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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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CEL

NEC's HIGH NOISE REDUCTION HIGH SPEED DIGITAL OUTPUT TYPE 8 PIN DIP OPTOCOUPLER

PS9614
PS9614L

FEATURES

- **HIGH COMMON MODE TRANSIENT IMMUNITY:**
  C_{MR}, C_{ML}: ± 20 kV/μs TYP
- **HIGH SPEED RESPONSE:**
  10 Mbps
- **HIGH ISOLATION VOLTAGE:**
  BV: 3750 $V_{r.m.s.}$ MIN
- **OPEN COLLECTOR OUTPUT TYPE**
- **TAPE AND REEL AVAILABLE:**
  PS9614L-E3, E4: 1000 Pcs/Reel

DESCRIPTION

NEC's PS9614 and PS9614L are optically coupled isolators containing a GaAlAs LED on the light emitting diode (input) side and a photodiode and a signal procesing circuit on the detector (output) side on one chip. The PS9614 is in a plastic DIP (Dual In-line Package) and the PS9614L is a lead-bending type (Gull-wing) for surface mount.

APPLICATIONS

- **MEASUREMENT EQUIPMENT**
- **PDP**
- **FACTORY AUTOMATION NETWORK**

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

PART NUMBER				PS9614, PS9614L		
	SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
Diode	V_F	Forward Voltage, I_F = 10 mA, T_A = 25°C	V	1.4	1.65	1.9
	I_R	Reverse Current, V_R = 5 V, T_A = 25°C	μA			10
	Ct	Terminal Capacitance, V = 0V, f = 1 MHz, T_A = 25°C	pF		30	
Detector	I_{OH}	High Level Output Current, V_{CC} = V_O = 5.5 V, V_F = 0.8 V	μA		0.03	250
	V_{OL}	Low Level Output Voltage, V_{CC} = 5.5 V, I_F = 5 mA, I_O = 13 mA	V		0.2	0.6
	I_{CCH}	High Level Supply Current, V_{CC} = 5.5 V, I_F = 0 mA	mA		2.6	8
	I_{CCL}	Low Level Supply Current, V_{CC} = 5.5 V, I_F = 10 mA	mA		7	11
	I_{FHL}	Threshold Input Current, V_{CC} = 5 V, V_O = 0, 0.8 V, R_L = 350 Ω	%		2.3	5
Coupled	R_{I-O}	Isolation Resistance, V_{in-out} = 1k V_{DC}, RH = 40 to 60%, T_A = 25°C	Ω	10^{11}		
	C_{I-O}	Isolation Capacitance, V = 0, f = 1 MHz, T_A = 25°C	pF		0.9	
	t_{PHL}	Propagation Delay Time, High → Low[1], V_{CC} = 5 V, R_L = 350 Ω, I_F = 7.5 mA	ns		61	75
		T_A = 25°C				100
	t_{PLH}	Propagation Delay Time, Low → High[1], V_{CC} = 5 V, R_L = 350 Ω, I_F = 7.5 mA	ns		51	75
		T_A = 25°C				100
	t_r	Rise Time, V_{CC} = 5 V, R_L = 350 Ω, I_F = 7.5 mA	ns		20	
	t_f	Fall Time, V_{CC} = 5 V, R_L = 350 Ω, I_F = 7.5 mA	ns		8	
	PWD	Pulse Width Distortion, V_{CC} = 5 V, R_L = 350 Ω, I_F = 7.5 mA	ns		10	50
	t_{PSK}	Propagation Skew, V_{CC} = 5 V, R_L = 350 Ω, I_F = 7.5 mA	ns			60
	CM_H	Common Mode Transient Immunity at High Level Output[2] V_{CC} = 5 V, V_{CM} = 1 kV, T_A = 25°C, I_F = 0 mA, $V_{O(MIN)}$ = 2 V, R_L = 350 Ω	kV/μs	10	20	
	CM_L	Common Mode Transient Immunity at Low Level Output[2] V_{CC} = 5 V, V_{CM} = 1 kV, T_A = 25°C, I_F = 0 mA, $V_{O(MIN)}$ = 0.8 V, R_L = 350 Ω	kV/μs	10	20	

Please see notes on the next page.

