DATA SHEET

NEC

PHOTOCOUPLER

PS2805-1,PS2805-4

HIGH ISOLATION VOLTAGE AC INPUT RESPONSE TYPE SOP 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 SOP 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 SOP, Pin pitch 1.27 mm)
- High collector to emitter voltage (V_{CEO} = 80 V)
- AC input response
- High-speed switching (t_r = 3 μs TYP., t_f = 5 μs TYP.)
- UL approved: File No. E72422 (S)
- ★ • VDE0884 approved (Option): PS2805-4 only
- Ordering number of taping product: PS2805-1-F3, F4, PS2805-4-F3, F4

APPLICATIONS

- Programmable logic controllers
- Measuring instruments
- Hybrid IC

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

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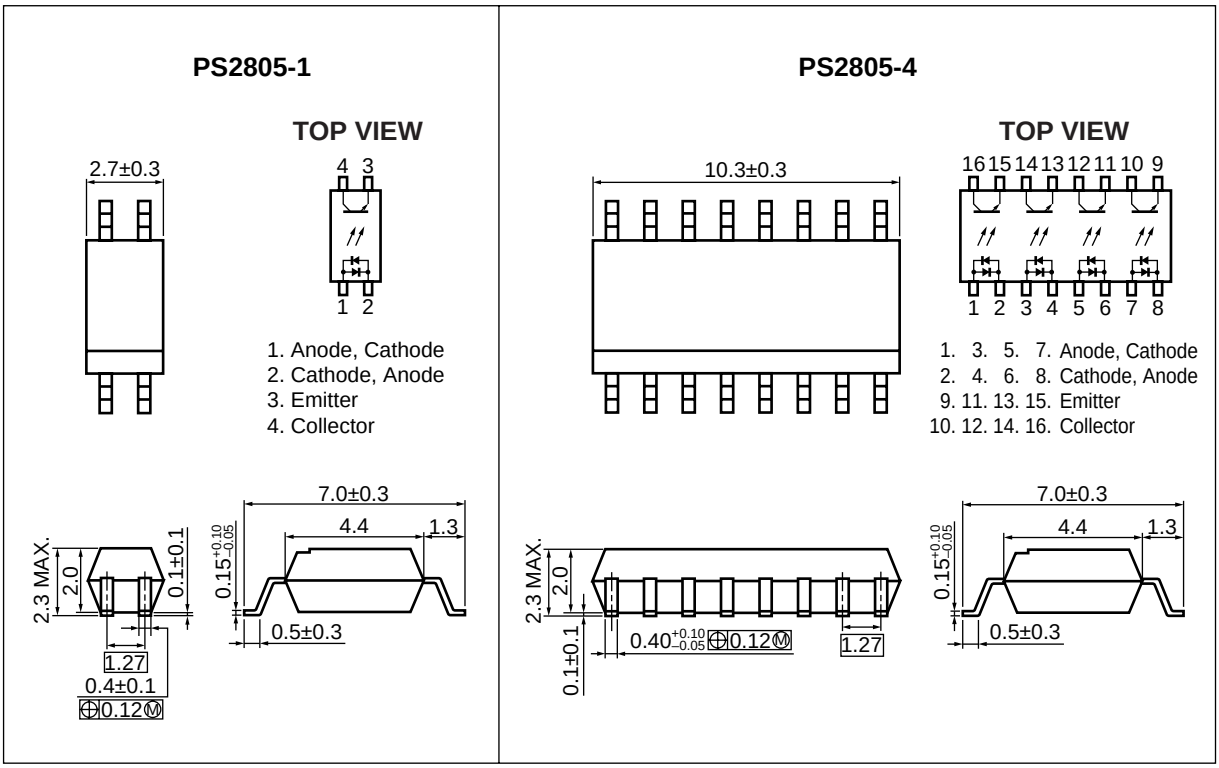
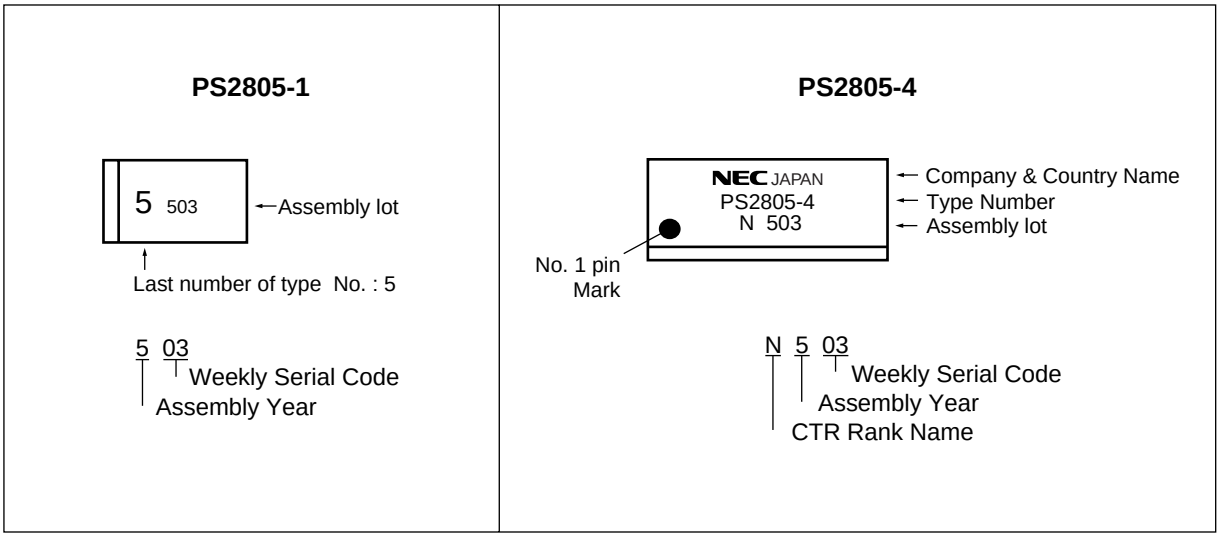
Printed in Japan

