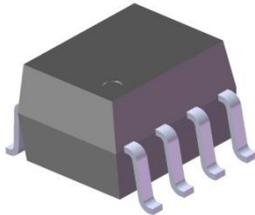


DATASHEET

8 PIN SOP 3.3V HIGH SPEED 1Mbit/s TRANSISTOR PHOTOCOUPLER EL050L series



Features

- 3.3 and 5 V dual supply voltage
- High speed 1Mbit/s
- 15kV/ μ s minimum common mode transient immunity at $V_{CM} = 1500V$
- High isolation voltage between input and output ($V_{iso} = 3750 V_{rms}$)
- Guaranteed performance from 0°C to 70°C
- Compliance Halogen Free (Br < 900 ppm, Cl < 900 ppm, Br+Cl < 1500 ppm)
- Compliance with EU REACH
- Pb free and RoHS compliant.
- UL and cUL approved (No. E214129)
- VDE approved (No. 40028116)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved Description
- CQC approved

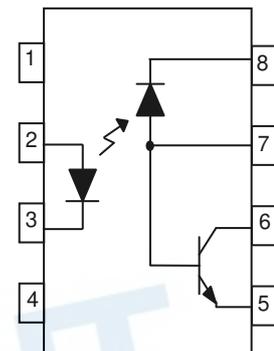
Description

The EL050L contains an infrared emitting diode optically coupled to a high speed integrated photo detector logic gate with a strobable output. It is packaged in a 8-pin SOP package and is suitable for surface mounting technology

Applications

- High voltage insulation
- Video signal isolation
- Power translator isolation in motor drives
- Line receivers
- Feedback element in switched mode power supplies
- High speed logic ground isolation – LVTTTL/LVCMOS
- Replaces pulse transformers
- Replaces slow phototransistor isolators
- Analog signal ground isolation

Schematic
EL050L



Pin Configuration

1. No Connection
2. Anode
3. Cathode
4. No Connection
5. Gnd
6. Vout
7. V_B
8. V_{CC}

Absolute Maximum Ratings (Ta=25°C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I_F	25	mA
	Peak forward current (50% duty, 1ms P.W)	I_{FP}	50	mA
	Peak transient current ($\leq 1\mu\text{s}$ P.W, 300pps)	I_{Ftrans}	1	A
	Reverse voltage	V_R	5	V
	Power dissipation	P_D	45	mW
Output	Average Output current	$I_{O(avg)}$	8	mA
	Output voltage	V_O	-0.5 to 7	V
	Supply voltage	V_{CC}	-0.5 to 7	V
	Power dissipation	P_C	85	mW
	Isolation voltage ^{*1}	V_{ISO}	3750	V rms
	Operating temperature	T_{OPR}	-40 ~ +85	°C
	Storage temperature	T_{STG}	-40 ~ +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.

Electrical Characteristics (T_A= 0 to 70°C unless specified otherwise)**Input**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V _F	-	1.45	1.8	V	I _F = 16mA
Reverse Voltage	V _R	5.0	-	-	V	I _R = 10μA
Temperature coefficient of forward voltage	ΔV _F /ΔT _A	-	-1.9	-	mV/°C	I _F = 16mA

Output

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Logic High Output Current	I _{OH}	-	0.001	0.5	μA	I _F =0mA, V _O =V _{CC} =3.3V
Logic Low Supply Current	I _{CCL}	-	100	200	μA	I _F =16mA, V _O =Open, V _{CC} =3.3V
Logic High Supply Current	I _{CCH}	-	0.01	1	μA	I _F =0mA, V _O =Open, V _{CC} =3.3V

Transfer Characteristics (T_A=0 to 70°C unless specified otherwise)

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition	
Current Transfer Ratio	EL050L	7	-	50	%	I _F = 16mA, V _O = 0.4V, V _{CC} =3.3V, T _A =25°C	
	EL050L	5	-	-			
Logic Low Output Voltage	EL050L	V _{OL}	-	0.12	0.4	V	I _F = 16mA, I _O = 3 mA, V _{CC} =3.3V, T _A =25°C

Switching Characteristics ($T_A=0$ to 70°C unless specified otherwise, $I_F=16\text{mA}$, $V_{CC}=3.3\text{V}$)

