PS9307L,PS9307L2

Preliminary Data Sheet

Specifications in this document are tentative and subject to change.

–NEPOC Series–

0.6 A OUTPUT CURRENT, HIGH CMR, IGBT GATE DRIVE, 6-PIN SDIP PHOTOCOUPLER

Oct. 12, 2011

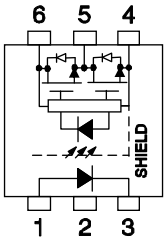
DESCRIPTION

The PS9307L and PS9307L2 are optical coupled isolators containing a GaAlAs LED on the input side and a photo diode, a signal processing circuit and a power output transistor on the output side on one chip.
The PS9307L and PS9307L2 are in 6-pin plastic SDIP (Shrink Dual In-line Package). The PS9307L2 has 8 mm creepage distance. The mount area of 6-pin plastic SDIP is half size of 8-pin DIP.
The PS9307L and PS9307L2 are designed specifically for high common mode transient immunity (CMR) and high switching speed. It is suitable for driving IGBTs and MOS FETs.
The PS9307L is lead bending type (Gull-wing) for surface mounting.
The PS9307L2 is lead bending type for long creepage distance (Gull-wing) for surface mount.

FEATURES

- Long creepage distance (8 mm MIN.: PS9307L2)
- Half size of 8-pin DIP
- Peak output current (0.6 A MAX., 0.4 A MIN.)
- High speed switching (t_{PLH}, t_{PHL} = 0.25 μs MAX.)
- High common mode transient immunity (CM_H, CM_L = ±50 kV/μs MIN.)
- Embossed tape product : PS9307L-E3 : 2 000 pcs/reel
  : PS9307L2-E3: 2 000 pcs/reel
- Pb-Free product
- Safety standards
  - UL approved: No. E72422
  - CSA approved: No. CA 101391 (CA5A, CAN/CSA-C22.2 60065, 60950)
  - SEMKO approved: No. 1115598
  - DIN EN60747-5-2 (VDE0884 Part2) approved: No. 40024069 (Option)

PIN CONNECTION
(Top View)



1. Anode
2. NC
3. Cathode
4. V_{EE}
5. V_O
6. V_{CC}

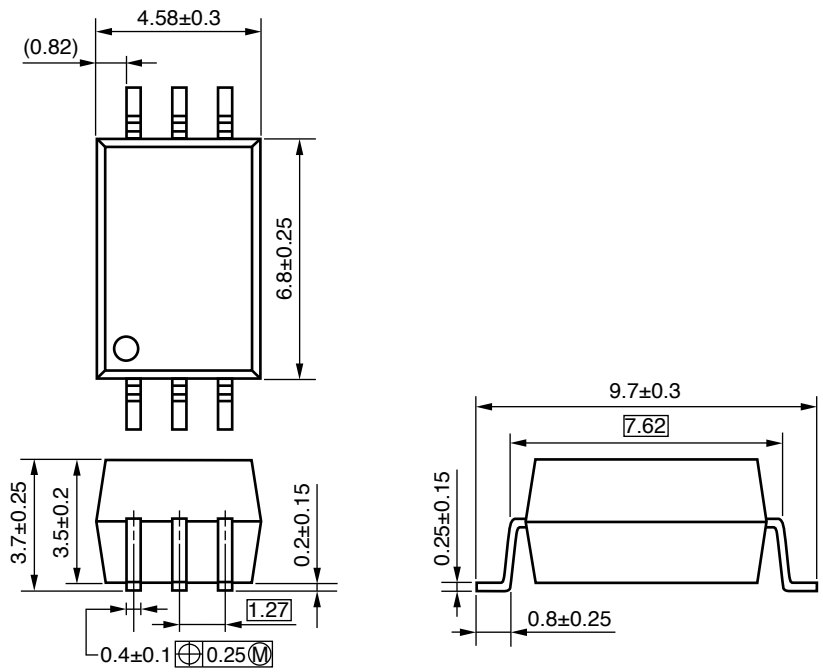
APPLICATIONS

- IGBT, Power MOS FET Gate Driver
- Industrial inverter
- AC Servo

PACKAGE DIMENSIONS (UNIT: mm)

