

HIGH ISOLATION VOLTAGE AC INPUT RESPONSE TYPE SSOP PHOTOCOUPLER

—NEPOC Series—

DESCRIPTION

The PS2805-1 and PS2805-4 are optically coupled isolators containing GaAs light emitting diodes and an NPN silicon phototransistor in a plastic SSOP for high density applications.

This package has shield effect to cut off ambient light.

FEATURES

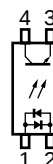
- High isolation voltage (BV = 2 500 Vr.m.s.)
- Small and thin package (4,16-pin SSOP, Pin pitch 1.27 mm)
- High collector to emitter voltage ($V_{CEO} = 80\text{ V}$)
- AC input response
- High-speed switching ($t_r = 3\text{ }\mu\text{s TYP.}$, $t_f = 5\text{ }\mu\text{s TYP.}$)
- Ordering number of tape product: PS2805-1-F3, F4, PS2805-4-F3, F4
- Pb-Free product
- ★ Safety standards: PS2805-1, -4
 - UL approved: File No. E72422
 - BSI approved: No. 8188, 8189
 - CSA approved: File No. CA 101391
 - DIN EN60747-5-2 (VDE0884 Part2) approved (Option)

APPLICATIONS

- Programmable logic controllers
- Measuring instruments
- Hybrid IC

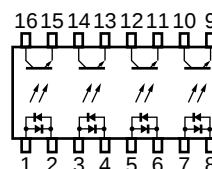
PIN CONNECTION (Top View)