The mark ★ shows major revised points.

★ **PACKAGE DIMENSIONS (in millimeters)**



MARKING



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

Parameter		Symbol	Ratings		Unit
			PS2805-1	PS2805-4	
Diode	Forward Current (DC)	I_F	±50		mA
	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
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

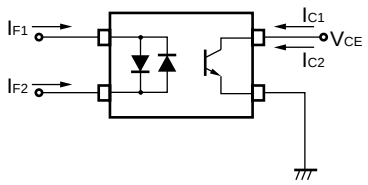
***1** PW = 100 μs, Duty Cycle = 1 %

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

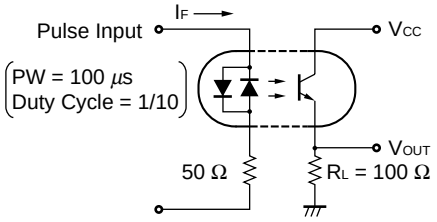
ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = ±5 mA		1.1	1.4	V
	Terminal Capacitance	C_t	V = 0 V, f = 1.0 MHz		60		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	V_{CE} = 80 V, I_F = 0 mA			100	nA
Coupled	Current Transfer Ratio (I_C/I_F)	CTR	I_F = ±5 mA, V_{CE} = 5 V	80		600	%
	CTR Ratio *1	CTR1/ CTR2	I_F = 5 mA, V_{CE} = 5 V	0.3	1.0	3.0	
	Collector Saturation Voltage	$V_{CE(sat)}$	I_F = ±10 mA, I_C = 2 mA			0.3	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		0.4		pF
	Rise Time *2	t_r	V_{CC} = 5 V, I_C = 2 mA, R_L = 100 Ω		3		μs
	Fall Time *2	t_f			5		

