

HIGH ISOLATION VOLTAGE, HIGH CTR
6-PIN PHOTOCOUPLER

–NEPOC™ Series–

DESCRIPTION

The PS2603, PS2604, PS2603L, PS2604L are optically coupled isolators containing a GaAs light emitting diode and an NPN silicon darlington-connected phototransistor in a plastic DIP (Dual In-line Package).

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

FEATURES

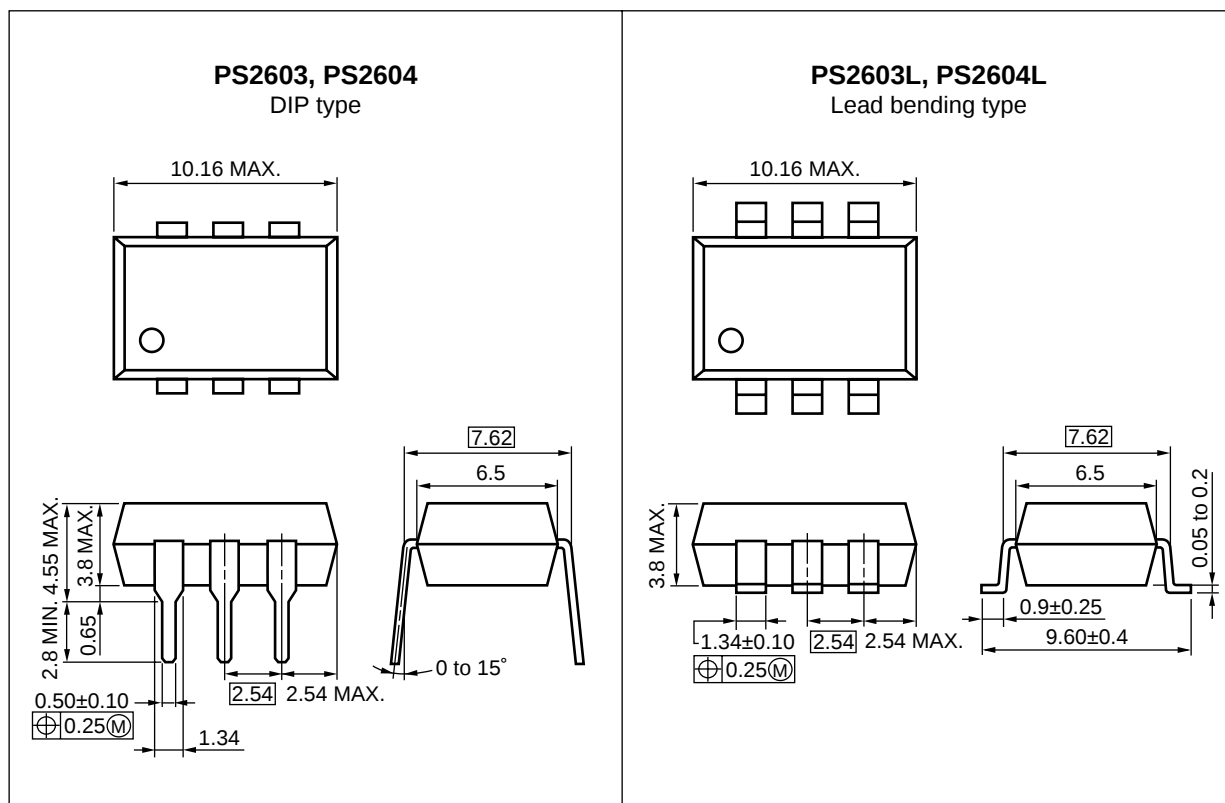
- High Isolation voltage ($BV = 5\,000\text{ V r.m.s.}$)
- High-speed switching ($t_r, t_f = 100\text{ }\mu\text{s TYP.}$)
- High current transfer ratio ($CTR = 2\,000\text{ \% TYP.}$)
- UL approved: File No. E72422 (S)
- Ordering number of taping product: PS2603L-E3, E4, PS2604L-E3, E4

