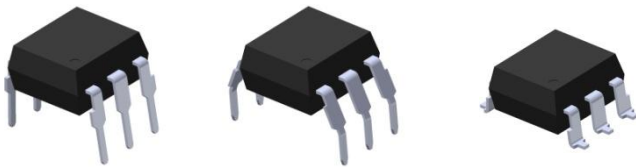


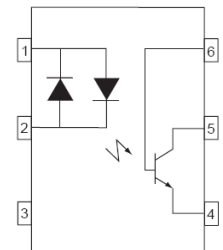
6 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER AC INPUT PHOTOCOUPLER H11AAX Series



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
- 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

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}	-	-	Ω	$V_{IO} = 500\text{Vdc}$, 40~60% R.H.
Input-output capacitance	C_{IO}	-	0.7	-	pF	$V_{IO} = 0, f = 1\text{MHz}$
Turn-on time	T_{on}	-	-	10	μs	$V_{CC} = 10\text{V}$, $I_C = 10\text{mA}, R_L = 100\Omega$
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 1. Forward Current vs Forward Voltage

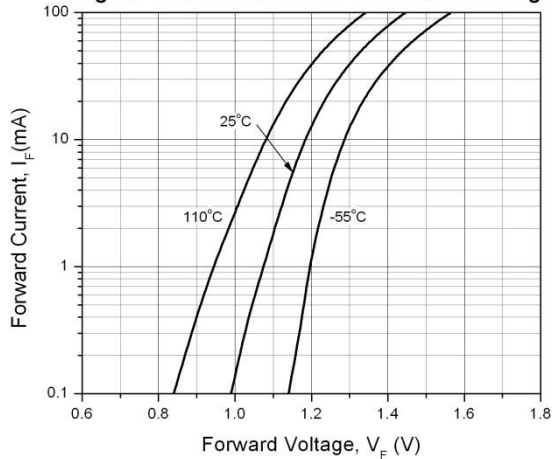


Figure 2. Current Transfer Ratio vs Forward Current

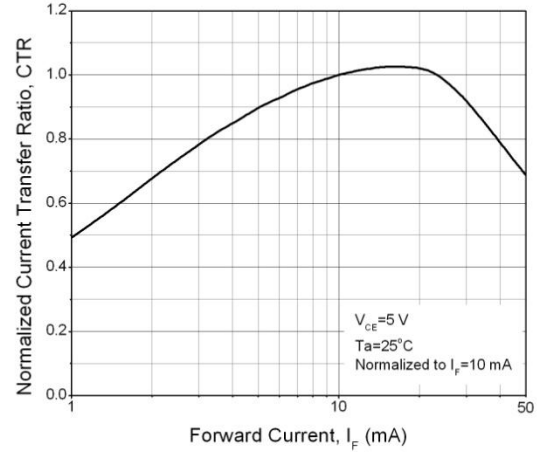


Figure 3. Current Transfer Ratio vs Ambient Temperature

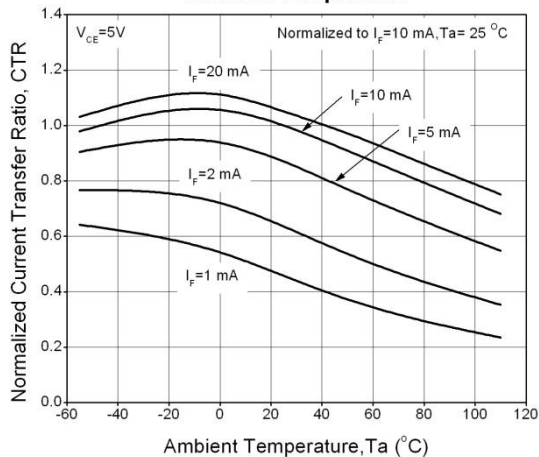


Figure 4. Current Transfer Ratio (Saturated) vs Base-Emitter Resistance

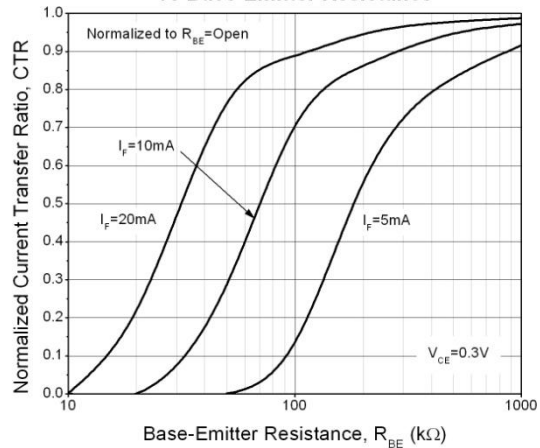


Figure 5. Current Transfer Ratio (Unsaturated) vs Base-Emitter Resistance

