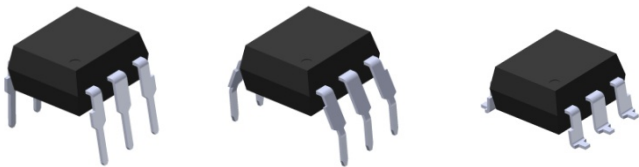


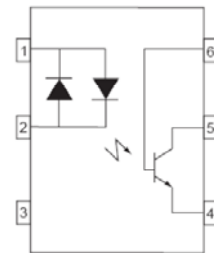
### 6 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER AC INPUT PHOTOCOUPLER H11AAX Series



#### Features:

- H11AAX series: H11AA1, H11AA2, H11AA3, H11AA4
- High isolation voltage between input and output  
Viso = 5000 Vrms
- Creepage distance >7.62 mm
- Compact dual-in-line package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No.132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved

#### Schematic



#### Pin Configuration

1. Anode / Cathode
2. Cathode / Anode
3. No Connection
4. Emitter
5. Collector
6. Base

#### Description

The H11AAX series of devices each consist of two infrared emitting diode, connected in inverse parallel, optically coupled to a phototransistor detector. They are packaged in a 6-pin DIP package and available in wide-lead spacing and SMD option.

#### Applications

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

**Absolute Maximum Ratings (Ta=25°C)**

	Parameter	Symbol	Rating	Unit
Input	Forward current	$I_F$	60	mA
	Peak forward current (t = 10μs)	$I_{FM}$	1	A
	Power dissipation (TA = 25°C)	$P_D$	120	mW
	Derating factor (above 90°C)		3.8	mW/°C
Output	Power dissipation (TA = 25°C) No derating up to 100°C	$P_C$	150	mW
	Collector-Emitter voltage	$V_{CEO}$	80	V
	Collector-Base voltage	$V_{CBO}$	80	V
	Emitter-Collector voltage	$V_{ECO}$	7	V
Total Power Dissipation		$P_{TOT}$	200	mW
Isolation Voltage*1		$V_{ISO}$	5000	V rms
Operating Temperature		$T_{OPR}$	-55 to 100	°C
Storage Temperature		$T_{STG}$	-55 to 125	°C
Soldering Temperature*2		$T_{SOL}$	260	°C

Notes:

\*1 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 & 3 are shorted together, and pins 4, 5 & 6 are shorted together.

\*2 For 10 seconds

**Electro-Optical Characteristics (Ta=25°C unless specified otherwise)**

**Input**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	$V_F$	-	1.2	1.5	V	$I_F = \pm 10\text{mA}$
Input capacitance	$C_{in}$	-	80	-	pF	$V = 0, f = 1\text{MHz}$

