

**HIGH CMR, 10 Mbps OPEN COLLECTOR OUTPUT TYPE
5-PIN SOP PHOTOCOUPLER**

-NEPOC Series-

DESCRIPTION

The PS9714 is an optically coupled high-speed, isolator containing a GaAlAs LED on the input side and a photodiode and a signal processing circuit on the output side on one chip.

FEATURES

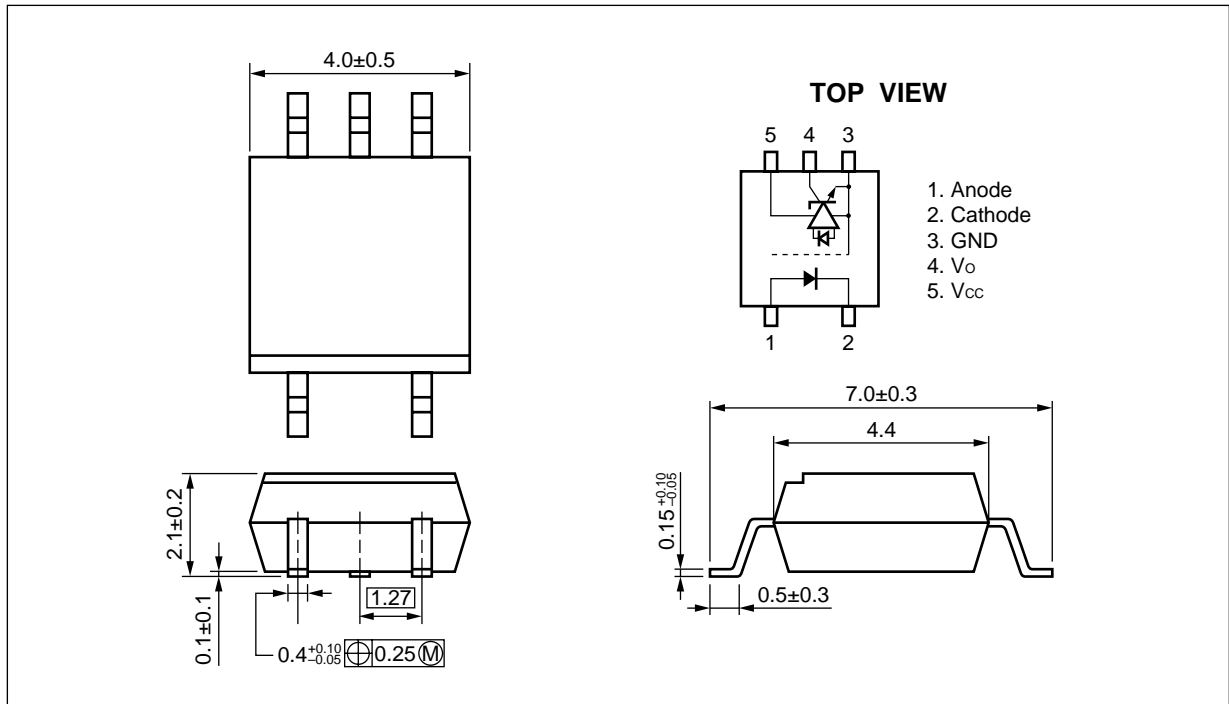
- High common mode transient immunity ($CM_H, CML = \pm 20 \text{ kV}/\mu\text{s}$ TYP.)
- Pulse width distortion ($|t_{PHL} - t_{PLH}| = 3 \text{ ns}$ TYP.)
- Small package (5-pin SOP)
- High-speed (10 Mbps)
- High isolation voltage ($BV = 2\,500 \text{ Vr.m.s.}$)
- Open collector output
- Ordering number of taping product: PS9714-F3, F4: 3 500 pcs/reel
- Safety standards
 - UL approved: File No. E72422 (S)
 - VDE0884 approved (Option)

