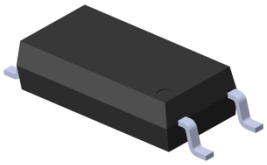
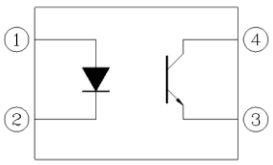
4 PIN LONG CREEPAGE SOP PHOTOTRANSISTOR PHOTOCOUPLER EL101XH-G Series



Preliminary

Schematic



Pin Configuration
1. Anode
2. Cathode
3. Emitter
4. Collector

This is a preliminary specification intended for design purposes and subject to change without prior notice.

Features:

- Compliance Halogen Free (Br < 900 ppm, Cl < 900 ppm, Br + Cl < 1500 ppm)
- Current transfer ratio (CTR: 50~600% at I_F = 5mA, V_{CE} = 5V)
- Operating temperature -55°C~125°C
- High isolation voltage between input and output (Viso =5000 V rms)
- Compact 4 Pin SOP with a 2.2 mm profile
- Compliance with EU REACH
- 8mm long creepage distance
- The product itself will remain within RoHS compliant version
- UL and cUL approved (No. E214129) pending
- VDE approved (No. 40028391) pending
- SEMKO approved pending
- NEMKO approved pending
- DEMKO approved pending
- FIMKO approved pending
- CQC approved pending

Description

The EL101XH-G series devices consist of an infrared emitting diode, optically coupled to a phototransistor detector. Compound use free halogens and Sb_2O_3.
They are packaged in a 4-pin SOP package

Applications

- Programmable controllers
- System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials and impedances

Absolute Maximum Ratings (Ta=25℃)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Peak forward current (1us, pulse)	I_{FP}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P_D	100	mW
Output	Power dissipation	P_C	150	mW
	Collector current	I_C	50	mA
	Collector-Emitter voltage	V_{CEO}	80	V
	Emitter-Collector voltage	V_{ECO}	7	V
Total Power Dissipation		P_{TOT}	250	mW
Isolation Voltage*1		V_{ISO}	5000	Vrms
Operating Temperature		T_{OPR}	-55 to 125	°C
Storage Temperature		T_{STG}	-55 to 150	°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 are shorted together, and pins 3, 4 are shorted together.
*2 For 10 seconds

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

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V_F	-	1.2	1.4	V	I_F =10mA
Reverse current	I_R	-	-	10	μA	V_R = 6V
Input capacitance	C_{in}	-	50	-	pF	V = 0, f = 1kHz

Output

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	I_{CEO}	-	-	200	nA	V_{CE} = 48V, I_F = 0mA
Collector-Emitter breakdown voltage	BV_{CEO}	80	-	-	V	I_C = 0.1mA
Emitter-Collector breakdown voltage	BV_{ECO}	7	-	-	V	I_E = 0.1mA

Transfer Characteristics

Parameter		Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer ratio	EL1010H	CTR	50	-	600	%	I_F = 5mA ,V_{CE} = 5V
	EL1011H		100	-	200		
	EL1017H		80	-	160		
	EL1018H		130	-	260		
	EL1019H		200	-	400		
Collector-Emitter saturation voltage		$V_{CE(sat)}$	-	-	0.3	V	I_F =10mA ,I_C = 1mA
Isolation resistance		R_{IO}	5×10^{10}	-	-	Ω	V_{IO} = 500Vdc, 40~60% R.H.
Floating capacitance		C_{IO}	-	-	1.0	pF	V_{IO} = 0, f = 1MHz

Transfer Characteristics

Parameter	Symbol	Min	Typ. *	Max.	Unit	Condition
Turn on time	T_{on}	-	12	-	μs	V_{CE} = 5V, I_C = 5mA, R_L = 100Ω
Turn off time	T_{off}	-	10	-		
Rise time	t_r	-	-	18	μs	V_{CE} = 5V, I_C = 5mA, R_L = 100Ω
Fall time	t_f	-	-	18		

