DATA SHEET

NEC

PHOTOCOUPLER

PS2801-1,PS2801-4

HIGH ISOLATION VOLTAGE SOP PHOTOCOUPLER

–NEPOC™ Series–

DESCRIPTION

The PS2801-1 and PS2801-4 are optically coupled isolators containing a GaAs light emitting diode 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)
- High-speed switching (t_r = 3 μs TYP., t_f = 5 μs TYP.)
- Ordering number of tape product: PS2801-1-F3, F4, PS2801-4-F3, F4
- ★ Safety standards: PS2801-1, -4
    - UL approved: File No. E72422 (S)
    - BSI approved: No. 8188, 8189
    - VDE0884 approved (Option): PS2801-4 only

APPLICATIONS

- Programmable logic controllers
- Measuring instruments
- Power supply
- Hybrid IC

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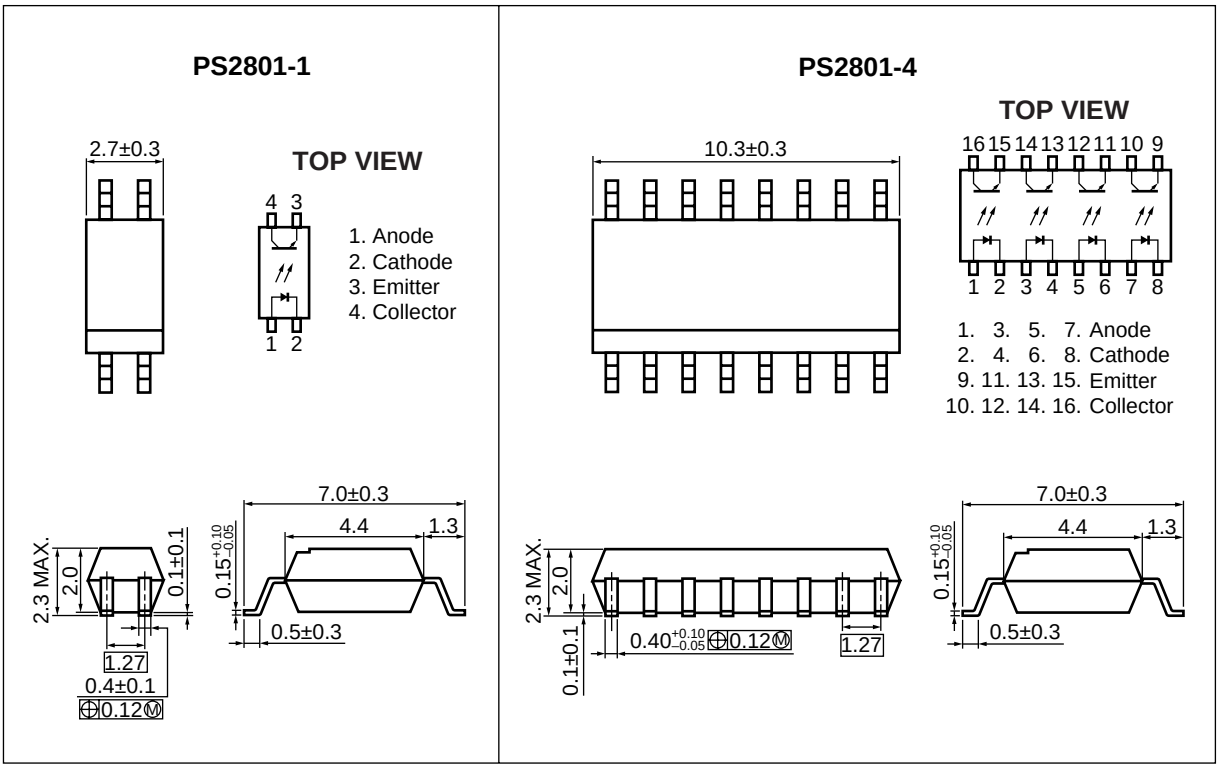
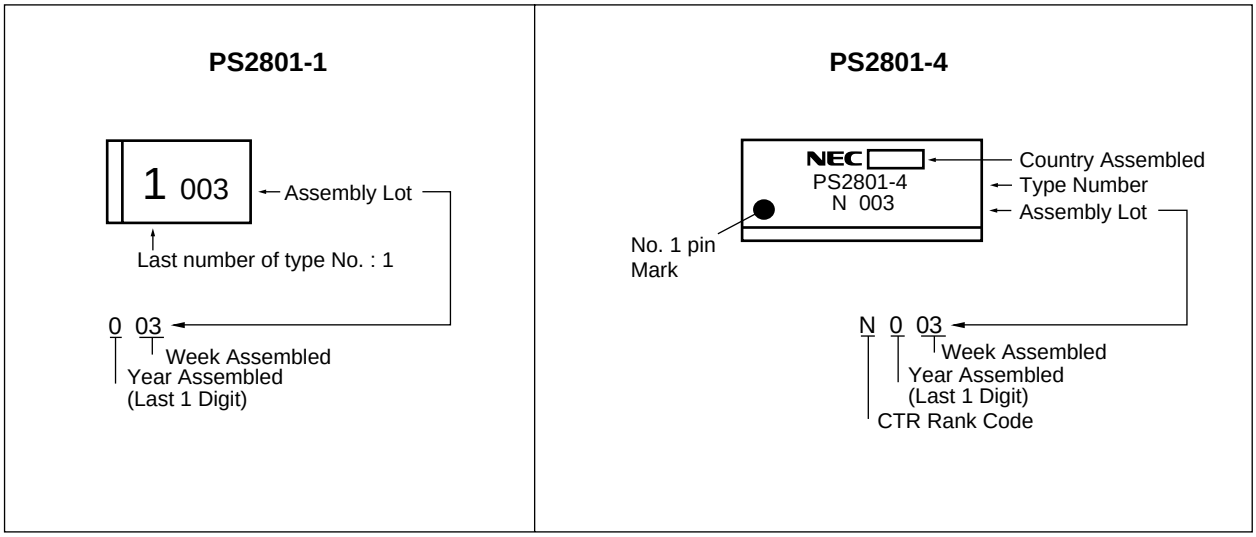
Printed in Japan

