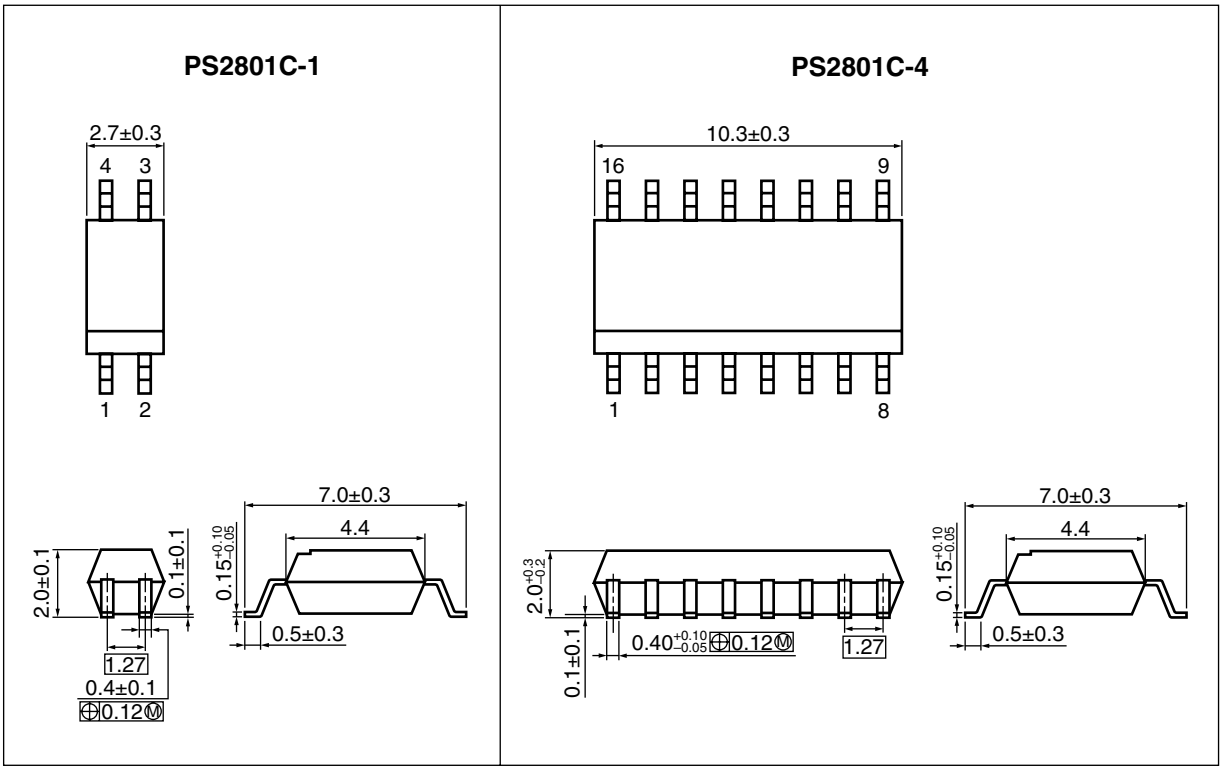
PACKAGE DIMENSIONS (UNIT: mm)

