

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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

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# TRANSCEIVER MODULE NL1020

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

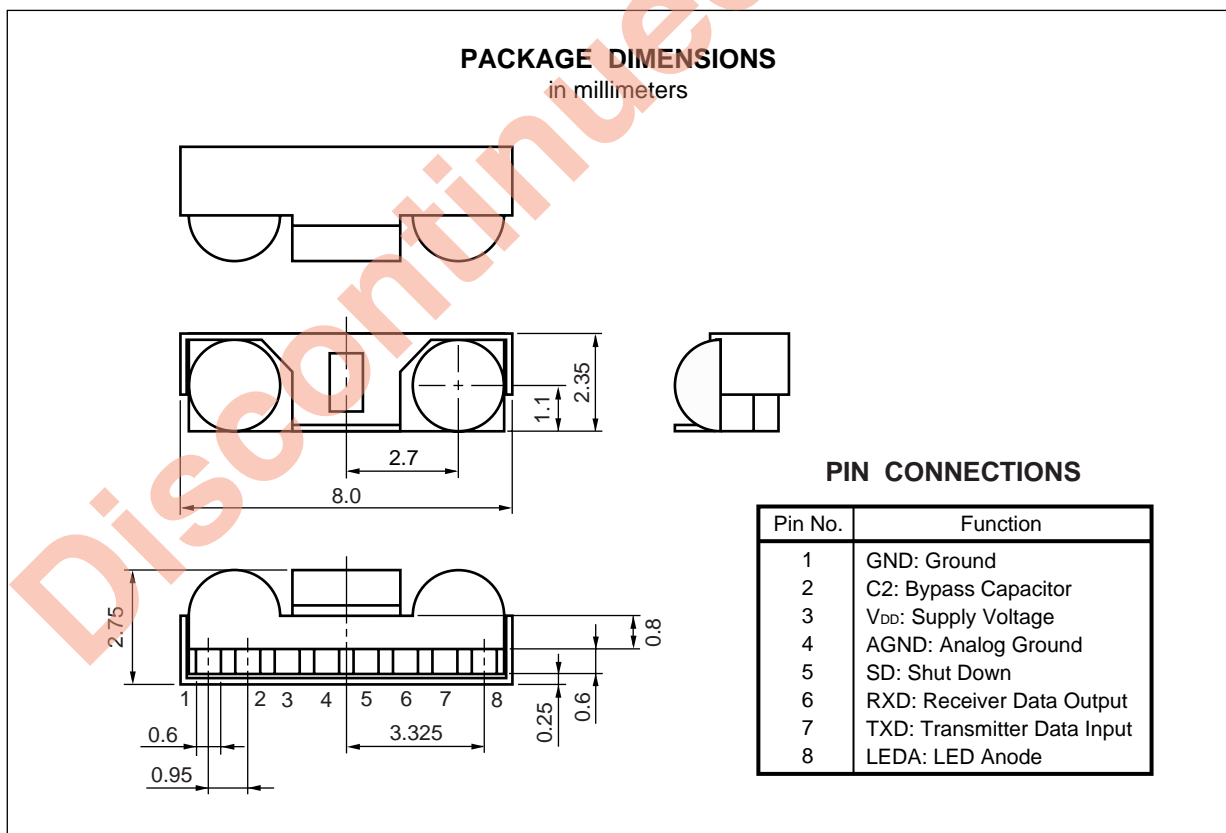
#### DESCRIPTION

The NL1020 is a small package transceiver module for IrDA Ver.1.2a. The NL1020 is ideal as the transceiver source for infrared transmission-system such as cellular phone, pager, E-wallets, E-cards, PDA etc.