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

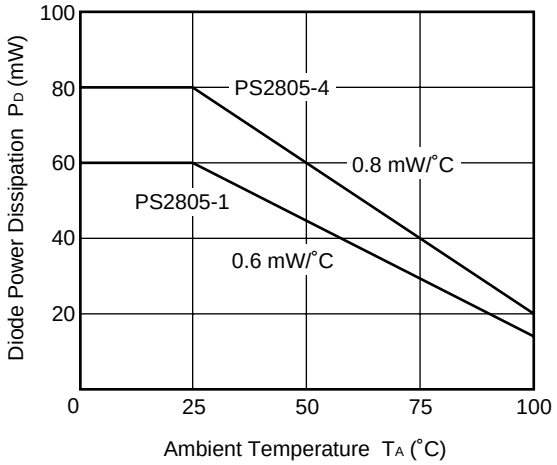


***2** Test circuit for switching time

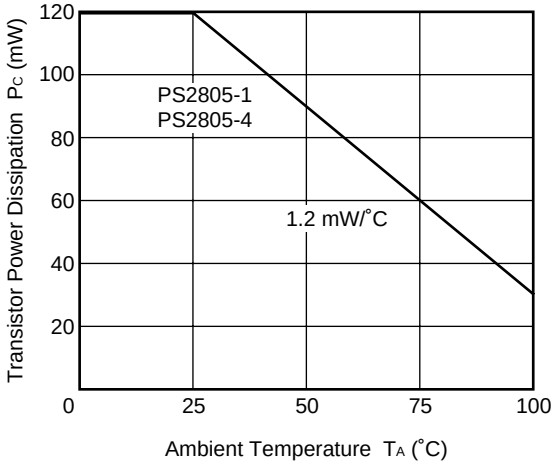


TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)

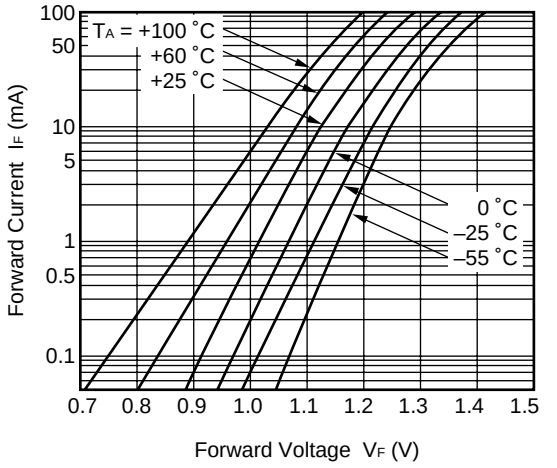
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



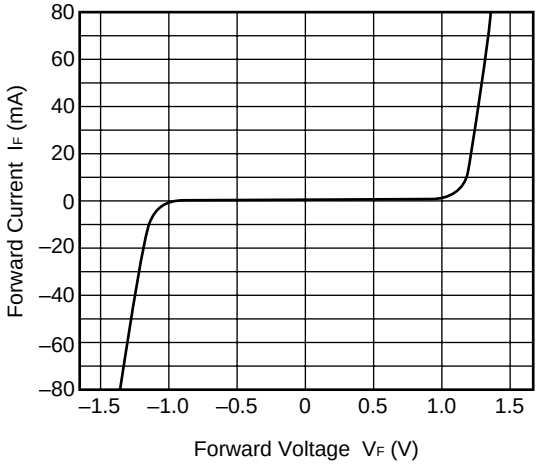
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



