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# 6 PIN DIP PHOTO COUPLER Schmitt Trigger

## H11Lx Series

### Features:

- High data rate, 1MHz typical (NRZ)
- Free from latch up and oscillation throughout voltage and temperature ranges.
- Microprocessor compatible drive
- Logic compatible output sinks 16mA at 0.4V maximum
- Guaranteed on/off threshold hysteresis
- Wide supply voltage capability, compatible with all popular logic systems
- High isolation voltage between input and output (Viso=5000 V rms )
- Compact dual-in-line package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approval (No.132249 )
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved (No. 2007798)

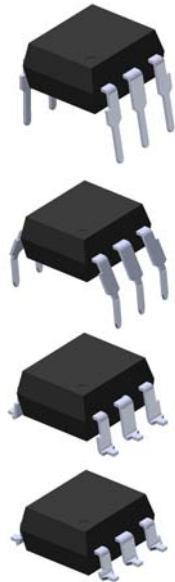
### Description

The H11LX series of devices each consist of a GaAs infrared emitting diode optically coupled a high speed integrated circuit detector. The output detector incorporates a Schmitt trigger, which provides hysteresis for noise immunity and pulse shaping.

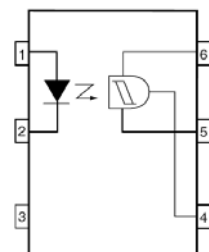
The devices are in a 6-pin DIP package and available in wide-lead spacing and SMD option.

### Applications

- Logic to logic isolator
- Programmable current level sensor
- Line receiver — eliminate noise and transient problems
- AC to TTL conversion — square wave shaping
- Digital programming of power supplies
- Interfaces computers with peripherals



### Schematic



1. Anode
2. Cathode
3. No Connection
4.  $V_O$
5. GND
6.  $V_{CC}$

### Truth Table

Input	Output
H	L
L	H



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### Absolute Maximum Ratings ( $T_a=25^{\circ}\text{C}$ )

Parameter		Symbol	Rating	Unit
Input	Forward current	$I_F$	60	mA
	Reverse voltage	$V_R$	6	V
	Power dissipation	$P_D$	120	mW
Output	$V_{45}$ Allowed Range	$V_o$	0 to 16	V
	$V_{65}$ Allowed Range	$V_{CC}$	3 to 16	V
	Output Current	$I_o$	50	mA
	power dissipation	$P_D$	150	mW
Total power dissipation		$P_{tot}$	250	mW
Isolation voltage <sup>*1</sup>		$V_{iso}$	5000	V rms
Operating temperature		$T_{opr}$	-55~+100	°C
Storage temperature		$T_{stg}$	-55~+150	°C
Soldering temperature <sup>*2</sup>		$T_{sol}$	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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## Schmitt Trigger

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### Electrical Characteristics (T<sub>a</sub>=25°C unless specified otherwise)

#### Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	V <sub>F</sub>	-	1.15	1.5	V	I <sub>F</sub> = 10mA
Reverse Leakage current	I <sub>R</sub>	-	-	10	μA	V <sub>R</sub> = 5V
Capacitance	C <sub>J</sub>	-	-	100	pF	V=0, f=1MHz

#### Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Operation Voltage Range	V <sub>CC</sub>	3	-	15	V	
Supply Current	I <sub>CC(off)</sub>	-	1.6	5	mA	I <sub>F</sub> =0mA, V <sub>CC</sub> =5V
Output Current, High	I <sub>OH</sub>	-	-	100	μA	I <sub>F</sub> =0mA, V <sub>CC</sub> =V <sub>O</sub> =15V
Isolation Resistance	R <sub>ISO</sub>	10 <sup>11</sup>	-	-	Ω	V <sub>I-O</sub> =500VDC