PS2805-1



1. Anode, Cathode
2. Cathode, Anode
3. Emitter
4. Collector

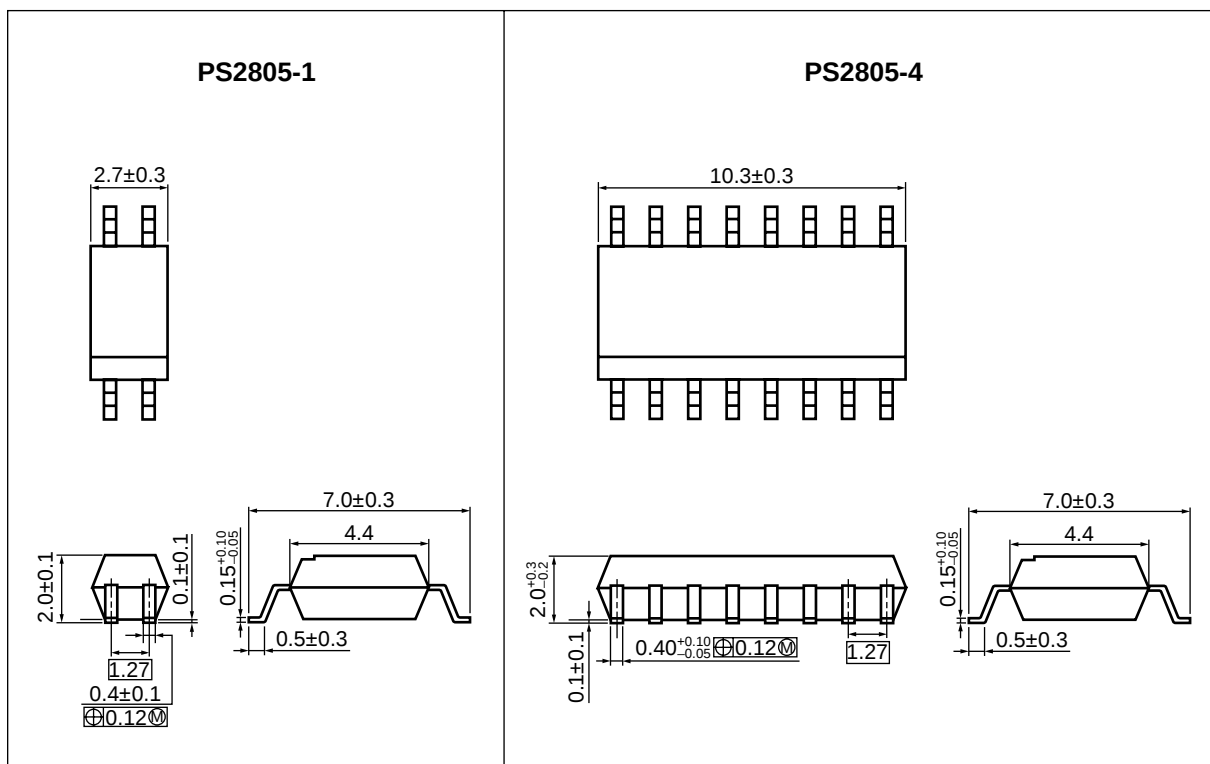
PS2805-4



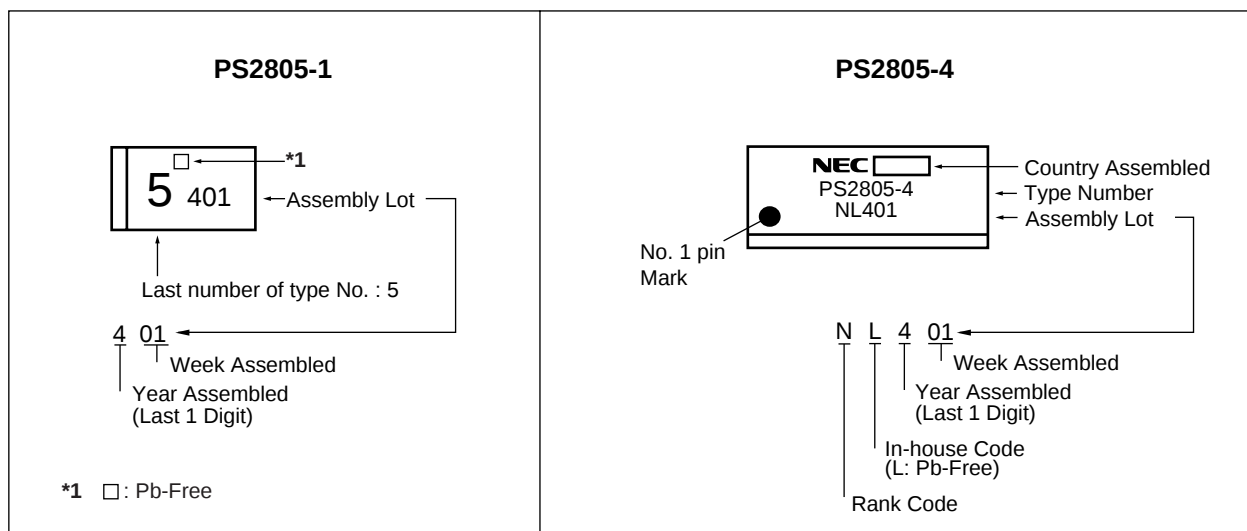
1. 3. 5. 7. Anode, Cathode
2. 4. 6. 8. Cathode, Anode
9. 11. 13. 15. Emitter
10. 12. 14. 16. Collector

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PACKAGE DIMENSIONS (UNIT: mm)



★ **MARKING EXAMPLE**



★ ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification	Packing Style	Safety Standard Approval	Application Part Number ^{*1}
PS2805-1	PS2805-1-A	Pb-Free	50 pcs (Tape 50 pcs cut)	Standard products (UL, BSI, CSA approved)	PS2805-1
PS2805-1-F3	PS2805-1-F3-A		Embossed Tape 3 500 pcs/reel		
PS2805-1-F4	PS2805-1-F4-A				
PS2805-1-V	PS2805-1-V-A		50 pcs (Tape 50 pcs cut)	DIN EN60747-5-2	
PS2805-1-V-F3	PS2805-1-V-F3-A		Embossed Tape 3 500 pcs/reel	(VDE0884 Part2)	
PS2805-1-V-F4	PS2805-1-V-F4-A			Approved (Option)	
PS2805-4	PS2805-4-A		Magazine Case 45 pcs	Standard products	PS2805-4
PS2805-4-F3	PS2805-4-F3-A		Embossed Tape 2 500 pcs/reel	(UL, BSI, CSA approved)	
PS2805-4-F4	PS2805-4-F4-A				
PS2805-4-V	PS2805-4-V-A		Magazine Case 45 pcs	DIN EN60747-5-2	
PS2805-4-V-F3	PS2805-4-V-F3-A		Embossed Tape 2 500 pcs/reel	(VDE0884 Part2)	
PS2805-4-V-F4	PS2805-4-V-F4-A			Approved (Option)	

***1** For the application of the Safety Standard, following part number should be used.

ABSOLUTE MAXIMUM RATINGS (Unless otherwise specified, T_A = 25°C)

Parameter		Symbol	Ratings		Unit
			PS2805-1	PS2805-4	
Diode	Forward Current (DC)	I _F	±50		mA/ch
	Power Dissipation Derating	ΔP _D /°C	0.6	0.8	mW/°C
	Power Dissipation	P _D	60	80	mW/ch
	Peak Forward Current *1	I _{FP}	±1		A/ch
Transistor	Collector to Emitter Voltage	V _{CEO}	80		V
	Emitter to Collector Voltage	V _{ECO}	6		V
	Collector Current	I _C	50		mA/ch
	Power Dissipation Derating	ΔP _C /°C	1.2		mW/°C
	Power Dissipation	P _C	120		mW/ch
Isolation Voltage *2		BV	2 500		Vr.m.s.
Operating Ambient Temperature		T _A	-55 to +100		°C
Storage Temperature		T _{stg}	-55 to +150		°C

*1 PW = 100 μs, Duty Cycle = 1%

*2 AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output.

