



# THE DATASHEET OF H11C3



**H11C1**

**H11C2**

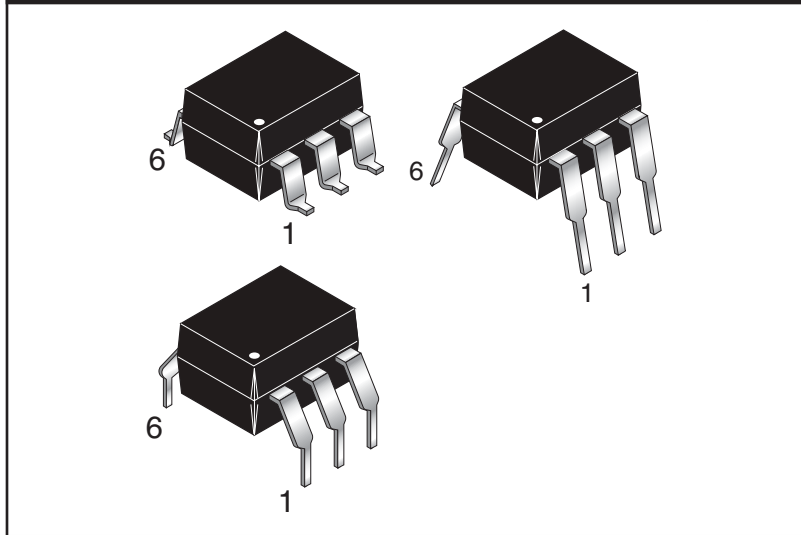
**H11C3**

**H11C4**

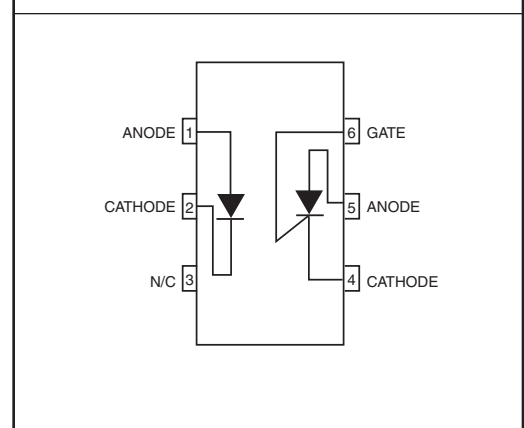
**H11C5**

**H11C6**

**PACKAGE**



**SCHEMATIC**



**DESCRIPTION**

The H11C series consists of a gallium-arsenide infrared emitting diode optically coupled with a light activated silicon controlled rectifier in a dual-in-line package

**FEATURES**

- High efficiency, low degradation, liquid epitaxial LED
- Underwriters Laboratory (UL) recognized fl File #E90700
- VDE recognized (File #94766) – ordering option .300. (e.g., H11C1.300)
- 200V/400V Peak blocking voltage
- High isolation voltage - 5300V AC (RMS)

**APPLICATIONS**

- Low power logic circuits
- Telecommunications equipment
- Portable electronics
- Solid state relays
- Interfacing coupling systems of different potentials and impedances.
- 10 A, T<sup>2</sup>L compatible, solid state relay
- 25 W logic indicator lamp driver
- 200 V symmetrical transistor coupler (H11C1, H11C2, H11C3)
- 400 V symmetrical transistor coupler (H11C4, H11C5, H11C6)

**H11C1**

**H11C2**

**H11C3**

**H11C4**

**H11C5**

**H11C6**

Parameter	Symbol	Device	Value	Units
<b>TOTAL DEVICE</b>				
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
<b>EMITTER</b>				
Continuous Forward Current	$I_F$	All	60	mA
Reverse Voltage	$V_R$	All	6	V
Forward Current - Peak (1 $\mu$ s pulse, 300 pps)	$I_{F(pk)}$	All	3.0	A
LED Power Dissipation Derate above 25°C	$P_D$	All	100	mW
			1.33	mW/°C
<b>DETECTOR</b>				
Power Dissipation (ambient) Derate linearly above 25°C ambient	$P_D$	All	400	mW
			5.3	mW/°C
Power Dissipation (case) Derate linearly above 25°C case	$P_D$	All	1	W
			13.3	mW/°C
Peak Reverse Gate Voltage	$V_{GR}$	All	6	V
RMS On-State Current	$I_{DM (RMS)}$	All	300	mA
Peak On-State Current (100 $\mu$ S, 1% duty cycle)	$I_{DM (Peak)}$	All	10	A
Surge Current (10ms)	$I_{DM (Surge)}$	All	5	A
Peak Forward Voltage	$V_{DM}$	H11C1, H11C2, H11C3	200	V
Peak Forward Voltage	$V_{DM}$	H11C4, H11C5, H11C6	400	V