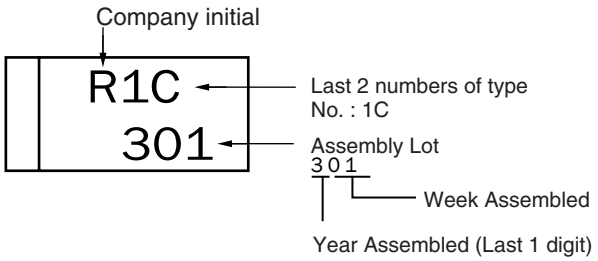
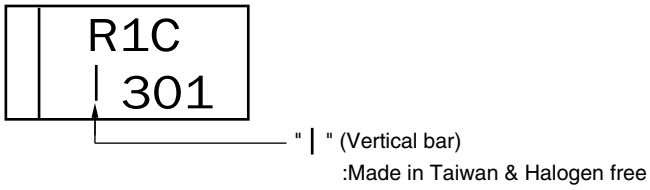
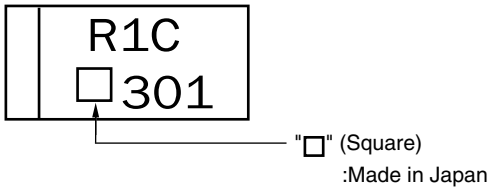
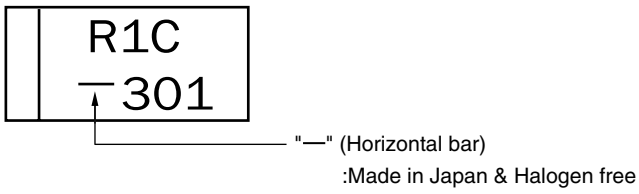


<R> PHOTOCOUPLER CONSTRUCTION

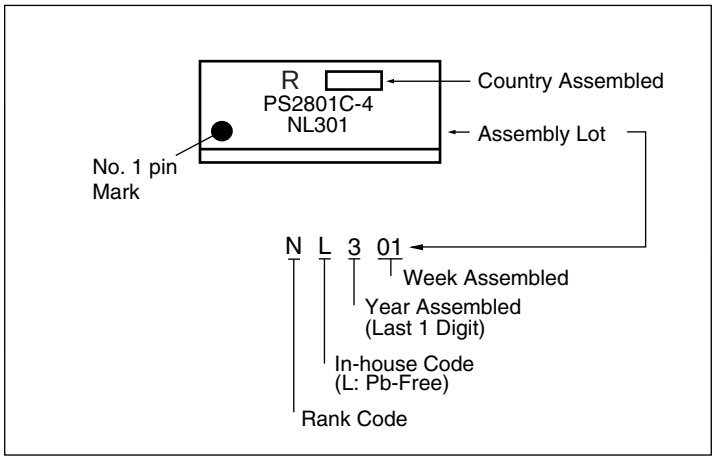
Parameter	Unit (MIN.)
Air Distance	4.5 mm
Outer Creepage Distance	4.5 mm
Inner Creepage Distance	2.5 mm
Isolation Distance	0.1 mm

<R> MARKING EXAMPLE

PS2801C-1

Made in Taiwan	
Made in Taiwan Halogen free	
Made in Japan	
Made in Japan Halogen free	

PS2801C-4



<R> ORDERING INFORMATION

Part Number	Order Number	Solder Plating Specification etc.	Packing Style	Safety Standard Approval	Application Part Number*1
PS2801C-1-F3	PS2801C-1-F3-A	Pb-Free	Embossed Tape 3 500 pcs/reel	Standard products (UL, CSA, BSI approved)	PS2801C-1
PS2801C-4-F3	PS2801C-4-F3-A		Embossed Tape 2 500 pcs/reel		PS2801C-4
PS2801C-1-V-F3	PS2801C-1-V-F3-A		Embossed Tape 3 500 pcs/reel	DIN EN 60747-5-5 (VDE0884-5) Approved (Option)	PS2801C-1
PS2801C-4-V-F3	PS2801C-4-V-F3-A		Embossed Tape 2 500 pcs/reel		PS2801C-4
PS2801C-1-F3	PS2801C-1Y-F3-A	Special version (Pb-Free and Halogen Free)	Embossed Tape 3 500 pcs/reel	Standard products (UL, CSA, BSI approved)	PS2801C-1
PS2801C-1-V-F3	PS2801C-1Y-V-F3-A		Embossed Tape 3 500 pcs/reel	DIN EN 60747-5-5 (VDE0884-5) Approved (Option)	

Note: *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
			PS2801C-1	PS2801C-4	
Diode	Forward Current (DC)	I_F	30		mA/ch
	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}	0.5		A/ch
Transistor	Collector to Emitter Voltage	V_{CEO}	80		V
	Emitter to Collector Voltage	V_{ECO}	5		V
	Collector Current	I_C	30		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

Notes: *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 (PS2801C-1).
Pins 1-8 shorted together, 9-16 shorted together (PS2801C-4).