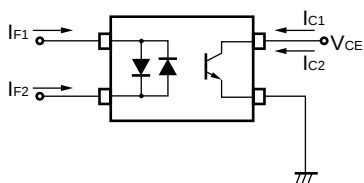
Pins 1-2 shorted together, 3-4 shorted together (PS2805-1).

Pins 1-8 shorted together, 9-16 shorted together (PS2805-4).

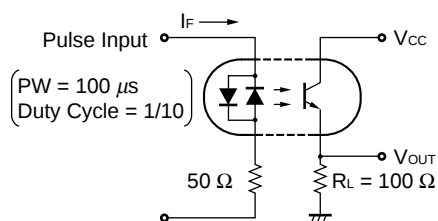
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	$I_F = \pm 5 \text{ mA}$		1.1	1.4	V
	Terminal Capacitance	C_t	$V = 0 \text{ V}, f = 1.0 \text{ MHz}$		30		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	$V_{CE} = 80 \text{ V}, I_F = 0 \text{ mA}$			100	nA
Coupled	Current Transfer Ratio (I_C/I_F)	CTR	$I_F = \pm 5 \text{ mA}, V_{CE} = 5 \text{ V}$	80		600	%
	CTR Ratio ^{*1}	CTR1/CTR2	$I_F = 5 \text{ mA}, V_{CE} = 5 \text{ V}$	0.3	1.0	3.0	
	Collector Saturation Voltage	$V_{CE(sat)}$	$I_F = \pm 10 \text{ mA}, I_C = 2 \text{ mA}$			0.3	V
	Isolation Resistance	R_{I-O}	$V_{I-O} = 1.0 \text{ kV}_{DC}$	10^{11}			Ω
	Isolation Capacitance	C_{I-O}	$V = 0 \text{ V}, f = 1.0 \text{ MHz}$		0.4		pF
	Rise Time ^{*2}	t_r	$V_{CC} = 5 \text{ V}, I_C = 2 \text{ mA}, R_L = 100 \Omega$		3		μs
	Fall Time ^{*2}	t_f			5		

