



# NEC's SINGLE TR. OUTPUT, HIGH COLLECTOR-EMITTER VOLTAGE, 4-PIN ULTRA SMALL FLAT LEAD OPTOCOUPLER

## PS2913-1

### FEATURES

- **ULTRA SMALL FLAT LEAD PACKAGE:**  
4.6 (L) x 2.5 (W) x 2.1 (H) mm
- **ISOLATION DISTANCE:**  
0.4 mm MIN
- **HIGH COLLECTOR TO EMITTER VOLTAGE:**  
 $V_{CEO} = 120\text{ V}$
- **HIGH ISOLATION VOLTAGE**  
 $BV = 2500\text{ Vr.m.s.}$
- **AVAILABLE IN TAPE AND REEL:**  
PS2913-1-F3, F4: 3500 pcs/reel

### DESCRIPTION

NEC's PS2913-1 is an optically coupled isolator containing a GaAs light emitting diode and an NPN silicon phototransistor is one package for high density mounting applications. This device is housed in an ultra small flat-lead package which realizes a reduction in mounting area of about 30% compared with the PS28XX series.

### APPLICATIONS

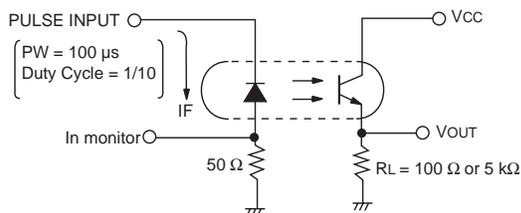
- HYBRID IC
- POWER SUPPLY

### ELECTRICAL CHARACTERISTICS (TA = 25°C)

PART NUMBER			PS2913-1			
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX	
Diode	V <sub>F</sub>	Forward Voltage, I <sub>F</sub> = 1 mA	V	0.9	1.3	
	I <sub>R</sub>	Reverse Current, V <sub>R</sub> = 5 V	μA		5	
	C <sub>T</sub>	Terminal Capacitance, V = 0, f = 1.0 MHz	pF		15	
Transistor	I <sub>CEO</sub>	Collector to Emitter Dark Current, I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 120 V	nA		100	
Coupled	CTR	Current Transfer Ratio (I <sub>C</sub> /I <sub>F</sub> ), I <sub>F</sub> = 1 mA, V <sub>CE</sub> = 5 V	%	50	200	
	V <sub>CE(sat)</sub>	Collector Saturation Voltage, I <sub>F</sub> = 1 mA, I <sub>C</sub> = 0.2 mA	V		0.3	
	R <sub>I-O</sub>	Isolation Resistance, V <sub>I-O</sub> = 1.0 kVDC	Ω	10 <sup>11</sup>		
	C <sub>I-O</sub>	Isolation Capacitance, V = 0 V, f = 1.0 MHz	pF		0.4	
	t <sub>r</sub>	Rise Time <sup>1</sup>	V <sub>CC</sub> = 5 V, I <sub>C</sub> = 2 mA, R <sub>L</sub> = 100 Ω	μs	10	
	t <sub>f</sub>	Fall Time <sup>1</sup>		μs	10	
	t <sub>ON</sub>	On Time <sup>1</sup>	V <sub>CC</sub> = 5 V, I <sub>F</sub> = 1 mA, R <sub>L</sub> = 5 kΩ	μs	80	
	t <sub>S</sub>	Storage Time <sup>1</sup>		μs	5	
t <sub>F</sub>	Off Time <sup>1</sup>	μs		50		

Note:

1. Test Circuit for Switching Time



**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** (TA = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
IF	Forward Current (DC)	mA	50
ΔIF/°C	Forward Current Derating	mA/°C	0.5
IF (Peak)	Peak Forward Current <sup>2</sup>	A	0.5
PD	Power Dissipation	mW	60
VR	Reverse Voltage	V	6
Transistor			
VCEO	Collector to Emitter Voltage	V	120
VECO	Emitter to Collector Voltage	V	6
IC	Collector Current	mA	30
ΔPc/°C	Power Dissipation Derating	mW/°C	1.2
Pc	Power Dissipation	mW	120
Coupled			
VISO	Isolation Voltage <sup>3</sup>	Vr.m.s.	2500
PT	Total Power Dissipation	mW	160
TA	Operating Ambient Temp.	°C	-55 to +100
TSTG	Storage Temperature	°C	-55 to +150