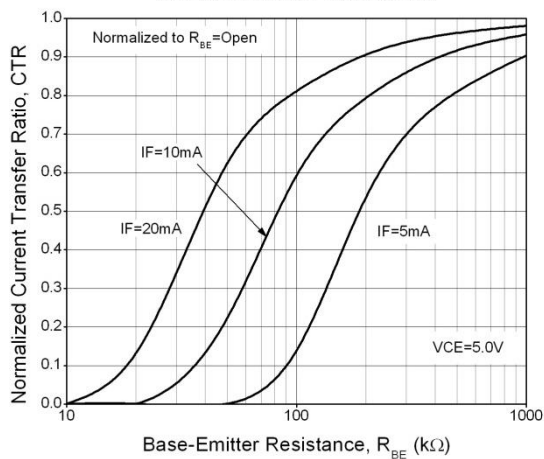


Figure 6. Dark Current vs Ambient Temperature

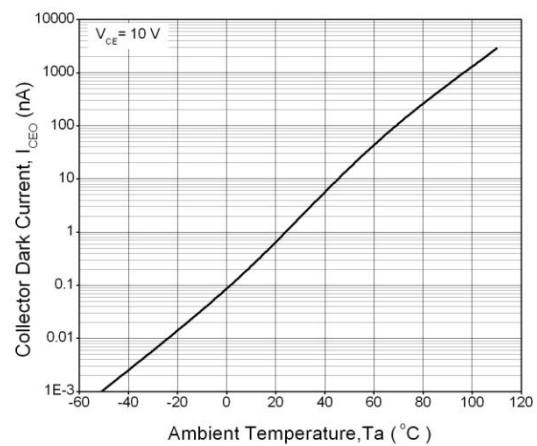


Figure 7. Collector-Emitter Saturation Voltage vs Collector Current

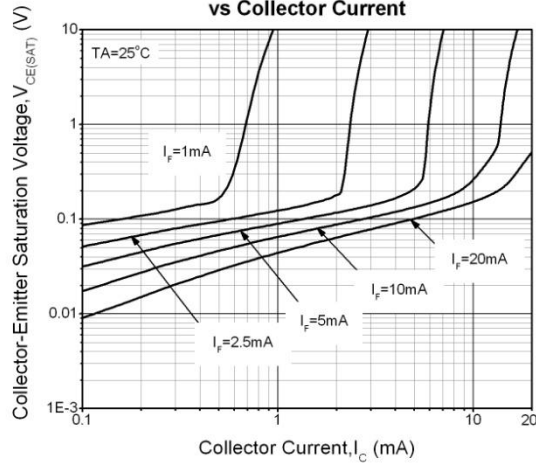


Figure 8. Switching Time vs Load Resistance

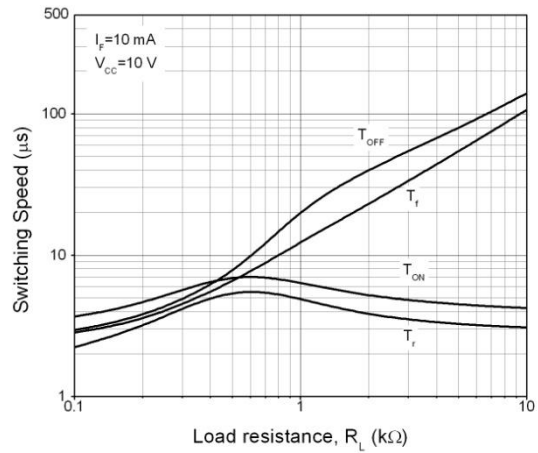


Figure 9. Turn-on Time vs Base-Emitter Resistance

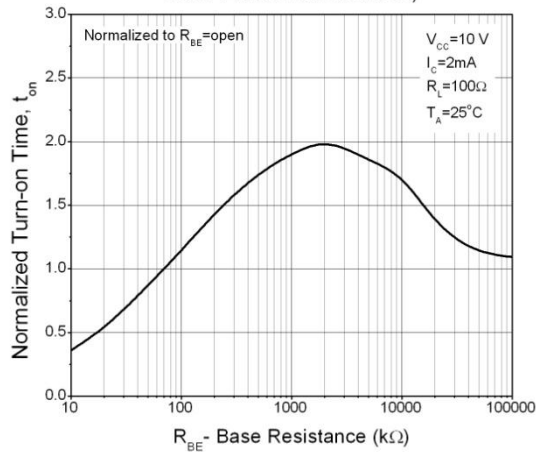


Figure 10. Turn-off Time vs Base-Emitter Resistance

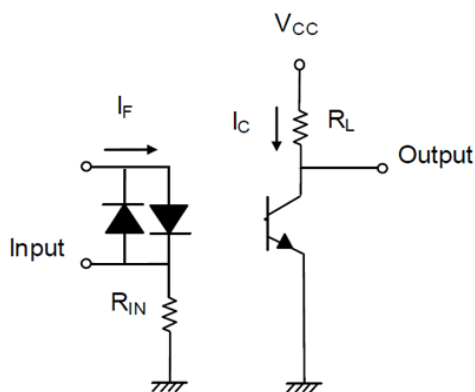
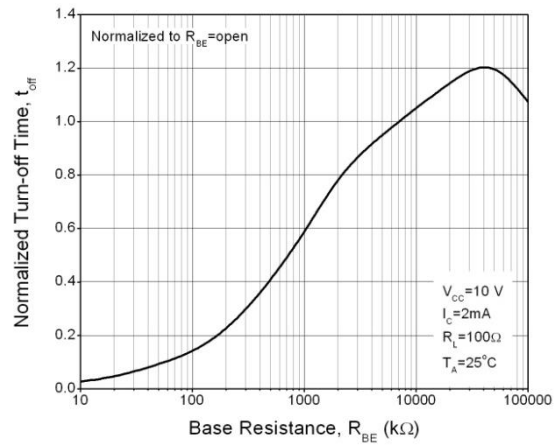