**H11C1**

**H11C2**

**H11C3**

**H11C4**

**H11C5**

**H11C6**

**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	$I_F = 10 \text{ mA}$	$V_F$	All		1.2	1.5	V
Reverse Leakage Current	$V_R = 3 \text{ V}$	$I_R$	All			10	$\mu\text{A}$
Capacitance	$V_F = 0 \text{ V}, f = 1.0 \text{ MHz}$	$C_J$	All		50		pF
<b>DETECTOR</b>							
Off-State Voltage	$R_{GK} = 10\text{k}\Omega, T_A = 100^\circ\text{C}, I_D = 50\mu\text{A}$	$V_{DM}$	H11C1, H11C2, H11C3	200			V
	$R_{GK} = 10\text{k}\Omega, T_A = 100^\circ\text{C}, I_D = 150\mu\text{A}$		H11C4, H11C5, H11C6	400			
Reverse Voltage	$R_{GK} = 10\text{k}\Omega, T_A = 100^\circ\text{C}, I_R = 50\mu\text{A}$	$V_{RM}$	H11C1, H11C2, H11C3	200			V
	$R_{GK} = 10\text{k}\Omega, T_A = 100^\circ\text{C}, I_R = 150\mu\text{A}$		H11C4, H11C5, H11C6	400			
On-State Voltage	$I_{TM} = 300 \text{ mA}$	$V_{TM}$	All		1.2	1.3	V
Off-State Current	$V_{DM} = 200\text{V}, T_A = 100^\circ\text{C}, I_F = 0 \text{ mA}, R_{GK} = 10\text{k}\Omega$	$I_{DM}$	H11C1, H11C2, H11C3			50	$\mu\text{A}$
	$V_{DM} = 400\text{V}, T_A = 100^\circ\text{C}, I_F = 0 \text{ mA}, R_{GK} = 10\text{k}\Omega$		H11C4, H11C5, H11C6			150	
Reverse Current	$V_{RM} = 200 \text{ V}, T_A = 100^\circ\text{C}, I_F = 0 \text{ mA}, R_{GK} = 10\text{k}\Omega$	$I_{RM}$	H11C1, H11C2, H11C3			50	$\mu\text{A}$
	$V_{RM} = 400 \text{ V}, T_A = 100^\circ\text{C}, I_F = 0 \text{ mA}, R_{GK} = 10\text{k}\Omega$		H11C4, H11C5, H11C6			150	

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

Characteristics	Test Conditions	Symbol	Device	Min	Typ*	Max	Units
Input Current to Trigger	$V_{AK} = 50 \text{ V}, R_{GK} = 10 \text{ k}\Omega$	$I_{FT}$	H11C1, H11C2, H11C4, H11C5			20	mA
			H11C3, H11C6			30	
	$V_{AK} = 100 \text{ V}, R_{GK} = 27 \text{ k}\Omega$		H11C1, H11C2, H11C4, H11C5			11	
			H11C3, H11C6			14	
Coupled dv/dt, input to output (figure 8)		dv/dt	ALL	500			V/ $\mu\text{S}$

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

**H11C1**

**H11C2**

**H11C3**

**H11C4**

**H11C5**

**H11C6**

**ISOLATION CHARACTERISTICS**

Characteristic	Test Conditions	Symbol	Min	Typ*	Max	Units
Isolation Voltage	(t = 1 min.) (note 1)	$V_{ISO}$	5300			V
Isolation Resistance	(note 1) ( $V_{I-O} = 500$ VDC)	$R_{ISO}$	$10^{11}$			$\Omega$
Isolation Capacitance	(note 1) (f = 1 MHz, $V_{I-O} = 0$ )	$C_{I-O}$		0.8		pF