* Typical values at T_a = 25°C

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

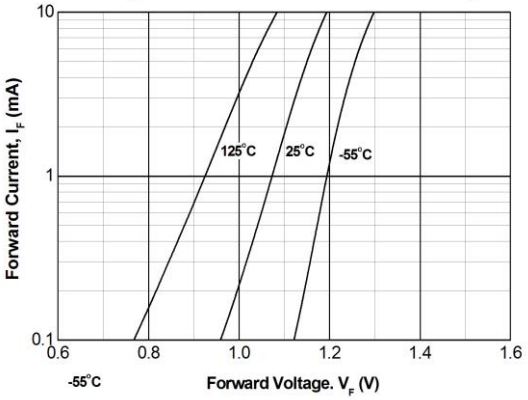


Figure 2. Dark Current vs Ambient Temperature

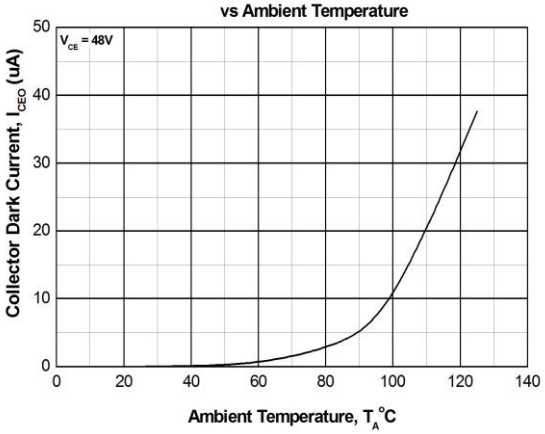


Figure 3. Collector Current vs. Collector Emitter Voltage

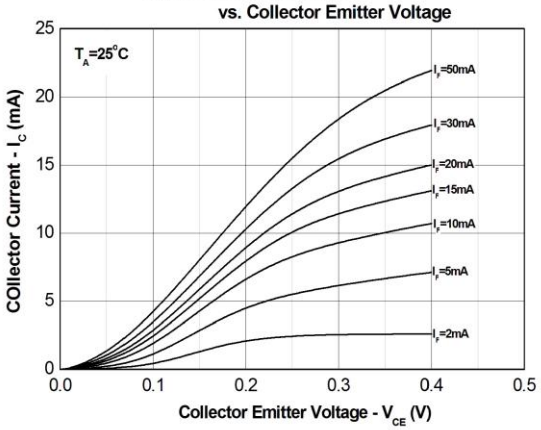


Figure 4. Collector Current vs. Collector Emitter Voltage

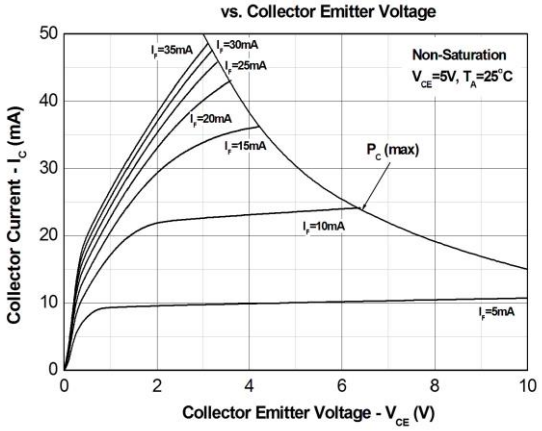


