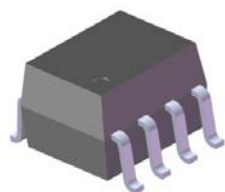


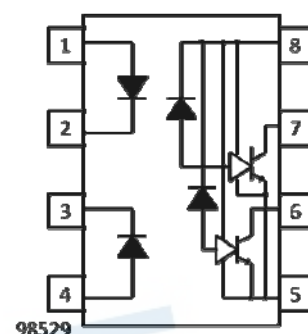
8 PIN SOP DUAL CHANNEL HIGH SPEED 10MBit/s LOGIC GATE PHOTOCOUPLER EL063X Series



Features

- Compliance Halogen Free .
(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)
- High speed 10Mbit/s
- 10kV/μs min. common mode transient immunity (EL0631)
- 3.3V/5 V Dual supply voltage
- Wide operating temperature range of -40°C to 100°C
- Logic gate output
- 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

Schematic



Pin Configuration

1. Anode
2. Cathode
3. Cathode
4. Anode
5. Gnd
6. $V_{out 2}$
7. $V_{out 1}$
8. V_{CC}

Description

The EL0630 and EL0631 are dual channel devices each consists of an infrared emitting diode optically coupled to a high speed integrated photo detector logic gate with a strobable output.

The devices are packaged in an 8-pin small outline package which conforms to the standard SO8 footprint.

Applications

- Ground loop elimination
- LSTTL to TTL, LSTTL or CMOS
- Line receiver, data transmission
- Data multiplexing
- Switching power supplies
- Pulse transformer replacement
- Computer peripheral interface

Truth Table (Positive Logic)

Input	Output
H	L
L	H

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward Current	I _F	20	mA
	Reverse Voltage	V _R	5	V
	Power Dissipation	P _D	40	mW
Output	Power Dissipation	P _C	60	mW
	Output Current	I _O	50	mA
	Output Voltage	V _O	7.0	V
	Supply Voltage	V _{CC}	7.0	V
Output Power Dissipation		P _O	100	mW
Isolation Voltage ^{*1}		V _{ISO}	3750	V rms
Operating Temperature		T _{OPR}	-40 ~ +100	°C
Storage Temperature		T _{STG}	-55 ~ +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

Recommended Operating Conditions

Characteristics	Symbol	Min	Max	Unit
Input Current, High Level	I _{FH}	6.3	15	mA
Supply Voltage	V _{CC}	2.7	3.6	V
		4.5	5.5	
Operating Temperature	T _{opr}	-40	85	°C

Electrical Characteristics

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V_F	-	1.4	1.8	V	$I_F = 10\text{mA}$
Reverse Voltage	V_R	5.0	-	-	V	$I_R = 10\mu\text{A}$
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}	-	13	18	mA	$I_F = 0\text{mA}, V_{CC} = 5.5\text{V}$
Low level Supply Current	I_{CCL}	-	15	21	mA	$I_F = 10\text{mA}, V_{CC} = 5.5\text{V}$

Transfer Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
High Level Output Current	I_{OH}	-	-	100	μA	$V_{CC} = 5.5\text{V}, V_O = 5.5\text{V}, I_F = 250\mu\text{A}$
Low Level Output Current	V_{OL}	-	-	0.6	V	$V_{CC} = 5.5\text{V}, I_F = 5\text{mA}, I_{OL} = 13\text{mA}$
Input Threshold Current	I_{FT}	-	-	5	mA	$V_{CC} = 5.5\text{V}, V_O = 0.6\text{V}, I_{OL} = 13\text{mA}$

Notes:

*a Over recommended operating conditions ($T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $4.5\text{V} \leq V_{CC} \leq 5.5\text{V}$) unless otherwise specified.

*b All Typical at $V_{CC} = 5\text{V}$, $T_A = 25^\circ\text{C}$.

Switching Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Propagation delay time to output High level	t_{PHL}	-	-	100	ns	$V_{CC}=5.5V$, $I_F=7.5mA$ $C_L=15pF$, $R_L=350\Omega$ $T_A=25^\circ C$
Propagation delay time to output Low level	t_{PLH}	-	-	100	ns	
Pulse width distortion	$ t_{PHL} - t_{PLH} $	-	15	-	ns	
Output rise time	t_r	-	40	-	ns	
Output fall time	t_f	-	10	-	ns	
Common Mode Transient Immunity at Logic High* ⁸	EL0630 ICM _{HI}	5000	-	-	V/ μs	$I_F=0mA$, $V_{OH(MIN)}=2.0V$, $V_{CC}=5V$ $R_L=350\Omega$, $T_A=25^\circ C$ $ V_{CMI} =1KV$
	EL0631	10000				$I_F=0mA$, $V_{OH(MIN)}=2.0V$, $V_{CC}=5V$ $R_L=350\Omega$, $T_A=25^\circ C$ $ V_{CMI} =1KV$
Common Mode Transient Immunity at Logic Low* ⁹	EL0630 ICM _{LI}	5000	-	-	V/ μs	$I_F=7.5mA$, $V_{OL(MAX)}=0.8V$, $V_{CC}=5V$ $R_L=350\Omega$, $T_A=25^\circ C$ $ V_{CMI} =1KV$
	EL0631	10000				$I_F=7.5mA$, $V_{OL(MAX)}=0.8V$, $V_{CC}=5V$ $R_L=350\Omega$, $T_A=25^\circ C$ $ V_{CMI} =1KV$