ABSOLUTE MAXIMUM RATINGS[1] (T_A = 25°C)

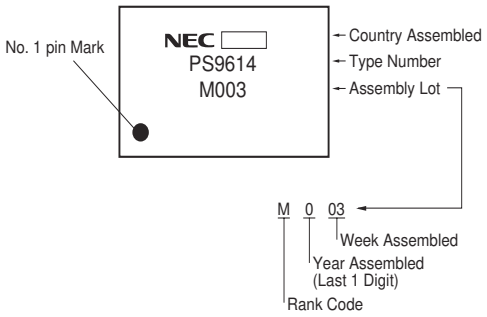
SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
I_F	Forward Current	mA	30
V_R	Reverse Voltage	V	3
Detector			
V_{CC}	Supply Voltage	V	7
V_O	Output Voltage	V	7
I_O	Output Current	mA	25
P_C	Power Dissipation	mW	40
BV	Isolation Voltage[2]	$V_{r.m.s.}$	3750
T_A	Operating Ambient Temp.	°C	-40 to +85
T_{STG}	Storage Temperature	°C	-55 to +125

Notes:
1. Operation in excess of any one of these parameters may result in permanent damage.
2. AC voltage for 1 minute at T_A = 25 °C, RH = 60 % between input and output.

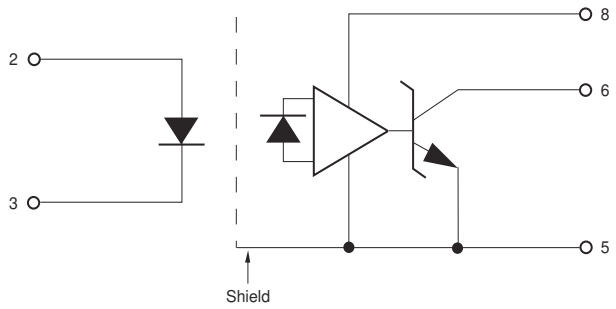
RECOMMENDED OPERATING CONDITIONS

SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX
V_{FL}	Low Level Input Voltage	V	0		0.8
I_{FH}	High Level Input Current	mA	6.3	10	12.5
V_{CC}	Supply Voltage	V	4.5	5	5.5
N	TTL (loads) (R_L = 1kΩ)				5
R_L	Pull-up Resistance	Ω	330		4k
T_A	Operating Ambient Temperature	-40		+85	

MARKING



FUNCTIONAL DIAGRAM

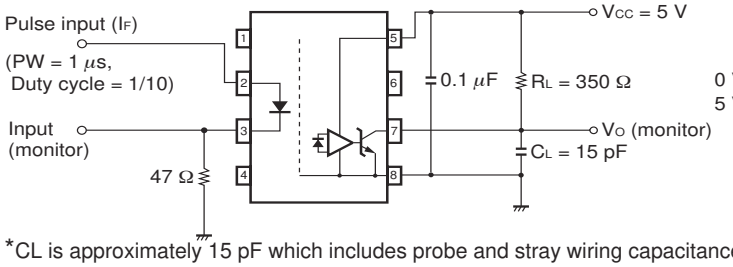


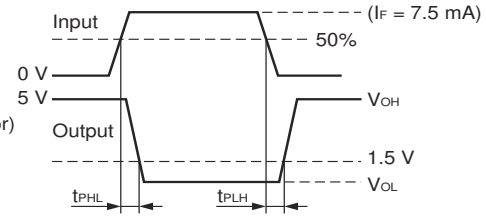
LED	Output
ON	L
OFF	H

(Continued from previous page.)

Note:

1. Test Circuit for Propagation Delay Time:

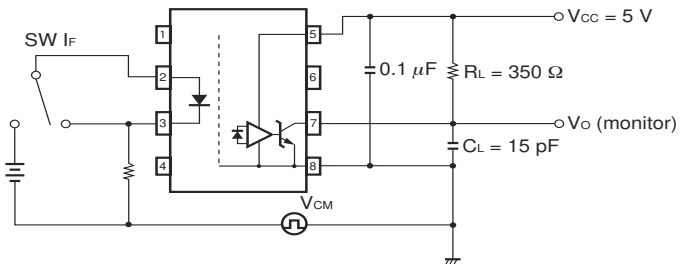


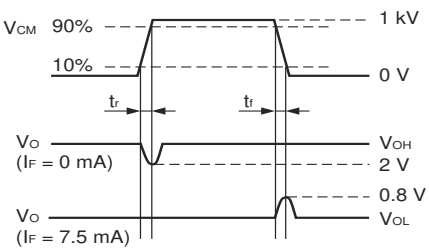


*CL is approximately 15 pF which includes probe and stray wiring capacitance.

