

PS2603, PS2604, PS2603L, PS2604L

HIGH ISOLATION VOLTAGE DARLINGTON
TRANSISTOR TYPE 6 PIN PHOTOCOUPLER

— NEPOC Series —

DESCRIPTION

PS2603, PS2604 and PS2603L, PS2604L are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon darlington-connected phototransistor.

PS2603, PS2604 are in a plastic DIP (Dual In-line Package).

PS2603L, PS2604L are lead bending type (Gull-wing) for surface mount.

PS2603, PS2603L have base pin and PS2604, PS2604L have no base pin.

FEATURES

- High isolation voltage (BV: 5 kV_{r.m.s.} MIN.)
- High speed switching ($t_r, t_f = 100 \mu s$ TYP.)
- Ultra High current transfer ratio (CTR: 2 000 % TYP.)
- UL recognized [File No. E72422(S)]
- Taping product name (PS2603L-E3, E4, PS2604L-E3, E4)

APPLICATIONS

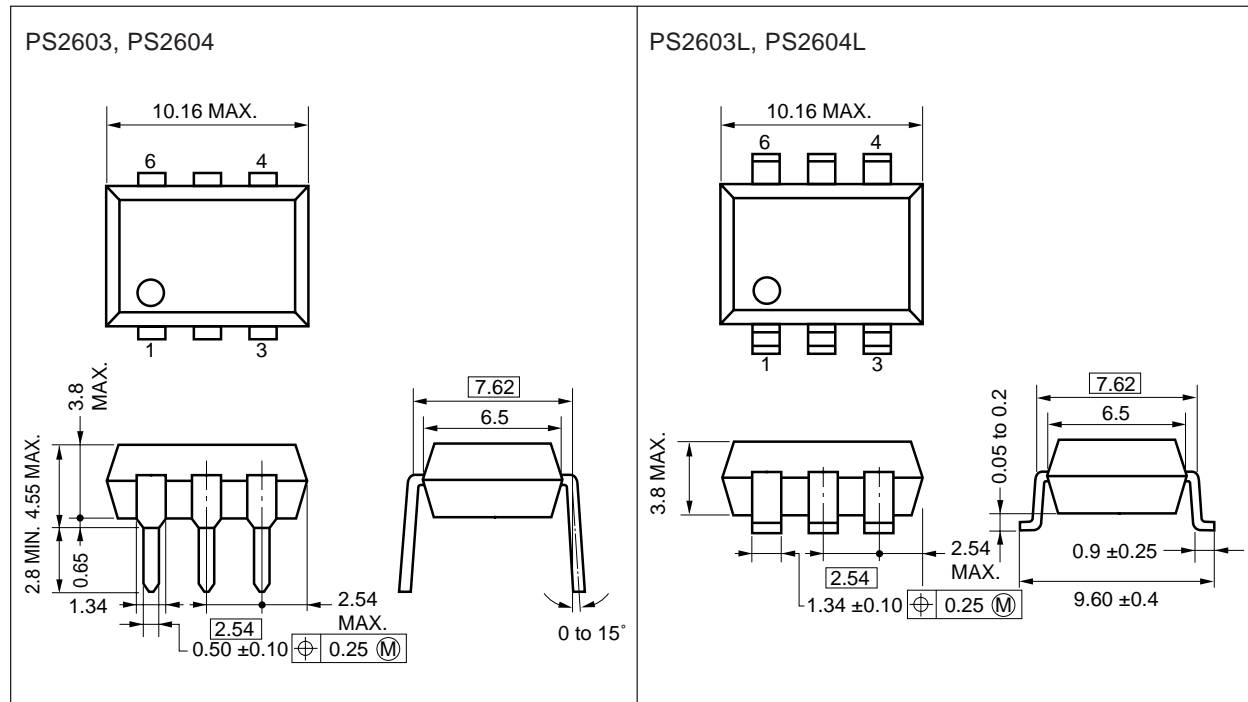
Interface circuit for various instrumentations, control equipments.

