

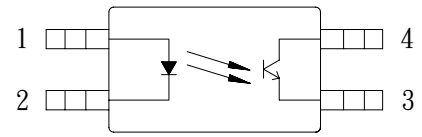
KPS2801 Series

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 ($V_{ISO}=3750V_{rms}$)
3. Small and thin package(4pin SSOP, pin pitch 1.27mm)
4. High collector to emitter voltage($V_{CEO}=80V$)
5. High-speed switching $t_r=3\mu s$ (typ.), $t_f=5\mu s$ (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: EN60065, EN60950
 - SEMKO Approved: EN60065, EN60950
 - CQC Approved: GB8898-2011, GB4943.1-2011

● Applications

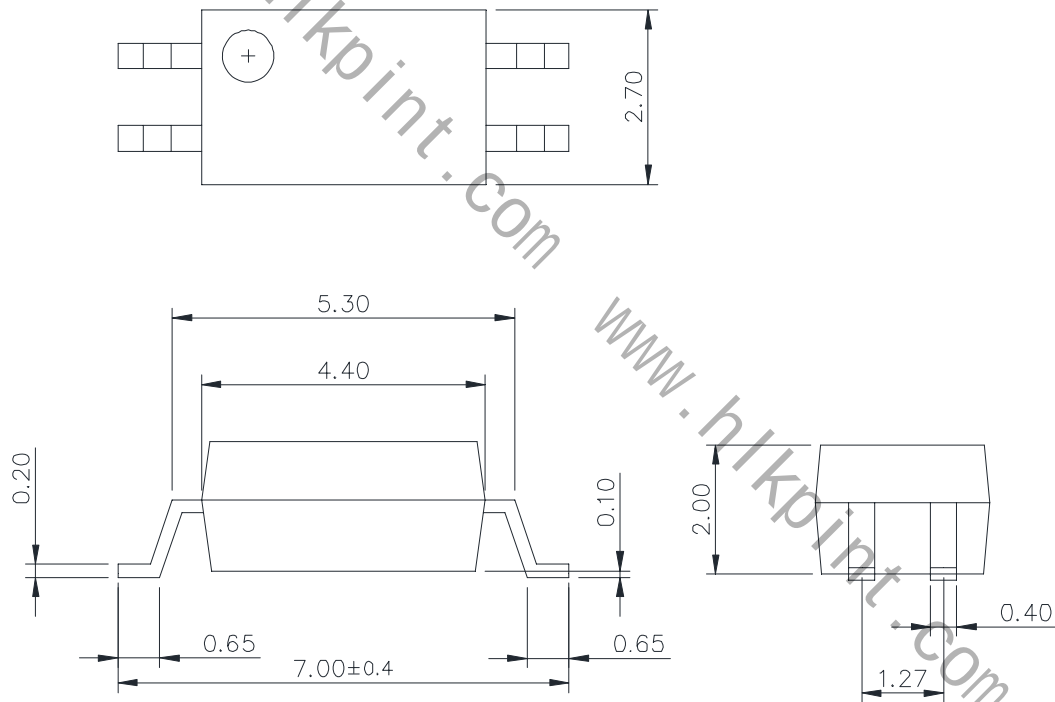
- Programmable logic controllers
- Measuring instruments
- Power supply
- Hybrid IC

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● Outside Dimension

Unit : mm



TOLERANCE: ±0.2mm

● Device Marking



Notes:

2801

YWW

Y: Year code / WW: Week code

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Absolute Maximum Ratings

(Ta=25°C)

Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	50	mA
	Peak forward current(*1)	I_{FP}	1	A
	Reverse voltage	V_R	6	V
	Power dissipation	P_D	60	mW
	Power dissipation derating	$P_D/^\circ\text{C}$	0.6	mW/°C
Output	Collector-Emitter voltage	V_{CEO}	80	V
	Emitter-Collector voltage	V_{ECO}	6	V
	Collector current	I_C	50	mA
	Collector power dissipation	P_C	160	mW
	Collector power dissipation derating	$P_C/^\circ\text{C}$	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

*1 PW=100μs,Duty Cycle=1%.

