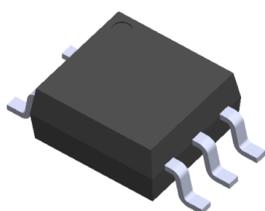
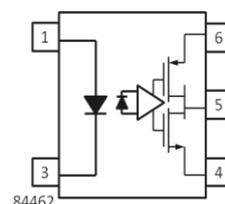


### 5 PIN SOP 3.3V HIGH SPEED 15MBit/s LOGIC GATE PHOTOCOUPLER ELM8XL-G Series



Schematic



Pin Configuration

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

#### 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

Truth Table (Positive Logic)

Input	Output
H	L
L	H

**Absolute Maximum Ratings (T<sub>A</sub>=25°C)**

	Parameter	Symbol	Rating	Unit
Input	Forward current	I <sub>F</sub>	15	mA
	Reverse voltage	V <sub>R</sub>	5	V
	Power dissipation	P <sub>D</sub>	35	mW
Output	Power dissipation	P <sub>O</sub>	85	mW
	Output current	I <sub>O</sub>	20	mA
	Supply voltage	V <sub>CC</sub>	5.5	V
Total Power Dissipation		P <sub>T</sub>	100	mW
Isolation voltage <sup>*2</sup>		V <sub>ISO</sub>	3750	V rms
Operating temperature		T <sub>OPR</sub>	-40 ~ +85	°C
Storage temperature		T <sub>STG</sub>	-55 ~ +125	°C
Soldering temperature <sup>*3</sup>		T <sub>SOL</sub>	260	°C

Notes:

\*1 The V<sub>CC</sub> 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<sub>CC</sub> 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	$ CM_H $	5,000	-	-	$V/\mu S$	$I_F = 0mA, T_A=25^\circ C$ $V_{CM}=1000Vp-p$
	M81L		10,000				
Common mode transient immunity at logic low*5	M80L	$ CM_L $	5,000	-	-	$V/\mu S$	$I_F = 8mA, T_A=25^\circ C$ $V_{CM}=1000Vp-p$
	M81L		10,000				