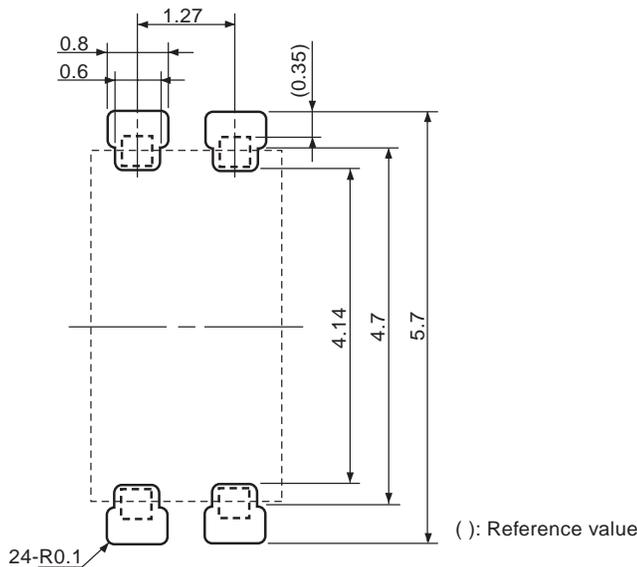
Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. PW = 100 μs, Duty Cycle = 1%.
3. AC voltage for 1 minute at TA = 25°C, RH = 60% between input and output.

**ORDERING INFORMATION**

PART NUMBER	PACKING STYLE
PS2913-1-F3	Embossed Tape 3500 pcs/reel
PS2913-1-F4	

**RECOMMENDED MOUNT PAD DIMENSIONS** (Units in mm)



Remark:

This drawing is considered to meet air and outer creepage distance 4.0 minimum. All dimensions in this figure must be evaluated before use.

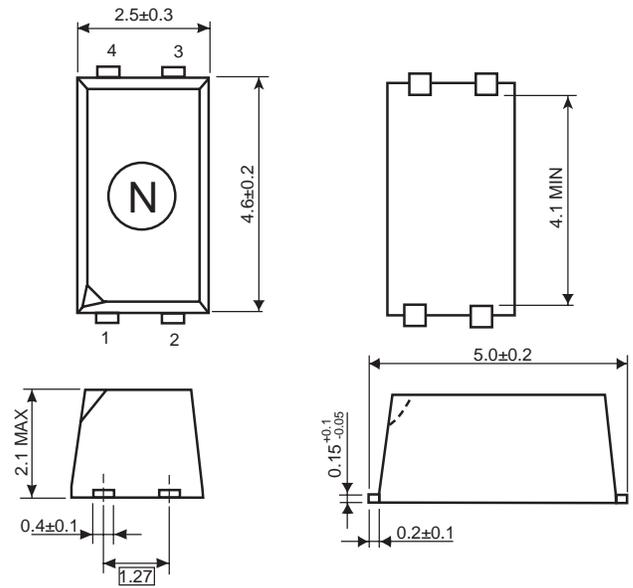
**OPTOCOUPLER CONSTRUCTION**

PARAMETER	UNITS (MIN)
Air Distance	4 mm
Creepage Distance	4 mm
Isolation Distance	0.4 mm

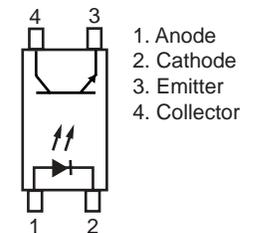
**CAUTIONS REGARDING NOISE:**

Be aware that when voltage is applied suddenly between the optocoupler'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.

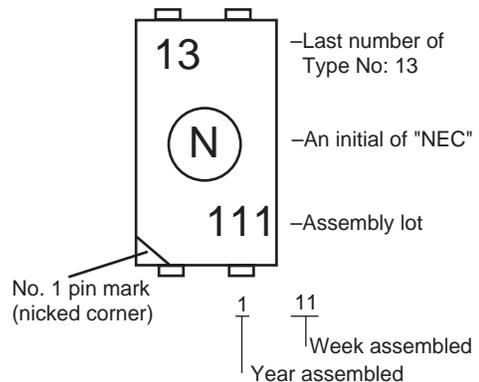
**OUTLINE DIMENSIONS** (Units in mm)



