

6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

Features:

- 4NXX series: 4N29, 4N30, 4N31, 4N32, 4N33
- H11BX series: H11B1, H11B2, H11B3, H11B255
- High isolation voltage between input and output (Viso=5000 V rms)
- Creepage distance >7.62 mm
- Meets or exceeds all JEDEC registered specifications
- 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)

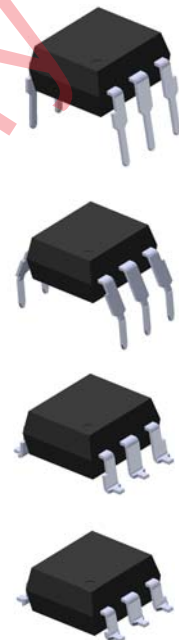
Description

The TIL113, 4NXX and H11BX series of devices each consist of an infrared emitting diode optically coupled to a photo darlington detector.

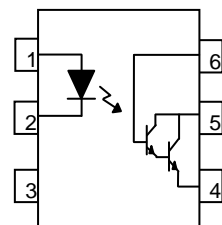
They are packaged in a 6-pin DIP package and available in wide-lead spacing and SMD option.

Applications

- Low power logic circuits
- Telecommunications equipment
- Portable electronics
- Interfacing coupling systems of different potentials and impedances



Schematic



Pin Configuration

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



LIGHTING FOREVER

6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

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

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	60	mA
	Peak forward current ($t = 10\mu\text{s}$)	I_{FM}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation No derating needed	P_D	120	mW
			3.8	mW/ $^{\circ}\text{C}$
Output	Power dissipation No derating needed	P_C	150	mW
			6.5	mW/ $^{\circ}\text{C}$
	Collector-Emitter voltage	V_{CEO}	55	V
	Collector-Base voltage	V_{CBO}	55	V
	Emitter-Collector voltage	V_{ECO}	7	V
	Emitter-Base voltage	V_{EBO}	7	V
Total power dissipation		P_{tot}	200	mW
Isolation voltage ^{*1}		V_{iso}	5000	V rms
Operating temperature		T_{opr}	-55~+100	$^{\circ}\text{C}$
Storage temperature		T_{stg}	-55~+125	$^{\circ}\text{C}$
Soldering temperature ^{*2}		T_{sol}	260	$^{\circ}\text{C}$

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.



LIGHTING FOREVER

6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX 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	1.5	V	$I_F = 10\text{mA}$ $I_F = 50\text{mA}$ for H11B3
Reverse current	I_R	-	-	10	μA	$V_R = 6\text{V}$
Input capacitance	C_{in}	-	50	-	pF	$V = 0, f = 1\text{MHz}$

Output

Parameter	Symbol	Min.	Typ.*	Max.	Unit	Condition
Collector-Emitter dark current	I_{CEO}	-	-	100	nA	$V_{CE} = 10\text{V}$
Collector-Emitter breakdown voltage	BV_{CEO}	55	-	-	V	$I_C = 1\text{mA}$
Collector-Base breakdown voltage	BV_{CBO}	55	-	-	V	$I_C = 0.1\text{mA}$
Emitter-Collector breakdown voltage	BV_{ECO}	7	-	-	V	$I_E = 0.1\text{mA}$

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



LIGHTING FOREVER

6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

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

Parameter		Symbol	Min.	Typ.*	Max.	Unit	Condition
Current transfer ratio	4N32 4N33	CTR	500	-	-	%	$I_F = 10\text{mA}, V_{CE} = 10\text{V}$
	4N29 4N30		100	-	-		
	4N31		50	-	-		
	H11B1		500	-	-		
	H11B2		200	-	-		$I_F = 1\text{mA}, V_{CE} = 5\text{V}$
	H11B3		100	-	-		
	H11B255		100	-	-		
	TIL113		300	-	-		
Collector-emitter saturation voltage	4N29 4N30 4N32 4N33	$V_{CE(sat)}$	-	-	1.0	V	$I_F = 8\text{mA}, I_C = 2\text{mA}$
	4N31 TIL113		-	-	1.2		$I_F = 8\text{mA}, I_C = 2\text{mA}$
	H11B1 H11B2 H11B3		-	-	1.0		$I_F = 1\text{mA}, I_C = 1\text{mA}$
	H11B255		-	-	1.0		$I_F = 50\text{mA}, I_C = 50\text{mA}$
Isolation resistance	R_{IO}	10^{11}	-	-	:	$V_{IO} = 500\text{Vdc}$	
Input-output capacitance	C_{IO}	-	0.8	-	pF	$V_{IO} = 0, f = 1\text{MHz}$	