Figure 11. Switching Time Test Circuit & Waveforms

Order Information

Part Number

H11AAXY(Z)-V

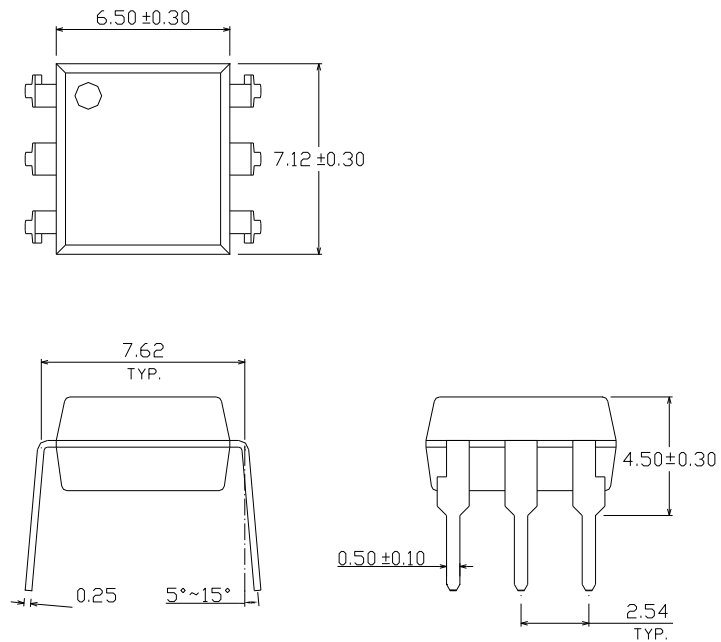
Notes

- 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).

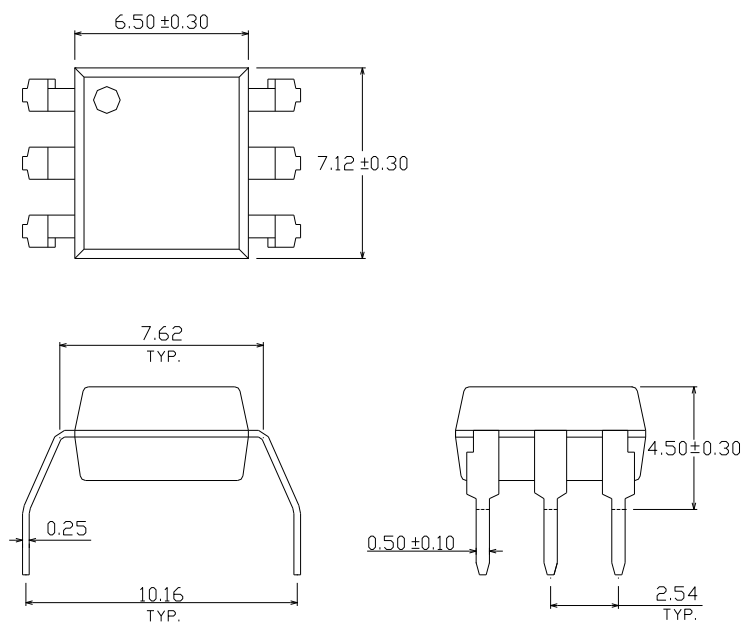
Option	Description	Packing quantity
None	Standard DIP-6	65 units per tube
M	Wide lead bend (0.4 inch spacing)	65 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead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