The mark ★ shows major revised points.

PACKAGE DIMENSIONS (UNIT: mm)



★ **MARKING**



★ ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number*1
PS2801-1	4-pin SOP	50 pcs (Tape 50 pcs cut)	PS2801-1
PS2801-1-F3		Embossed Tape 3 500 pcs/reel	
PS2801-1-F4			
PS2801-4	16-pin SOP	Magazine Case 45 pcs	PS2801-4
PS2801-4-F3		Embossed Tape 2 500 pcs/reel	
PS2801-4-F4			

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

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

Parameter		Symbol	Ratings		Unit
			PS2801-1	PS2801-4	
Diode	Forward Current (DC)	I_F	50		mA
	Reverse Voltage	V_R	6		V
	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
		Reverse Current	I_R	V_R = 5 V			5	μA
★		Terminal Capacitance	C_t	V = 0 V, f = 1.0 MHz		15		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) *1	CTR	I_F = 5 mA, V_{CE} = 5 V	80		600	%
		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** CTR rank (PS2801-1 only)

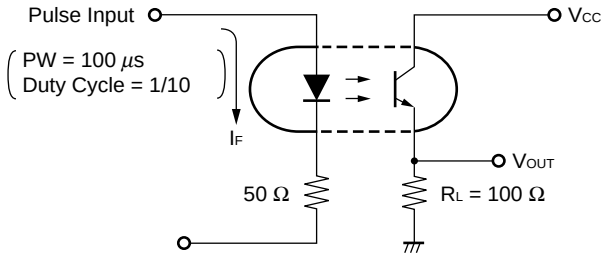
K : 300 to 600 (%)