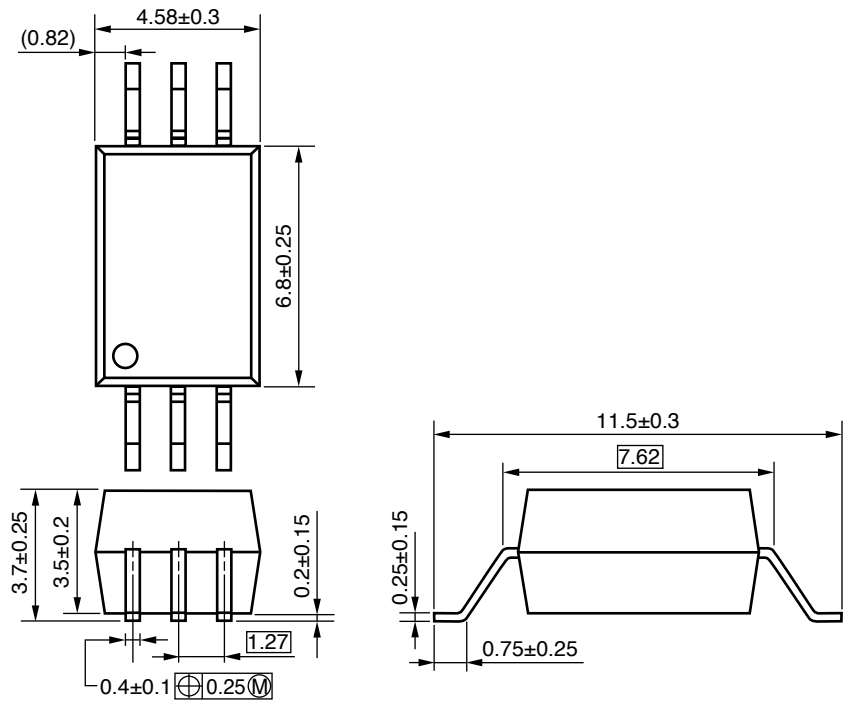
Lead Bending Type (Gull-wing) For Surface Mount

PS9307L



Lead Bending Type (Gull-wing) For Long Creepage Distance (Surface Mount)

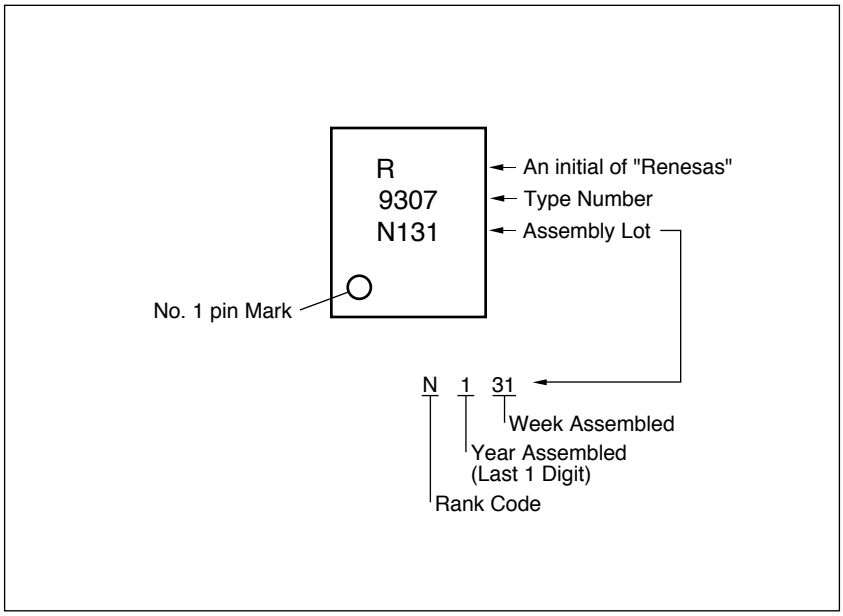
PS9307L2



PHOTOCOUPLER CONSTRUCTION

Parameter	PS9307L	PS9307L2
Air Distance (MIN.)	7 mm	8 mm
Outer Creepage Distance (MIN.)	7 mm	8 mm
Isolation Distance (MIN.)	0.4 mm	0.4 mm

MARKING EXAMPLE



ABSOLUTE MAXIMUM RATINGS (T_A = 25°C, unless otherwise specified)

Parameter		Symbol	Ratings	Unit
Diode	Forward Current	I_F	25	mA
	Peak Transient Forward Current (Pulse Width < 1 μs)	$I_{F\ (TRAN)}$	1.0	A
	Reverse Voltage	V_R	5	V
	Power Dissipation *1	P_D	45	mW
Detector	High Level Peak Output Current *2	$I_{OH\ (PEAK)}$	0.6	A
	Low Level Peak Output Current *2	$I_{OL\ (PEAK)}$	0.6	A
	Supply Voltage	(V_{CC}–V_{EE})	0 to 35	V
	Output Voltage	V_O	0 to V_{CC}	V
	Power Dissipation *3	P_C	250	mW
Isolation Voltage *4		BV	5 000	Vr.m.s.
Operating Frequency		f	250	kHz
Operating Ambient Temperature		T_A	–40 to +125	°C
Storage Temperature		T_{stg}	–55 to +150	°C

