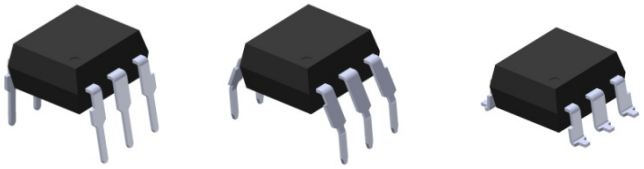
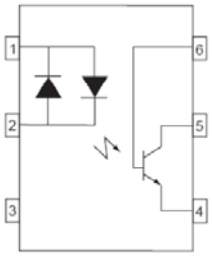
DATASHEET

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
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No.132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA 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

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Absolute Maximum Ratings (Ta=25℃)

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 (T_A = 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

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Electro-Optical Characteristics (Ta=25℃ unless specified otherwise)

Input

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

Output

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

Transfer Characteristics

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

* Typical values at T_a = 25°C

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Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

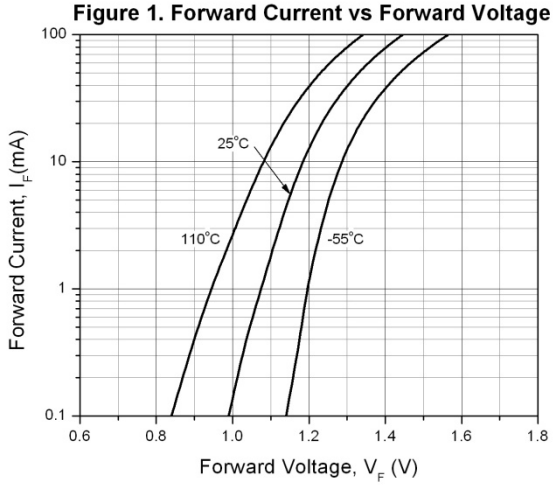


Figure 2. Current Tranfer Ratio vs Forward Current

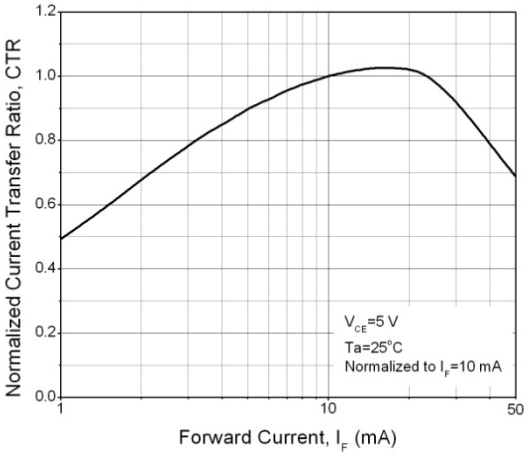


Figure 3. Current Tranfer Ratio vs Ambient Temperature

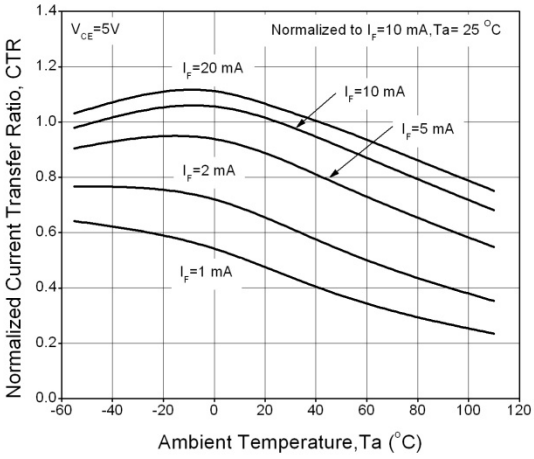


Figure 4. Current Transfer Ratio (Saturated) vs Base-Emitter Resistance

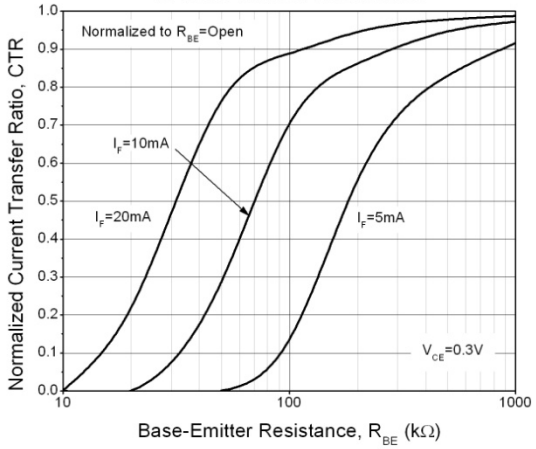


Figure 5. Current Transfer Ratio (Unsaturated) vs Base-Emitter Resistance

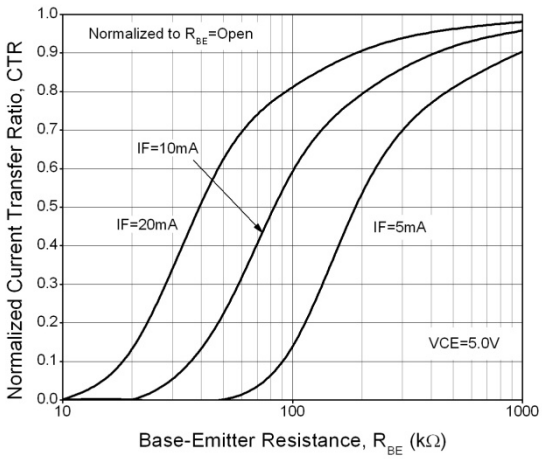
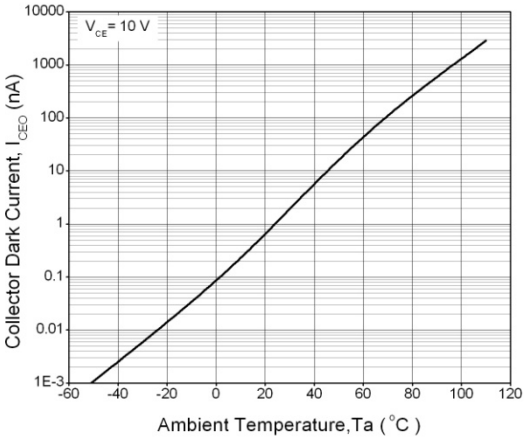


Figure 6. Dark Current vs Ambient Temperature



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Figure 7. Collector-Emitter Saturation Voltage vs Collector Current

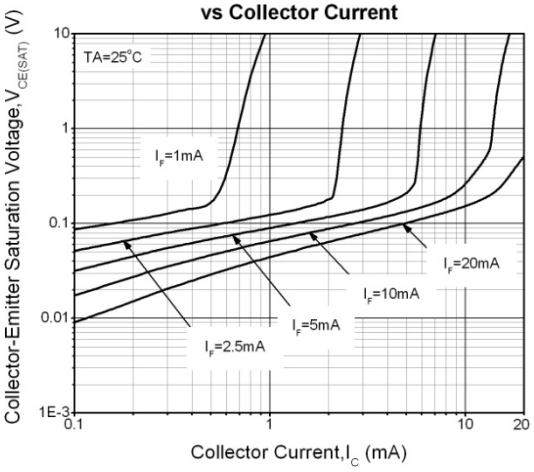


Figure 8. Switching Time vs Load Resistance

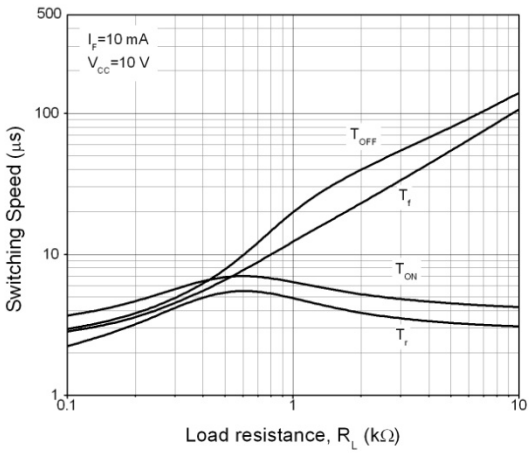


Figure 9. Turn-on Time vs Base-Emitter Resistance)