P : 150 to 300 (%)

L : 100 to 300 (%)

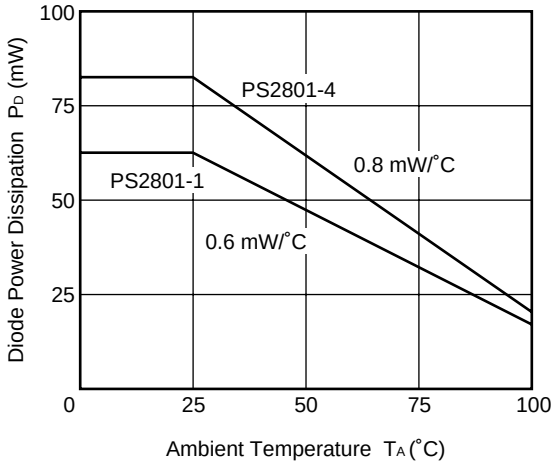
N : 80 to 600 (%)

***2** Test circuit for switching time

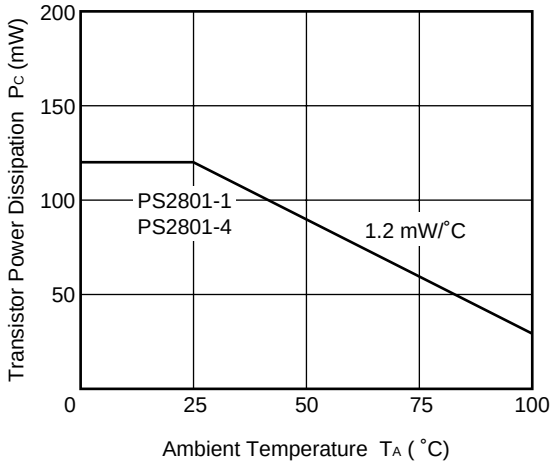


TYPICAL CHARACTERISTICS (T_A = 25 °C, unless otherwise specified)

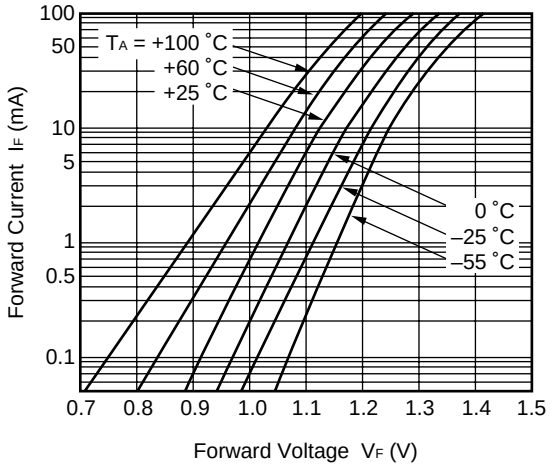
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



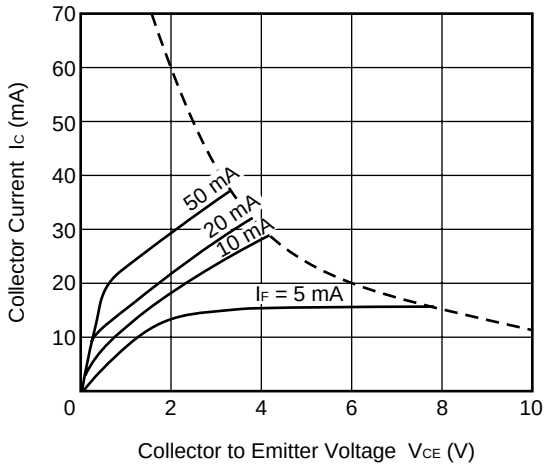
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



