DATA SHEET

NEC

PHOTOCOUPLER

PS2915-1

HIGH CTR, AC INPUT RESPONSE TYPE 4-PIN ULTRA SMALL FLAT-LEAD PHOTOCOUPLER

–NEPOC Series–

DESCRIPTION

The PS2915-1 is an optically coupled isolator containing GaAs light emitting diodes and an NPN silicon phototransistor in one package for high density mounting applications.

An ultra small flat-lead package has been provided which realizes a reduction in mounting area of about 30% compared with the PS28xx series.

FEATURES

★ • Ultra small flat-lead package (4.6 (L) × 2.5 (W) × 2.1 (H) mm)

★ • High current transfer ratio (CTR = 200% TYP. @ I_F = ±1 mA, V_{CE} = 5 V)

• High isolation voltage (BV = 2 500 Vr.m.s.)

• Ordering number of taping product: PS2915-1-F3, F4: 3 500 pcs/reel

APPLICATIONS

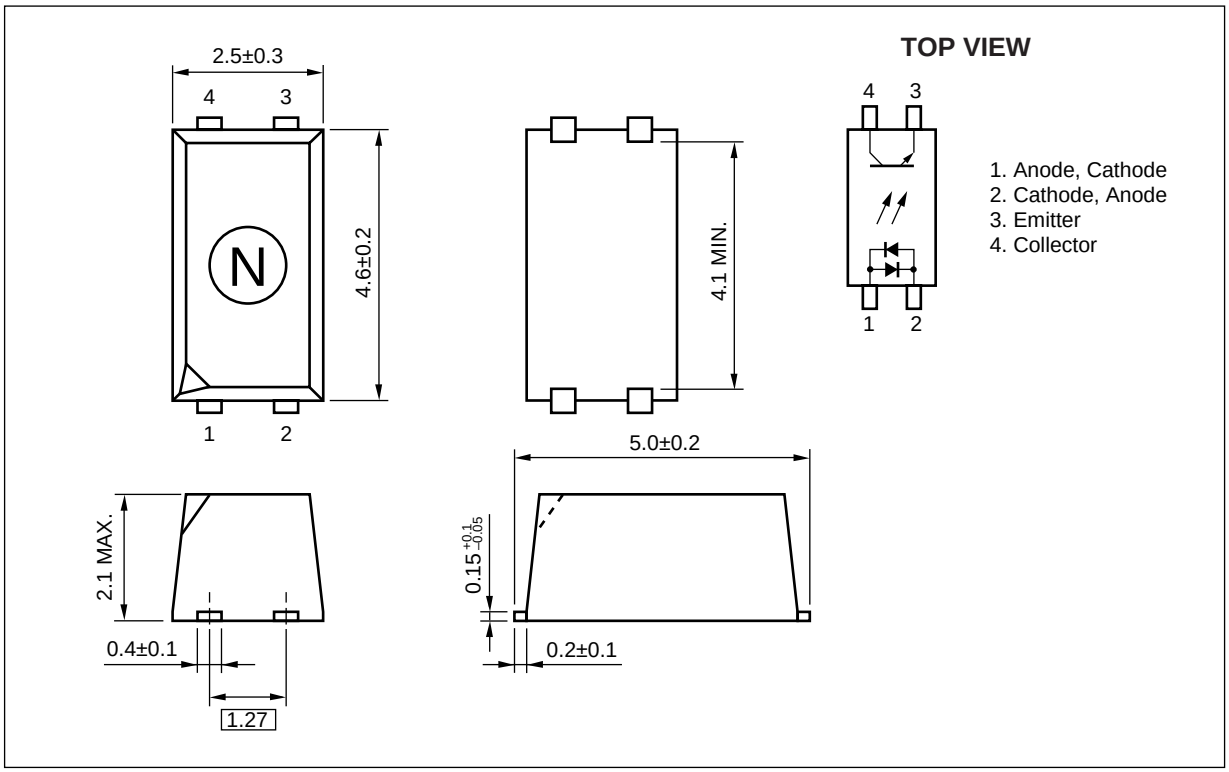
• DC/DC converter

• Modem/PC card

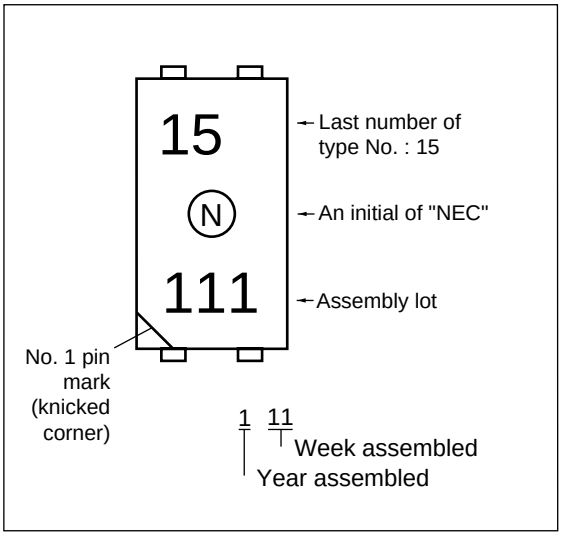
Document No. PN10044EJ01V0DS (1st edition)
(Previous No. P15036EJ1V0DS00)
Date Published November 2001 CP(K)
Printed in Japan

The mark ★ shows major revised points.

★ **PACKAGE DIMENSIONS (in millimeters)**



MARKING



PHOTOCOUPLER CONSTRUCTION

	Parameter	Unit (MIN.)
★	Air Distance	4 mm
★	Creepage Distance	4 mm
	Isolation Distance	0.4 mm

★ ORDERING INFORMATION

Part Number	Package	Packing Style	Application Part Number*1
PS2915-1-F3	4-pin ultra small flat-lead	Embossed Tape 3 500 pcs/reel	PS2915-1