C_L includes probe and stray wiring capacitance.

2. Test Circuit for Common Mode Transient Immunity:





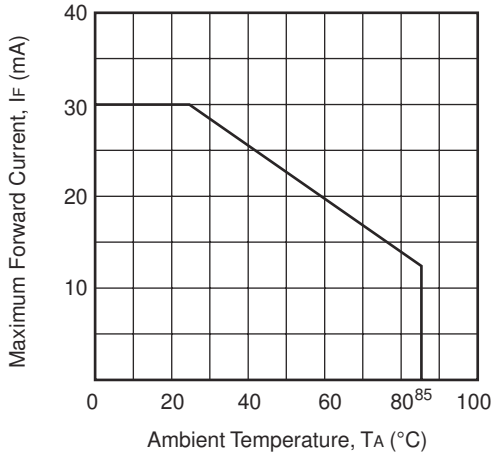
C_L includes probe and stray wiring capacitance.

USAGE CAUTIONS

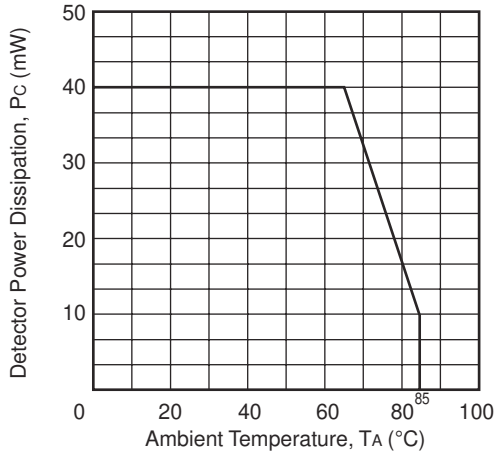
1. Protect against static electricity when handling this product.
2. Bypass capacitor greater than 0.1 μF is used between V_{CC} and GND near device (lead distance: 10 mm MIN).

TYPICAL PERFORMANCE CURVES (T_A = 25°C)

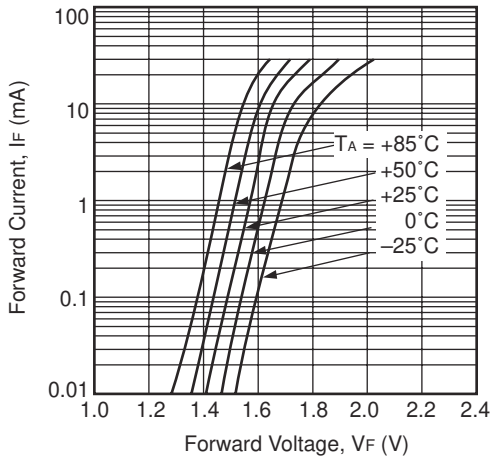
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



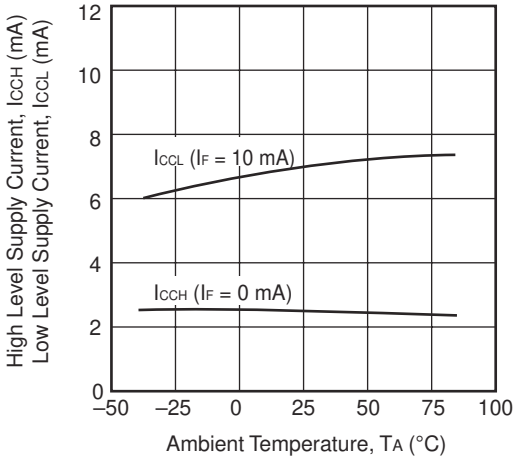
DETECTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