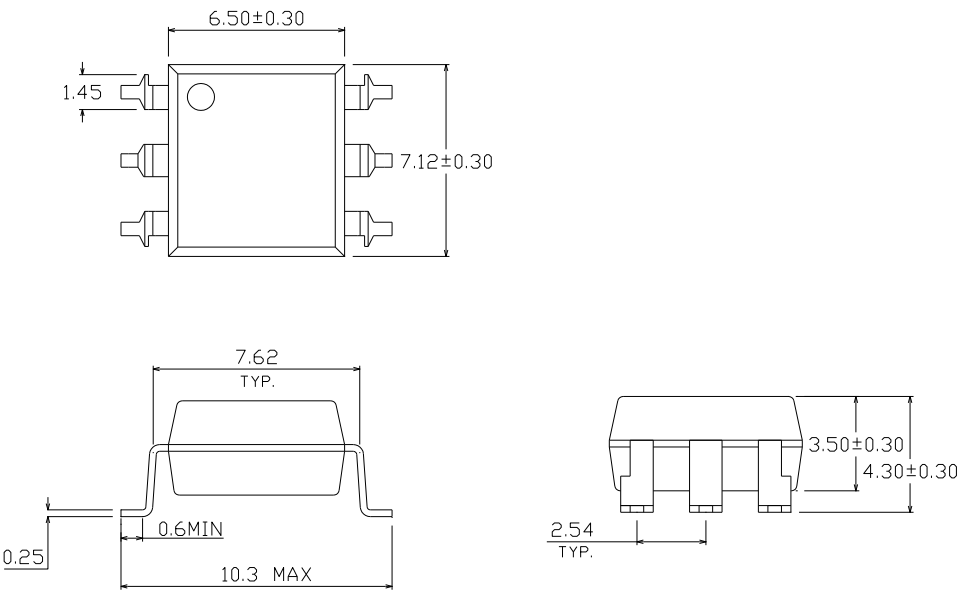
Standard DIP Type



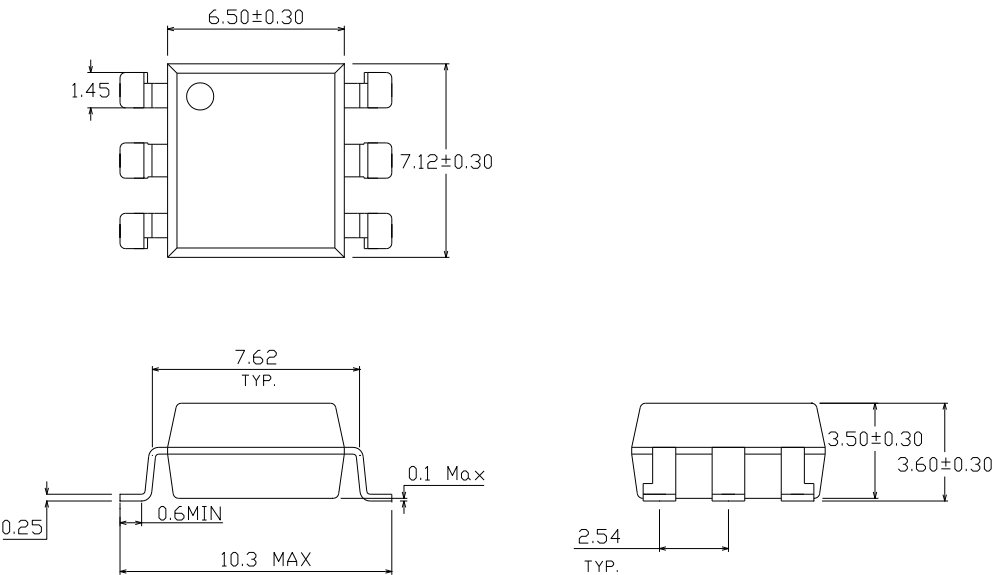
Option M Type



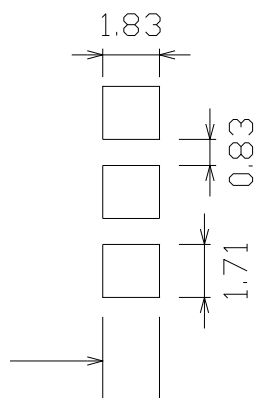
Option S Type



Option S1 Type



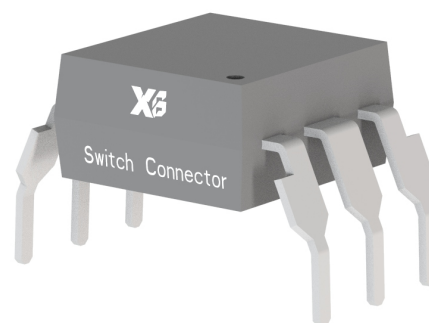
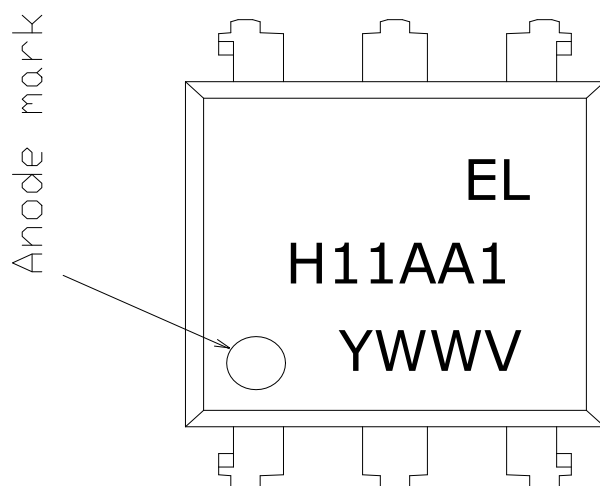
Recommended pad layout for surface mount leadform



