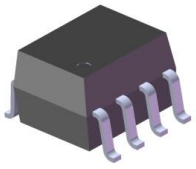
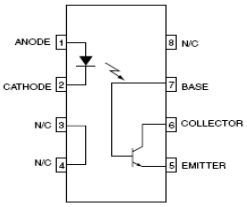
DATASHEET

8 PIN SOP PHOTOTRANSISTOR PHOTOCOUPLER
EL20X Series
EL21X Series



Schematic



Pin Configuration
1. Anode
2. Cathode
3. No Connection
4. No Connection
5. Emitter
6. Collector
7. Base
8. No Connection

Features:

- Halogens free.(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- Current transfer ratios offered in narrow ranges
  - EL205: 40-80%
  - EL206: 63-125%
  - EL207: 100-200%
  - EL208: 160-320%
  - EL211: >20%
  - EL212: >50%
  - EL213: >100%
- High isolation voltage between input and output (Viso = 3750 Vrms)
- Operating temperature range of -55 to +110℃
- High BVceo of 80V
- Standard SO-8 footprint package
- Compliance with EU REACH
- Pb free and RoHS compliant
- UL and cUL approved(No. E214129)
- VDE approval (pending)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved

Description

The EL20X and EL21X series contain an infrared emitting diode optically coupled to a phototransistor detector.
The devices are packaged in an 8-pin small outline package which conforms to the standard SO-8 footprint.

Applications

- Feedback Control Circuits
- Interfacing and coupling systems of different potentials and impedances
- General Purpose Switching Circuits
- Monitor and Detection Circuits

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
	Reverse voltage	V_R	6	V
	Power dissipation No derating needed	P_D	90	mW
Output	Collector power dissipation No derating needed	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}	240	mW
Isolation Voltage*1		V_{ISO}	3750	V rms
Operating Temperature		T_{OPR}	-55 to 110	°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 & 4 are shorted together, and pins 5, 6, 7 & 8 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	-	1.3	1.5	V	I_F = 10mA
Reverse current	I_R	-	0.1	100	μA	V_R = 6V
Input capacitance	C_{in}	-	13	-	pF	V = 0, f = 1MHz

Output

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-Emitter dark current	I_{CEO}	-	5.0	50	nA	V_{CE} = 10V, 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
Collector-Emitter capacitance	C_{CE}	-	8	-	pF	V_{CE} = 0V, f = 1MHz

Transfer Characteristics

Parameter		Symbol	Min	Typ.	Max.	Unit	Condition
Current Transfer Ratio	EL205	CTR	40	-	80	%	I_F = 10mA ,V_{CE} = 5V
	EL206		63	-	125		
	EL207		100	-	200		
	EL208		160	-	320		
	EL211		20	-	-		
	EL212		50	-	-		
	EL213		100	-	-		
Current Transfer Ratio	EL205	CTR	13	25	-	%	I_F = 1mA ,V_{CE} = 5V
	EL206		22	40	-		
	EL207		34	60	-		
	EL208		56	95	-		
	EL215		20	50	-		
	EL216		50	80	-		
	EL217		100	130	-		

* Typical values at T_a = 25°C

Transfer Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Collector-emitter saturation voltage	$V_{CE(sat)}$	-	-	0.4	V	I_F = 10mA , I_C = 2mA
Isolation resistance	R_{IO}	-	10^{11}	-	Ω	V_{IO} = 500Vdc
Input-output capacitance	C_{IO}	-	0.5	-	pF	V_{IO} = 0, f = 1MHz
Turn-on time	T_{on}	-	3.0	-	μs	V_{CC} = 10V, I_C = 2mA, R_L = 100Ω
Turn-off time	T_{off}	-	3.0	-		
Rise time	T_r	-	1.6	-		
Fall time	T_f	-	2.2	-		

