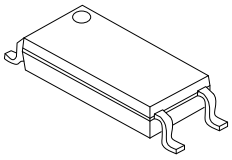
# 4 PIN LSOP PHOTOTRANSISTOR PHOTOCOUPLER



LSOP-4

## ■ DESCRIPTION

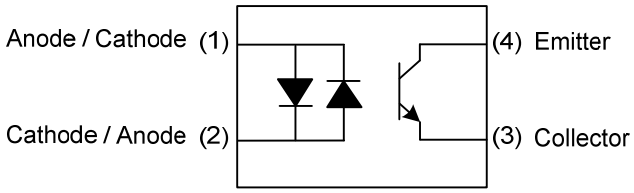
The UTC **UPC814** is a 4 pin phototransistor photocoupler, it uses UTC's advanced technology to provide the customers with high isolation voltage between input and output, etc.

The UTC **UPC814** is suitable for programmable controllers and telecommunication equipments, etc.

## ■ FEATURES

* Current transfer ratio (CTR: MIN. 20% at $I_F$=±1mA, $V_{CE}$=5V)
* High input-output isolation voltage ($V_{ISO}$=5,000Vrms)
* Response time ($t_r$: MAX. 18μs at $V_{CE}$=2V, $I_C$=2mA, $R_L$=1000Ω)
* Low collector dark current ($I_{CEO}$: MAX.$10^{-7}$A at $V_{CE}$=20V)
* AC input response
* Green Package

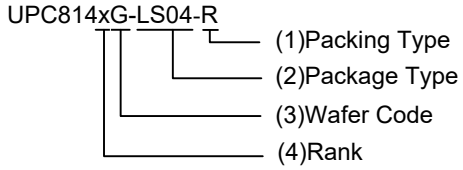
## ■ SYMBOL




## ■ ORDERING INFORMATION

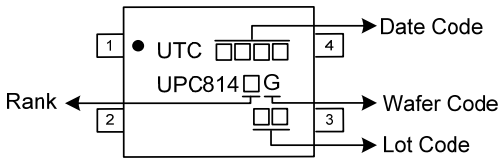
| Ordering Number | Package | Pin Assignment | | | | Packing |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | |
| UPC814G-LS04-R | LSOP-4 | A / K | K / A | C | E | Tape Reel |
| UPC814xG-LS04-R | LSOP-4 | A / K | K / A | C | E | Tape Reel |

Note: Pin Assignment: A: Anode K: Cathode E: Emitter C: Collector




(1) R: Tape Reel
(2) LS04: LSOP-4
(3) Wafer Code
(4) Refer to TRANSFER CHARACTERISTICS

■ MARKING



## ■ ABSOLUTE MAXIMUM RATING ($T_A$=25°C, unless otherwise specified)

| PARAMETER | | SYMBOL | RATINGS | UNIT |
|---|---|---|---|---|
| Input | Forward Current | $I_F$ | ±60 | mA |
| | Power Dissipation | $P_D$ | 100 | mW |
| 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 |
| Total Power Dissipation | | $P_{tot}$ | 200 | mW |
| Isolation Voltage (Note 2) | | $V_{ISO}$ | 5000 | Vrms |
| Operating Temperature | | $T_{OPR}$ | -30 ~ +110 | °C |
| Storage Temperature | | $T_{STG}$ | -55 ~ +125 | °C |

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. AC for 1 minute, R.H. = 40~60%.
   Isolation voltage shall be measured using the following method.
   (1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side.
   (2) The isolation voltage tester with zero-cross circuit shall be used.
   (3) The waveform of applied voltage shall be a sine wave.

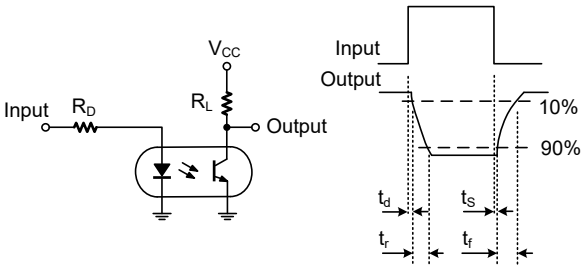
## ■ ELECTRICAL CHARACTERISTICS ($T_A$=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **INPUT** | | | | | | |
| Forward Voltage | $V_F$ | $I_F$=±20mA | | | 1.4 | V |
| Input Capacitance | $C_{IN}$ | V=0, f=1kHz | | | 250 | pF |
| **OUTPUT** | | | | | | |
| Collector-Emitter Dark Current | $I_{CEO}$ | $V_{CE}$=20V, $I_F$=0 | | | 100 | nA |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | $I_C$=0.1mA, $I_F$=0 | 80 | | | V |
| Emitter-Collector Breakdown Voltage | $BV_{ECO}$ | $I_E$=10μA, $I_F$=0 | 6 | | | V |

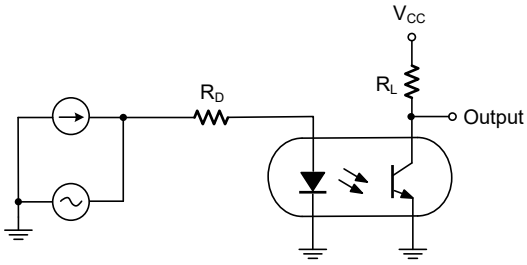
## ■ TRANSFER CHARACTERISTICS ($T_A$=25°C, unless otherwise specified)

| PARAMETER | SYMBOL | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| Collector Current | $I_C$ | $I_F$=±1mA,$V_{CE}$=5V | | 0.2 | | 3.0 | mA |
| Current Transfer Ratio | CTR | $I_F$=±1mA<br>$V_{CE}$=5V | UPC814 | 20 | | 300 | % |
| | | | UPC814A | 50 | | 150 | % |
| | | | UPC814B | 100 | | 300 | % |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_F$=±20mA , $I_C$=1mA | | | | 0.2 | V |
| Isolation Resistance | $R_{IO}$ | $V_{IO}$=500Vdc, 40~60% R.H. | | $5\times10^{10}$ | | | Ω |
| Rise Time | $t_r$ | $V_{CE}$=2V, $I_C$=2mA, $R_L$=1000Ω | | | | 18 | μs |
| Fall Time | $t_f$ | | | | | 18 | μs |

## ■ TEST CIRCUITS AND WAVEFORMS




**Test Circuit for Response Time**




**Test Circuit for Frequency Response**