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = 5 mA		1.2	1.4	V
	Reverse Current	I_R	V_R = 5 V			5	μA
	Terminal Capacitance	C_t	V = 0 V, f = 1.0 MHz		10		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	50		400	%
	Collector Saturation Voltage	$V_{CE (sat)}$	I_F = 10 mA, I_C = 2 mA		0.13	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		5		μs
	Fall Time *2	t_f			7		
<R>	Turn-on Time *2	t_{on}			10		
<R>	Turn-off Time *2	t_{off}			7		

Notes: *1. CTR rank

PS2801C-1

N : 50 to 400 (%)

P : 150 to 300 (%)

L : 100 to 300 (%)

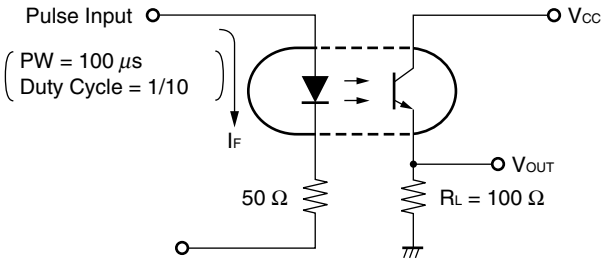
M : 100 to 400 (%)

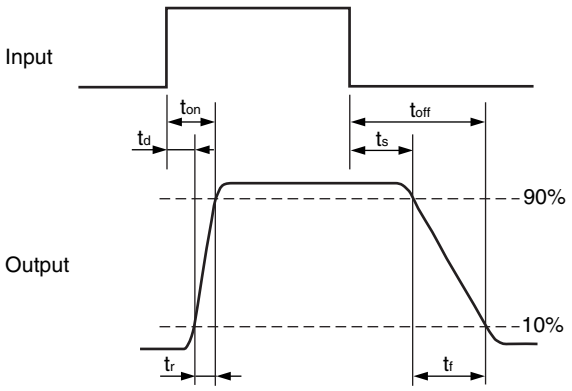
PS2801C-4

N : 50 to 400 (%)

M : 100 to 400 (%)

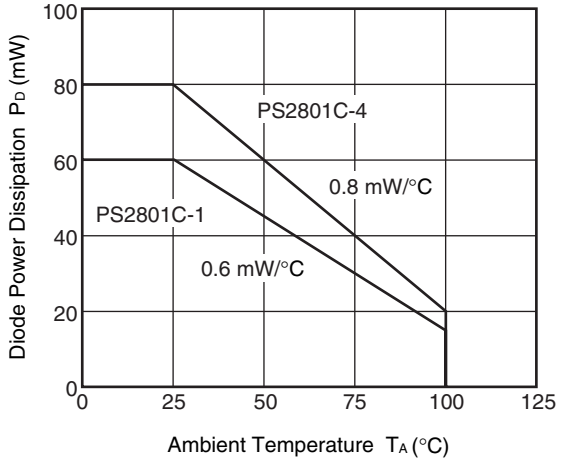
*2. Test circuit for switching time



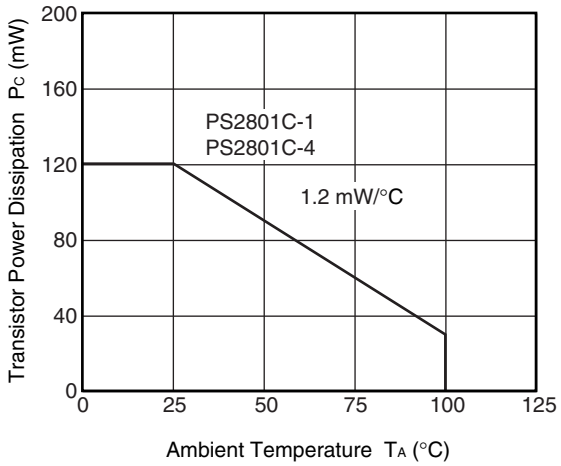


<R> TYPICAL CHARACTERISTICS (T_A = 25°C, unless otherwise specified)