★ APPLICATIONS

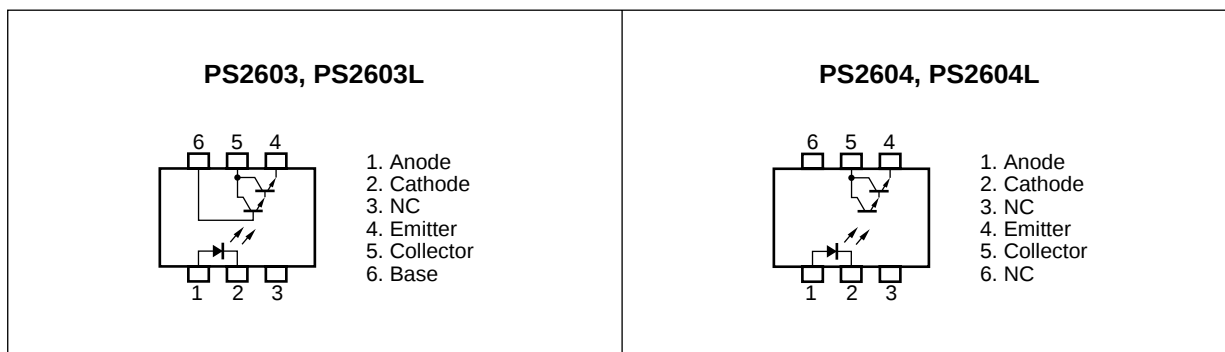
- Power supply
- Telephone
- AC/DC line interface
- Electric home appliances

The information in this document is subject to change without notice.

★ PACKAGE DIMENSIONS (in millimeters)



PIN CONNECTIONS (TOP VIEW)



ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Diode	Forward Current (DC)	I_F	80	mA
	Reverse Voltage	V_R	6.0	V
	Power Dissipation Derating	$\Delta P_D/^{\circ}\text{C}$	1.5	mW/ $^{\circ}\text{C}$
	Power Dissipation	P_D	150	mW
	Peak Forward Current ^{*1}	I_{FP}	1	A
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
Isolation Voltage ^{*2}		BV	5 000	Vr.m.s.
Operating Ambient Temperature		T_A	-55 to +100	$^{\circ}\text{C}$
Storage Temperature		T_{stg}	-55 to +150	$^{\circ}\text{C}$

***1** PW = 100 μs , Duty Cycle = 1 %

***2** AC voltage for 1 minute at $T_A = 25\text{ }^{\circ}\text{C}$, RH = 60 % between input and output

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V _F	I _F = 10 mA		1.1	1.4	V
	Reverse Current	I _R	V _R = 5 V			5.0	μA
	Terminal Capacitance	C _t	V = 0 V, f = 1.0 MHz		30		pF
Transistor	Collector to Emitter Dark Current	I _{CEO}	V _{CE} = 40 V, I _F = 0 mA			400	nA
	DC Current Gain ^{*1}	h _{FE}	I _C = 2 mA, V _{CE} = 5 V		180		
Coupled	Current Transfer Ratio (I _C /I _F) ^{*2}	CTR	I _F = 1 mA, V _{CE} = 2 V	200	2 000		%
	Collector Saturation Voltage	V _{CE (sat)}	I _F = 1 mA, I _C = 2 mA			1.0	V
	Isolation Resistance	R _{I-O}	V _{I-O} = 1.0 kV _{DC}	10 ¹¹			Ω
	Isolation Capacitance	C _{I-O}	V = 0 V, f = 1.0 MHz		0.6		pF
	Rise Time ^{*3}	t _r	V _{CC} = 5 V, I _C = 10 mA, R _L = 100 Ω		100		μs
	Fall Time ^{*3}	t _f			100		

***1** Second stage transistor (PS2603, PS2603L only)

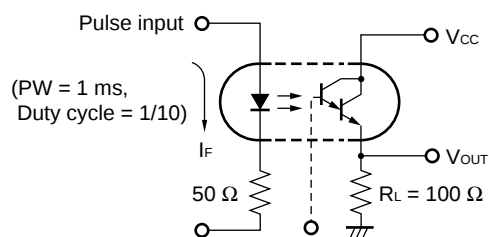
***2** CTR rank

K : 2 000 to (%)

L : 700 to 3 400 (%)

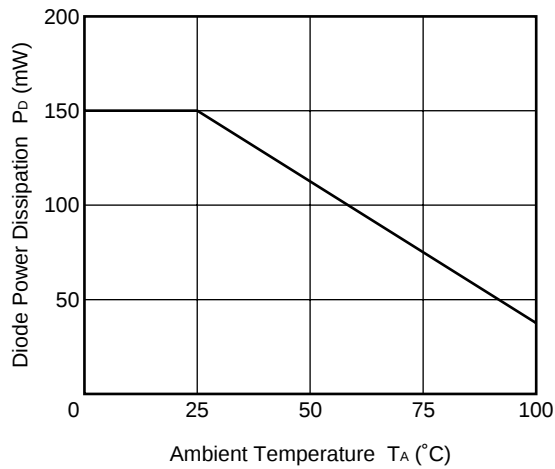
M : 200 to 1 000 (%)