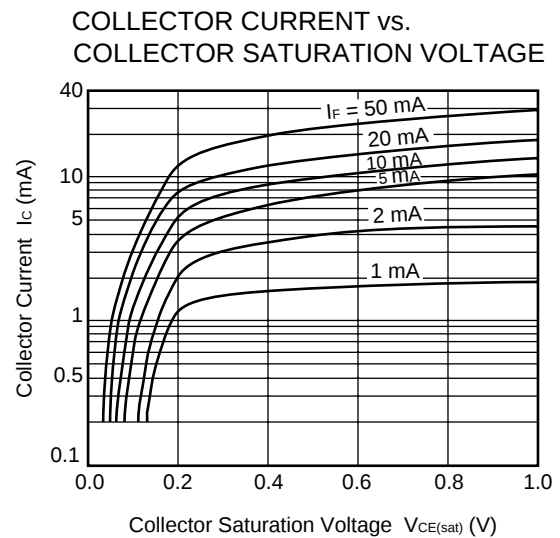
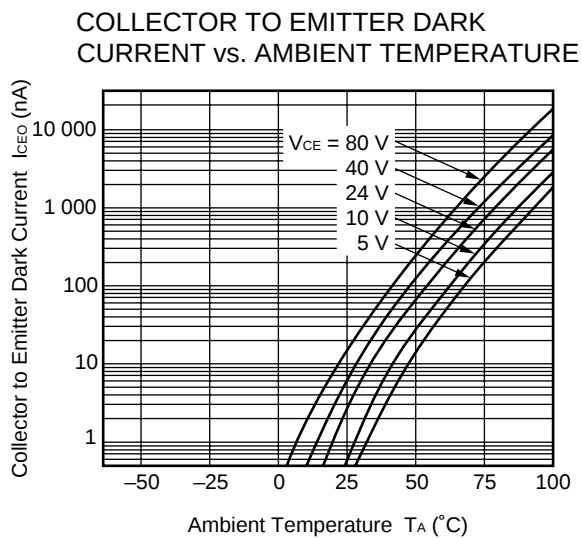
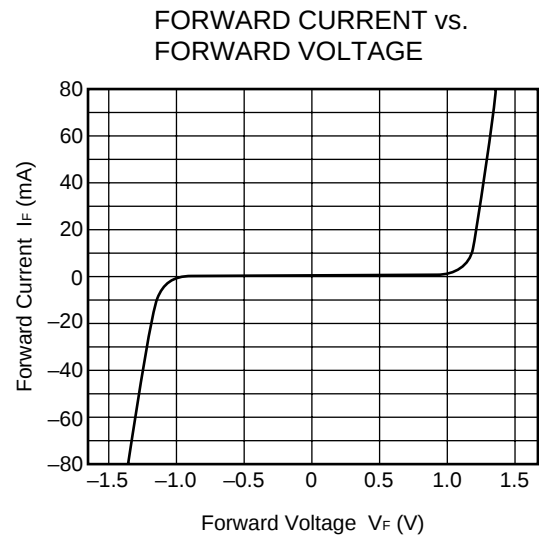
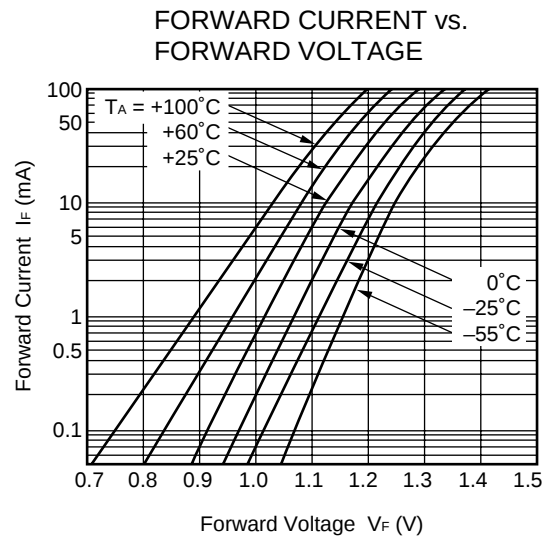
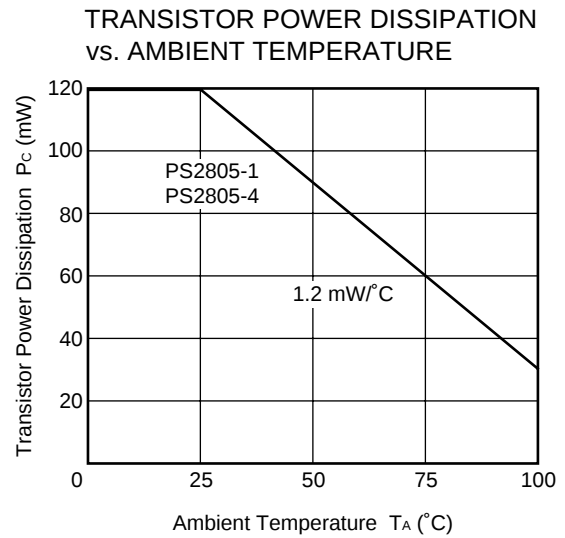
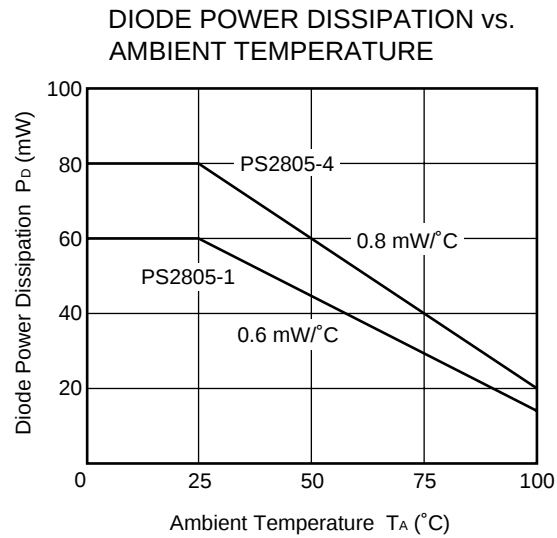
***1** $CTR1 = I_{C1}/I_{F1}$, $CTR2 = I_{C2}/I_{F2}$



***2** Test circuit for switching time

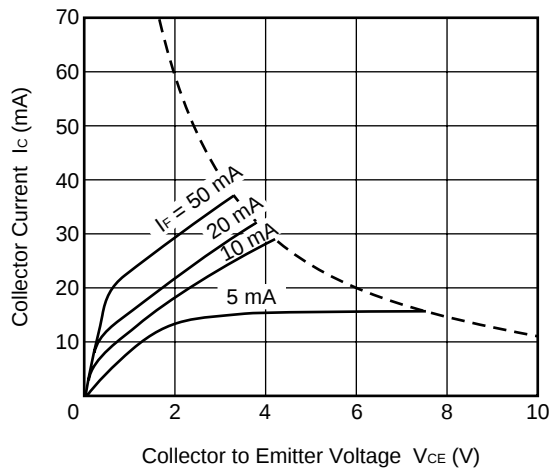


TYPICAL CHARACTERISTICS (Unless otherwise specified, $T_A = 25^\circ\text{C}$)