### Transfer Characteristics

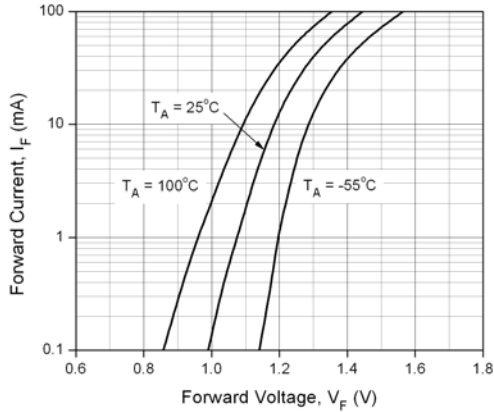
Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Supply Current	I <sub>CC(on)</sub>	-	1.6	5	mA	I <sub>F</sub> =10mA, V <sub>CC</sub> =5V
Output Voltage .low	V <sub>OL</sub>	-	-	0.4	V	V <sub>CC</sub> =5V, I <sub>F</sub> =I <sub>Fon</sub> (max.), R <sub>L</sub> =270Ω
Turn on Threshold Current <sup>1</sup>	H11L1	-	-	1.6	mA	V <sub>CC</sub> =5V, R <sub>L</sub> =270Ω
	H11L2	-	-	10		
	H11L3	-	-	5		
Turn off Threshold Current	I <sub>Foff</sub>	-	1	-	mA	V <sub>CC</sub> =5V, R <sub>L</sub> =270Ω
Hysteresis Ratio	I <sub>Fon</sub> /I <sub>Foff</sub>	0.5	-	0.9		V <sub>CC</sub> =5V, R <sub>L</sub> =270Ω
Turn on Time	t <sub>on</sub>	-	-	4	μS	V <sub>CC</sub> =5V, I <sub>F</sub> =I <sub>Fon</sub> , R <sub>L</sub> =270Ω
Fall Time	t <sub>r</sub>	-	0.1	-	μS	
Turn off Time	t <sub>off</sub>	-	-	4	μS	
Rise Time	t <sub>r</sub>	-	0.1	-	μS	
Data Rate		-	1	-	MHz	

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

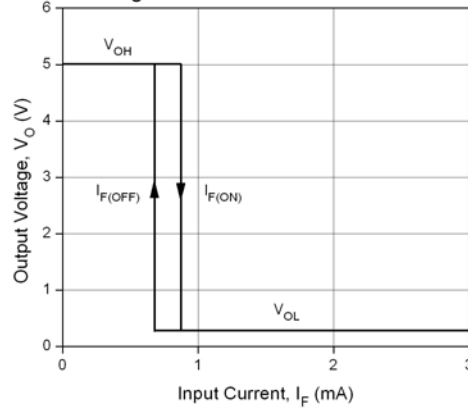
<sup>1</sup>. Max. I<sub>F(ON)</sub> is the maximum current required to trigger the output. For examples, a 1.6mA maximum trigger current would require the LED to be driven at a current greater than 1.6mA to guarantee the device will turn on. A 10% guard band is recommended to account for degradation of the LED over its lifetime. The maximum allowable LED drive current is 60mA.

### Typical Performance Curves

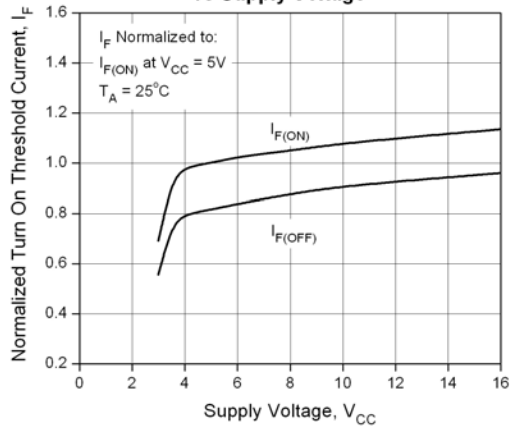
**Figure 1. Forward Current vs Forward Voltage**