#### FEATURES

- Conform to IrDA Ver.1.2a standards
- Data rate 2.4 k to 115.2 kbps
- Supply voltage 2.7 to 3.6 V
- Data link distance to 20 cm
- Ultra small size 2.35 × 8.0 × 2.75 (mm) (with shield case)
- ★ • Receiver circuit current (stand-by) 130  $\mu$ A
- Receiver circuit current (shut down) 1 nA
- Shield Case

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C, unless otherwise specified)**

Parameter	Symbol	Ratings	Unit
Supply Voltage	V <sub>DD</sub>	-0.5 to +6.0	V
Data Input Voltage	V <sub>TXD</sub>	-0.5 to V <sub>DD</sub> +0.5	V
Shut Down Input Voltage	V <sub>SD</sub>	-0.5 to V <sub>DD</sub> +0.5	V
Data Output Voltage	V <sub>RXD</sub>	-0.5 to V <sub>DD</sub> +0.5	V
LED Current (DC)	I <sub>DC</sub>	20	mA
Peak LED Current	I <sub>FP</sub>	200	mA
Repetitive Pulse LED Current	I <sub>RP</sub>	100	mA
Operating Ambient Temperature	T <sub>A</sub>	-25 to +85	°C
Storage Temperature	T <sub>stg</sub>	-40 to +100	°C
Soldering Temperature (10 s)	T <sub>slid</sub>	260	°C

**RECOMMENDED OPERATING CONDITIONS (T<sub>A</sub> = 25 °C)**

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Supply Voltage	V <sub>DD</sub>	2.7	3.0	3.6	V
Data Input Voltage (High)	V <sub>IH</sub>	2.4		V <sub>DD</sub>	V
Data Input Voltage (Low)	V <sub>IL</sub>	0		0.8	V
Shut Down Input Voltage (High)	V <sub>SDH</sub>	2.4		V <sub>DD</sub>	V
Shut Down Input Voltage (Low)	V <sub>SDL</sub>	0		0.8	V
Input Irradiance Intensity (High)	E <sub>IH</sub>	0.0081		500	mW/cm <sup>2</sup>
Input Irradiance Intensity (Low)	E <sub>IL</sub>			0.3	μW/cm <sup>2</sup>
Pulse LED Current	I <sub>LED</sub>		20	50	mA
Receiver Latency Time				50	μs
Data Rate		2.4 k		115.2 k	bps