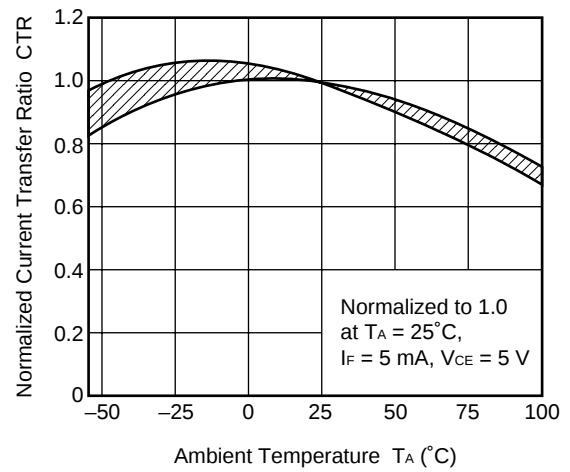


Remark The graphs indicate nominal characteristics.

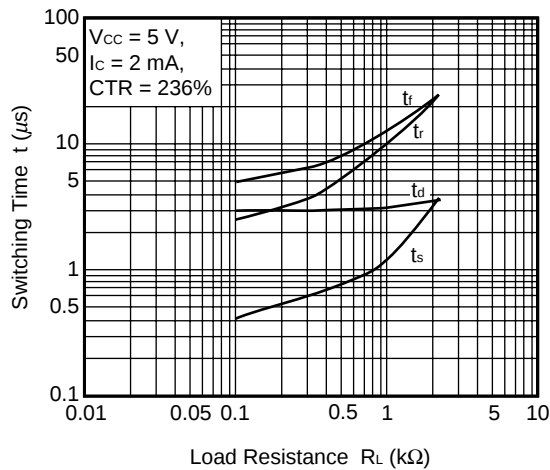
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



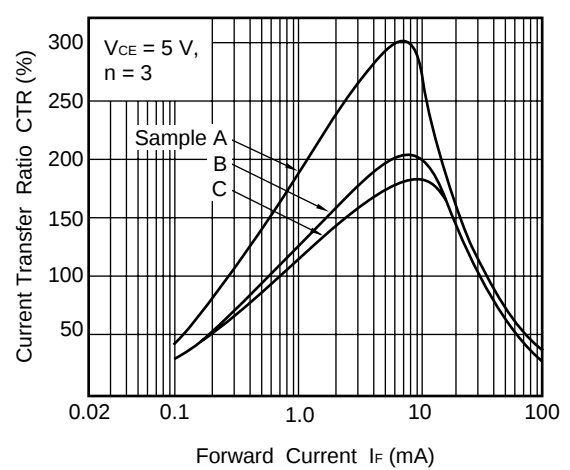
NORMALIZED CURRENT TRANSFER
RATIO vs. AMBIENT TEMPERATURE



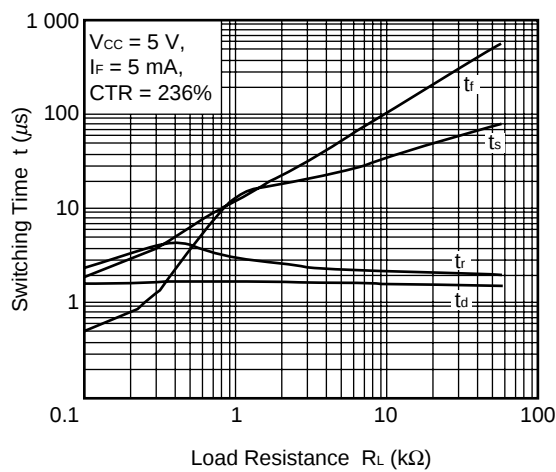
SWITCHING TIME vs.
LOAD RESISTANCE



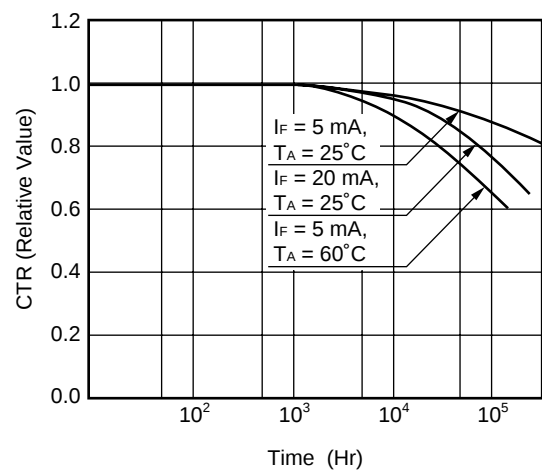
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



