Elektronische Bauelemente

# BL814

**0.05A , 80V , 150mW**

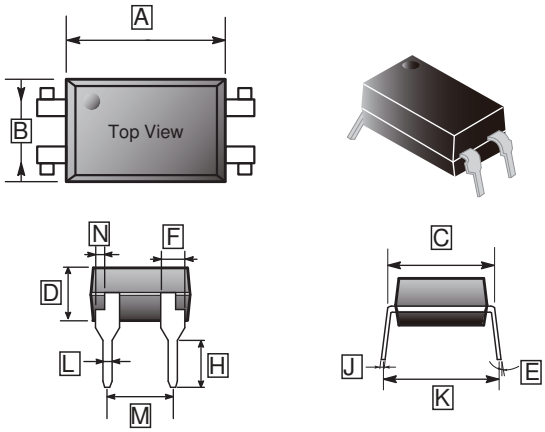
**4 Pin DIP Phototransistor Photocoupler**

RoHS Compliant Product
A suffix of "-C" specifies halogen & lead-free

## DESCRIPTION

The BL814 series of devices each consist of an infrared Emitting diodes, optically coupled to a phototransistor detector. They are packaged in a 4-pin DIP package and available in Wide-lead spacing and SMD option.

**DIP4**




## FEATURES

- Current transfer ratio
  （CTR：20%-300% at $I_F$=1mA,$V_{CE}$=5V）
- High isolation voltage between input and output (Viso = 5000V rms)
- Creepage distance > 7.62mm
- UL/CUL Approved (File No. E340048)

## 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

| REF. | Millimeter | | REF. | Millimeter | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min.. | Max |
| A | 6.30 | 6.70 | H | 2.60 | 3.00 |
| B | 4.40 | 4.80 | J | 0.20 | 0.30 |
| C | 7.9 | 8.3 | K | 8.65 | 9.35 |
| D | 3.20 | 3.75 | L | 0.50 TYP. | |
| E | 2° | 8° | M | 2.40 | 2.70 |
| F | 1.25 TYP. | | N | 0.40 TYP. | |

## ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25℃ unless otherwise specified)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Input | Forward Current | $I_F$ | ±50 | mA |
| | Peak forward current(t=10us) | $I_{FM}$ | 1 | A |
| | Power dissipation | $P_D$ | 70 | mW |
| | Derating factor(above 100℃) | | 2.9 | mW / ℃ |
| Output | Collector-Emitter Voltage | $V_{CEO}$ | 80 | V |
| | Emitter-Collector Voltage | $V_{ECO}$ | 6 | |
| | Power dissipation | $P_C$ | 150 | mW |
| | Derating factor(above 100℃) | | 5.8 | mW / ℃ |
| Total Power Dissipation | | $P_{tot}$ | 200 | mW |
| Isolation Voltage [1] | | $V_{iso}$ | 5000 | V rms |
| Operating Temperature | | $T_{opr}$ | -55~110 | ℃ |
| Storage Temperature | | $T_{stg}$ | -55~125 | |
| Soldering Temperature [2] | | $T_{sol}$ | 260 | |

Note：

1. AC for 1 minute, R.H.=40~60% R.H. In this test, pins 1&2 are shorted together , and pins 3&4 are shorted together.
2. For 10 Seconds.

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25℃ unless otherwise specified)

| Parameter | | | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|---|---|
| Input | Forward Voltage | | $V_F$ | - | 1.2 | 1.4 | V | $I_F$=±20mA |
| | Input capacitance | | $C_{in}$ | - | 50 | 250 | pF | V=0, f=1KHz |
| Output | Collector Dark Current | | $I_{CEO}$ | - | - | 100 | nA | $V_{CE}$=20V, $I_F$=0 |
| | Collector-Emitter Breakdown Voltage | | $BV_{CEO}$ | 80 | - | - | V | $I_C$=0.1mA |
| | Emitter-Collector Breakdown Voltage | | $BV_{ECO}$ | 6 | - | - | V | $I_E$=0.1mA |
| Transfer Characteristics | Current Transfer Ratio | BL814 | CTR | 20 | - | 300 | % | $V_{CE}$=5V, $I_F$=±1mA |
| | | BL814A | | 50 | - | 150 | | |
| | Collector-Emitter Saturation Voltage | | $V_{CE(sat)}$ | - | 0.05 | 0.2 | V | $I_F$=±20mA, $I_C$=1mA |
| | Isolation Resistance | | $R_{IO}$ | $5x10^{10}$ | $10^{11}$ | - | Ω | $V_{IO}$=500Vdc, 40~60%R.H. |
| | Floating Capacitance | | $C_{IO}$ | - | 0.6 | 1 | pF | $V_{IO}$=0, f=1MHz |
| | Cut-Off Frequency | | $f_C$ | - | 80 | - | KHz | $V_{CE}$=5V, $I_C$=2mA, $R_L$=100Ω, -3dB |
| | Response Time(Rise) | | $t_r$ | - | 7 | 18 | μs | $V_{CE}$=2V, $I_C$=2mA, $R_L$=100Ω |
| | Response Time(Fall) | | $t_f$ | - | 11 | 18 | μs | |