**Output**

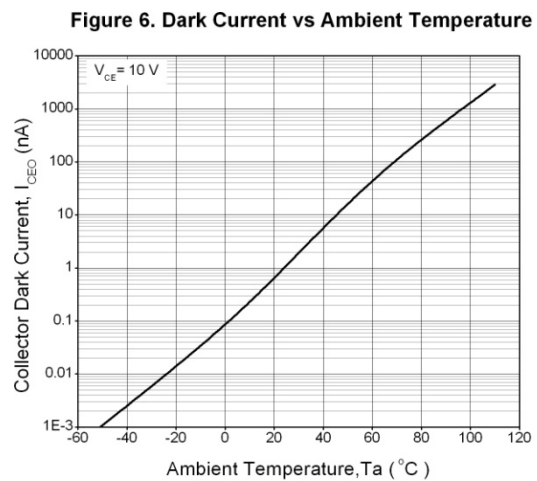
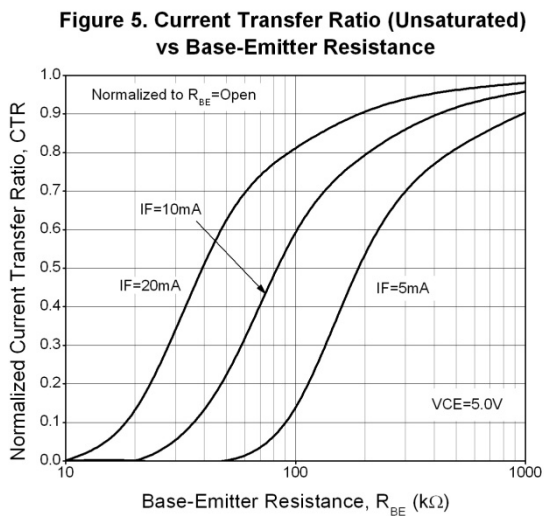
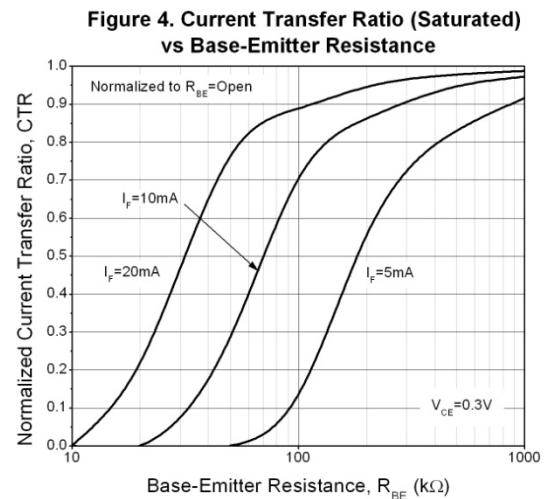
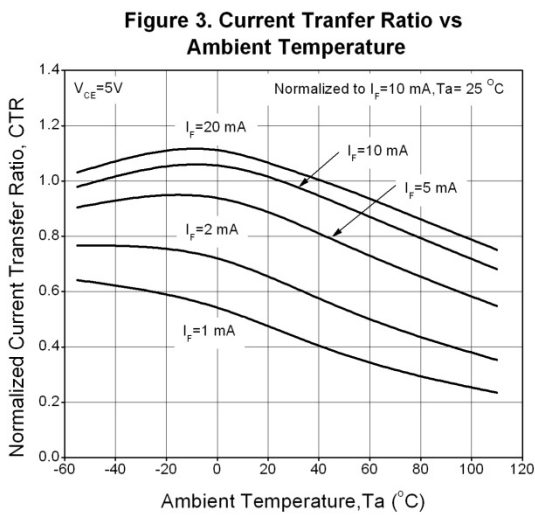
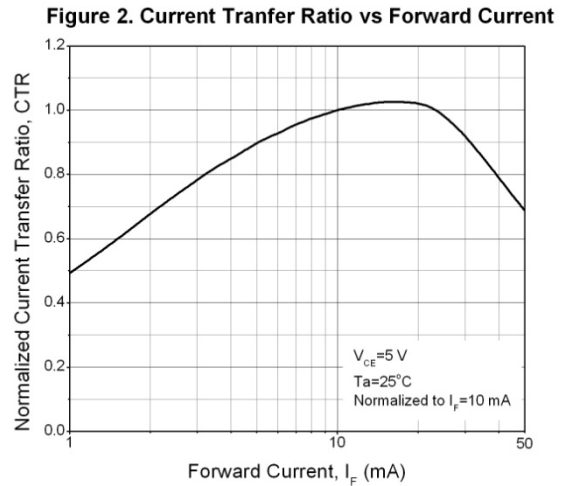
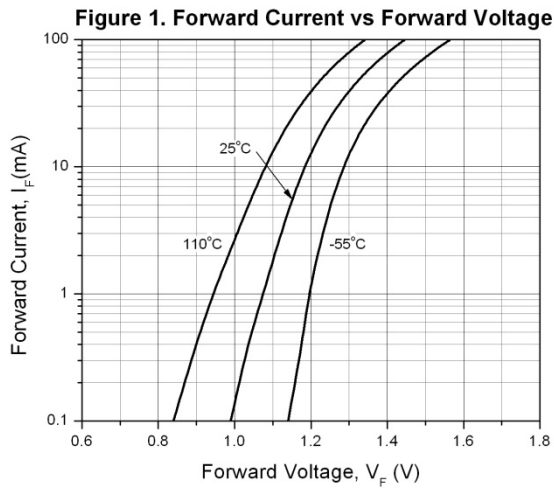
Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	$I_{CEO}$	-	-	50	nA	$V_{CE} = 10\text{V}, I_F = 0\text{mA}$
Collector-Emitter breakdown voltage	$BV_{CEO}$	80	-	-	V	$I_C = 1\text{mA}$
Collector-Base breakdown voltage	$BV_{CBO}$	80	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	$BV_{ECO}$	7	-	-	V	$I_E = 0.1\text{mA}$
Collector-Emitter capacitance	$C_{CE}$	-	10	-	pF	$V_{CE} = 0\text{V}, f = 1\text{MHz}$

