**KPC815 Series**
**4PIN PHOTODARLINGTON PHOTOCOUPLER**

- **Description**
  The KPC815 series consist of an infrared-emitting diode in a 4-pin DIP package and available in wide-lead spacing and SMD option. The input-output isolation voltage is rated at 5000 Vrms.

- **Features**
  1. High current transfer ratio
     (CTR: Min. 600% at \( I_F = 1mA \), \( V_{CE} = 2V \))
  2. High isolation voltage between input and output
     (Viso: 5000Vrms)
  3. Compact dual-in-line package
  4. Pb free and RoHS compliant
  5. MSL class 1
  6. Agency Approvals
     • UL Approved (No. E169586): UL1577
     • c-UL Approved (No. E169586)
     • VDE Approved (No. 40005500): DIN EN60747-5-5
     • FIMKO Approved: EN60065, EN60950
     • CQC Approved: GB8898-2011, GB4943.1-2011

- **Applications**
  • System appliances, measuring instruments
  • Industrial robots
  • Copiers, automatic vending machines, facsimiles
  • Signal transmission between circuits of different potentials and impedances

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**Schematic**

1. Anode
2. Cathode
3. Emitter
4. Collector
KPC815 Series
4PIN PHOTODARLINGTON PHOTOCOUPLER

● Outside Dimension

Unit: mm

1. Dual-in-line type.

2. Surface mount type.

3. Long creepage distance type

4. Long creepage distance for surface mount type.

TOLERANCE: ±0.2mm

● Device Marking

Notes:

cosmo 815
YWW Y: Year code / WW: Week code
## Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forward current</td>
<td>( I_F )</td>
<td>50</td>
<td>mA</td>
</tr>
<tr>
<td>Peak forward current</td>
<td>( I_{FM} )</td>
<td>1</td>
<td>A</td>
</tr>
<tr>
<td>Reverse voltage</td>
<td>( V_R )</td>
<td>6</td>
<td>V</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>( P_D )</td>
<td>70</td>
<td>mW</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collector-emitter voltage</td>
<td>( V_{CEO} )</td>
<td>35</td>
<td>V</td>
</tr>
<tr>
<td>Emitter-collector voltage</td>
<td>( V_{ECO} )</td>
<td>6</td>
<td>V</td>
</tr>
<tr>
<td>Collector current</td>
<td>( I_C )</td>
<td>80</td>
<td>mA</td>
</tr>
<tr>
<td>Collector power dissipation</td>
<td>( P_C )</td>
<td>150</td>
<td>mW</td>
</tr>
<tr>
<td>Total power dissipation</td>
<td>( P_{tot} )</td>
<td>200</td>
<td>mW</td>
</tr>
<tr>
<td>Isolation voltage 1 minute</td>
<td>( V_{iso} )</td>
<td>5000</td>
<td>Vrms</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>( T_{opr} )</td>
<td>-55 to +115</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>( T_{stg} )</td>
<td>-55 to +125</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering temperature 10 seconds</td>
<td>( T_{sol} )</td>
<td>260</td>
<td>°C</td>
</tr>
</tbody>
</table>

