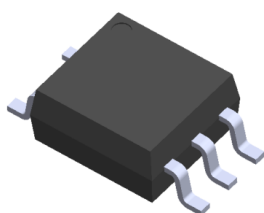


5 PIN SOP 3.3V HIGH SPEED 15MBit/s LOGIC GATE PHOTOCOUPLER ELM8XL-G Series



Features

- Compliance Halogen Free
(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- 3.3 and 5 V CMOS compatibility, Logic gate output
- Guaranteed performance from -40 to 85°C
- High isolation voltage between input and output (Viso=3750 V rms)
- Compliance with EU REACH
- Pb free and RoHS compliant
- UL and cUL approved
- VDE approved
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved

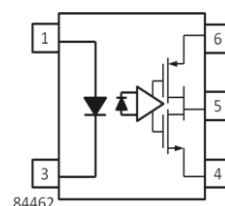
Description

The ELM8XL consists of an infrared emitting diode optically coupled to a CMOS detector ICs.
It is packaged in a 5-pin SOP package and is suitable for surface mounting technology.

Applications

- Line receiver, data transmission
- Data multiplexing
- Switching power supplies
- Pulse transformer replacement
- Computer peripheral interface
- High speed logic ground isolation

Schematic



Pin Configuration

- 1: Anode
- 3: Cathode
- 4: GND
- 5: V_{out}
- 6: V_{CC}

Truth Table (Positive Logic)

Input	Output
H	L
L	H

Absolute Maximum Ratings (T_A=25°C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I _F	15	mA
	Reverse voltage	V _R	5	V
	Power dissipation	P _D	35	mW
Output	Power dissipation	P _O	85	mW
	Output current	I _O	20	mA
	Supply voltage	V _{CC}	5.5	V
	Total Power Dissipation	P _T	100	mW
	Isolation voltage ^{*2}	V _{ISO}	3750	V rms
	Operating temperature	T _{OPR}	-40 ~ +85	°C
	Storage temperature	T _{STG}	-55 ~ +125	°C
	Soldering temperature ^{*3}	T _{SOL}	260	°C

Notes:

*1 The V_{CC} supply must be bypassed by a 0.1μF capacitor or larger. This can be either a ceramic or solid tantalum capacitor with good high frequency characteristic and should be connected as close as possible to the package V_{CC} and GND pins

*2 AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1 & 3 are shorted together, and pins 4, 5 & 6 are shorted together.

*3 For 10 seconds

Electrical Characteristics

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	V_F	-	1.4	1.8	V	$I_F = 8\text{mA}$
Reverse voltage	V_R	5.0	-	-	V	$I_R = 10\mu\text{A}$
Temperature coefficient of forward voltage	$\Delta V_F / \Delta T_A$	-	-1.7	-	mV/°C	$I_F = 8\text{mA}$
Input capacitance	C_{IN}	-	60	-	pF	$V_F = 0, f = 1\text{MHz}$

Output

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
High level supply current	I_{CCH}	-	1.3	6	mA	$I_F = 0\text{mA}$
Low level supply current	I_{CCL}	-	1.3	6	mA	$I_F = 8\text{mA}$
High level output voltage	V_{OH}	$V_{CC}-1$	$V_{CC}-0.3$	-	V	$V_{CC}=3.3\text{V}, I_F=0\text{mA}, I_O=-4\text{mA}$
		$V_{CC}-1$	$V_{CC}-0.2$	-	V	$V_{CC}=5\text{V}, I_F=0\text{mA}, I_O=-4\text{mA}$
Low level output voltage	V_{OL}	-	0.21	0.6	V	$V_{CC} = 3.3\text{V}, I_F=8\text{mA}, I_O=4\text{mA}$
		-	0.17	0.6	V	$V_{CC} = 5.0\text{V}, I_F=8\text{mA}, I_O=4\text{mA}$
Input threshold current	I_{FT}	-	2	5	mA	$V_{CC} = 3.3\text{V}, I_{OL}=20\mu\text{A}$