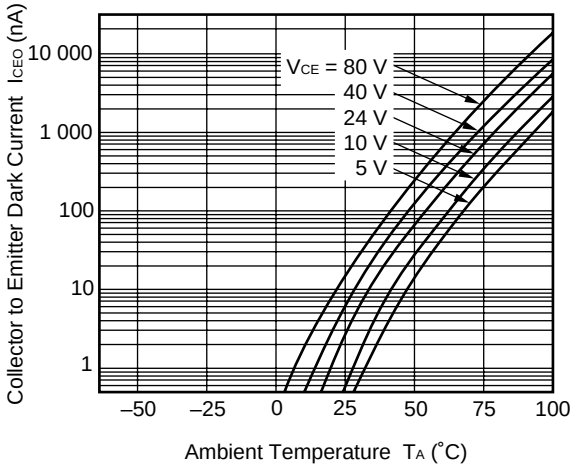
FORWARD CURRENT vs. FORWARD VOLTAGE



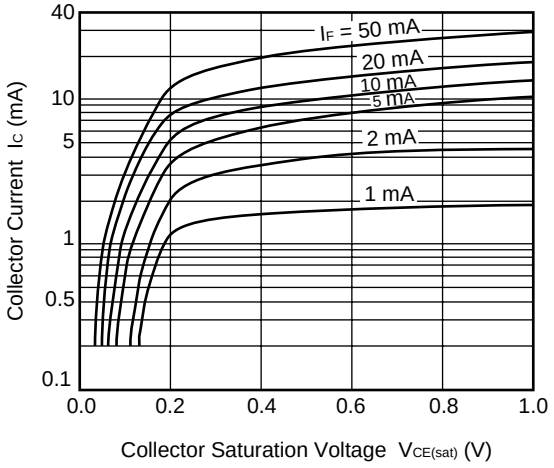
FORWARD CURRENT vs. FORWARD VOLTAGE



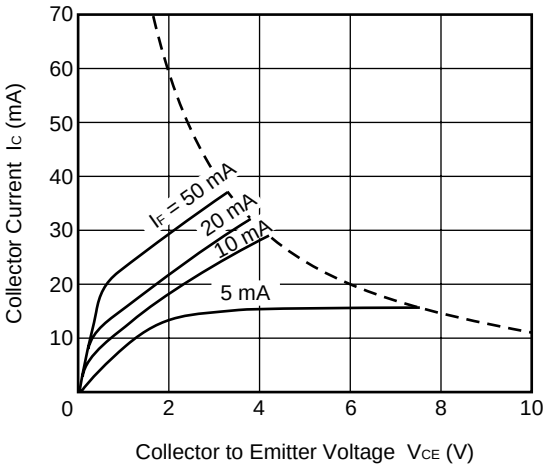
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



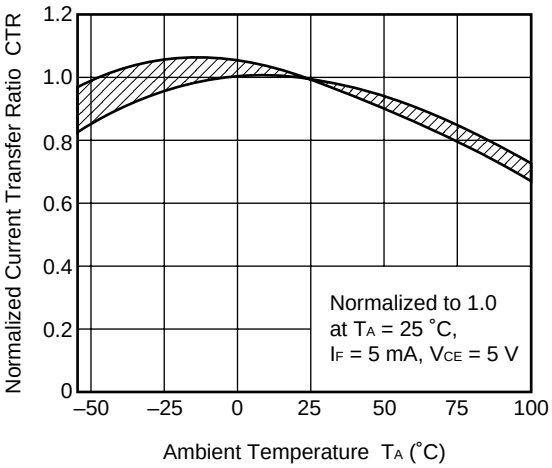
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



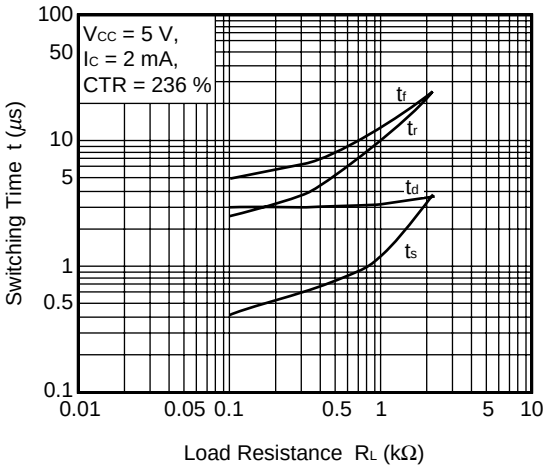
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