LIGHTING FOREVER

6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113 4NXX Series H11BX Series

Transfer Characteristics

Parameter		Symbol	Min.	Typ.*	Max.	Unit	Condition
Turn-on time	H11B1 H11B2 H11B3 H11B255	Ton	-	25	-	μs	V _{CC} = 10V, I _F = 10mA, R _L = 100:
	4N29 4N30 4N31 4N32 4N33 TIL113		-	-	5		V _{CC} = 10V, I _C = 50mA, I _F = 200mA
Turn-off time	H11B1 H11B2 H11B3 H11B255	Toff	-	18	-	μs	V _{CC} = 10V, I _F = 10mA, R _L = 100:
	4N32 4N33 TIL113		-	-	100		V _{CC} = 10V, I _C = 50mA, I _F = 200mA
	4N29 4N30 4N31		-	-	40		

* Typical values at T_a = 25°C

**6 PIN PHOTODARLINGTON
PHOTOCOUPLER**

Typical Performance Curves

Figure 1. Forward Current vs Forward Voltage

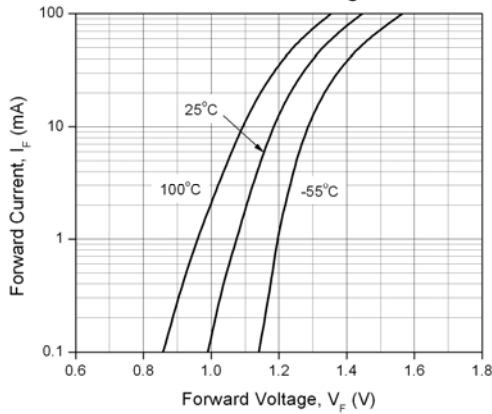


Figure 2. Current Transfer Ratio vs. Ambient Temperature

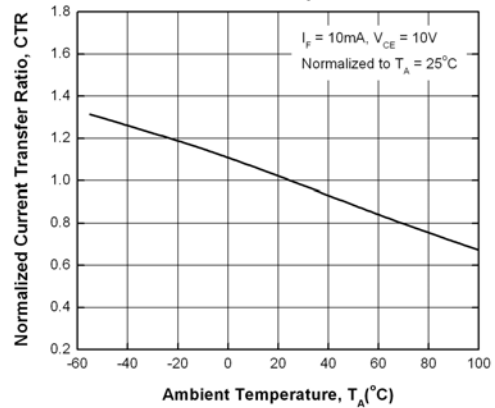


Figure 3. Normalized Current Transfer Ratio vs Forward Current

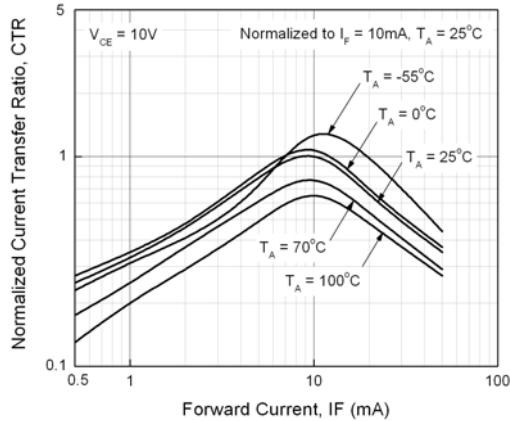


Figure 4. Collector Dark Current vs Ambient Temperature

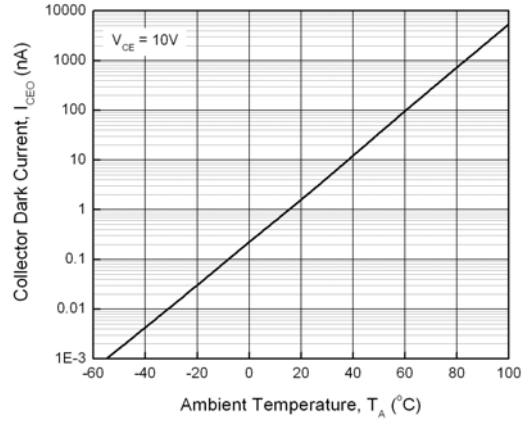


Figure 5. Turn-on Time vs Forward Current

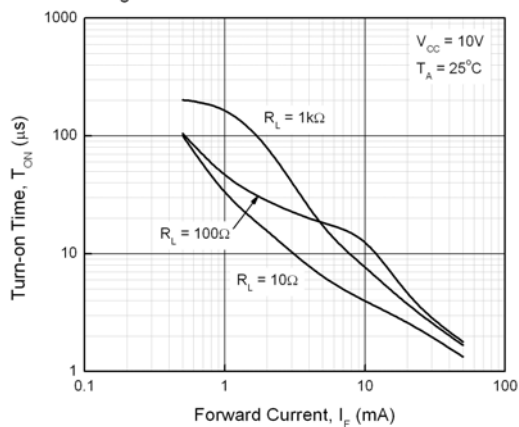
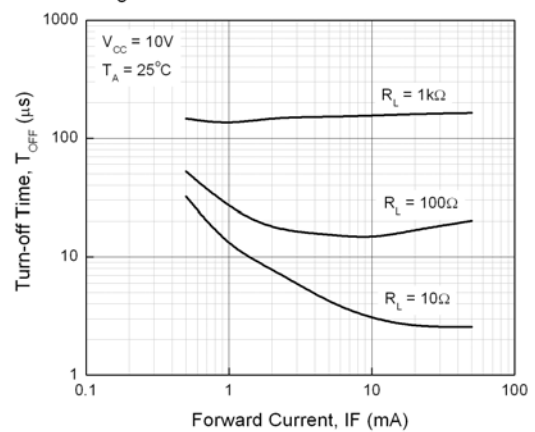