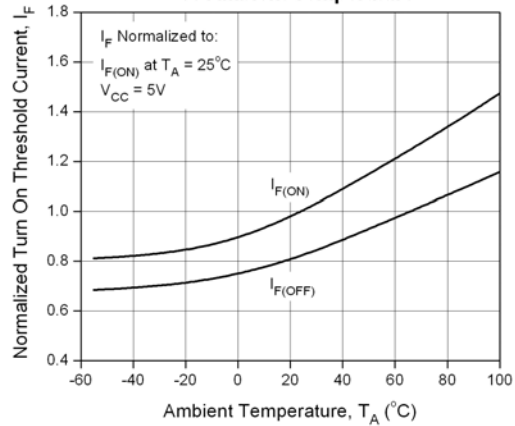
**Figure 2. Transfer Characteristics**



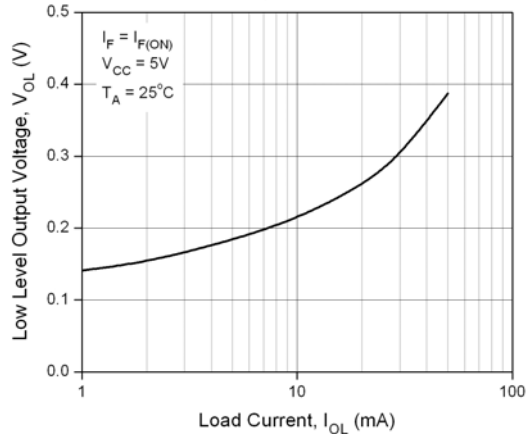
**Figure 3. Turn On Threshold Current vs Supply Voltage**



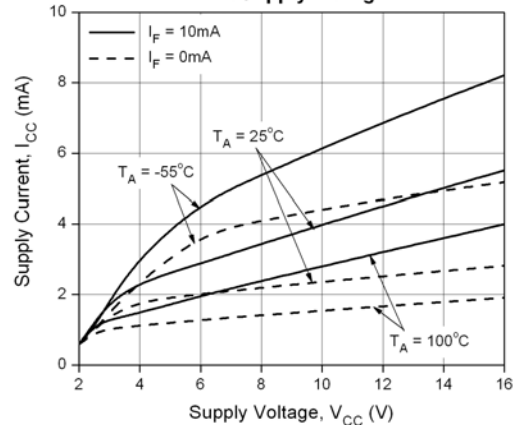
**Figure 4. Turn On Threshold Current vs Ambient Temperature**



**Figure 5. Low Level Output Voltage vs Load Current**



**Figure 6. Supply Current vs Supply Voltage**



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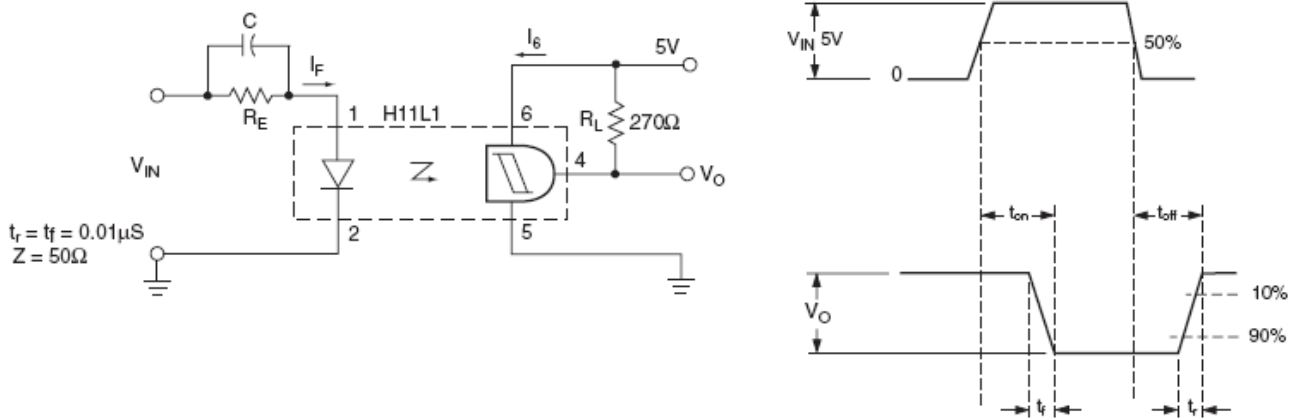