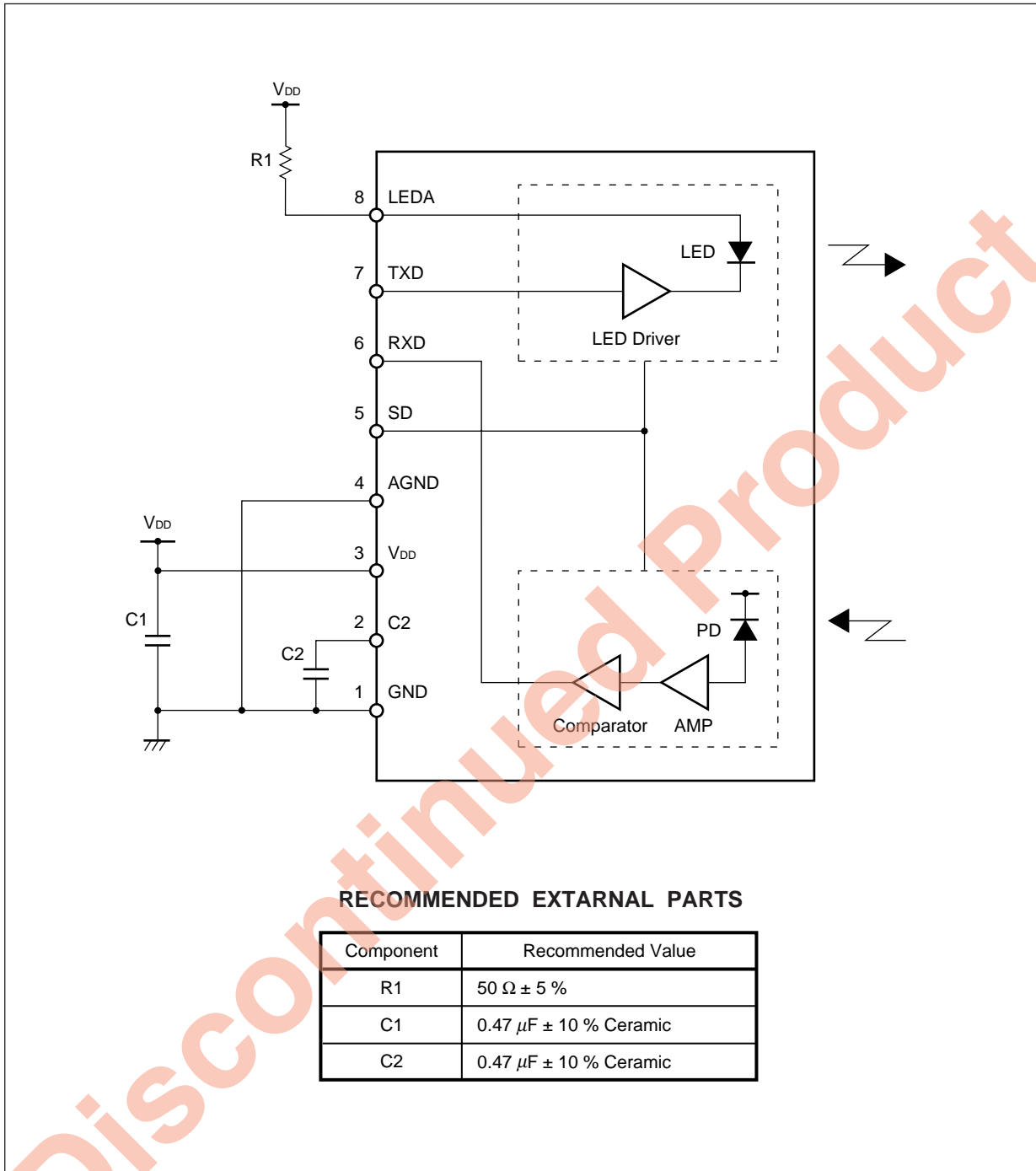
**ELECTRO-OPTICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C, V<sub>DD</sub> = 3.0 V, unless otherwise specified)**

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Transmitter	LED Peak Wavelength	$\lambda_P$		850		900	nm
	Half Spectral Width	$\Delta\lambda_{1/2}$			40		nm
	Radiant Intensity (High)	I <sub>EH</sub>	V <sub>SD</sub> = V <sub>SDL</sub> , V <sub>TXD</sub> = 3.0 V, I <sub>LED</sub> = 20 mA	4	8	28.8	mW/sr
	Radiant Intensity (Low)	I <sub>EL</sub>	V <sub>SD</sub> = V <sub>SDL</sub> or V <sub>TXD</sub> = V <sub>IL</sub>			0.3	$\mu$ W/sr
	Viewing Angle	$\theta$		30		60	deg.
	LED Leakage Current	I <sub>LK</sub>	V <sub>DD</sub> = 3.6 V, V <sub>IL</sub> = 0.8 V			100	$\mu$ A
	Data Input Current (High)	I <sub>IH</sub>	V <sub>IH</sub> = 2.4 V	-1.0		1.0	$\mu$ A
	Data Input Current (Low)	I <sub>IL</sub>	GND $\leq$ V <sub>IL</sub> $\leq$ 0.8 V	-1.0		1.0	$\mu$ A
	Rise Time	t <sub>r</sub>	V <sub>IH</sub> = 3.0 V, t <sub>pw</sub> (TXD) = 1.6 $\mu$ s,			0.6	$\mu$ s
	Fall Time	t <sub>f</sub>	f = 115.2 kHz			0.6	$\mu$ s
	Pulse Width	t <sub>pw</sub>		1.5	1.6	2.1	$\mu$ s
Receiver	Data Output Voltage (High)	V <sub>OH</sub>	V <sub>SD</sub> = V <sub>SDH</sub> or E <sub>i</sub> = E <sub>IL</sub>	2.4			V
	Data Output Voltage (Low)	V <sub>OL</sub>	V <sub>SD</sub> = V <sub>SDL</sub> , E <sub>i</sub> = E <sub>IH</sub>			0.4	V
	Viewing Angle	$\theta$		30			deg.
	Circuit Current	I <sub>DD</sub>	V <sub>SD</sub> = V <sub>SDH</sub> ( At Shut Down)		1	100	nA
			V <sub>SD</sub> = V <sub>SDL</sub> , V <sub>TXD</sub> = V <sub>IL</sub> , E <sub>i</sub> = 0 mW/cm <sup>2</sup> (At Stand-By)		130	350	$\mu$ A
			V <sub>SD</sub> = V <sub>SDL</sub> , V <sub>TXD</sub> = V <sub>IL</sub> , E <sub>i</sub> = 500 mW/cm <sup>2</sup> (At Receive)			12	mA
Pulse width	t <sub>pw</sub>	t <sub>pw</sub> = 1.63 $\mu$ s @ 115.2 kbps	1.0		5.0	$\mu$ s	
		t <sub>pw</sub> = 78 $\mu$ s @ 2.4 kbps	1.0		90		