Figure 5. Normalized Collector Current vs. Forward Current

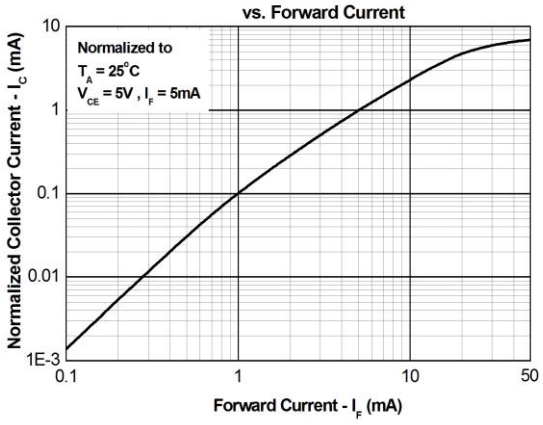


Figure 6. Normalized Current Transfer Ratio vs. Forward Current

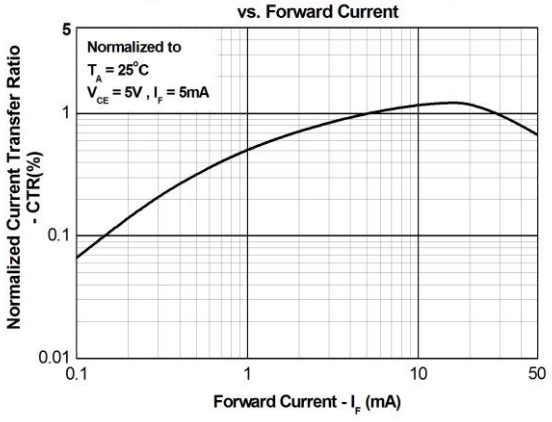


Figure 7. Normalized Current Transfer Ratio vs. Ambient Temperature

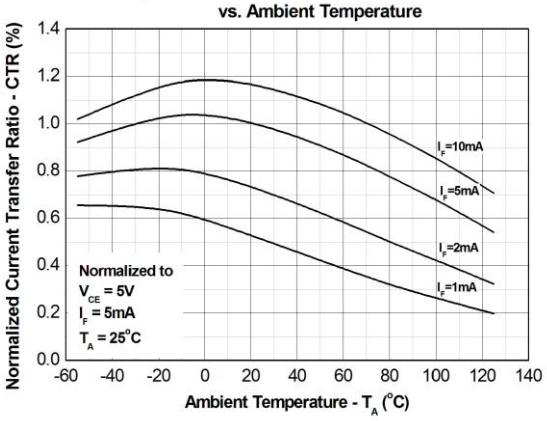


Figure 8. Turn on/off Time vs. Collector Current

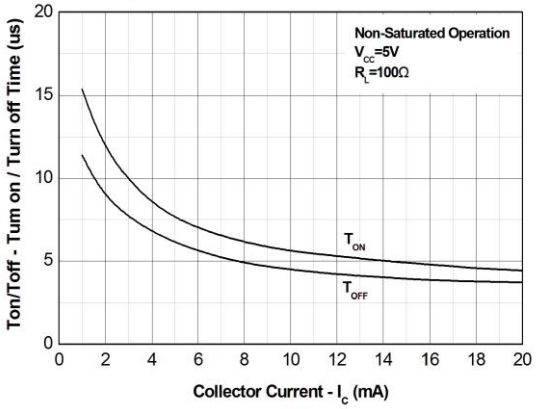
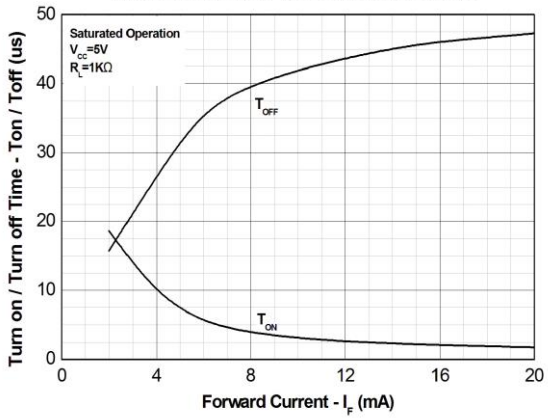


