

# **DATASHEET**

# **8 PIN DIP PHOTOTRANSISTOR PHOTOCOUPLER EL827 Series**







#### Features:

- Current transfer ratio (CTR:  $50\sim600\%$  at  $I_F = 5mA$ ,  $V_{CE} = 5V$ )
- High isolation voltage between input and output (Viso=5000 V rms)
- Compact small outline package
- Pb free and RoHS compliant.
- UL approved (No. E214129)
- VDE approved (No. 132249)
- SEMKO approved
- NEMKO approved
- DEMKO approved
- FIMKO approved
- CSA approved
- CQC approved

## **Description**

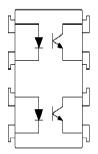
The EL827series devices each of consist of an infrared emitting diodes, optically coupled to a phototransistor detector.

They are packaged in a 8-pin DIP package and available in wide-lead spacing and SMD option.

## **Applications**

- Programmable controllers
- · System appliances, measuring instruments
- Telecommunication equipments
- Home appliances, such as fan heaters, etc.
- Signal transmission between circuits of different potentials and impedances

#### **Schematic**



#### Pin Configuration

- 1, 3. Anode
- 2, 4. Cathode
- 5, 7. Emitter
- 6, 8. Collector

8

7



# Absolute Maximum Ratings (Ta=25℃)

	Parameter	Symbol	Rating	Unit
	Forward current	I <sub>F</sub>	60	mA
	Peak forward current (1us, pulse)	I <sub>FP</sub>	1	А
Input	Reverse voltage	$V_{R}$	6	V
	Power dissipation	$P_{D}$	100	mW
	Power dissipation	P <sub>C</sub>	150	mW
Output	Collector current	I <sub>C</sub>	50	mA
•	Collector-Emitter voltage	$V_{CEO}$	80	V
	Emitter-Collector voltage	V <sub>ECO</sub>	7	V
Total power dissipation		P <sub>TOT</sub>	200	mW
Isolation voltage *1		$V_{ISO}$	5000	V rms
Operating temperature		T <sub>OPR</sub>	-55 to 110	°C
Storage temperature		T <sub>STG</sub>	-55 to 125	°C
Soldering temperature *2		T <sub>SOL</sub>	260	°C

#### Notes:

<sup>\*1</sup> AC for 1 minute, R.H.= 40 ~ 60% R.H. In this test, pins 1, 2 & 3, 4are shorted together, and pins 5, 6 & 7, 8 are shorted together.

<sup>\*2</sup> For 10 seconds



# **Electro-Optical Characteristics (Ta=25°C unless specified otherwise)**

Input

Parameter	Symbol	Min.	Тур.*	Max.	Unit	Condition
Forward Voltage	$V_{F}$	-	1.2	1.4	V	$I_F = 20 \text{mA}$
Reverse Current	I <sub>R</sub>	-	-	10	μA	$V_R = 4V$
Input capacitance	C <sub>in</sub>	-	30	250	pF	V = 0, f = 1kHz

Output

Parameter	Symbol	Min.	Тур.*	Max.	Unit	Condition
Collector-Emitter dark current	I <sub>CEO</sub>	-	-	100	nA	V <sub>CE</sub> = 20V, I <sub>F</sub> = 0mA
Collector-Emitter breakdown voltage	BV <sub>CEO</sub>	80	-	-	V	I <sub>C</sub> = 0.1mA
Emitter-Collector breakdown voltage	BV <sub>ECO</sub>	7	-	-	V	I <sub>E</sub> = 0.1mA

## **Transfer Characteristics**

Parameter	Symbol	Min	Тур.	Max.	Unit	Condition
Current Transfer ratio	CTR	50	-	600	%	$I_F = 5mA, V_{CE} = 5V$
Collector-Emitter saturation voltage	V <sub>CE(sat)</sub>	-	0.1	0.2	V	I <sub>F</sub> = 20mA ,I <sub>C</sub> = 1mA
Isolation resistance	R <sub>IO</sub>	5×10 <sup>10</sup>	-	-	Ω	V <sub>IO</sub> = 500Vdc, 40~60% R.H.
Floating capacitance	$C_{IO}$	-	0.6	1.0	pF	$V_{IO} = 0$ , $f = 1MHz$
Cut-off frequency	fc	-	80	-	kHz	$V_{CE} = 5V$ , $I_C = 2mA$ $R_L = 100\Omega$ , $-3dB$
Rise time	t <sub>r</sub>	-	3	18	μs	$V_{CE} = 2V, I_{C} = 2mA,$
Fall time	t <sub>f</sub>	-	4	18	μs	$R_L = 100\Omega$