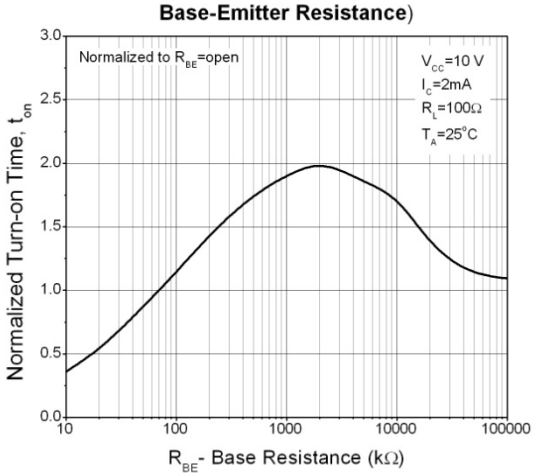
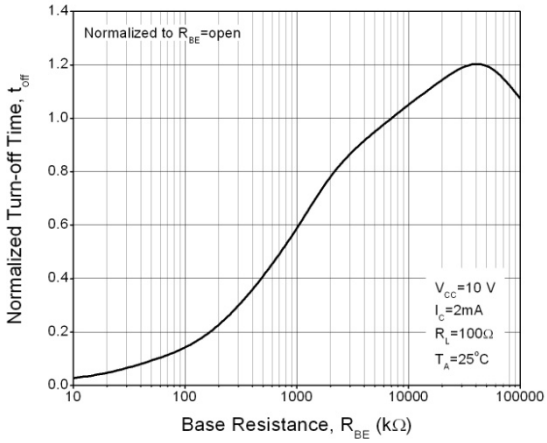


