

## Optocoupler

### 1. Description

The SL214N is a four-channel optocoupler consisting of light-emitting diodes and phototransistors, packaged in SSOP16 format.

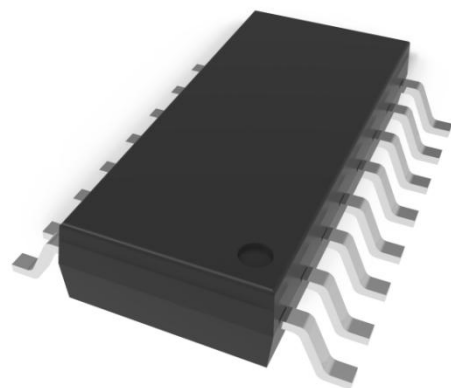
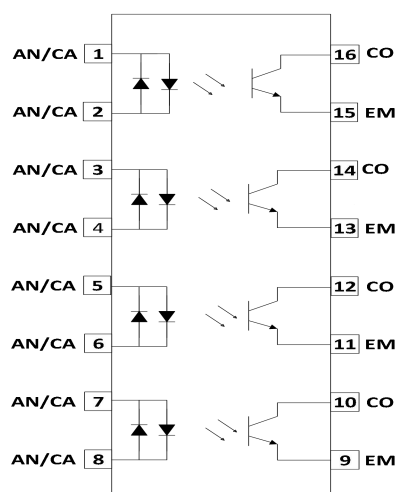
### 2. Features

- Current Transfer Ratio (CTR) range:  $\geq 20\%$
- Input-output isolation voltage (Viso=3750Vrms)
- Collector-emitter breakdown voltage (BVCEO)  $\geq 80V$
- Creepage distance  $\geq 5mm$
- External electrical clearance  $\geq 5mm$
- DTI  $\geq 0.3mm$

### 3. Applications

- Switching power supply, smart meter
- Industrial control, measuring instruments
- Office equipment, such as photocopiers
- Household appliances, such as air conditioners, fans, water heaters, etc

### 4. Structural schematics and packaging



### 5. Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Value	Unit
Transmitter	Forward Current	I <sub>F</sub>	± 50	mA
	Power dissipation	P <sub>D</sub>	70	mW
	Derating Factor (Above T <sub>A</sub> =100°C)	P <sub>DD</sub>	2.9	mW/°C
	Thermal resistance (junction-ambient)	R <sub>thJ-A</sub>	325	°C/W
	Thermal resistance (junction-case)	R <sub>thJ-C</sub>	200	°C/W
Receiver	Collector power dissipation	P <sub>C</sub>	150	mW
	Collector current	I <sub>C</sub>	50	mA
	Collector-emitter voltage	V <sub>CEO</sub>	80	V
	Emitter-collector voltage	V <sub>ECO</sub>	7	V
Total power dissipation		P <sub>tot</sub>	500	mW
Transient Voltage Suppression (TVS) capability		V <sub>iso</sub>	3750	V <sub>rms</sub>
Operating temperature		T <sub>opr</sub>	-55~+100	°C
Storage temperature		T <sub>stg</sub>	-55~+125	°C
Soldering temperature		T <sub>sol</sub>	260	°C