<sup>\*</sup> Typical values at T<sub>a</sub> = 25°C



## **Typical Electro-Optical Characteristics Curves**

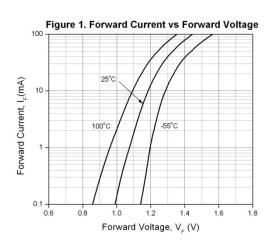


Figure 2. Normalized Collector Current vs
Forward Current

10

V<sub>cE</sub>=10V

V<sub>cE</sub>=5V

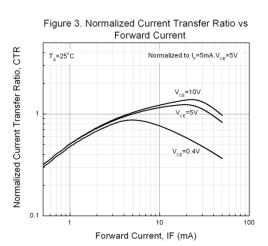
V<sub>cE</sub>=0.4V

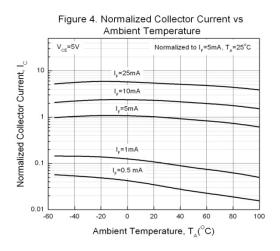
10

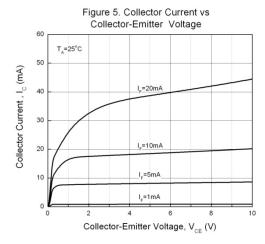
T<sub>A</sub>=25°C
Normalized to I<sub>F</sub>=5mA,V<sub>cE</sub>=5V

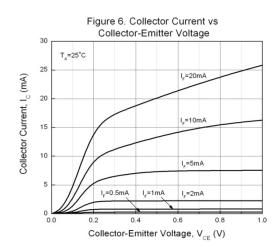
10

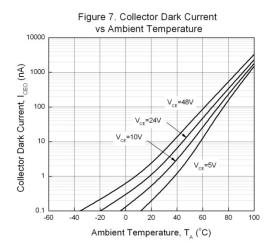
Forward Current, I<sub>F</sub> (mA)

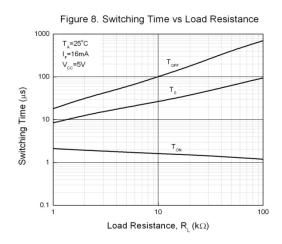


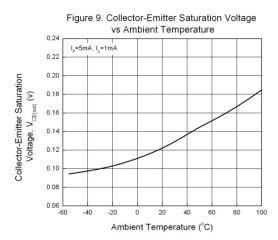












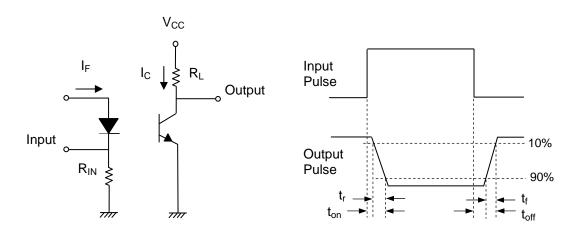


Figure 10. Switching Time Test Circuit & Waveforms



## **Order Information**

#### **Part Number**

# **EL827X(Z)-V**

#### Note

X = Lead form option (S, S1, M or none)

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

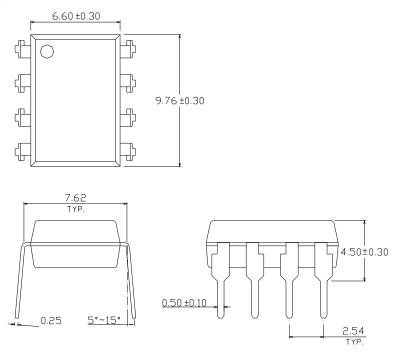
V = VDE safety (optional)

Option	Description	Packing quantity
None	Standard DIP-8	45 units per tube
М	Wide lead bend (0.4 inch spacing)	45 units per tube
S (TA)	Surface mount lead form + TA tape & reel option	1000 units per reel
S (TB)	Surface mount lead form + TB tape & reel option	1000 units per reel
S1 (TA)	Surface mount lead form (low profile) + TA tape & reel option	1000 units per reel
S1 (TB)	Surface mount lead form (low profile) + TB tape & reel option	1000 units per reel

