

SINGLE Tr. OUTPUT, HIGH COLLECTOR TO EMITTER VOLTAGE 4-PIN ULTRA SMALL FLAT-LEAD PHOTOCOUPLER

–NEPOC Series–

DESCRIPTION

The PS2913-1 is an optically coupled isolator containing a GaAs light emitting diode 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

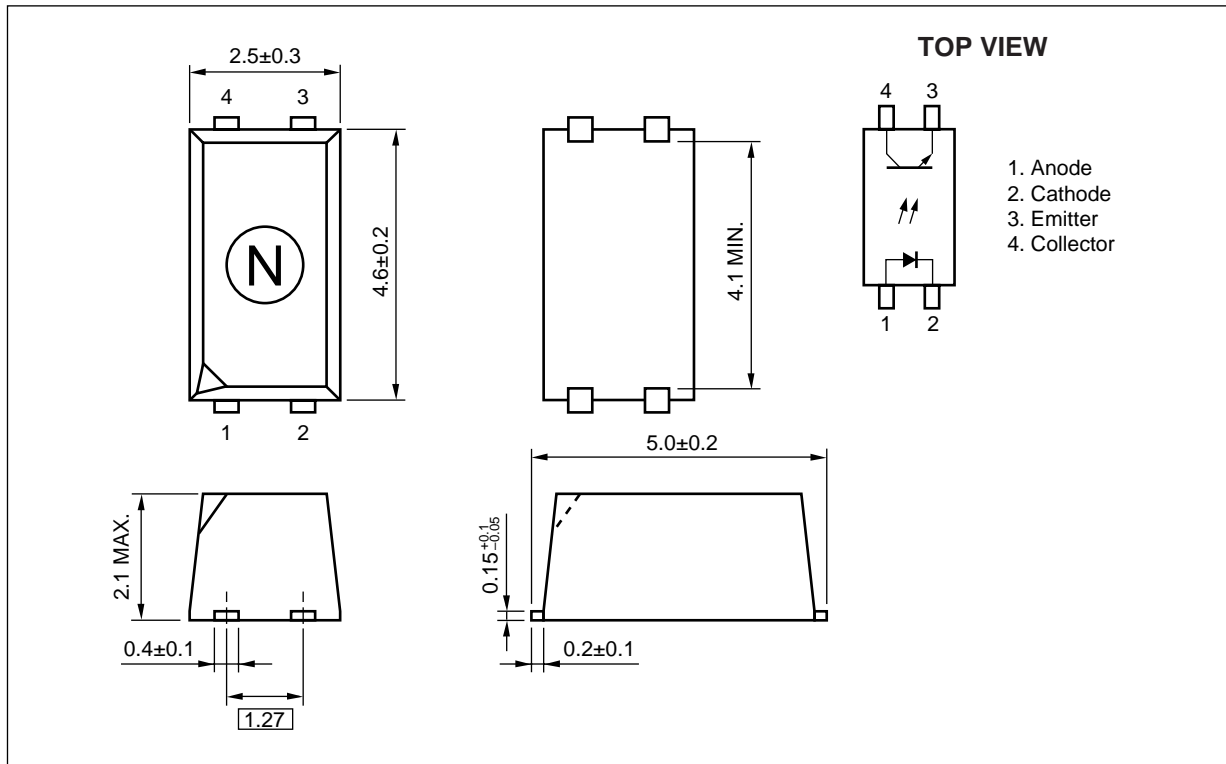
- Ultra small flat-lead package (4.6 (L) × 2.5 (W) × 2.1 (H) mm)
- Isolation distance (0.4 mm MIN.)
- High collector to emitter voltage ($V_{CE0} = 120\text{ V}$)
- High isolation voltage ($BV = 2\ 500\text{ Vr.m.s.}$)
- Ordering number of taping product: PS2913-1-F3, F4: 3 500 pcs/reel