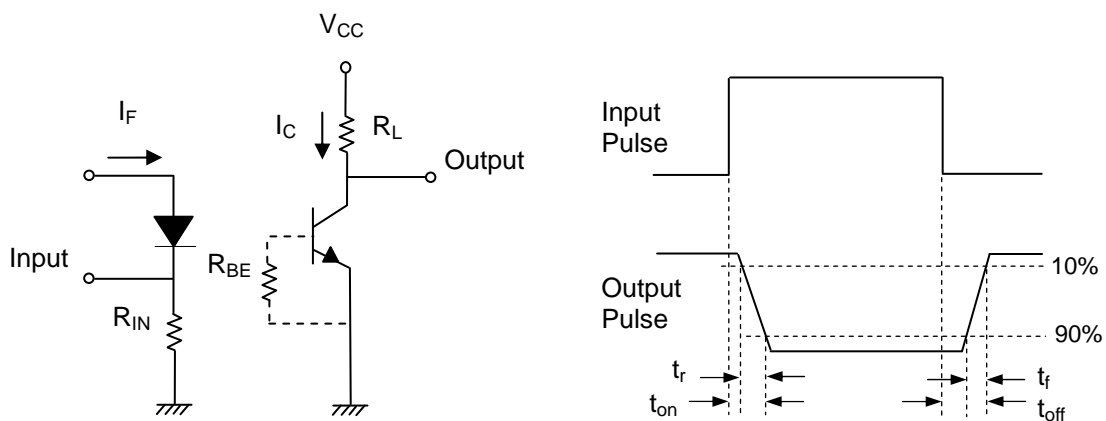
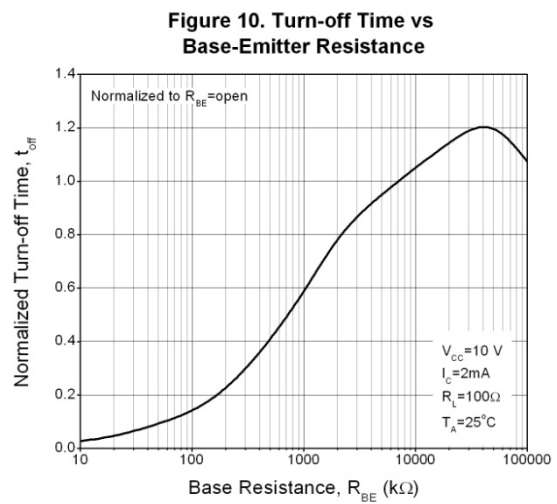
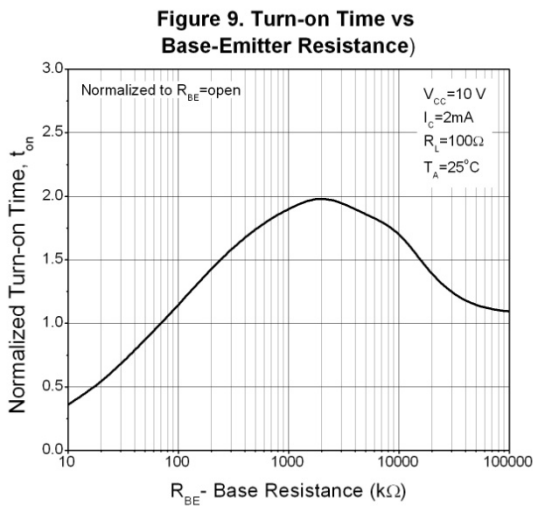
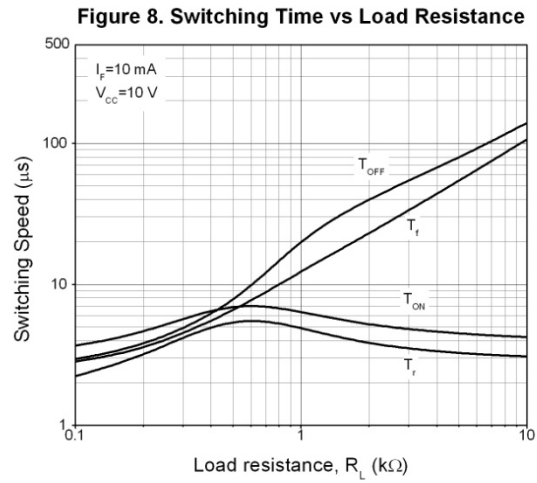
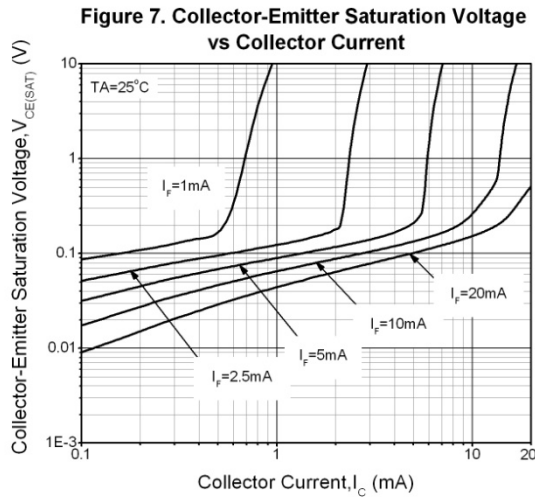
**Transfer Characteristics**