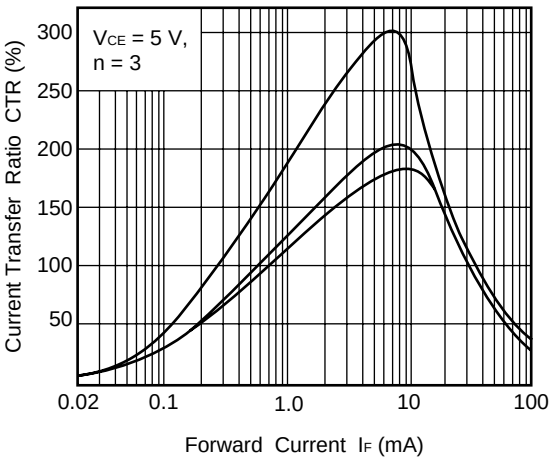
NORMALIZED CURRENT TRANSFER
RATIO vs. AMBIENT TEMPERATURE



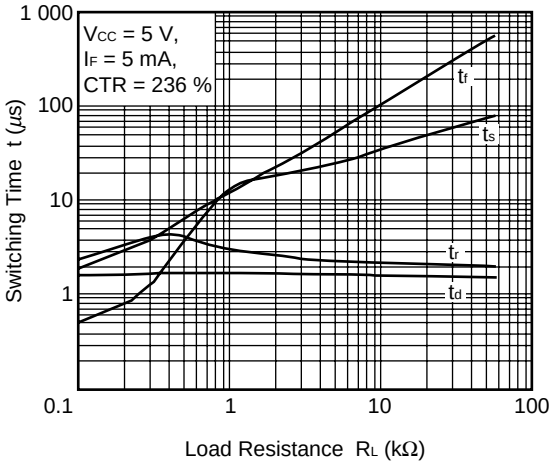
SWITCHING TIME vs.
LOAD RESISTANCE



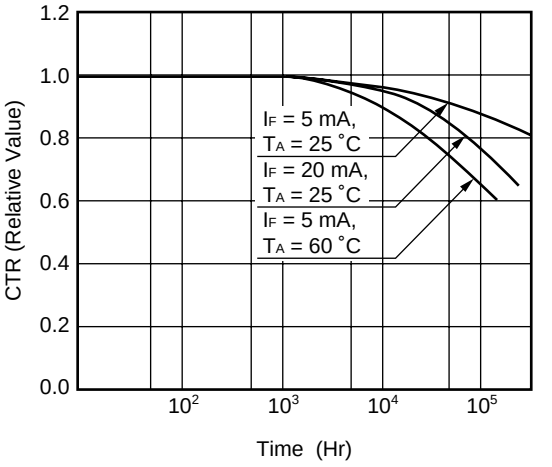
CURRENT TRANSFER RATIO vs.
FORWARD CURRENT



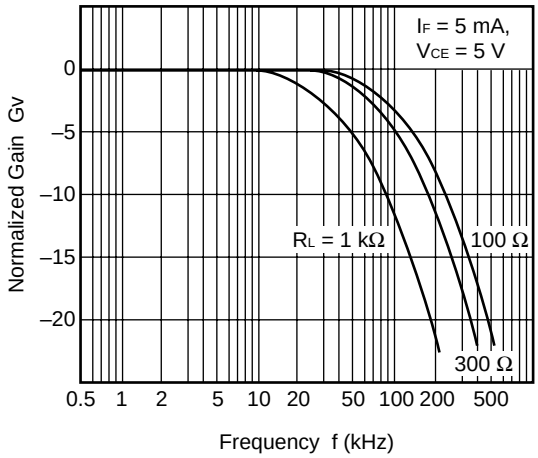
SWITCHING TIME vs.
LOAD RESISTANCE



LONG TERM CTR DEGRADATION



FREQUENCY RESPONSE

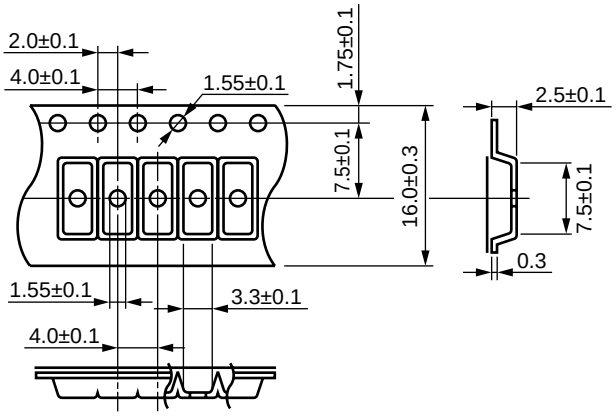


Remark The graphs indicate nominal characteristics.