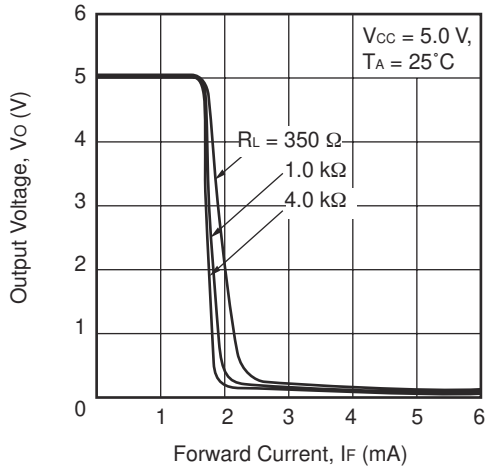
FORWARD CURRENT vs. FORWARD VOLTAGE



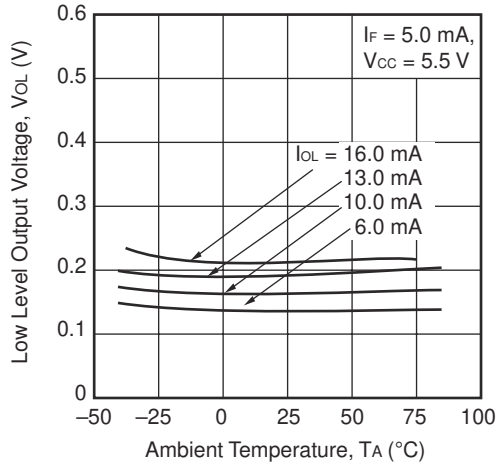
SUPPLY CURRENT vs. AMBIENT TEMPERATURE



OUTPUT VOLTAGE vs. FORWARD CURRENT

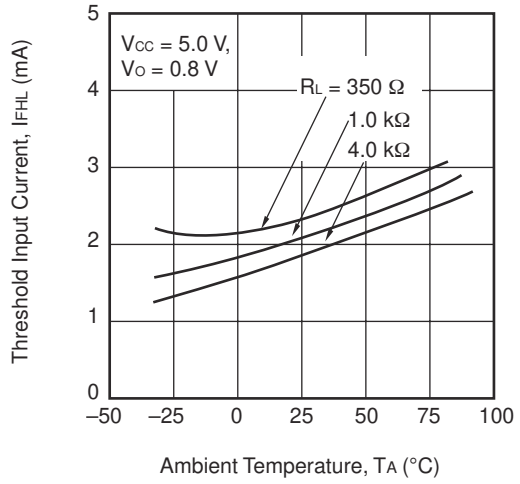


LOW LEVEL OUTPUT VOLTAGE vs. AMBIENT TEMPERATURE

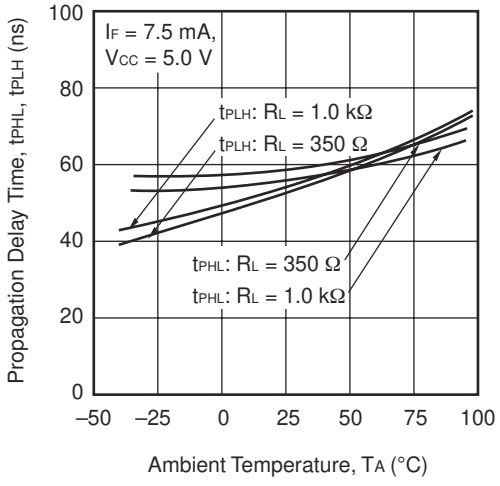


TYPICAL PERFORMANCE CURVES (T_A = 25°C)

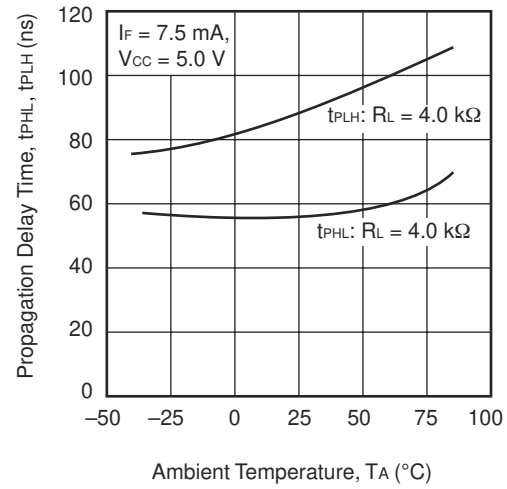
THRESHOLD INPUT CURRENT vs. AMBIENT TEMPERATURE



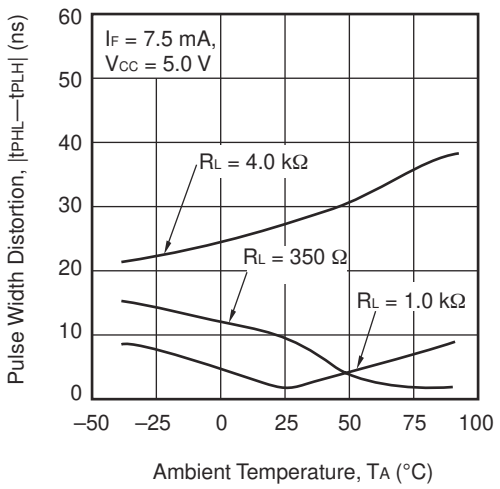
PROPAGATION DELAY TIME vs. AMBIENT TEMPERATURE



