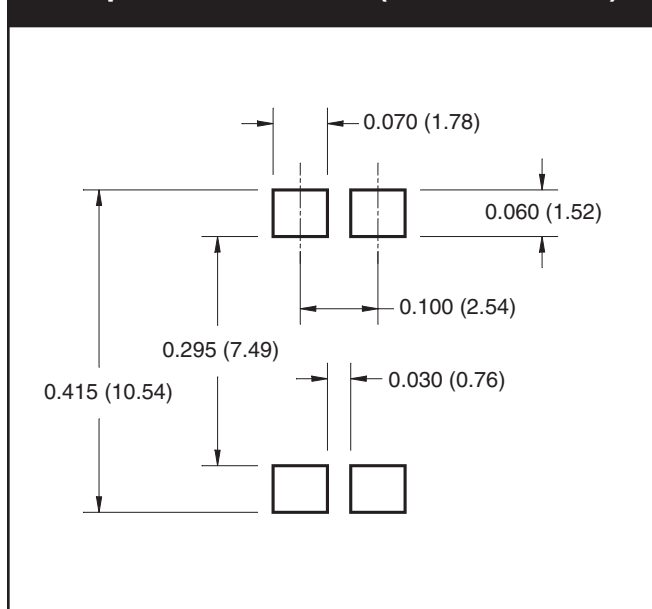
### Package Dimensions (Surface Mount)



### Package Dimensions (0.4" Lead Spacing)



### Footprint Dimensions (Surface Mount)



#### NOTE

All dimensions are in inches (millimeters)

**H11AA814 SERIES**

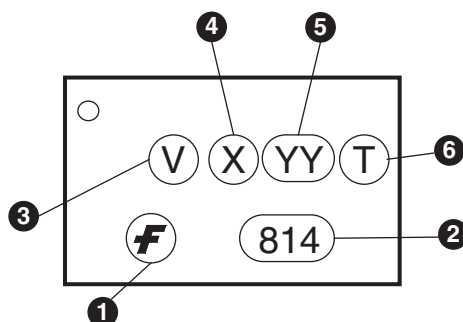
**H11A617 SERIES**

**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**



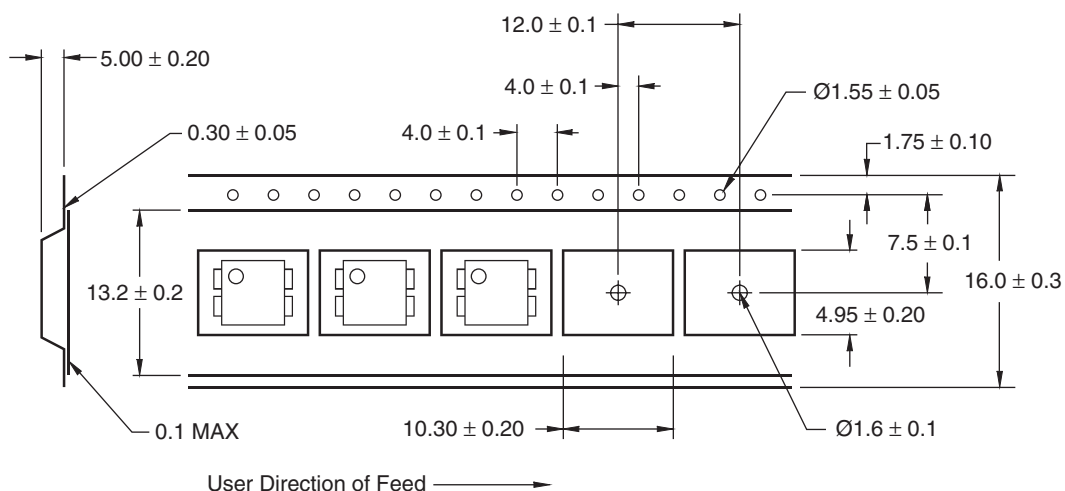
| Definitions |                                                                                        |
|-------------|----------------------------------------------------------------------------------------|
| 1           | Fairchild logo                                                            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