Figure 6. Turn-off Time vs Forward Current



**6 PIN PHOTODARLINGTON
PHOTOCOUPLER**

**TIL113
4NXX Series
H11BX Series**

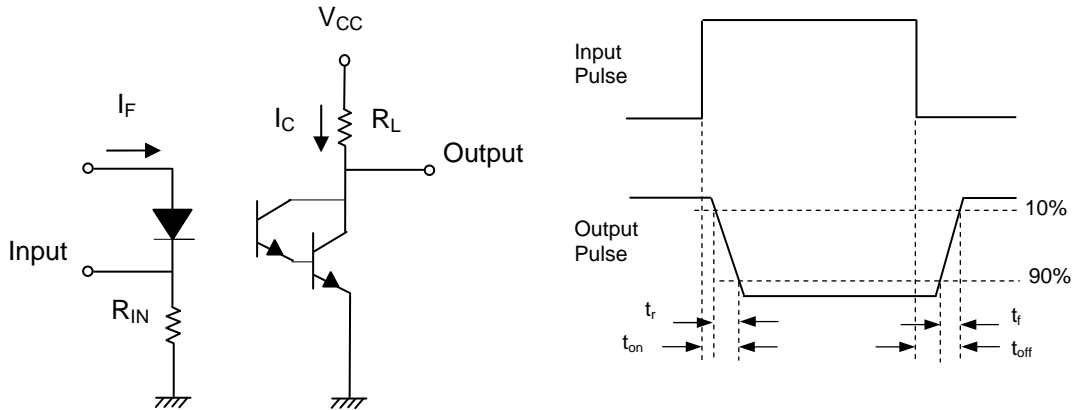


Figure 7. Switching Time Test Circuit & Waveforms

Order Information

Part Number

4NXXY(Z)-V
or **H11BXY(Z)-V**
or **TIL113Y(Z)-V**

Note

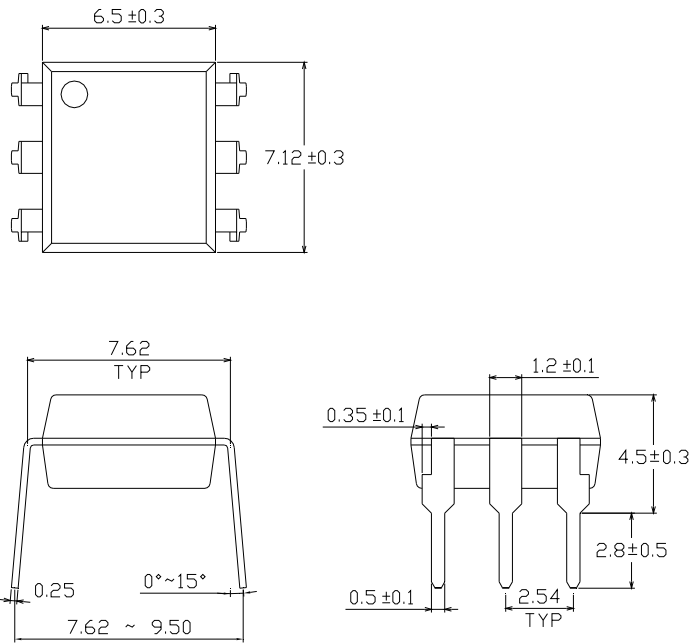
- XX = Part No. for 4NX series (29, 30, 31, 32 or 33)
- X = Part No. for H11BX series (1, 2, 3 or 255)
- Y = Lead form option (S, S1, M or none)
- Z = Tape and reel option (TA, TB or none).
- V = VDE safety (optional)

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

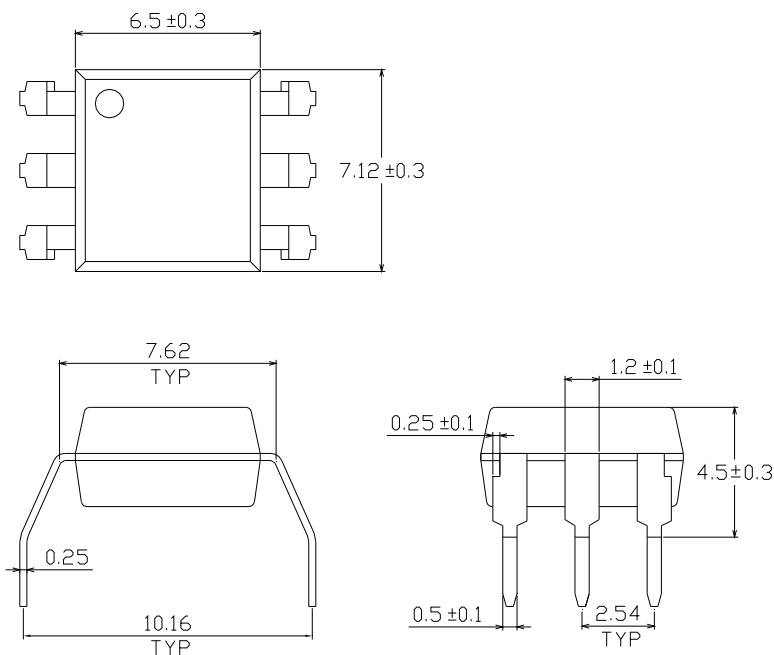
**6 PIN PHOTODARLINGTON
PHOTOCOUPLER**

Package Drawings
(Dimensions in mm)