Figure. 7 Switching test circuit and waveform

### Order Information

#### Part Number

# H11LXY(Z)-V

#### Note

- X = Part No. for 1, 2 or 3
- Y = Lead form option (S, S1, M or none)
- Z = Tape and reel option (TA, TB or none).
- V = VDE (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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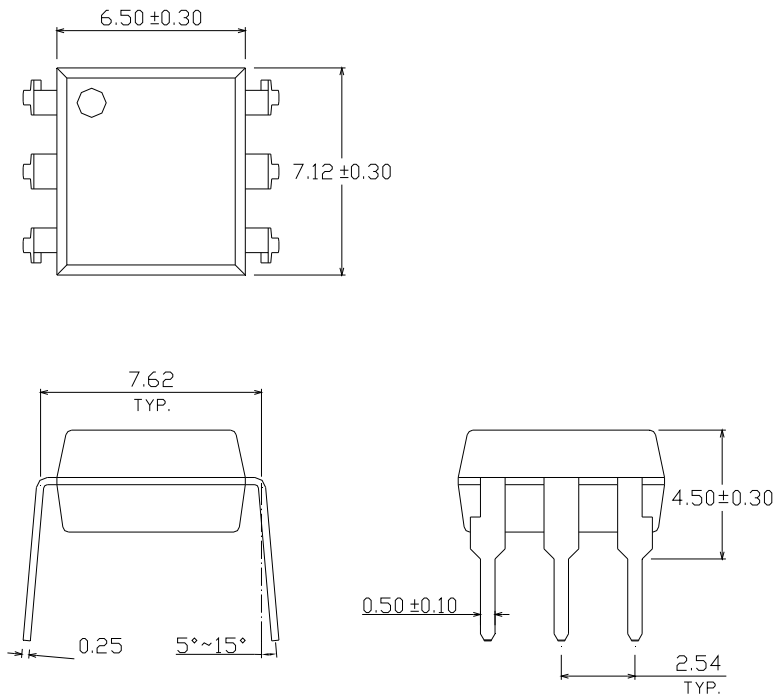
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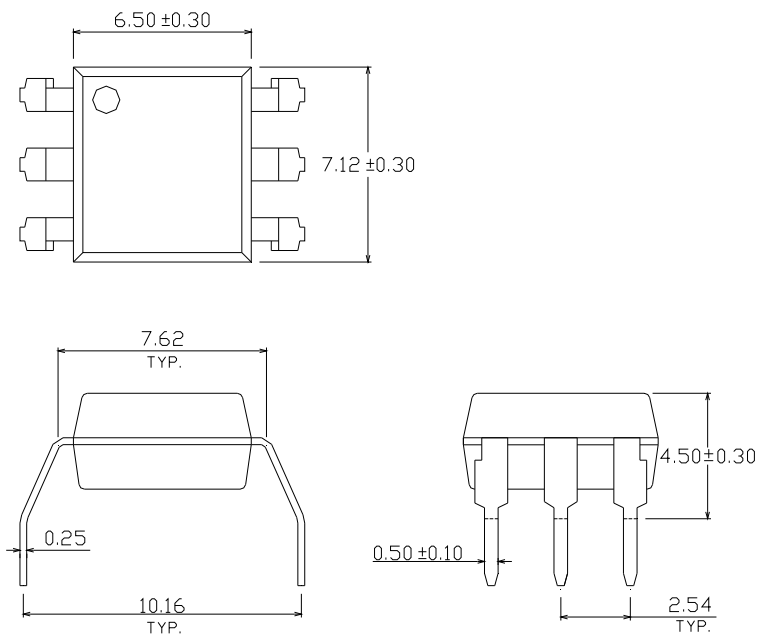
### Package Drawings

(Dimensions in mm)