- AC Line/Digital Logic Isolate high voltage transient
- Digital Logic/Digital Logic Eliminate spurious ground loops
- Twisted pair line receiver Eliminate ground loop pick-up
- Telephone/Telegraph line receiver Isolate high voltage transient
- High Frequency Power Supply Feedback Control Maintain floating ground

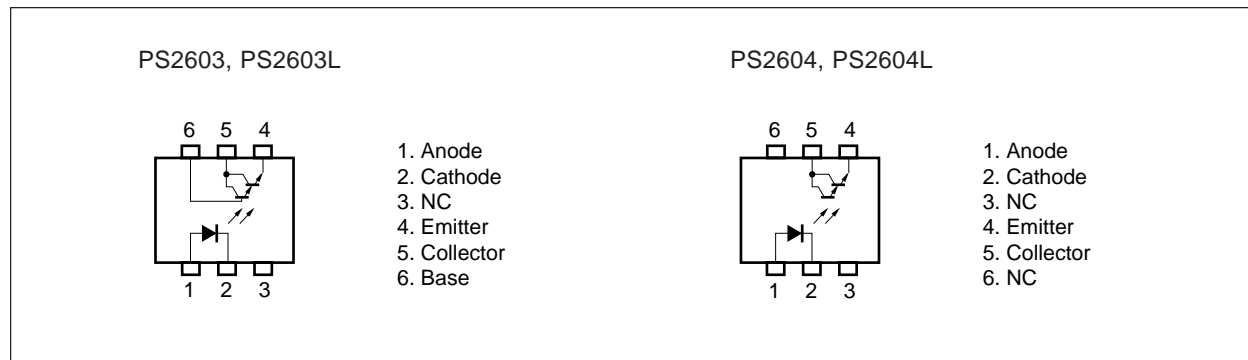
PACKAGE DIMENSIONS (in millimeters)

DIP (Dual In-line Package)

Lead Bending type (Gull-wing)



PIN CONNECTION (Top View)



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)**Diode**

| | | | |
|---|-----------------------------|-----|----------------------|
| Reverse Voltage | V_R | 6 | V |
| Forward Current (DC) | I_F | 80 | mA |
| Power Dissipation Derating | $\Delta P_D/^\circ\text{C}$ | 1.5 | mW/ $^\circ\text{C}$ |
| Power Dissipation | P_D | 150 | mW |
| Peak Forward Current | $I_{F(\text{Peak})}$ | 1 | A |
| (PW = 100 μs , Duty Cycle 1 %) | | | |

Transistor

| | | | |
|------------------------------|-----------------------------|-----|----------------------|
| Collector to Emitter Voltage | V_{CEO} | 40 | V |
| Emitter to Collector Voltage | V_{ECO} | 6 | V |
| Collector Current | I_C | 200 | mA |
| Power Dissipation Derating | $\Delta P_C/^\circ\text{C}$ | 2.0 | mW/ $^\circ\text{C}$ |
| Power Dissipation | P_C | 200 | mW |

Coupled

| | | | |
|-----------------------|-----------|-------------|------------------|
| Isolation Voltage *1) | BV | 5000 | $V_{r.m.s.}$ |
| Storage Temperature | T_{stg} | -55 to +150 | $^\circ\text{C}$ |
| Operating Temperature | T_{opt} | -55 to +100 | $^\circ\text{C}$ |

*1) AC voltage for 1 minute at $T_A = 25^\circ\text{C}$, RH = 60 % between input (Pin No. 1, 2, 3, Common) and output (Pin No. 4, 5, 6 Common).