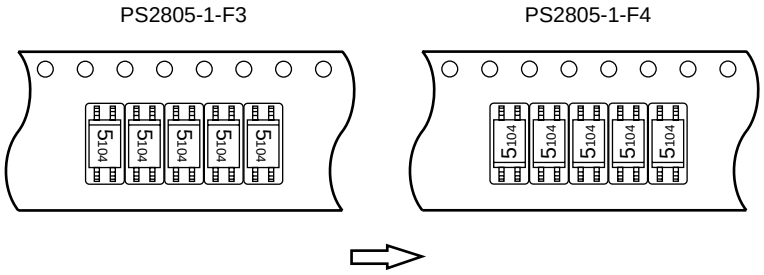
TAPING SPECIFICATIONS (in millimeters)

PS2805-1

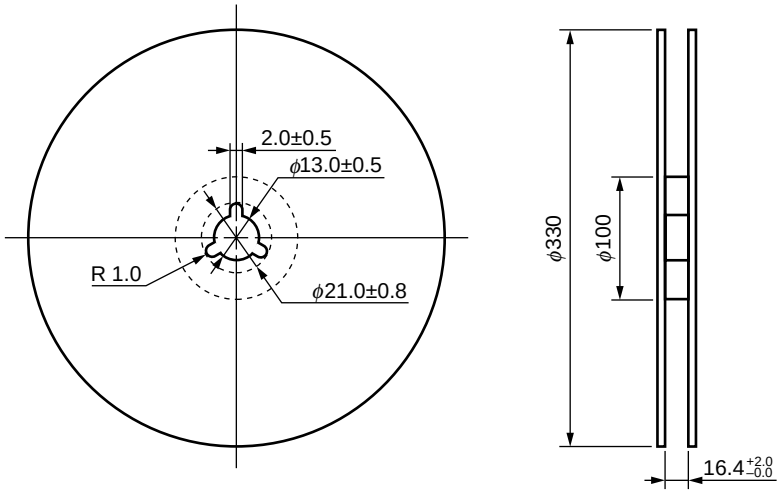
Outline and Dimensions (Tape)



Tape Direction



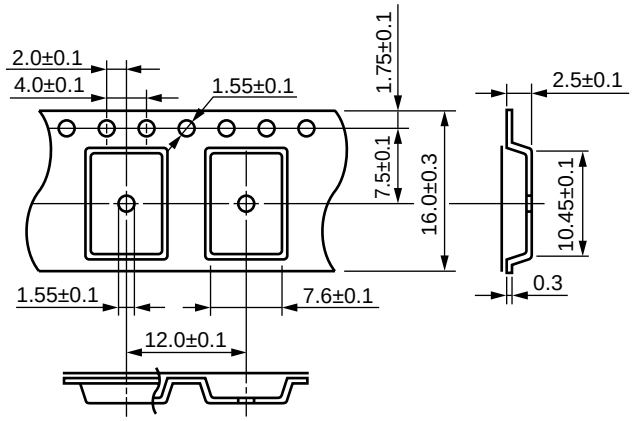
Outline and Dimensions (Reel)



