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## 4 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

EL814 Series

### Features:

- AC input response
- Current transfer ratio  
(CTR: Min. 20% at  $I_F = \pm 1\text{mA}$ ,  $V_{CE} = 5\text{V}$ )
- High isolation voltage between input and output ( $V_{iso} = 5000\text{ V rms}$ )
- Wide Operating temperature range  
-55~110°C
- High collector-emitter voltage  $V_{CEO} = 80\text{V}$
- Compact dual-in-line package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved (No. 716108)
- NEMKO approved (No. P06206474)
- DEMKO approved (No. 313924)
- FIMKO approved (No. FI 22807)
- CSA approved (No. 1143601)

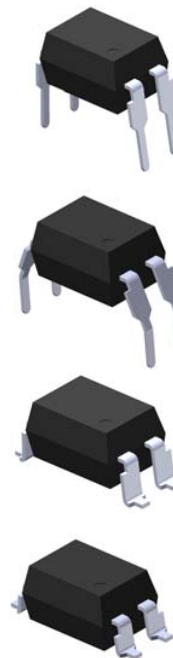
### Description

The EL814 series of devices each consist of two infrared emitting diodes, connected in inverse parallel, optically coupled to a phototransistor detector.

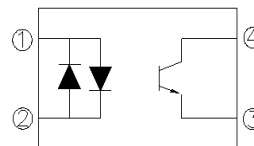
They are packaged in a 4-pin DIP package and available in wide-lead spacing and SMD option.

### Applications

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



### Schematic



### Pin Configuration

1. Anode / Cathode
2. Cathode / Anode
3. Emitter
4. Collector



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EL814 Series

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

Parameter		Symbol	Rating	Unit
Input	Forward current	$I_F$	$\pm 50$	mA
	Peak forward current ( $t = 10\mu\text{s}$ )	$I_{FM}$	1	A
	Power dissipation	$P_D$	70	mW
	Derating factor (above 100 °C)		2.9	mW/°C
Output	Power dissipation	$P_C$	150	mW
	Derating factor (above 100 °C)		5.8	mW/°C
	Collector-Emitter voltage	$V_{CEO}$	80	V
	Emitter-Collector voltage	$V_{ECO}$	6	V
Total power dissipation		$P_{tot}$	200	mW
Isolation voltage <sup>*1</sup>		$V_{iso}$	5000	V rms
Operating temperature		$T_{opr}$	-55~+110	°C
Storage temperature		$T_{stg}$	-55~+125	°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 are shorted together, and pins 3 & 4 are shorted together.

\*2 For 10 seconds.



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## EL814 Series

### Electrical Characteristics ( $T_a=25^\circ\text{C}$ unless specified otherwise)

#### Input

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Forward voltage	$V_F$	-	1.2	1.4	V	$I_F = \pm 20\text{mA}$
Input capacitance	$C_{in}$	-	50	250	pF	$V = 0, f = 1\text{KHz}$

#### Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Collector-Emitter dark current	$I_{CEO}$	-	-	100	nA	$V_{CE} = 20\text{V}, I_F = 0\text{mA}$
Collector-Emitter breakdown voltage	$BV_{CEO}$	80	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	$BV_{ECO}$	6	-	-	V	$I_E = 0.1\text{mA}$