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition	
Propagation Delay Time to Logic Low (Fig.8)	EL050L	TPHL	-	-	2.0	μs	$R_L=4.1\text{K}\Omega$, $T_A=25^\circ\text{C}$
					0.9		$R_L=1.9\text{K}\Omega$, $T_A=25^\circ\text{C}$
Propagation Delay Time to Logic High (Fig.8)	EL050L	TPLH	-	-	2.0	μs	$R_L=4.1\text{K}\Omega$, $T_A=25^\circ\text{C}$
					0.9		$R_L=1.9\text{K}\Omega$, $T_A=25^\circ\text{C}$
Common Mode Transient Immunity at Logic High (Fig.9) ^{*3}	EL050L	CM_H	-	1,000	-	$V/\mu\text{s}$	$I_F=0\text{mA}$, $V_{CM}=10\text{Vp-p}$, $R_L=4.1\text{K}\Omega$, $T_A=25^\circ\text{C}$
			-	1,000	-		$I_F=0\text{mA}$, $V_{CM}=10\text{Vp-p}$, $R_L=1.9\text{K}\Omega$, $T_A=25^\circ\text{C}$
Common Mode Transient Immunity at Logic Low (Fig.9) ^{*3}	EL050L	CM_L	-	1,000	-	$V/\mu\text{s}$	$I_F=16\text{mA}$, $V_{CM}=10\text{Vp-p}$, $R_L=4.1\text{K}\Omega$, $T_A=25^\circ\text{C}$
			-	1,000	-		$I_F=16\text{mA}$, $V_{CM}=10\text{Vp-p}$, $R_L=1.9\text{K}\Omega$, $T_A=25^\circ\text{C}$