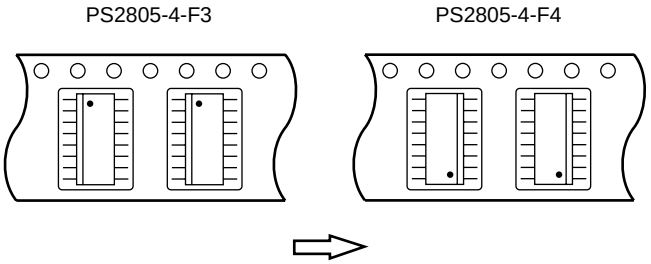
Packing: 3 500 pcs/reel

PS2805-4

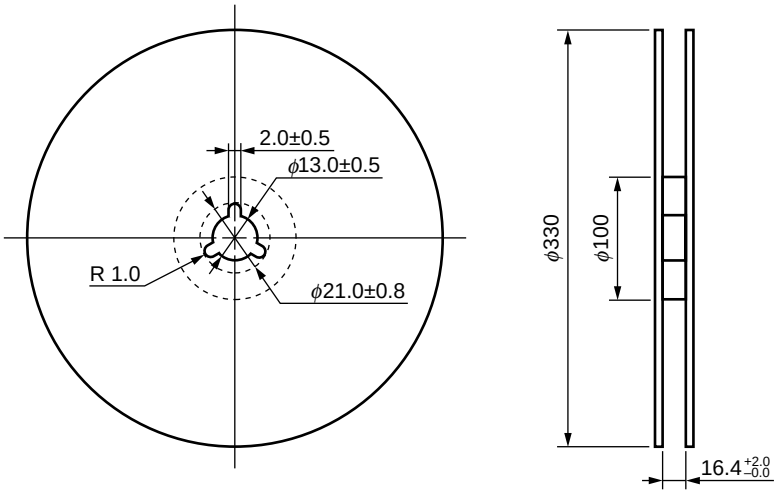
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



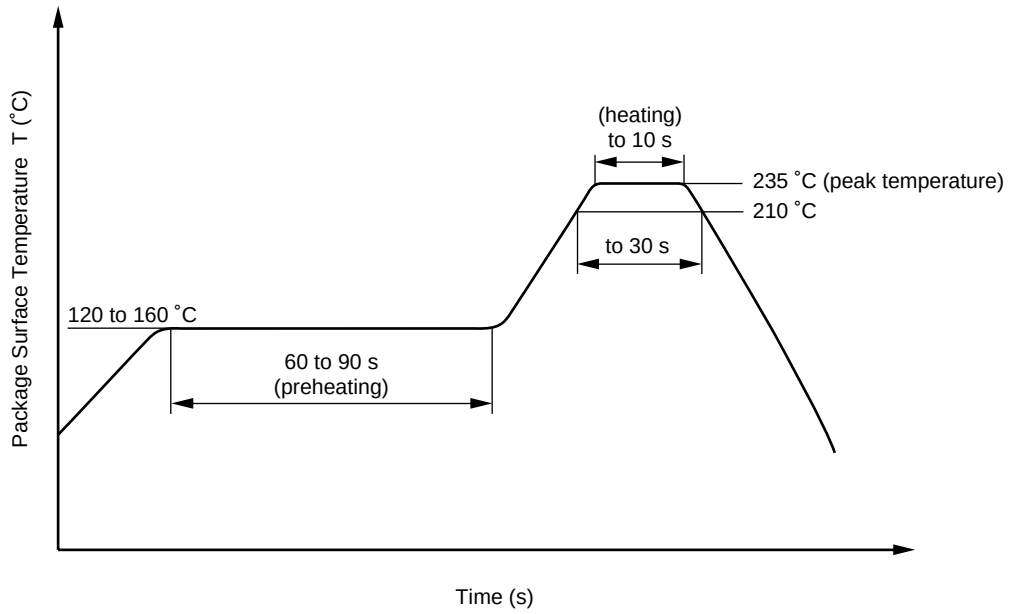
Packing: 2 500 pcs/reel

RECOMMENDED SOLDERING CONDITIONS

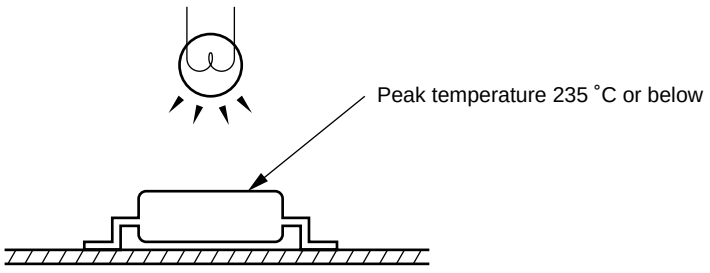
(1) Infrared reflow soldering

- 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 Avoid removing the residual flux with chlorine-based cleaning solvent after a reflow process.**