APPLICATIONS

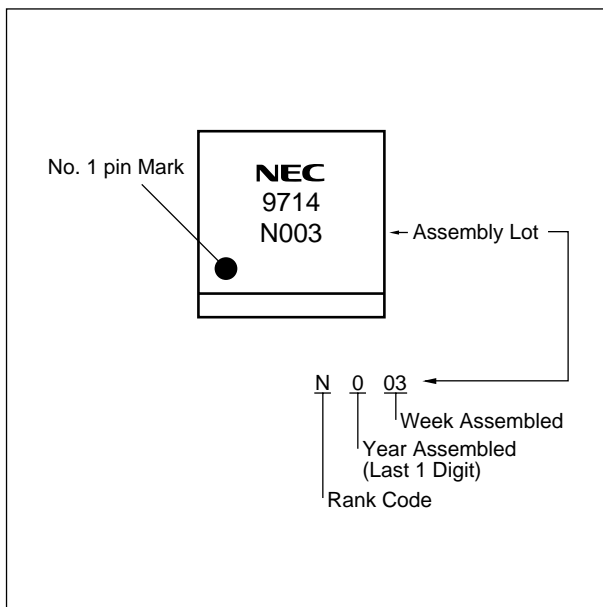
- Measurement equipment
- PDP
- FA Network

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PACKAGE DIMENSIONS (UNIT: mm)



MARKING



ORDERING INFORMATION

Part Number	Package	Packing Style	Safety Standards Approval	Application Part Number ^{*1}
PS9714	5-pin SOP	Magazine case 100 pcs	UL approved	PS9714
PS9714-F3		Embossed Tape 3 500 pcs/reel		
PS9714-F4			VDE0884 approved	
PS9714-V		Magazine case 100 pcs		
PS9714-V-F3		Embossed Tape 3 500 pcs/reel		
PS9714-V-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	30	mA
	Reverse Voltage	V _R	3	V
Detector	Supply Voltage	V _{CC}	7	V
	Output Voltage	V _O	7	V
	Output Current	I _O	25	mA
	Power Dissipation ^{*1}	P _C	40	mW
Isolation Voltage ^{*2}		BV	2 500	Vr.m.s.
Operating Ambient Temperature		T _A	-40 to +85	°C
Storage Temperature		T _{stg}	-55 to +125	°C

*1 Applies to output pin V_O. Reduced to 1.5 mW/°C at T_A = 65°C or more.

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

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Low Level Input Voltage	V _{FL}	0		0.8	V
High Level Input Current	I _{FH}	6.3		12.5	mA
Supply Voltage	V _{CC}	4.5	5.0	5.5	V
TTL (R _L = 1 kΩ, loads)	N			5	
Pull-up resistor	R _L	330		4 k	Ω

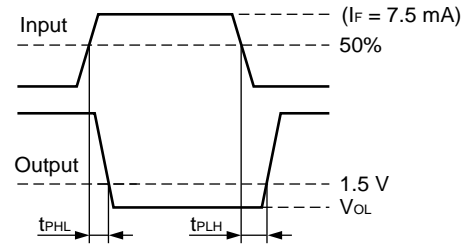
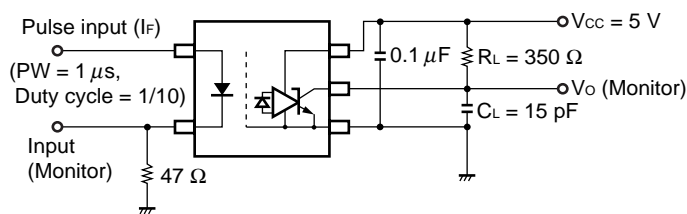
ELECTRICAL CHARACTERISTICS (T_A = -40 to +85°C, unless otherwise specified)