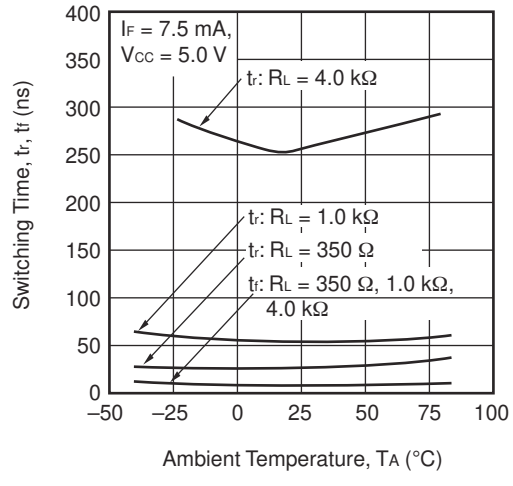
PROPAGATION DELAY TIME vs. AMBIENT TEMPERATURE



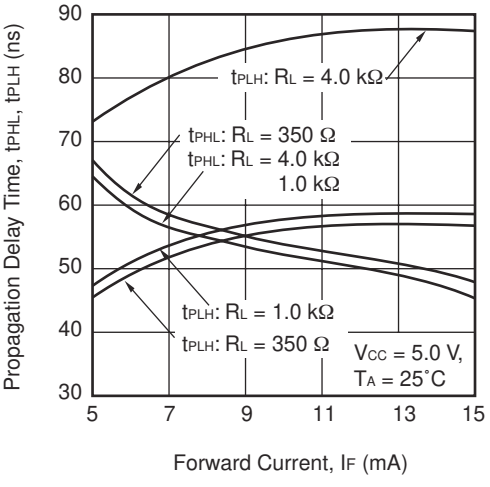
PULSE WIDTH DISTORTION vs. AMBIENT TEMPERATURE



SWITCHING TIME vs. AMBIENT TEMPERATURE

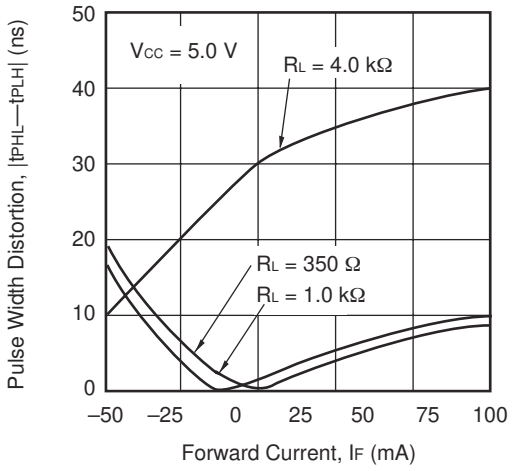


PROPAGATION DELAY TIME vs. FORWARD CURRENT

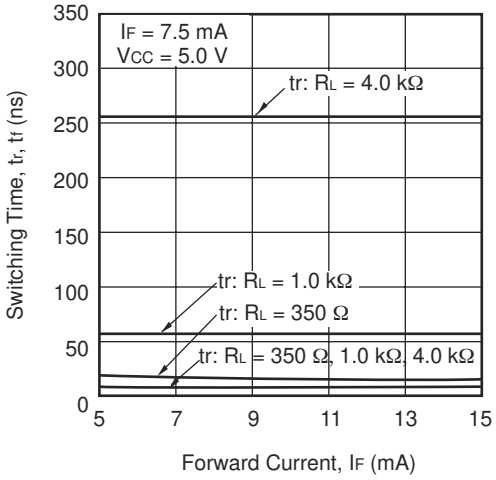


TYPICAL PERFORMANCE CURVES (T_A = 25°C)