## Electro-optical Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forward voltage</td>
<td>( V_F )</td>
<td>( I_F=20,mA )</td>
<td>-</td>
<td>1.2</td>
<td>1.4</td>
<td>V</td>
</tr>
<tr>
<td>Peak forward voltage</td>
<td>( V_{FM} )</td>
<td>( I_{FM}=0.5A )</td>
<td>-</td>
<td>-</td>
<td>3.5</td>
<td>V</td>
</tr>
<tr>
<td>Reverse current</td>
<td>( I_R )</td>
<td>( V_R=4V )</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>( \mu )A</td>
</tr>
<tr>
<td>Terminal capacitance</td>
<td>( C_t )</td>
<td>( V=0, f=1,kHz )</td>
<td>-</td>
<td>30</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>Collector dark current</td>
<td>( I_{CEO} )</td>
<td>( V_{CE}=10V, I_F=0 )</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>( \mu )A</td>
</tr>
<tr>
<td>Output</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collector dark current</td>
<td>( I_{CEO} )</td>
<td>( V_{CE}=10V, I_F=0 )</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>V</td>
</tr>
<tr>
<td>Current transfer ratio</td>
<td>( CTR )</td>
<td>( I_F=1mA, V_{CE}=2V )</td>
<td>600</td>
<td>-</td>
<td>7500</td>
<td>%</td>
</tr>
<tr>
<td>Collector-emitter saturation</td>
<td>( V_{CE(sat)} )</td>
<td>( I_F=80mA, I_C=2mA )</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
<td>V</td>
</tr>
<tr>
<td>Isolation resistance</td>
<td>( R_{iso} )</td>
<td>DC500V</td>
<td>( 5\times10^{10} )</td>
<td>-</td>
<td>-</td>
<td>Ω</td>
</tr>
<tr>
<td>Floating capacitance</td>
<td>( C_f )</td>
<td>( V=0, f=1,MHz )</td>
<td>-</td>
<td>0.6</td>
<td>1.0</td>
<td>pF</td>
</tr>
<tr>
<td>Cut-off frequency</td>
<td>( f_C )</td>
<td>( V_{CC}=5V, I_C=2mA, R_L=100,\Omega )</td>
<td>-</td>
<td>7</td>
<td>-</td>
<td>kHz</td>
</tr>
<tr>
<td>Response time (Rise)</td>
<td>( t_r )</td>
<td>( V_{CE}=10V, I_C=50mA, R_L=100,\Omega )</td>
<td>-</td>
<td>5</td>
<td>40</td>
<td>( \mu )s</td>
</tr>
<tr>
<td>Response time (Fall)</td>
<td>( t_f )</td>
<td>( R_L=100,\Omega )</td>
<td>-</td>
<td>60</td>
<td>100</td>
<td>( \mu )s</td>
</tr>
</tbody>
</table>
Classification table of current transfer ratio is shown below.

<table>
<thead>
<tr>
<th>KPC815 Model No.</th>
<th>CTR (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KPC815 E</td>
<td>600 ~ 7500</td>
</tr>
</tbody>
</table>

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
**KPC815 Series**
**4PIN PHOTODARLINGTON PHOTOCOUPLER**

**Fig.6 Collector Current vs. Collector-Emitter Voltage**

**Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature**

**Fig.8 Collector-Emitter Saturation Voltage vs. Forward Current**

**Fig.9 Collector-Emitter Saturation Voltage vs. Ambient Temperature**

**Fig.10 Response Time vs. Load Resistance**
- 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.)

(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.
Numbering System

KPC815 X Y (Z)

Notes:
KPC815 = Part No.
X = Lead form option (0,S,H,L)
Y = CTR rank (E)
Z = Tape and reel option (TLD, TRU)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Packing quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>S (TLD)</td>
<td>surface mount type package + TLD tape &amp; reel option</td>
<td>2000 units per reel</td>
</tr>
<tr>
<td>S (TRU)</td>
<td>surface mount type package + TRU tape &amp; reel option</td>
<td>2000 units per reel</td>
</tr>
<tr>
<td>L (TLD)</td>
<td>long creepage distance for surface mount type package + TLD tape &amp; reel option</td>
<td>2000 units per reel</td>
</tr>
<tr>
<td>L (TRU)</td>
<td>long creepage distance for surface mount type package + TRU tape &amp; reel option</td>
<td>2000 units per reel</td>
</tr>
</tbody>
</table>

Recommended Pad Layout for Surface Mount Lead Form

1. Surface mount type.
   4 pin SMD

2. Long creepage distance for surface mount type.
   4 pin L

Unit: mm
KPC815 Series
4PIN PHOTODARLINGTON PHOTOCOUPLER

- 4-pin SMD Carrier Tape & Reel

TOLERANCE : ±0.2mm

Direction of feed from reel

Cosmo Electronics Corp.
Document No. 69P20004.3
http://www.cosmo-ic.com
KPC815 Series
4PIN PHOTODARLINGTON PHOTOCOUPLER

- 4-pin L Carrier Tape & Reel

TOLERANCE: ±0.2mm

Direction of feed from reel

Direction of feed from reel
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