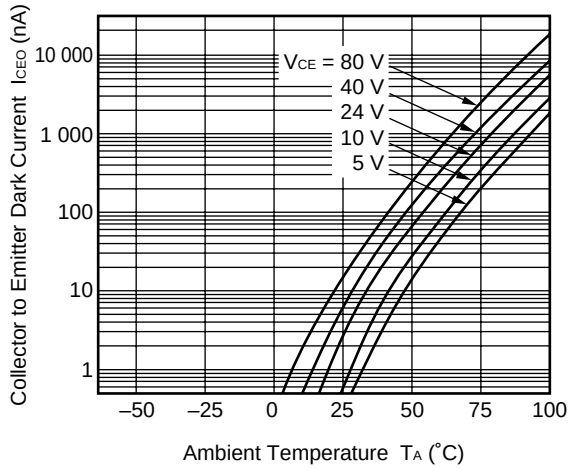
FORWARD CURRENT vs. FORWARD VOLTAGE



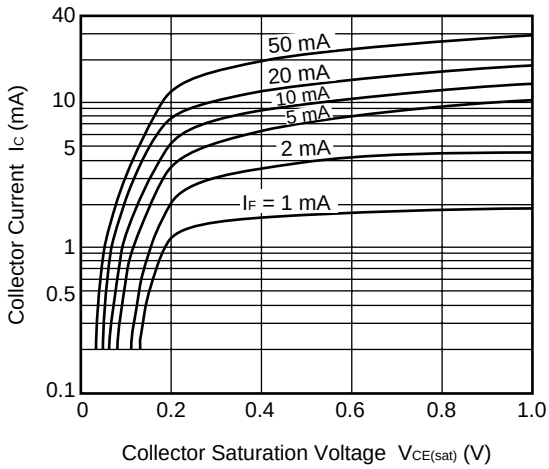
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



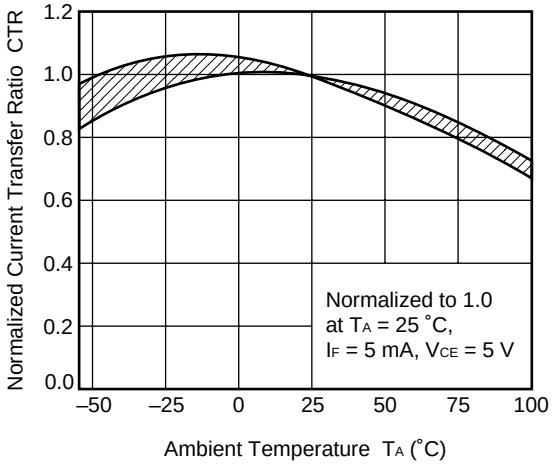
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



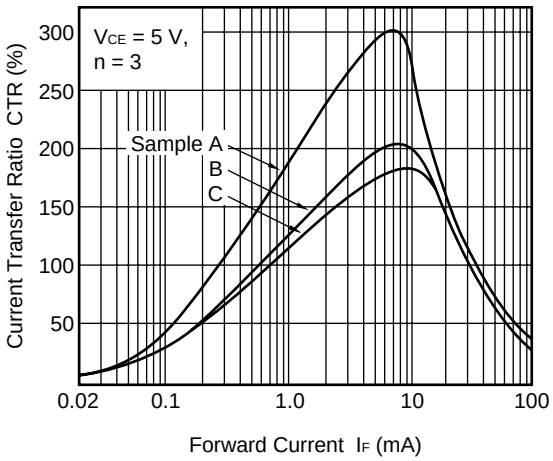
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



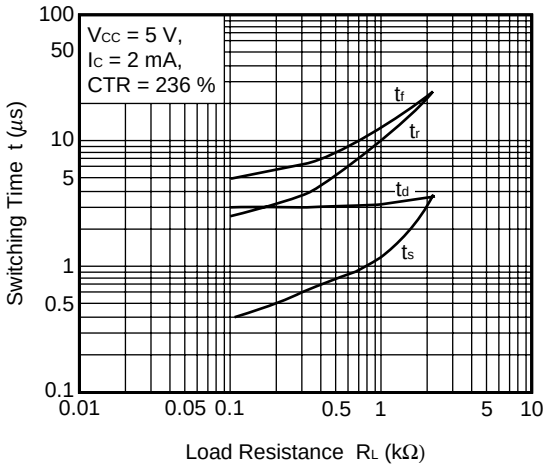
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



