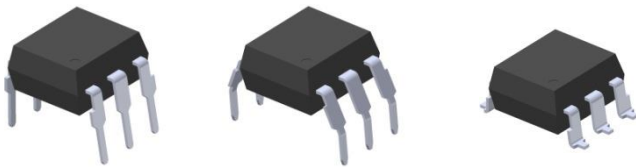




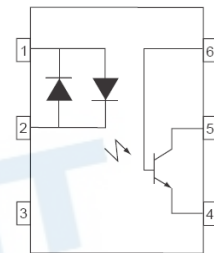
**THE DATASHEET OF  
H11AA2S1(TA)**



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



Schematic



#### Pin Configuration

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

#### 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
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- UL and cUL approved(No. E214129)
- VDE approved (No.132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CQC approved

#### 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 <sub>F</sub>	60	mA
	Peak forward current (t = 10μs)	I <sub>FM</sub>	1	A
	Power dissipation (T <sub>A</sub> = 25°C) Derating factor (above 90°C)	P <sub>D</sub>	120 3.8	mW mW/°C
Output	Power dissipation (T <sub>A</sub> = 25°C) No derating up to 100°C	P <sub>C</sub>	150	mW
	Collector-Emitter voltage	V <sub>CEO</sub>	80	V
	Collector-Base voltage	V <sub>CB0</sub>	80	V
	Emitter-Collector voltage	V <sub>ECO</sub>	7	V
	Total Power Dissipation	P <sub>TOT</sub>	200	mW
	Isolation Voltage*1	V <sub>ISO</sub>	5000	V rms
	Operating Temperature	T <sub>OPR</sub>	-55 to 100	°C
	Storage Temperature	T <sub>STG</sub>	-55 to 125	°C
	Soldering Temperature*2	T <sub>SOL</sub>	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 <sub>F</sub>	-	1.2	1.5	V	I <sub>F</sub> = ±10mA
Input capacitance	C <sub>in</sub>	-	80	-	pF	V = 0, f = 1MHz

**Output**

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	I <sub>CEO</sub>	-	-	50	nA	V <sub>CE</sub> = 10V, I <sub>F</sub> = 0mA
Collector-Emitter breakdown voltage	BV <sub>CEO</sub>	80	-	-	V	I <sub>C</sub> = 1mA
Collector-Base breakdown voltage	BV <sub>CBO</sub>	80	-	-	V	I <sub>C</sub> = 0.1mA
Emitter-Collector breakdown voltage	BV <sub>ECO</sub>	7	-	-	V	I <sub>E</sub> = 0.1mA
Collector-Emitter capacitance	C <sub>CE</sub>	-	10	-	pF	V <sub>CE</sub> = 0V, f = 1MHz

**Transfer Characteristics**

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	H11AA1	20	-	-	%	I <sub>F</sub> = ±10mA, V <sub>CE</sub> = 10V
	H11AA2	10	-	-		
	H11AA3	50	-	-		
	H11AA4	100	-	-		
CTR Symmetry		0.5	-	2.0		I <sub>F</sub> = ±10mA, V <sub>CE</sub> = 10V
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	-	-	0.4	V	I <sub>F</sub> = ±10mA, I <sub>C</sub> = 0.5mA
Isolation resistance	R <sub>IO</sub>	10 <sup>11</sup>	-	-	Ω	V <sub>IO</sub> = 500Vdc, 40~60% R.H.
Input-output capacitance	C <sub>IO</sub>	-	0.7	-	pF	V <sub>IO</sub> = 0, f = 1MHz
Turn-on time	T <sub>on</sub>	-	-	10	μs	V <sub>CC</sub> = 10V, I <sub>C</sub> = 10mA, R <sub>L</sub> = 100Ω
Turn-off time	T <sub>off</sub>	-	-	10		
Rise time	T <sub>r</sub>	-	-	10		
Fall time	T <sub>f</sub>	-	-	10		