Parameter		Symbol	Conditions	MIN.	TYP. ^{*1}	MAX.	Unit
Diode	Forward Voltage	V _F	I _F = 10 mA, T _A = 25°C	1.4	1.65	1.9	V
	Reverse Current	I _R	V _R = 3 V, T _A = 25°C			10	μA
	Terminal Capacitance	C _t	V = 0 V, f = 1 MHz, T _A = 25°C		30		pF
Detector	High Level Output Current	I _{OH}	V _{CC} = V _O = 5.5 V, V _F = 0.8 V		0.02	250	μA
	Low Level Output Voltage ^{*2}	V _{OL}	V _{CC} = 5.5 V, I _F = 5 mA, I _{OL} = 13 mA		0.15	0.6	V
	High Level Supply Current	I _{CCH}	V _{CC} = 5.5 V, I _F = 0 mA		3	8	mA
	Low Level Supply Current	I _{CCL}	V _{CC} = 5.5 V, I _F = 10 mA		7.0	11	mA
Coupled	Threshold Input Current (H → L)	I _{FHL}	V _{CC} = 5 V, V _O = 0.8 V, R _L = 350 Ω		2	5	mA
	Isolation Resistance	R _{I-O}	V _{I-O} = 1 kV _{DC} , R _H = 40 to 60%, T _A = 25°C	10 ¹¹			Ω
	Isolation Capacitance	C _{I-O}	V = 0 V, f = 1 MHz, T _A = 25°C		0.9		pF
	Propagation Delay Time (H → L) ^{*3}	t _{PHL}	T _A = 25°C		54	75	ns
			V _{CC} = 5 V, R _L = 350 Ω, I _F = 7.5 mA			100	
	Propagation Delay Time (L → H) ^{*3}	t _{PLH}	T _A = 25°C		51	75	ns
			V _{CC} = 5 V, R _L = 350 Ω, I _F = 7.5 mA			100	
	Rise Time	t _r	V _{CC} = 5 V, R _L = 350 Ω, I _F = 7.5 mA		20		
	Fall Time	t _f	V _{CC} = 5 V, R _L = 350 Ω, I _F = 7.5 mA		10		
	Pulse Width Distortion (PWD) ^{*3}	t _{PHL} - t _{PLH}	V _{CC} = 5 V, R _L = 350 Ω, I _F = 7.5 mA		3	50	ns
	Propagation Delay Skew	t _{PSK}	V _{CC} = 5 V, R _L = 350 Ω, I _F = 7.5 mA			60	
Common Mode Transient Immunity at High Level Output ^{*4}	CM _H	R _L = 350 Ω, T _A = 25°C, I _F = 0 mA, V _{O(MIN)} = 2 V, V _{CM} = 1 kV	10	20		kV/μs	
Common Mode Transient Immunity at Low Level Output ^{*4}	CM _L	R _L = 350 Ω, T _A = 25°C, I _F = 7.5 mA, V _{O(MAX)} = 0.8 V, V _{CM} = 1 kV	10	20		kV/μs	

*1 Typical values at $T_A = 25^\circ\text{C}$

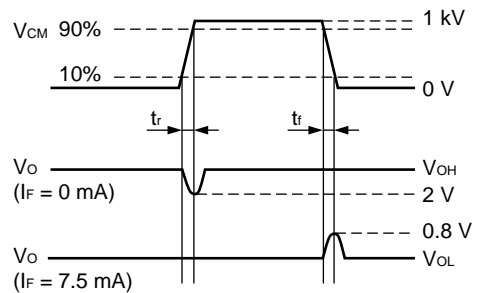
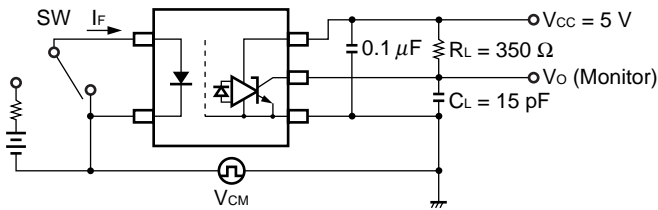
*2 Because V_{OL} of 2 V or more may be output when LED current input and when output supply of $V_{CC} = 2.6\text{ V}$ or less, it is important to confirm the characteristics (operation with the power supply on and off) during design, before using this device.

*3 Test circuit for propagation delay time



Remark C_L includes probe and stray wiring capacitance.