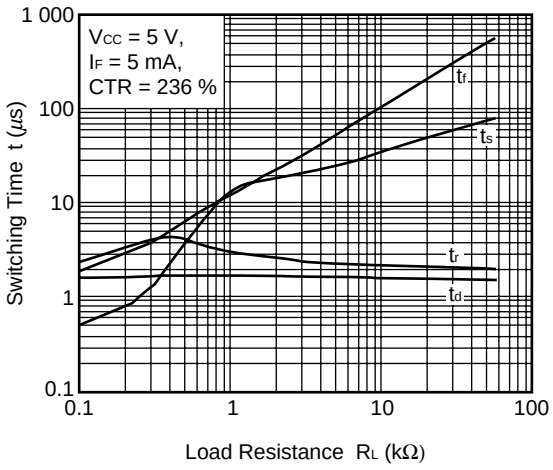
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



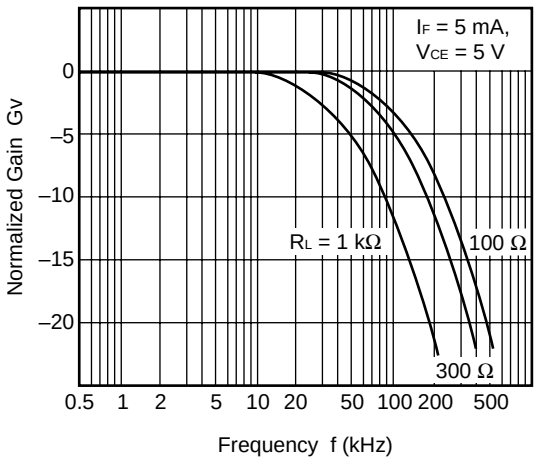
SWITCHING TIME vs. LOAD RESISTANCE



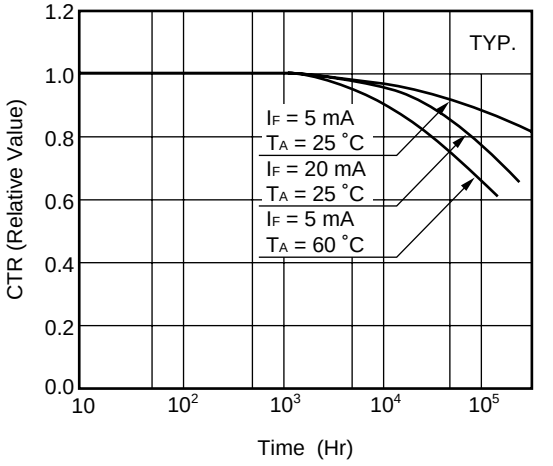
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



