NEC

PHOTOCOUPLER
PS9851-1,-2

HIGH NOISE REDUCTION, 15 Mbps CMOS OUTPUT TYPE 8-PIN SSOP PHOTOCOUPLER

–NEPOC Series–

DESCRIPTION

The PS9851-1, -2 are optically coupled isolators containing GaAlAs LED on the input side and a CMOS output IC on the output side.

They are high common mode transient immunity (CMR), high-speed CMOS output type photocouplers designed for high-speed logic interface circuits.

FEATURES

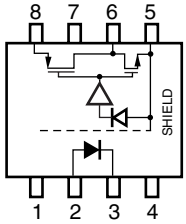
- High-speed response (15 Mbps)
- Operable at high temperature (–40 to +100°C)
- High common mode transient immunity (CM_H, CM_L = ±15 kV/μs TYP.)
- High isolation voltage (BV = 2 500 Vr.m.s.)
- Pulse width distortion ($|t_{PHL}-t_{PLH}|$ = 5 ns TYP.)
- Ordering number of tape product : PS9851-1-F3, F4: 1 500 pcs/reel
  : PS9851-2-F3, F4: 1 500 pcs/reel
- Safety standards
  - UL awaiting approved
  - DIN EN60747-5-2 (VDE0884 Part2) awaiting approved

APPLICATIONS

- FA Network
- Measurement equipment
- PDP

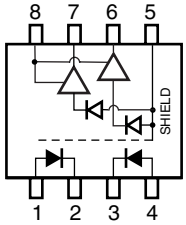
PIN CONNECTION
(Top View)