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

Note

1. For this test, LED pins 1 and 2 are common, and SCR pins 4, 5 and 6 are common.

H11C1

H11C2

H11C3

H11C4

H11C5

H11C6

Figure 1. LED Forward Current vs. Forward Voltage

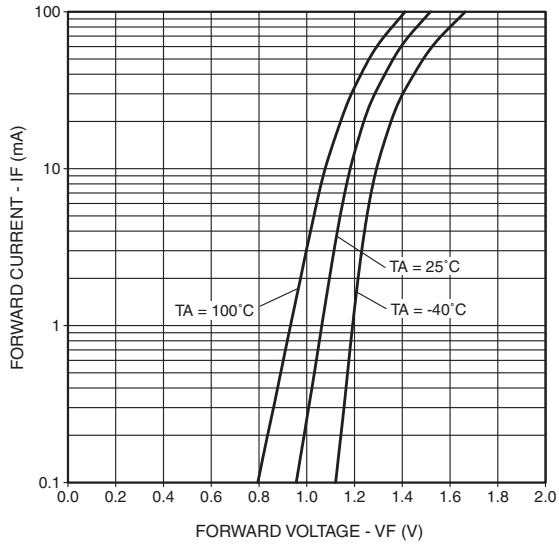


Figure 2. Trigger Current vs. Anode-Cathode Voltage

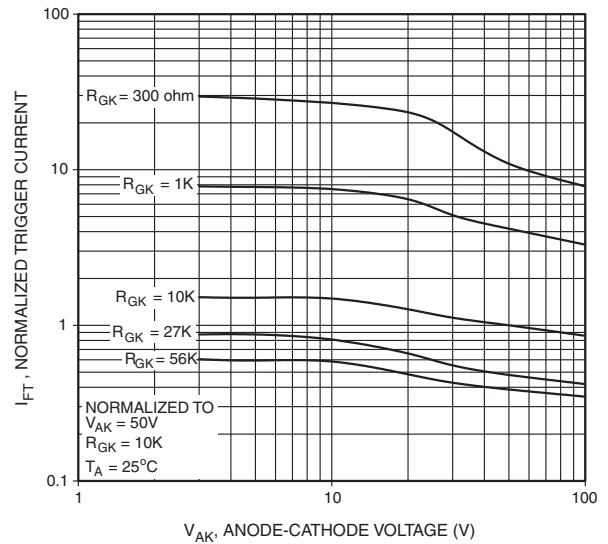


Figure 3. Input Trigger Current vs. Temperature

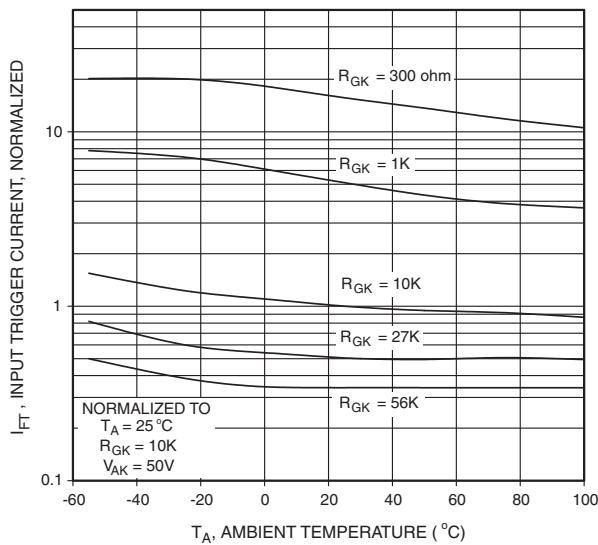
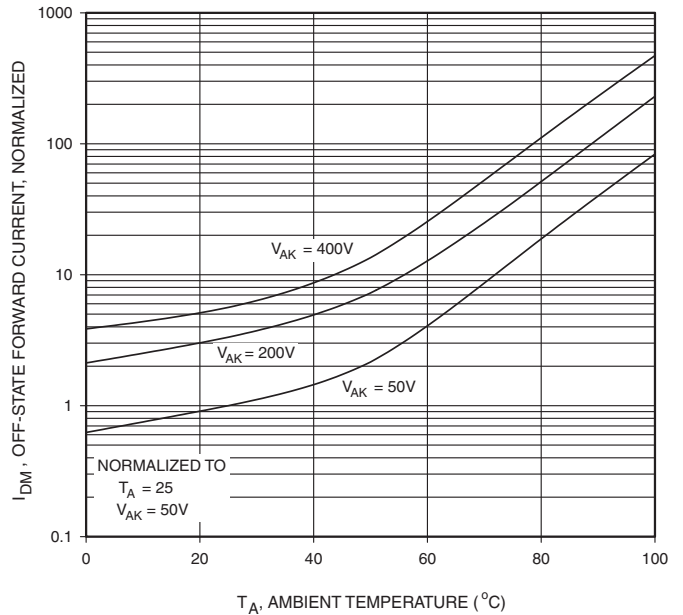


