



NEC's HIGH CTR, 4 PIN ULTRA SMALL PACKAGE FLAT LEAD OPTOCOUPLER

PS2911-1

FEATURES

- **SMALL AND THIN PACKAGE:**
4.6 (L) x 2.5 (W) x 2.1 (H) mm
- **HIGH CURRENT TRANSFER RATIO:**
CTR = 200% TYP @ $I_F = 1 \text{ mA}$, $V_{CE} = 5 \text{ V}$
- **HIGH ISOLATION VOLTAGE**
BV: 2500 Vr.m.s.
- **TAPE AND REEL AVAILABLE**

DESCRIPTION

NEC's PS2911-1 is an optically coupled isolator containing a GaAs light emitting diode and an NPN silicon phototransistor in one package for high density mounting applications. An ultra small flat lead package has been provided which realizes a reduction in mounting area of about 30% compared with the PS28XX series.

APPLICATIONS

- DC/DC CONVERTER
- MODEM/PC CARD

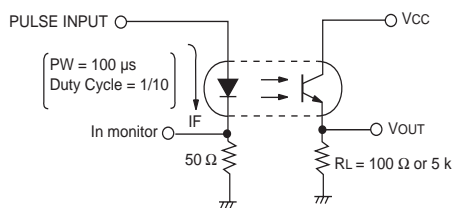
ELECTRICAL CHARACTERISTICS (TA = 25°C)

PART NUMBER		PS2911-1				
SYMBOLS	PARAMETERS	UNITS	MIN	TYP	MAX	
Diode	V _F	Forward Voltage, I _F = 5 mA	V	0.9	1.1	1.3
	I _R	Reverse Current, V _R = 5 V	μA			5
	C _T	Terminal Capacitance, V = 0, f = 1.0 MHz	pF		15	
Transistor	I _{CEO}	Collector to Emitter Current, I _F = 0 mA, V _{CE} = 40 V	nA			100
Coupled	CTR	Current Transfer Ratio (I _C /I _F) ¹ , I _F = 1 mA, V _{CE} = 5 V	%	100	200	400
	V _{CE(sat)}	Collector Saturation Voltage, I _F = 1 mA, I _C = 0.2 mA	V		0.13	0.3
	R _{I-O}	Isolation Resistance, V _{I-O} = 1.0 k V _{DC}	Ω	10 ¹¹		
	C _{I-O}	Isolation Capacitance, V = 0 V, f = 1.0 MHz	pF		0.4	
	t _R	Rise Time ² , V _{CC} = 5 V, I _C = 2 mA, R _L = 100 Ω	μs		5	
	t _F	Fall Time ² , V _{CC} = 5 V, I _C = 2 mA, R _L = 100 Ω	μs		10	
	t _{ON}	On Time ² , V _{CC} = 5 V, I _F = 1 mA, R _L = 5 kΩ	μs		40	
	t _S	Storage Time ² , V _{CC} = 5 V, I _F = 1 mA, R _L = 5 kΩ	μs		10	
t _{OFF}	Off Time ² , V _{CC} = 5 V, I _F = 1 mA, R _L = 5 kΩ	μs		120		

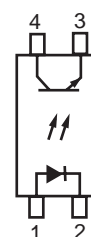
1. CTR RANK:

- N: 100 to 400 (%)
- K: 200 to 400 (%)
- L: 150 to 300 (%)
- M: 100 to 200 (%)

2. Test Circuit for Switching Time



PS2911-1



ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
Diode			
I _F	Forward Current (DC)	mA	50
ΔI _F /°C	Forward Current Derating	mA/°C	0.5
I _F (Peak)	Peak Forward Current ²	A	0.5
P _D	Power Dissipation	mW	60
V _R	Reverse Voltage	V	6
Transistor			
V _{CEO}	Collector to Emitter Voltage	V	40
V _{ECO}	Emitter to Collector Voltage	V	5
I _C	Collector Current	mA	40
ΔP _C /°C	Power Dissipation Derating	mW/°C	1.2
P _C	Power Dissipation	mW	120
Coupled			
BV	Isolation Voltage ³	V _{r.m.s.}	2500
P _T	Total Power Dissipation	mW	160
T _A	Operating Ambient Temp.	°C	-55 to +100
T _{STG}	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 T_A = 25 °C, RH = 60 % between input and output.