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

| CHARACTERISTIC | | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|----------------|-----------------------------------|----------------------|-----------|------|------|---------------|--|
| Diode | Forward Voltage | V_F | | 1.1 | 1.4 | V | $I_F = 10\text{ mA}$ |
| | Reverse Current | I_R | | | 5 | μA | $V_R = 5\text{ V}$ |
| | Junction Capacitance | C_t | | 30 | | pF | $V = 0$, $f = 1.0\text{ MHz}$ |
| Transistor | Collector to Emitter Dark Current | I_{CEO} | | | 400 | nA | $V_{CE} = 40\text{ V}$, $I_F = 0$ |
| | DC Current Gain*2) | h_{FE} | | 180 | | | $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ |
| Coupled | Current Transfer Ratio*3) | CTR | 200 | 2000 | | % | $I_F = 1\text{ mA}$, $V_{CE} = 2\text{ V}$ |
| | Collector Saturation Voltage | $V_{CE(\text{sat})}$ | | | 1.0 | V | $I_F = 1\text{ mA}$, $I_C = 2\text{ mA}$ |
| | Isolation Resistance | R_{1-2} | 10^{11} | | | Ω | $V_{in-out} = 1.0\text{ kV}$ |
| | Isolation Capacitance | C_{1-2} | | 0.6 | | pF | $V = 0$, $f = 1.0\text{ MHz}$ |
| | Rise Time*4) | t_r | | 100 | | μs | $V_{CC} = 5\text{ V}$, $I_C = 10\text{ mA}$, $R_L = 100\text{ }\Omega$ |
| | Fall Time*4) | t_f | | 100 | | μs | $V_{CC} = 5\text{ V}$, $I_C = 10\text{ mA}$, $R_L = 100\text{ }\Omega$ |

*2) Second stage Transistor
(PS2603, PS2603L only)

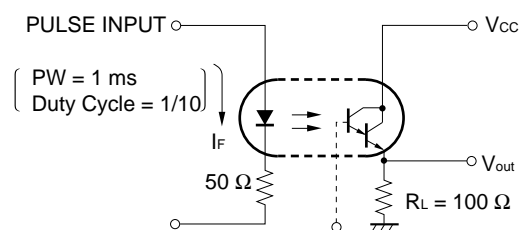
*3) CTR rank

K : 2000 to (%)