Typical Electro-Optical Characteristics Curves

Figure 1. Forward Voltage vs Forward Current

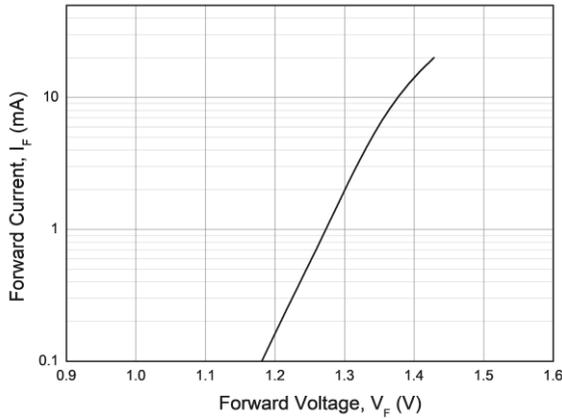


Figure 2. Input Threshold Current vs. Ambient Temperature

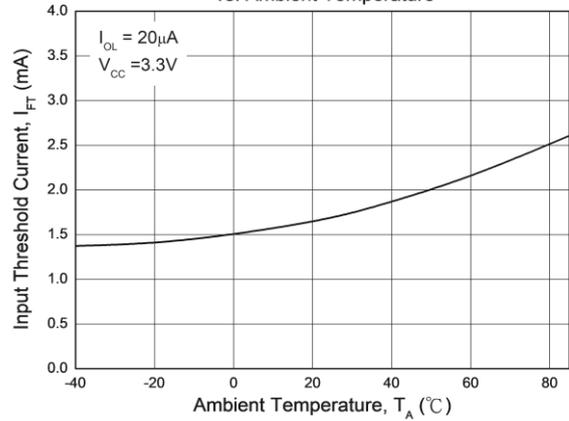


Figure 3. High Level Supply Current vs. Ambient Temperature

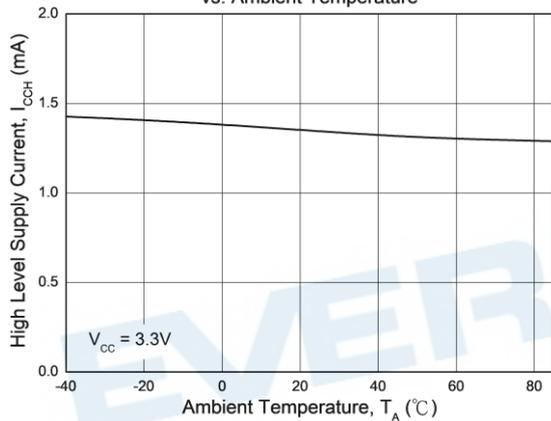


Figure 4. Low Level Supply Current vs. Ambient Temperature

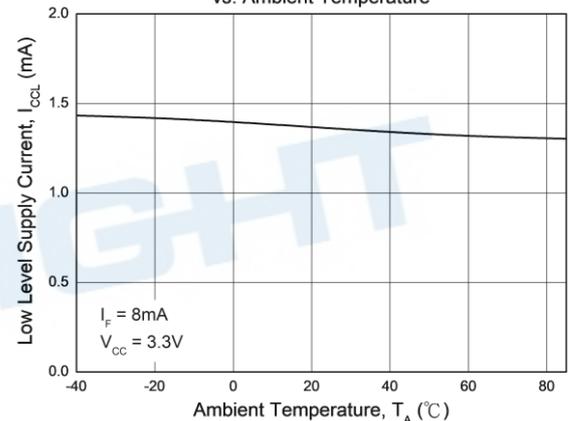


Figure 5. Switching Time vs. Forward Current

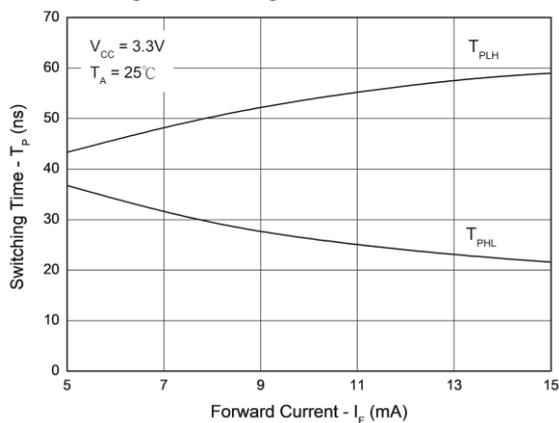


Figure 6. Switching Time vs. Forward Current

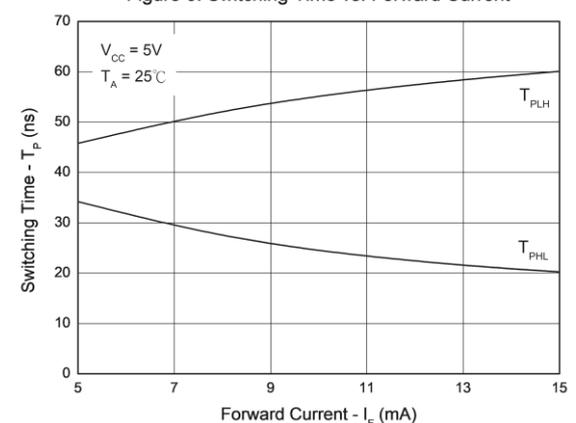


Figure 7. Test circuit and waveforms for  $t_{PHL}$ ,  $t_{PLH}$ ,  $t_r$ , and  $t_f$