Figure 4. Off-State Current vs. Temperature



H11C1

H11C2

H11C3

H11C4

H11C5

H11C6

Figure 5. Forward Blocking Voltage,  $V_{DM}$  vs. Temperature

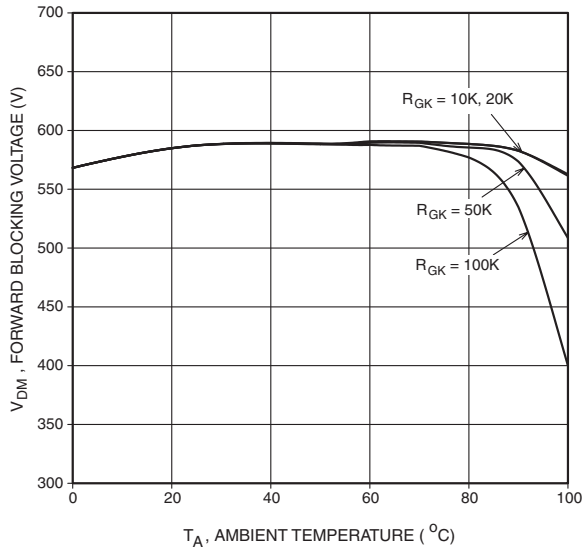


Figure 6. On-State Characteristics

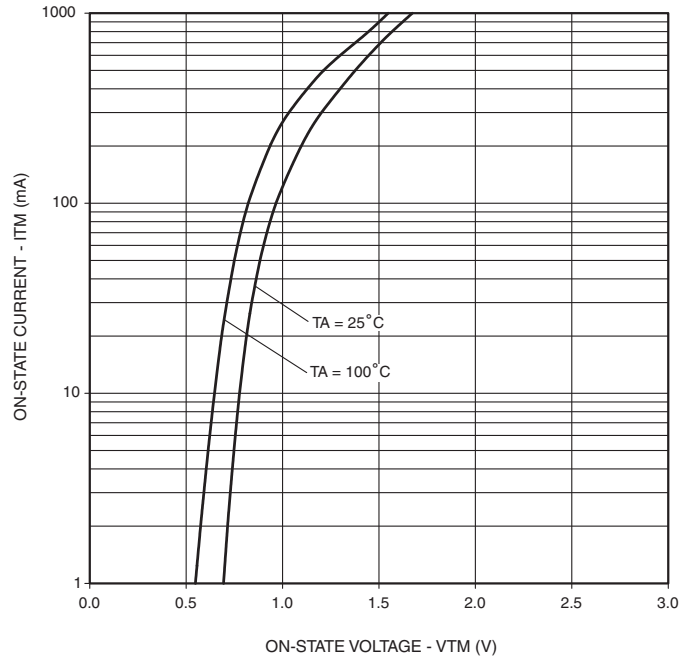
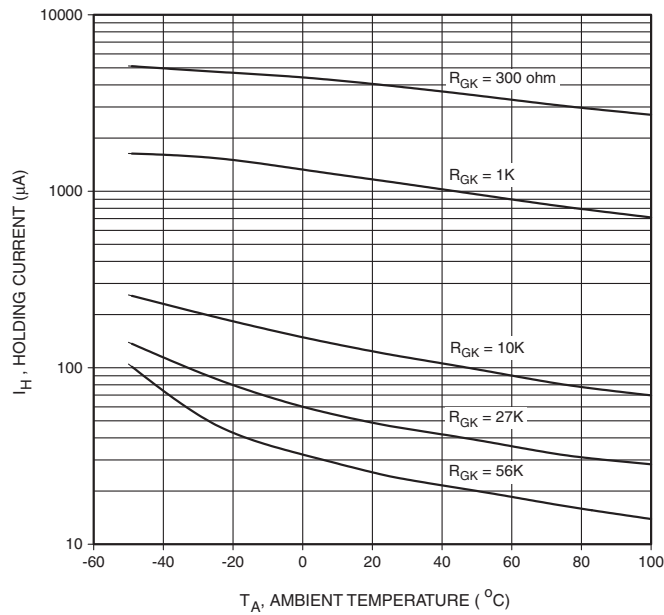