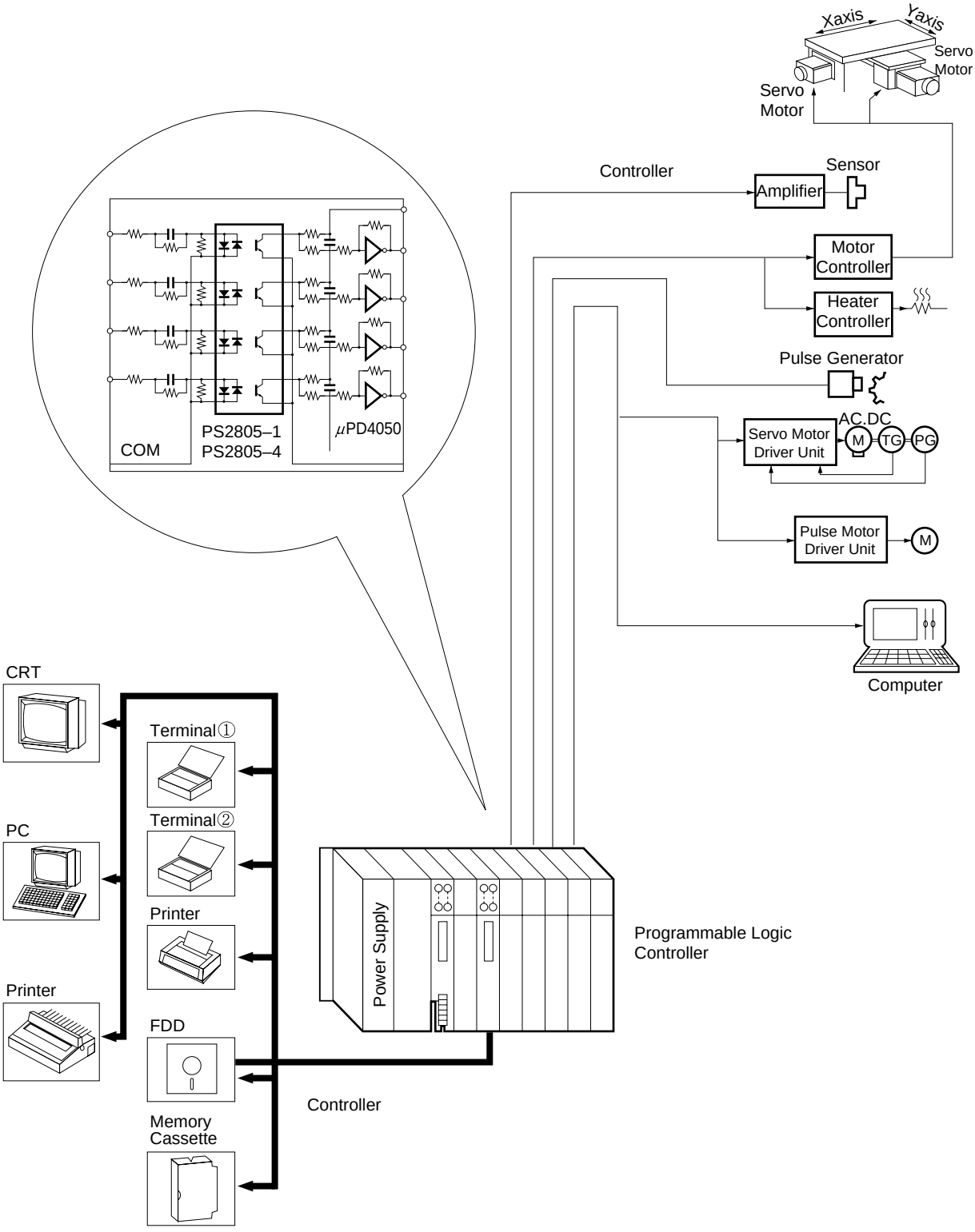


(2) Dip soldering

- 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.)

PROGRAMMABLE LOGIC CONTROLLERS EXAMPLE

Purpose: In-out interface



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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