APPLICATIONS

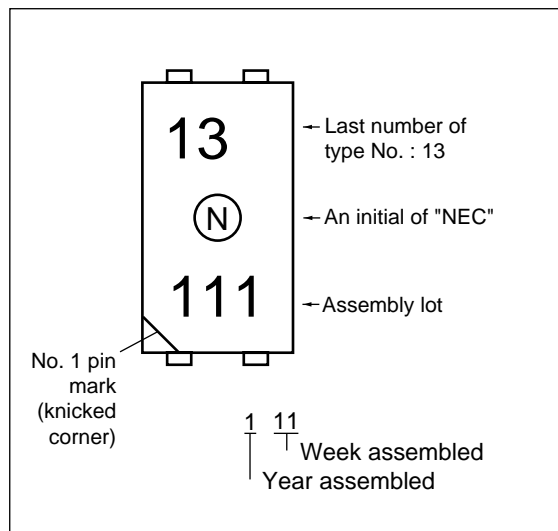
- Hybrid IC
- Power supply

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PACKAGE DIMENSIONS (UNIT: mm)



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}
PS2913-1-F3	4-pin ultra	Embossed Tape 3 500 pcs/reel	PS2913-1
PS2913-1-F4	small flat-lead		

*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
	Reverse Voltage	V _R	6	V
Transistor	Collector to Emitter Voltage	V _{CEO}	120	V
	Emitter to Collector Voltage	V _{ECO}	6	V
	Collector Current	I _C	30	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%

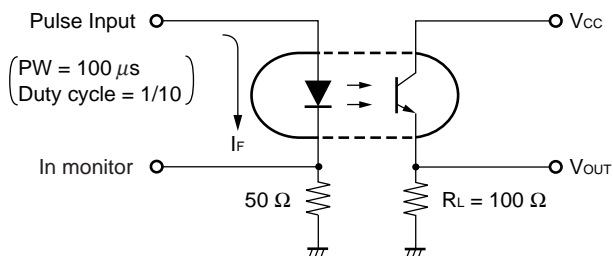
*2 AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output

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
	Reverse Current	I _R	V _R = 5 V			5	μA
	Terminal Capacitance	C _t	V = 0 V, f = 1 MHz		15		pF
Transistor	Collector to Emitter Dark Current	I _{CEO}	I _F = 0 mA, V _{CE} = 120 V			100	nA
Coupled	Current Transfer Ratio (I _c /I _F) ⁻¹	CTR	I _F = 1 mA, V _{CE} = 5 V	50	100	200	%
	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 = 100 Ω		10		μs
	Fall Time ²	t _f			10		
	On Time ²	t _{on}	V _{CC} = 5 V, I _F = 1 mA, R _L = 5 kΩ		80		μs
	Storage Time ²	t _s			5		μs
Off Time ²	t _{off}			50		μs	

- ★ *1 CTR rank
 - N : 50 to 200 (%)
 - K : 100 to 200 (%)
 - L : 75 to 150 (%)
 - M : 50 to 100 (%)

*2 Test circuit for switching time

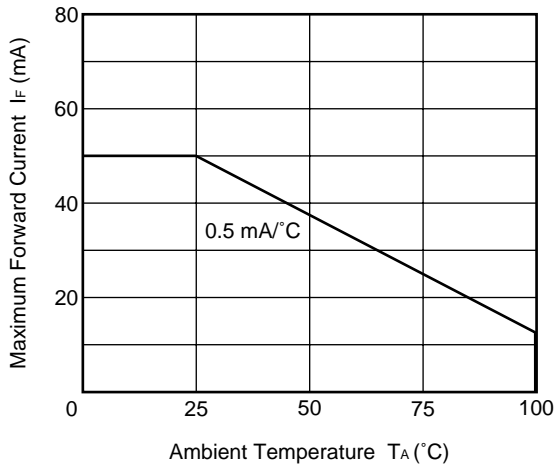


CAUTIONS REGARDING NOISE

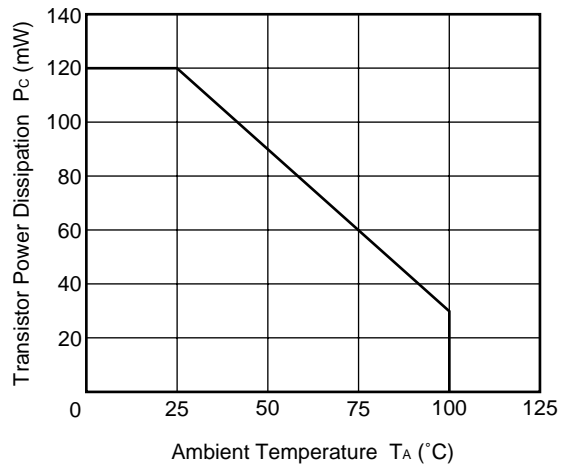
Be aware that when voltage is applied suddenly between the photocoupler's input and output or between collector-emitters at startup, the output side may enter the on state, even if the voltage is within the absolute maximum ratings.