Switching Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Propagation delay time to output high level	t_{PHL}	-	30	65	ns	$I_F=8mA, V_{CC}=3.3V$
		-	33		ns	$I_F=8mA, V_{CC}=5V$
Propagation delay time to output low level	t_{PLH}	-	48	65	ns	$I_F=8mA, V_{CC}=3.3V$
			52		ns	$I_F=8mA, V_{CC}=5V$
Pulse width distortion	$ t_{PHL} - t_{PLH} $		20	50	ns	$I_F=8mA, V_{CC}=3.3V$
			22		ns	$I_F=8mA, V_{CC}=5V$
Output rise time	t_r	-	7	-	ns	$I_F=8mA, V_{CC}=3.3V$
Output fall time	t_f	-	7	-	ns	
Common mode transient Immunity at logic high*4	M80L	5,000	-	-	V/ μ S	$I_F = 0mA, T_A=25^\circ C$ $V_{CM}=1000Vp-p$
	M81L	10,000			V/ μ S	
Common mode transient immunity at logic low*5	M80L	5,000	-	-	V/ μ S	$I_F = 8mA, T_A=25^\circ C$ $V_{CM}=1000Vp-p$
	M81L	10,000			V/ μ S	

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Voltage vs Forward Current

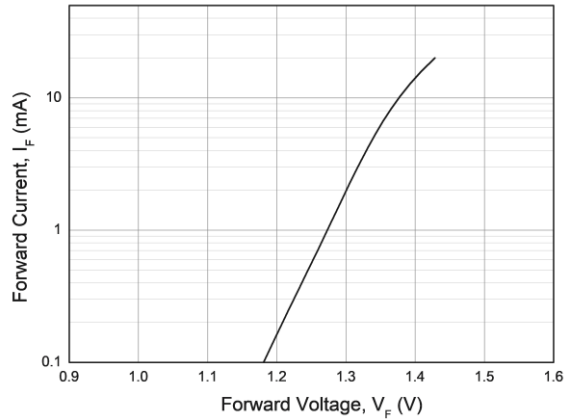


Figure 2. Input Threshold Current vs. Ambient Temperature