### Transfer Characteristics ( $T_a=25^\circ\text{C}$ unless specified otherwise)

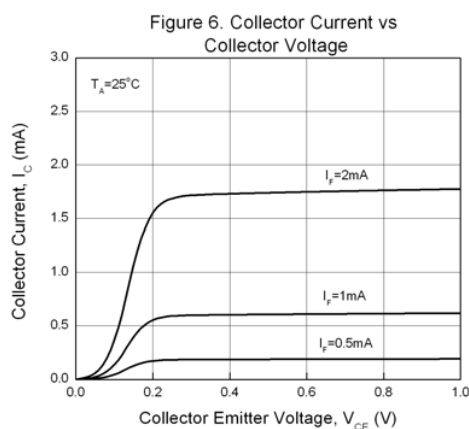
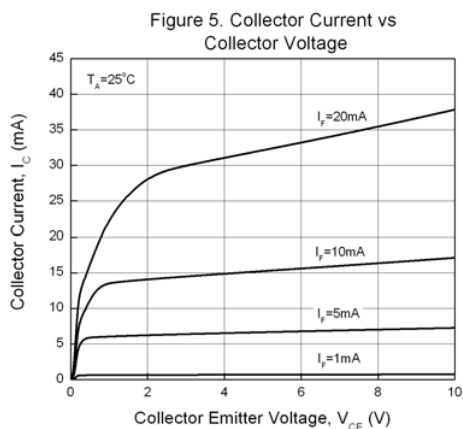
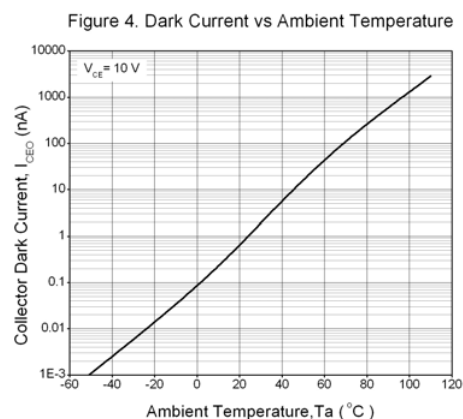
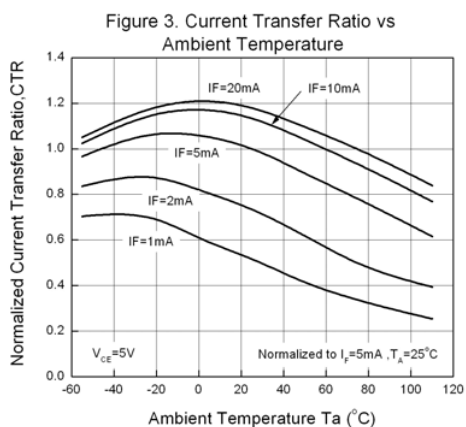
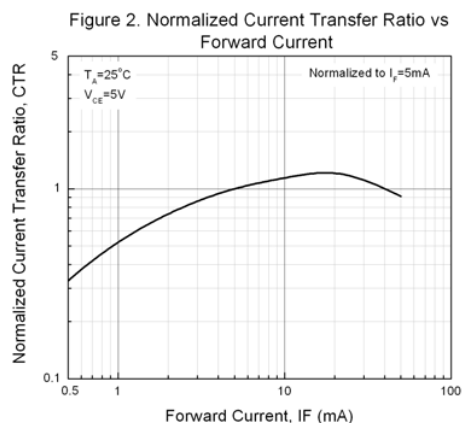
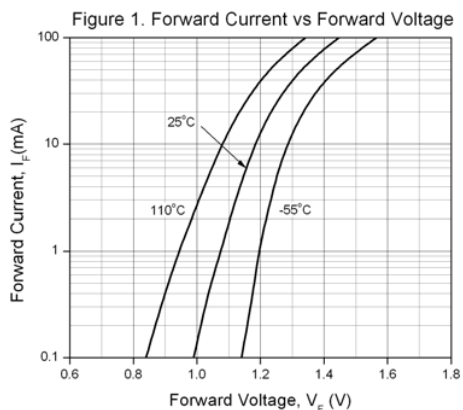
Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Current Transfer ratio	EL814	20	-	300	%	$I_F = \pm 1\text{mA}, V_{CE} = 5\text{V}$
	EL814A	50	-	150		
Collector-emitter saturation voltage	$V_{CE(sat)}$	-	0.05	0.2	V	$I_F = \pm 20\text{mA}, I_C = 1\text{mA}$
Isolation resistance	$R_{IO}$	$5 \times 10^{10}$	$10^{11}$	-	$\Omega$	$V_{IO} = 500\text{Vdc}, 40\sim 60\%R.H$
Cut-off frequency	$f_c$	-	80	-	kHz	$V_{CE}=5\text{V}, I_C=2\text{mA}, R_L=100\Omega, -3\text{dB}$
Floating capacitance	$C_{IO}$	-	0.6	1.0	pF	$V_{IO} = 0, f = 1\text{MHz}$
Rise time	$T_r$	-	7	18	$\mu\text{s}$	$V_{CE}=2\text{V}, I_C=2\text{mA}, R_L=100\Omega$
Fall time	$T_f$	-	11	18	$\mu\text{s}$	