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

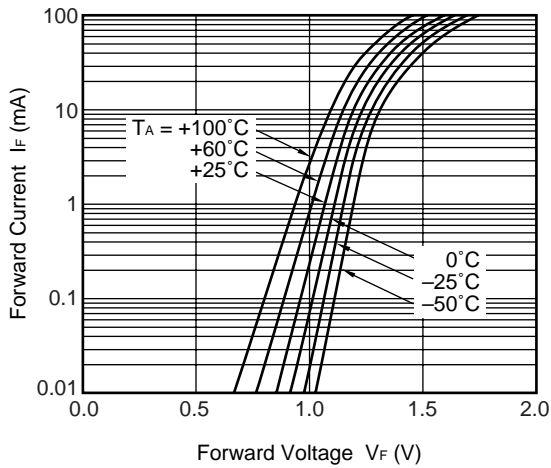
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



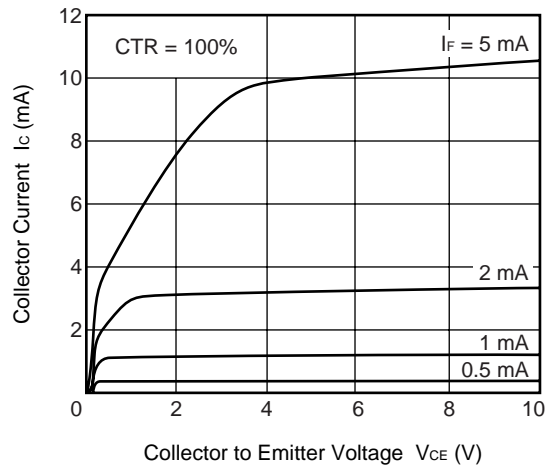
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



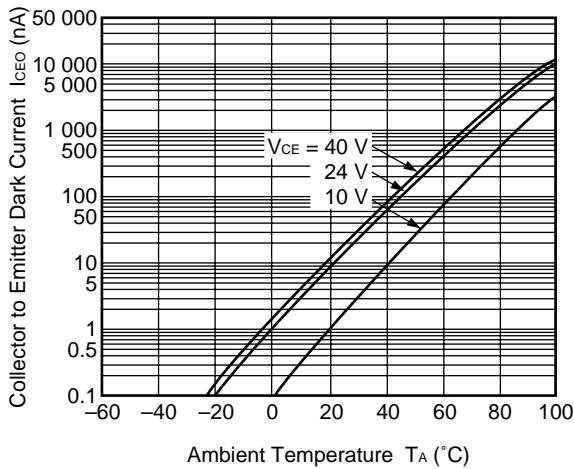
FORWARD CURRENT vs. FORWARD VOLTAGE



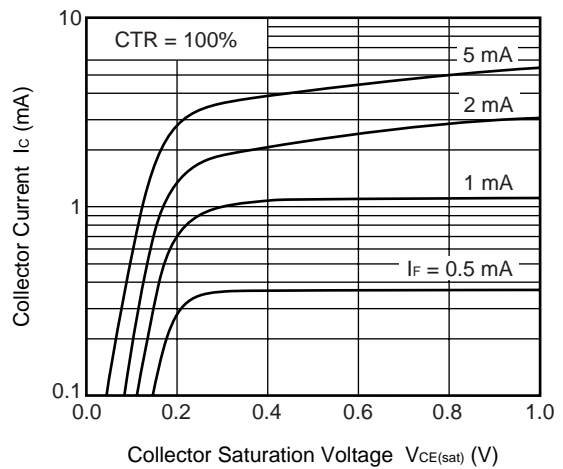
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE