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	H11AA1	20	-	-	%	$I_F = \pm 10\text{mA}, V_{CE} = 10\text{V}$
	H11AA2	10	-	-		
	H11AA3	50	-	-		
	H11AA4	100	-	-		
CTR Symmetry		0.5	-	2.0		$I_F = \pm 10\text{mA}, V_{CE} = 10\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$	-	-	0.4	V	$I_F = \pm 10\text{mA}, I_C = 0.5\text{mA}$
Isolation resistance	$R_{IO}$	$10^{11}$	-	-	$\Omega$	$V_{IO} = 500\text{Vdc}, 40\sim 60\% \text{ R.H.}$
Input-output capacitance	$C_{IO}$	-	0.7	-	pF	$V_{IO} = 0, f = 1\text{MHz}$
Turn-on time	$T_{on}$	-	-	10	$\mu\text{s}$	$V_{CC} = 10\text{V}, I_C = 10\text{mA}, R_L = 100\Omega$
Turn-off time	$T_{off}$	-	-	10		
Rise time	$T_r$	-	-	10		
Fall time	$T_f$	-	-	10		

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

Typical Electro-Optical Characteristics Curves





**Figure 11. Switching Time Test Circuit & Waveforms**

## Order Information

### Part Number

# H11AAXY(Z)-V

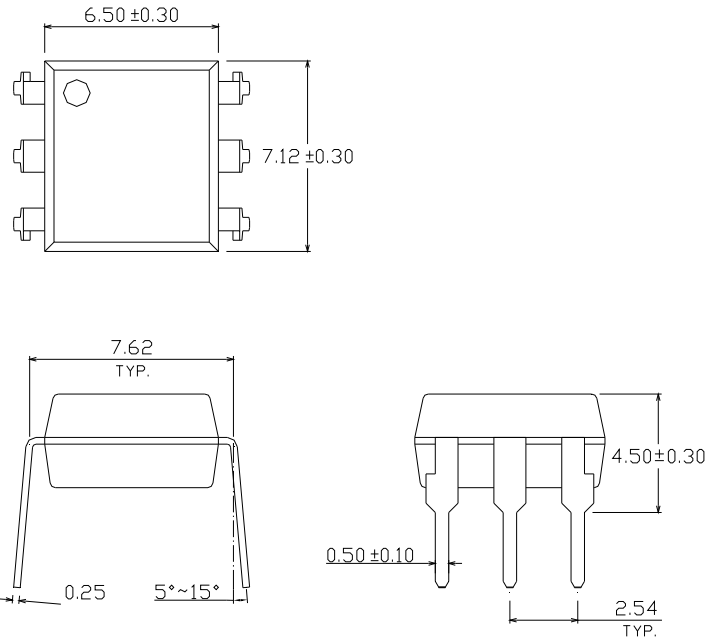
### Note

- X = CTR Rank (1, 2, 3, or 4)
- Y = Lead form option (S, S1, M or none)
- Z = Tape and reel option (TA, TB, or none).
- V = VDE safety (optional).