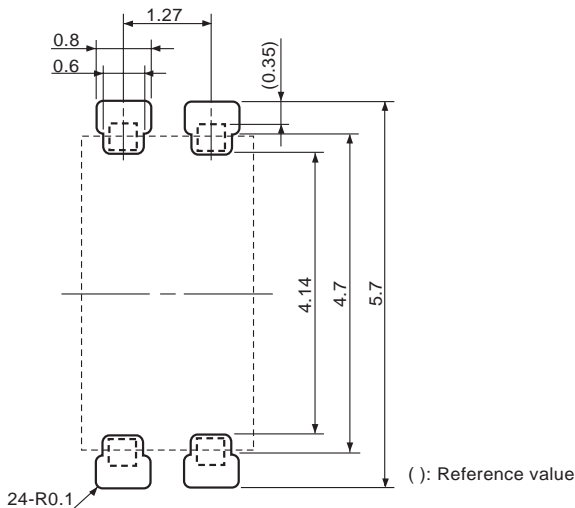
CAUTIONS REGARDING NOISE:

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.

ORDERING INFORMATION

PART NUMBER	PACKING STYLE
PS2911-1-F3	Embossed Tape 3500 pcs/reel
PS2911-1-F4	

RECOMMENDED MOUNT PAD DIMENSIONS (Units in mm)

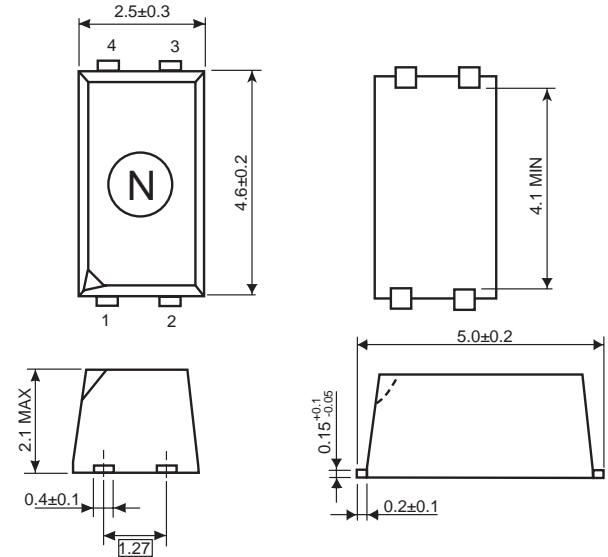


Remark: This drawing is considered to meet air and outer creepage distance 4.0 mm minimum. All dimensions in this figure must be evaluated before use.

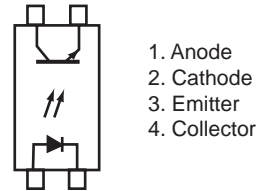
OPTOCOUPLER CONSTRUCTION

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

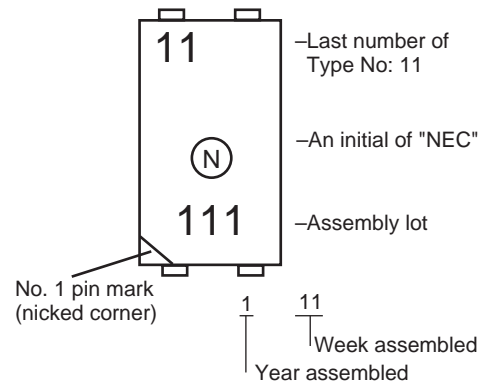
OUTLINE DIMENSIONS (Units in mm)



