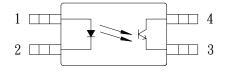


4PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER

### Description

The KPS2801 series is DC-input single channel which contains a light emitting diode optically coupled to a phototransistor. It is packaged in a 4-pin SSOP package. The input-output isolation voltage is rated at 3750Vrms.

### Schematic



- 1. Anode
- 2. Cathode
- 3. Emitter
- 4. Collector

#### Features

- 1. Pb free and RoHS compliant
- 2. High isolation voltage (V<sub>ISO</sub>=3750Vrms)
- 3. Small and thin package(4pin SSOP, pin pitch 1.27mm)
- 4. High collector to emitter voltage(V<sub>CEO</sub>=80V)
- 5. High-speed switching tr =3µs (typ.), tf =5µs (typ.)
- 6. MSL class 1
- 7. Agency Approvals:
  - UL Approved (No. E169586): UL1577
  - c-UL Approved (No. E169586)
  - VDE Approved (No. 40010469): DIN EN60747-5-5
  - FIMKO Approved: EN62368-1, EN60601-1
  - CQC Approved: GB8898-2011, GB4943.1-2011

### Applications

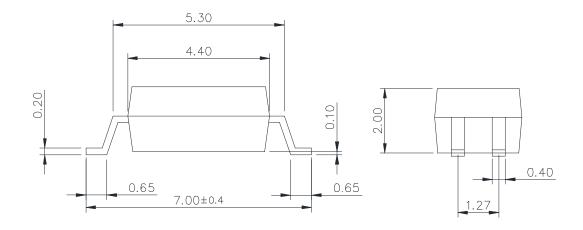
- Programmable logic controllers
- · Measuring instruments
- Power supply
- Hybrid IC

4PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER

### Outside Dimension







TOLERANCE: ±0.2mm

# Device Marking



Notes:

2801

YWW

Y: Year code / WW: Week code



4PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER

### Absolute Maximum Ratings

(Ta=25°C)

	Parameter	Symbol	Rating	Unit
Input	Forward current	I <sub>F</sub>	50	mA
	Peak forward current(*1)	I <sub>FP</sub>	1	А
	Reverse voltage	V <sub>R</sub>	6	V
	Power dissipation	P <sub>D</sub>	60	mW
	Power dissipation derating	P <sub>D</sub> /°C	0.6	mW/°C
	Collector-Emitter voltage	V <sub>CEO</sub>	80	V
	Emitter-Collector voltage	V <sub>ECO</sub>	6	V
Output	Collector current	I <sub>C</sub>	50	mA
	Collector power dissipation	Pc	160	mW
	Collector power dissipation derating	P <sub>C</sub> /°C	1.2	mW/°C
	Isolation voltage 1 minute(*2)	Viso	3750	Vrms
Operating temperature		Topr	-55 to +115	°C
	Storage temperature	Tstg	-55 to +125	°C

<sup>\*1</sup> PW=100µs,Duty Cycle=1%.

### Electro-optical Characteristics

(Ta=25°ℂ)

	Parameter	Symbol	Conditions	Min.	Тур.	Max.	Unit
Input	Forward voltage	V <sub>F</sub>	I <sub>F</sub> =5mA	-	1.1	1.4	V
	Reverse current	I <sub>R</sub>	V <sub>R</sub> =5V	-	-	5	μΑ
	Terminal capacitance	Ct	V=0, f=1MH <sub>Z</sub>	-	60	-	pF
Output	Collector dark current	I <sub>CEO</sub>	V <sub>CE</sub> =80V,I <sub>F</sub> =0mA	-	-	100	nA
charac-	Current transfer ratio	CTR	I <sub>F</sub> =5mA, V <sub>CE</sub> =5V	50	-	600	%
			I <sub>F</sub> =1mA, V <sub>CE</sub> =5V	15	-	-	%
	Collector-Emitter saturation voltage	V <sub>CE</sub> (sat)	I <sub>F</sub> =10mA, Ic=2mA	-	0.1	0.3	V
	Isolation resistance	Riso	DC500V	5x10 <sup>10</sup>	10 <sup>11</sup>	-	Ω
	Floating capacitance	Cf	V=0, f=1MH <sub>Z</sub>	-	0.4	-	pF
	Response time (Rise)(*3)	tr	\/aa=5\/la=2mA	-	3	18	μs
	Response time (Fall) (*3)	tf	Vce=5V,Ic=2mA,R <sub>L</sub> =100 $\Omega$	-	5	18	μs

<sup>\*3</sup> Test Circuit for Switching Time

<sup>\*2</sup> AC voltage for 1minute at T =25°C, RH=60% between input and output.

4PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER

# Fig.1 Current Transfer Ratio vs. Forward Current

Classification table of current transfer ratio is shown below.

CTR Rank.	CTR (%)
KPS28010A	80 TO 160
KPS28010B	130 TO 260
KPS28010C	200 TO 400
KPS28010D	300 TO 600
KPS28010E	50 TO 600

V<sub>CE</sub>=5V 450 **Current Transfer Ratio** 400 350 300 250 200 150 100 5 10 0 0.5 20 50 Forward Current I<sub>F</sub> (mA)

Fig.2 Collector Power Dissipation vs. Ambient Temperature

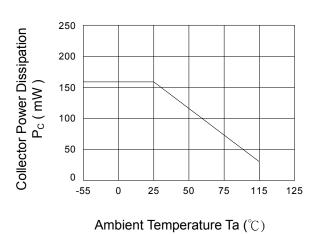


Fig.3 Collector Dark Current vs. Ambient Temperature

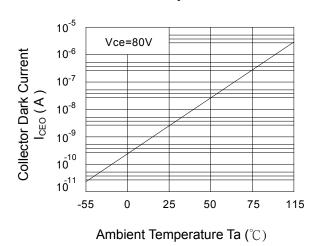


Fig.4 Forward Current vs. Ambient Temperature

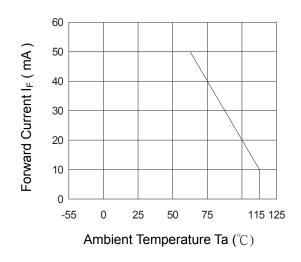
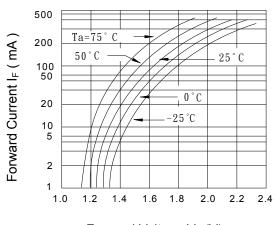


Fig.5 Forward Current vs. Forward Voltage



Forward Voltage V<sub>F</sub> (V)

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4PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER

Fig.6 Collector Current vs. Collector-Emitter Voltage

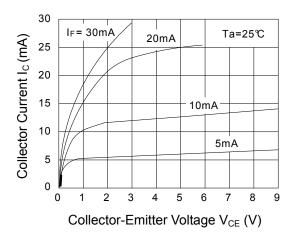
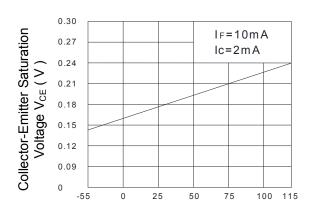


Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature



Ambient Temperature Ta (°C)

Fig.10 Response Time (Rise) vs. Load Resistance

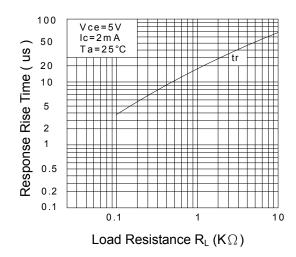


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

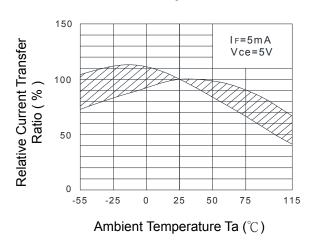
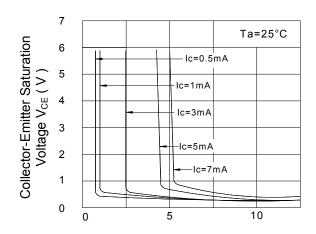
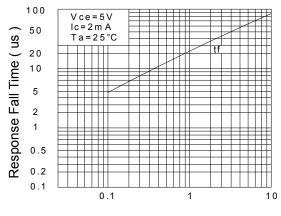


Fig.9 Collector-Emitter Saturation Voltage vs. Forward Current



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

Fig.11 Response Time (Fall) vs. Load Resistance

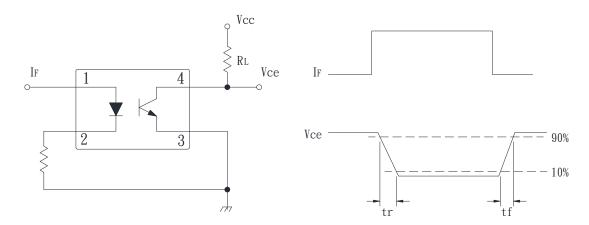


Load Resistance  $R_L(K\Omega)$ 



4PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER

# • Test Circuit for Response Time





# 4PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER

### Recommended Soldering Conditions

### (a) Infrared reflow soldering:

■ Peak reflow soldering : 260°C or below (package surface temperature)