PS2915-1-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
Diode	Forward Current	I_F	±50	mA
★	Forward Current Derating	ΔI_F/°C	0.5	mA/°C
★	Peak Forward Current*1	I_{FP}	±0.5	A
	Power Dissipation	P_D	60	mW
Transistor	Collector to Emitter Voltage	V_{CEO}	40	V
	Emitter to Collector Voltage	V_{ECO}	5	V
	Collector Current	I_C	40	mA
	Power Dissipation Derating	ΔP_C/°C	1.2	mW/°C
	Power Dissipation	P_C	120	mW
Isolation Voltage*2		BV	2 500	Vr.m.s.
Total Power Dissipation		P_T	160	mW
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

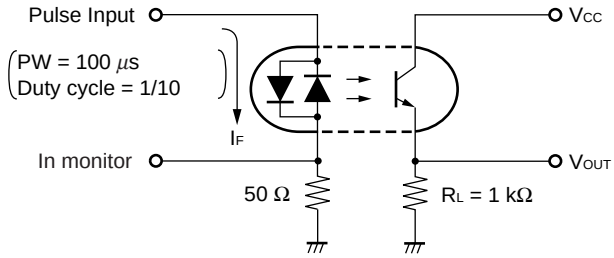
★ ELECTRICAL CHARACTERISTICS (T_A = 25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = ±1 mA	0.9	1.1	1.3	V
	Terminal Capacitance	C_t	V = 0 V, f = 1 MHz		30		pF
Transistor	Collector to Emitter Dark Current	I_{CEO}	I_F = 0 mA, V_{CE} = 40 V			100	nA
Coupled	Current Transfer Ratio (I_C/I_F)*1	CTR	I_F = ±1 mA, V_{CE} = 5 V	100	200	400	%
	Collector Saturation Voltage	$V_{CE\ (sat)}$	I_F = ±1 mA, I_C = 0.2 mA		0.13	0.3	V
	Isolation Resistance	R_{I-O}	V_{I-O} = 1 kV_{DC}	10^{11}			Ω
	Isolation Capacitance	C_{I-O}	V = 0 V, f = 1 MHz		0.4		pF
	Rise Time*2	t_r	V_{CC} = 5 V, I_C = 2 mA, R_L = 1 kΩ		5		μs
	Fall Time*2	t_f			10		
	On Time*2	t_{on}	V_{CC} = 5 V, I_F = ±1 mA, R_L = 5 kΩ		40		μs
	Storage Time*2	t_s			10		μs
	Off Time*2	t_{off}			120		μs