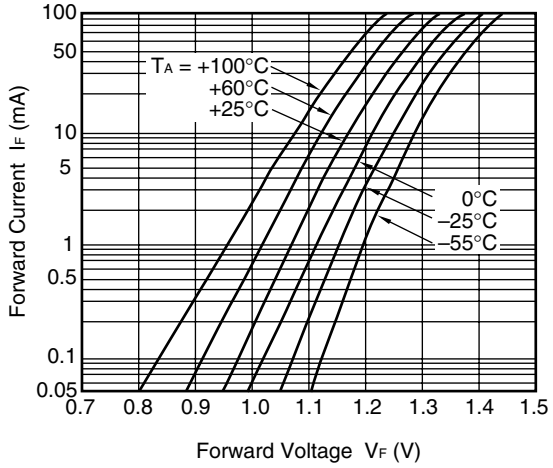
DIODE POWER DISSIPATION vs. AMBIENT TEMPERATURE



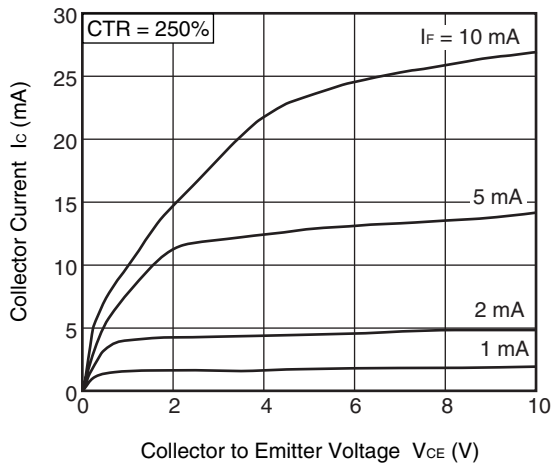
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



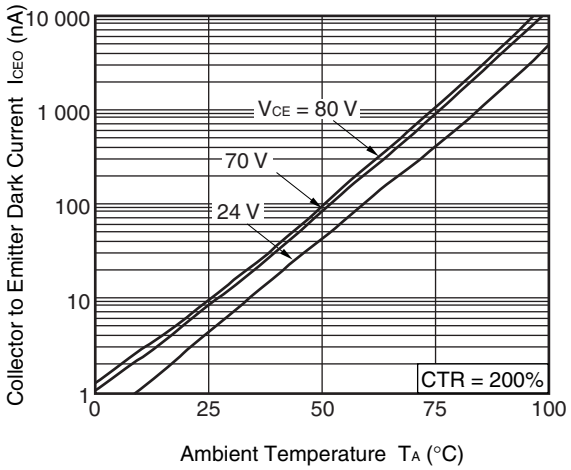
FORWARD CURRENT vs. FORWARD VOLTAGE



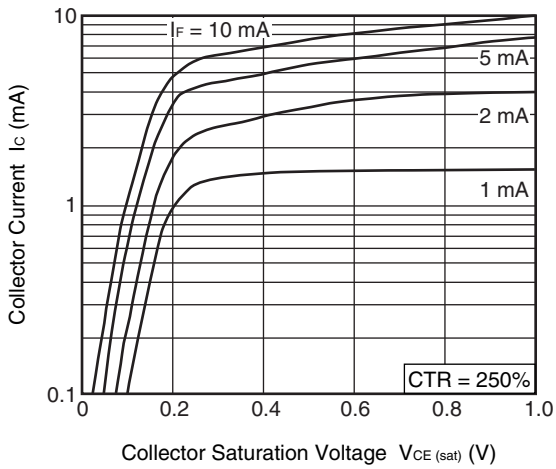
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