Notes:

*a Over recommended operating conditions ($T_A = -40^\circ C$ to $+85^\circ C$, $4.5V \leq V_{CC} \leq 5.5V$, $I_F=7.5mA$) unless otherwise specified.

*b All Typical at $V_{CC} = 5V$, $T_A = 25^\circ C$.

Electrical Characteristics

Input

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V_F	-	1.4	1.8	V	$I_F = 10\text{mA}$
Reverse Voltage	V_R	5.0	-	-	V	$I_R = 10\mu\text{A}$
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}	-	8	18	mA	$I_F = 0\text{mA}, V_{CC} = 3.3\text{V}$
Low Level Supply Current	I_{CCL}	-	10	21	mA	$I_F = 10\text{mA}, V_{CC} = 3.3\text{V}$

Transfer Characteristics

Transfer Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
High Level Output Current	I_{OH}	-	-	200	μA	$V_{CC} = 3.3\text{V}, V_O = 3.3\text{V}$ $I_F = 250\mu\text{A}$
Low Level Output Current	V_{OL}	-	-	0.6	V	$V_{CC} = 3.3\text{V}, I_F = 5\text{mA},$ $I_{OL} = 13\text{mA}$
Input Threshold Current	I_{FT}	-	-	6	mA	$V_{CC} = 3.3\text{V}, V_O = 0.6\text{V},$ $I_{OL} = 13\text{mA}$

Notes:

*a Over recommended operating conditions ($T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $2.7\text{V} \leq V_{CC} \leq 3.6\text{V}$) unless otherwise specified.

*b All Typical at $V_{CC} = 3.3\text{V}$, $T_A = 25^\circ\text{C}$.

Switching Characteristics

Parameter	Symbol	Min	Typ.	Max.	Unit	Condition
Propagation delay time to output High level	t_{PHL}	-	-	120	ns	$V_{CC}=3.3V, I_F=7.5mA$ $C_L=15pF, R_L=350\Omega$ $T_A=25^\circ C$
Propagation delay time to output Low level	t_{PLH}	-	-	120	ns	
Pulse width distortion	$ t_{PHL} - t_{PLH} $	-	30	-	ns	
Output rise time	t_r	-	65	-	ns	
Output fall time	t_f	-	15	-	ns	
Common Mode Transient Immunity at Logic High	EL0630 ICM _{HI}	5000	-	-	V/ μs	$I_F=0mA, V_{OH(MIN)}=2.0V,$ $V_{CC}=3.3V$ $R_L=350\Omega, T_A=25^\circ C$ $ V_{CML} =1KV$
	EL0631	10000				$I_F=0mA, V_{OH(MIN)}=2.0V,$ $V_{CC}=3.3V$ $R_L=350\Omega, T_A=25^\circ C$ $ V_{CML} =1KV$
Common Mode Transient Immunity at Logic Low	EL0630 ICM _{LI}	5000	-	-	V/ μs	$I_F=7.5mA, V_{OL(MAX)}=0.8V,$ $V_{CC}=3.3V$ $R_L=350\Omega, T_A=25^\circ C$ $ V_{CML} =1KV$
	EL0631	10000				$I_F=7.5mA, V_{OL(MAX)}=0.8V,$ $V_{CC}=3.3V$ $R_L=350\Omega, T_A=25^\circ C$ $ V_{CML} =1KV$

Notes:

- *a Over recommended operating conditions ($T_A = -40^\circ C$ to $+85^\circ C$, $2.7V \leq V_{CC} \leq 3.6V$, $I_F=7.5mA$) unless otherwise specified.
*b All Typical at $V_{CC} = 3.3V$, $T_A=25^\circ C$.