* Typical values at T_a = 25°C

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

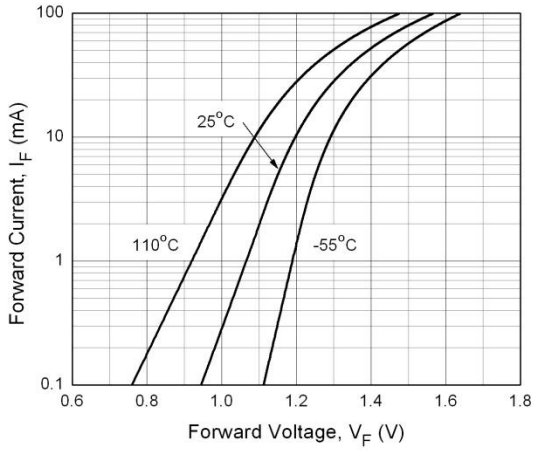


Figure 2. Normalized Collector Current vs. Forward Current

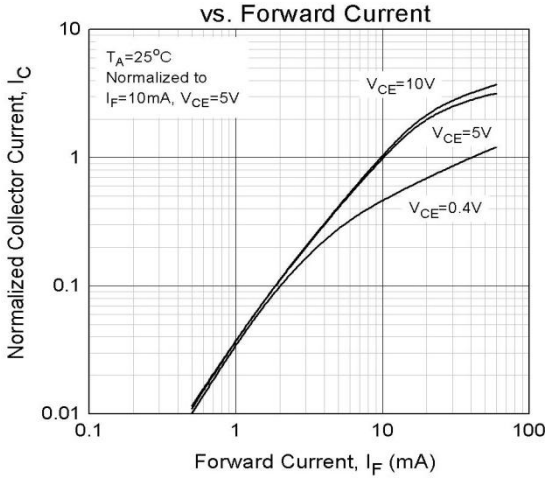


Figure 3. Normalized Collector Current vs Ambient Temperature

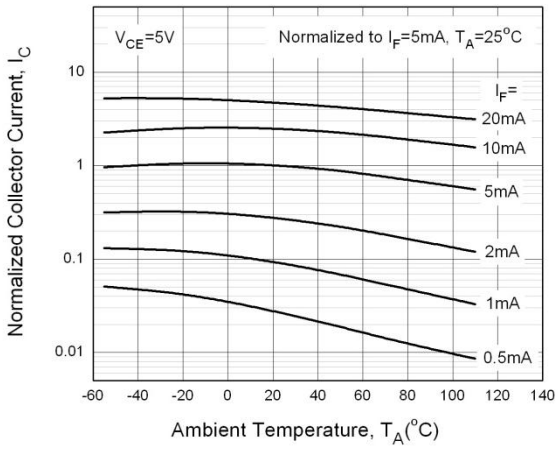