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

Electro-optical Characteristics

(Ta=25°C)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input	Forward voltage	V_F	$I_F=5\text{mA}$	-	1.1	1.4	V
	Reverse current	I_R	$V_R=5\text{V}$	-	-	5	μA
	Terminal capacitance	C_t	$V=0, f=1\text{MHz}$	-	60	-	pF
Output	Collector dark current	I_{CEO}	$V_{CE}=80\text{V}, I_F=0\text{mA}$	-	-	100	nA
Transfer characteristics	Current transfer ratio	CTR	$I_F=5\text{mA}, V_{CE}=5\text{V}$	50	-	600	%
			$I_F=1\text{mA}, V_{CE}=5\text{V}$	15	-	-	%
	Collector-Emitter saturation voltage	$V_{CE(sat)}$	$I_F=10\text{mA}, I_C=2\text{mA}$	-	0.1	0.3	V
	Isolation resistance	Riso	DC500V	5×10^{10}	10^{11}	-	Ω
	Floating capacitance	C_f	$V=0, f=1\text{MHz}$	-	0.4	-	pF
	Response time (Rise)(*3)	t_r	$V_{CE}=5\text{V}, I_C=2\text{mA}, R_L=100\Omega$	-	3	18	μs
	Response time (Fall) (*3)	t_f		-	5	18	μs

*3 Test Circuit for Switching Time

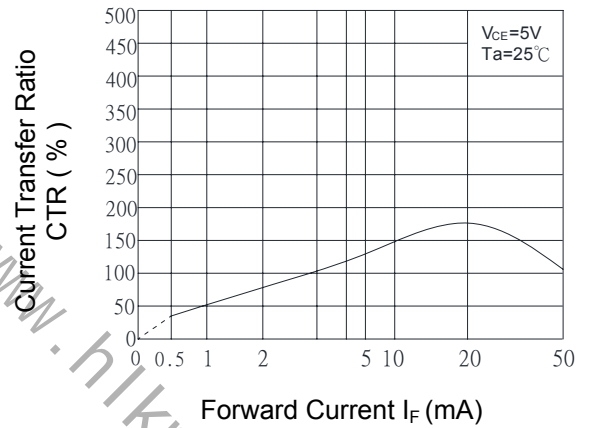
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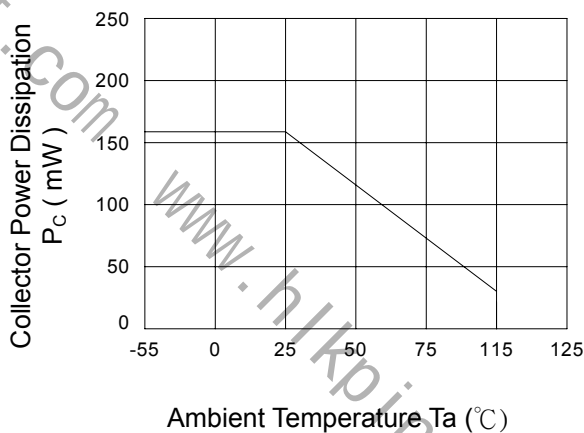
Classification table of current transfer ratio is shown below.

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

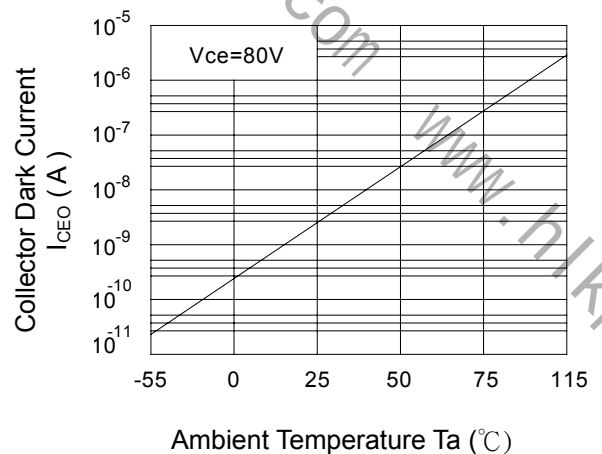
**Fig.1 Current Transfer Ratio
vs. Forward Current**