\* Typical values at T<sub>a</sub> = 25°C

Typical Electro-Optical Characteristics Curves

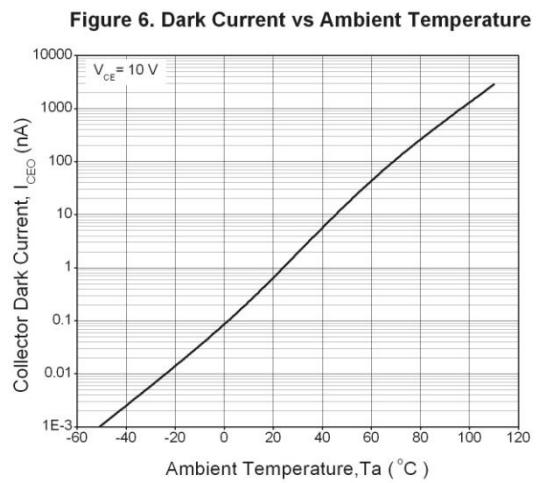
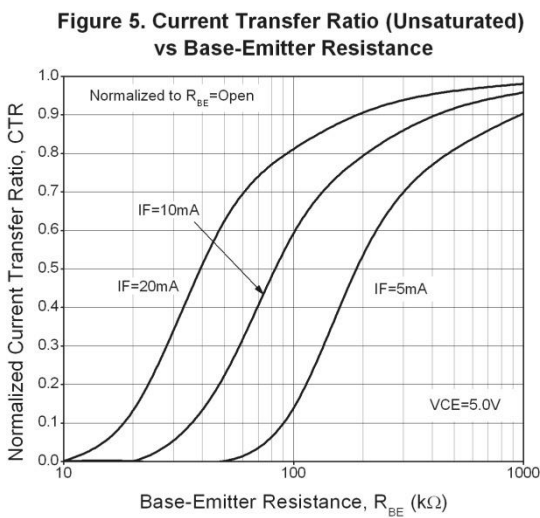
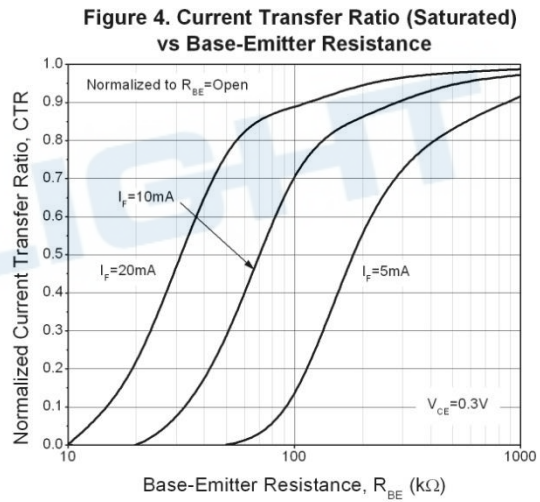
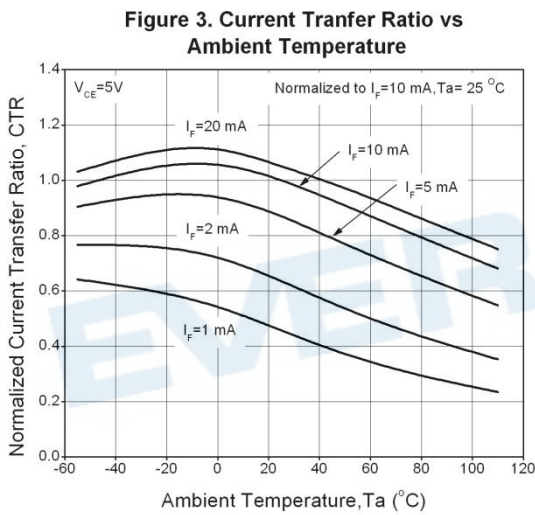
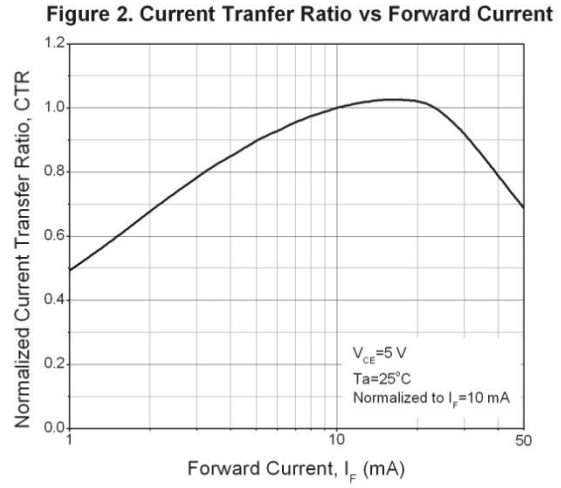
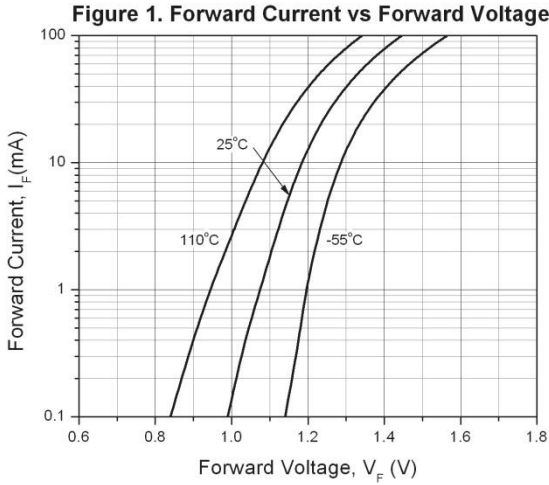