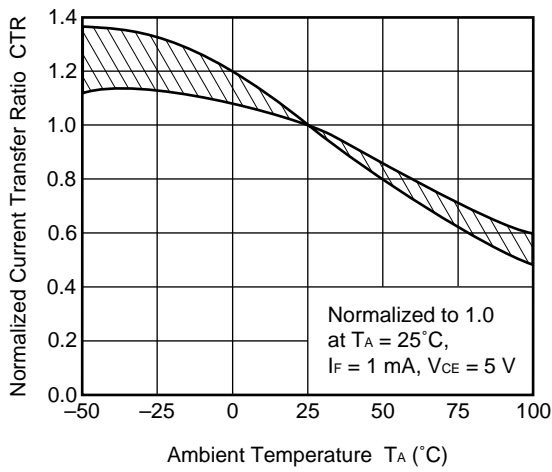


COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

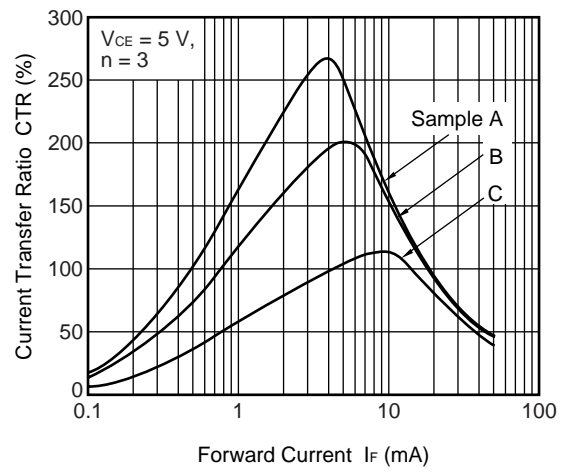


Remark The graphs indicate nominal characteristics.

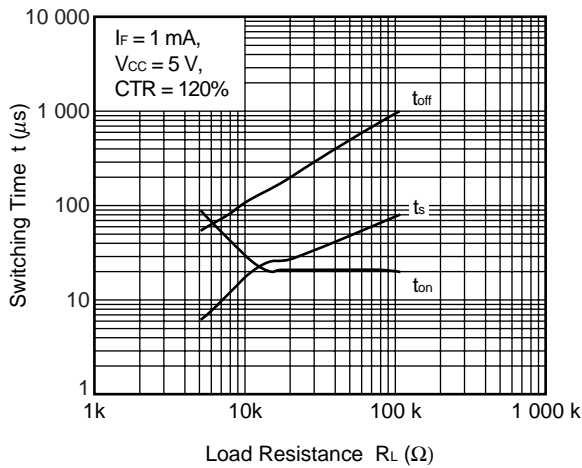
NORMALIZED CURRENT TRANSFER RATIO vs. AMBIENT TEMPERATURE



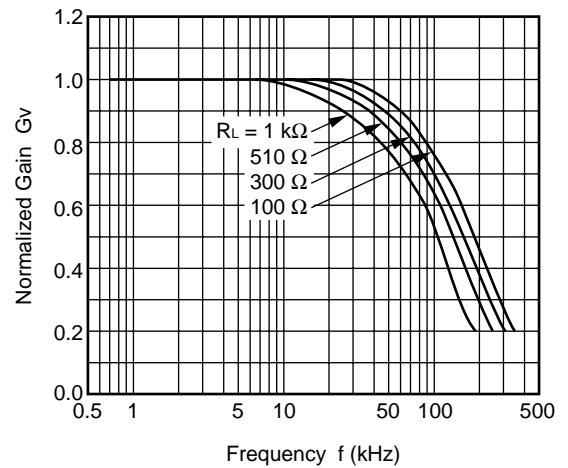
CURRENT TRANSFER RATIO vs. FORWARD CURRENT