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

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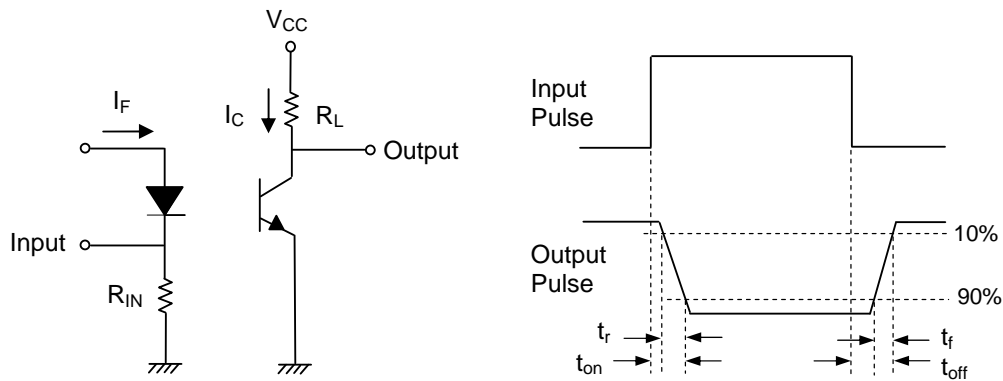
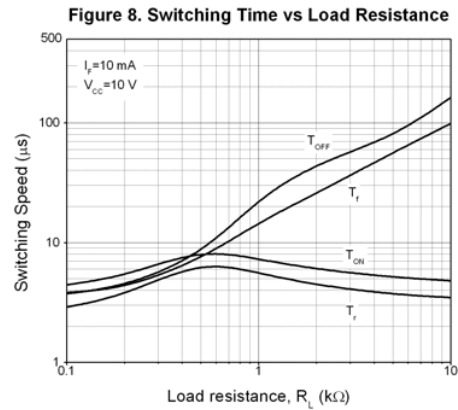
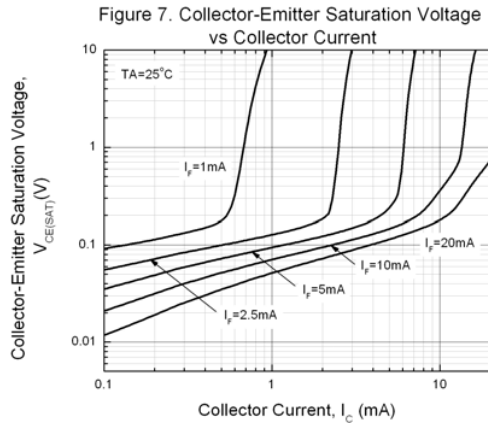
**EL814 Series**

## Typical Performance Curves



# 4 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

**EL814 Series**



**Figure 9. Switching Time Test Circuit & Waveforms**



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## 4 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

EL814 Series

### Order Information

#### Part Number

**EL814X(Y)(Z)**

#### Note

- X = Lead form option (S, S1, M or none)
- Y = CTR Rank option (A or none)
- Z = Tape and reel option (TA, TB, TU, TD or none).

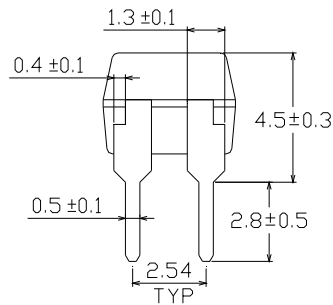
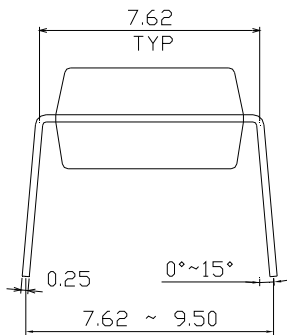
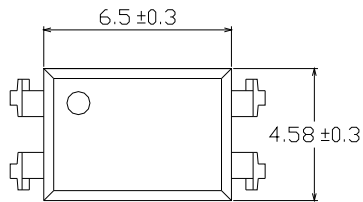
Option	Description	Packing quantity
None	Standard DIP-4	100 units per tube
M	Wide lead bend (0.4 inch spacing)	100 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount 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
S (TU)	Surface mount lead form + TU tape & reel option	1500 units per reel
S (TD)	Surface mount lead form + TD tape & reel option	1500 units per reel
S1 (TU)	Surface mount lead form (low profile) + TU tape & reel option	1500 units per reel
S1 (TD)	Surface mount lead form (low profile) + TD tape & reel option	1500 units per reel