PULSE WITH DISTORTION vs. FORWARD CURRENT



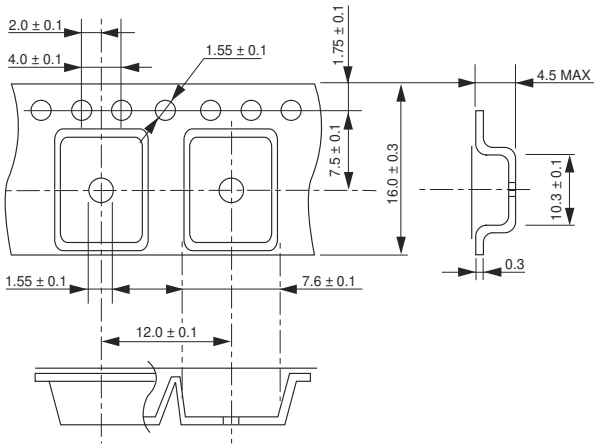
SWITCHING TIME vs. FORWARD CURRENT



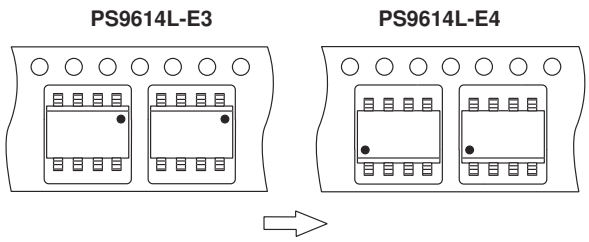
Note: Graphs indicate nominal characteristics.

TAPING SPECIFICATIONS (Units in mm)