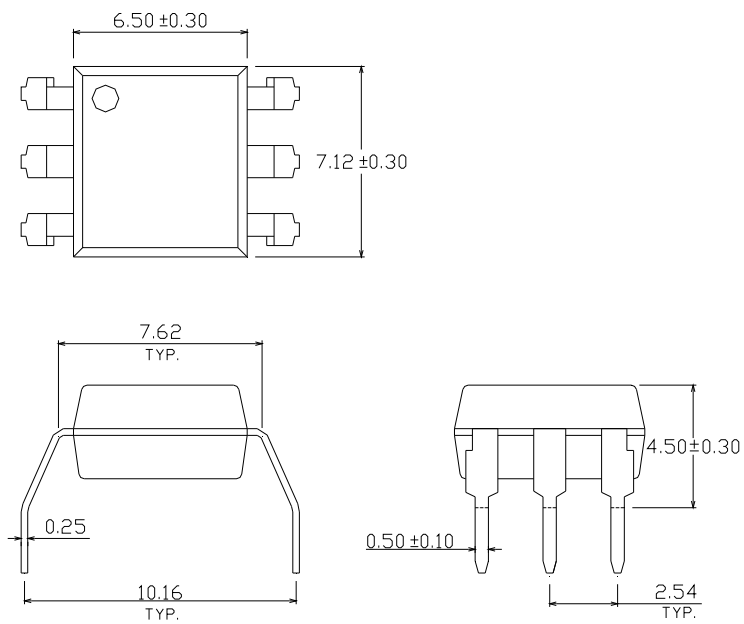
Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
M	Wide lead bend (0.4 inch spacing)	65 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S1 (TB)	Surface mount lead form (low profile) + TB tape & reel option	1000 units per reel

Package Dimension (Dimensions in mm)