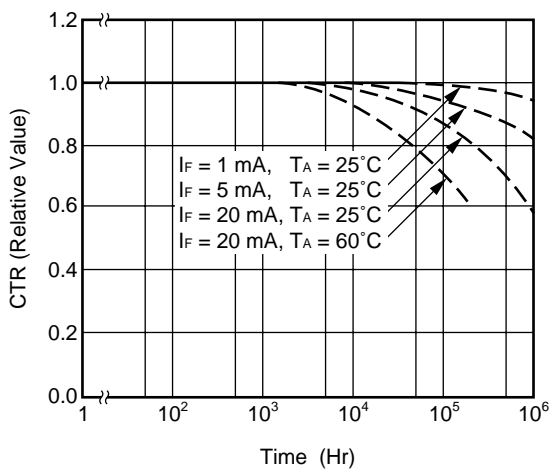
SWITCHING TIME vs. LOAD RESISTANCE



FREQUENCY RESPONSE



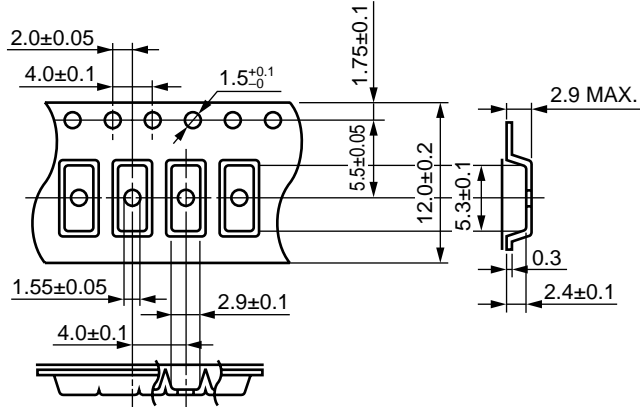
LONG TERM CTR DEGRADATION



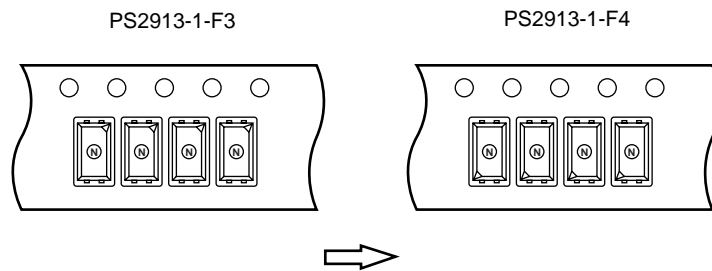
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (UNIT: mm)

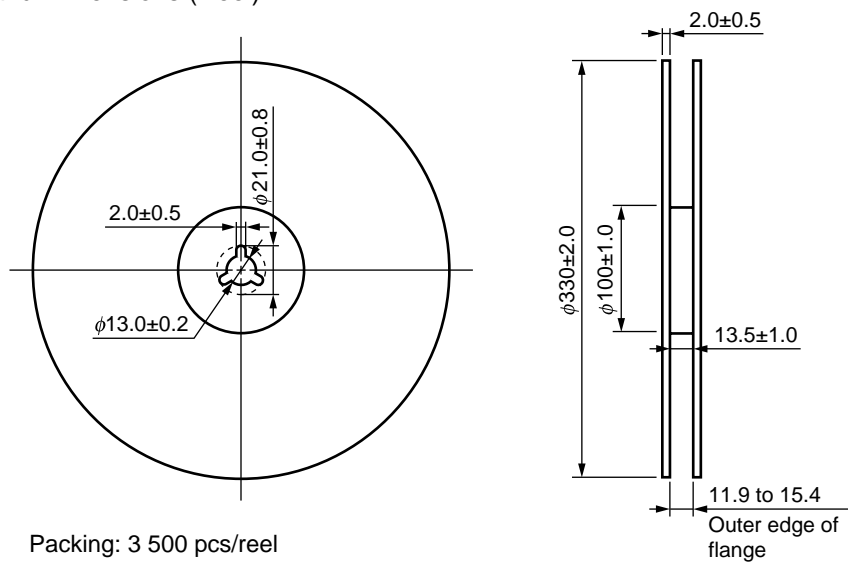
Outline and Dimensions (Tape)