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

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Current vs Forward Voltage

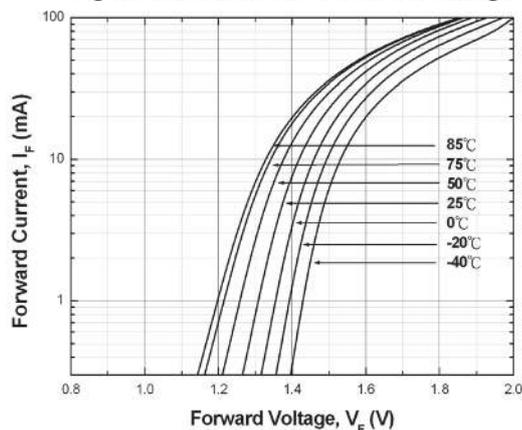


Figure 2. Current Transfer Ratio vs Forward Current

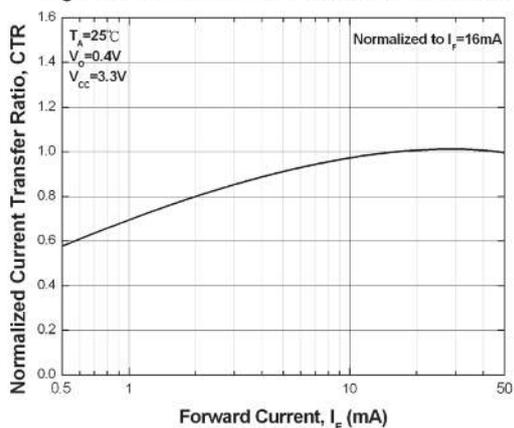


Figure 3. Current Transfer Ratio vs Ambient Temperature

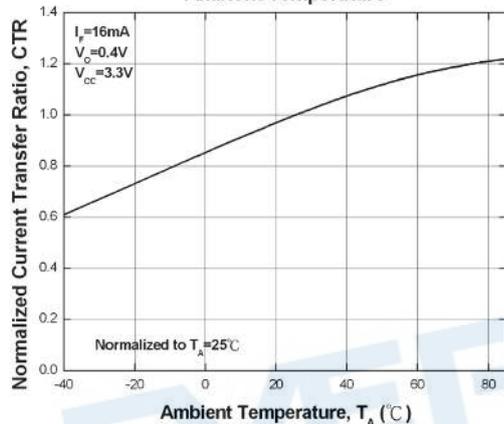


Figure 4. Output Current vs Output Voltage

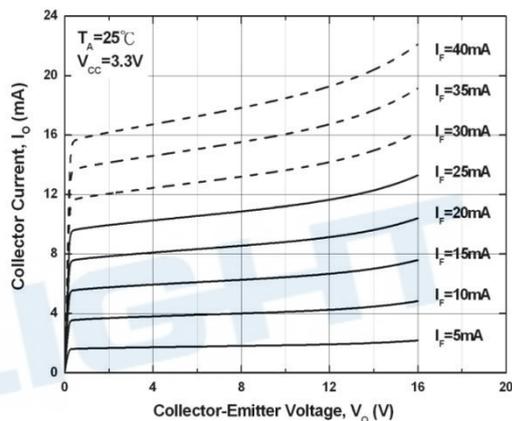


Figure 5. Logic High Output Current vs Ambient Temperature

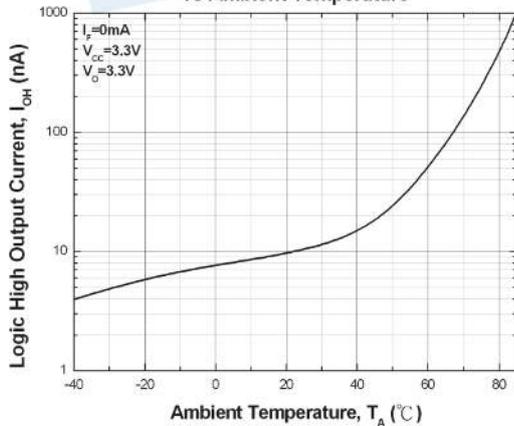


Figure 6. Propagation Delay vs. Load Resistance

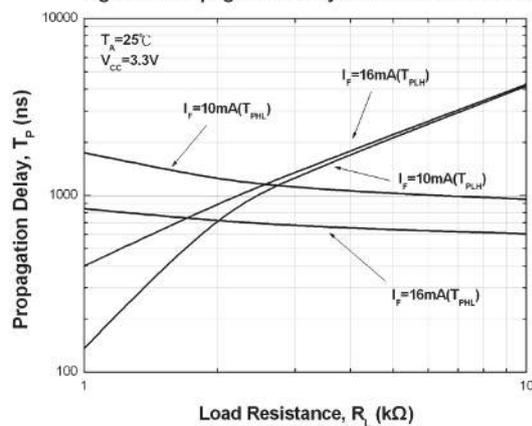


Figure 7. Propagation Delay vs. Temperature

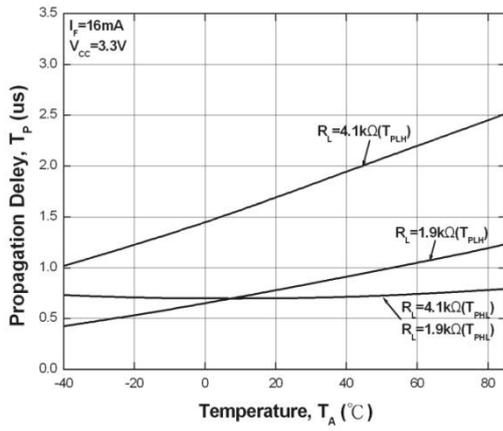


Figure 8 Switching Time Test Circuit & Waveform

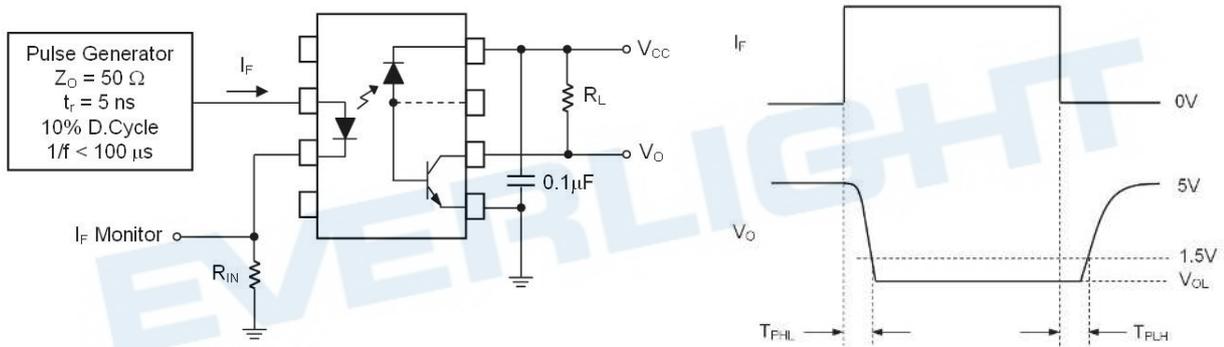
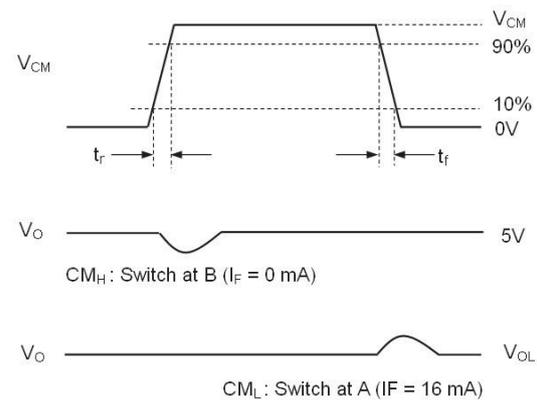
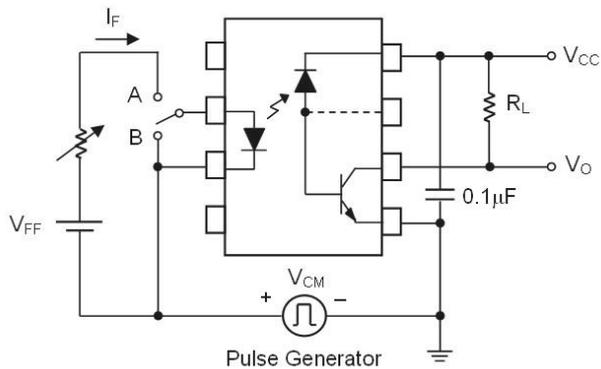