### 6. Electrical characteristics (Ta=25°C)

Parameter		Symbol	Conditions	Min.	Type	Max.	Unit
Transmitter	Forward voltage	V <sub>F</sub>	I <sub>F</sub> =± 20mA	-	1.2	1.4	V
	Terminal capacitance	C <sub>t</sub>	V=0, f=1kHz	-	30	250	pF
Receiver	Collector dark current	I <sub>CEO</sub>	I <sub>F</sub> =0mA, V <sub>CE</sub> =20V	-	-	100	nA
	Collector-emitter breakdown voltage	BV <sub>CEO</sub>	I <sub>C</sub> =0.1mA, I <sub>F</sub> =0	80	-	-	V
	Emitter-collector breakdown voltage	BV <sub>ECO</sub>	I <sub>E</sub> =10μA, I <sub>F</sub> =0	7	-	-	V
Transmission characteristics	Current transfer ratio	CTR*	I <sub>F</sub> =± 1mA, V <sub>CE</sub> =5V	20	-	300	%
	Collector-emitter saturation voltage drop	V <sub>CE(sat)</sub>	I <sub>F</sub> =± 20mA, I <sub>C</sub> =1mA	-	0.1	0.2	V
	Isolation resistance	R <sub>iso</sub>	DC500V, 40~60%R.H.	5x10 <sup>10</sup>	10 <sup>11</sup>	-	Ω
	Isolation capacitor	C <sub>f</sub>	V=0, f=1MHz	-	0.6	1.0	pF
	Cut-off frequency	F <sub>c</sub>	V <sub>CE</sub> =5V, I <sub>C</sub> =2mA, R <sub>L</sub> =100Ω, -3dB	-	80	-	kHz
	Rise time	T <sub>r</sub>	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA, R <sub>L</sub> =100Ω	-	-	18	μs
	Fall time	T <sub>f</sub>	V <sub>CE</sub> =2V, I <sub>C</sub> =2mA, R <sub>L</sub> =100Ω	-	-	18	μs