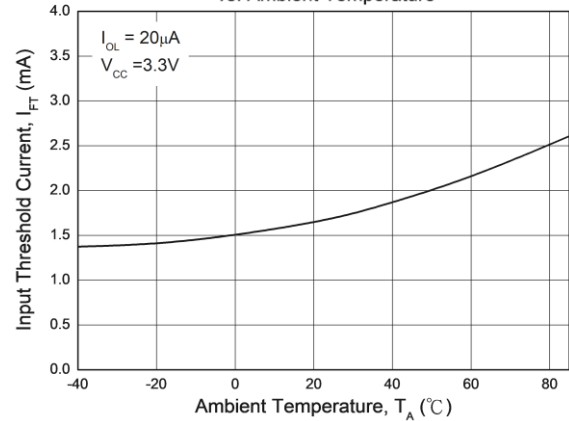


Figure 3. High Level Supply Current vs. Ambient Temperature

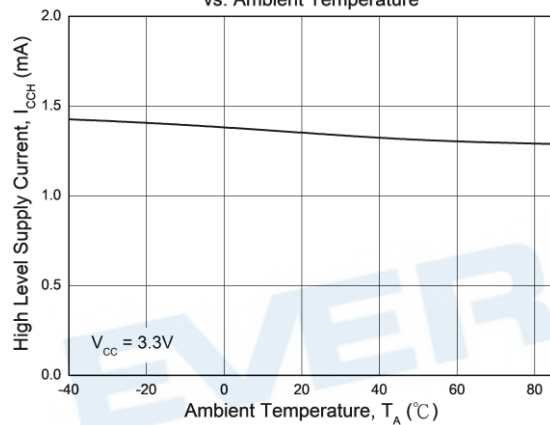


Figure 4. Low Level Supply Current vs. Ambient Temperature

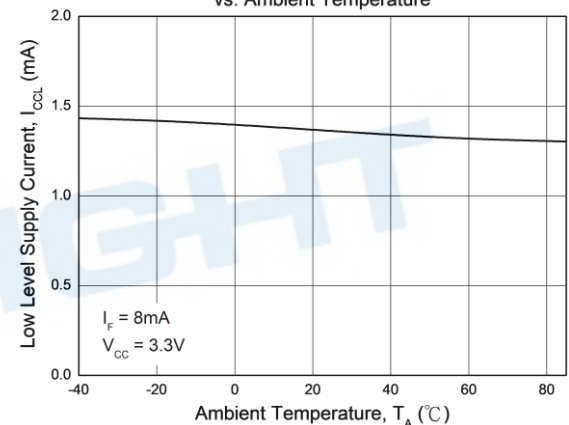


Figure 5. Switching Time vs. Forward Current

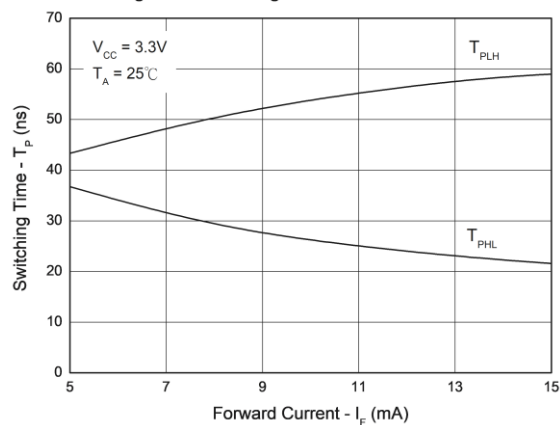


Figure 6. Switching Time vs. Forward Current

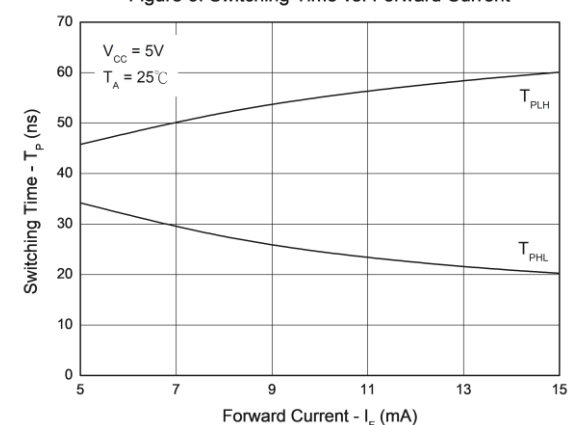


Figure 7. Test circuit and waveforms for t_{PHL} , t_{PLH} , t_r , and t_f

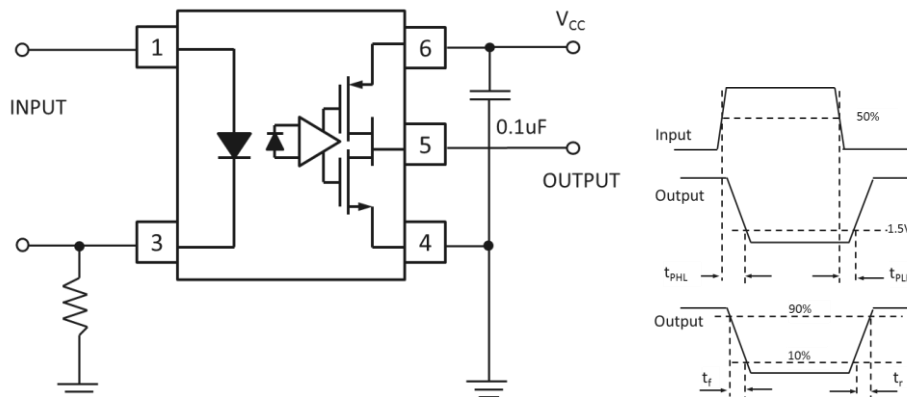
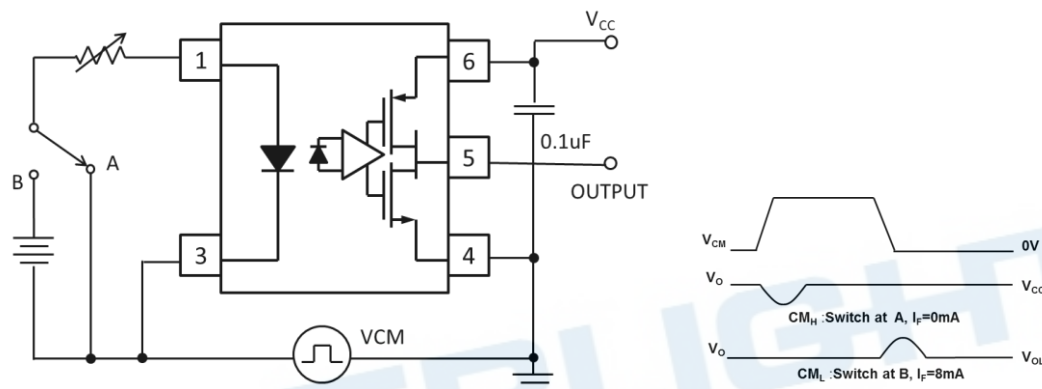


Figure 8. Test circuit Common mode Transient Immunity



Note:

*4. CM_H — The maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the HIGH state (i.e., $V_{OUT} > 2.0V$).

*5. CM_L — The maximum tolerable rate of rise of the common mode voltage to ensure the output will remain in the LOW output state (i.e., $V_{OUT} < 0.8V$).