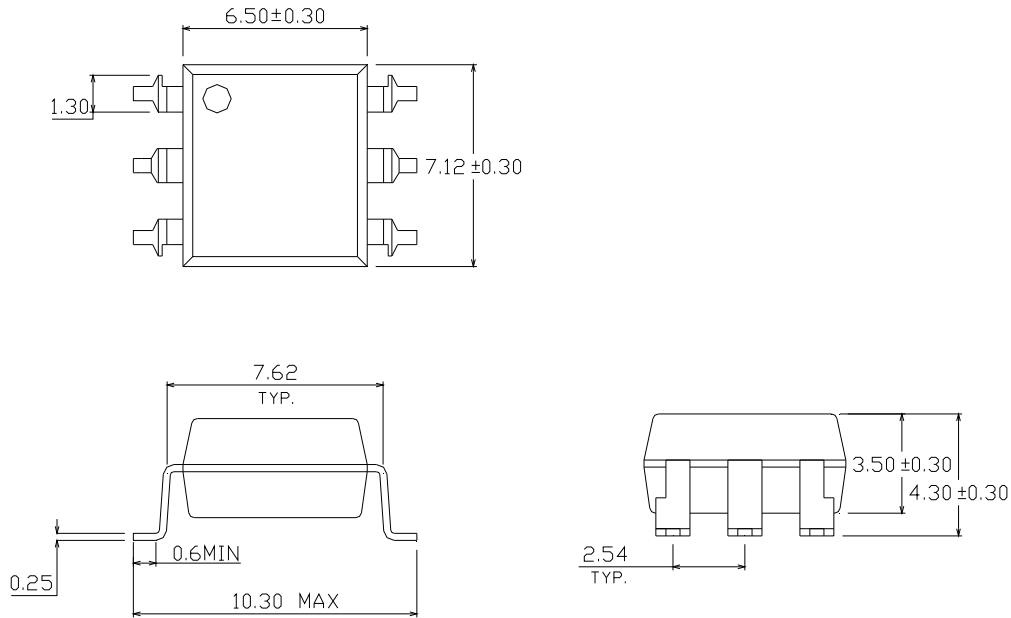
Standard DIP Type



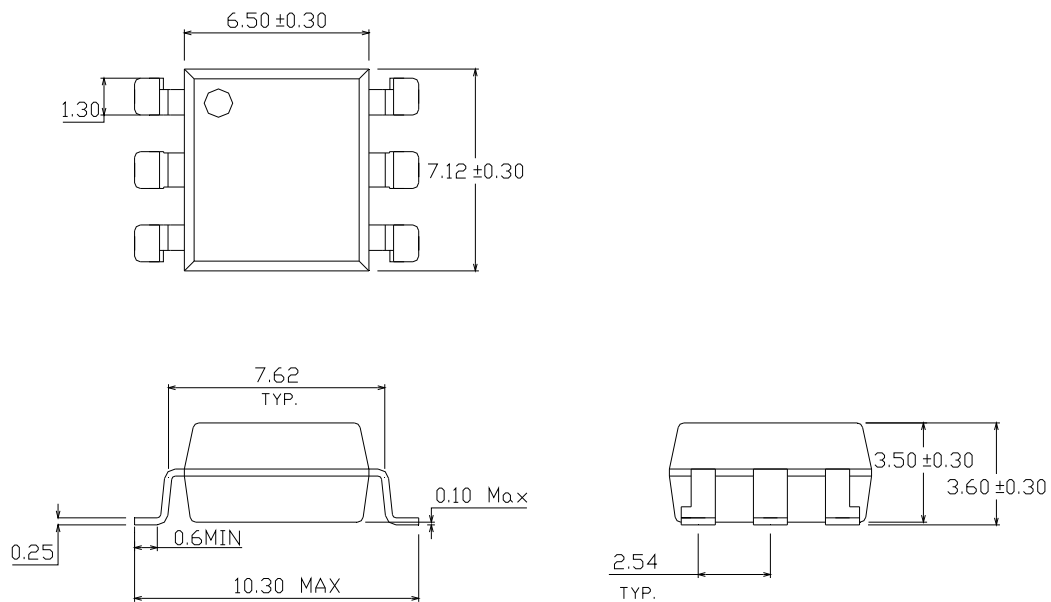
Option M Type



Option S Type

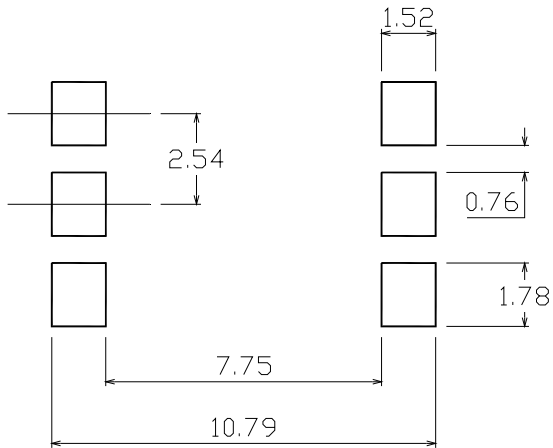


Option S1 Type

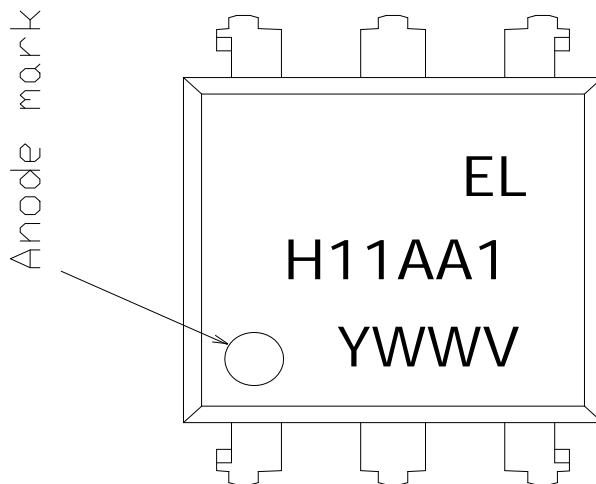




### Recommended pad layout for surface mount leadform



### Device Marking

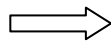
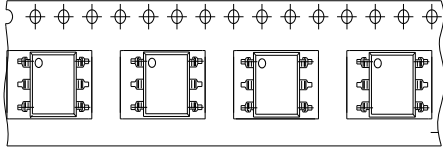