\* CTR=I<sub>C</sub>/I<sub>F</sub> x 100%

## 7. Typical photoelectric characteristic curves

Fig.1 Test circuits

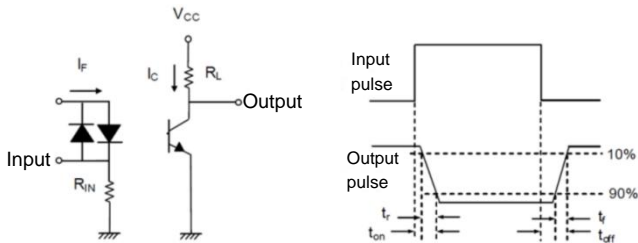


Fig.2 Relative Current Transfer Ratio vs. Forward Current

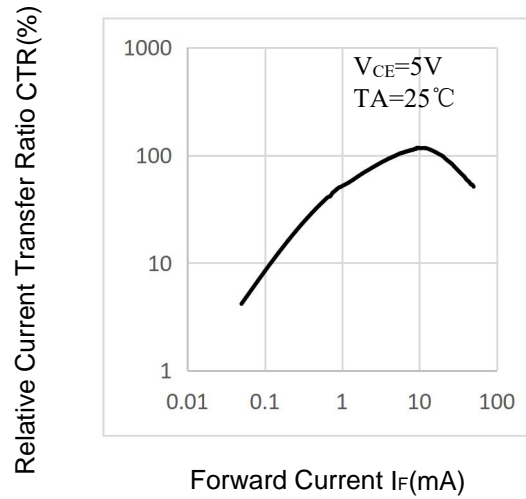


Fig.3 Forward Current vs. Forward Voltage

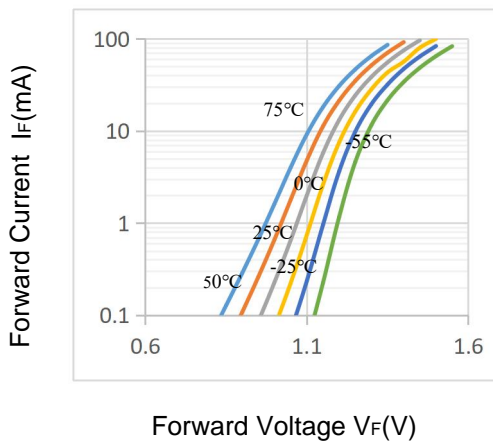


Fig.4 Collector Current vs. Collector-Emitter Voltage

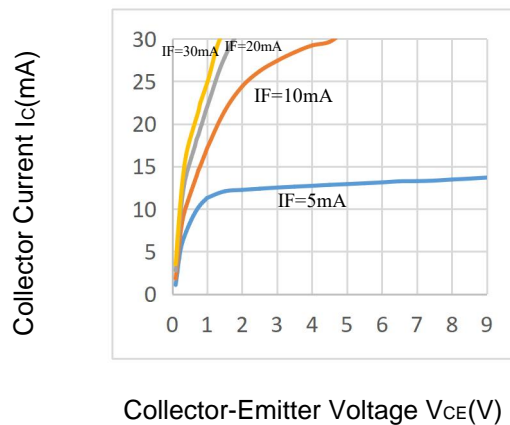


Fig.5 Relative Current Transfer Ratio vs. Ambient Temperature

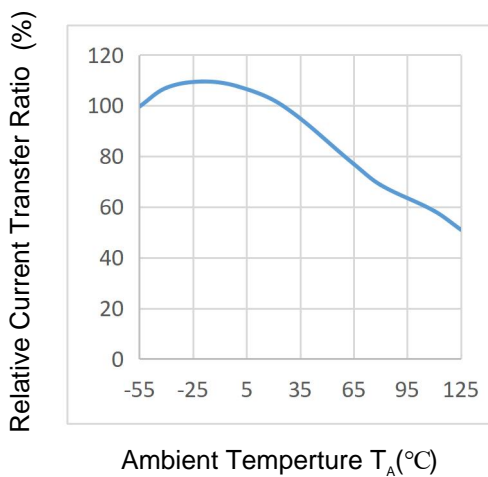
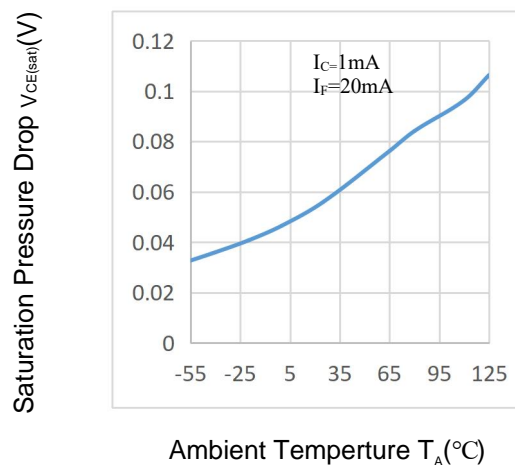
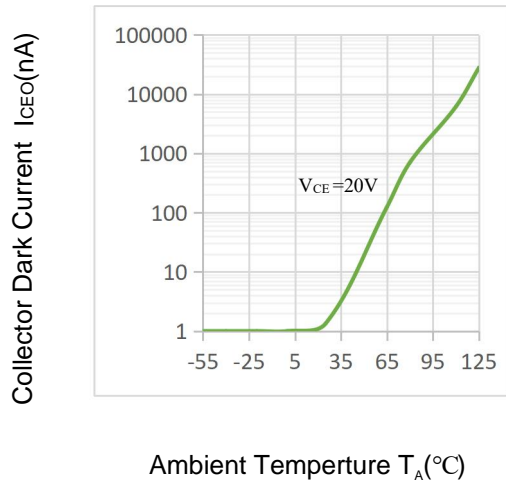


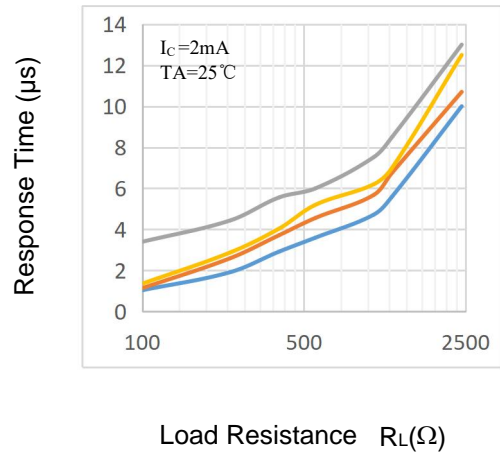
Fig.6 Saturation Pressure Drop vs. Ambient Temperature