Order Information

Part Number

ELM8XL(Z)-V

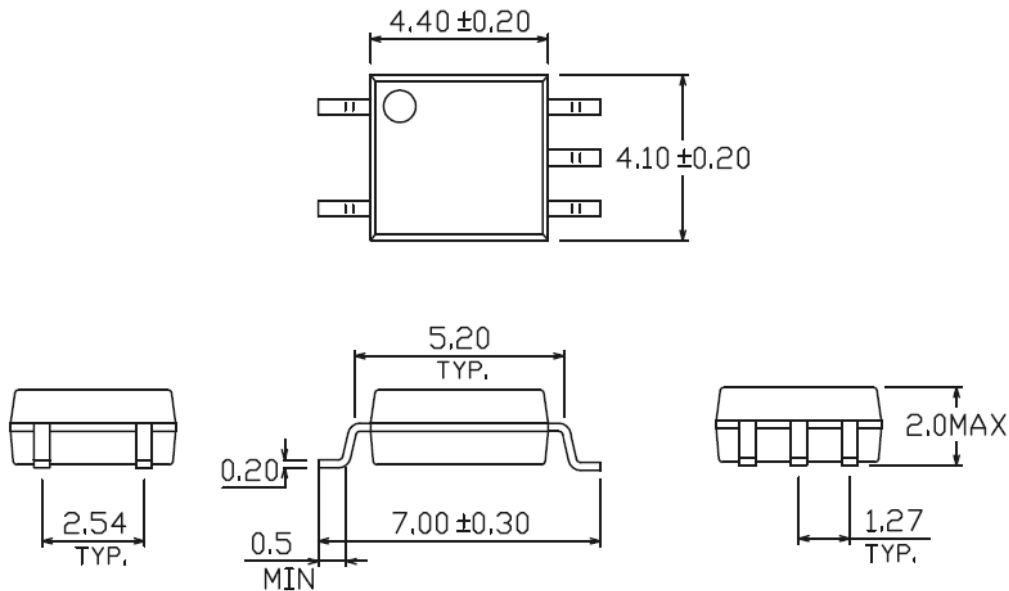
Note

M8XL = Part No
Z = Tape and reel option (TA, TB or none).
V = VDE (optional)

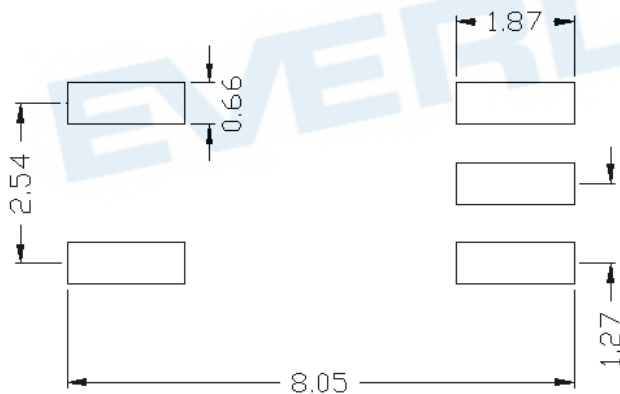
Option	Description	Packing quantity
None	Standard SMD option	100 units per tube
(TA)	Surface mount lead form + TA tape & reel option	3000 units per reel
(TB)	Surface mount lead form + TB tape & reel option	3000 units per reel

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Package Dimension
(Dimensions in mm)



Recommended pad layout for surface mount leadform

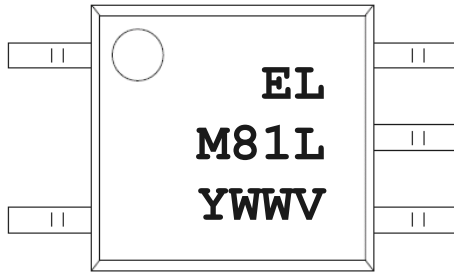


Notes.

Suggested pad dimension is just for reference only.

Please modify the pad dimension based on individual need.