***3** Test circuit for switching time

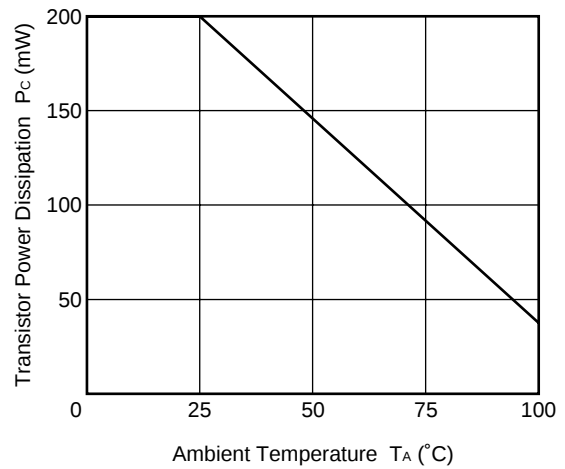


★ TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

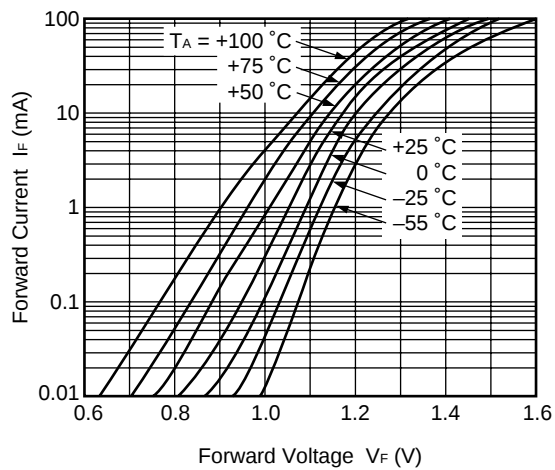
DIODE POWER DISSIPATION vs.
AMBIENT TEMPERATURE



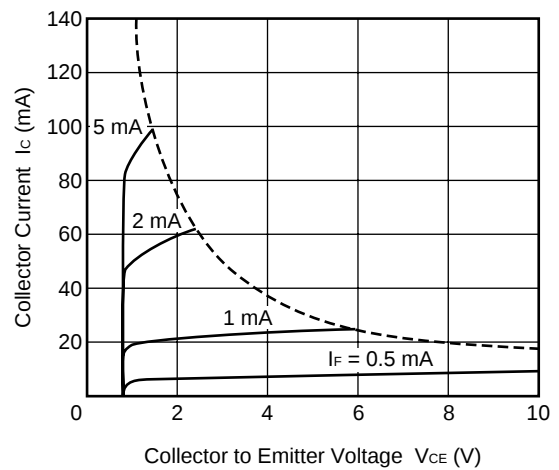
TRANSISTOR POWER DISSIPATION
vs. AMBIENT TEMPERATURE