Figure 7. Holding Current,  $I_H$  vs. Temperature



**H11C1**

**H11C2**

**H11C3**

**H11C4**

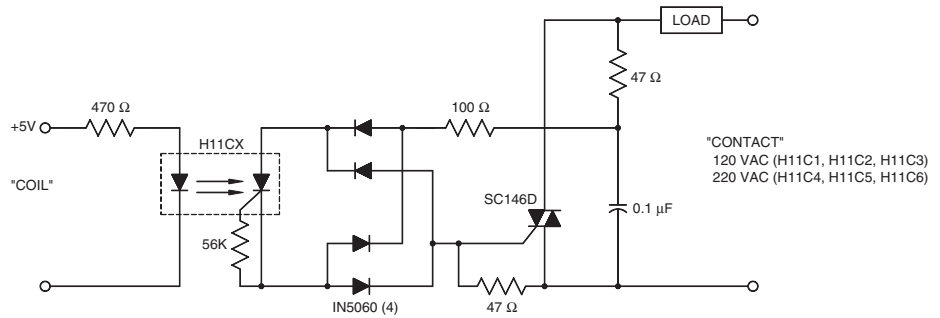
**H11C5**

**H11C6**

**TYPICAL APPLICATIONS**

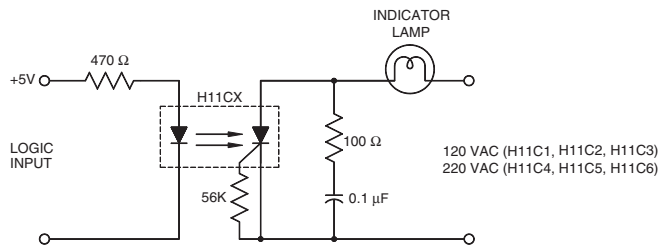
**10A, T<sup>2</sup>L COMPATIBLE, SOLID STATE RELAY**

Use of the H11C4 for high sensitivity, 5300 V isolation capability, provides this highly reliable solid state relay design. This design is compatible with 74, 74S and 74H series T<sup>2</sup>L logic systems inputs and 120V AC (H11C1, H11C2, H11C3) or 220V AC (H11C4, H11C5, H11C6) loads up to 10A.



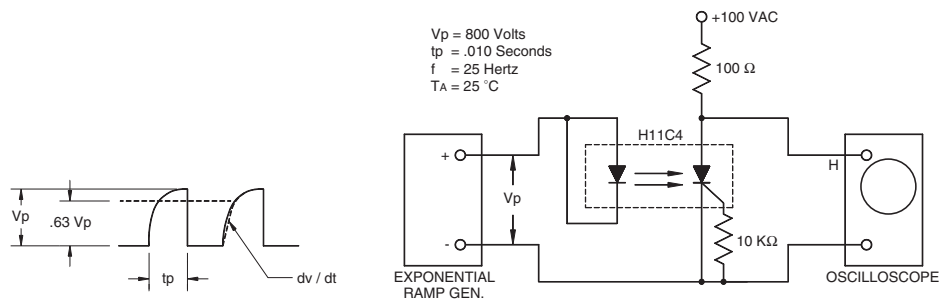
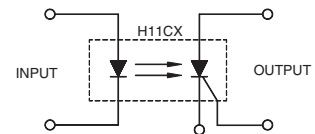
**25W, LOGIC INDICATOR LAMP DRIVER**

The high surge capability and non-reactive input characteristics of the H11C allow it to directly couple, without buffers, T<sup>2</sup>L and DTL logic to indicator alarm devices, without danger of introducing noise and logic glitches.



**200V/400V SYMMETRICAL TRANSISTOR COUPLER**

Use of the high voltage PNP portion of the H11C provides a 400V transistor capable of conducting positive and negative signals with current transfer ratios of over 1%. This function is useful in remote instrumentation, high voltage power supplies and test equipment. Care should be taken not to exceed the H11C 400mW power dissipation rating when used at high voltages.