Figure 7. Collector-Emitter Saturation Voltage vs Collector Current

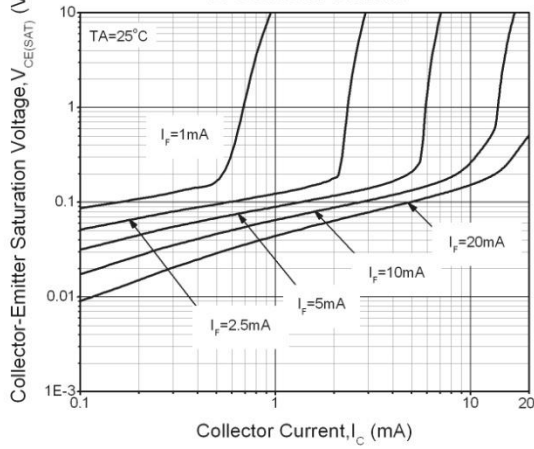


Figure 8. Switching Time vs Load Resistance

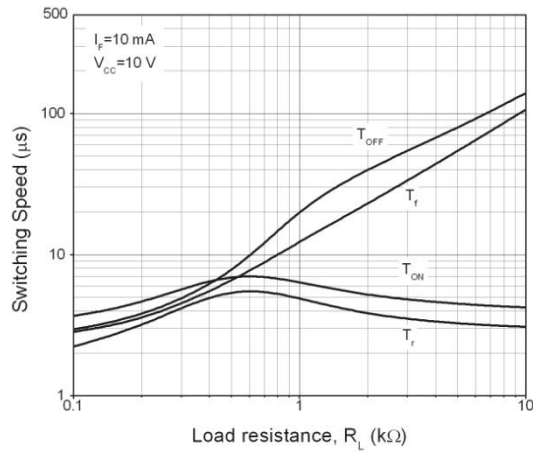


Figure 9. Turn-on Time vs Base-Emitter Resistance

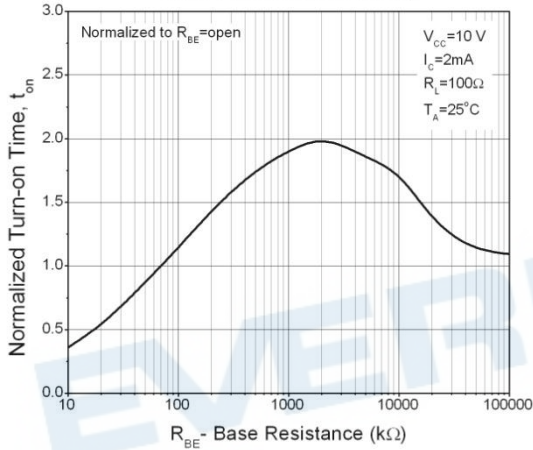


Figure 10. Turn-off Time vs Base-Emitter Resistance

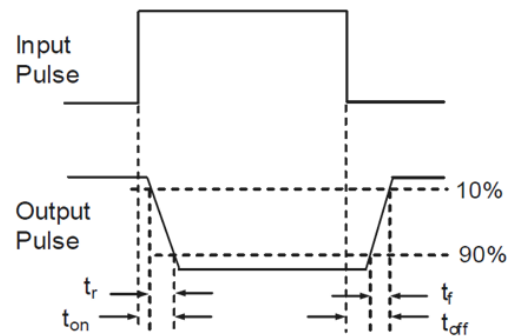
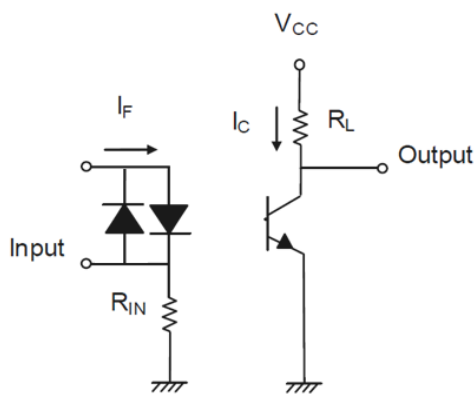
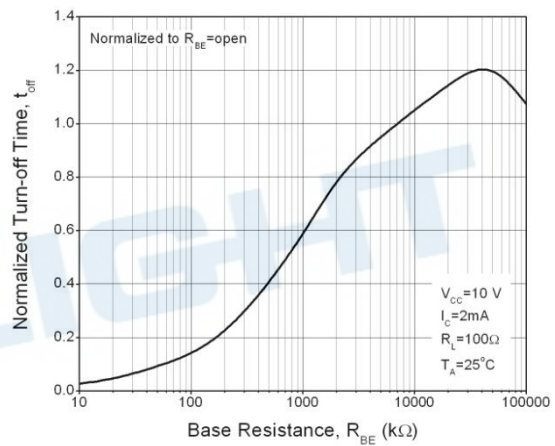


Figure 11. Switching Time Test Circuit & Waveforms