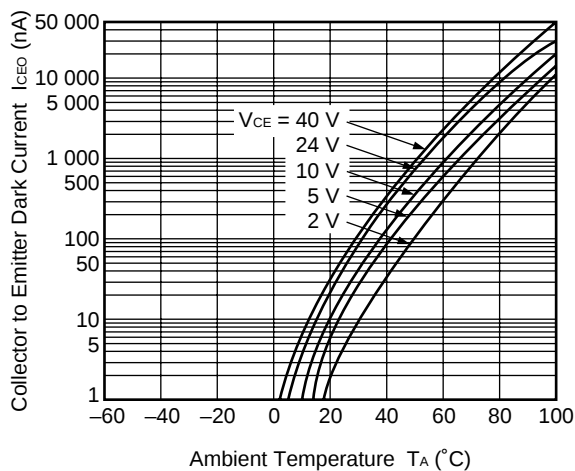
FORWARD CURRENT vs.
FORWARD VOLTAGE



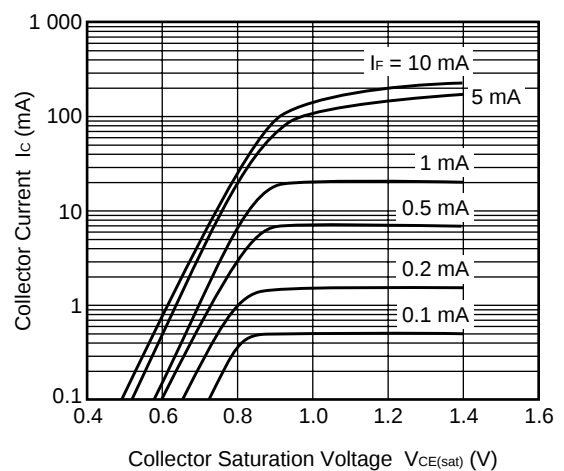
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



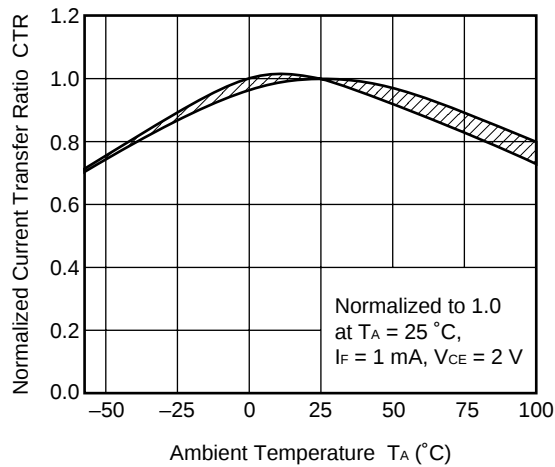
COLLECTOR TO EMITTER DARK
CURRENT vs. AMBIENT TEMPERATURE



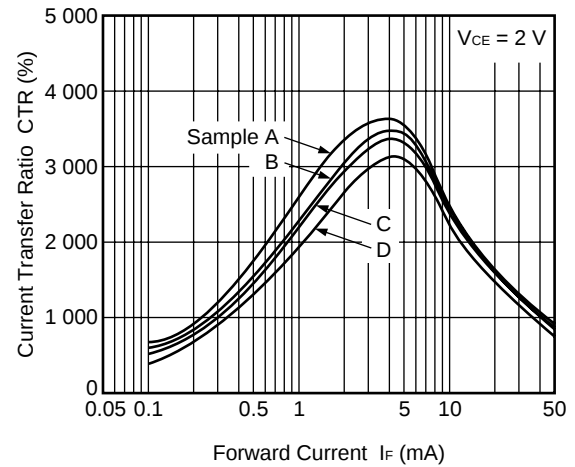
COLLECTOR CURRENT vs.
COLLECTOR SATURATION VOLTAGE



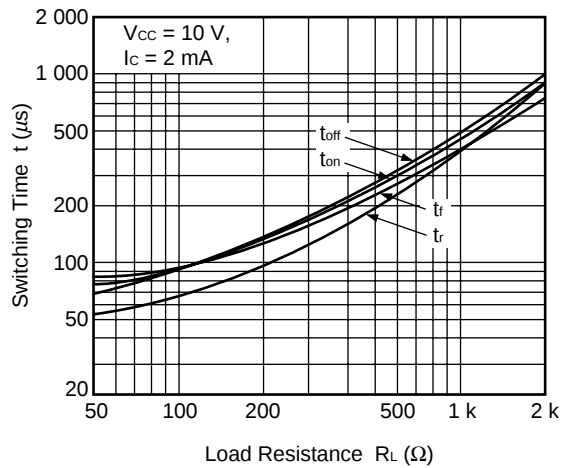
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



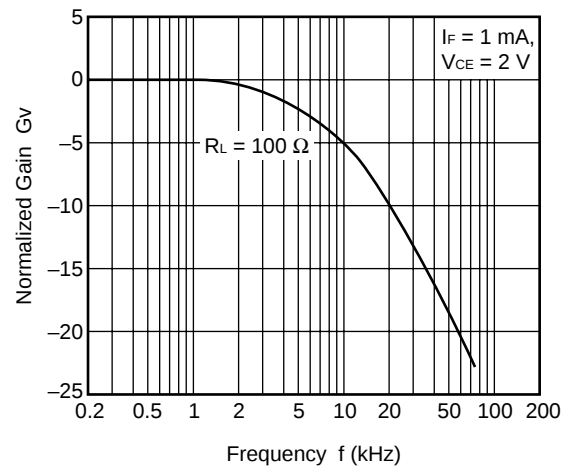
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