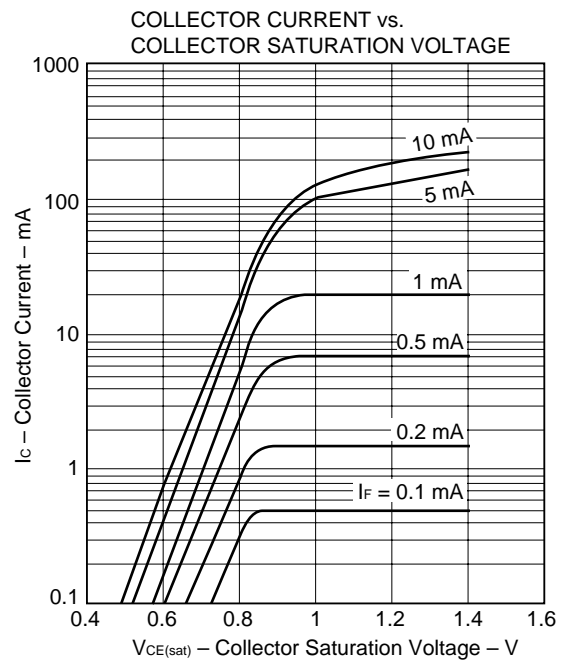
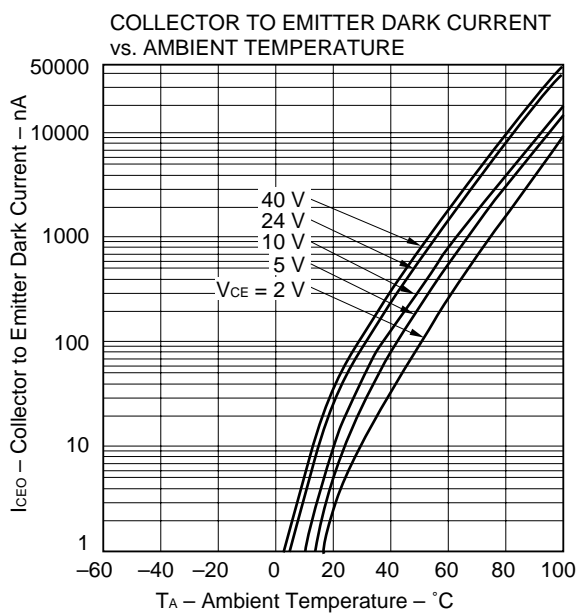
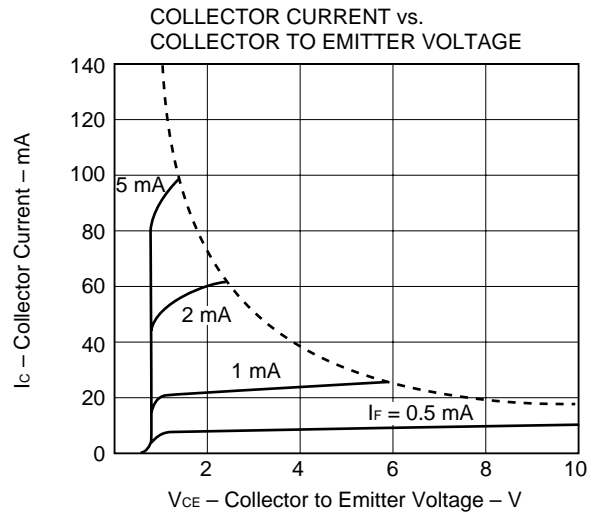
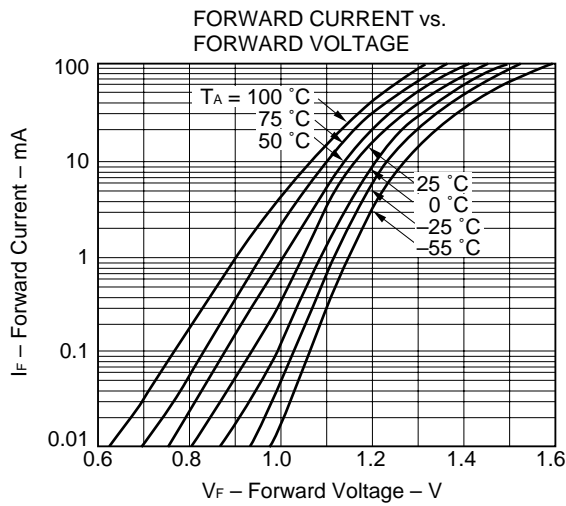
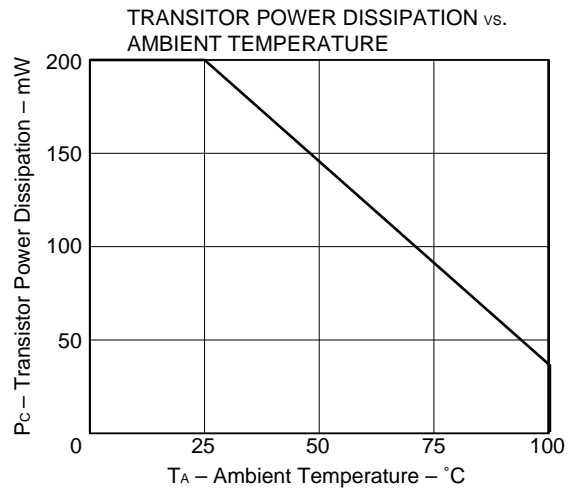
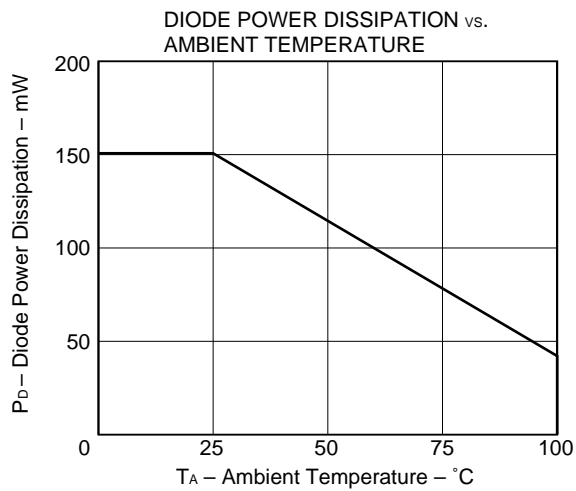
L : 700 to 3400 (%)