***1** CTR rank

N : 100 to 400 (%)

***2** Test circuit for switching time

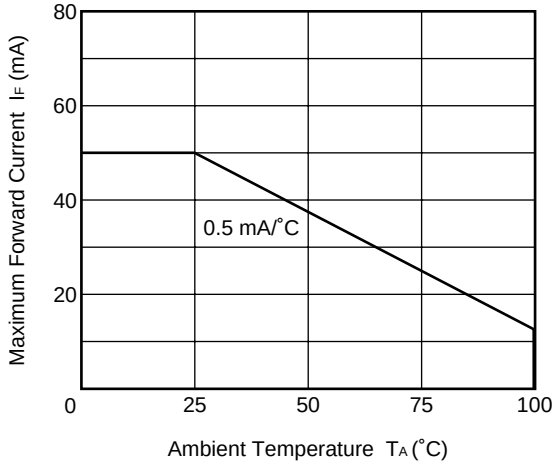


★ CAUTIONS REGARDING NOISE

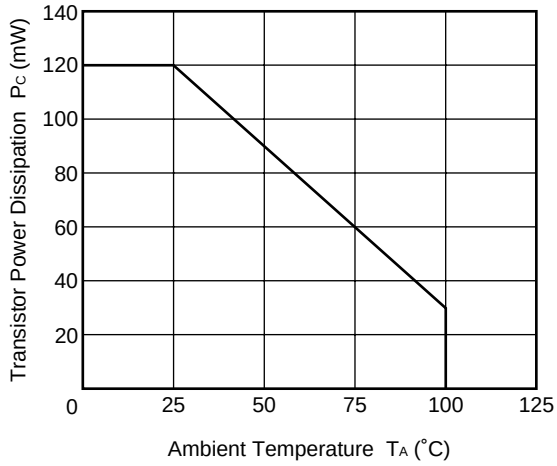
Be aware that when voltage is applied suddenly between the photocoupler's input and output or between corrector-emitters at startup, the output side may enter the on state, even if the voltage is within the absolute maximum ratings.

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

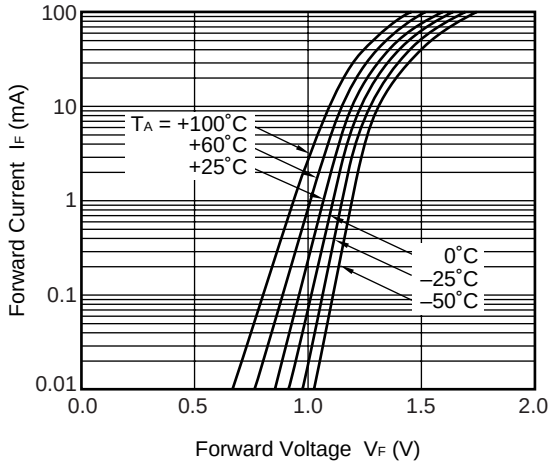
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



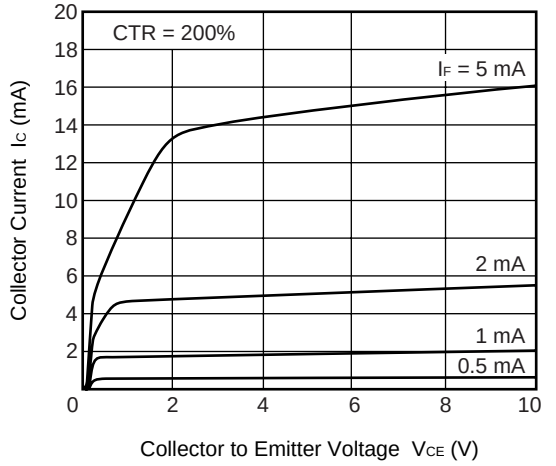
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