## Order Information

### Part Number

# H11AAXY(Z)-V

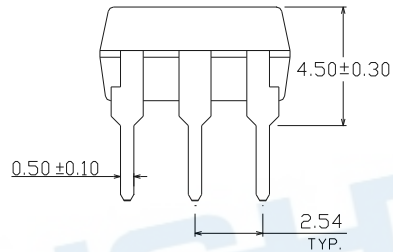
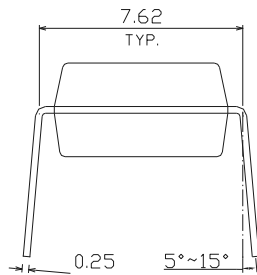
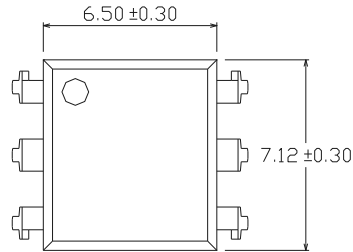
### Notes

- 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).

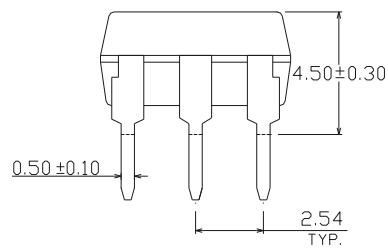
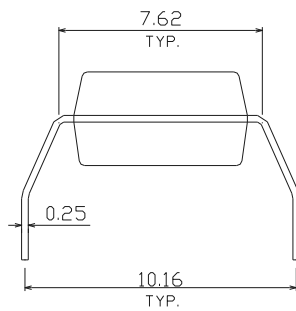
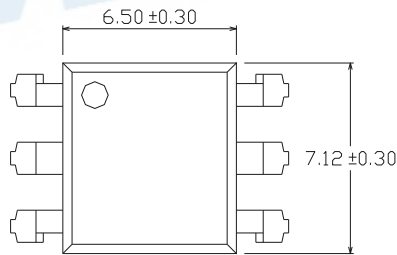
Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
M	Wide lead bend (0.4 inch spacing)	65 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead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