### Notes

- EL denotes Everlight
- H11AA1 denotes Part Number
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE safety (optional)

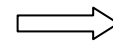
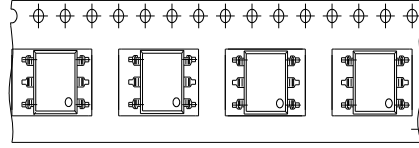
**Tape & Reel Packing Specifications**

**Option TA**



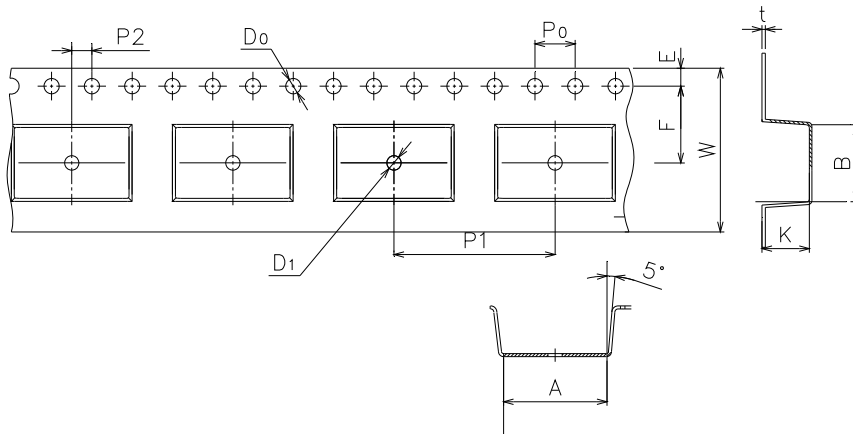
Direction of feed from reel

**Option TB**



Direction of feed from reel

**Tape dimensions**

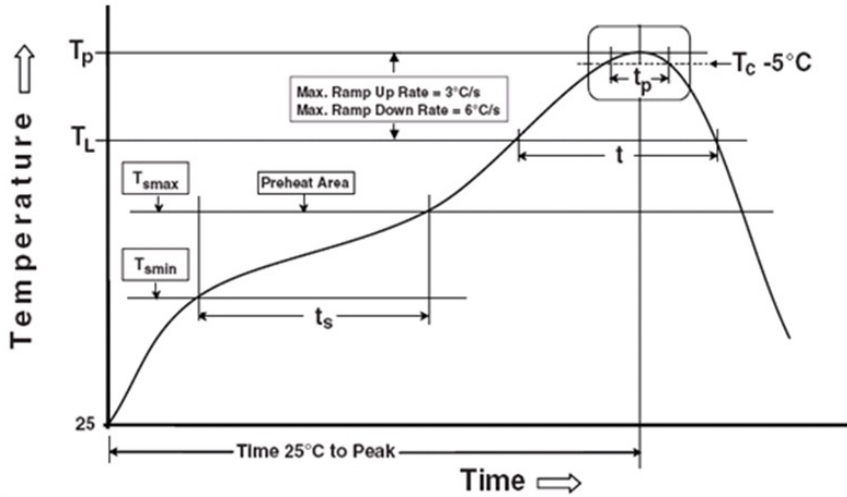


Dimension No.	<b>A</b>	<b>B</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm)	10.4±0.1	7.5±0.1	1.5±0.1	1.5+0.1/-0	1.75±0.1	7.5±0.1
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>K</b>
Dimension (mm)	4.0±0.15	12±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

## Precautions for Use

### 1. Soldering Condition

#### 1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note:

Reference: IPC/JEDEC J-STD-020D

#### Preheat

Temperature min ( $T_{smin}$ )	150 °C
Temperature max ( $T_{smax}$ )	200°C
Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60-120 seconds
Average ramp-up rate ( $T_{smax}$ to $T_p$ )	3 °C/second max

#### Other

Liquidus Temperature ( $T_L$ )	217 °C
Time above Liquidus Temperature ( $t_L$ )	60-100 sec
Peak Temperature ( $T_p$ )	260°C
Time within 5 °C of Actual Peak Temperature: $T_p - 5^\circ\text{C}$	30 s
Ramp- Down Rate from Peak Temperature	6°C /second max.
Time 25°C to peak temperature	8 minutes max.
Reflow times	3 times

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2. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
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