Typical Electro-Optical Characteristics Curves

Figure 1. Low Level Output Voltage vs. Ambient Temperature

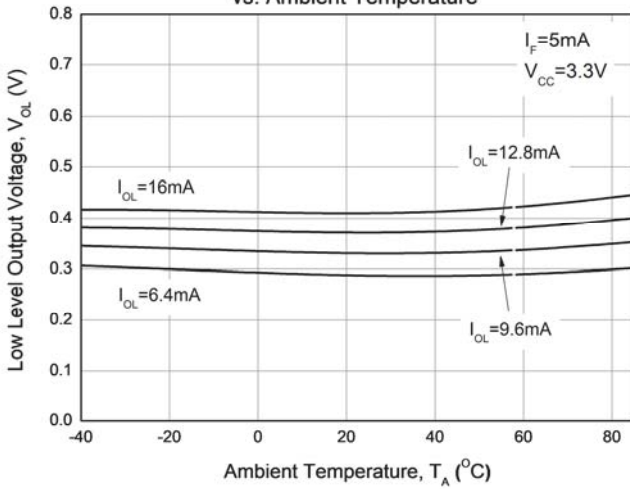


Figure 2. Low Level Output Voltage vs. Ambient Temperature

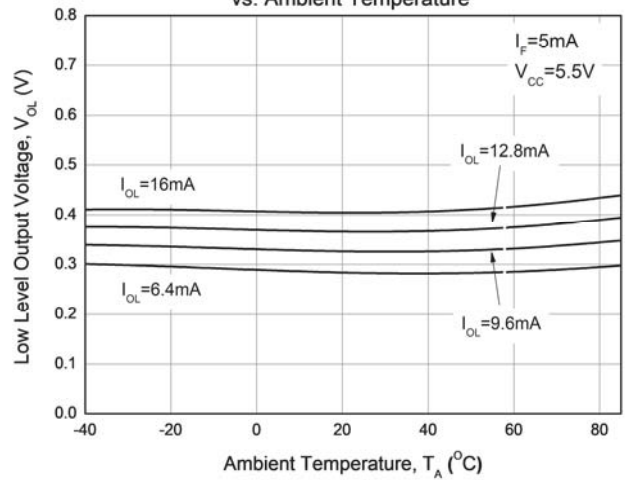


Figure 3. Low Level Output Current vs Ambient Temperature

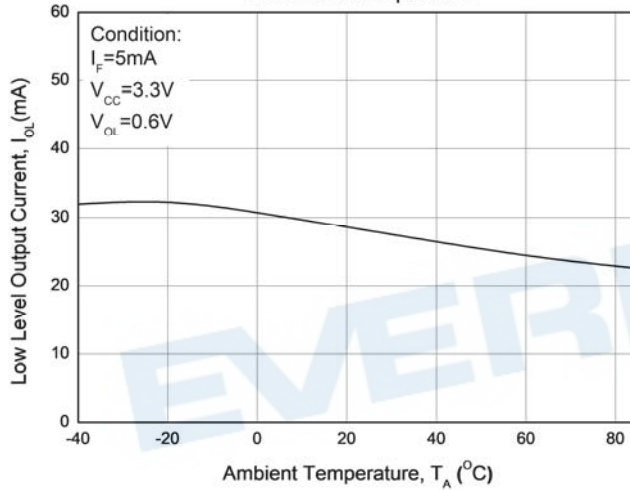


Figure 4. Low Level Output Current vs Ambient Temperature

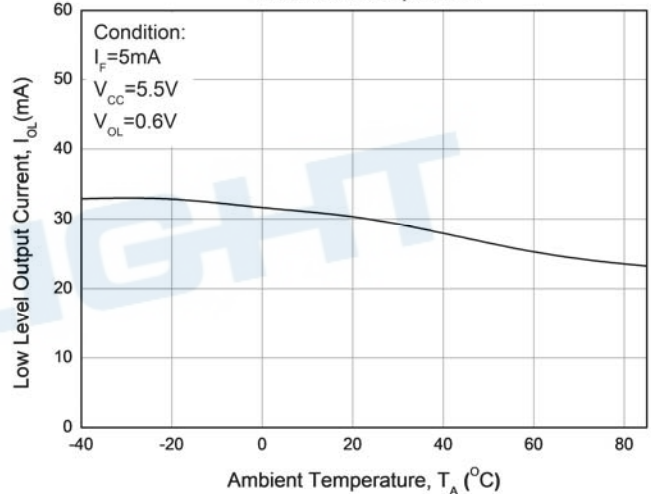


Figure 5. High Level Output Current vs Ambient Temperature

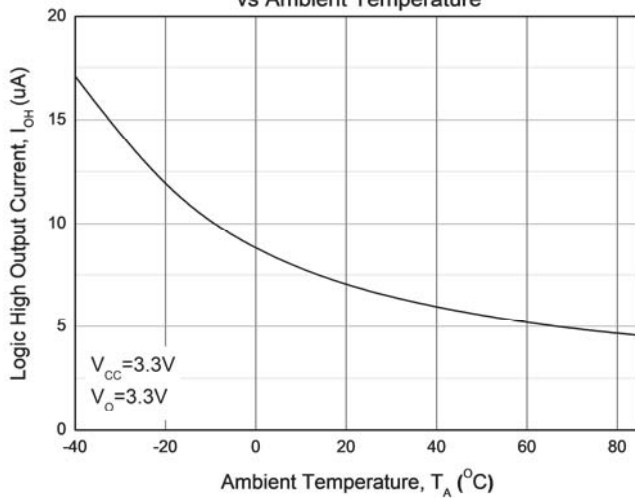


Figure 6. High Level Output Current vs Ambient Temperature