Standard DIP Type



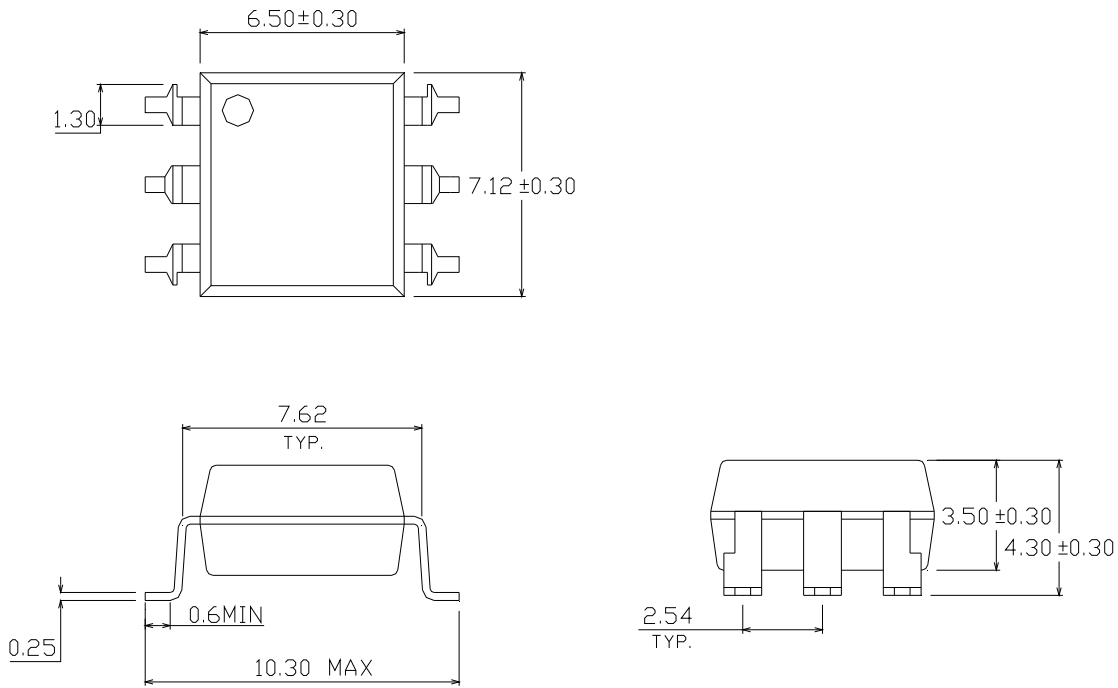
Option M Type



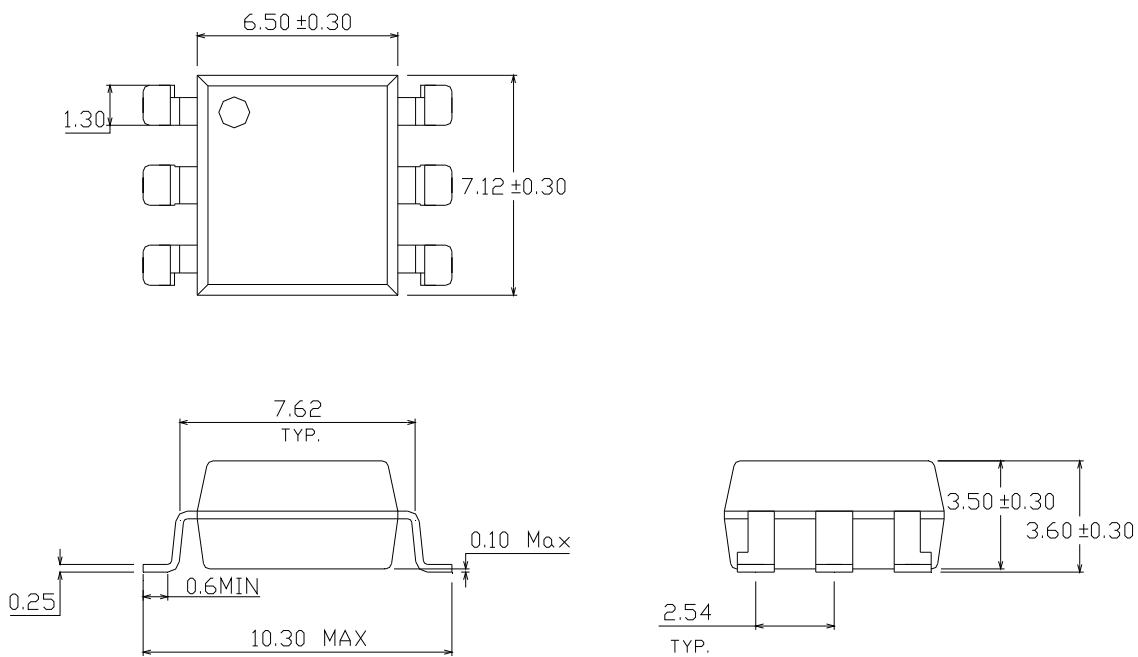
6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