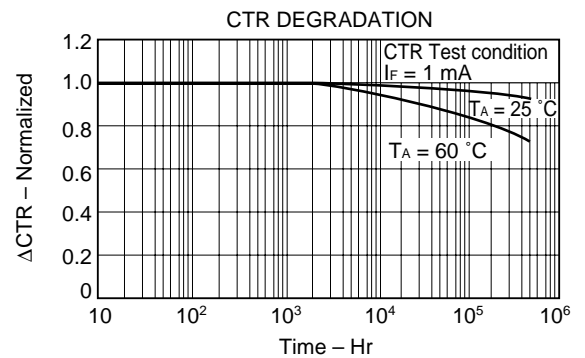
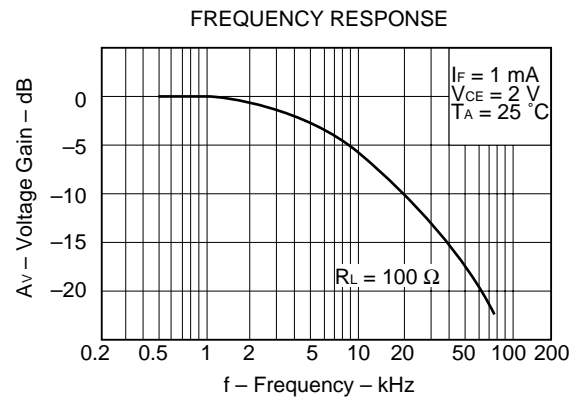
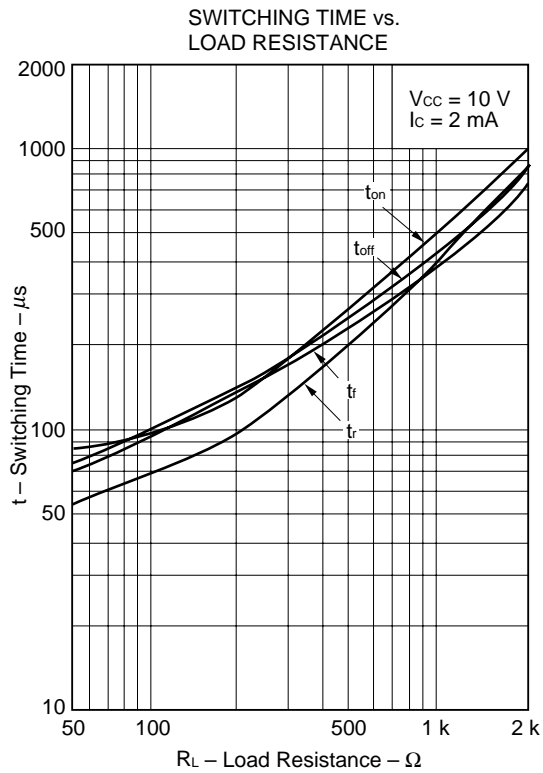
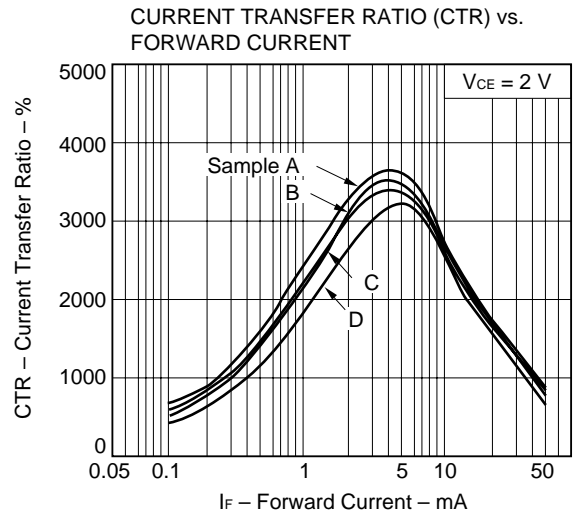
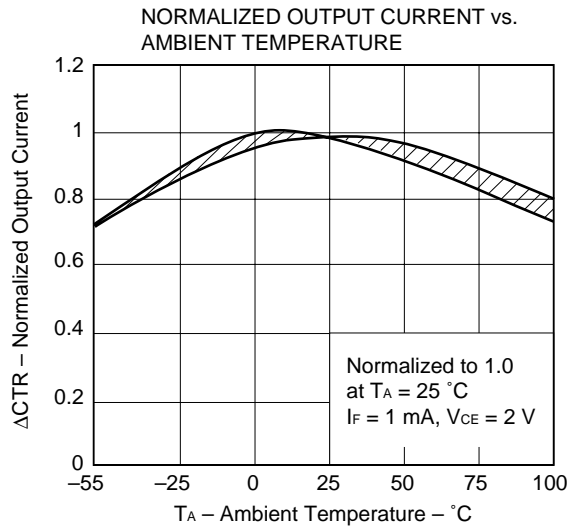
M : 200 to 1000 (%)