Figure 4. Collector Dark Current vs Ambient Temperature

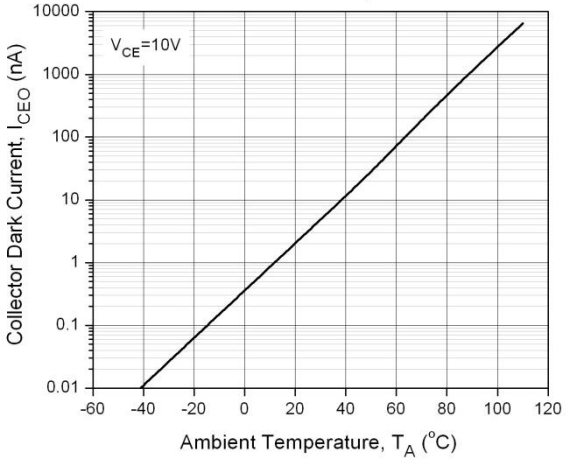


Figure 5. Collector Current vs Collector-Emitter Voltage

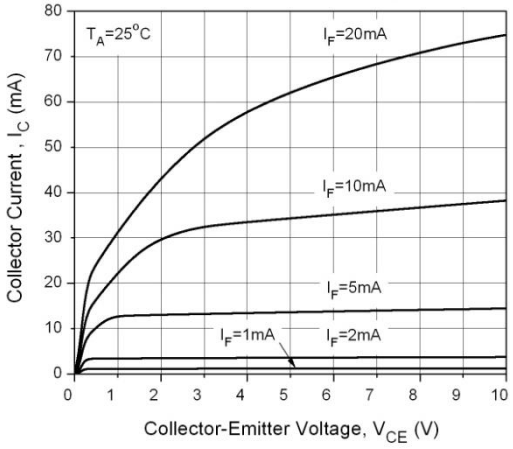


Figure 6. Collector Current vs Collector-Emitter Voltage

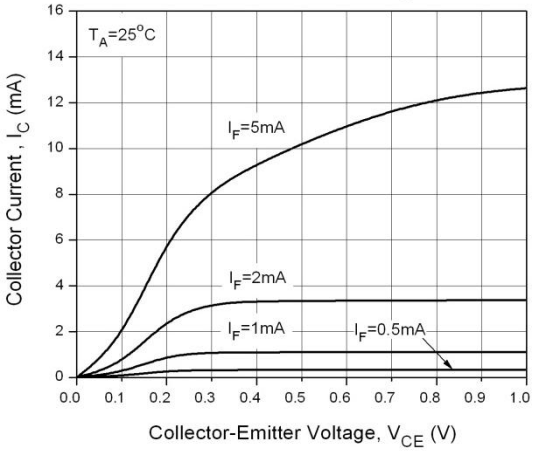
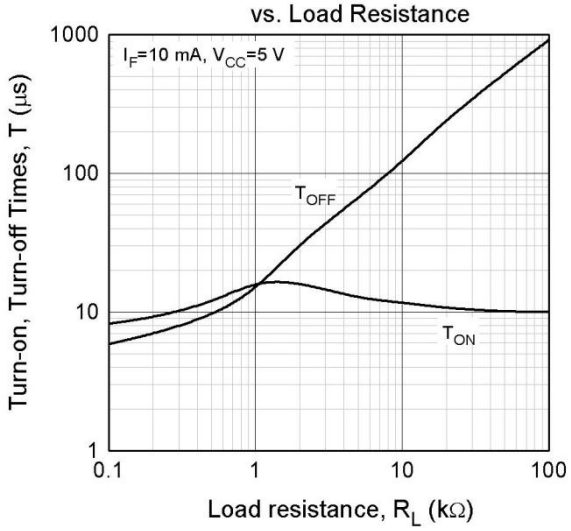