Option S Type



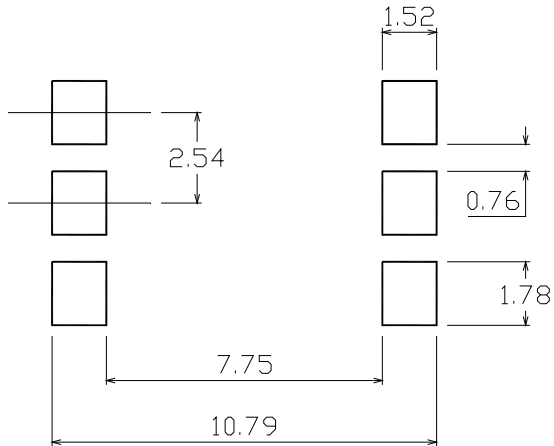
Option S1 Type



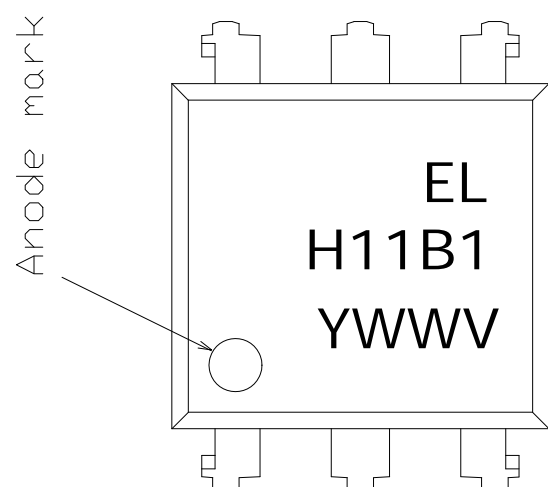
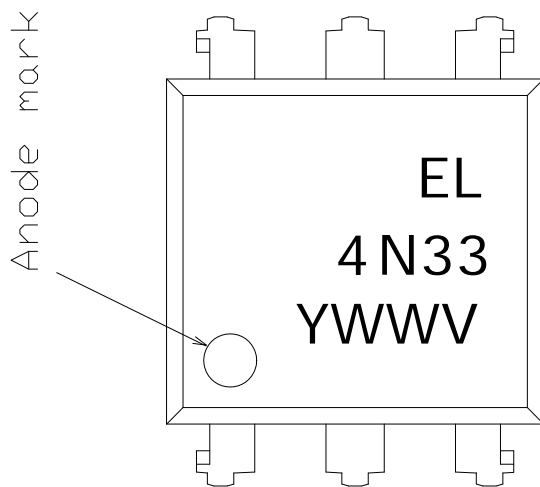
6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

Recommended pad layout for surface mount leadform



Device Marking



Notes

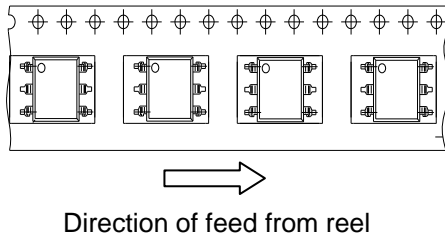
- EL denotes Everlight
- 4N33 denotes Part Number
- H11B1 denotes Part Number
- Y denotes 1 digit Year code
- WW denotes 2 digit Week code
- V denotes VDE safety (optional)

6 PIN PHOTODARLINGTON PHOTOCOUPLER

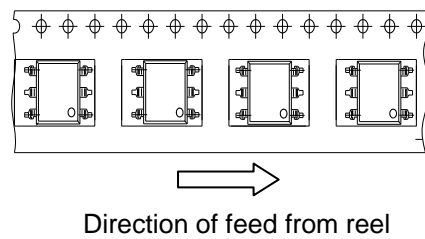
TIL113
4NXX Series
H11BX Series

Tape & Reel Packing Specifications

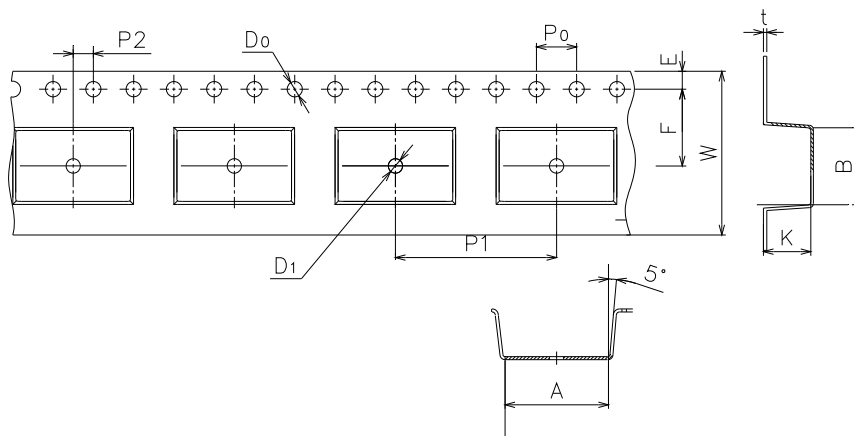
Option TA



Option TB



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	16.0±0.1	2.0±0.1	0.35±0.03	16.0±0.2	4.5±0.1