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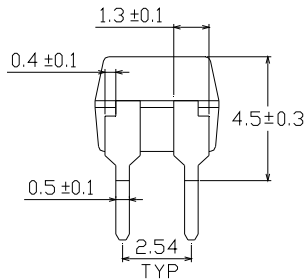
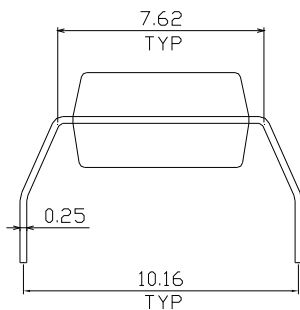
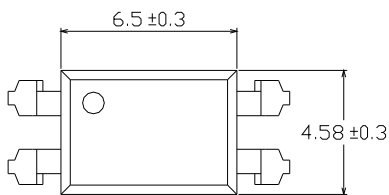
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## Package Drawings (Dimensions in mm)

### Standard DIP Type



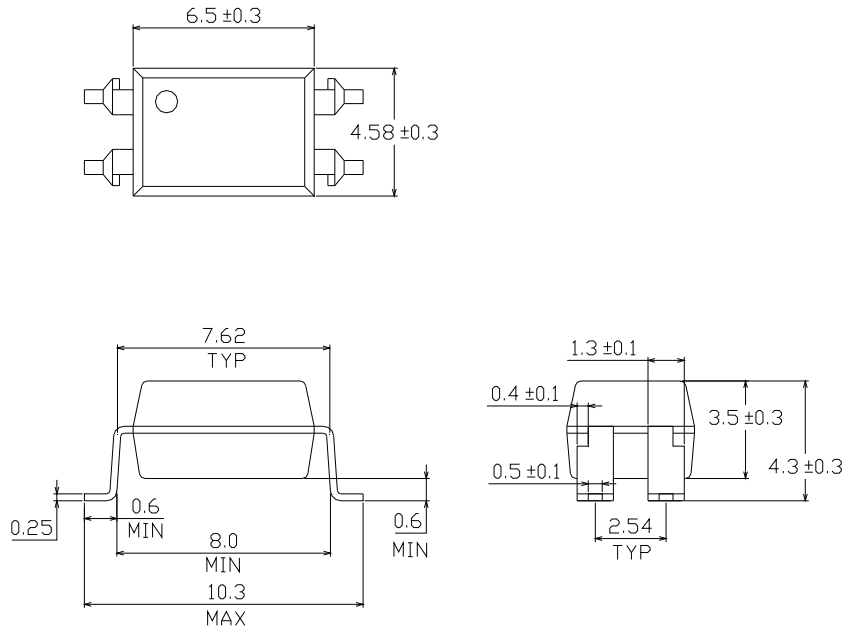
### Option M Type



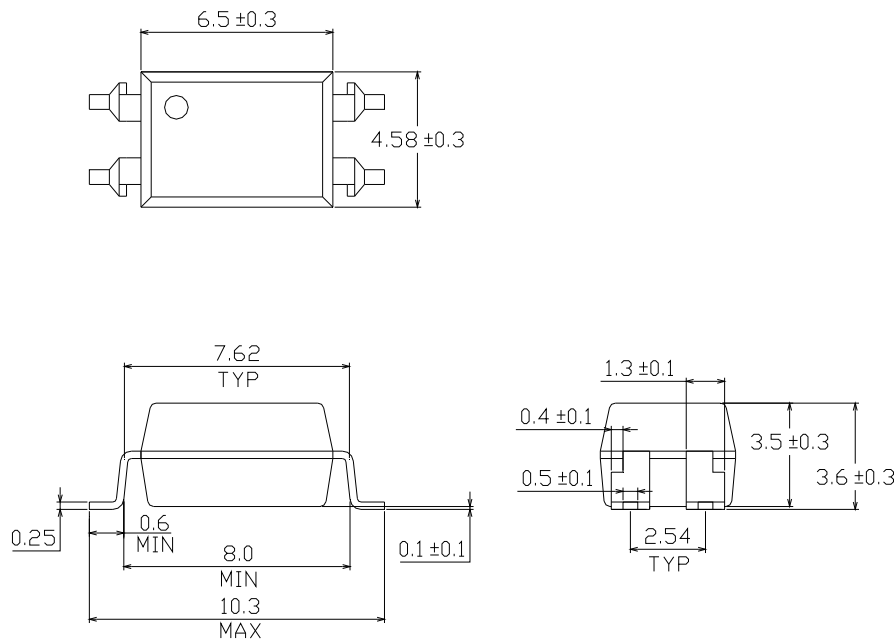
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## Option S Type