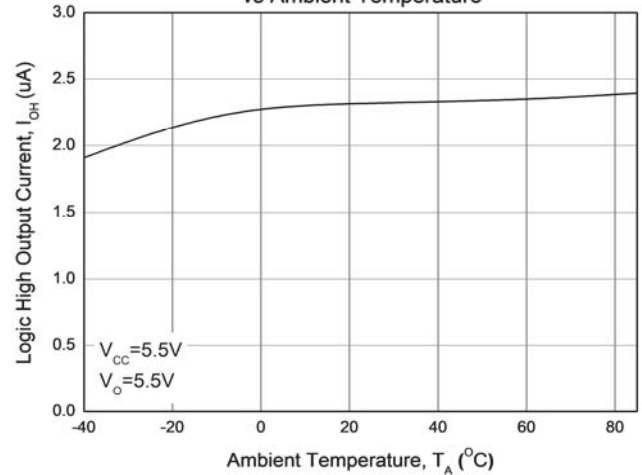


Figure 7. Input Threshold Current vs Ambient Temperature

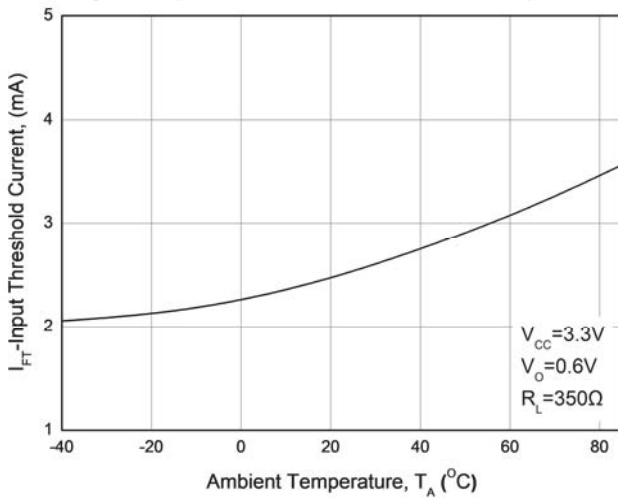


Figure 8. Input Threshold Current vs Ambient Temperature

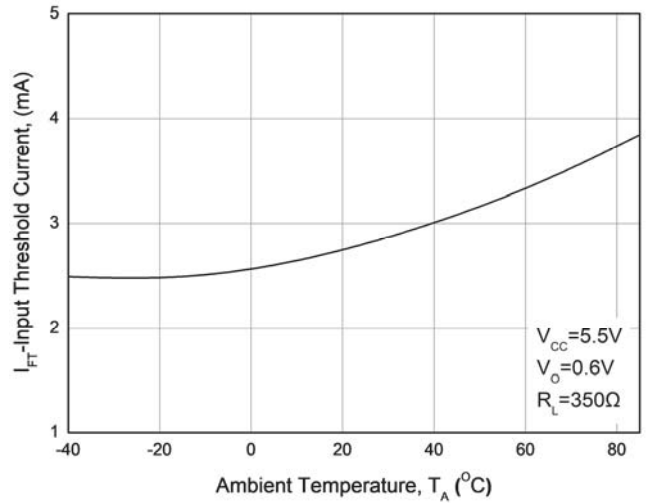


Figure 9. Switching Time vs. Ambient Temperature

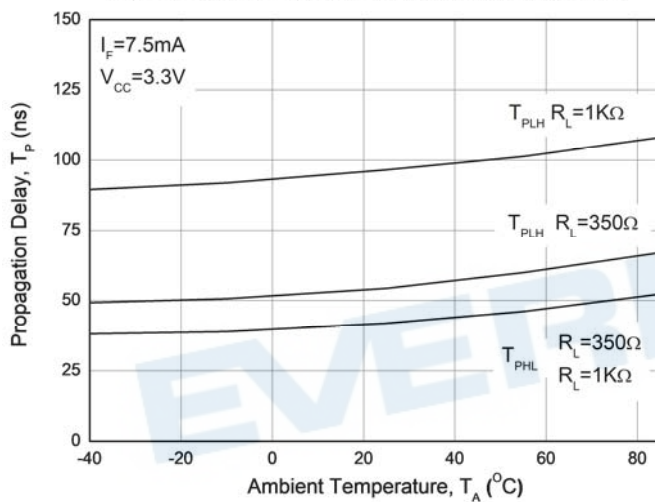


Figure 10. Switching Time vs. Ambient Temperature

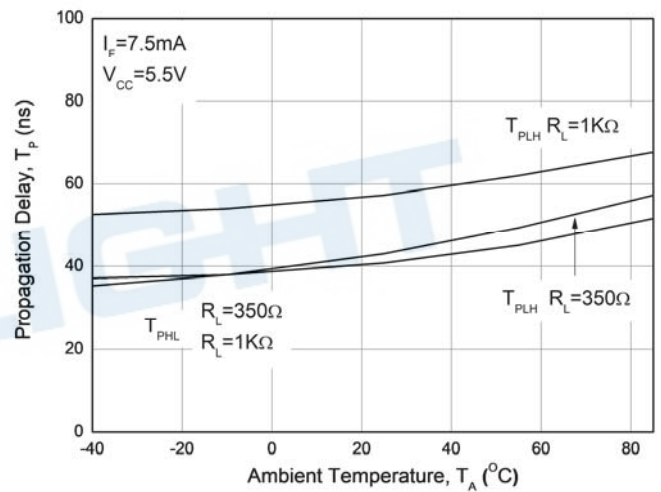


Figure 11. Pulse Width Distortion vs. Temperature

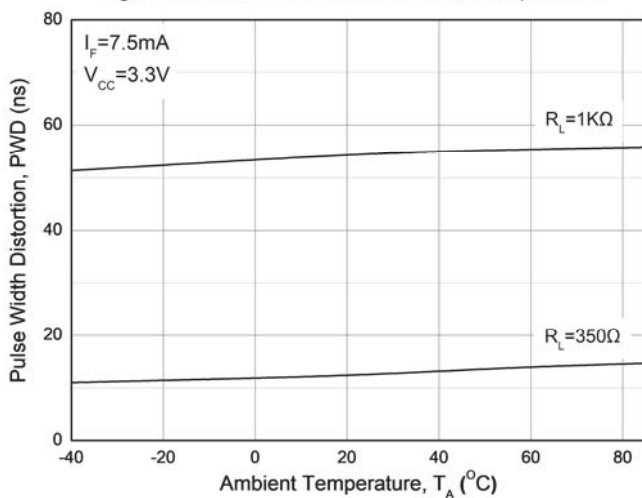


Figure 12. Pulse Width Distortion vs. Temperature

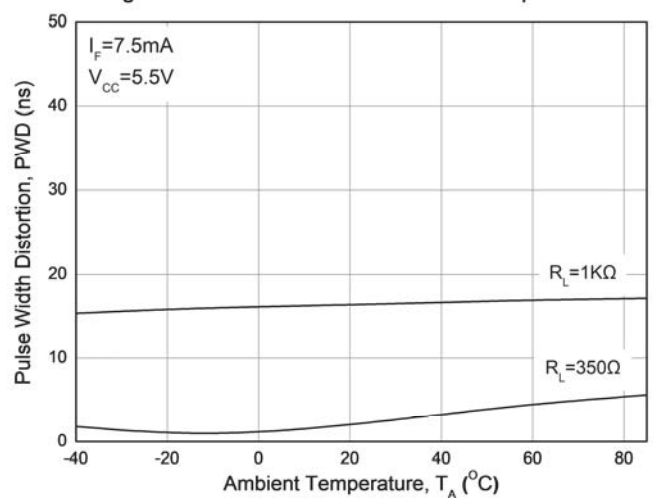


