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## NTE31000 IR Receiver Module for Remote Control Systems

**Description:**

The NTE31000 is a miniaturized receiver for infrared remote control systems. A PIN diode and a preamplifier are assembled on a lead frame, the epoxy package acts as an IR filter.

The demodulated output signal can be directly decoded by a microprocessor. The NTE31000 is compatible with all common IR remote control data formats, primarily older AGC2 designs.

This component has not been qualified according to automotive specifications.

**Features:**

- Very Low Supply Current
- Photo Detector and Preamplifier in One Package
- Internal Filter for PCM Frequency
- Improved Shielding Against EMI
- Supply Voltages: 2.5V to 5.5V
- Improved Immunity Against Ambient Light
- Insensitive to Supply Voltage Ripple and Noise

**Absolute Maximum Ratings:**

Supply Voltage, $V_S$ .....	-0.3 to +6V
Supply Current, $I_S$ .....	3mA
Output Voltage, $V_O$ .....	-0.3 to ( $V_S + 0.3$ )V
Output Current, $I_O$ .....	5mA
Power Consumption ( $T_A \leq +85^\circ\text{C}$ ), $P_{tot}$ .....	10mW
Operating Junction Temperature, $T_J$ .....	+100°C
Operating Temperature Range, $T_A$ .....	-25° to +85°C
Storage Temperature Range, $T_{stg}$ .....	-25° to +85°C
Soldering Temperature ( $t \leq 10s$ , 1mm from case), $T_{sd}$ .....	+260°C

Note 1. Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect the devices reliability.



**Electrical and Optical Characteristics:** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Current	$I_{SD}$	$E_V = 0, V_S = 3.3V$	0.27	0.35	0.45	mA
	$I_{SH}$	$E_V = 40\text{klx, sunlight}$	–	0.45	–	mA
Supply Voltage	$V_S$		2.5	–	5.5	V
Transmission Distance	d	$E_V = 0, I_F = 250\text{mA}$	–	45	–	m
Output Voltage Low	$V_{OSL}$	$I_{OSL} = 0.5\text{mA}, E_e = 0.7\text{mW/m}^2$	–	–	100	mV
Minimum Irradiance	$E_e \text{ min.}$	Note 2	–	0.15	0.35	$\text{mW/m}^2$
Maximum Irradiance	$E_e \text{ max.}$	Note 2	30	–	–	$\text{W/m}^2$
Directivity	$\phi_{1/2}$	Angle of half transmission distance	–	$\pm 45$	–	deg.

Note 2. Pulse Width Tolerance:  $t_{pi} - 5/f_o < t_{po} < t_{pi} + 6/f_o$

**Suitable Data Format:**

The NTE31000 is designed to suppress spurious output pulses due to noise or disturbance signals. Data and disturbance signals can be distinguished by the devices according to carrier frequency, burst length and envelope duty cycle. The data signal should be close to the band-pass center frequency (e.g. 38kHz) and fulfill the conditions in the table below.

When a data signal is applied to the IR receiver in the presence of a disturbance signal, the sensitivity of the receiver is reduced to insure that no spurious pulses are present at the output. Some examples of disturbance signals which are suppressed are:

- DC light (e.g. from tungsten bulb or sunlight)
- Continuous signals at any frequency
- Strongly or weakly modulated noise from fluorescent lamps with electronic ballasts

Minimum burst length	10 cycles/burst
After each burst of length a minimum gap time is required	10 to 70 cycles $\geq 10$ cycles
For bursts greater than a minimum gap time in the data stream is needed of	70 cycles $> 4 \times$ burst length
Maximum number of continuous short burst/second	1800
Recommended for NEC code	Yes
Recommended for RC5/RC6 code	Yes
Recommended for Sony code	Yes
Recommended for Thomson 56kHz code	Yes
Recommended for Mitsubishi code (38kHz, preburst 8ms, 16 bit)	Yes
Recommended for Sharp code	Yes
Suppression of interference from fluorescent lamps	Most common disturbance signals are suppressed

