To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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TRANSCEIVER MODULE
NL1000

3.0 V, SMALL PACKAGE IrDA COMPLIANT TRANSCEIVER MODULE
DATA RATE: 2.4 k to 115.2 kbps

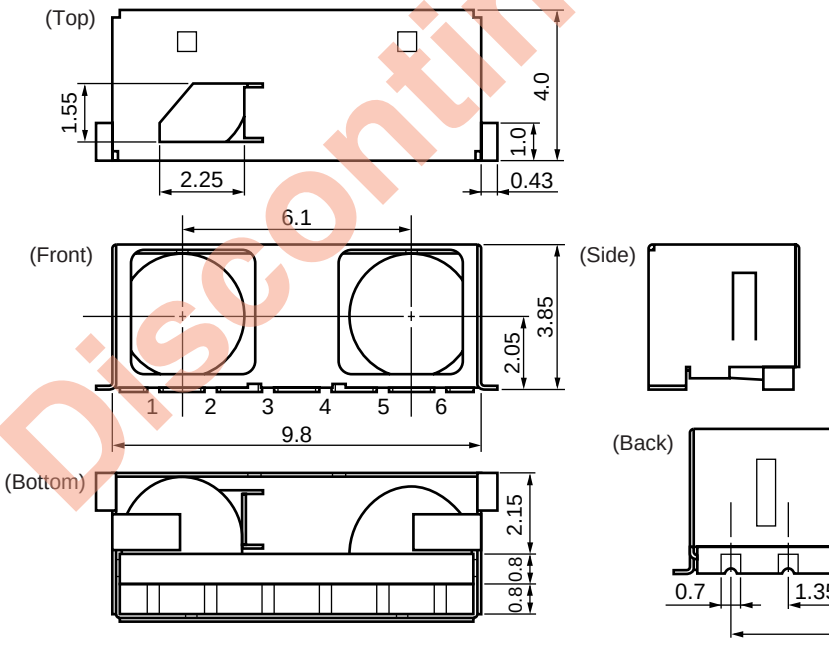
DESCRIPTION

The NL1000 is a small package transceiver module for IrDA Ver.1.0. This module incorporates an infrared Rays LED and an integrated photo detector with wide bandwidth amplifier, and it has low operating voltage and low operating current.

★ FEATURES

- Conform to IrDA Ver.1.0 standards
- Data rate 2.4 k to 115.2 kbps
- Supply voltage 2.7 to 3.6 V
- Data link distance to 1 m
- Ultra small size 3.85 × 9.8 × 4.0 (mm) (with shield case)
- Circuit current (stand by) 130 μA
- Circuit current (shut down) 1 nA

★ PACKAGE DIMENSIONS
in millimeters



PIN CONNECTIONS

Pin No.	Function
1	LEDA: LED Anode
2	TXD: Transmitter Data Input
3	RXD: Receiver Data Output
4	SD: Shut Down
5	V_{DD}: Supply Voltage
6	GND: Ground

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Printed in Japan

The mark ★ shows major revised points.

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

	Parameter	Symbol	Conditions	Ratings	Unit
★	Supply Voltage	V_{DD}		–0.5 to +6.0	V
	Data Input Voltage	V_{TXD}		–0.5 to V_{DD}+0.5	V
	Data Output Voltage	V_{RXD}		–0.5 to V_{DD}+0.5	V
★	Peak LED Current	I_{FP}	PW ≤ 2 μs, duty ≤ 10 %	1.0	A
★	Repetitive Pulse LED Current	I_{RP}	PW ≤ 90 μs, duty ≤ 25 %	500	mA
	Operating Ambient Temperature	T_A		0 to +70	°C
	Storage Temperature	T_{stg}		–25 to +85	°C
	Soldering Temperature (10 s)	T_{sld}		260	°C