## CHARACTERISTIC CURVE

Fig.1 Forword Current vs. Ambient Temperatute

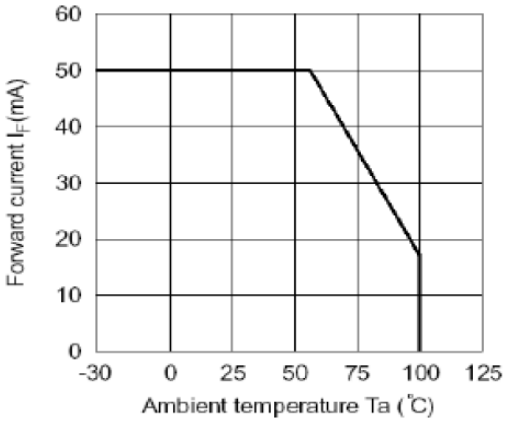



Fig.2 Collector Power Dissipation vs. Ambient Temperature

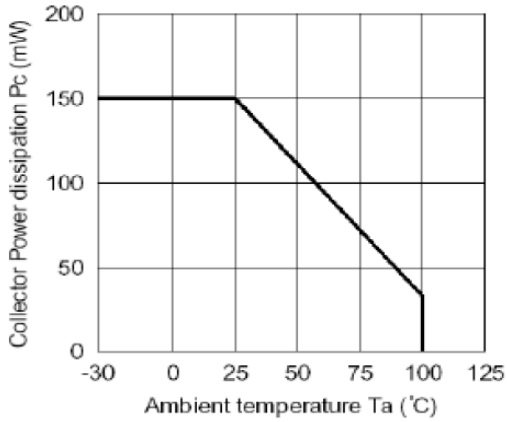



Fig.3 Collector-emitter Saturation Voltage vs. Forward Current

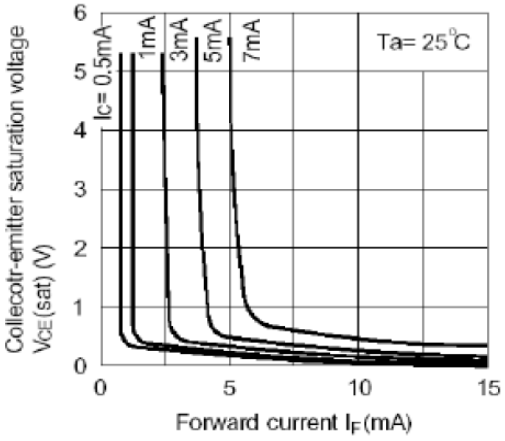



Fig.4 Forward Current vs. Forward Voltage

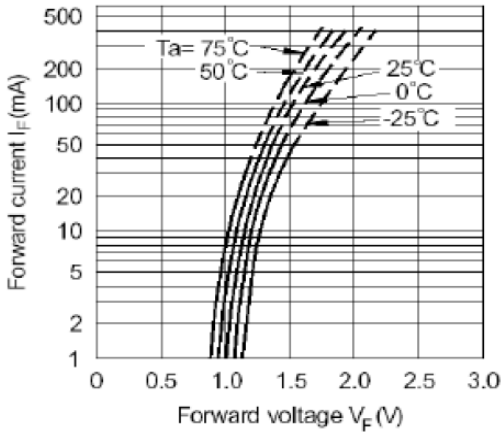



Fig.5 Current Transfer Ratio vs. Forward Current

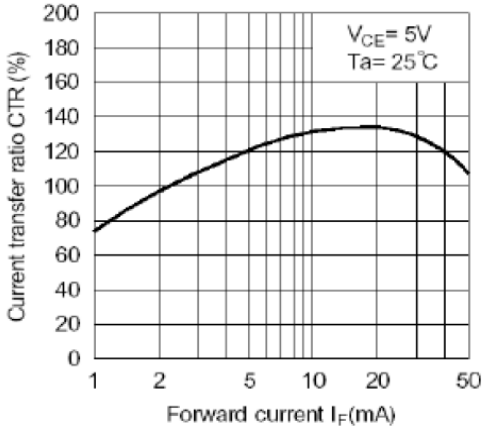
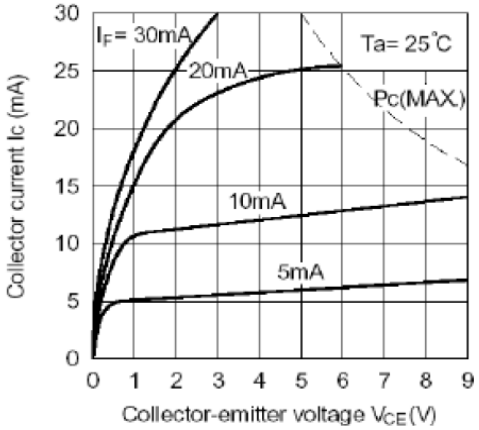