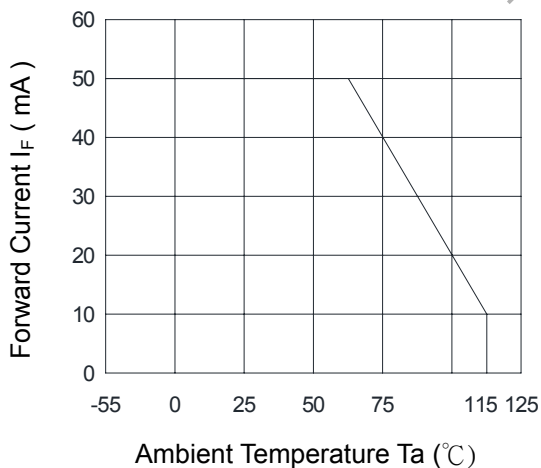
**Fig.2 Collector Power Dissipation
vs. Ambient Temperature**



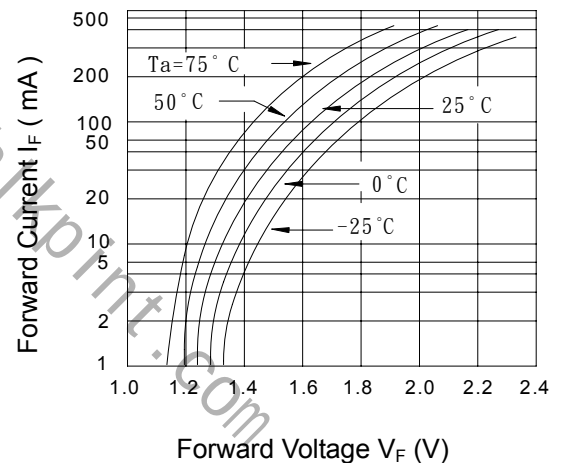
**Fig.3 Collector Dark Current
vs. Ambient Temperature**



**Fig.4 Forward Current
vs. Ambient Temperature**



**Fig.5 Forward Current
vs. Forward Voltage**



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Fig.6 Collector Current vs. Collector-Emitter Voltage