Figure 10. Turn-off Time vs Base-Emitter Resistance



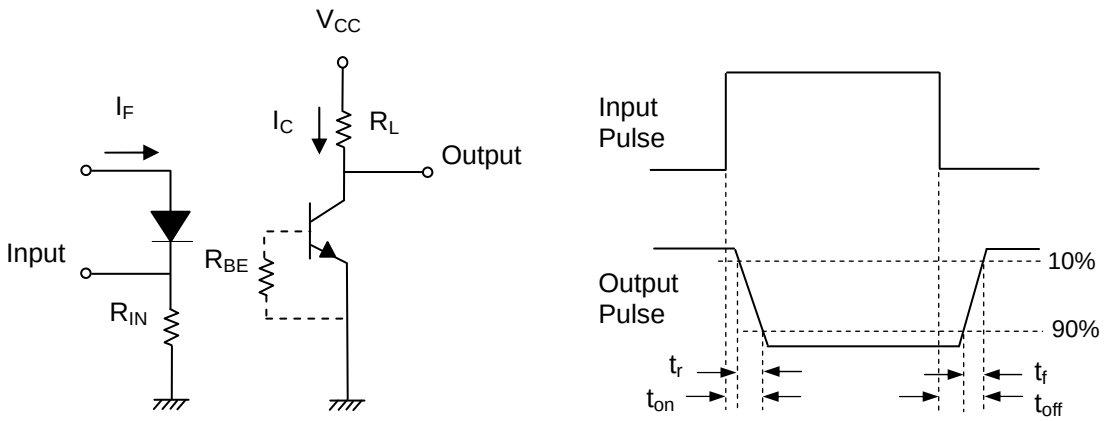


Figure 11. Switching Time Test Circuit & Waveforms

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Order Information

Part Number

H11AAXY(Z)-V

Note

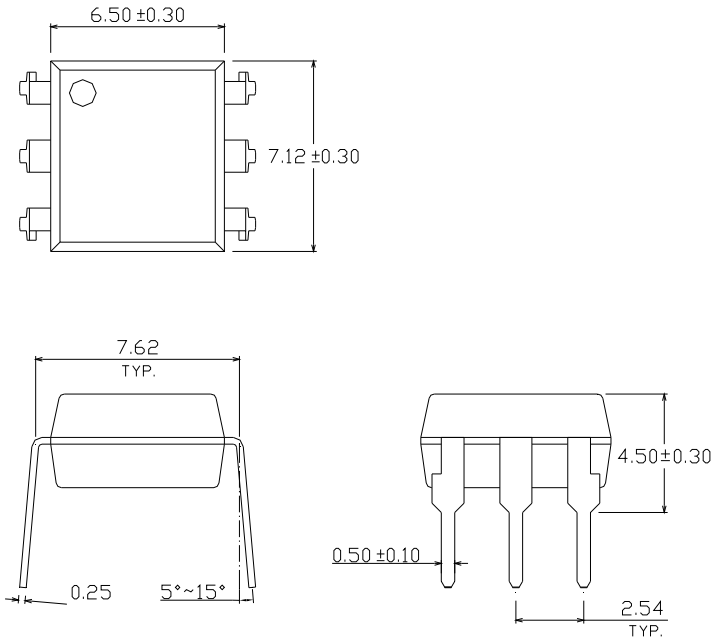
X = CTR Rank (1, 2, 3, or 4)
Y = Lead form option (S, S1, M or none)
Z = Tape and reel option (TA, TB, or none).
V = VDE safety (optional).

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

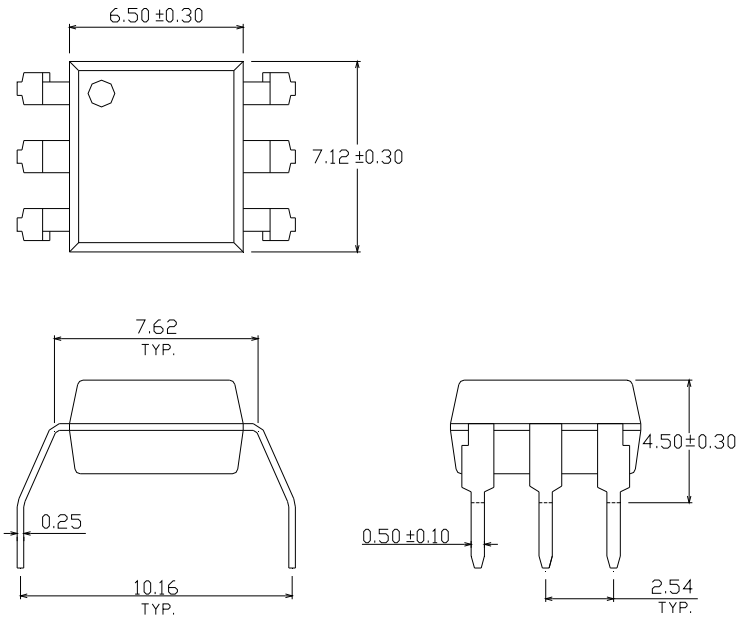
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Package Dimension (Dimensions in mm)