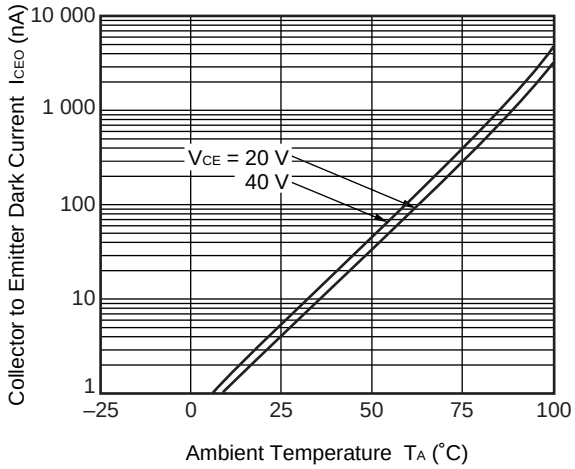
FORWARD CURRENT vs. FORWARD VOLTAGE



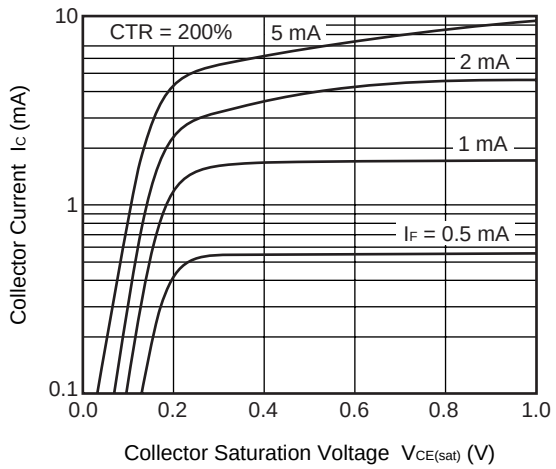
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



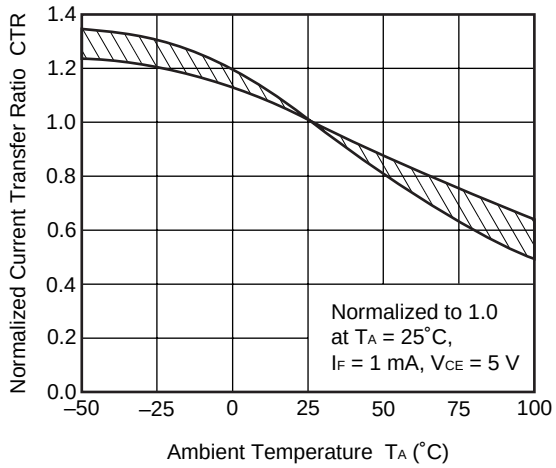
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



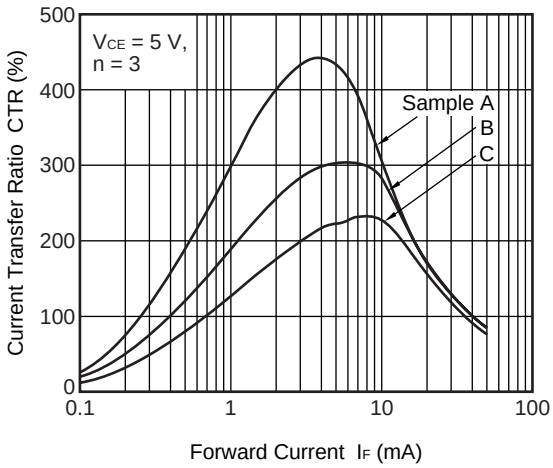
COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE



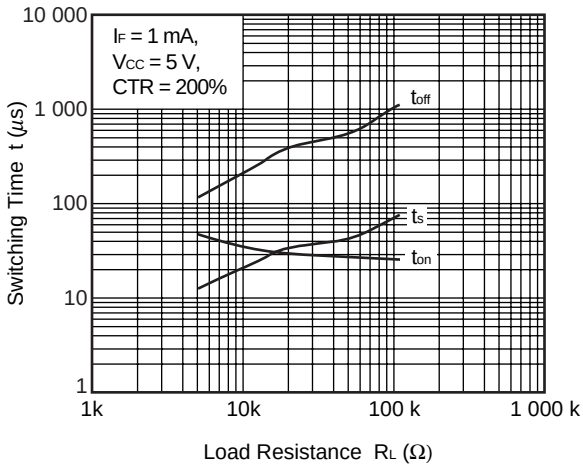
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



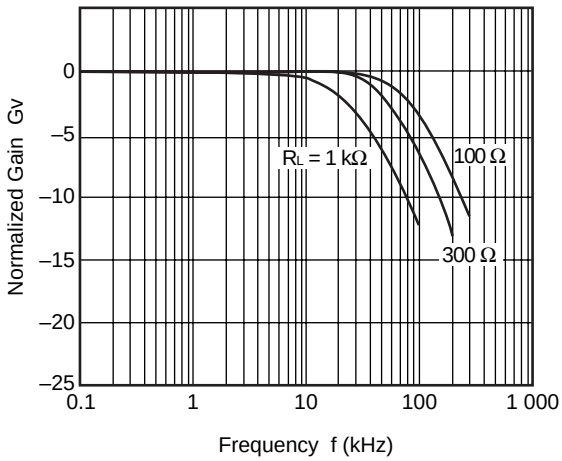
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



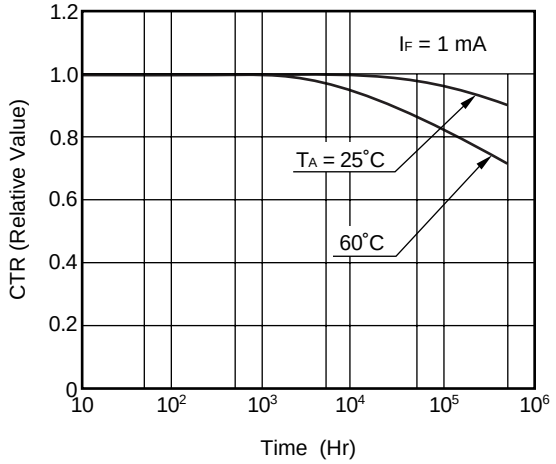
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



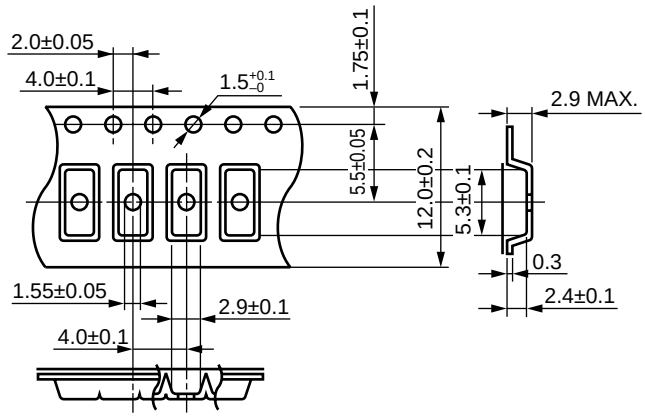
LONG TERM CTR DEGRADATION



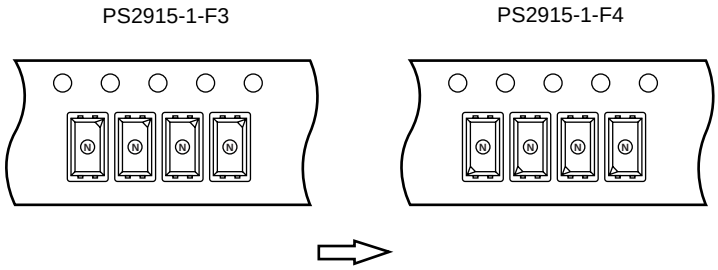
Remark The graphs indicate nominal characteristics.