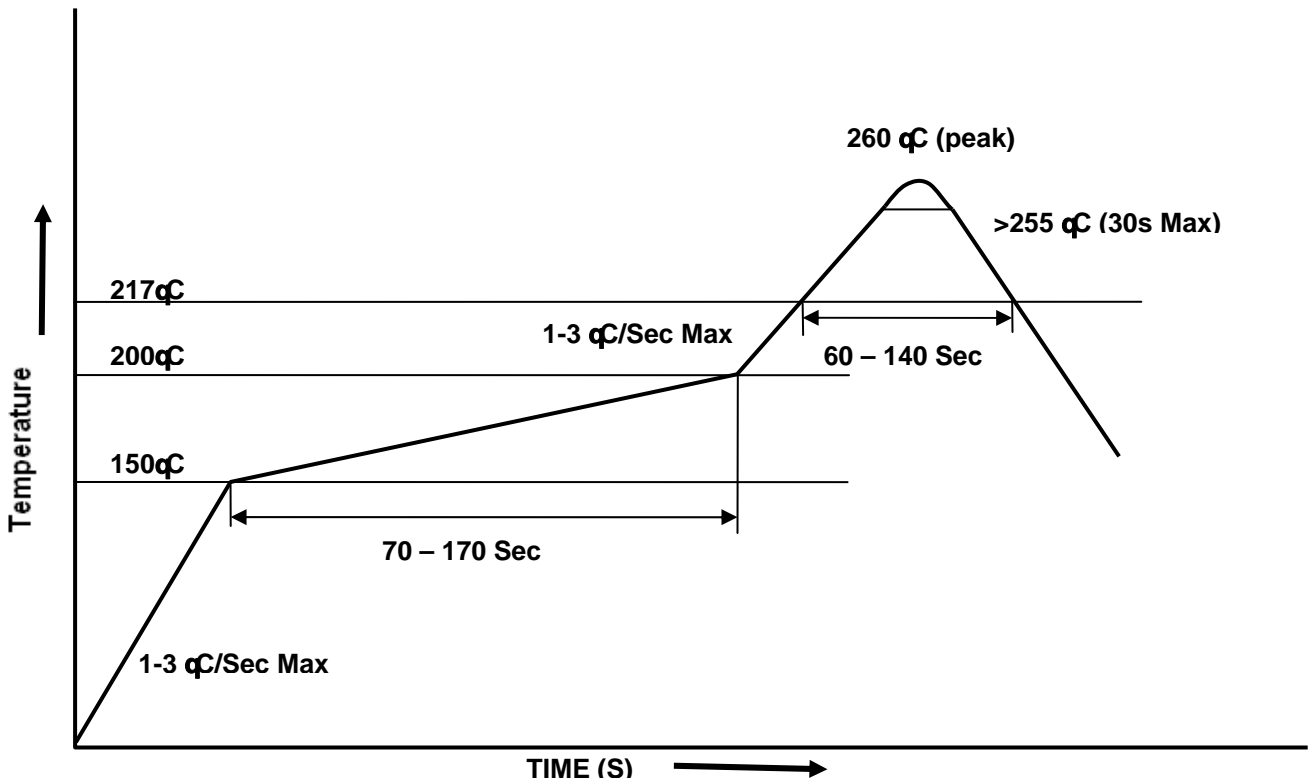


LIGHTING FOREVER

6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

Solder Reflow Temperature Profile





LIGHTING FOREVER

6 PIN PHOTODARLINGTON PHOTOCOUPLER

TIL113
4NXX Series
H11BX Series

DISCLAIMER

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
3. These specification sheets include materials protected under copyright of EVERLIGHT. Reproduction in any form is prohibited without the specific consent of EVERLIGHT.