Figure 9. Turn on/off Time vs. Forward Current



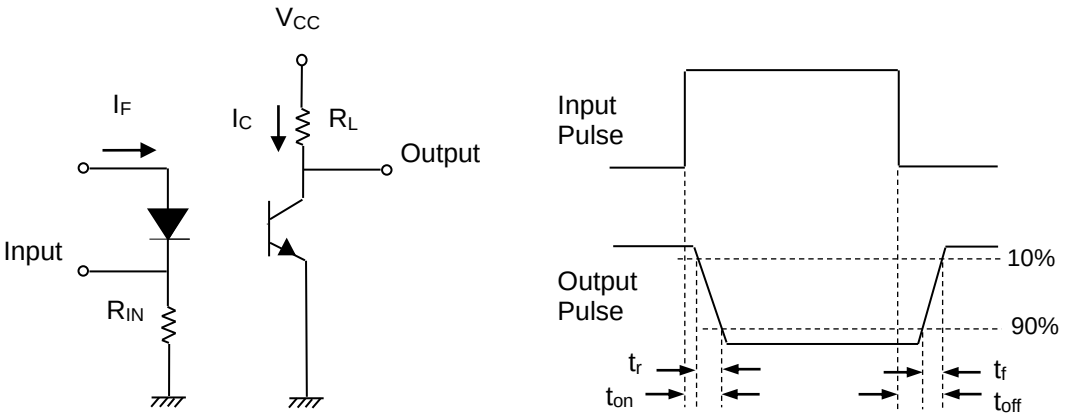


Figure 11. Switching Time Test Circuit & Waveforms

Order Information

Part Number

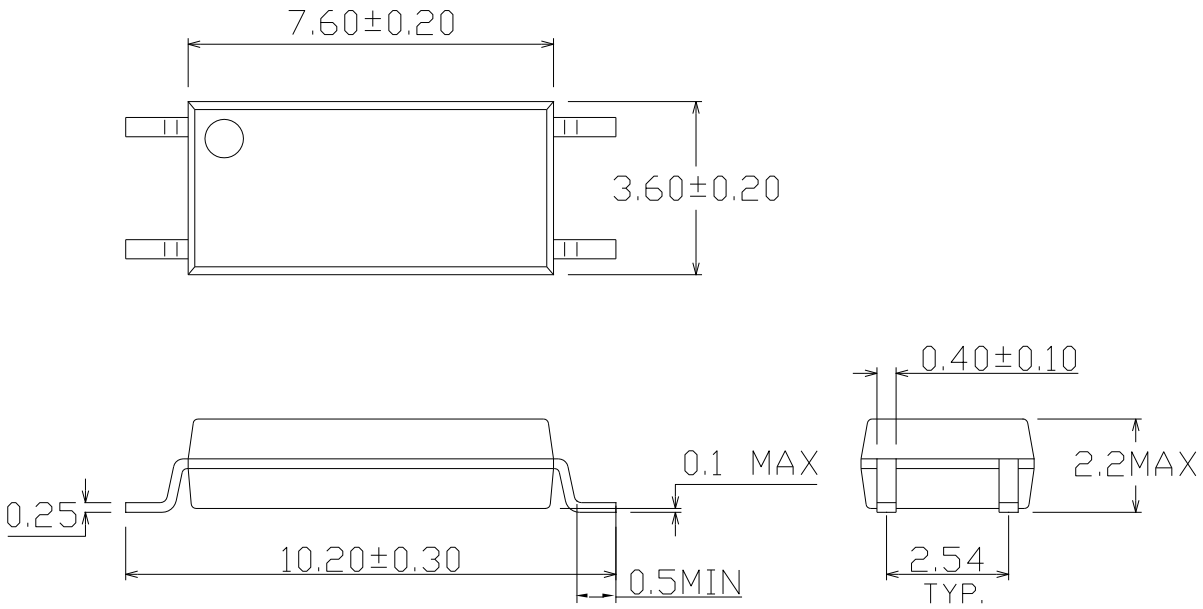
EL101XH(Y)-VG

Notes

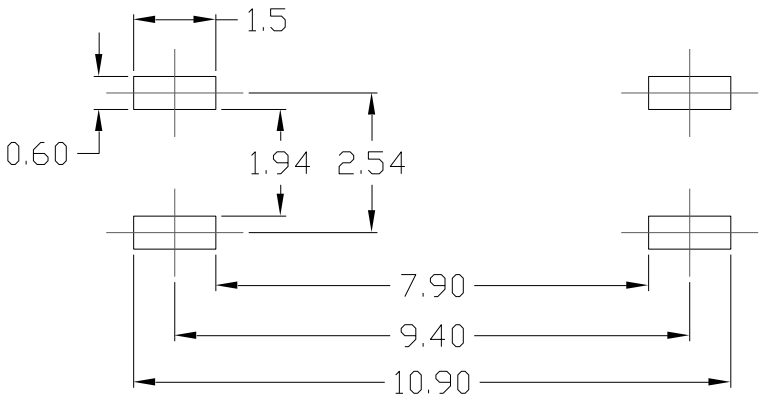
EL101 = Part No.
X = CTR Rank(0, 1, 7, 8, 9)
H = Operating high temperature
Y = Tape and reel option (TA, TB or none)
V = VDE safety (optional)
G = Halogens free

Option	Description	Packing quantity
None	Standard SMD option	100 units per tube
-V	Standard SMD option + VDE	100 units per tube
(TA)	TA Tape & reel option	3000 units per reel
(TB)	TB Tape & reel option	3000 units per reel
(TA)-V	TA Tape & reel option + VDE	3000 units per reel
(TB)-V	TB Tape & reel option + VDE	3000 units per reel

Package Dimension (Dimensions in mm)



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.