TOP VIEW

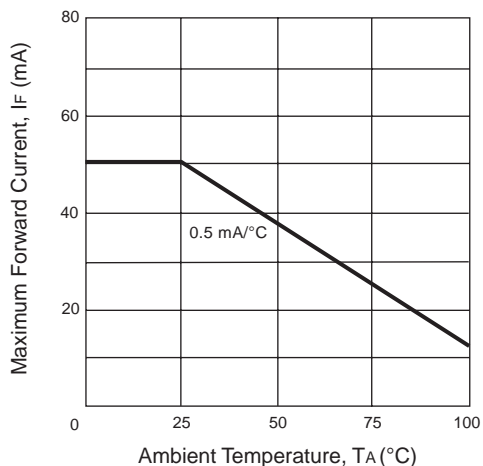


MARKING

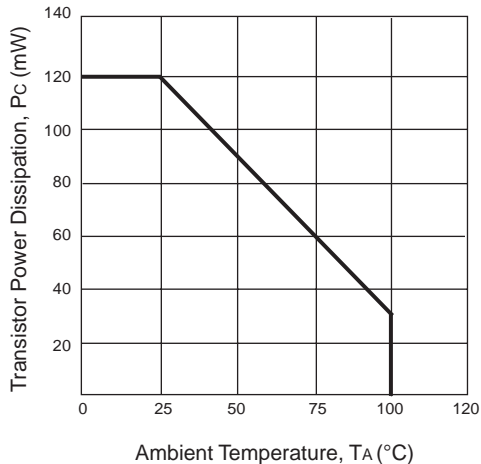


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

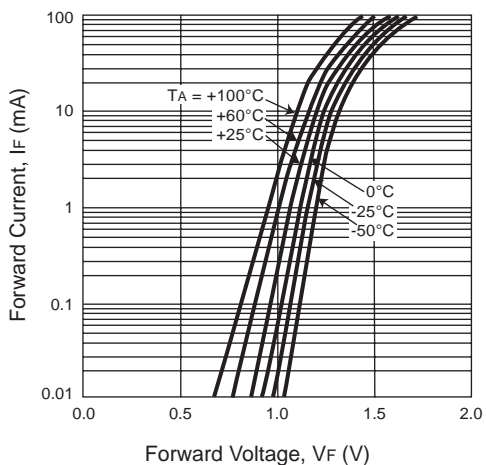
MAXIMUM FORWARD CURRENT vs. AMBIENT TEMPERATURE



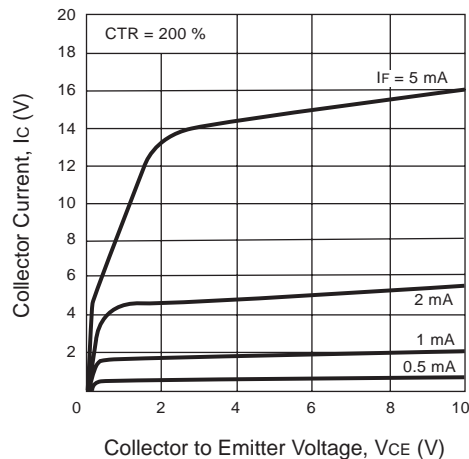
TRANSISTOR POWER DISSIPATION vs. AMBIENT TEMPERATURE



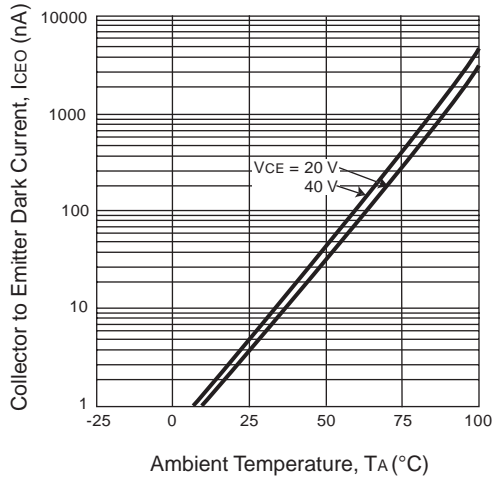
FORWARD CURRENT vs. FORWARD VOLTAGE



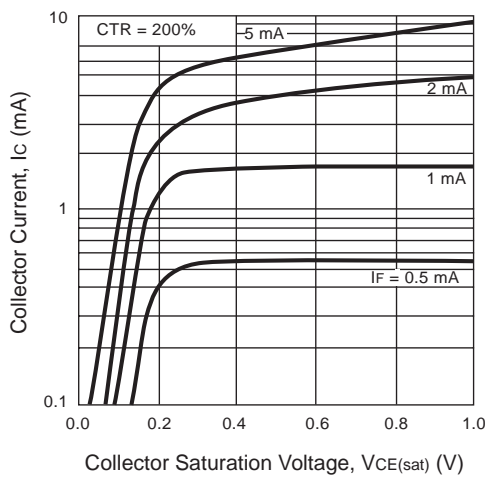
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