**Fig. 8 Coupled dv/dt - Test Circuit**

**H11C1**

**H11C2**

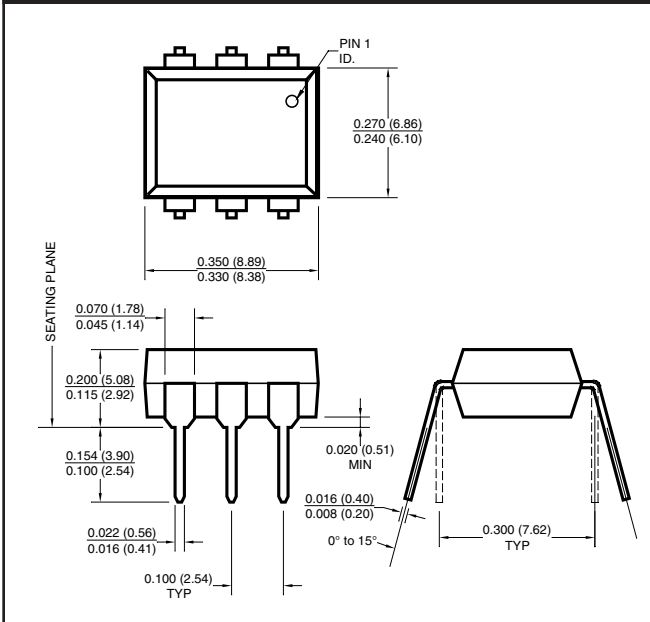
**H11C3**

**H11C4**

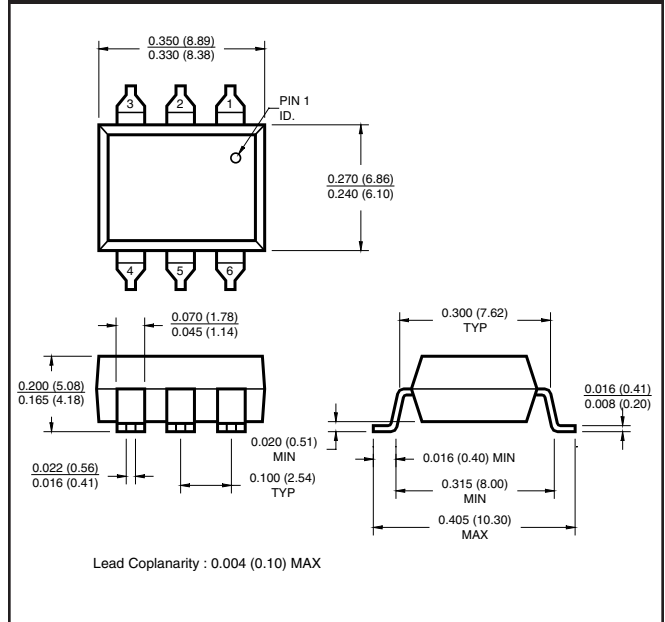
**H11C5**

**H11C6**

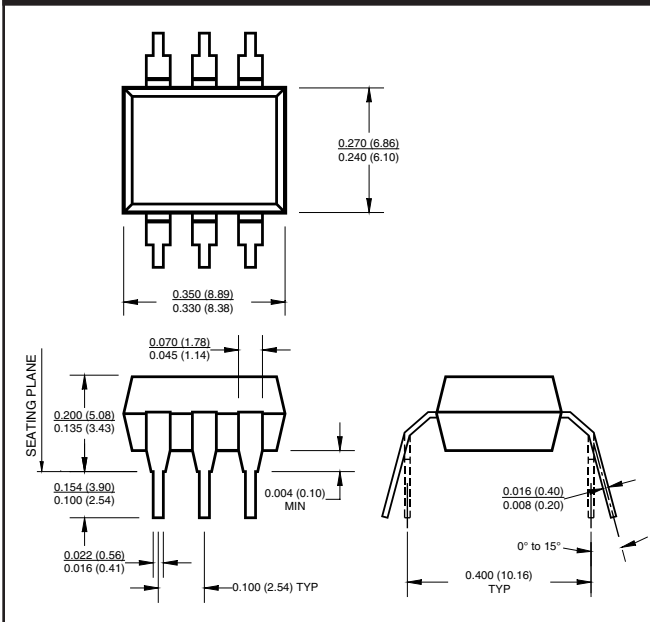
**Package Dimensions (Through Hole)**



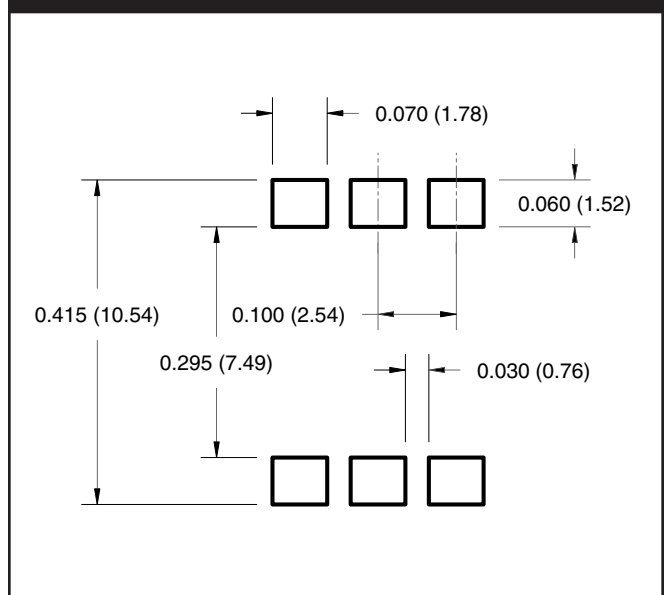
**Package Dimensions (Surface Mount)**



**Package Dimensions (0.4" Lead Spacing)**



**Recommended Pad Layout for Surface Mount Leadform**



**Note**

All dimensions are in inches (millimeters)

**H11C1**

**H11C2**

**H11C3**

**H11C4**

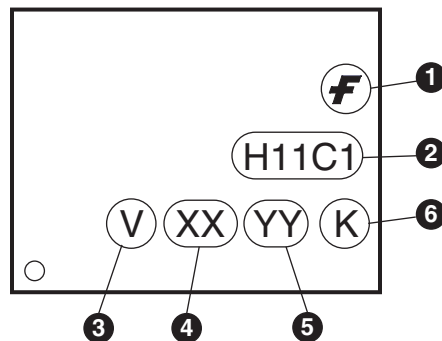
**H11C5**

**H11C6**

**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 and 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	Two digit year code, e.g., '03'
5	Two digit work week ranging from '01' to '53'