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

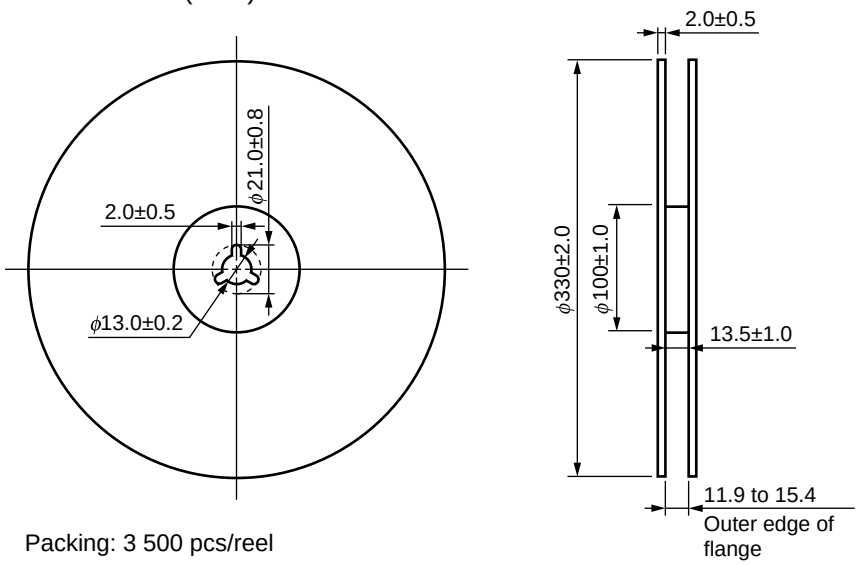
Outline and Dimensions (Tape)