PS9851-1



1. NC
2. Anode
3. Cathode
4. NC
5. GND
6. V_O
7. NC
8. V_{DD}

PS9851-2



1. Anode1
2. Cathode1
3. Cathode2
4. Anode2
5. GND
6. V_O2
7. V_O1
8. V_{DD}

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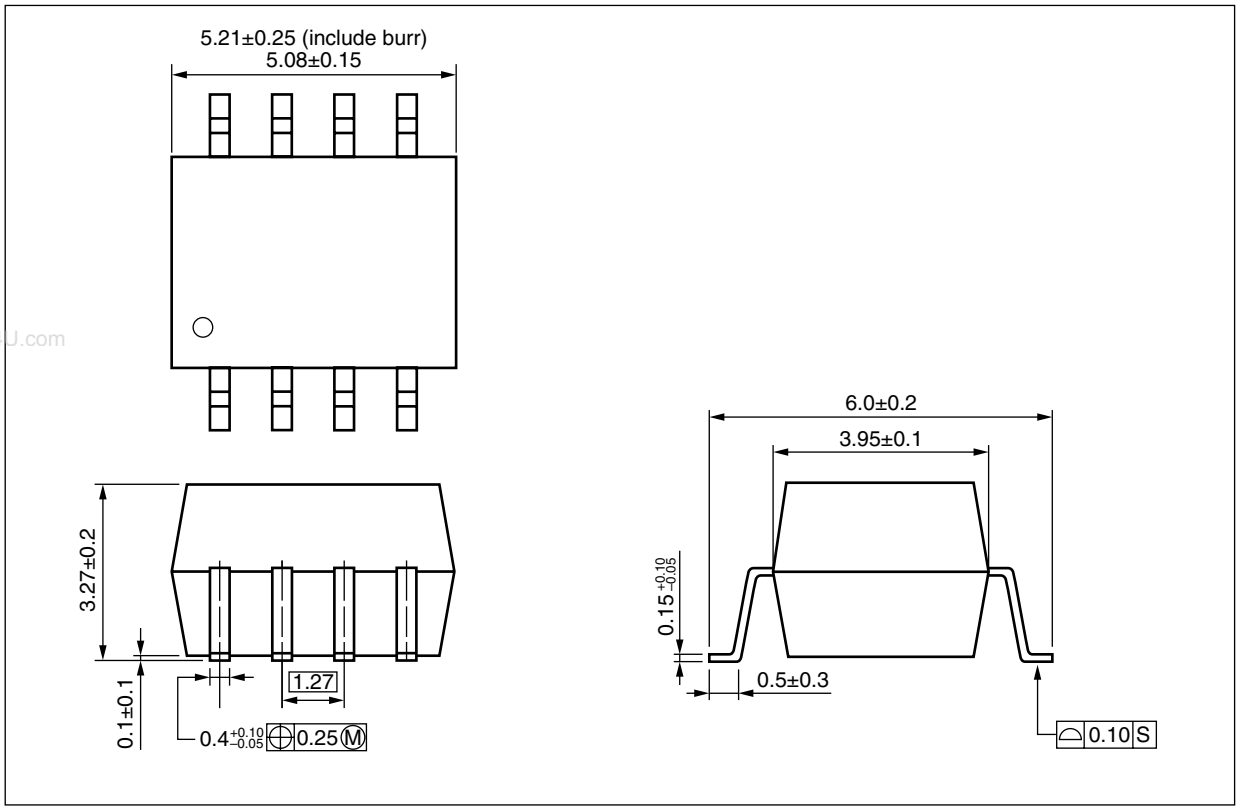
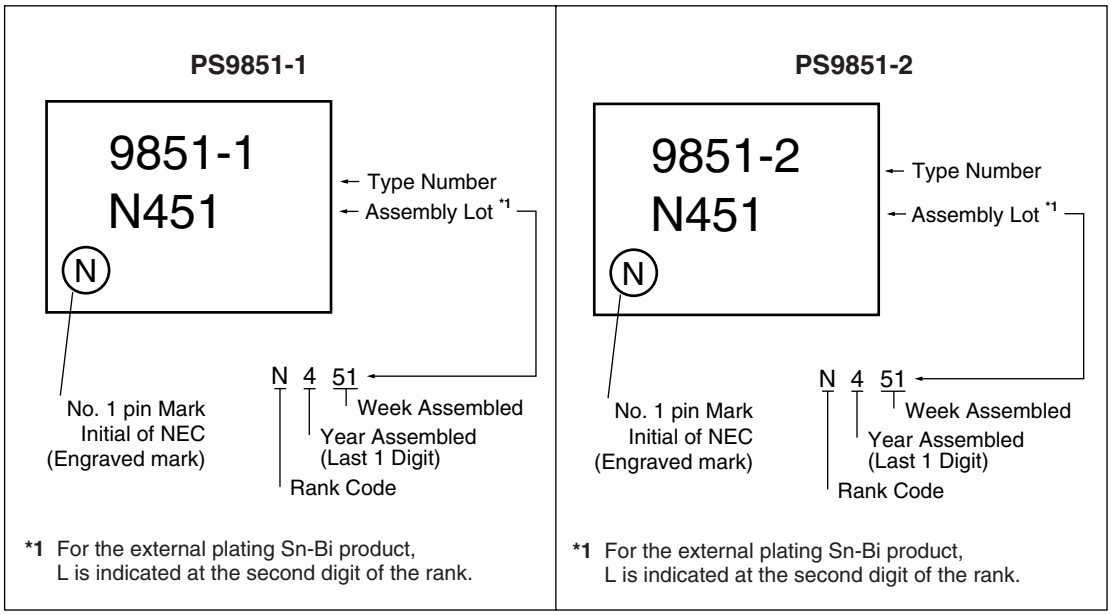
PACKAGE DIMENSIONS (UNIT: mm)