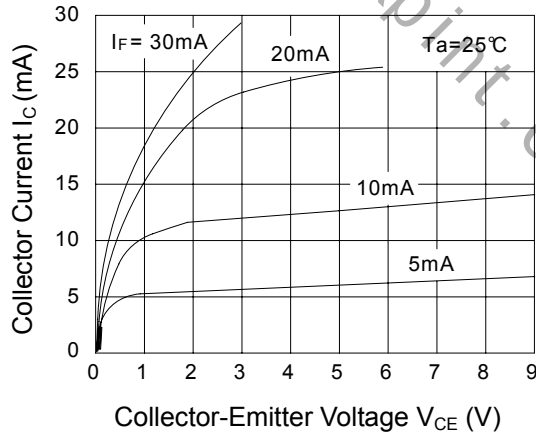


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

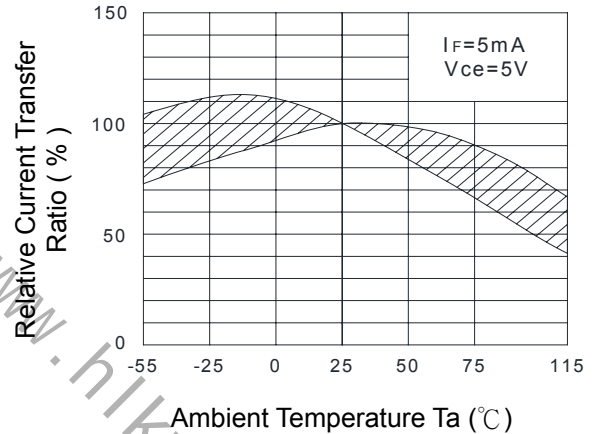


Fig.8 Collector-Emitter Saturation Voltage vs. Ambient Temperature

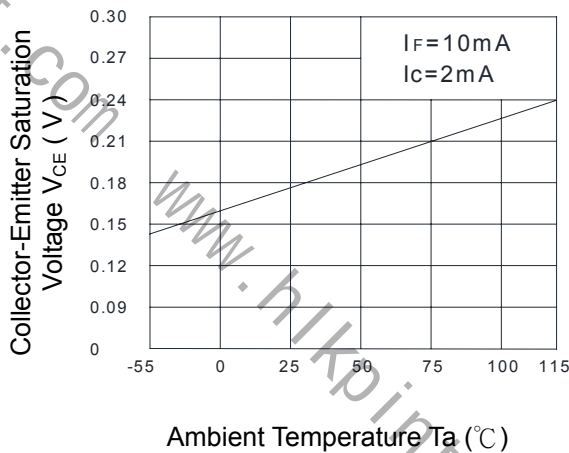


Fig.9 Collector-Emitter Saturation Voltage vs. Forward Current

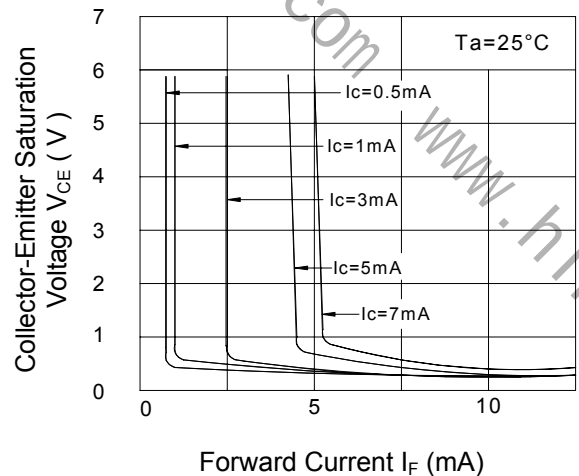


Fig.10 Response Time (Rise) vs. Load Resistance

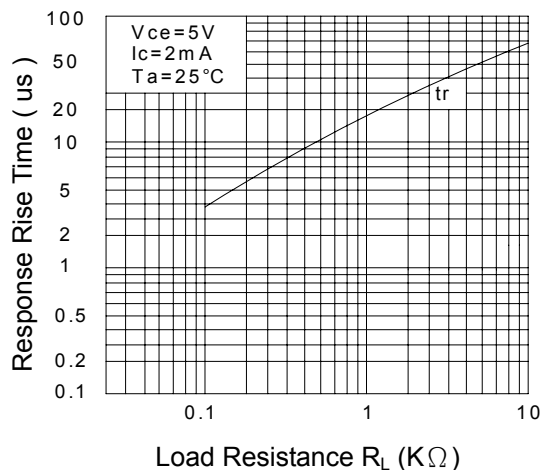
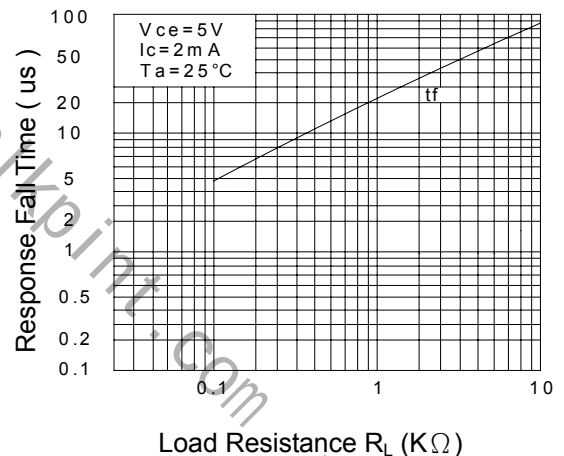


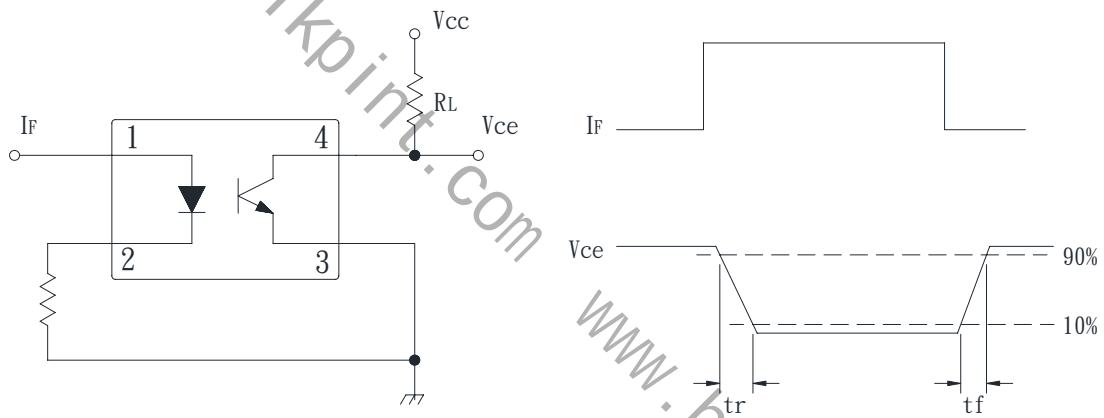
Fig.11 Response Time (Fall) vs. Load Resistance