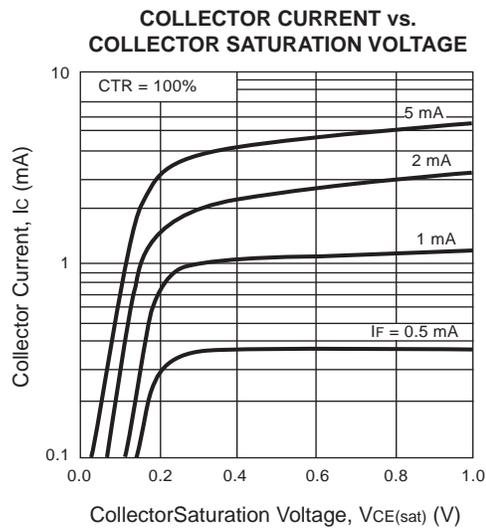
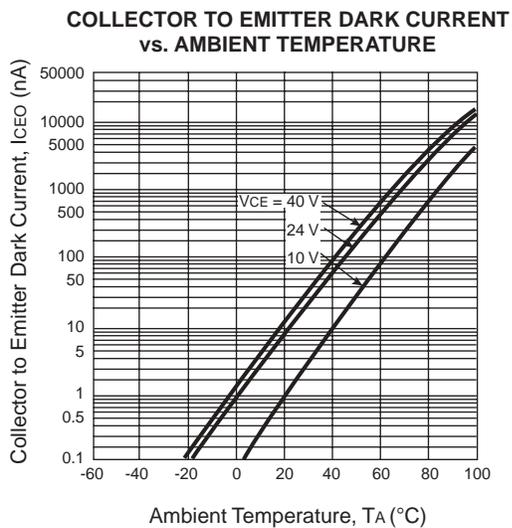
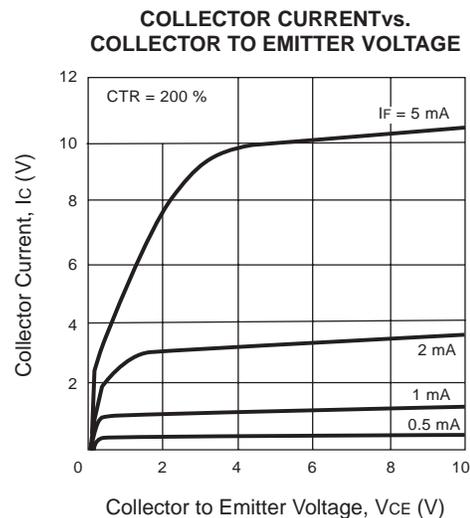
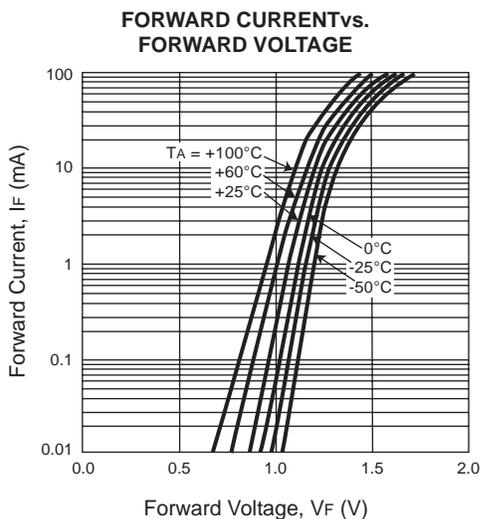
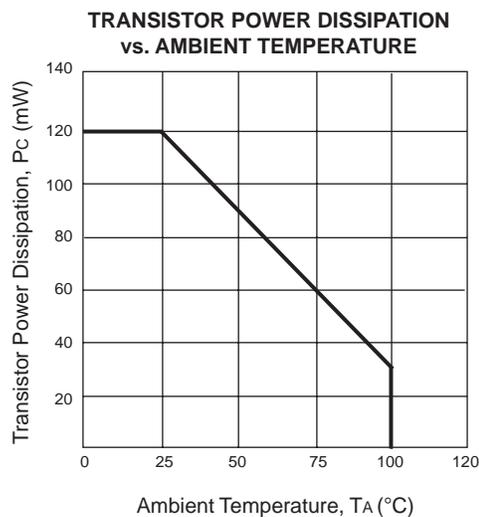
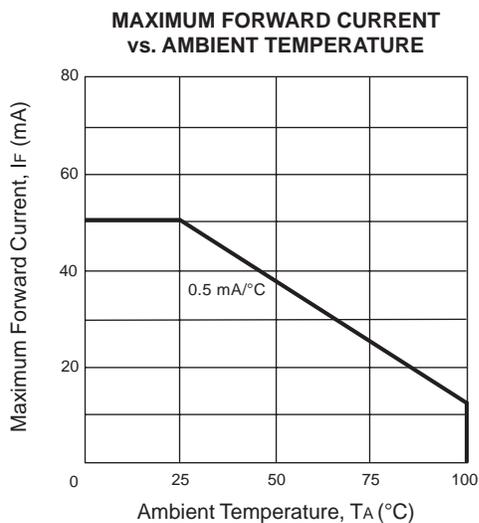
**TOP VIEW**