MARKING EXAMPLE



ORDERING INFORMATION

Part Number	Package	Packing Style	Safety Standards Approval	Solder plating specification	Application Part Number*1
PS9851-1	8-pin SSOP (SO-8)	20 pcs (Tape 20 pcs cut)	Standard products (UL awaiting approved)	Sn-Pb	PS9851-1
PS9851-1-F3		Embossed Tape 1 500 pcs/reel			
PS9851-1-F4					
PS9851-2		20 pcs (Tape 20 pcs cut)			PS9851-2
PS9851-2-F3		Embossed Tape 1 500 pcs/reel			
PS9851-2-F4					
PS9851-1-V		20 pcs (Tape 20 pcs cut)	DIN EN60747-5-2 (VDE0884 Part2) awaiting approved (Option)		PS9851-1
PS9851-1-V-F3		Embossed Tape 1 500 pcs/reel			
PS9851-1-V-F4					
PS9851-2-V		20 pcs (Tape 20 pcs cut)			PS9851-2
PS9851-2-V-F3		Embossed Tape 1 500 pcs/reel			
PS9851-2-V-F4					
PS9851-1-A		20 pcs (Tape 20 pcs cut)	Standard products (UL awaiting approved)	Sn-Bi	PS9851-1
PS9851-1-F3-A		Embossed Tape 1 500 pcs/reel			
PS9851-1-F4-A					
PS9851-2-A		20 pcs (Tape 20 pcs cut)			PS9851-2
PS9851-2-F3-A		Embossed Tape 1 500 pcs/reel			
PS9851-2-F4-A					
PS9851-1-V-A		20 pcs (Tape 20 pcs cut)	DIN EN60747-5-2 (VDE0884 Part2) awaiting approved (Option)		PS9851-1
PS9851-1-V-F3-A		Embossed Tape 1 500 pcs/reel			
PS9851-1-V-F4-A					
PS9851-2-V-A		20 pcs (Tape 20 pcs cut)			PS9851-2
PS9851-2-V-F3-A		Embossed Tape 1 500 pcs/reel			
PS9851-2-V-F4-A					

***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	20	mA
	Reverse Voltage	V_R	5	V
Detector	Supply Voltage	V_{DD}	0 to 5.5	V
	Output Voltage	V_O	–0.5 to V_{DD}+0.5	V
	Output Current	I_O	2	mA
Isolation Voltage *1		BV	2 500	Vr.m.s.
Operating Ambient Temperature		T_A	–40 to +100	°C
Storage Temperature		T_{stg}	–55 to +125	°C

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

RECOMMENDED OPERATING CONDITIONS (T_A = 25°C)

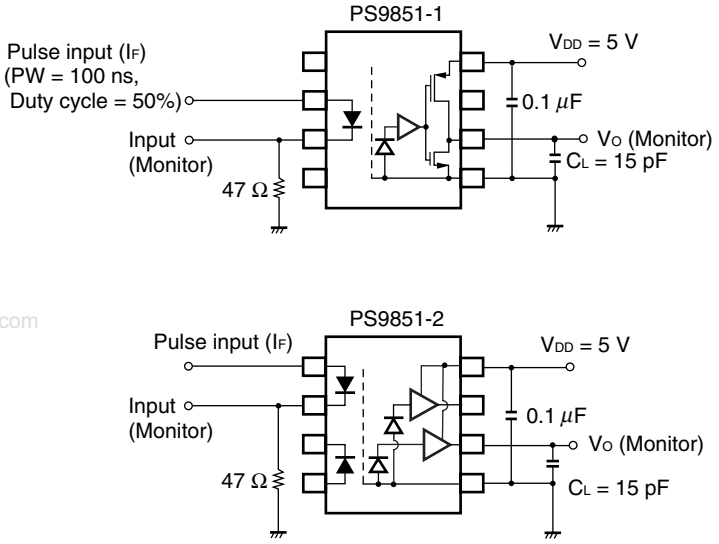
Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Forward Current	I_F	10		16	mA
Supply Voltage	V_{DD}	4.5	5.0	5.5	V

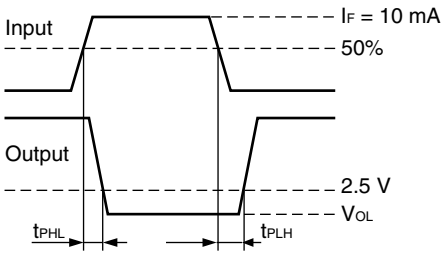
ELECTRICAL CHARACTERISTICS (T_A = –40 to +100°C, V_{DD} = 4.5 to 5.5 V, unless otherwise specified)