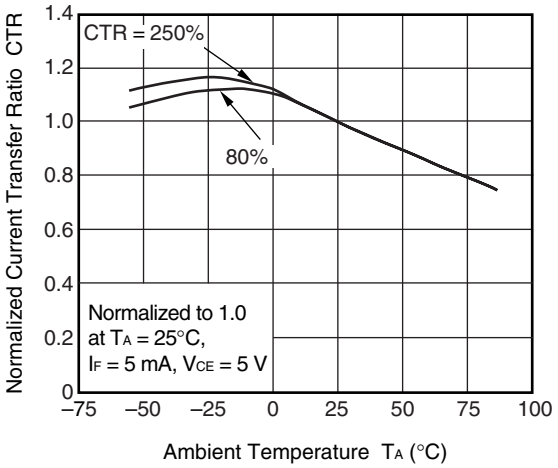


COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

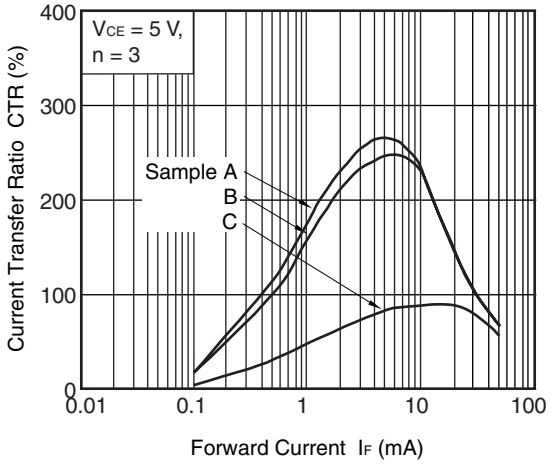


Remark The graphs indicate nominal characteristics.

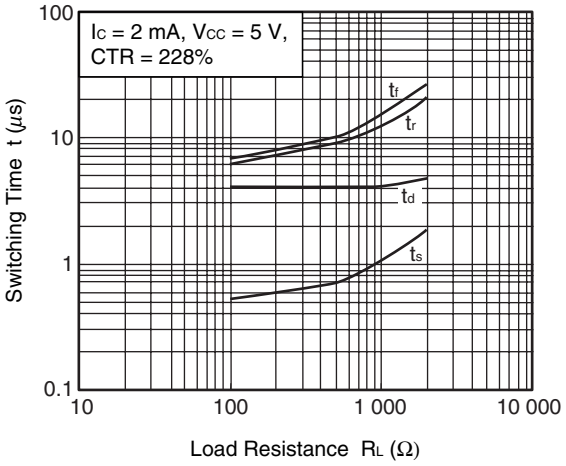
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



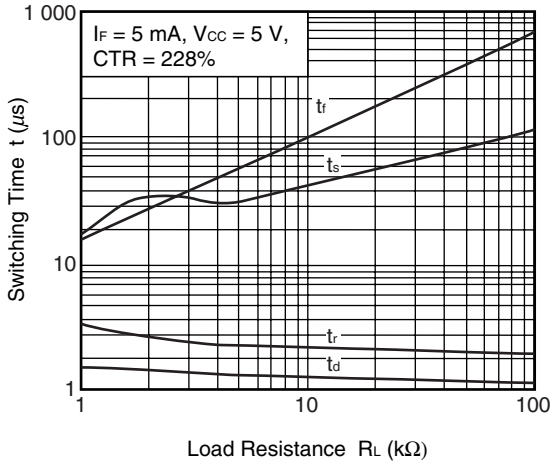
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