Figure 7. Turn-on, Turn-off Times vs. Load Resistance



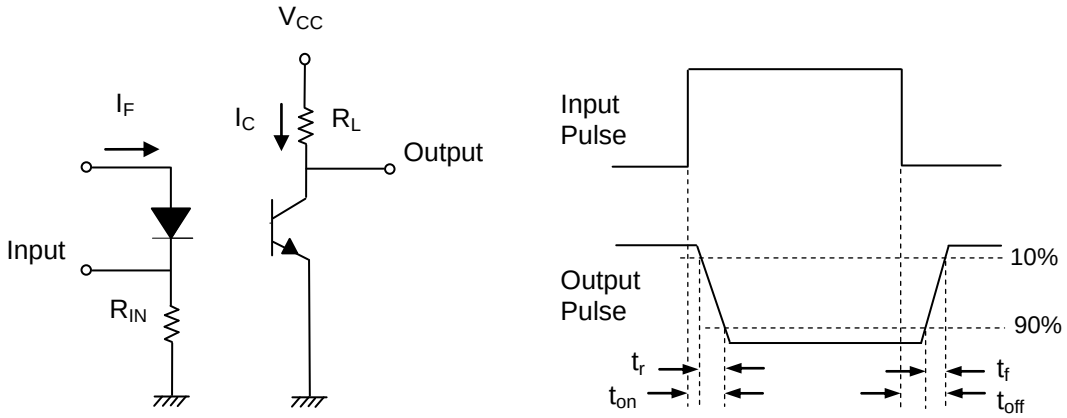


Figure 8. Switching Time Test Circuit & Waveforms

Order Information

Part Number

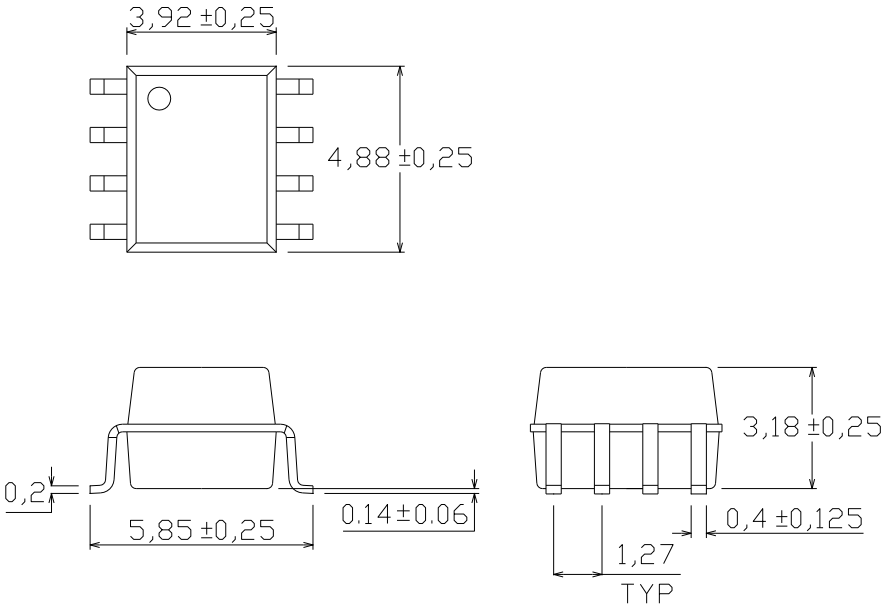
EL2XX(Y)-V

Note

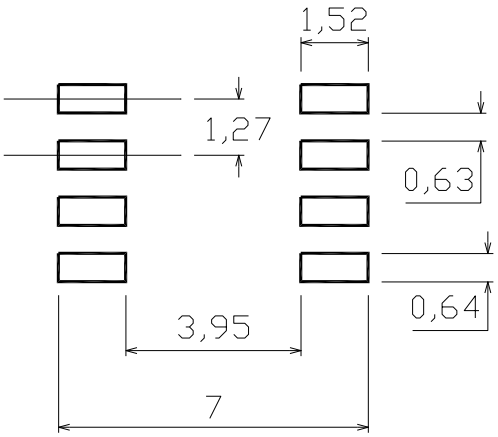
XX = Part no. (05, 06, 07, 08, 11, 12, 13, 15, 16 or 17)
Y = Tape and reel option (TA, TB or none).
V = VDE safety (Optional)

Option	Description	Packing quantity
None	Standard	100 units per tube
-V	Standard + VDE	100 units per tube
(TA)	TA tape & reel option	2000 units per reel
(TB)	TB tape & reel option	2000 units per reel
(TA)-V	TA tape & reel option + VDE	2000 units per reel
(TB)-V	TB tape & reel option + VDE	2000 units per reel

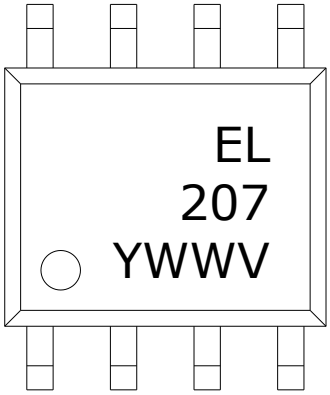
Package Dimension (Dimensions in mm)



Recommended pad layout for surface mount leadform



Device Marking

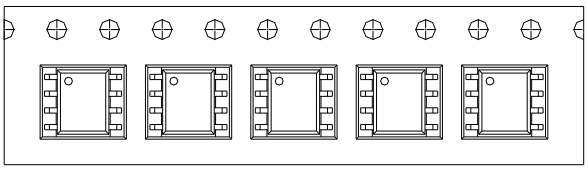


Notes

EL	denotes Everlight
207	denotes Part Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code