Figure 9 Transient Immunity Test Circuit & Waveform

**Note:**

*3 Common mode transient immunity in logic high level is the maximum tolerable (positive) dV_{CM}/dt on the leading edge of the common mode pulse signal V_{CM} , to assure that the output will remain in a logic high state (i.e., $V_O > 2.0V$).

Common mode transient immunity in logic low level is the maximum tolerable (negative) dV_{cm}/dt on the trailing edge of the common mode pulse signal, V_{CM} , to assure that the output will remain in a logic low state (i.e., $V_O < 0.8V$).

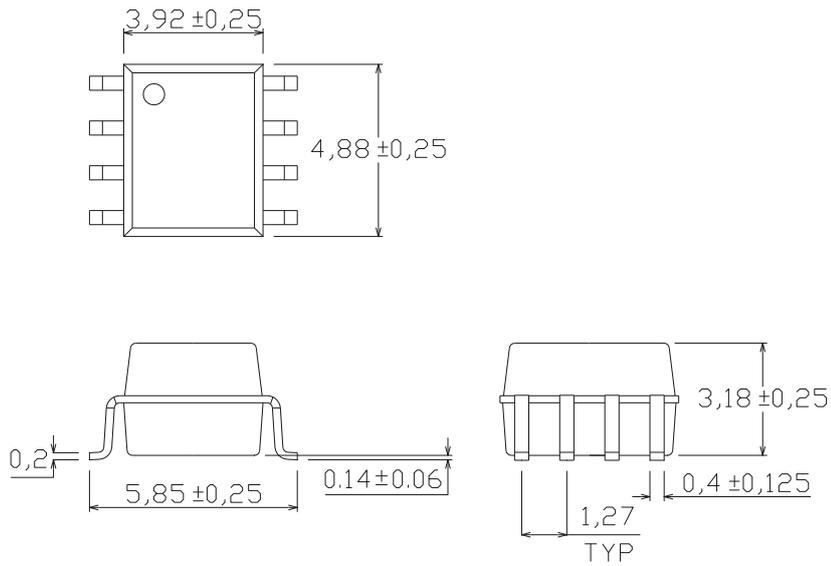
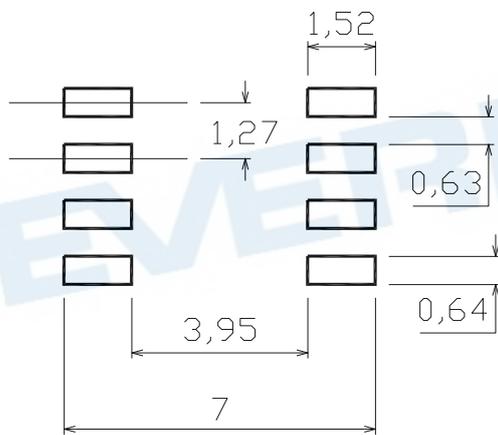
EVERLIGHT