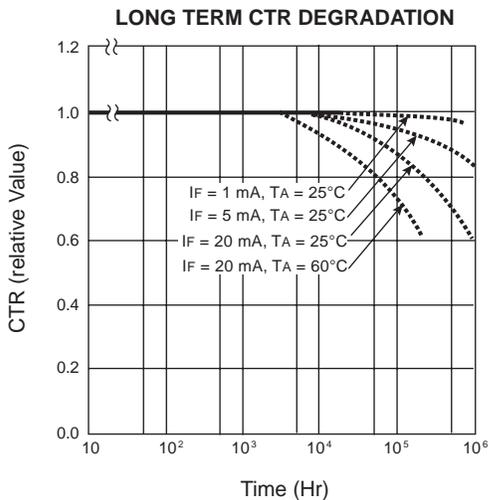
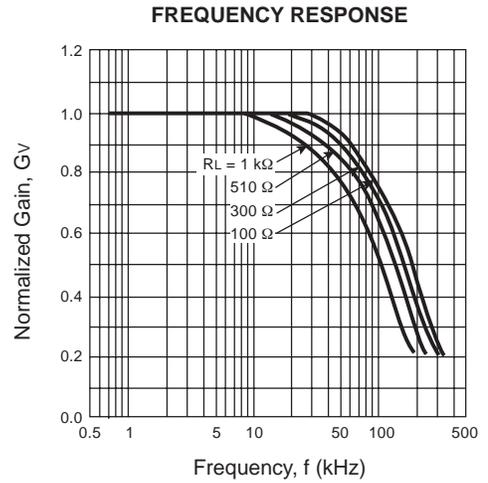
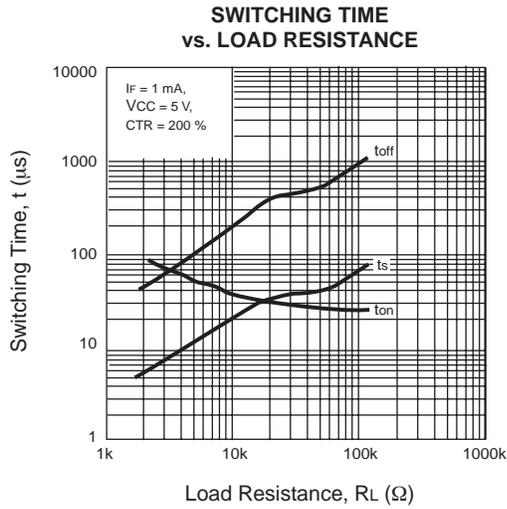
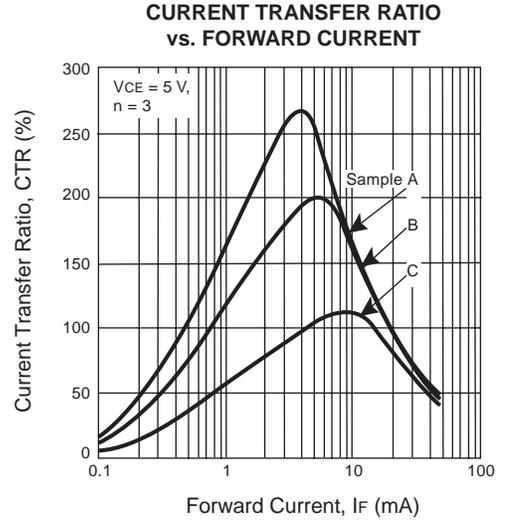
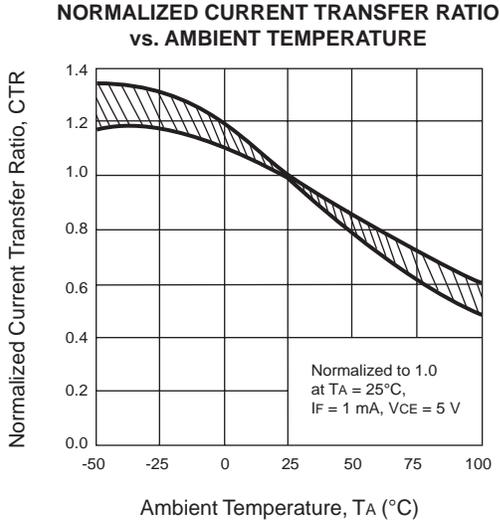
**MARKING**