Standard DIP Type

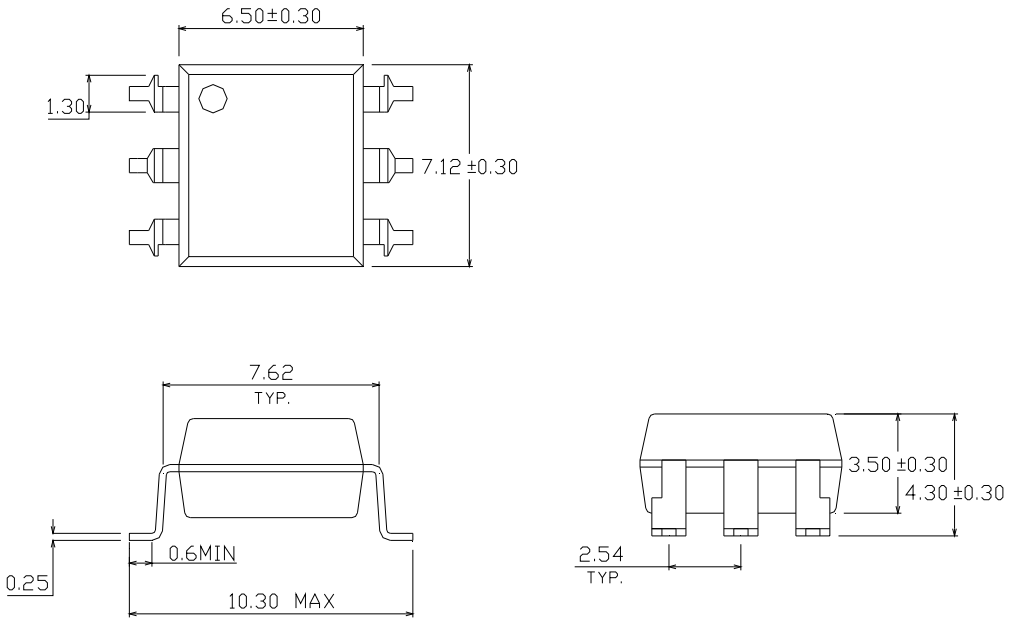


Option M Type

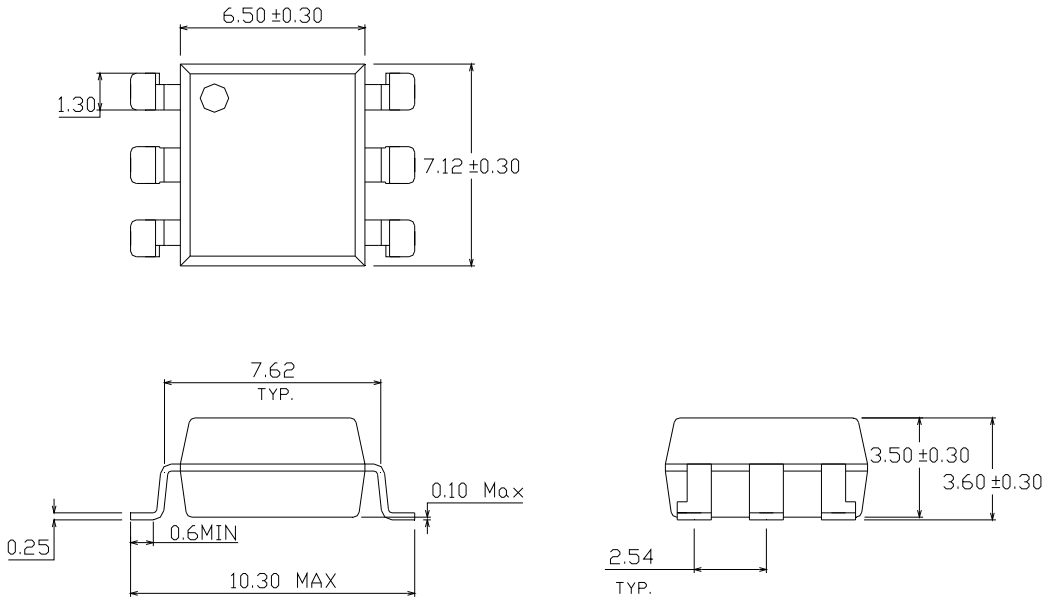


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Option S Type

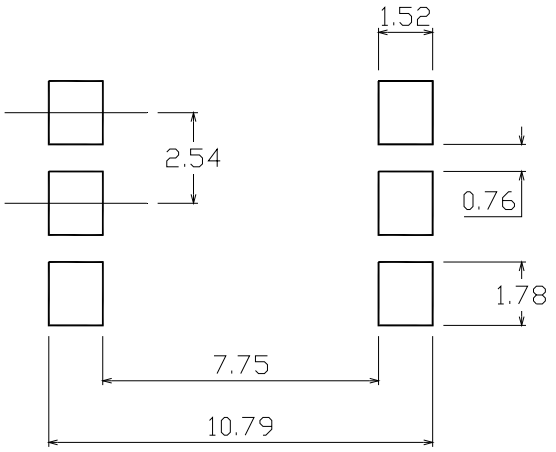


Option S1 Type

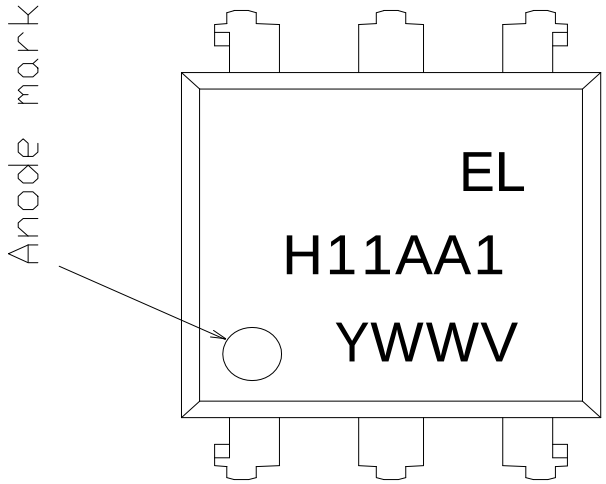


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Recommended pad layout for surface mount leadform