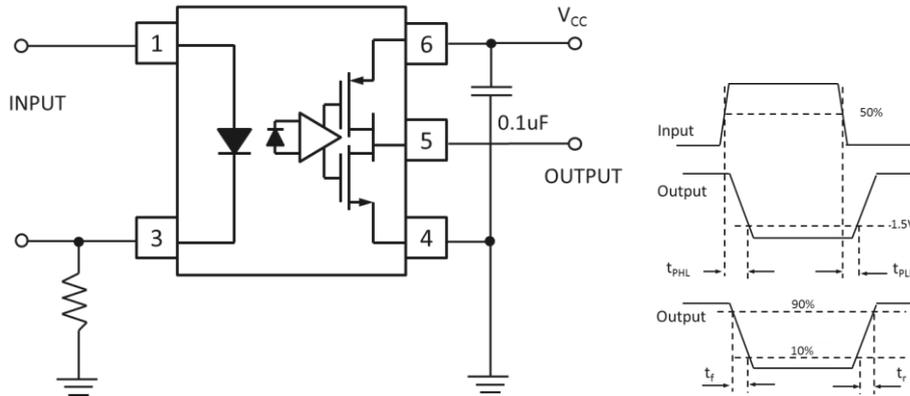
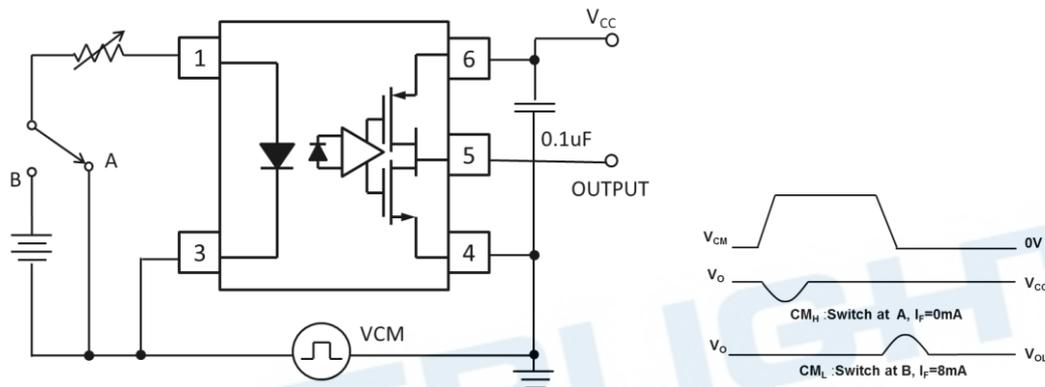