Order Information**Part Number****EL050L(Z)-V****Note**

Z = Tape and reel option (TA, TB or none)

V = VDE (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 Drawing
(Dimensions in mm)**Recommended pad layout for surface mount leadform**

Device Marking



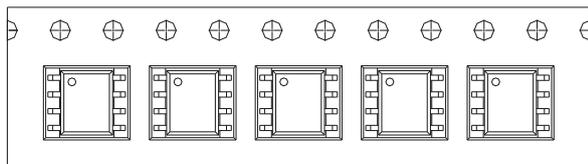
Notes

EL	denotes EVERLIGHT
050L	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

EVERLIGHT

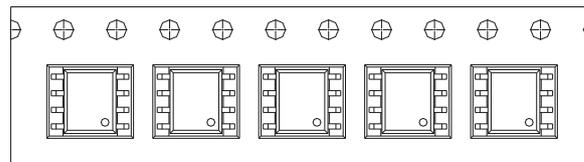
Tape & Reel Packing Specifications

Option TA



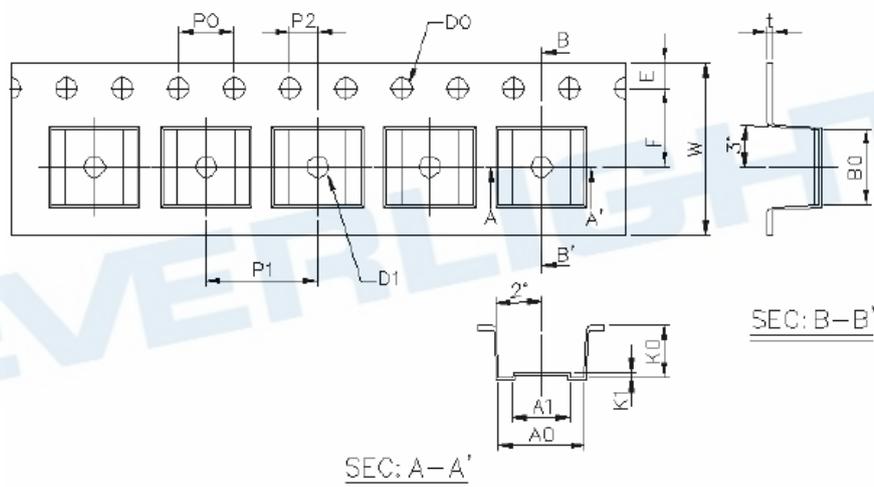
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions

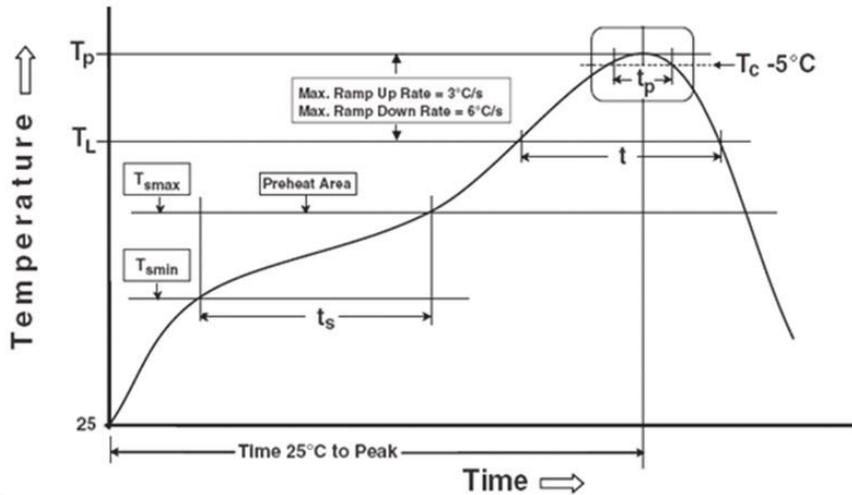


Dimension No.	A0	A1	B0	D0	D1	E	F
Dimension(mm)	6.2±0.1	4.1±0.1	5.28±0.1	1.5±0.1	1.5±0.3	1.75±0.1	5.5±0.1
Dimension No.	P0	P1	P2	t	W	K0	K1
Dimension(mm)	4.0±0.1	8.0±0.1	2.0±0.1	0.4±0.1	12.0+0.3/ -0.1	3.7±0.1	0.3±0.1

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: $T_p - 5^\circ\text{C}$	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

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 using 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.
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