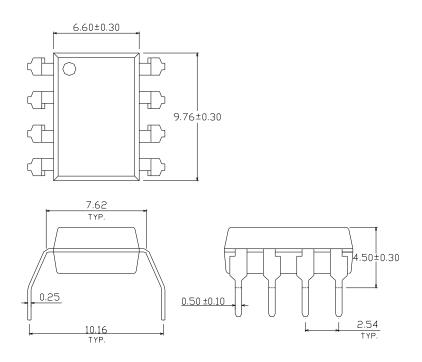


# Package Dimension (Dimensions in mm)

## **Standard DIP Type**

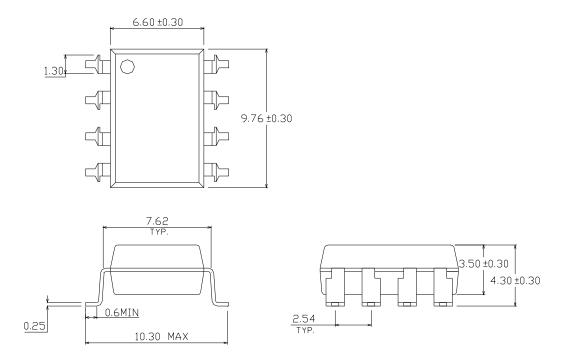


## **Option M Type**

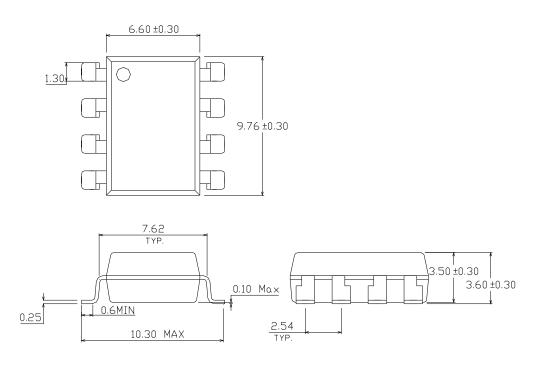




## **Option S Type**

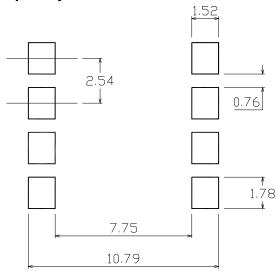


## **Option S1 Type**

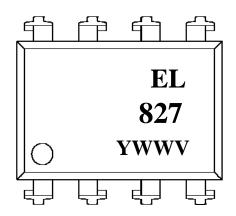




## Recommended pad layout for surface mount leadform



## **Device Marking**



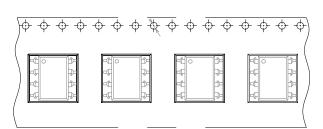
#### **Notes**

EL827 Y WW denotes Device Number denotes 1 digit Year code denotes 2 digit Week code denotes VDE (optional)

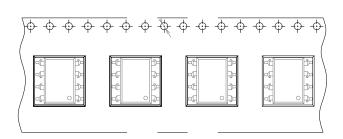


## **Tape & Reel Packing Specifications**

## **Option TA**



## **Option TB**



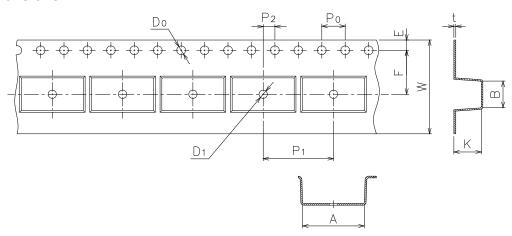
Direction of feed from reel

 $\Longrightarrow$ 

Direction of feed from reel



## **Tape dimensions**



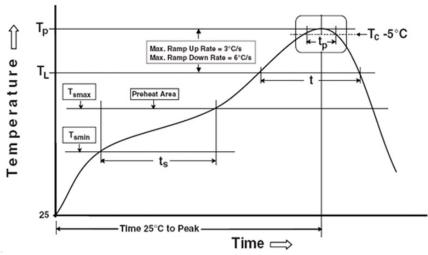
Dimension No.	Α	В	Do	D1	E	F
Dimension(mm)	10.4±0.1	10.0±0.1	1.5±0.1	1.5+0.25 -0.1	1.75±0.1	7.5±0.1
Dimension No.	Ро	P1	P2	t	w	К
Dimension(mm)	4.0±0.1	12.0±0.1	2.0±0.1	0.4±0.1	16.0±0.3	4.5±0.1



#### **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 <sub>smin</sub> )	150 °C
Temperature max (T <sub>smax</sub> )	200°C

Time  $(T_{smin} \text{ to } T_{smax}) (t_s)$ 60-120 seconds Average ramp-up rate  $(T_{smax} to T_p)$ 3 °C/second max

#### Other

Liquidus Temperature (T <sub>L</sub> )	217 °C
Time above Liquidus Temperature (t L)	60-100 sec
Peak Temperature (T <sub>P</sub> )	260°C

Time within 5 °C of Actual Peak Temperature: T<sub>P</sub> - 5°C

Ramp- Down Rate from Peak Temperature

Time 25°C to peak temperature

Reflow times

С

30 s

6°C /second max.

8 minutes max.

3 times

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