Figure 8. Test circuit Common mode Transient Immunity



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**

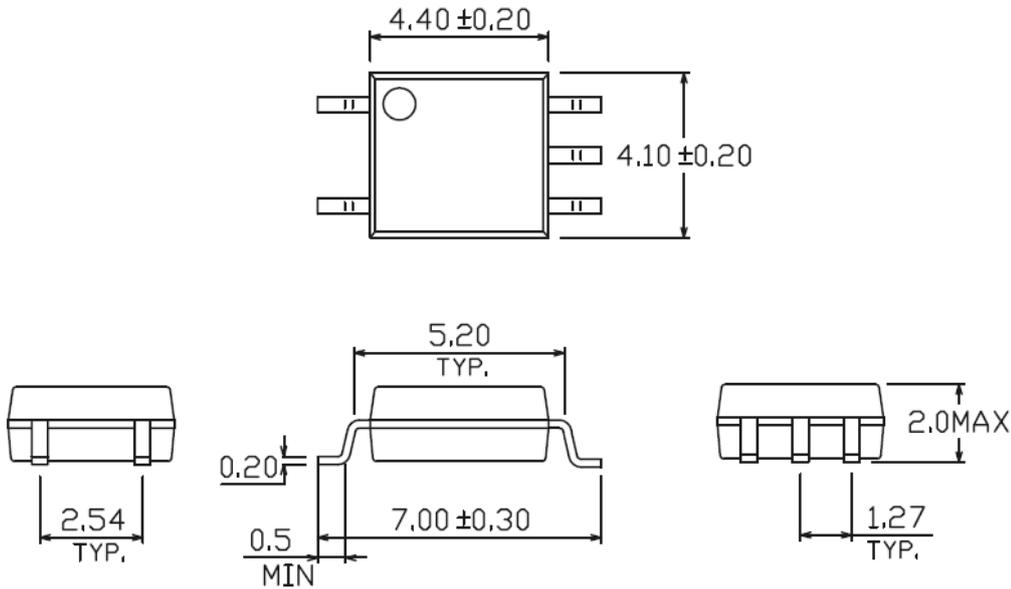
### Note

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

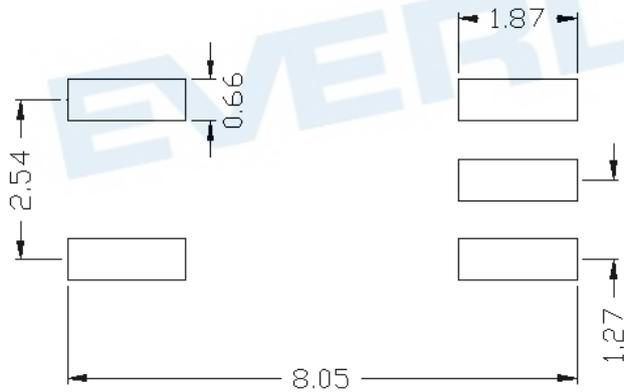
Option	Description	Packing quantity
None	Standard SMD option	100 units per tube
(TA)	Surface mount lead form + TA tape & reel option	3000 units per reel
(TB)	Surface mount lead form + TB tape & reel option	3000 units per reel

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**Package Dimension**  
(Dimensions in mm)