#### Standard DIP Type



#### Option M Type



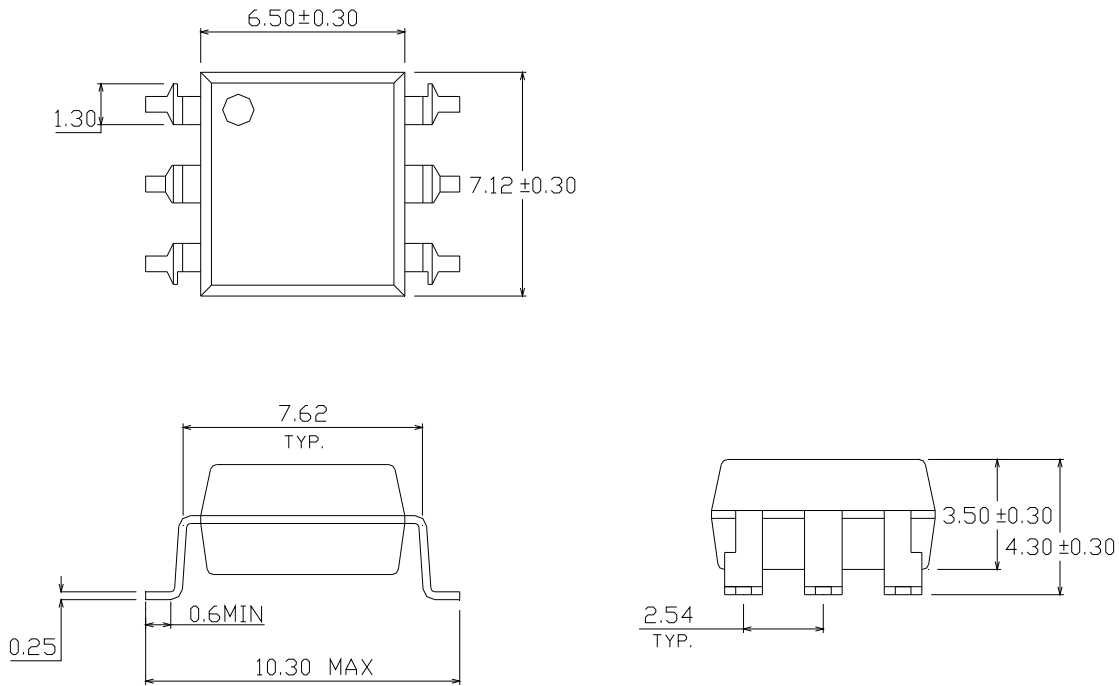


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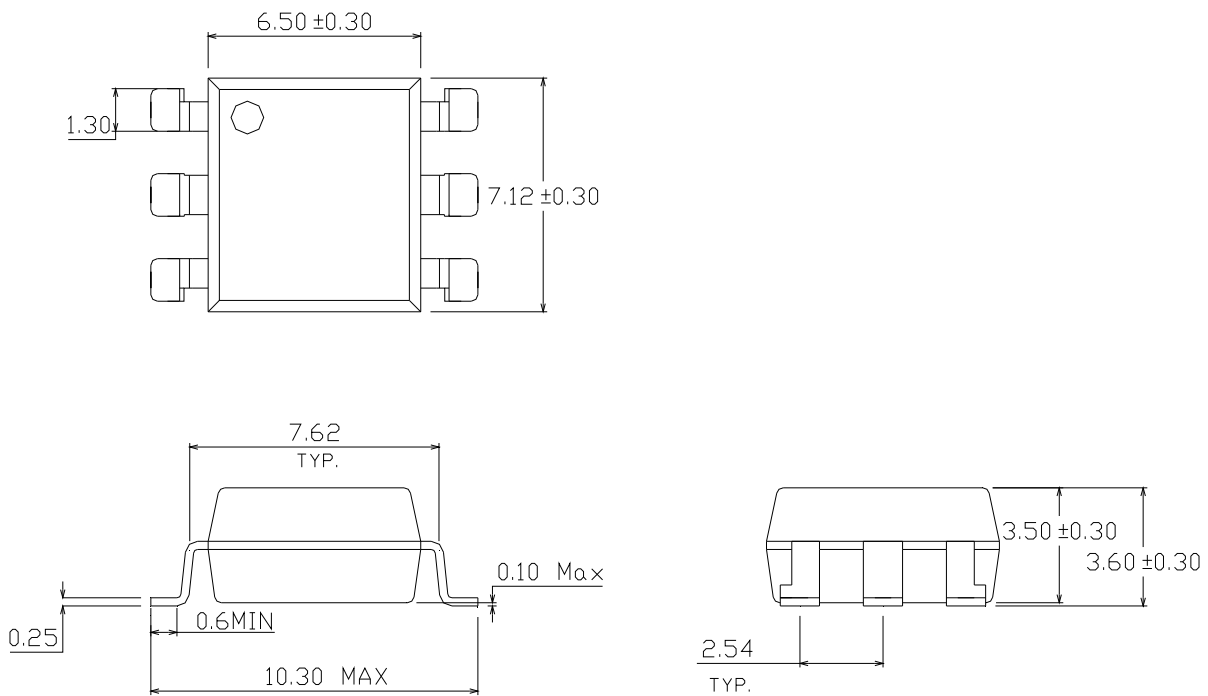
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### Option S Type