Figure 13. Forward Voltage vs Forward Current

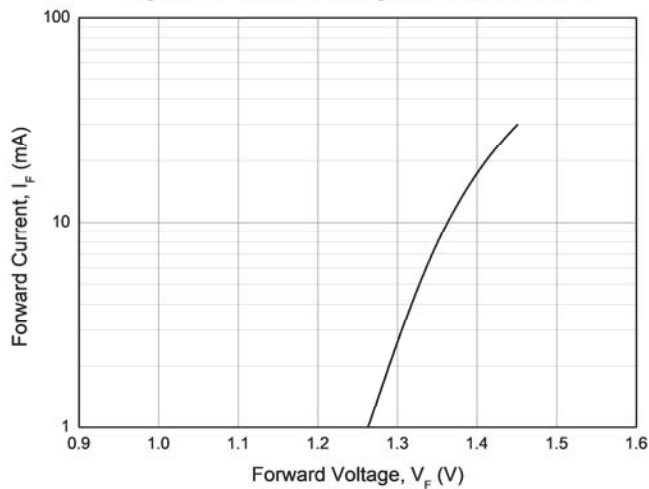


Fig. 14 Test circuit and waveforms for t_{PHL} , t_{PLH} , t_r , and t_f

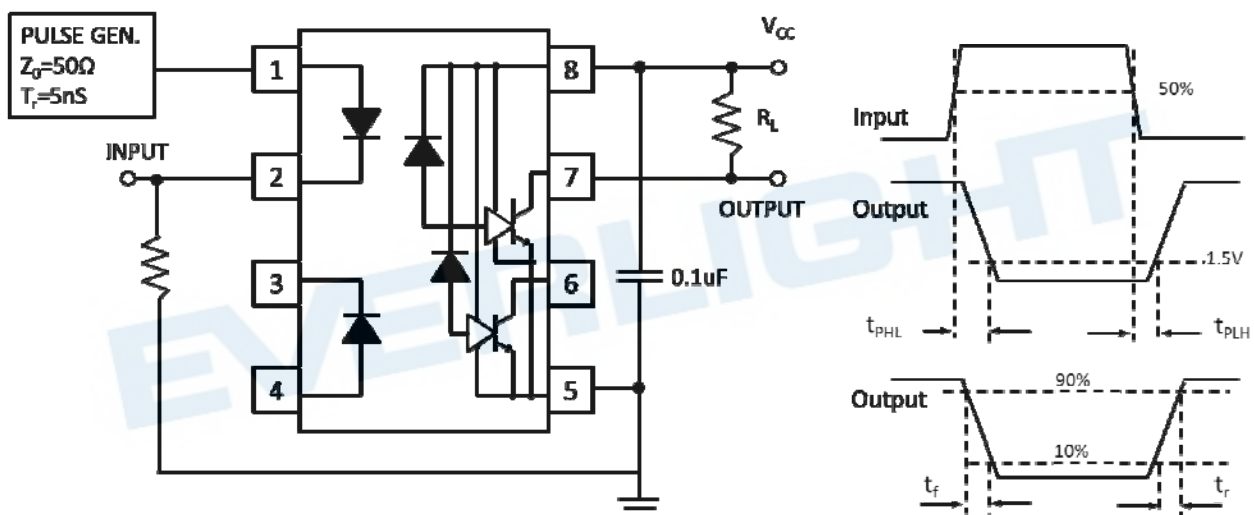
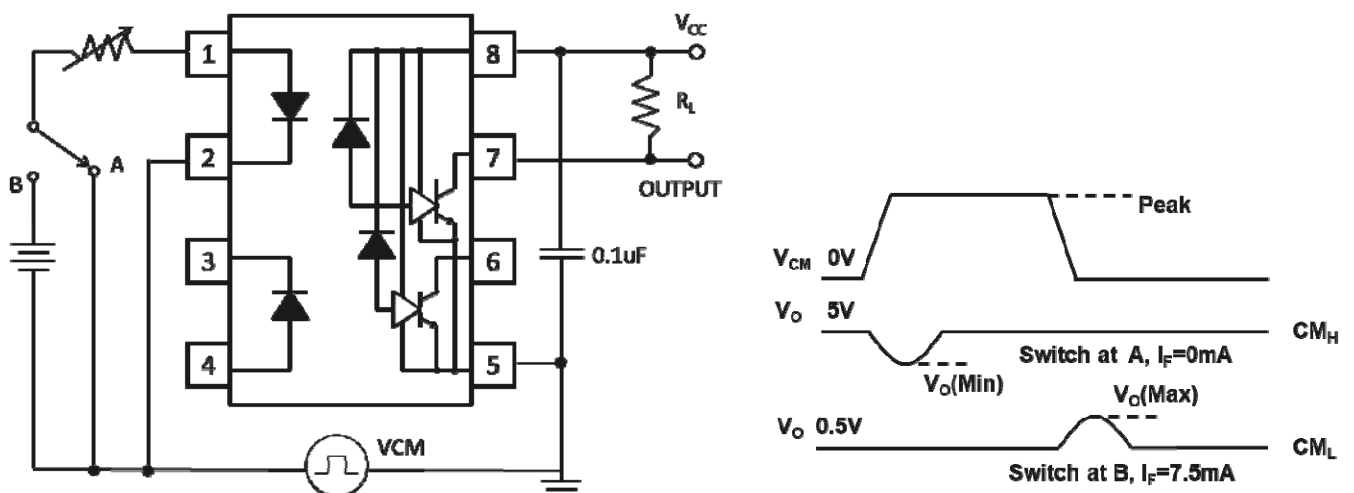


Fig. 15 Test circuit Common mode Transient Immunity



Notes

- *3 The V_{CC} supply must be bypassed by a 0.1 μ F 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
- *4. t_{PLH} – Propagation delay is measured from the 3.75mA level on the HIGH to LOW transition of the input current pulse to the 1.5 V level on the LOW to HIGH transition of the output voltage pulse.
- *5. t_{PHL} – Propagation delay is measured from the 3.75mA level on the LOW to HIGH transition of the input current pulse to the 1.5 V level on the HIGH to LOW transition of the output voltage pulse.
- *6. t_r – Rise time is measured from the 90% to the 10% levels on the LOW to HIGH transition of the output pulse.
- *7. t_f – Fall time is measured from the 10% to the 90% levels on the HIGH to LOW transition of the output pulse.
- *8 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., $V_{OUT} > 2.0V$).
- *9 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., $V_{OUT} < 0.8V$).