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



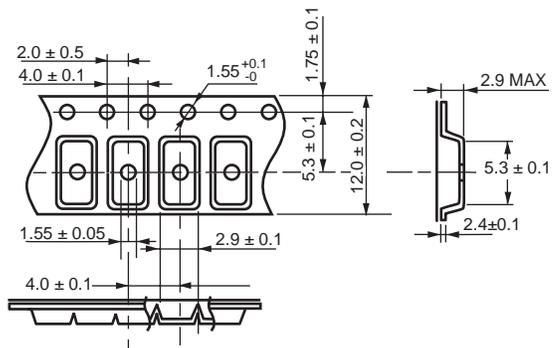
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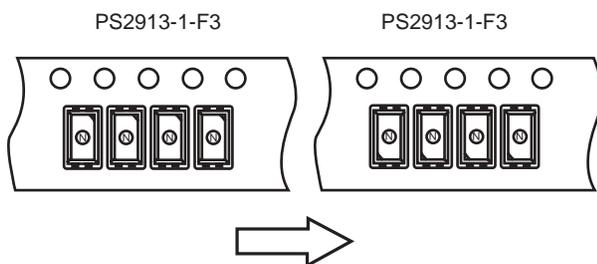
**REMARK:** The graphs indicate nominal characteristics.

# TAPING SPECIFICATIONS (Units in mm)

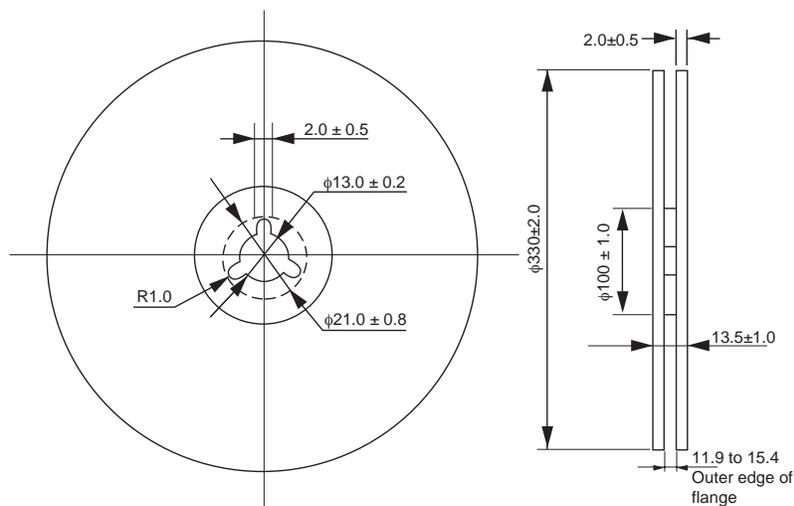
## TAPE OUTLINE AND DIMENSIONS



## TAPE DIRECTION



## REEL OUTLINE AND DIMENSIONS



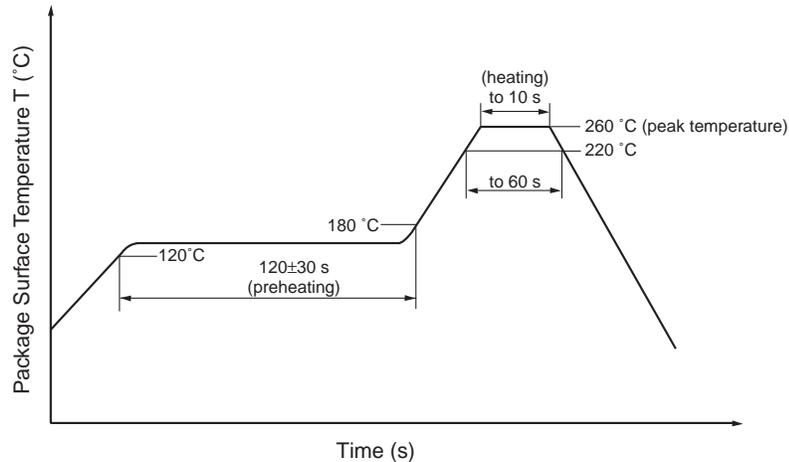
Packing: 3500 pcs/reel

## 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 chlorine-based cleaning solvent after a reflow process.

### USAGE CAUTIONS

1. Protect against static electricity when handling.
2. Avoid storage at a high temperature and high humidity.

#### Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

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10/14/2003