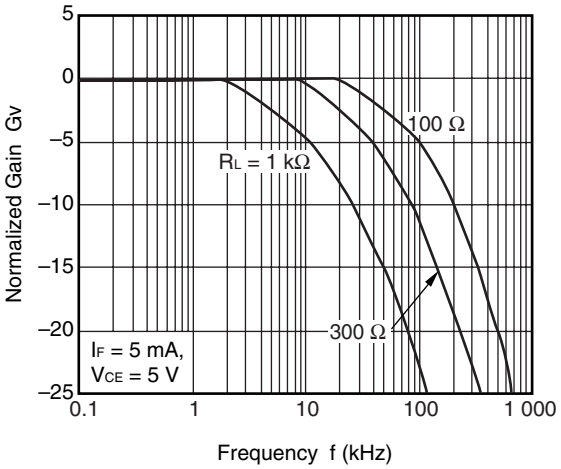
SWITCHING TIME vs. LOAD RESTISTANCE



SWITCHING TIME vs. LOAD RESTISTANCE



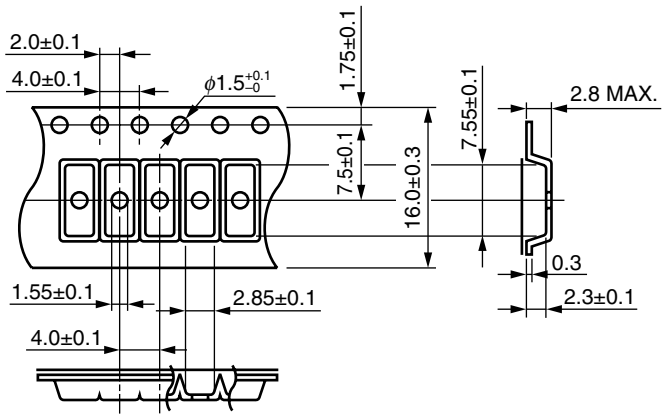
FREQUENCY RESPONSE



Remark The graphs indicate nominal characteristics.

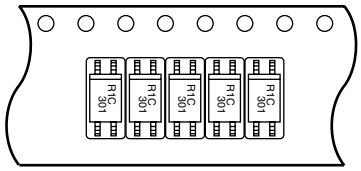
<R> TAPING SPECIFICATIONS (UNIT: mm)

Outline and Dimensions (Tape)