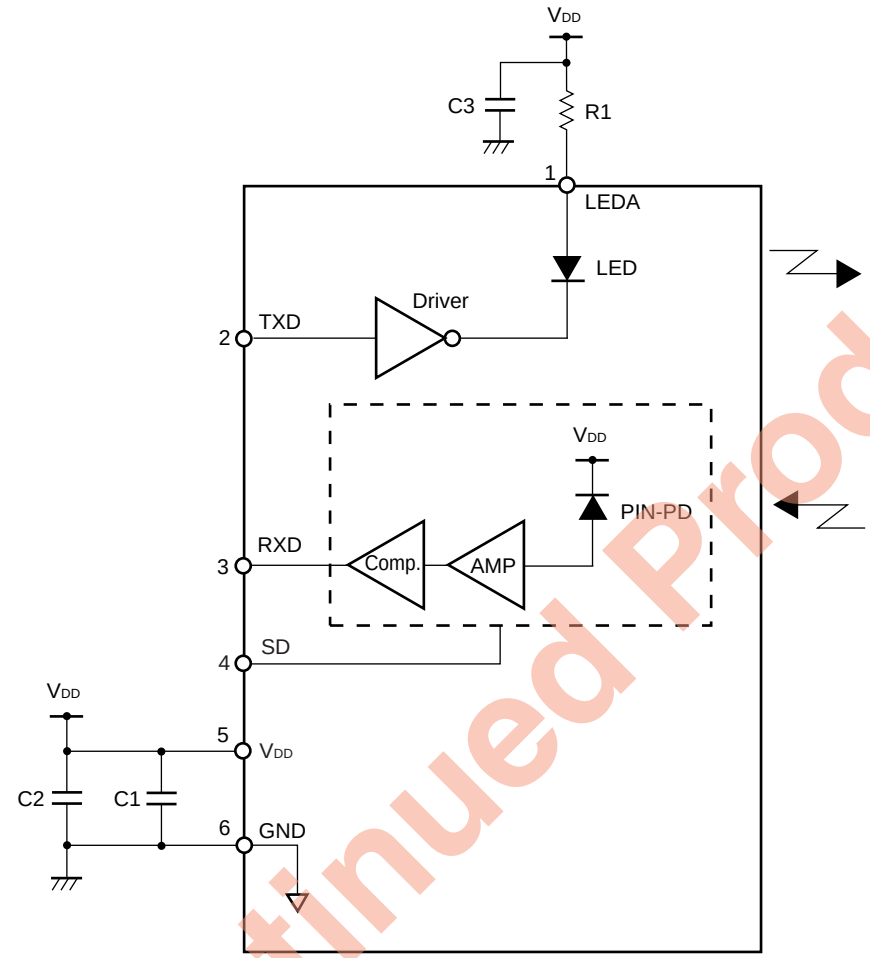
★ RECOMMENDED OPERATING CONDITIONS (T_A = 25 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Supply Voltage	V_{DD}		2.7	3.0	3.6	V
Data Input Voltage (High)	V_{IH}		2.4		V_{DD}	V
Data Input Voltage (Low)	V_{IL}		0		0.8	V
Shut Down Input Voltage (High)	V_{SDH}		2.4		V_{DD}	V
Shut Down Input Voltage (Low)	V_{SDL}		0		0.8	V
Logic High Input Irradiance	E_{IH}	2.4 kbps to 115.2 kbps	0.0036		500	mW/cm^2
Logic Low Input Irradiance	E_{IL}				0.3	μW/cm^2
Pulse LED Current	I_{LED}			200	250	mA
Data Rate			2.4 k		115.2 k	bps

★ ELECTRO-OPTICAL CHARACTERISTICS (T_A = 25 °C, V_{DD} = 3.0 V)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Transmitter	LED Peak Wavelength	λ_P	I_F = 200 mA	850	875	900	nm
	Radiant Intensity (Low)	I_{EL}	$V_{TXD} = V_{IL}$ or $V_{SD} = V_{SDH}$			0.3	μW/sr
	Radiant Intensity (High)	I_{EH}	I_F = 200 mA, V_{TXD} = 3.0 V	40	80	500	mW/sr
	Viewing Angle	θ	I_F = 200 mA	30		60	deg.
	LED Pulse ForwardVoltage	V_{FP}	I_F = 200 mA		1.7	2.5	V
	LED Leakage Current	I_{LK}	V_{DD} = 3.6 V, V_{IL} = 0.8 V			100	μA
	Rise Time	t_r	V_{IH} = 3.0 V, t_{pw} (TXD) = 1.63 μs,		0.4	0.6	μs
	Fall Time	t_f	f = 115.2 kbps		0.4	0.6	μs
	Pulse Width	t_{pw}		1.4	1.6	2.2	μs
Receiver	Data Output Voltage (Low)	V_{OL}	$V_{SD} = V_{SDH}$, $E_I = E_{IH}$			0.4	V
	Data Output Voltage (High)	V_{OH}	$V_{SD} = V_{SDL}$, $E_I = E_{IL}$	2.4			V
	Pulse Width @ 9.6 kbps			0.8		22	μs
	Pulse Width @ 115.2 kbps			0.8		5.0	μs
	Viewing Angle	θ		30			deg.
	Circuit Current (stand by)	I_{DD}	GND < V_I < 0.3 V		130		μA
	Circuit Current (shut down)				1		nA