Device Marking

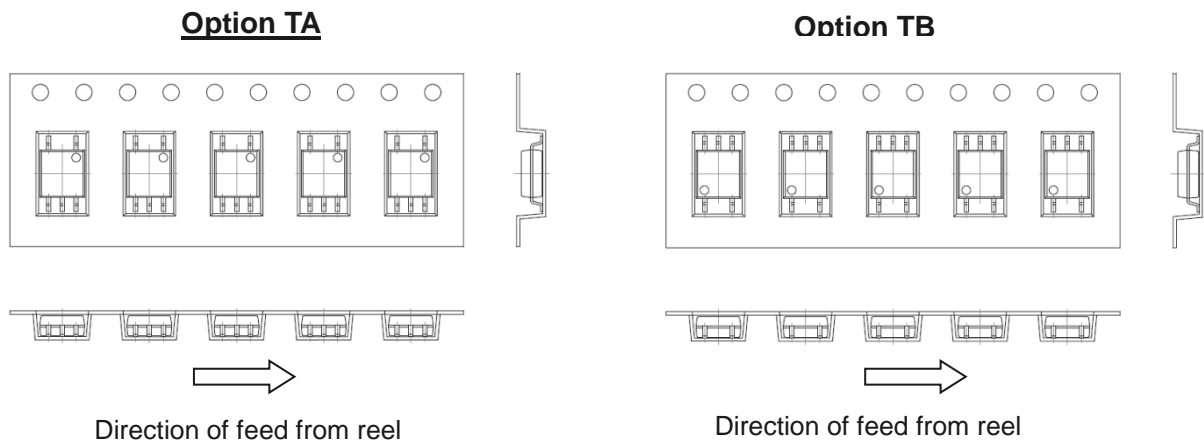


Notes

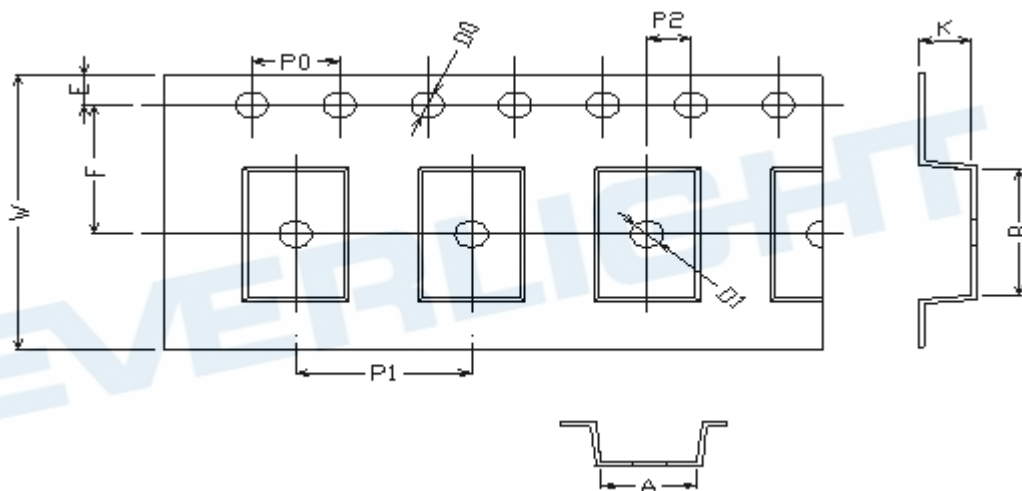
EL	denotes EVERLIGHT
M81L	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

EVERLIGHT

Tape & Reel Packing Specifications



Tape dimension

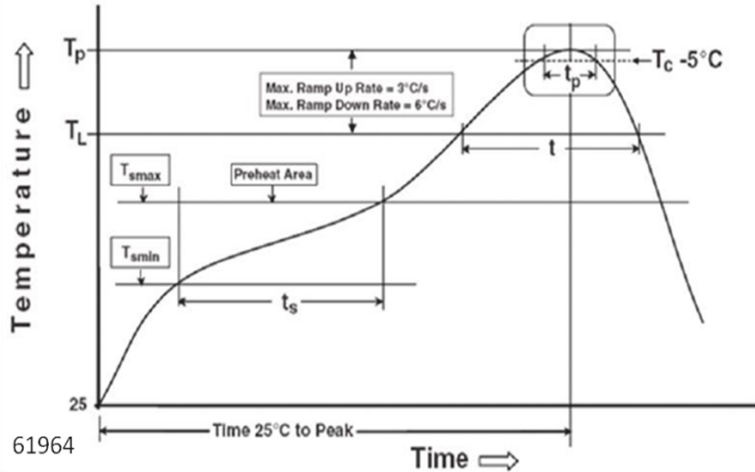


Dimension No.	A	B	D0	D1	E	F
Dimension (mm)	4.4±0.1	7.6±0.1	1.5±0.1	1.5±0.1	1.75±0.1	7.5±0.1
Dimension No.	Po	P1	P2	t	W	K
Dimension (mm)	4.0±0.15	8.0±0.1	2.0±0.1	0.3±0.1	16.0±0.2	2.4±0.1

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

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2. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
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