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Discontinued Product

★ BLOCK DIAGRAM



RECOMMENDED EXTARNAL PARTS

Component	Recommended Value
R1	50 Ω ± 5 %
C1	0.47 μF ± 10 % Ceramic
C2	0.47 μF ± 10 % Ceramic

**RECOMMENDED SOLDERING CONDITIONS**

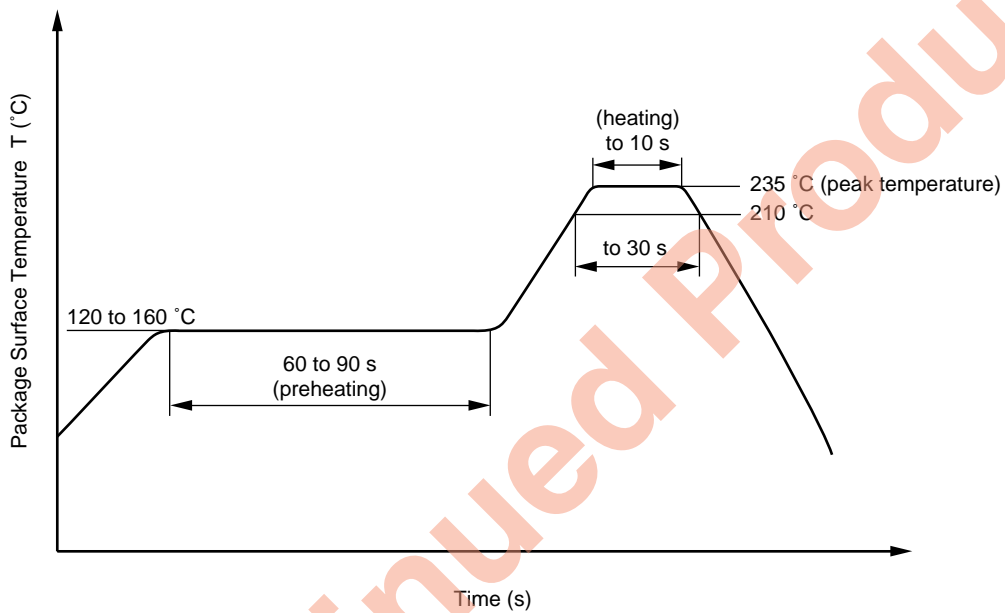
**(1) Soldering by soldering iron**

- 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                              Two

Recommended Temperature Profile of Infrared Reflow



Discontinued Product

[MEMO]

Discontinued Product



[MEMO]

Discontinued Product

## 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.**

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