Notes: *1. Reduced to 1.2 mW/°C at T_A = 110°C or more.
*2. Maximum pulse width = 10 μs, Maximum duty cycle = 0.5%
*3. Reduced to 3.9 mW/°C at T_A = 85°C or more.
*4. AC voltage for 1 minute at T_A = 25°C, RH = 60% between input and output.
Pins 1-3 shorted together, 4-6 shorted together.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	(V_{CC}–V_{EE})	10		30	V
Forward Current (ON)	$I_{F\ (ON)}$	8		12	mA
Forward Voltage (OFF)	$V_{F\ (OFF)}$	–2		0.8	V
Operating Ambient Temperature	T_A	–40		125	°C

ELECTRICAL CHARACTERISTICS (T_A = –40 to +125°C, V_{CC} = 10 to 30 V, $I_{F\ (ON)}$ = 8 to 12 mA, $V_{F\ (OFF)}$ = –2 to 0.8 V, V_{EE} = GND, unless otherwise specified)

Parameter		Symbol	Conditions	MIN.	TYP.*1	MAX.	Unit
Diode	Forward Voltage	V_F	I_F = 10 mA, T_A = 25°C	1.3	1.56	1.8	V
	Reverse Current	I_R	V_R = 3 V, T_A = 25°C			10	μA
	Input Capacitance	C_{IN}	f = 1 MHz, V_F = 0 V		30		pF
Detector	High Level Output Current	I_{OH}	V_O = (V_{CC}–4 V) *2	0.2			A
			V_O = (V_{CC}–10 V) *3	0.4	0.7		
	Low Level Output Current	I_{OL}	V_O = (V_{EE}+2.5 V) *2	0.2			A
			V_O = (V_{EE}+10 V) *3	0.4	0.7		
	High Level Output Voltage	V_{OH}	I_F = 10 mA, I_O = 100 mA *4	V_{CC}–3.0	V_{CC}–1.7		V
	Low Level Output Voltage	V_{OL}	I_F = 0 mA, I_O = 100 mA		0.4	1.0	V
	High Level Supply Current	I_{CCH}	I_F = 10 mA, I_O = 0 mA		1.2	2.0	mA
	Low Level Supply Current	I_{CCL}	I_F = 0 mA, I_O = 0 mA		1.3	2.0	mA
Coupled	Threshold Input Current (L H)	I_{FLH}	I_O = 0 mA, V_O > 5 V		2.1	5.0	mA
	Threshold Input Voltage (H L)	V_{FHL}	I_O = 0 mA, V_O < 5 V	0.8			V

Notes: *1. Typical values at T_A = 25°C, V_{CC}–V_{EE} = 30 V.
*2. Maximum pulse width = 50 μs, Maximum duty cycle = 0.2%.
*3. Maximum pulse width = 10 μs, Maximum duty cycle = 0.5%.
*4. V_{OH} is measured with the DC load current in this testing.

SWITCHING CHARACTERISTICS (T_A = –40 to +125°C, V_{CC} = 10 to 30 V, $I_{F\ (ON)}$ = 8 to 12 mA, $V_{F\ (OFF)}$ = –2 to 0.8 V, V_{EE} = GND, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.*1	MAX.	Unit
Propagation Delay Time (L H)	t_{PLH}	R_g = 47 Ω, C_g = 3 nF, f = 50 kHz, Duty Cycle = 50%*2, I_F = 10 mA, V_{CC} = 30 V	0.040	0.075	0.175	μs
Propagation Delay Time (H L)	t_{PHL}		0.040	0.090	0.175	μs
Pulse Width Distortion (PWD)	$\lvert t_{PHL}–t_{PLH} \rvert$				0.090	μs
Propagation Delay Time (Difference Between Any Two Products)	$t_{PHL}–t_{PLH}$		–0.120		0.120	μs
Rise Time	t_r			30		ns
Fall Time	t_f			30		ns
Common Mode Transient Immunity at High Level Output	$\lvert CM_H \rvert$	T_A = 25°C, I_F = 10 mA, V_{CC} = 30 V, V_{CM} = 1.5 kV	50			kV/μs
Common Mode Transient Immunity at Low Level Output	$\lvert CM_L \rvert$	T_A = 25°C, V_F = 0 mA, V_{CC} = 30 V, V_{CM} = 1.5 kV	50			kV/μs

Notes: *1. Typical values at T_A = 25°C, V_{CC}–V_{EE} = 30 V.
*2. This load condition is equivalent to the IGBT load at 1 200 V/25 A.

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.