Tape Direction

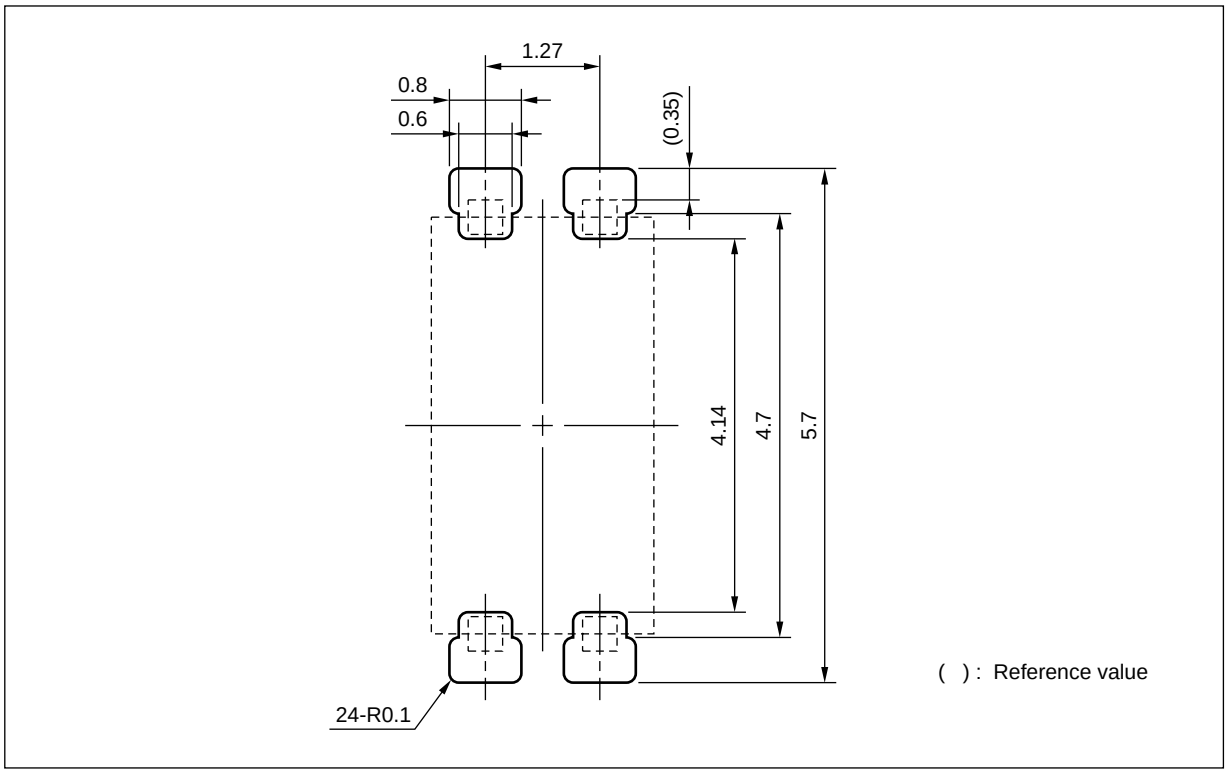


Outline and Dimensions (Reel)



Packing: 3 500 pcs/reel

★ **RECOMMENDED MOUNT PAD DIMENSIONS (UNIT: mm)**



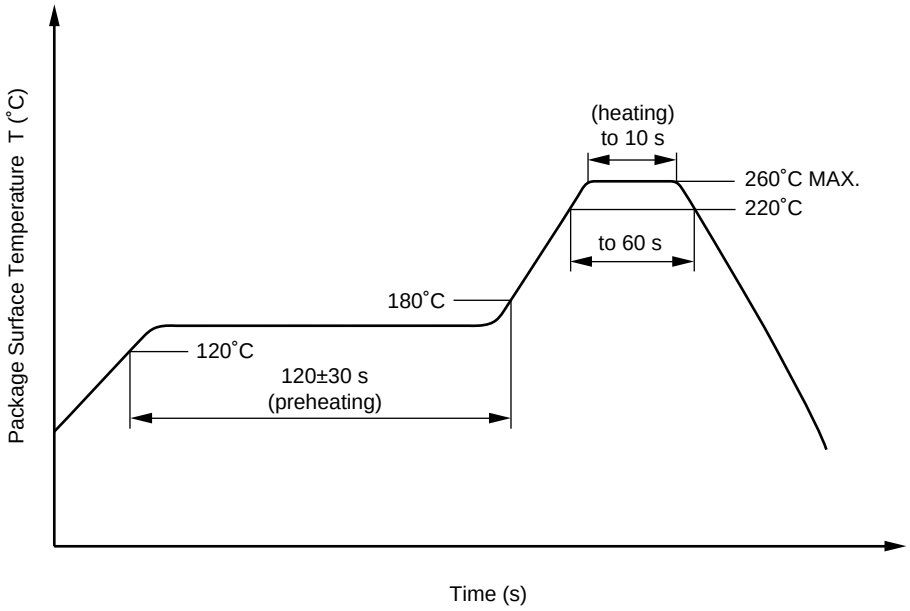
Remark This drawing is considered to meet air and outer creepage distance 4.0 mm minimum. All dimensions in this figure must be evaluated before use.

★ 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) Cautions

• Fluxes

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

★ USAGE CAUTIONS

1. Protect against static electricity when handling.

2. Avoid storage at a high temperature and high humidity.

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M8E 00.4-0110

SAFETY INFORMATION ON THIS PRODUCT

Caution GaAs Products	The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested. • Do not destroy or burn the product. • Do not cut or cleave off any part of the product. • Do not crush or chemically dissolve the product. • Do not put the product in the mouth. Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.

▶Business issue

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▶Technical issue

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