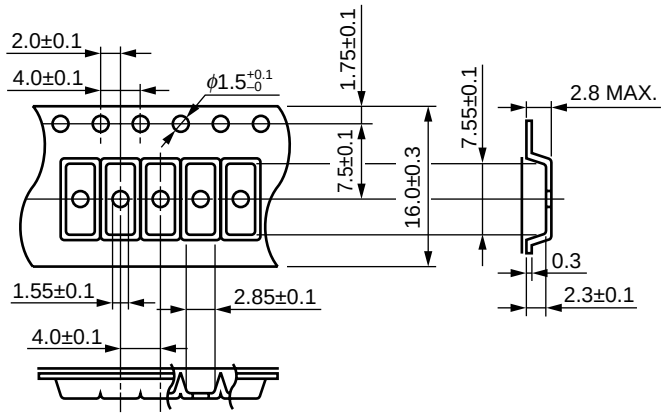
LONG TERM CTR DEGRADATION



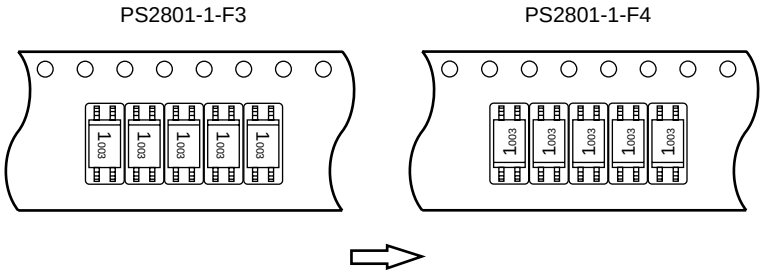
Remark The graphs indicate nominal characteristics.

★ **TAPING SPECIFICATIONS (UNIT: mm)**

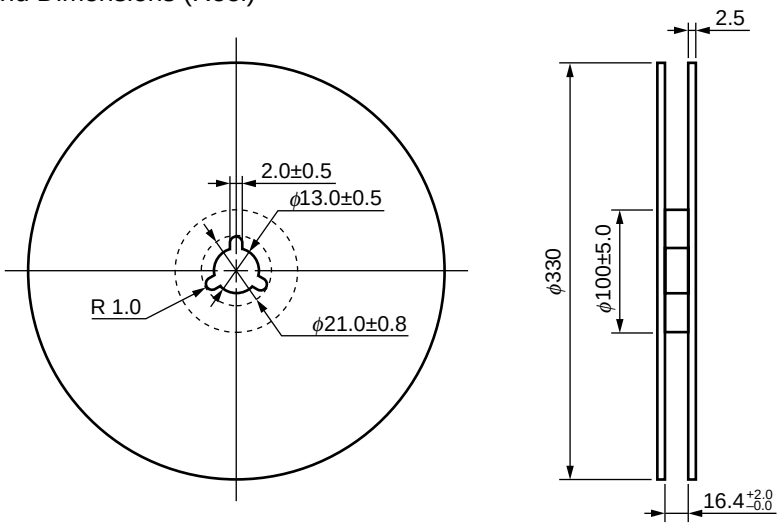
Outline and Dimensions (Tape)



Tape Direction

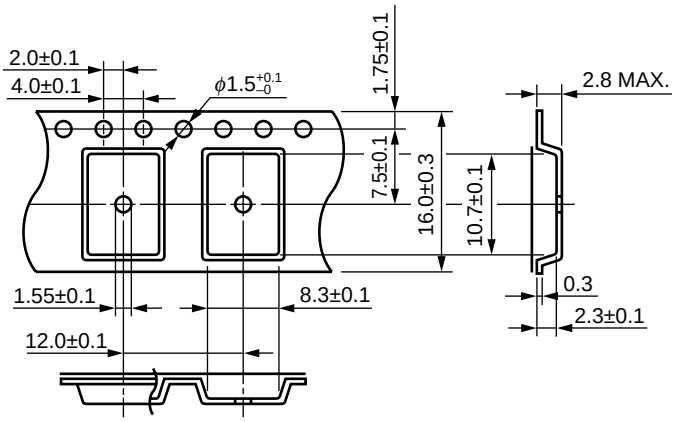


Outline and Dimensions (Reel)