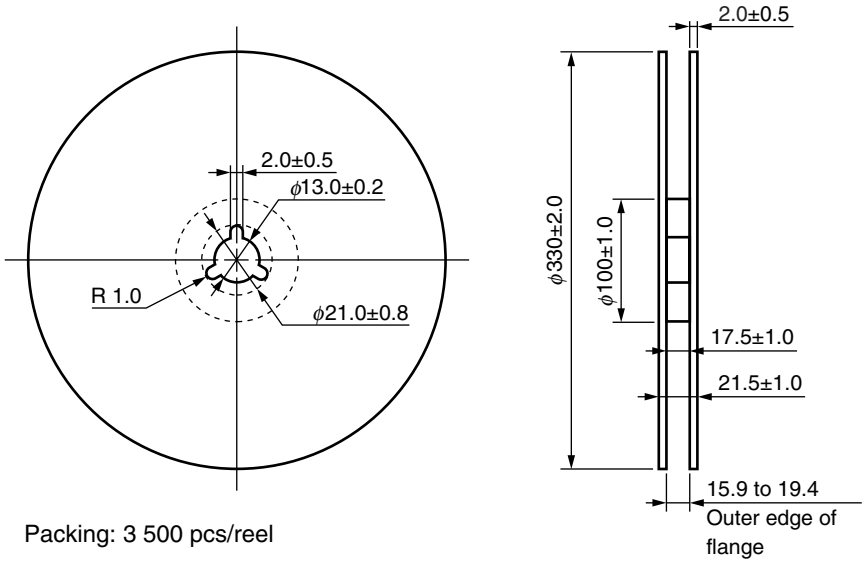


Tape Direction

PS2801C-1-F3

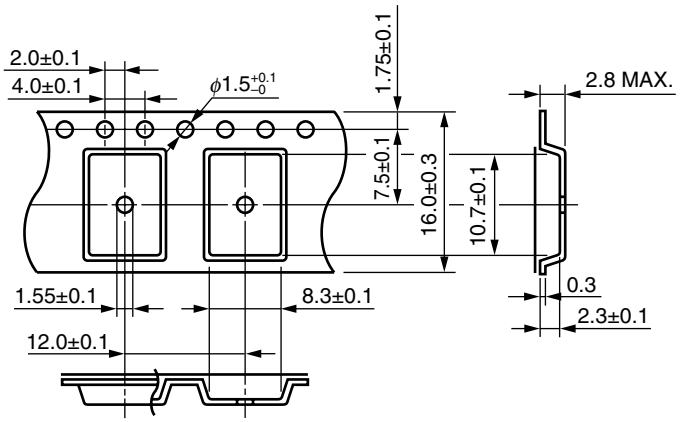


Outline and Dimensions (Reel)



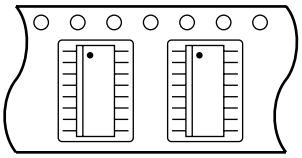
Packing: 3 500 pcs/reel

Outline and Dimensions (Tape)

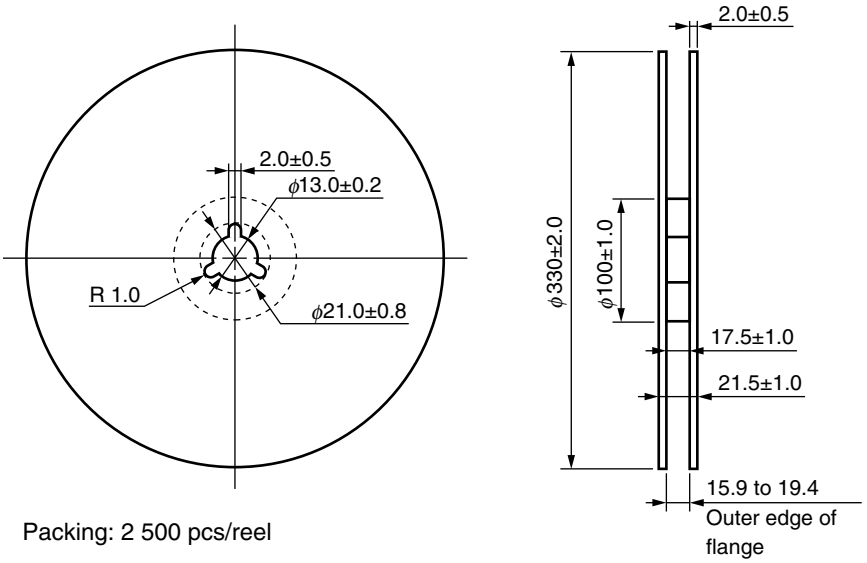


Tape Direction

PS2801C-4-F3



Outline and Dimensions (Reel)