*4 Test circuit for common mode transient immunity



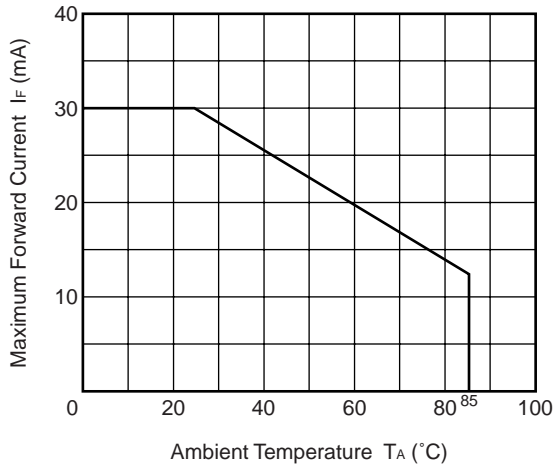
Remark C_L includes probe and stray wiring capacitance.

USAGE CAUTIONS

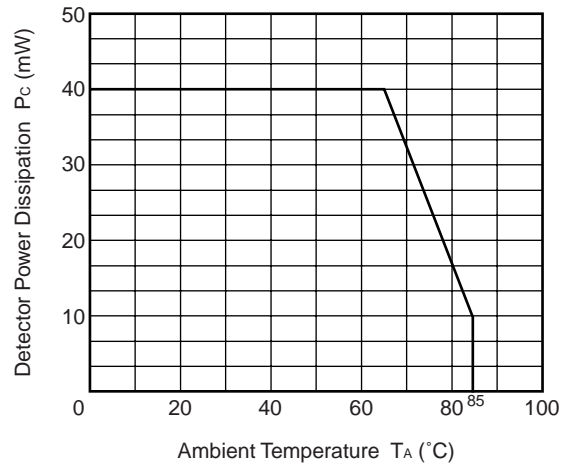
1. This product is weak for static electricity by designed with high-speed integrated circuit so protect against static electricity when handling.
2. By-pass capacitor of more than $0.1\ \mu\text{F}$ is used between V_{CC} and GND near device. Also, ensure that the distance between the leads of the photocoupler and capacitor is no more than 10 mm.

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

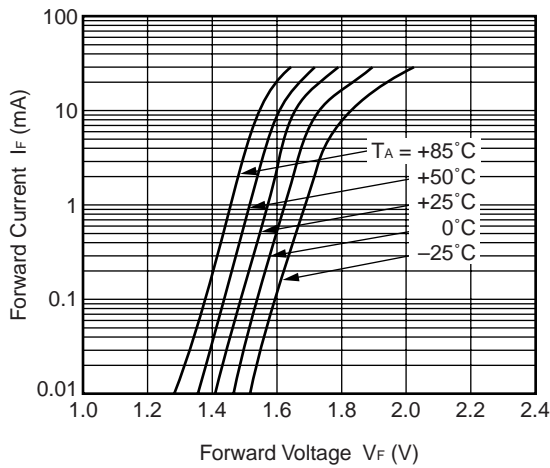
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



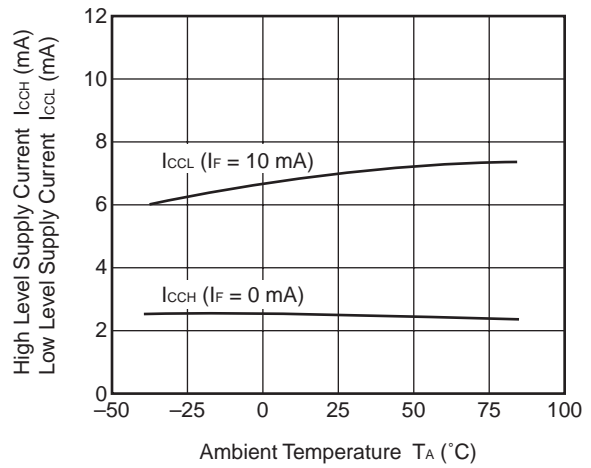
DETECTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