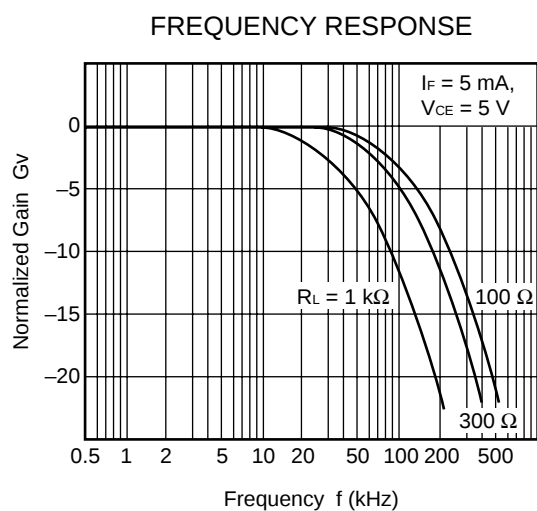
SWITCHING TIME vs.
LOAD RESISTANCE



LONG TERM CTR DEGRADATION



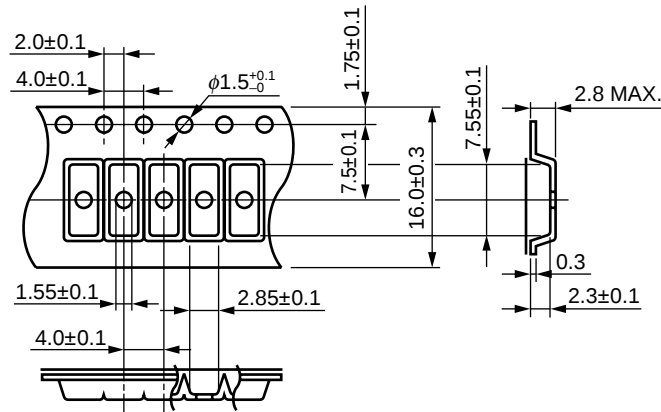
Remark The graphs indicate nominal characteristics.



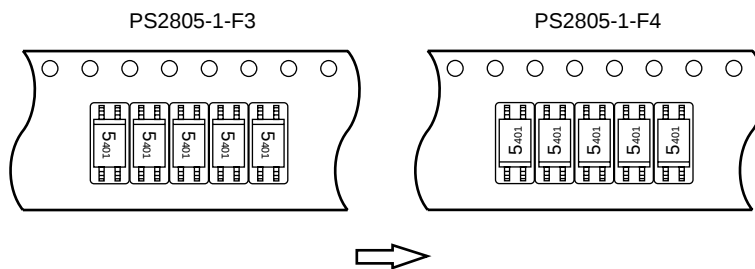
Remark The graph indicates nominal characteristics.

TAPING SPECIFICATIONS (UNIT: mm)

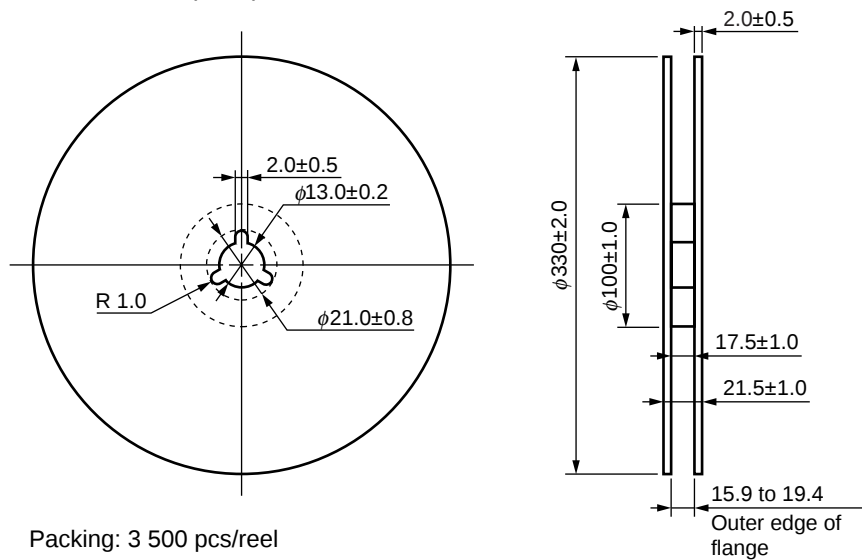
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Technical drawing of a mechanical part, showing a top view and a side view. The drawing includes dimensions and tolerances for various features.