■ Time of peak reflow temperature : 10 sec
 ■ Time of temperature higher than 230°C : 30-60 sec
 ■ Time to preheat temperature from 180~190°C : 60-120 sec

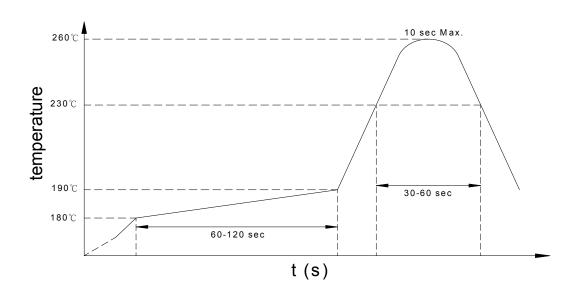
■ Time(s) of reflow: Two

■ Flux : Rosin flux containing small amount of chlorine (The

flux with a maximum chlorine content of 0.2 Wt% is

recommended.)

### Recommended Temperature Profile of Infrared Reflow



#### (b) Wave soldering:

■ Temperature : 260°C or below (molten solder temperature)

■ Time : 10 seconds or less

■ Preheating conditions : 120°C or below (package surface temperature)

■ Time(s) of reflow : One

■ Flux: Rosin flux containing small amount of chlorine (The flux with a maximum

chlorine content of 0.2 Wt% is recommended.)

(c) Cautions:

■ Fluxes : Avoid removing the residual flux with freon-based and chlorine-based

cleaning solvent.

Avoid shorting between portion of frame and leads.

4PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER

### Numbering System

# **KPS2801 Y** (Z)

### Notes:

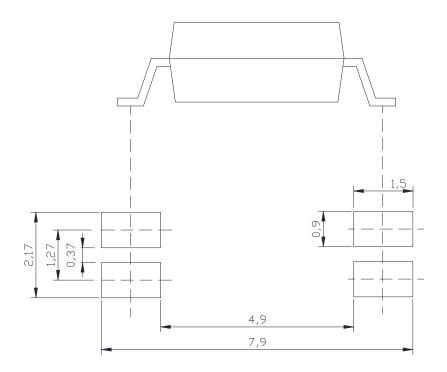
KPS2801 = Part No.

 $Y = CTR \text{ rank option } (A \sim E)$ 

Z = Tape and reel option (TLD \ TRU)

Option	Description	Packing quantity		
TLD	TLD tape & reel option	3000 units per reel		
TRU	TRU tape & reel option	3000 units per reel		

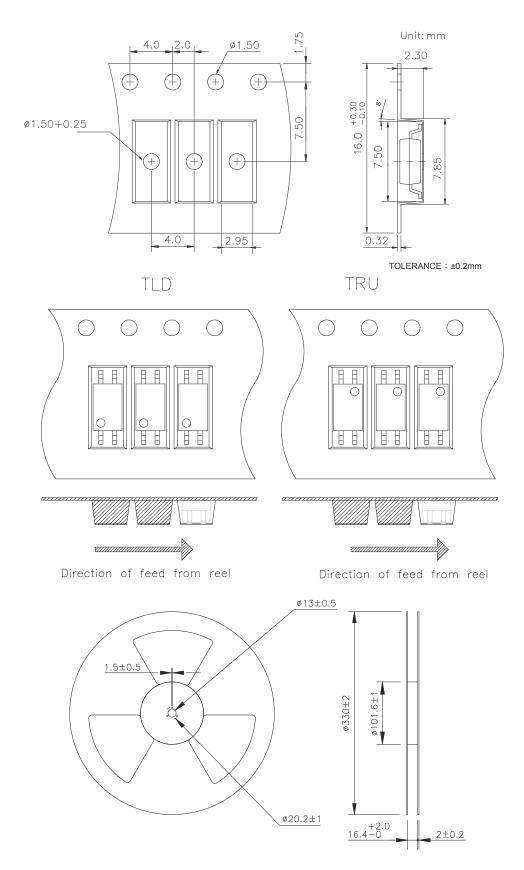
### • Recommended Pad Layout for Surface Mount Lead Form



Unit:mm

4PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER

### • 4-pin SSOP Carrier Tape & Reel



# cosmo

# KPS2801 Series

4PIN SSOP PHOTOTRANSISTOR PHOTOCOUPLER

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