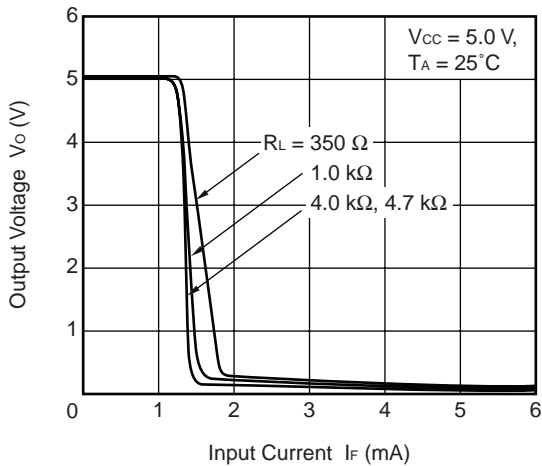
FORWARD CURRENT vs. FORWARD VOLTAGE



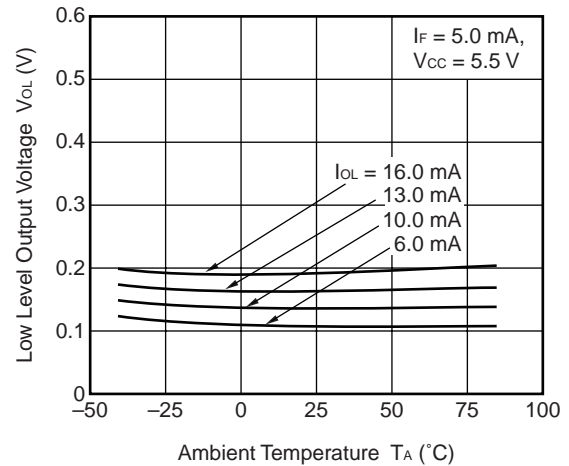
SUPPLY CURRENT vs. AMBIENT TEMPERATURE



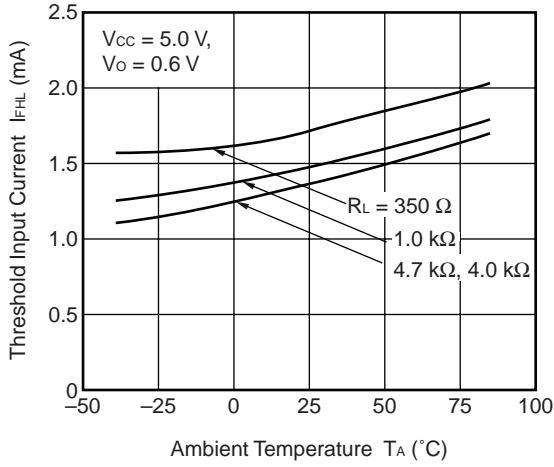
OUTPUT VOLTAGE vs. INPUT CURRENT



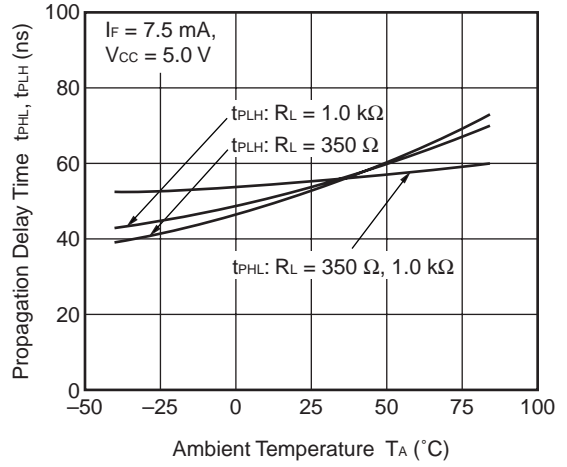
LOW LEVEL OUTPUT VOLTAGE vs. AMBIENT TEMPERATURE



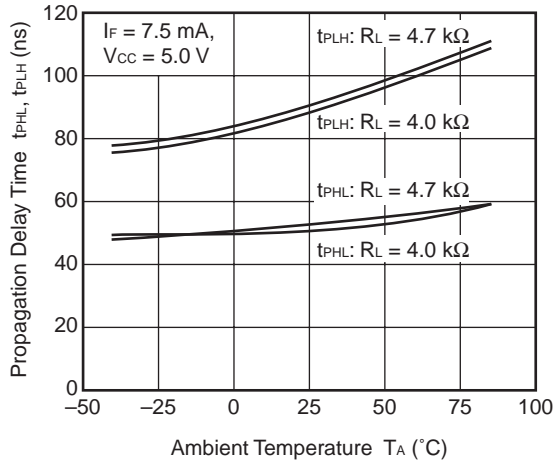
THRESHOLD INPUT CURRENT vs. AMBIENT TEMPERATURE