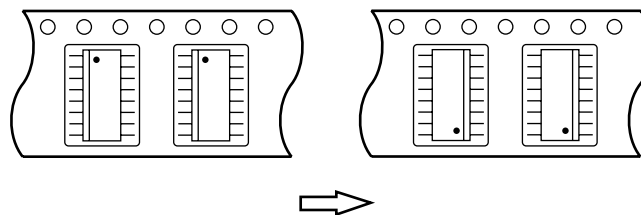
Top View Dimensions:

- Overall width: 12.0 ± 0.1
- Distance from left edge to first hole center: 1.55 ± 0.1
- Distance between hole centers: 4.0 ± 0.1
- Distance from last hole center to right edge: 8.3 ± 0.1
- Hole diameter: $\phi 1.5^{+0.1}_{-0}$
- Distance from top edge to hole row: 1.75 ± 0.1
- Distance from hole row to bottom edge: 7.5 ± 0.1
- Overall height: 16.0 ± 0.3

Side View Dimensions:

- Overall height: 10.7 ± 0.1
- Top flange thickness: 0.3
- Bottom flange thickness: 2.3 ± 0.1
- Maximum width of top flange: 2.8 MAX.

PS2805-4-F4



Technical drawing of a circular part. The drawing shows a large circle with a central hole. The hole is defined by a dashed circle with a diameter of $\phi 13.0 \pm 0.2$. The hole has a depth of 2.0 ± 0.5 . The hole is surrounded by a circular feature with a radius of $R 1.0$. The overall diameter of the part is $\phi 21.0 \pm 0.8$.

Technical drawing of a vertical pipe section showing dimensions for the flange and main body. The drawing includes the following dimensions:

- Overall diameter: $\phi 330 \pm 2.0$
- Flange diameter: $\phi 100 \pm 1.0$
- Flange thickness: 2.0 ± 0.5
- Distance from flange face to first reinforcement: 17.5 ± 1.0
- Distance from flange face to second reinforcement: 21.5 ± 1.0
- Distance from flange face to third reinforcement: 15.9 to 19.4
- Label: "Outer edge of flange"

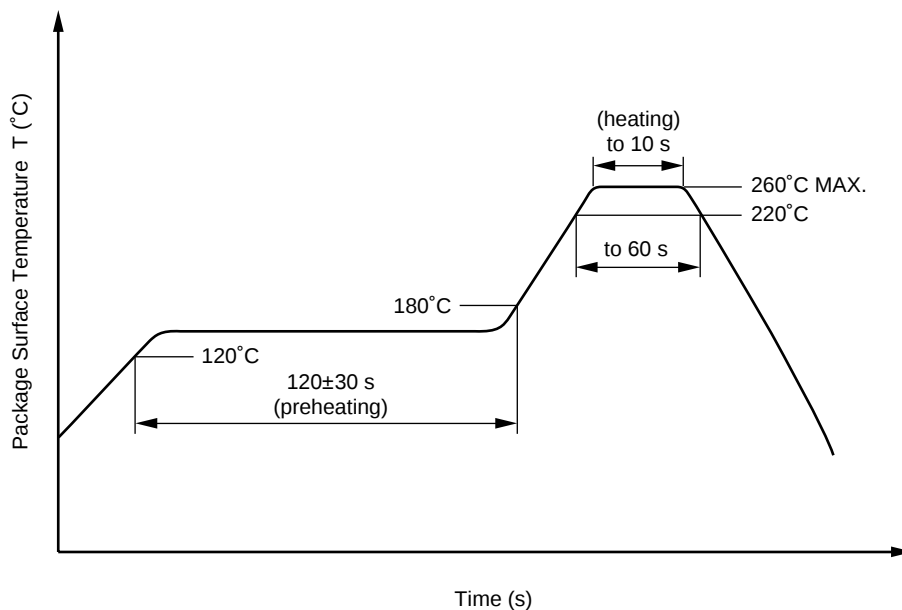
NOTES ON HANDLING

1. Recommended soldering conditions

(1) Infrared reflow soldering

- Peak reflow temperature 260°C or below (package surface temperature)
- Time of peak reflow temperature 10 seconds or less
- Time of temperature higher than 220°C 60 seconds or less
- Time to preheat temperature from 120 to 180°C 120±30 s
- 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



(2) Wave soldering

- Temperature 260°C or below (molten solder temperature)
- Time 10 seconds or less
- Preheating conditions 120°C or below (package surface temperature)
- Number of times One (Allowed to be dipped in solder including plastic mold portion.)
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

(3) Soldering by soldering iron

- Peak temperature (lead part temperature) 350°C or below
- Time (each pins) 3 seconds or less
- Flux Rosin flux containing small amount of chlorine (The flux with a maximum chlorine content of 0.2 Wt% is recommended.)

(a) Soldering of leads should be made at the point 1.5 to 2.0 mm from the root of the lead.

(b) Please be sure that the temperature of the package would not be heated over 100°C.

(4) Cautions

- Fluxes

Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.