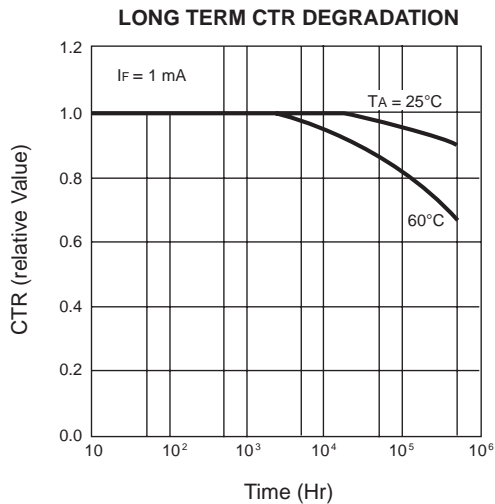
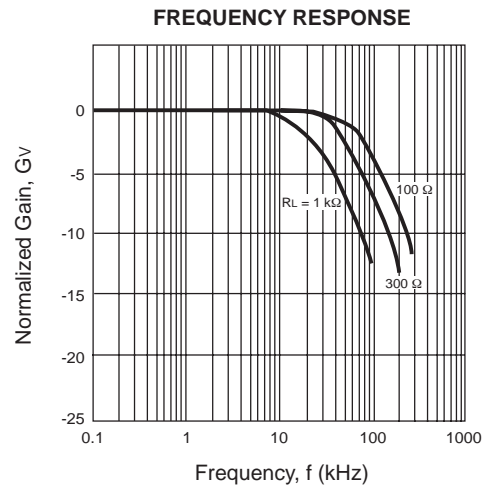
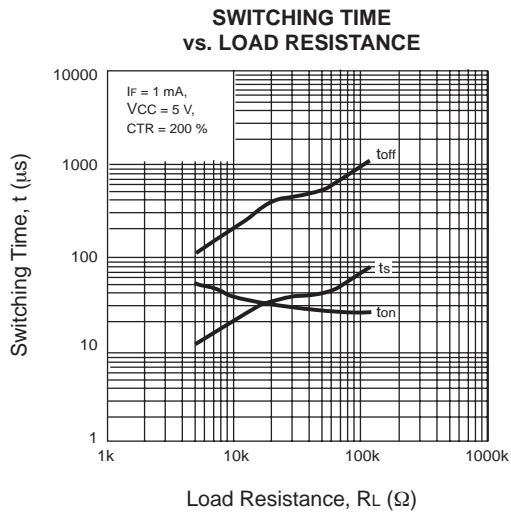
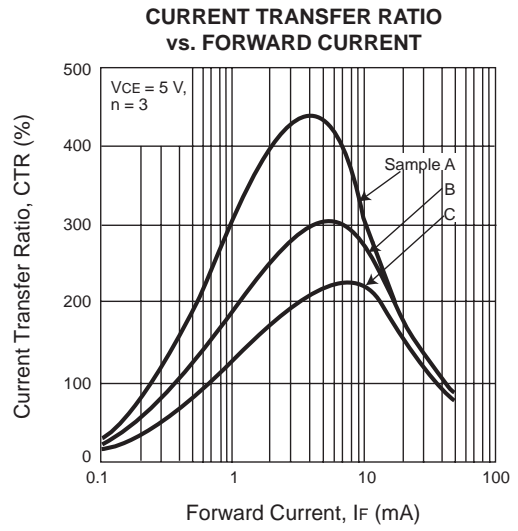
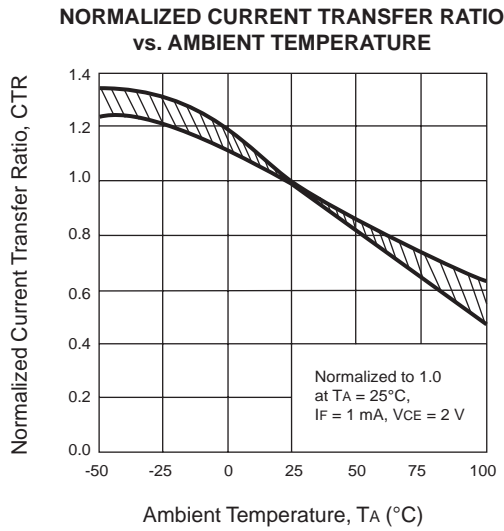
COLLECTOR TO EMITTER DARK CURRENT vs. AMBIENT TEMPERATURE