Notes

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

Device Marking

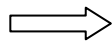
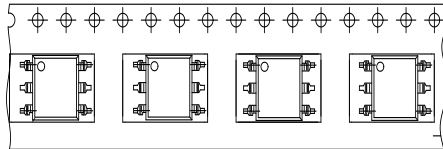


Notes

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

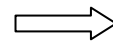
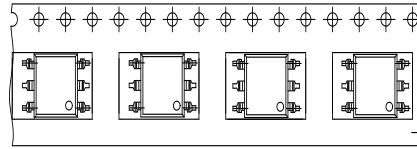
Tape & Reel Packing Specifications

Option TA



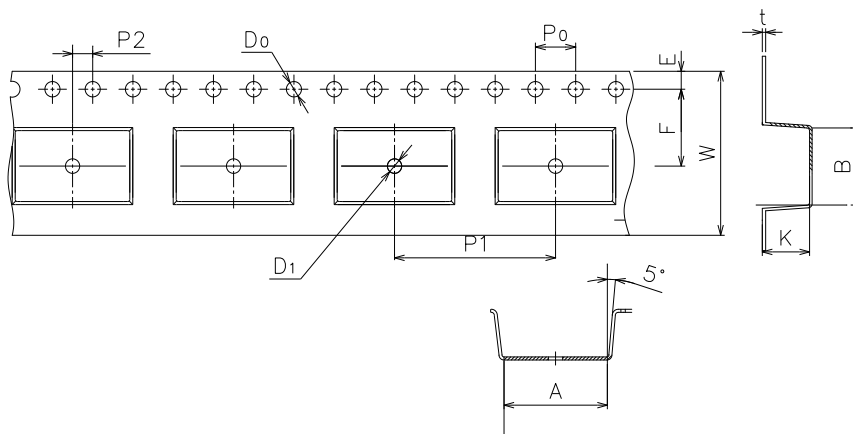
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions

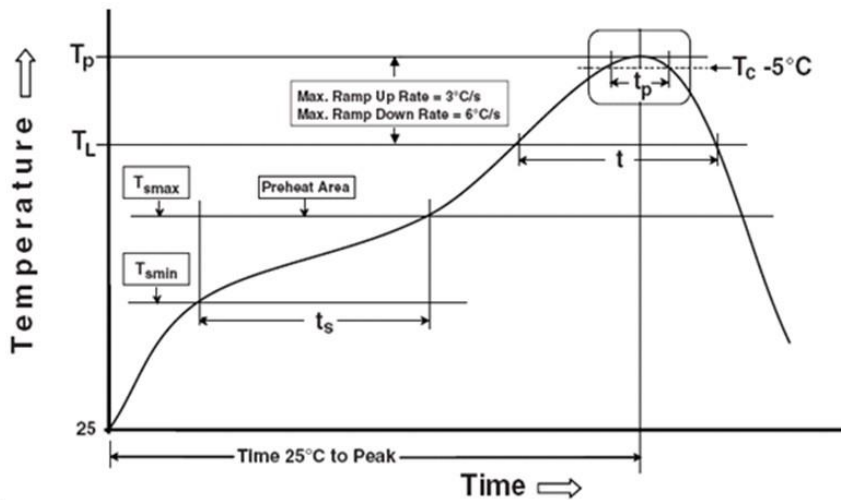


Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	10.8±0.1	7.55±0.1	1.5±0.1	1.5+0.1/-0	1.75±0.1	7.5±0.1
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0±0.15	12±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

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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