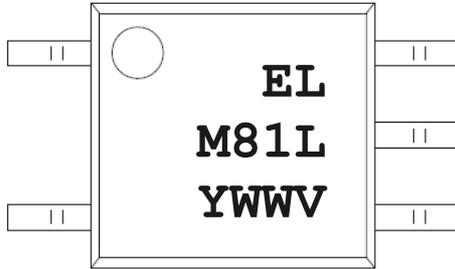


**Recommended pad layout for surface mount leadform**



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

## Device Marking

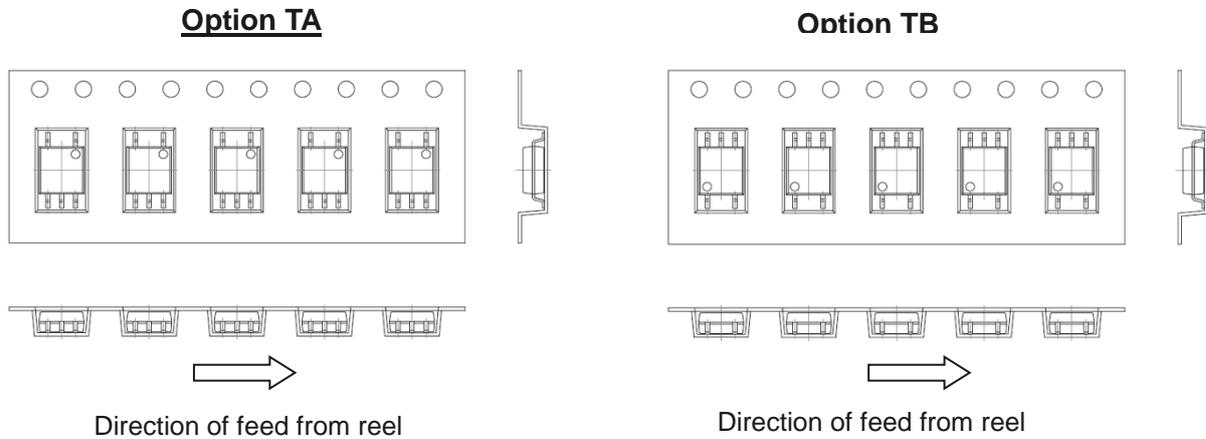


## Notes

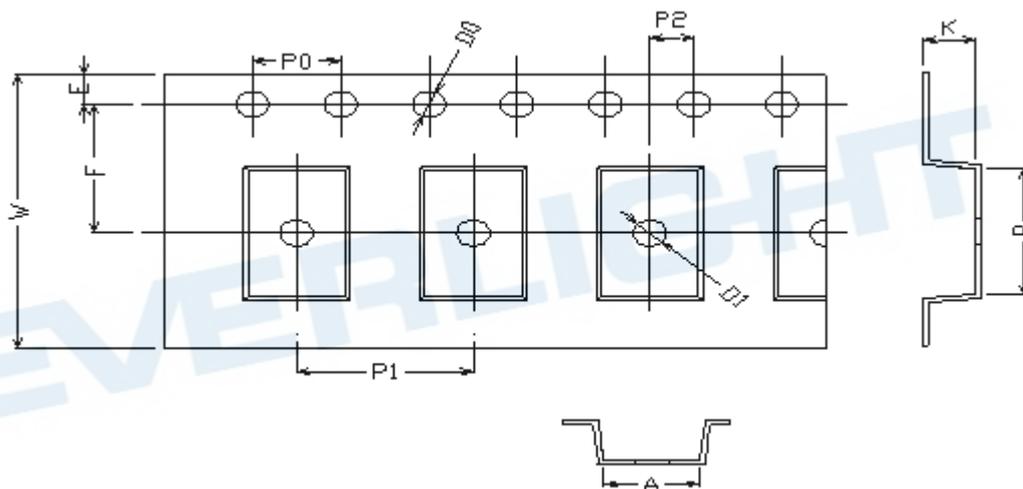
EL	denotes EVERLIGHT
M81L	denotes Device Number
Y	denotes 1 digit Year code
WW	denotes 2 digit Week code
V	denotes VDE (optional)

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**Tape & Reel Packing Specifications**



**Tape dimension**

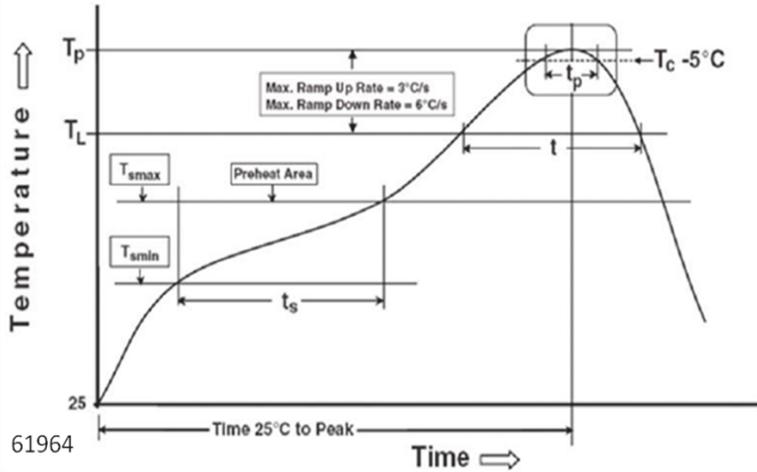


Dimension No.	<b>A</b>	<b>B</b>	<b>D0</b>	<b>D1</b>	<b>E</b>	<b>F</b>
Dimension (mm)	4.4±0.1	7.6±0.1	1.5±0.1	1.5±0.1	1.75±0.1	7.5±0.1
Dimension No.	<b>Po</b>	<b>P1</b>	<b>P2</b>	<b>t</b>	<b>W</b>	<b>K</b>
Dimension (mm)	4.0±0.15	8.0±0.1	2.0±0.1	0.3±0.1	16.0±0.2	2.4±0.1

## 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.
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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