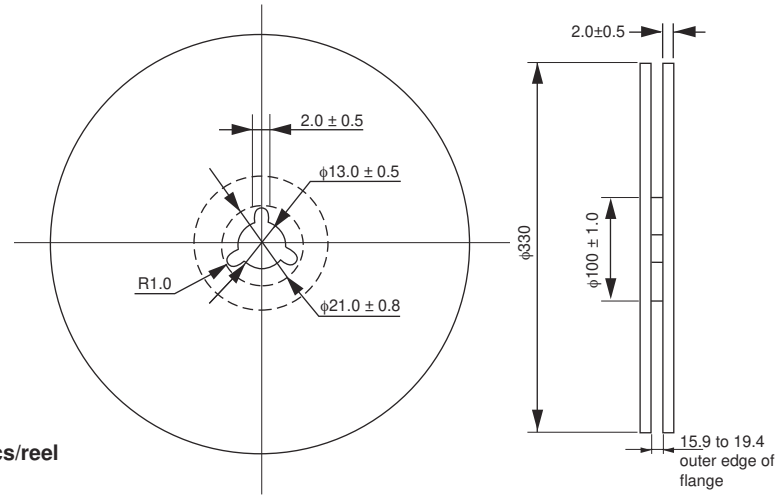
Tape Outline and Dimensions



Tape Direction



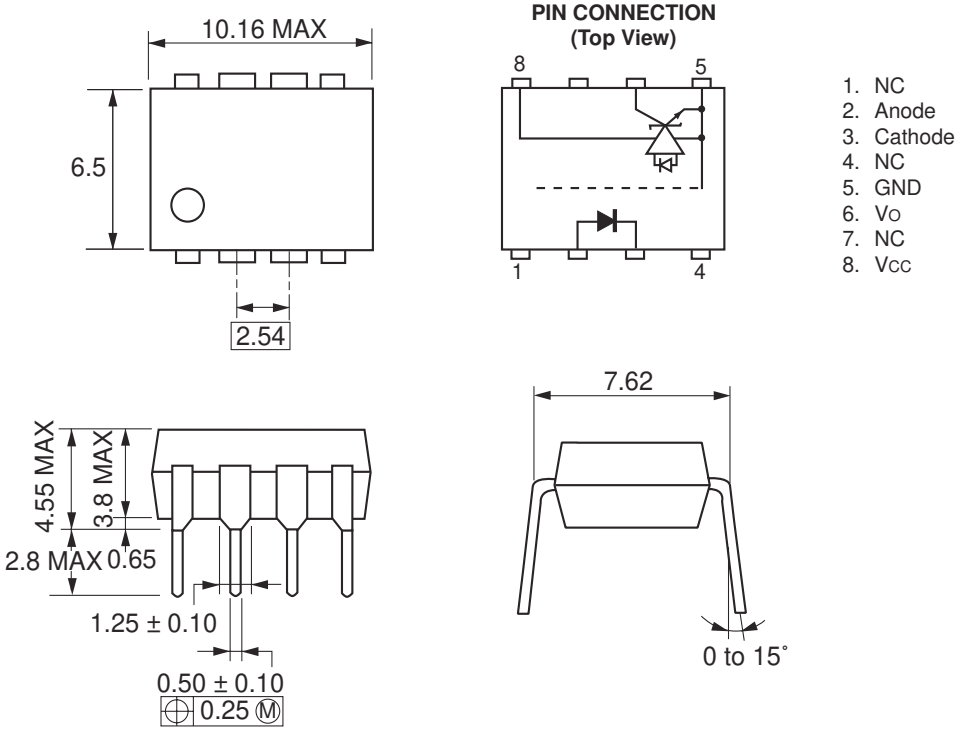
Reel Outline and Dimensions



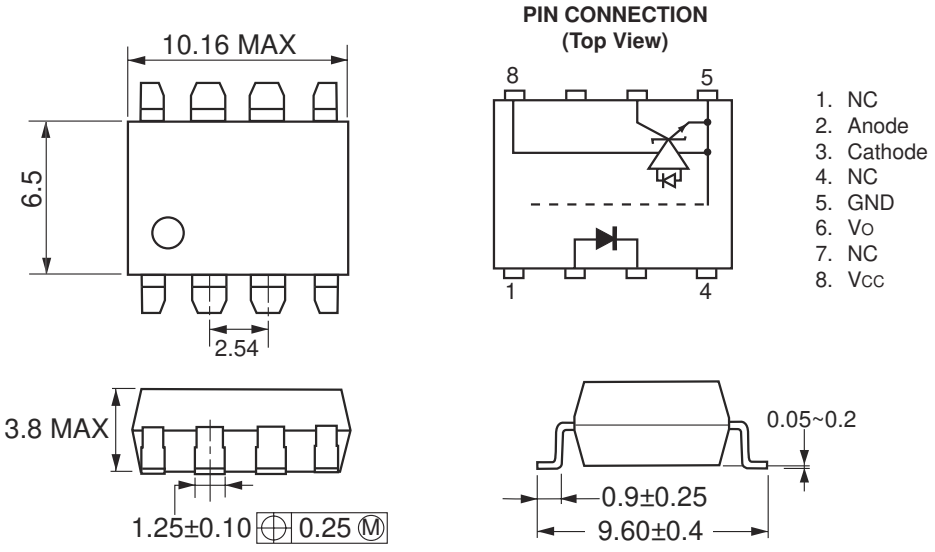
Packing: 1000 pcs/reel

PACKAGE OUTLINE (Units in mm)

PS9614



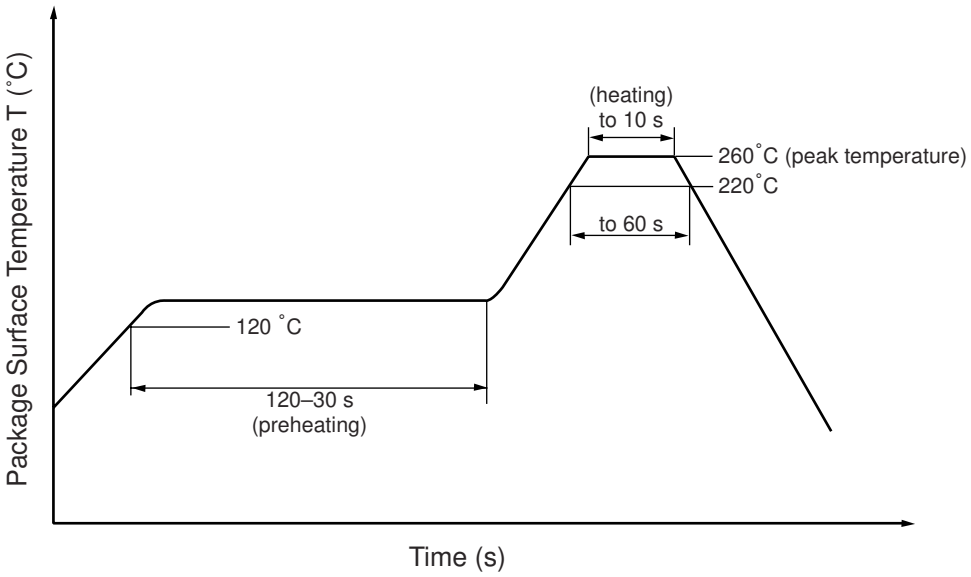
PS9614L



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 ºC	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.)



(2) Wave Soldering

• Temperature	260°C or below
• 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.