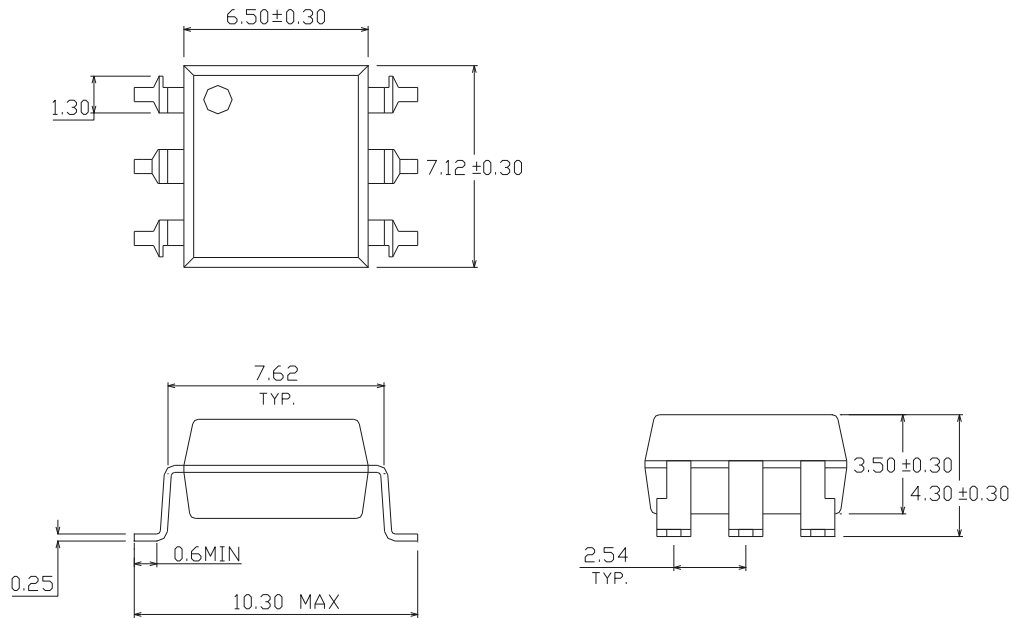
Standard DIP Type



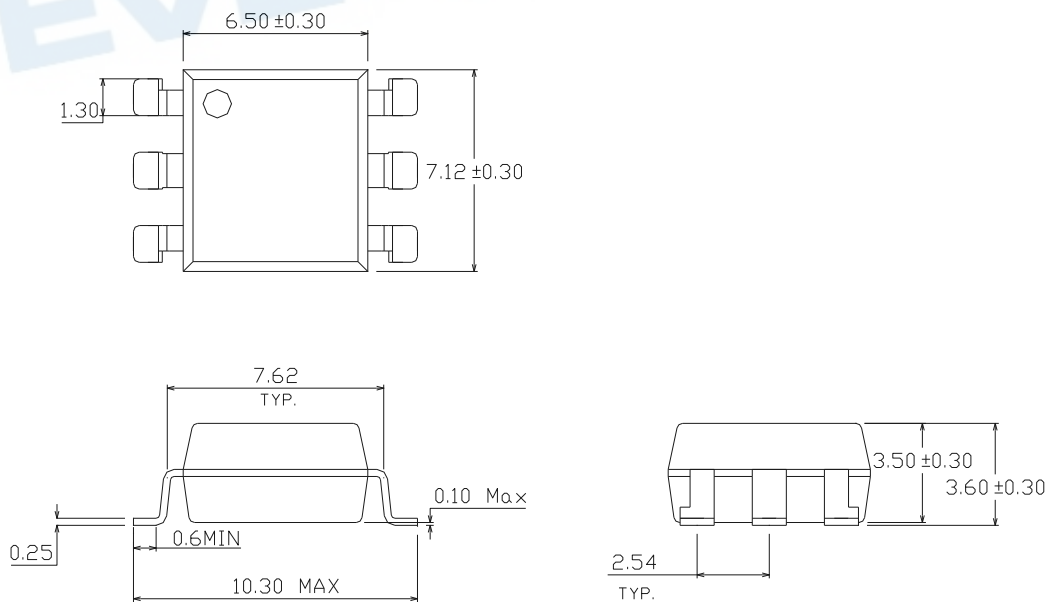
Option M Type



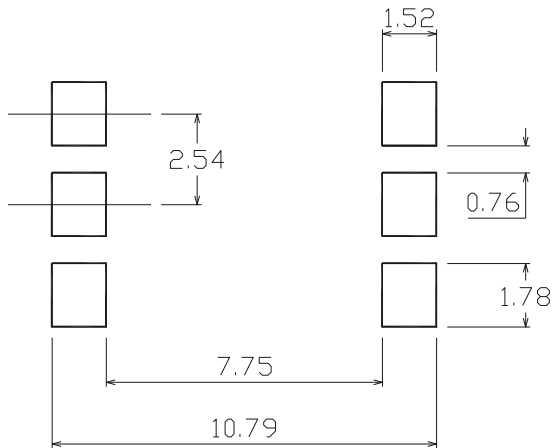
Option S Type



Option S1 Type



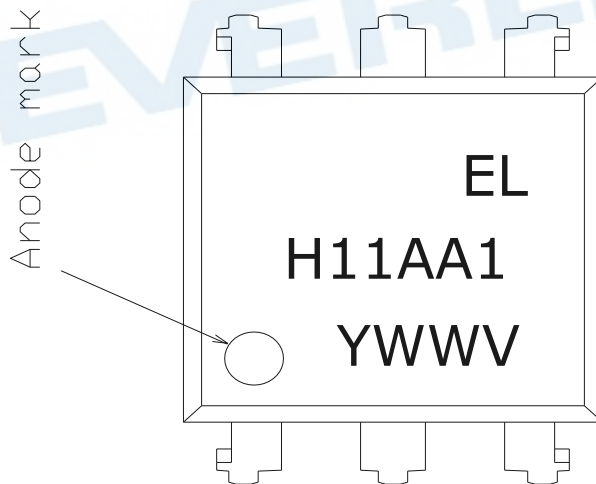
### Recommended pad layout for surface mount leadform



#### Notes

Suggested pad dimension is just for reference only.  
Please modify the pad dimension based on individual need.