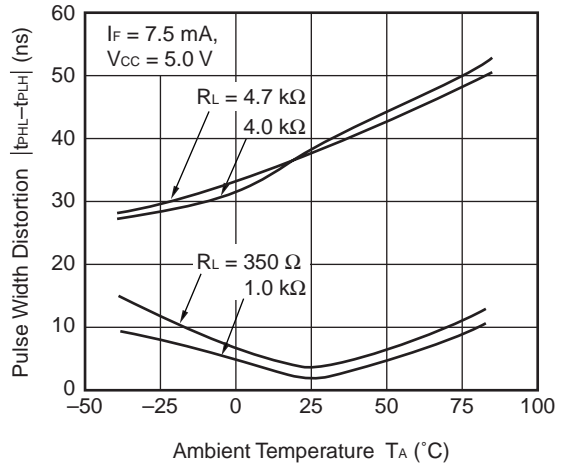
PROPAGATION DELAY TIME vs. AMBIENT TEMPERATURE



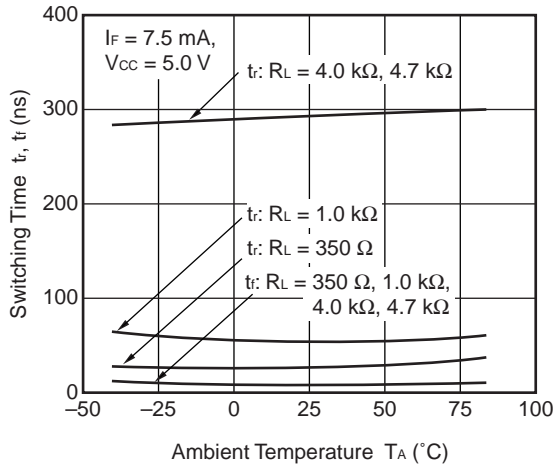
PROPAGATION DELAY TIME vs. AMBIENT TEMPERATURE



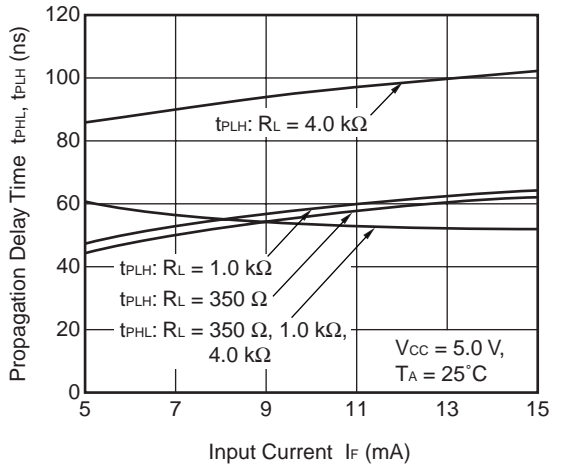
PULSE WIDTH DISTORTION vs. AMBIENT TEMPERATURE



SWITCHING TIME vs. AMBIENT TEMPERATURE



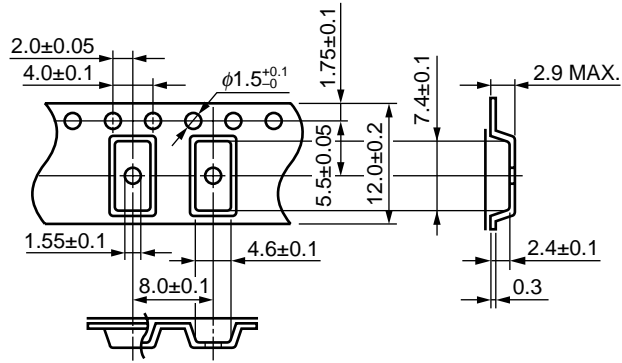
PROPAGATION DELAY TIME vs. INPUT CURRENT