Fig.6 Collector Current vs. Collector-emitter Voltage



## CHARACTERISTIC CURVE

Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature

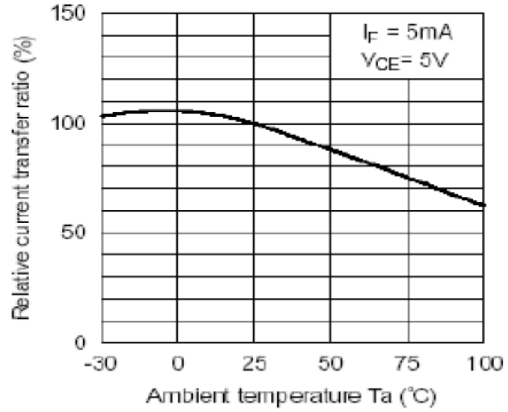



Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

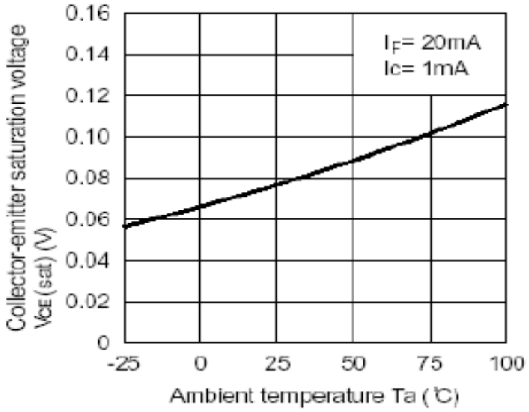



Fig.9 Collector Dark Current vs. Ambient Temperature

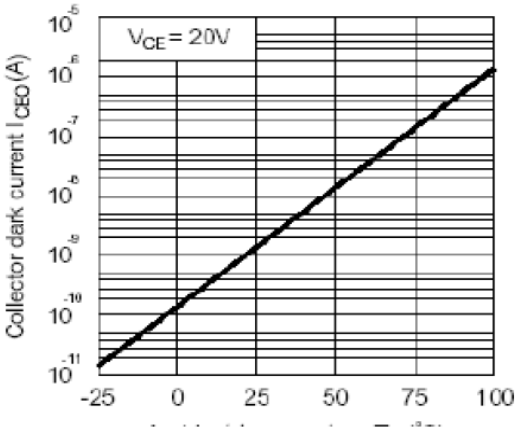



Fig.10 Response Time vs. Load Resistance

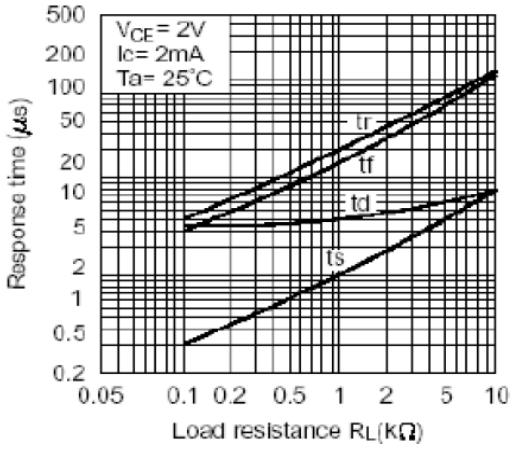
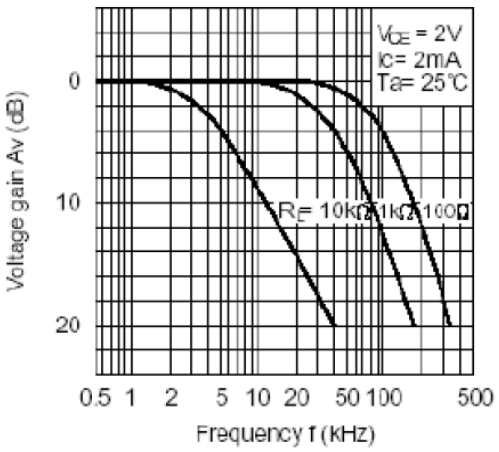
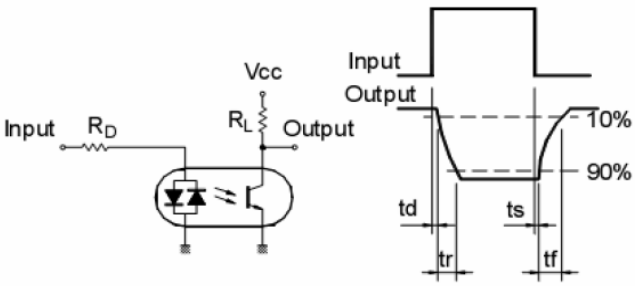



Fig.11 Frequency Response




Test Circuit for Response Time




Test Circuit for Frequency Response