EVERLIGHT

Order Information

Part Number

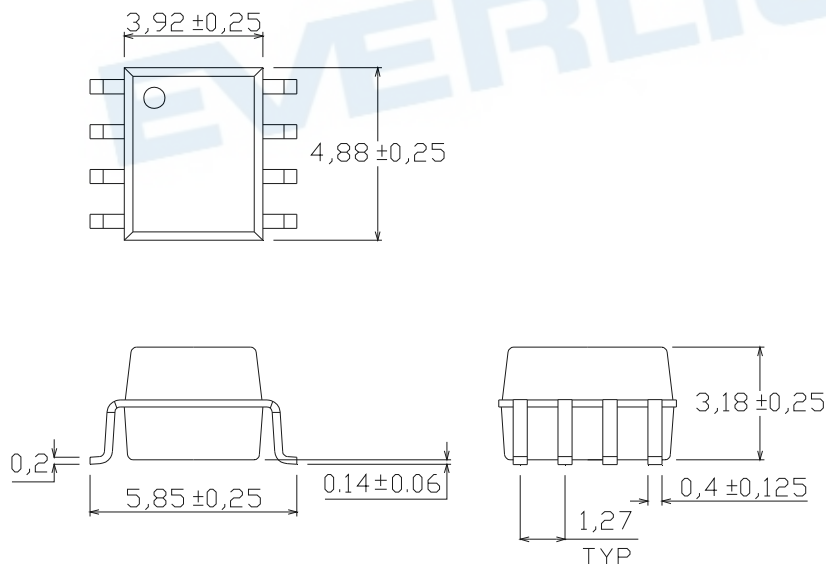
EL063X(Z) -V

Note

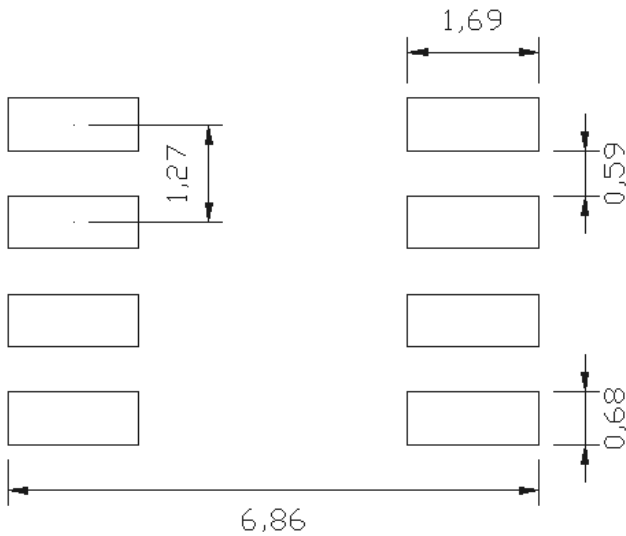
X = Part no. (X = 0 or 1)
Z = Tape and reel option (TA, TB).
V = VDE (optional)

Option	Description	Packing quantity
(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)



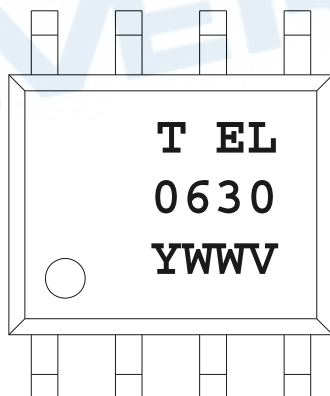
Recommended pad layout for surface mount leadform



Notes

Suggested pad dimension is just for reference only.
Please modify the pad dimension based on individual need.

Device Marking

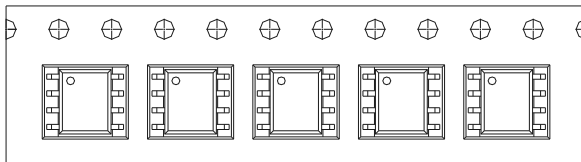


Notes

T	denotes Factory No code : made in China T : made in Taiwan
EL	denotes EVERLIGHT
0630	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