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● Test Circuit for Response Time

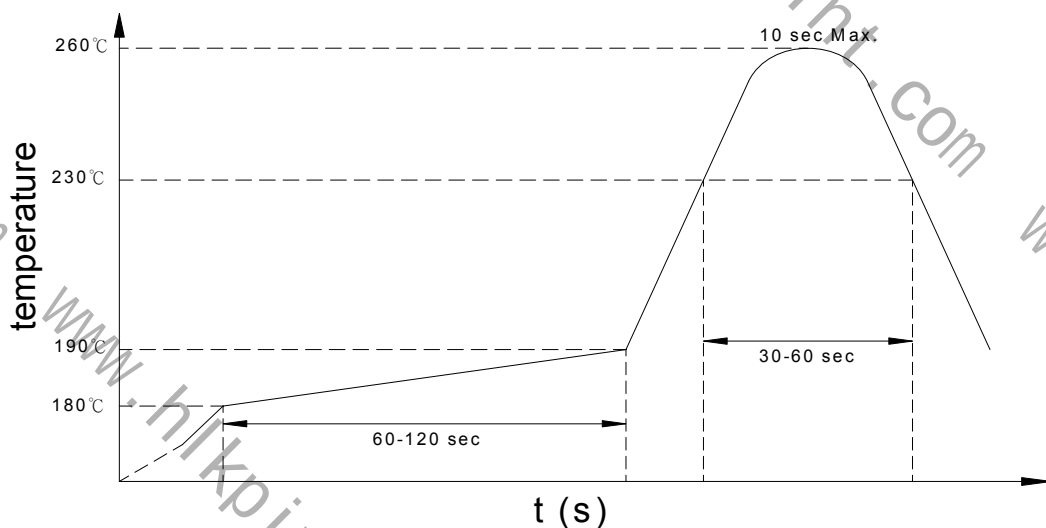


● **Recommended Soldering Conditions**

(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.

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● Numbering System

KPS2801 Y (Z)

Notes:

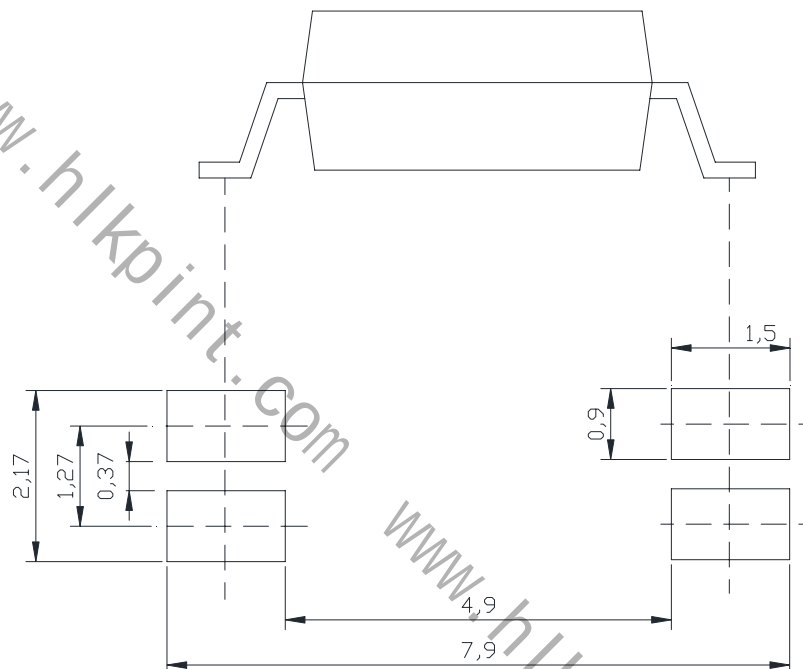
KPS2801 = Part No.

Y = CTR rank option (A ~ 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

- **4-pin SSOP Carrier Tape & Reel**