COLLECTOR CURRENT vs. COLLECTOR SATURATION VOLTAGE

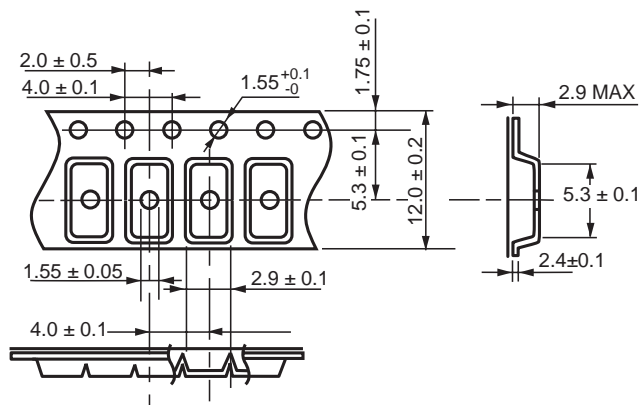


TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

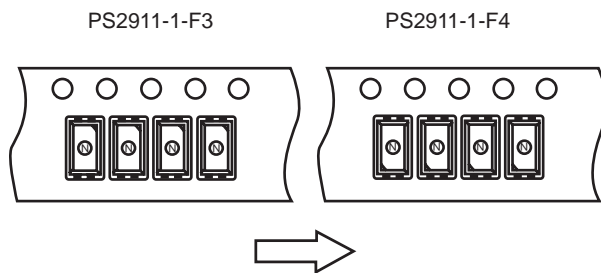


TAPING SPECIFICATIONS (Units in mm)

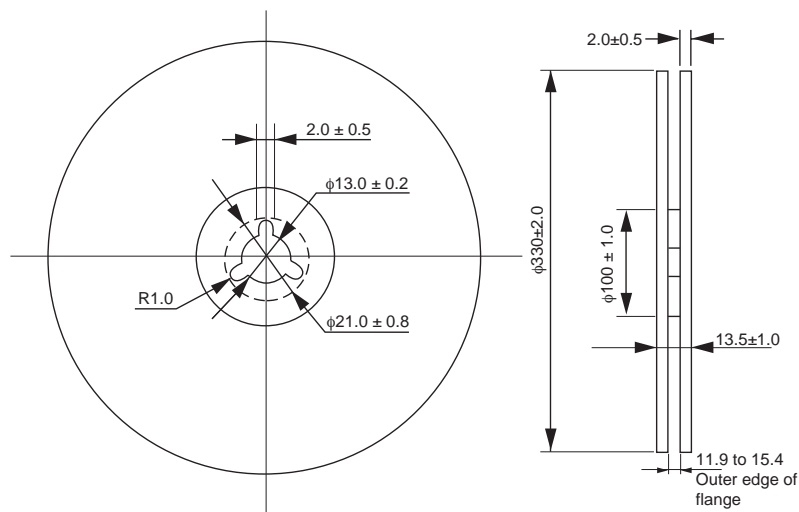
Tape Outline and Dimensions



Tape Direction



Reel Outline and Dimensions

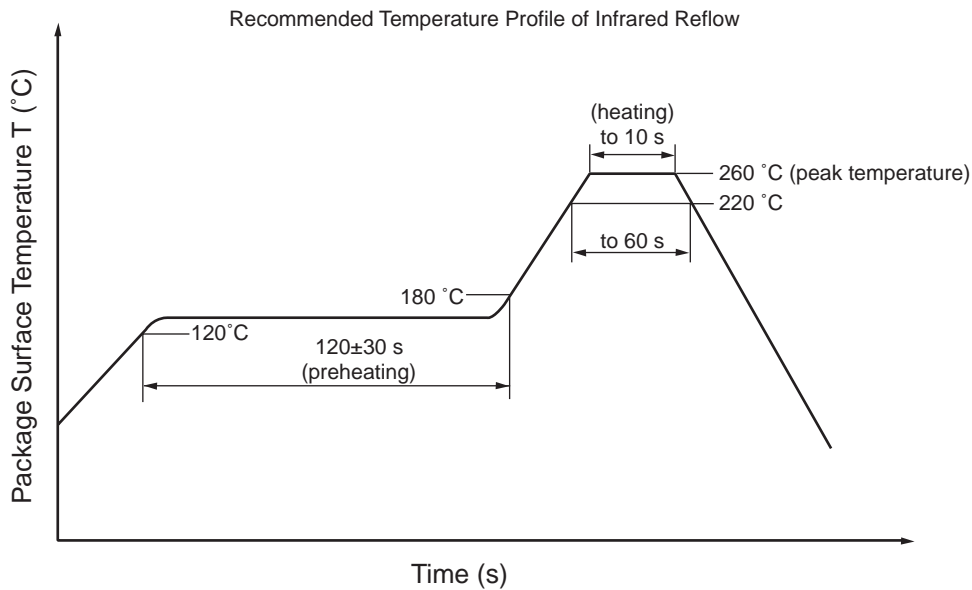


Packing: 3500 pcs/reel

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).



(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.

CEL California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.
 4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • FAX (408) 988-0279 • www.cel.com

DATA SUBJECT TO CHANGE WITHOUT NOTICE

10/14/2003