*4) Test Circuit for Switching Time



TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)





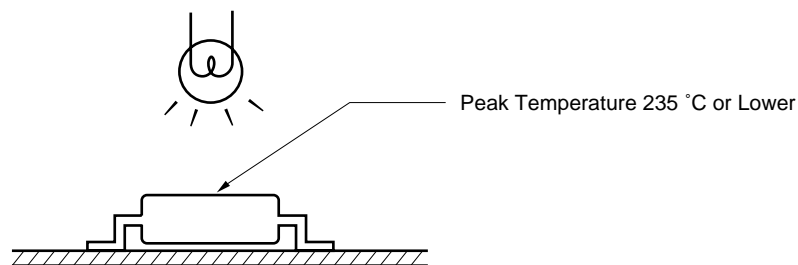
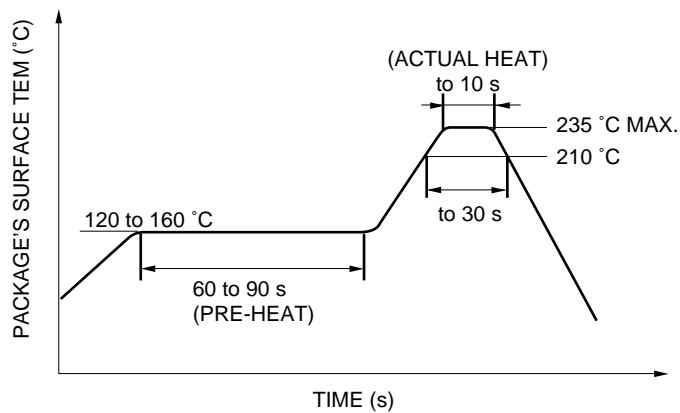
★ The measurement of TYPICAL CHARACTERISTICS are only for reference, not guaranteed.

SOLDERING PRECAUTION

(1) Infrared reflow soldering

- Peak reflow temperature : 235 °C or below (Plastic surface temperature)
- Reflow time : 30 seconds or less
(Time period during which the plastic surface temperature is 210 °C)
- Number of reflow processes : Three
- Flux : Rosin flux containing small amount of chlorine
(The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

INFRARED RAY REFLOW TEMPERATURE PROFILE



(2) Dip soldering

- Peak temperature : 260 °C or lower
- Time : 10 s or less
- Flux : Rosin-base flux

[MEMO]

Caution

The Great Care must be taken in dealing with the devices in this guide.

The reason is that the material of the devices is GaAs (Gallium Arsenide), which is designated as harmful substance according to the law concerned.

Keep the law concerned and so on, especially in case of removal.

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Anti-radioactive design is not implemented in this product.