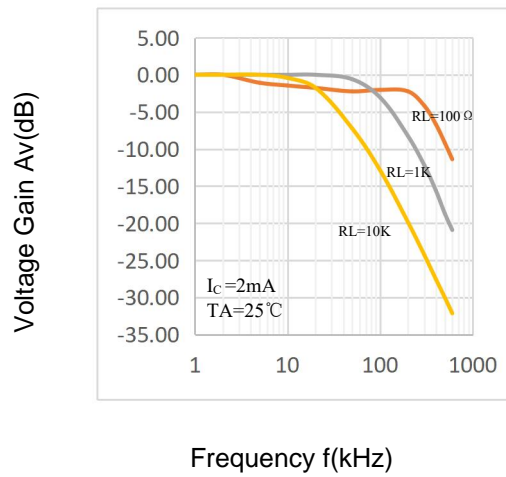
**Fig.7 Collector Dark Current vs. Ambient Temperature**



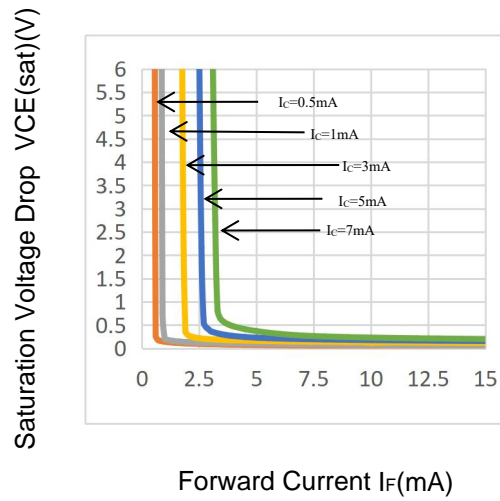
**Fig.8 Response Time vs. Load Resistance**



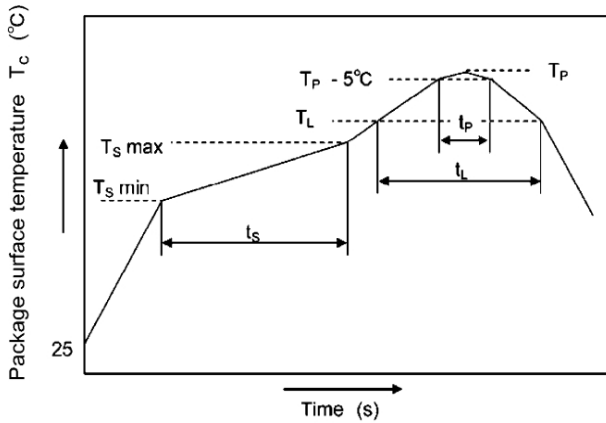
**Fig.9 Frequency Response**



**Fig.10 Saturation Voltage Drop vs. Forward Current**



## 8. Reflow temperature curves



	Symbol	Min	Max	Unit
Preheat temperature	$T_S$	150	200	°C
Preheat time	$t_s$	60	120	s
Ramp-up rate ( $T_L$ to $T_P$ )			3	°C/s
Liquidus temperature	$T_L$	217		°C
Time above $T_L$	$t_L$	60	150	s
Peak temperature	$T_P$		260	°C
Time during which $T_c$ is between ( $T_P - 5$ ) and $T_P$	$t_p$		30	s
Ramp-down rate ( $T_P$ to $T_L$ )			6	°C/s

Note:

1. It is recommended to perform reflow soldering under the specified temperature and time conditions, with no more than three cycles.
2. Manual soldering with a soldering iron
  - A. Manual soldering with a soldering iron is only intended for product rework or sample testing.
  - B. Manual soldering requirements: Temperature of  $360^{\circ}\text{C} \pm 5^{\circ}\text{C}$ , duration  $\leq 3$  seconds.

## 9. Package dimensions

SSOP-16

Unit:mm