## Option S1 Type





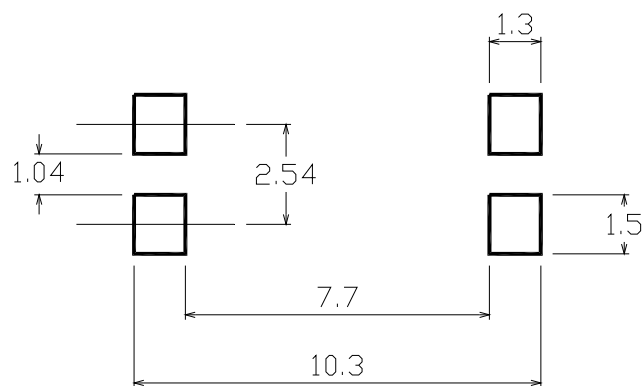


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## 4 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

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### Recommended pad layout for surface mount leadform



### Device Marking



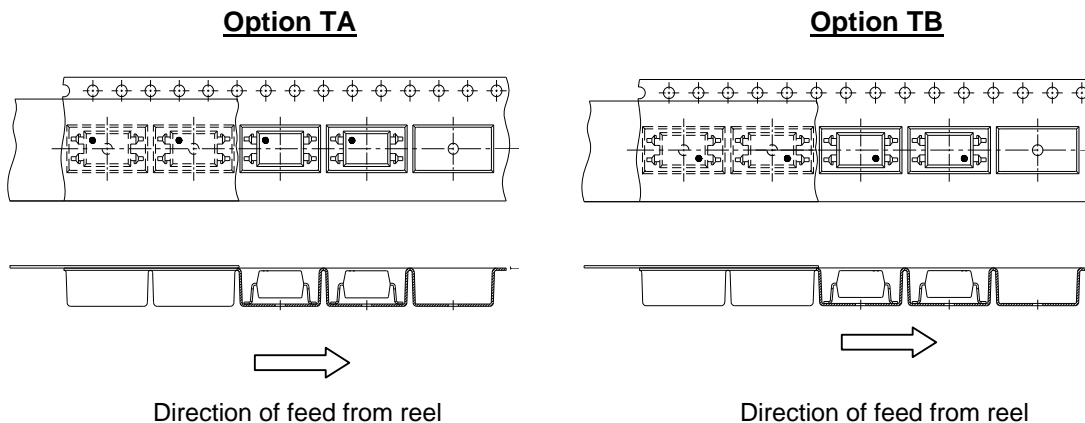
### Notes

- EL814 denotes Device Number
- F denotes Factory Code (C: China, T: Taiwan)
- R denotes CTR Rank (A or none)
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code

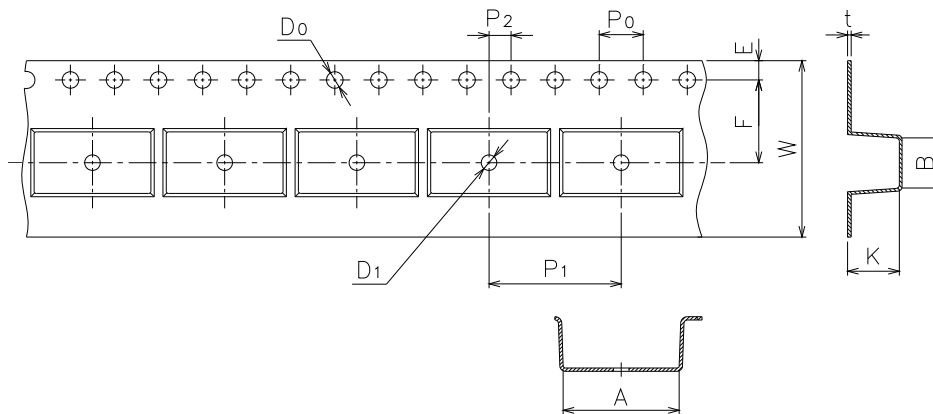
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## Tape & Reel Packing Specifications



## Tape dimensions

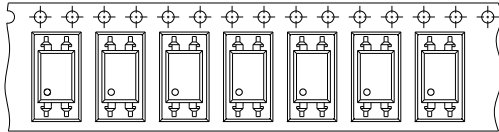


Dimension No.	<b>A</b>	<b>B</b>	<b>Do</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension(mm)	10.4±0.1	4.55±0.1	1.5±0.1	1.5±0.05	1.75±0.1	7.5±0.1
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>K</b>
Dimension(mm)	4.0±0.1	12.0±0.1	2.0±0.1	0.33±0.1	16.0+0.3/ -0.1	4.55±0.1