Parameter		Symbol	Conditions	MIN.	TYP. *1	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = 10 mA, T_A = 25°C		1.6	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 Supply Current	I_{DDH}	I_F = 0 mA (1ch)		3	5	mA
	Low Level Supply Current	I_{DDL}	I_F = 10 mA (1ch)		3	5	
	High Level Output Voltage	V_{OH}	I_O = –20μA, I_F = 0 mA	4.0	5.0		V
	Low Level Output Voltage	V_{OL}	I_O = 20μA, I_F = 10 mA		0.01	0.1	
Coupled	Threshold Input Current	I_{FHL}	V_O < 1 V			6	mA
	Isolation Resistance	R_{I-O}	V_{I-O} = 1 kV$_{DC}$, RH = 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) *2	t_{PHL}	I_F = 10 mA, V_{DD} = 5 V, CL = 15 pF, CMOS Levels		35	60	ns
	Propagation Delay Time (L → H) *2	t_{PLH}			30	60	
	Pulse Width	PW		100			
	Pulse Width Distortion (PWD)	$\lvert t_{PHL}-t_{PLH} \rvert$			5	30	
	Propagation Delay Skew	t_{PSK}				40	
	Rise Time	t_r			3		
	Fall Time	t_f			3		
	Common Mode Transient Immunity at High Level Output *3	CM_H	V_{DD} = 5 V, I_F = 0 mA, V_{CM} = 1 kV, V_O > 4 V, T_A = 25°C	10	15		kV/μs
	Common Mode Transient Immunity at Low Level Output *3	CM_L	V_{DD} = 5 V, I_F = 10 mA, V_{CM} = 1 kV, V_O < 1 V, T_A = 25°C	10	15		

***1** Typical values at T_A = 25°C

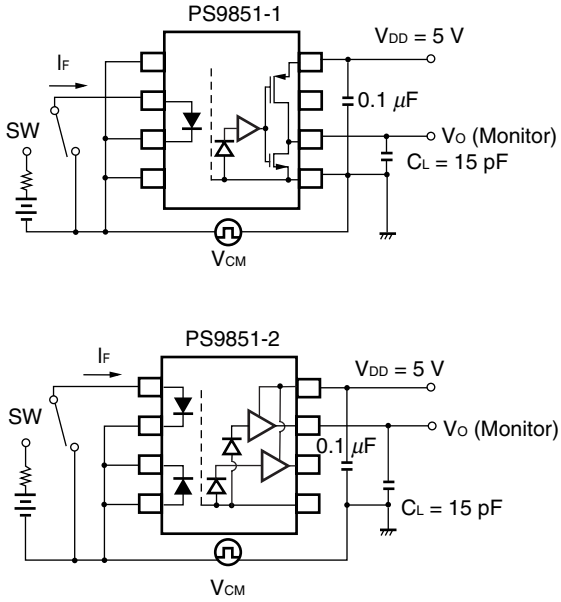
***2** Test circuit for propagation delay time

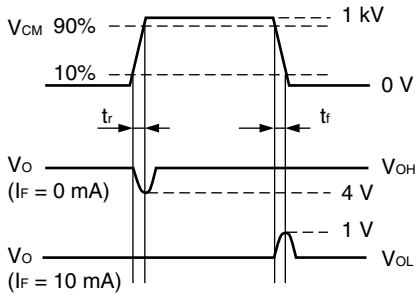




Remark C_L includes probe and stray wiring capacitance.

***3** Test circuit for common mode transient immunity





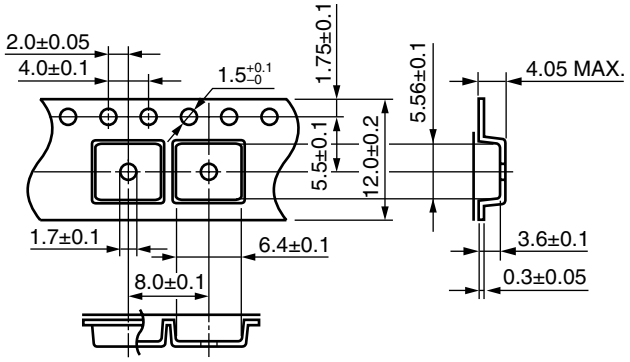
Remark C_L includes probe and stray wiring capacitance.

USAGE CAUTIONS

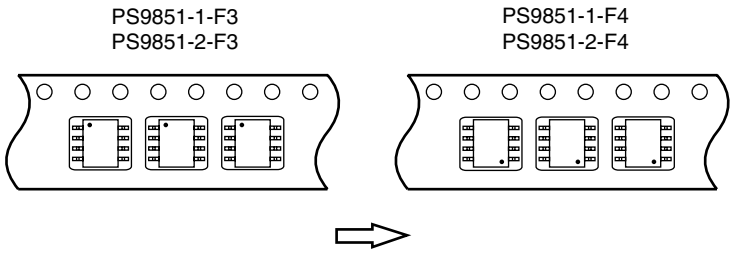
1. This product is weak for static electricity by designed with high-speed integrated circuit so protect against static electricity when handling.
2. By-pass capacitor of more than 0.1 μF is used between V_{DD} and GND near device. Also, ensure that the distance between the leads of the photocoupler and capacitor is no more than 10 mm.
3. Avoid storage at a high temperature and high humidity.