### Option S1 Type



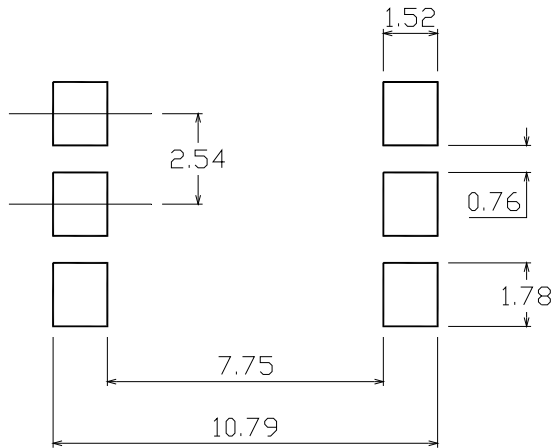


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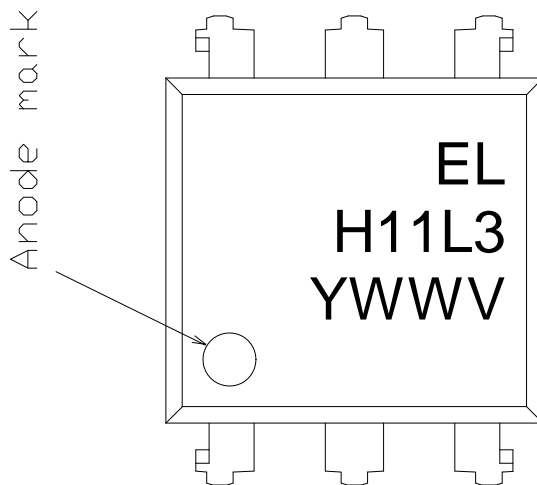
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### Recommended pad layout for surface mount leadform



### Device Marking



### Notes

- EL denotes Everlight
- H11L3 denotes Device Number
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE (optional)





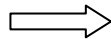
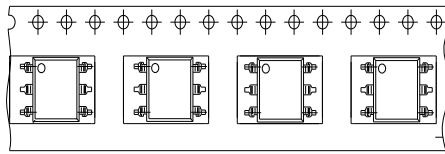
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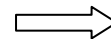
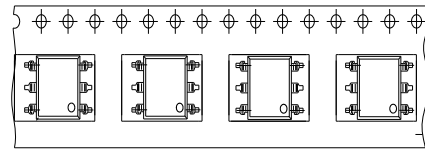
### Tape & Reel Packing Specifications