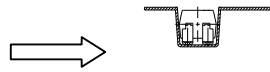
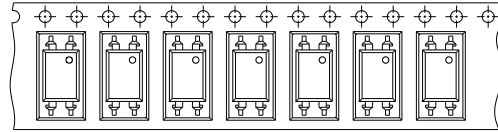
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**Option TD**



**Option TU**

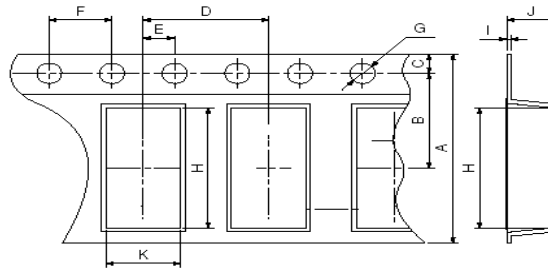


Direction of feed from reel



Direction of feed from reel

## Tape dimensions



Dimension No.	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
Dimension(mm)	16.00±0.3	7.5±0.1	1.75±0.1	8.0±0.1	2.0±0.1	4.0±0.1
Dimension No.	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>	
Dimension(mm)	1.5+0.1/-0	10.4±0.1	0.4±0.05	4.55±0.1	5.1±0.1	

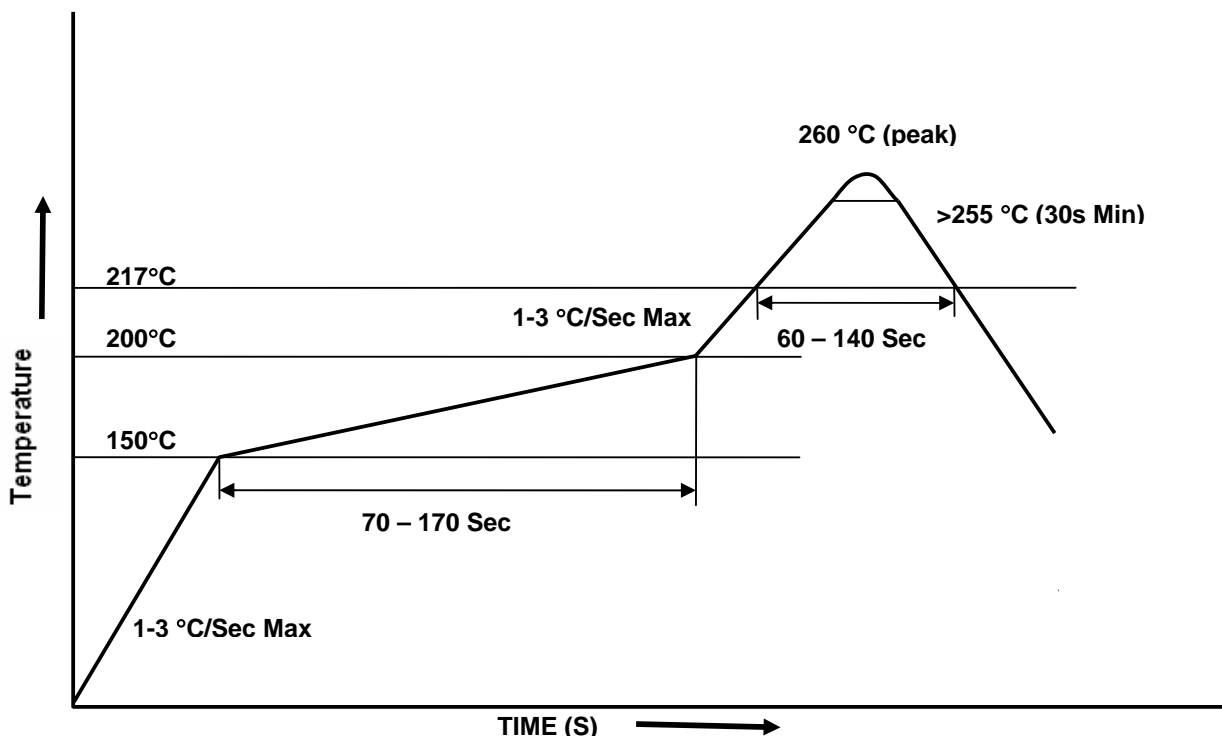


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# 4 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

## EL814 Series

### Solder Reflow Temperature Profile





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## 4 PIN DIP PHOTOTRANSISTOR AC INPUT PHOTOCOUPLER

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