Packing: 2 500 pcs/reel

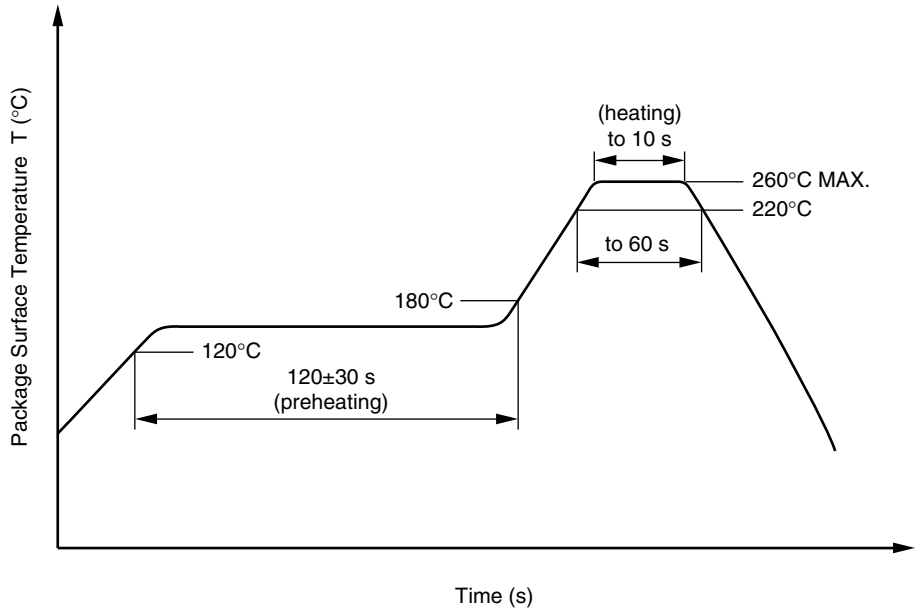
<R> NOTES ON HANDLING

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

(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 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.

SPECIFICATION OF VDE MARKS LICENSE DOCUMENT

	Parameter	Symbol	Spec.	Unit
	Climatic test class (IEC 60068-1/DIN EN 60068-1)		55/100/21	
	Dielectric strength maximum operating isolation voltage	U_{IORM}	705	V_{peak}
<R>	Test voltage (partial discharge test, procedure a for type test and random test) <R> $U_{pr} = 1.6 \times U_{IORM}$, $P_d < 5$ pC	U_{pr}	1 128	V_{peak}
	Test voltage (partial discharge test, procedure b for all devices) $U_{pr} = 1.875 \times U_{IORM}$, $P_d < 5$ pC	U_{pr}	1 322	V_{peak}
	Highest permissible overvoltage	U_{TR}	6 000	V_{peak}
<R>	Degree of pollution (DIN EN 60664-1 VDE0110 Part 1)		2	
	Comparative tracking index (IEC 60112/DIN EN 60112 (VDE 0303 Part 11))	CTI	175	
	Material group (DIN EN 60664-1 VDE0110 Part 1)		III a	
	Storage temperature range	T_{stg}	–55 to +150	°C
	Operating temperature range	T_A	–55 to +100	°C
	Isolation resistance, minimum value V_{IO} = 500 V dc at T_A = 25°C V_{IO} = 500 V dc at T_A MAX. at least 100°C	 Ris MIN. Ris MIN.	 10^{12} 10^{11}	 Ω Ω
	Safety maximum ratings (maximum permissible in case of fault, see thermal derating curve) Package temperature Current (input current I_F, Psi = 0) Power (output or total power dissipation) Isolation resistance V_{IO} = 500 V dc at T_A = Tsi	 Tsi Isi Psi Ris MIN.	 150 300 500 10^9	 °C mA mW Ω

Revision History	PS2801C-1, PS2801C-4 Data Sheet

Rev.	Date	Description	
		Page	Summary
1.00	May 30, 2006	–	This data sheet was released as PN10610EJ01V0DS
4.00	Jan 9, 2013	Throughout	Renesas format is applied to this data sheet.
		p.1	The ordering number and safety standards are revised.
		p.2	PHOTOCOUPLER CONSTRUCTION is added as each distance of this device.
		p.3	The explanation in MARKING EXAMPLE is revised.
		p.4	ORDERING INFORMATION is modified with the revision of the safety standards.
		p.5	Turn-on Time (t_{on}) and Turn-off Time (t_{off}) are added to the table in ELECTRICAL CHARACTERISTICS.
		p.7	The graph of LONG TERM CTR DEGRADATION is deleted from those in TYPICAL CHARACTERISTICS.
		p.8	PS2801C-1-F4 is deleted form Tape Direction image in TAPING SPECIFICATIONS.
		p.9	PS2801C-4-F4 is deleted form Tape Direction image in TAPING SPECIFICATIONS.
		p.10	The note about temperature condition of the recommended soldering conditions is deleted.
		p.12	The values in SPECIFICATION OF VDE MARKS LICENSE DOCUMENT are changed as follows. -- Test voltage is changed from the factor, 1.5, and the value, 1058, to 1.6 and 1128, respectively. -- Clearance distance is moved to PHOTOCOUPLER CONSTRUCTION with changing 5.0 (min.) to 4.5 (min.).

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