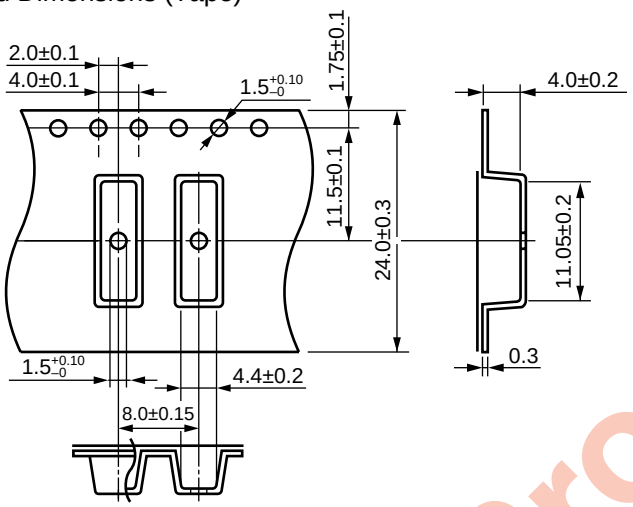
★ BLOCK DIAGRAM



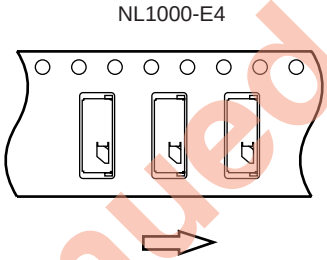
Component	Recommended Value
R1	4 Ω ± 5 %
C1	0.47 μF ± 10 % Ceramic
C2	6.8 μF ± 10 % Tantalm
C3	0.47 μF ± 10 % Ceramic

★ TAPING SPECIFICATIONS (in millimeters)

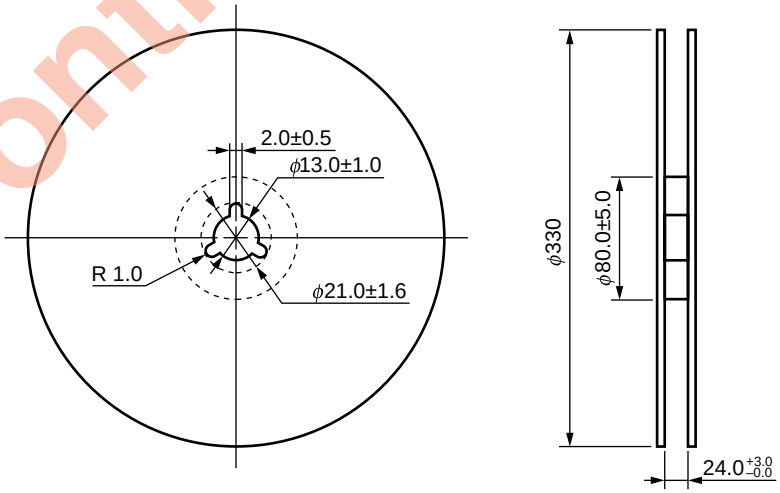
Outline and Dimensions (Tape)



Tape Direction



Outline and Dimensions (Reel)



Packing: 1 000 pcs/reel

RECOMMENDED SOLDERING CONDITIONS

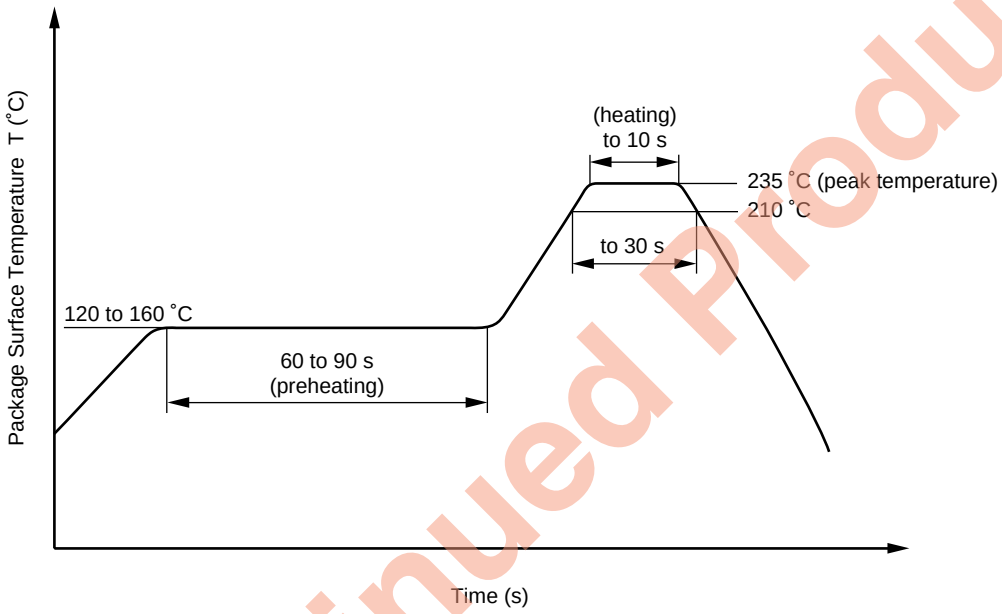
(1) Soldering by soldering iron

- Temperature 260 °C or below
- Time 10 seconds or less

(2) Infrared reflow soldering

- Peak reflow temperature 235 °C (package surface temperature)
- Time of temperature higher than 210 °C 30 seconds or less
- Number of reflows Three

Recommended Temperature Profile of Infrared Reflow



[MEMO]

CAUTION

Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.