Device Marking



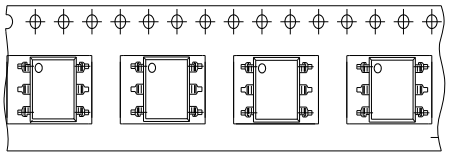
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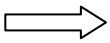
EL	denotes Everlight
H11AA1	denotes Part Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE safety (optional)

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Tape & Reel Packing Specifications

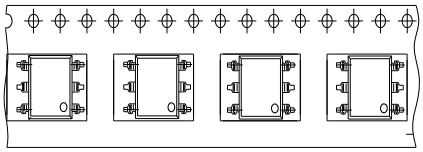
Option TA

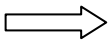




Direction of feed from reel

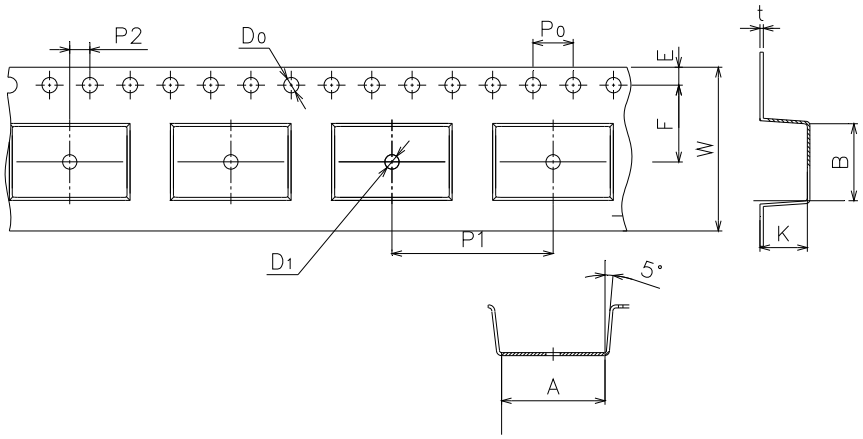
Option TB





Direction of feed from reel

Tape dimensions



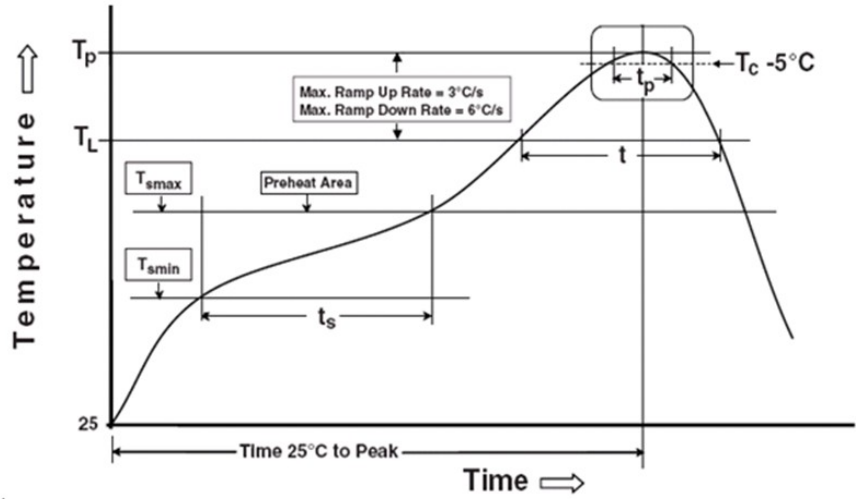
Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	10.4±0.1	7.5±0.1	1.5±0.1	1.5+0.1/-0	1.75±0.1	7.5±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**K**
Dimension (mm)	4.0±0.15	12±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

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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°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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