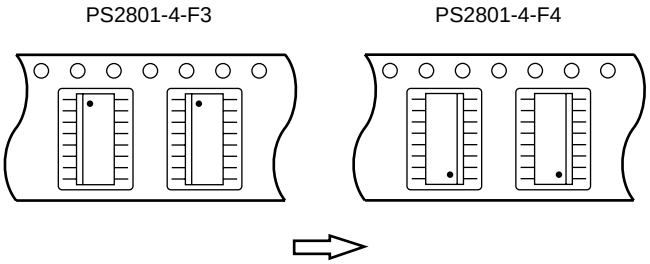


Packing: 3 500 pcs/reel

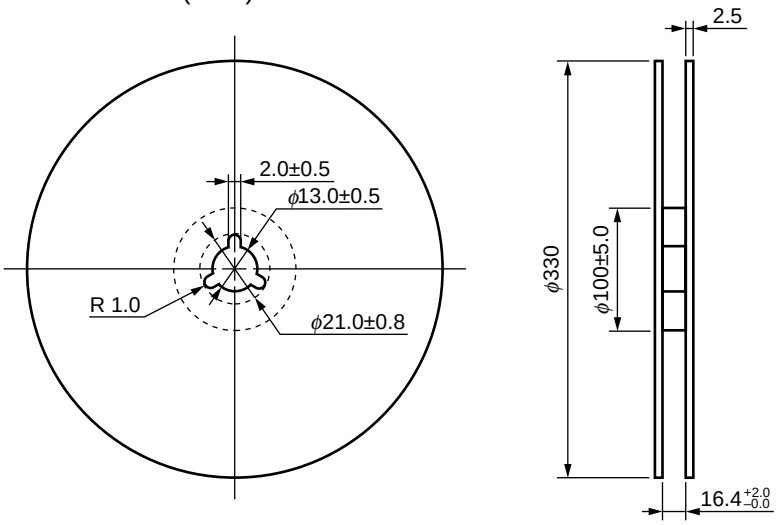
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 2 500 pcs/reel

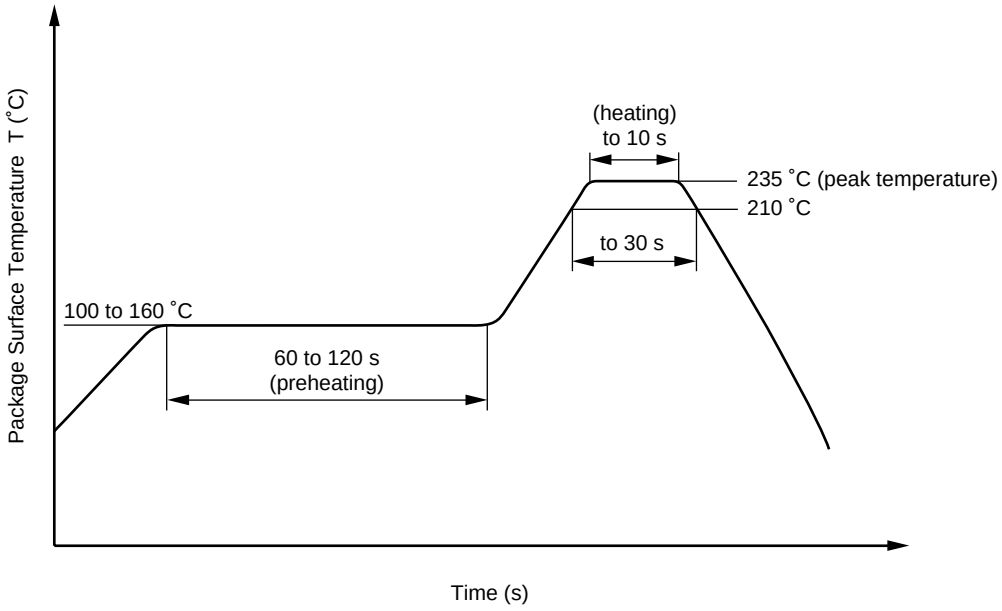
★ NOTES ON HANDLING

1. Recommended soldering conditions

(1) Infrared reflow soldering

- Peak reflow temperature — 235 °C or below (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



(2) Dip soldering

- Temperature — 260 °C or below (molten solder temperature)
- Time — 10 seconds or less
- 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) Cautions