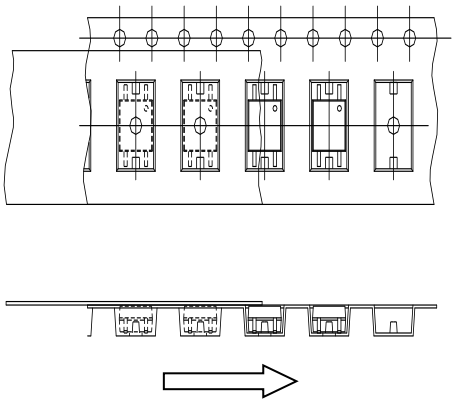
Device Marking

Notes

EL denotes XI BNANG
1010 denotes Device Number (0, 1, 7, 8, 9) H denotes Operating high temperature Y denotes 1 digit Year code
WW denotes 2 digit Week code
V denotes VDE (optional)

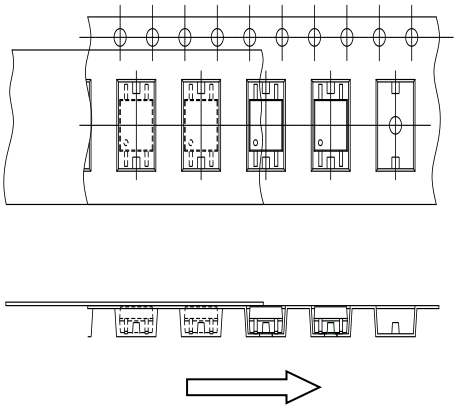
Tape & Reel Packing Specifications

Option TA



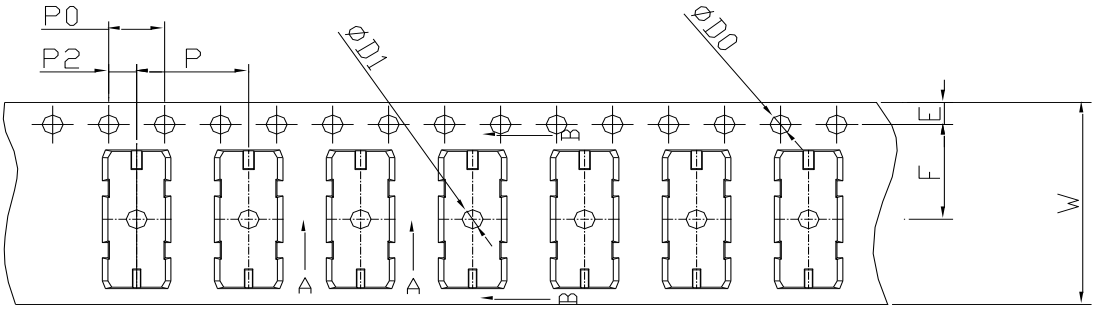
Direction of feed from reel

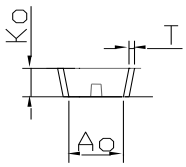
Option TB

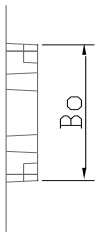


Direction of feed from reel

Tape dimensions





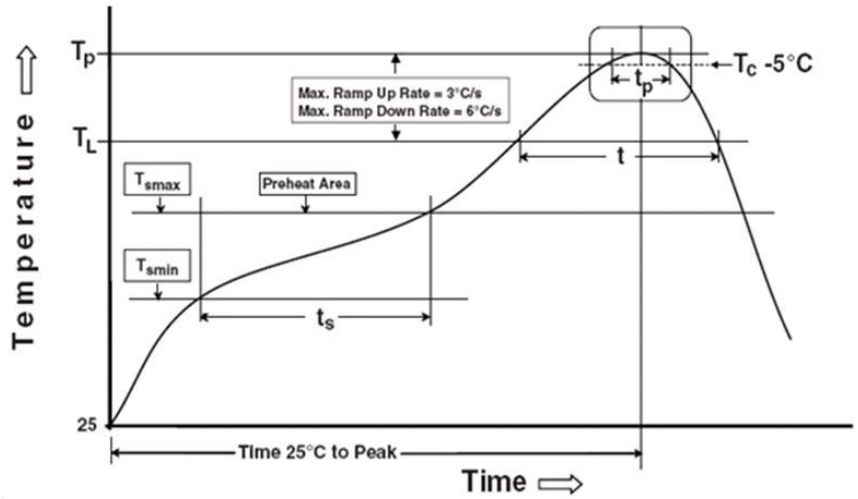


Dimension No.	**Ao**	**Bo**	**Do**	**D1**	**E**	**F**
Dimension (mm)	3.9 ± 0.10	10.82 ± 0.10	1.5 ± 0.10	1.5 ± 0.10	1.75 ± 0.10	7.5 ± 0.10
Dimension No.	**Po**	**P**	**P2**	**T**	**W**	**Ko**
Dimension (mm)	4.0 ± 0.10	8.0 ± 0.10	2.0 ± 0.10	0.4 ± 0.05	16.0 ± 0.30	2.25 ± 0.10

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°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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DISCLAIMER

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