6	Assembly package code

H11C1

H11C2

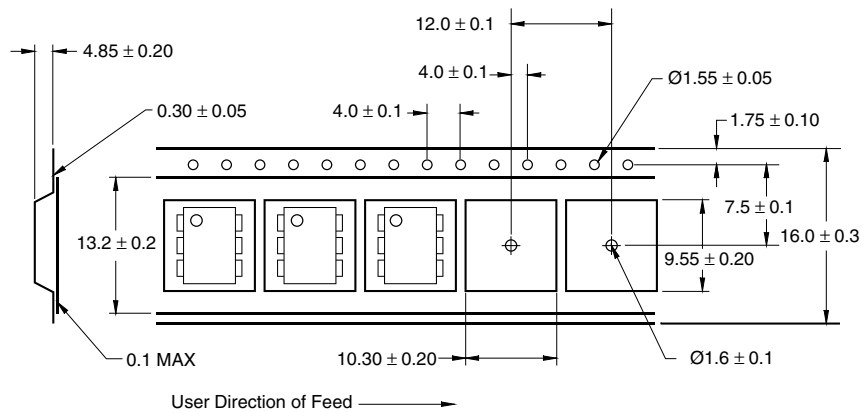
H11C3

H11C4

H11C5

H11C6

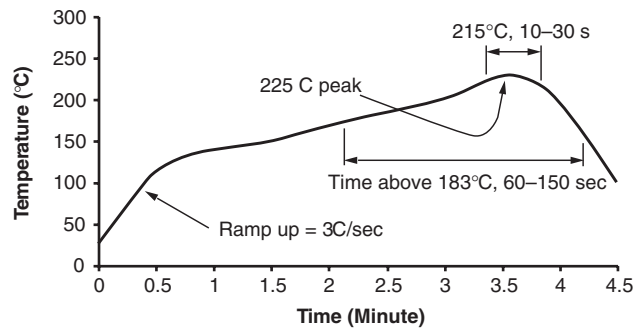
**Carrier Tape Specifications**



**NOTE**

All dimensions are in inches (millimeters)

**Reflow Profile (Black Package, No Suffix)**



- Peak reflow temperature: 225°C (package surface temperature)
- Time of temperature higher than 183°C for 60–150 seconds
- One time soldering reflow is recommended

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**H11C1**

**H11C2**

**H11C3**

**H11C4**

**H11C5**

**H11C6**

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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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