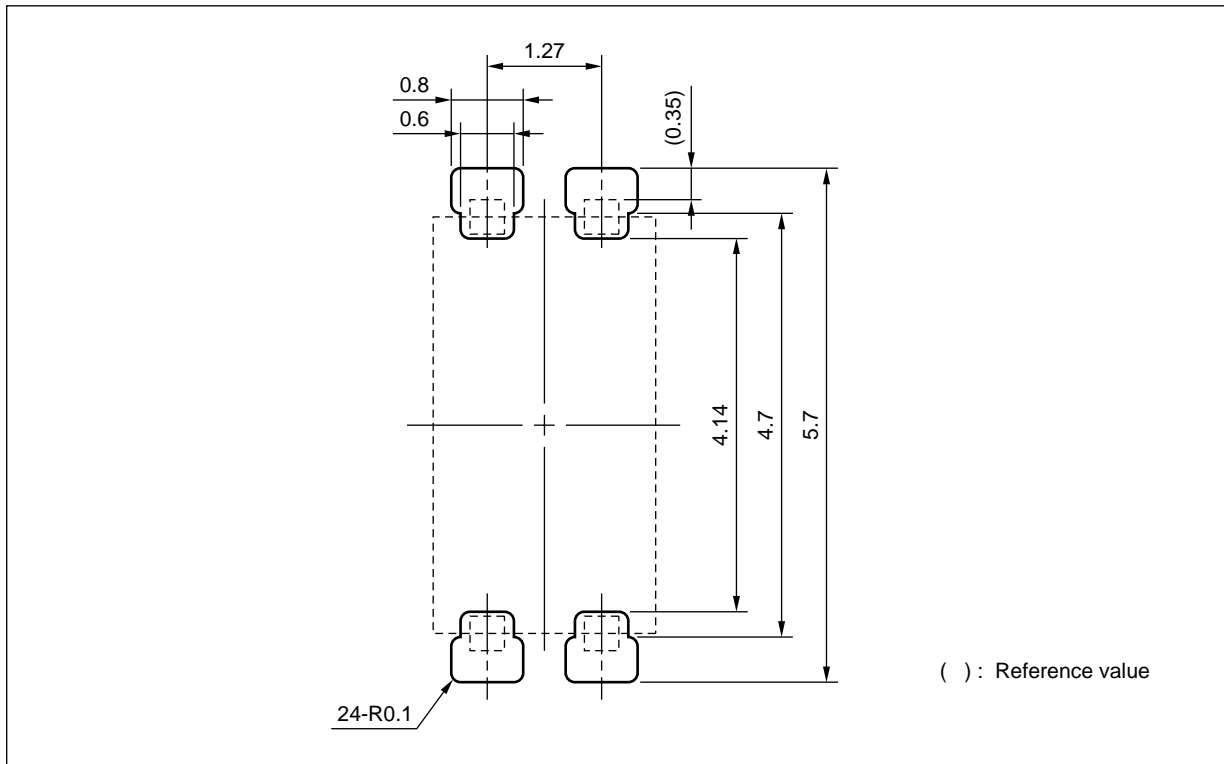
Tape Direction



Outline and Dimensions (Reel)



RECOMMENDED MOUNT PAD DIMENSIONS (UNIT: mm)



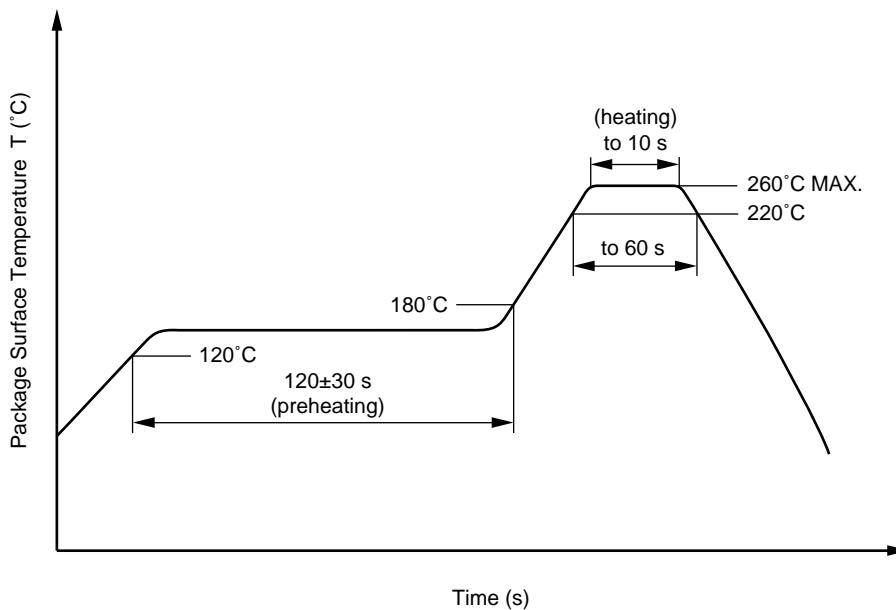
Remark This drawing is considered to meet air and outer creepage distance 4.0 mm minimum. All dimensions in this figure must be evaluated before use.

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

<p>Caution</p>	<p>GaAs Products</p>	<p>This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points.</p> <ul style="list-style-type: none"> • Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below. <ol style="list-style-type: none"> 1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials. 2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth.
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