### Device Marking

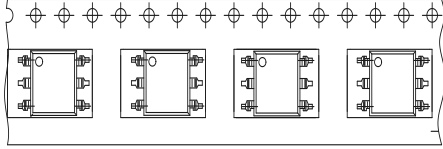


#### Notes

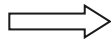
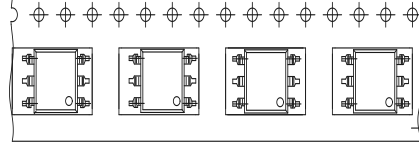
EL denotes Everlight  
H11AA1 denotes Part Number  
Y denotes 1 digit Year code  
WW denotes 2 digit Week code  
V denotes VDE safety (optional)

**Tape & Reel Packing Specifications**

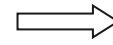
**Option TA**



**Option TB**

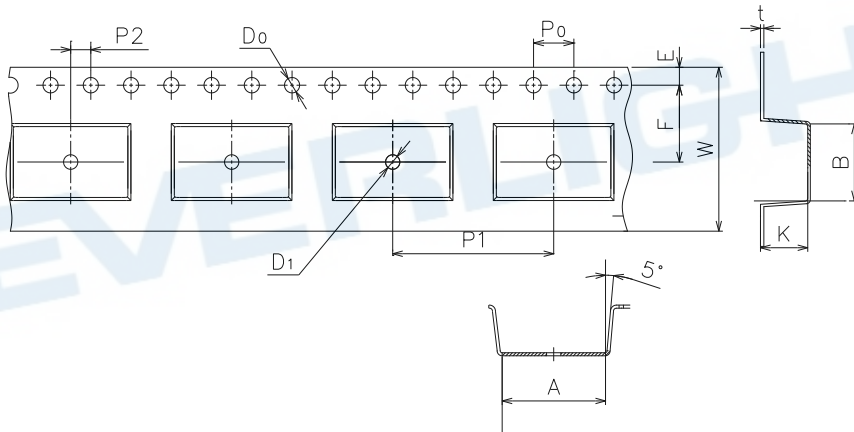


Direction of feed from reel



Direction of feed from reel

**Tape dimensions**

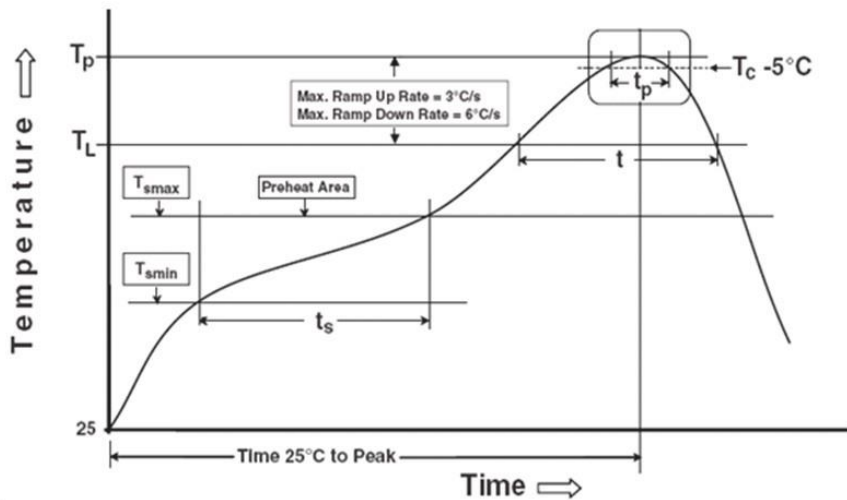


Dimension No.	<b>A</b>	<b>B</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm)	10.8±0.1	7.5±0.1	1.5±0.1	1.5+0.1/-0	1.75±0.1	7.5±0.1
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>K</b>
Dimension (mm)	4.0±0.15	12±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

## Precautions for Use

### 1. Soldering Condition

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



Notes

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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