2. Cautions regarding noise

Be aware that when voltage is applied suddenly between the photocoupler's input and output or between collector-emitters at startup, the output transistor may enter the on state, even if the voltage is within the absolute maximum ratings.

★ 3. Measurement conditions of current transfer ratios (CTR), which differ according to photocoupler

Check the setting values before use, since the forward current conditions at CTR measurement differ according to product.

When using products other than at the specified forward current, the characteristics curves may differ from the standard curves due to CTR value variations or the like. This tendency may sometimes be obvious, especially below $I_F = 1 \text{ mA}$.

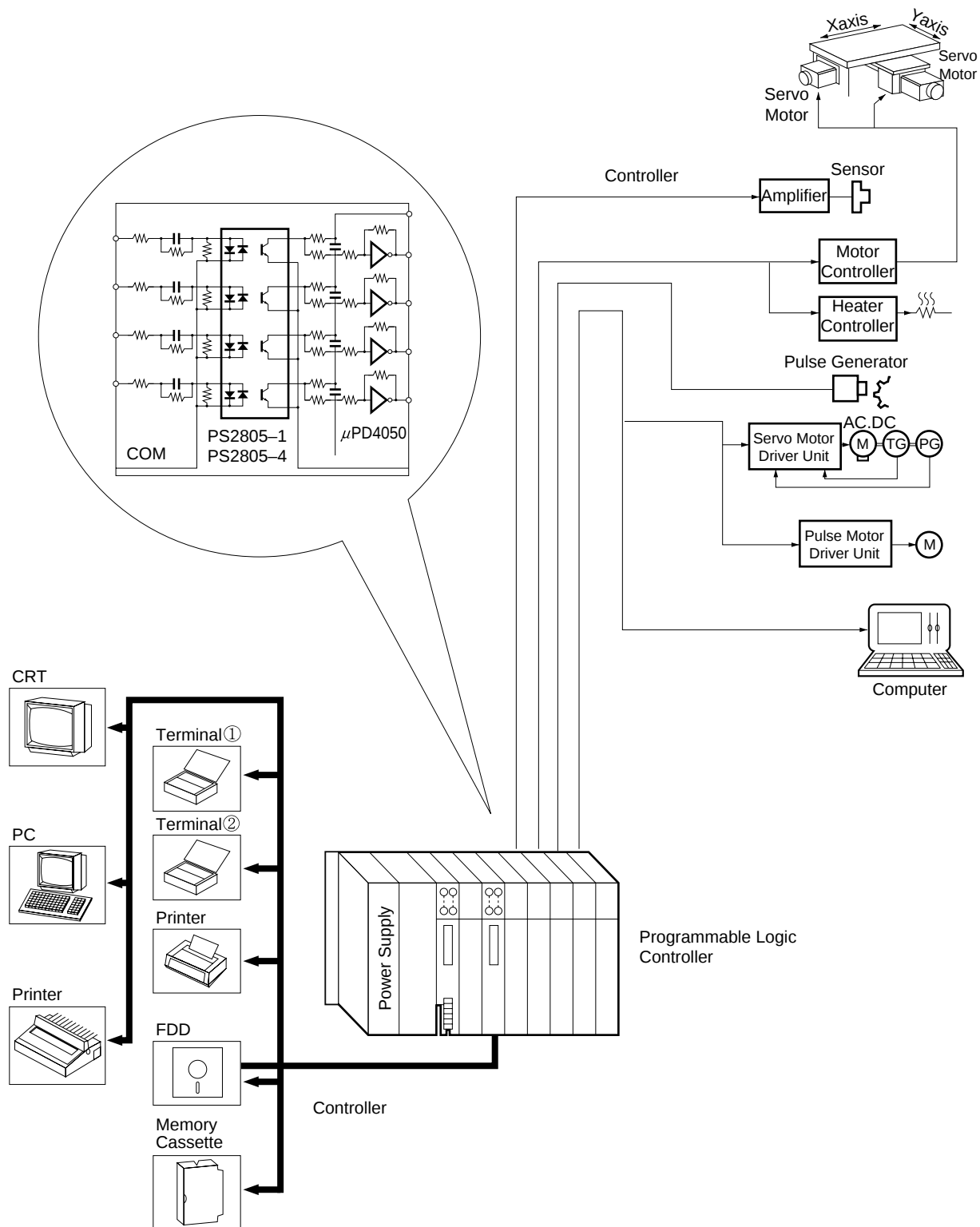
Therefore, check the characteristics under the actual operating conditions and thoroughly take variations or the like into consideration before use.

USAGE CAUTIONS

1. Protect against static electricity when handling.
2. Avoid storage at a high temperature and high humidity.

PROGRAMMABLE LOGIC CONTROLLERS EXAMPLE

Purpose: In-out interface



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M8E 00.4-0110

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► For further information, please contact

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