- Fluxes

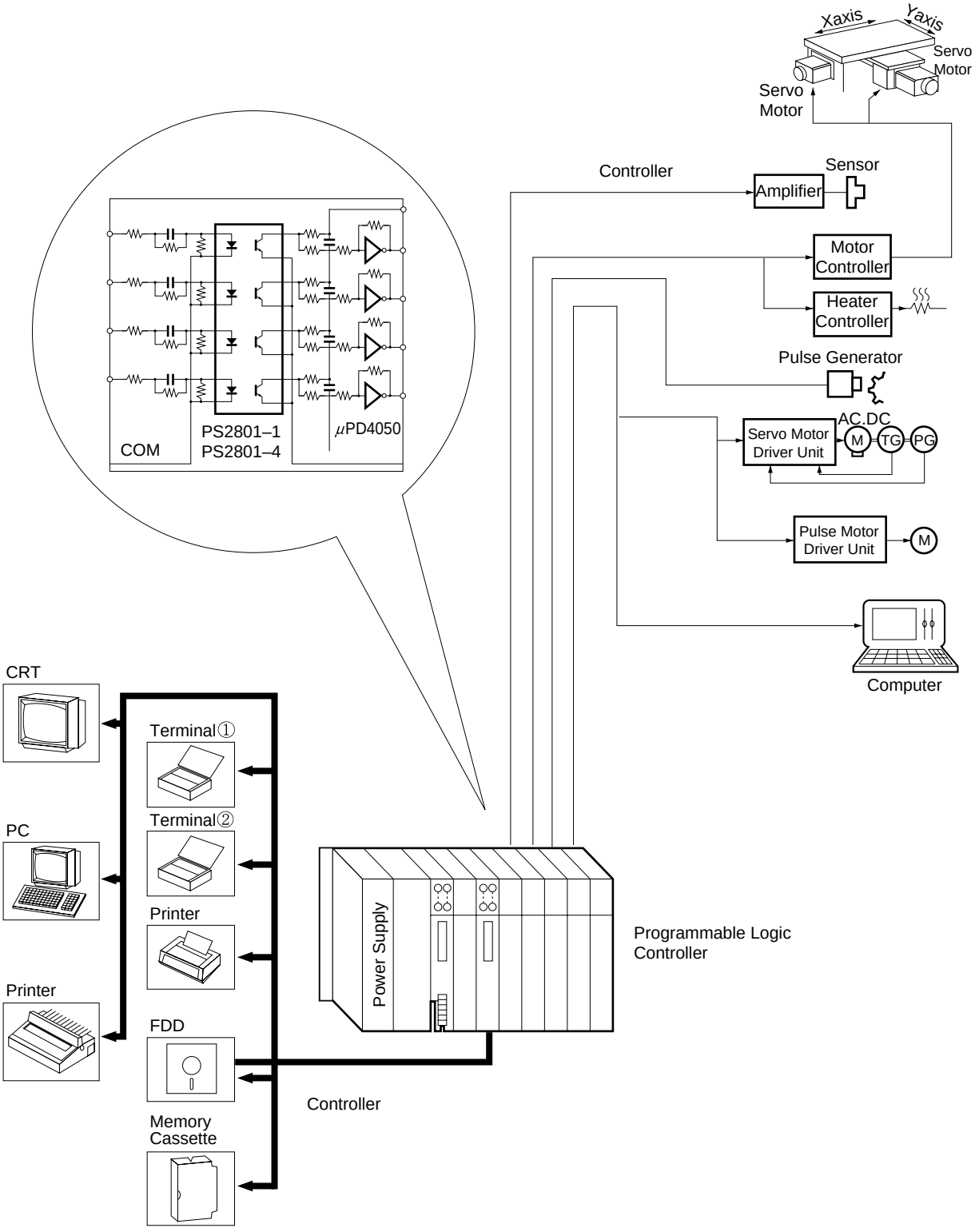
  Avoid removing the residual flux with freon-based and chlorine-based cleaning solvent.

2. Cautions regarding noise

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

PROGRAMMABLE LOGIC CONTROLLERS EXAMPLE

Purpose: In-out interface



[MEMO]

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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