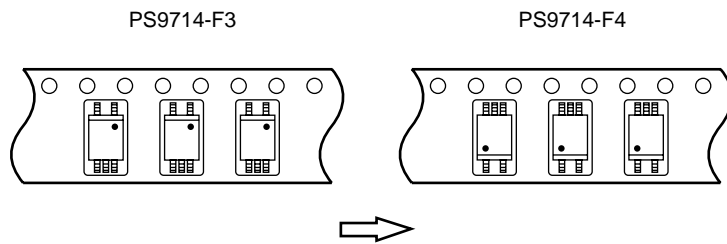
Remark The graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (UNIT: mm)

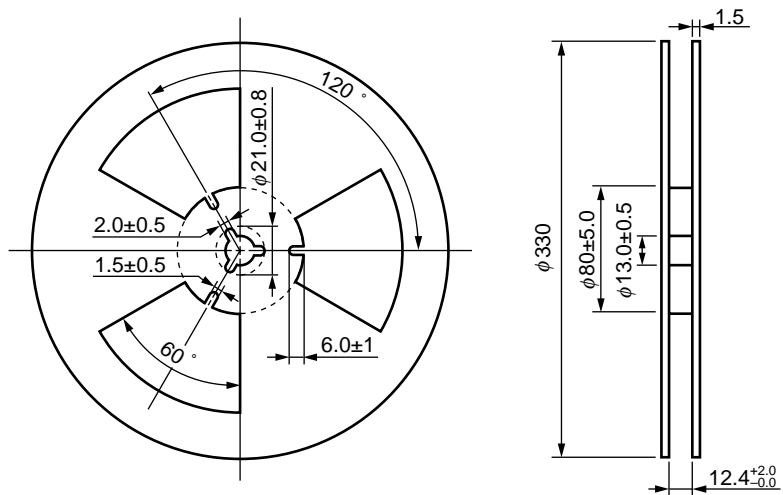
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



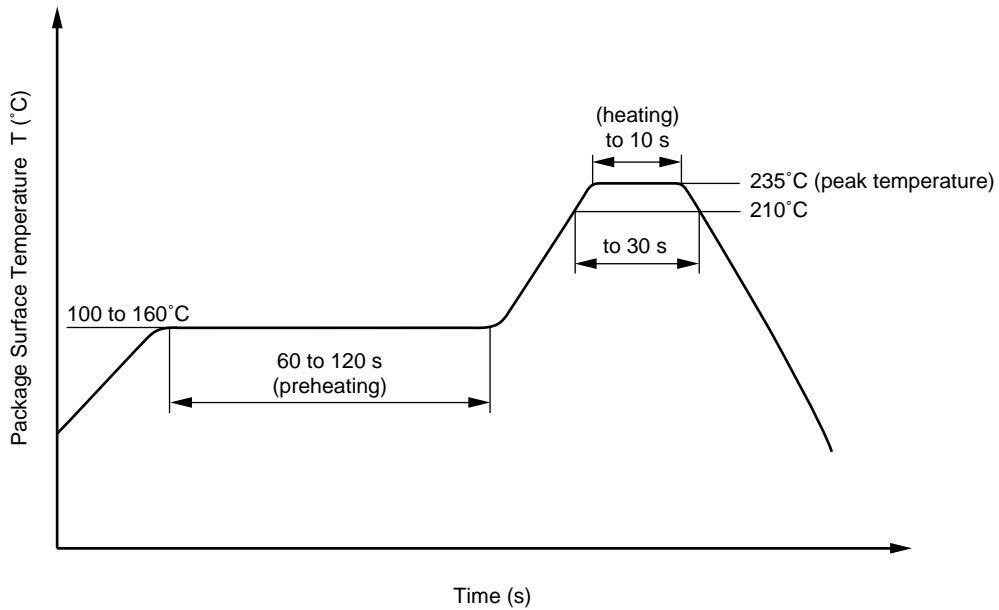
Packing: 3 500 pcs/reel

RECOMMENDED 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) Cautions

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

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M8E 00.4-0110

SAFETY INFORMATION ON THIS PRODUCT

<p>Caution</p>	<p>GaAs Products</p>	<p>The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested.</p> <ul style="list-style-type: none"> • 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. <p>Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.</p>
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► **Business issue**

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► **Technical issue**

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