**Option TA**



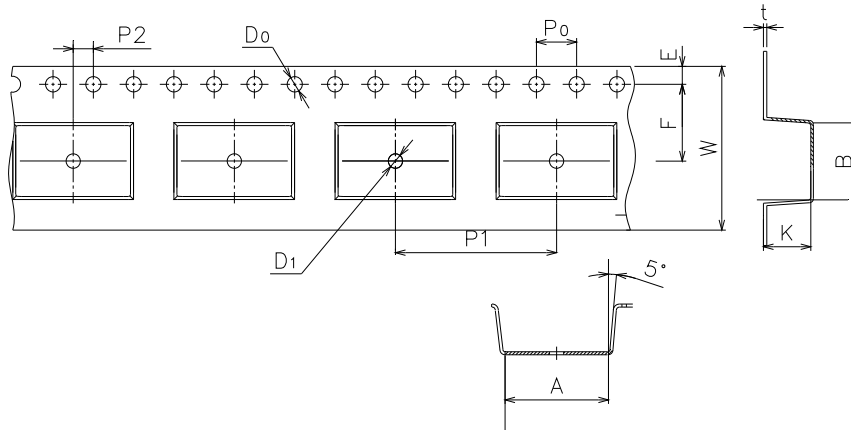
Direction of feed from reel

**Option TB**



Direction of feed from reel

### Tape dimensions



Dimension No.	A	B	Do	D1	E	F
Dimension (mm)	10.4±0.1	7.52±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	1.6±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

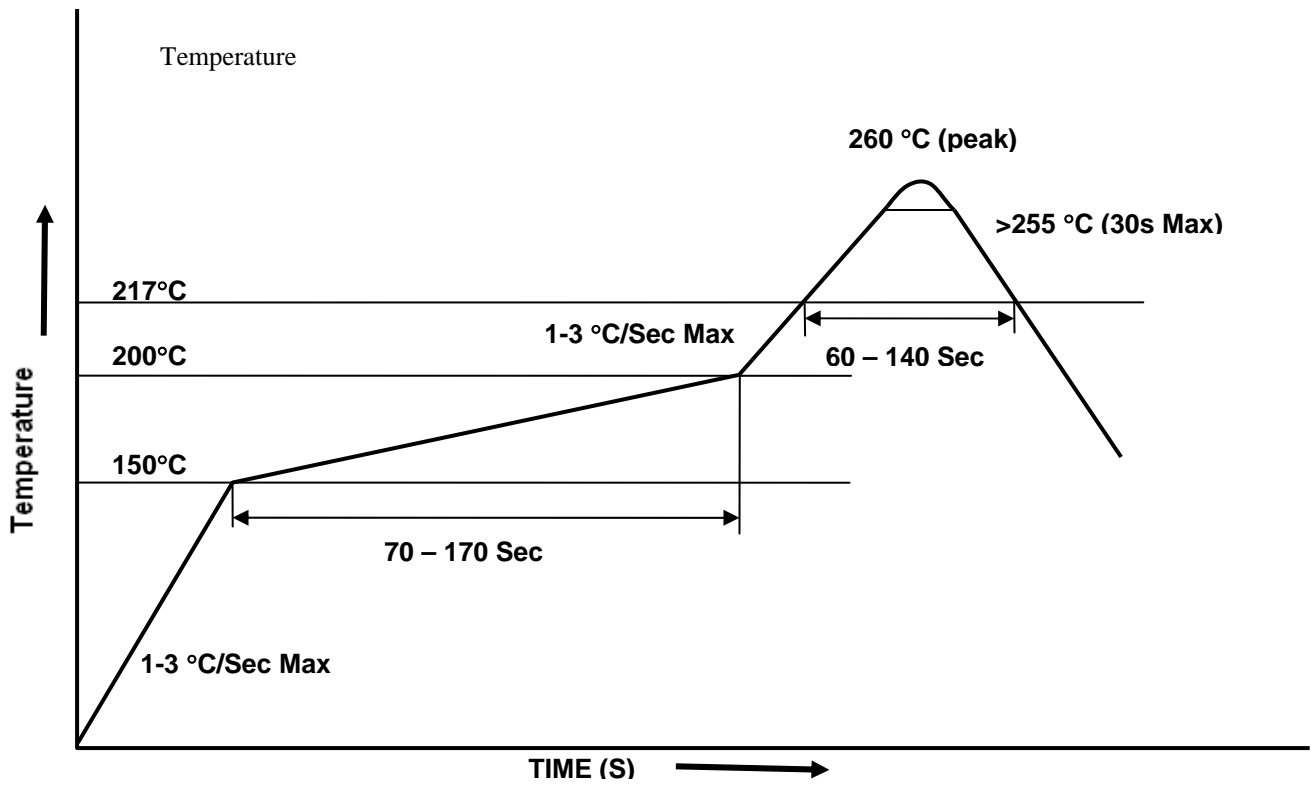


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### Solder Reflow Temperature Profile





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