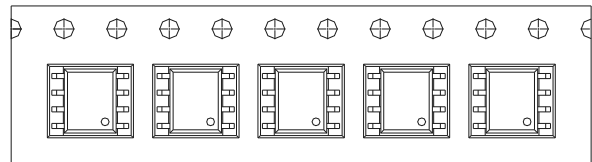
Tape & Reel Packing Specifications

Option TA



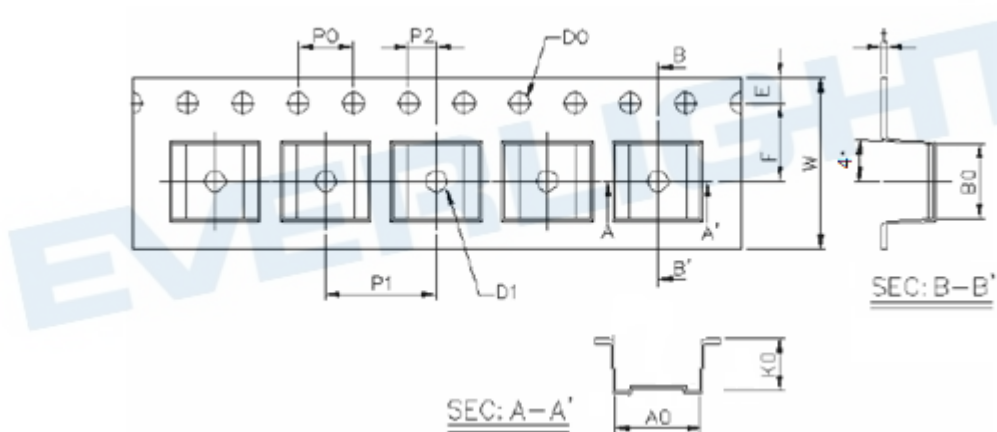
Direction of feed from reel

Option TB



Direction of feed from reel

Tape dimensions

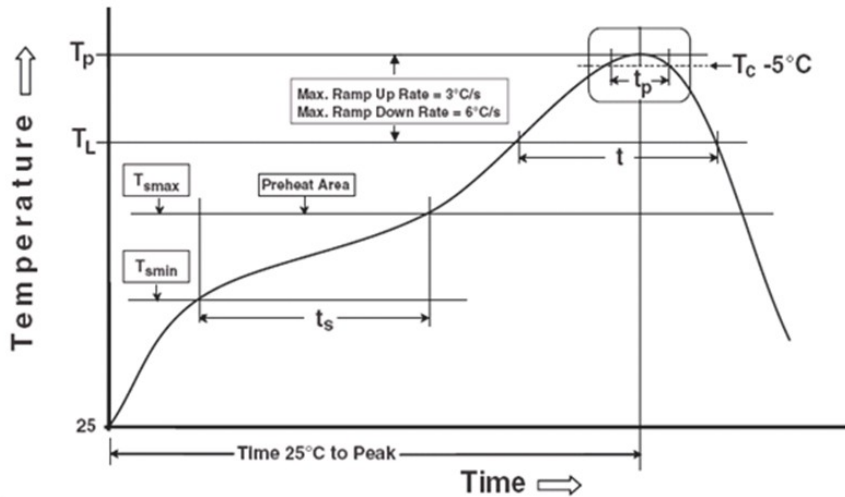


Dimension No.	A0	B0	D0	D1	E	F
Dimension(mm)	6.2±0.1	5.26±0.1	1.5±0.1	1.5±0.3	1.75±0.1	5.5±0.1
Dimension No.	P0	P1	P2	t	W	K0
Dimension(mm)	4.0±0.1	8.0±0.1	2.0±0.1	0.25±0.1	12.0+0.3/ -0.1	3.75±0.1

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

EN-60747-5-5 Insulation Related Characteristics

Description	Symbol	Rating	Unit
Climatic Classification	-	55/100/21	-
Pollution Degree	-	2	-
Maximum Working Insulation Voltage	V_{IORM}	566	V_{peak}
Input to Output Test Voltage, Method A $V_{IORM} \times 1.6 = V_{PR}$, Type and Sample Test, $t_m = 10s$, Partial Discharge < 5 pC	V_{PR}	905.6	V_{peak}
Input to Output Test Voltage, Method B $V_{IORM} \times 1.875 = V_{PR}$, 100% Production Test with $t_m = 1s$, Partial Discharge < 5 pC	V_{PR}	1061	V_{peak}
Highest Allowable Overvoltage (Transient Overvoltage, $t_{ini} = 60s$)	V_{IOTM}	4500	V_{peak}
Safety Limiting Values (max. allowable ratings in case of fault, also refer to thermal derating curve)			
Temperature	T_s	150	°C
Input Current	$I_{S,INPUT}$	130	mA
Output Power	$P_{S,OUTPUT}$	256	mW
Insulation Resistance at T_s , $V_{IO} = 500 V$	R_s	10^9	Ω

DISCLAIMER

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.
2. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
3. 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.
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6. Statements regarding the suitability of products for certain types of applications are based on Everlight's knowledge of typical requirements that are often placed on Everlight products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Everlight's terms and conditions of purchase, including but not limited to the warranty expressed therein.