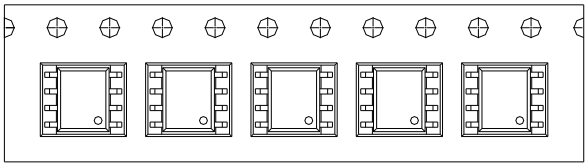
Tape & Reel Packing Specifications

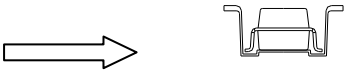
Option TA



Direction of feed from reel

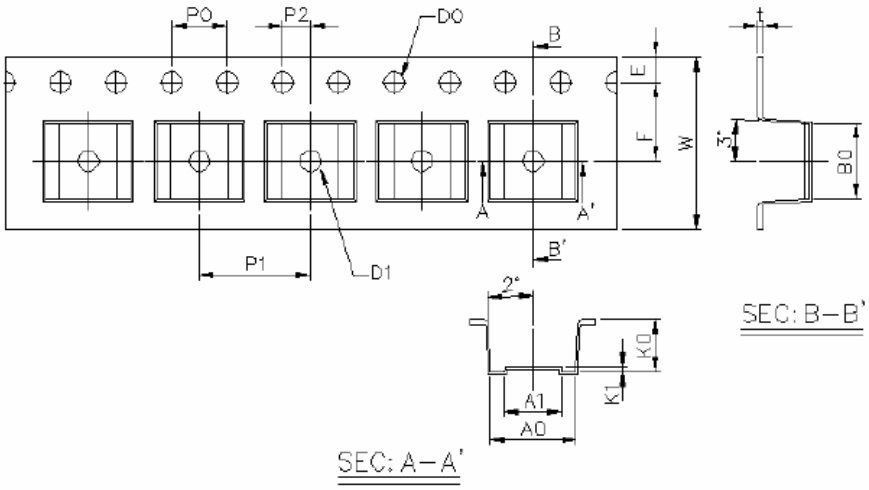
Option TB





Direction of feed from reel

Tape dimensions

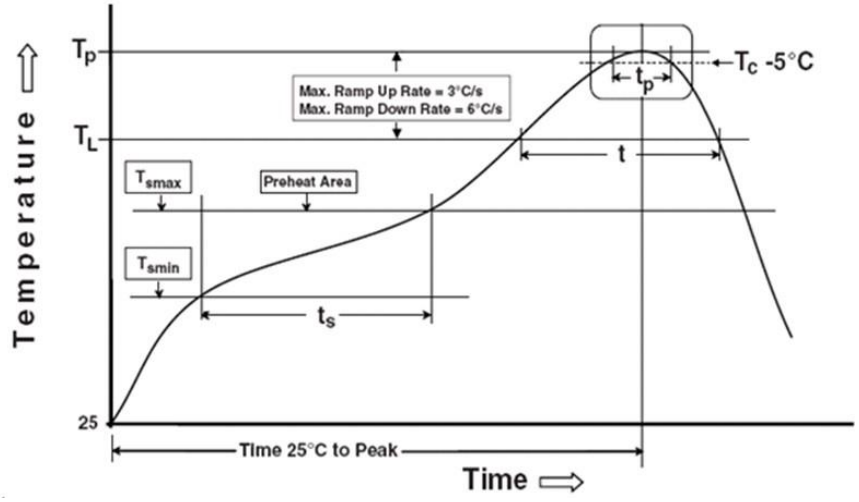


Dimension No.	**A0**	**A1**	**B0**	**D0**	**D1**	**E**	**F**
Dimension (mm)	6.2±0.1	4.1±0.1	5.28±0.1	1.5±0.1	1.5±0.3	1.75±0.1	5.5±0.1
Dimension No.	**Po**	**P1**	**P2**	**t**	**W**	**K0**	**K1**
Dimension (mm)	4.0±0.1	8.0±0.1	2.0±0.1	0.4±0.1	12.0+0.3/ -0.1	3.7±0.1	0.3±0.1

Precautions for Use

1. Soldering Condition

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note: 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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