TAPING SPECIFICATIONS (UNIT: mm)

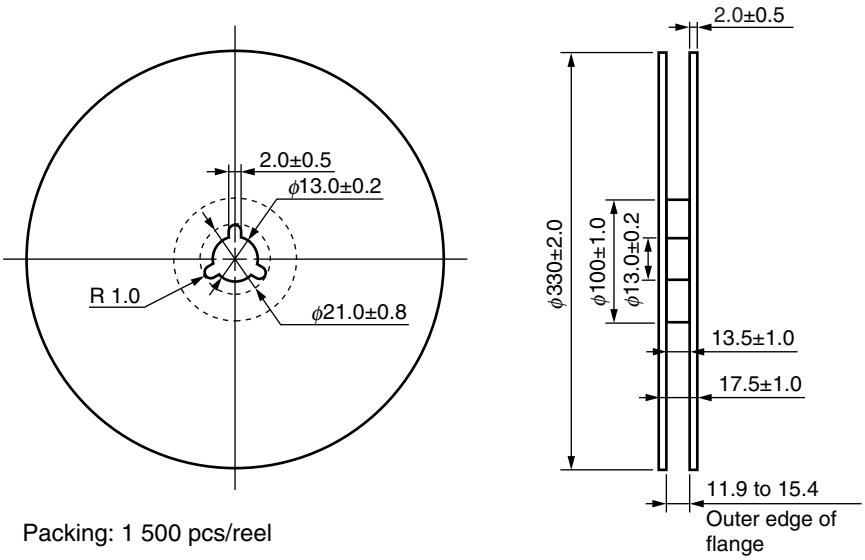
Outline and Dimensions (Tape)



Taping Direction



Outline and Dimensions (Reel)



Packing: 1 500 pcs/reel

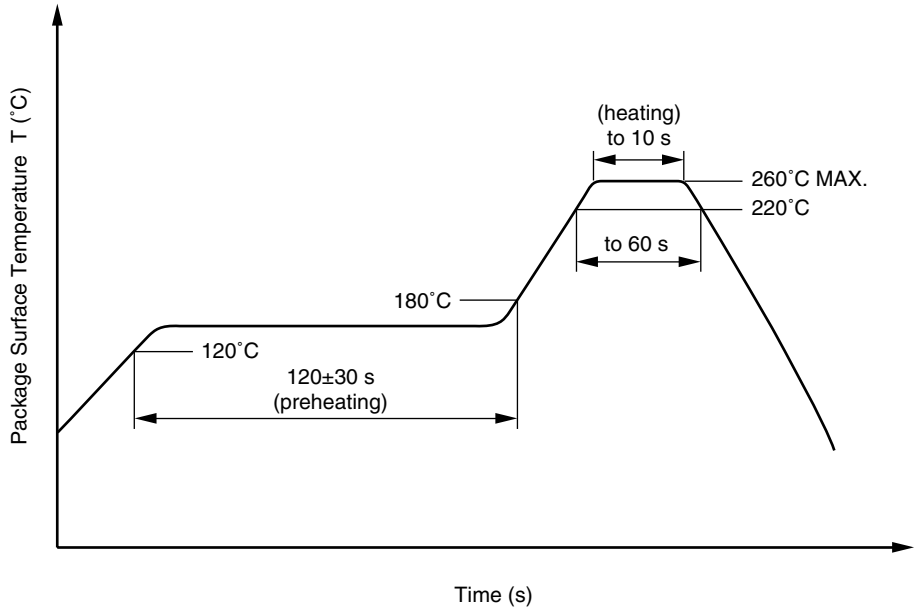
NOTES ON HANDLING

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) 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 side may enter the on state, even if the voltage is within the absolute maximum ratings.

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M8E 00.4-0110

Caution GaAs Products	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. • 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. 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.

▶**For further information, please contact**

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