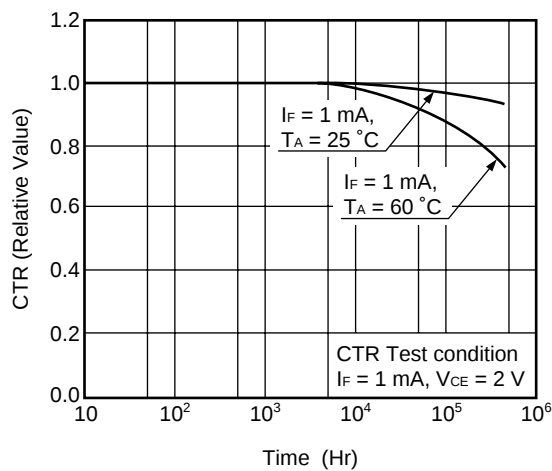
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



LONG TERM CTR DEGRADATION



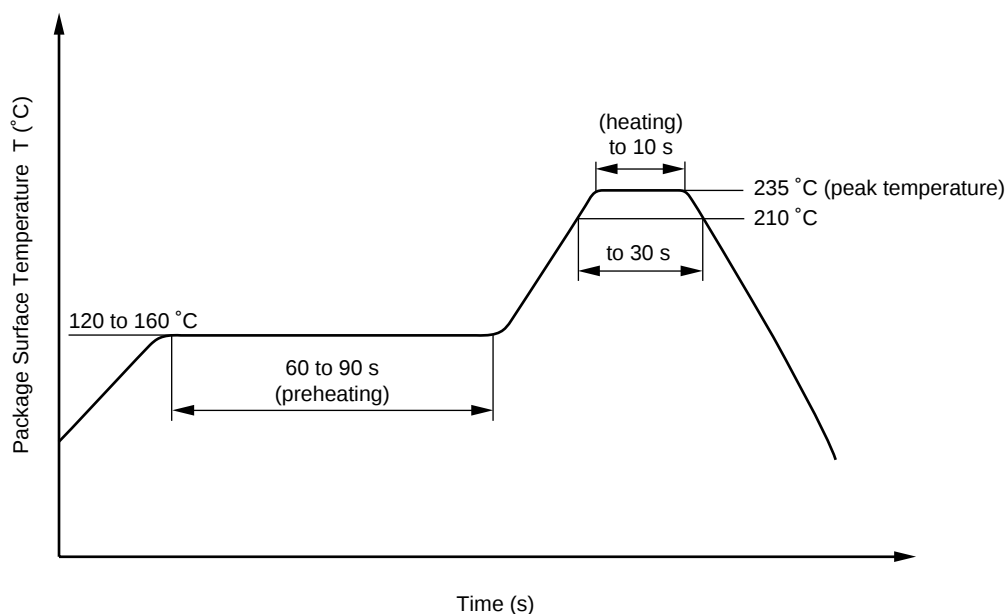
Remark The graphs indicate nominal characteristics.

RECOMMENDED SOLDERING CONDITIONS

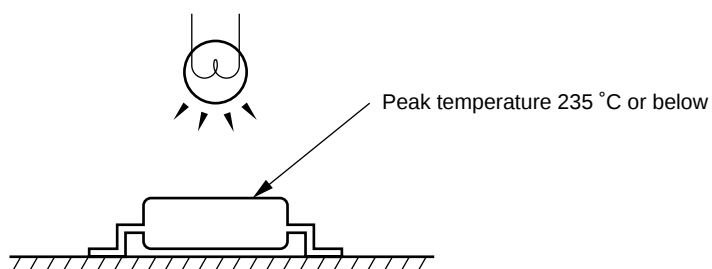
(1) Infrared reflow soldering

- Peak reflow temperature 235 °C (package surface temperature)
- Time of temperature higher than 210 °C 30 seconds or less
- Number of reflows Three
- 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



Caution Please avoid removing the residual flux by water after the first reflow process.



(2) Dip soldering

- Temperature 260 °C or below (molten solder temperature)
- Time 10 seconds or less
- Number of times One
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt % is recommended.)

CAUTION

Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.

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Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

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Anti-radioactive design is not implemented in this product.