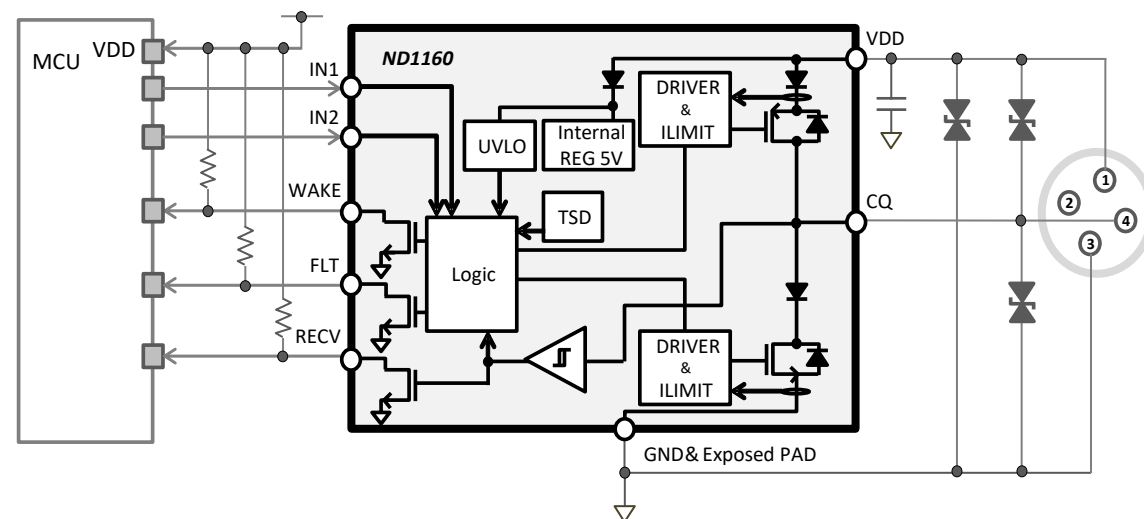


- ❑ IO-Link compliant COM1/2/3 available
- ❑ Specifications designed for simplicity
- ❑ Ultra-compact PKG: WLCSP version also available

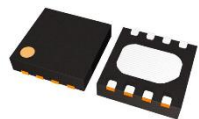
### KEY SPECIFICATIONS

- IO-Link Compliant COM1/2/3 available
- High-side, low-side, and push-pull operation can be configured
- Output Current: 200mA (min)
- Operating Voltage Range: 8.5V to 36V
- Over Current Protection: < 500mA
- Thermal Shutdown(TSD)
- Reverse Current Protection
- Wake-up detection and Overcurrent flag function: (WAKE pin/FLT pin)

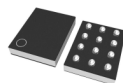
### Basic circuit example



### PACKAGE (UNIT:mm)



DFN3030-8-GG  
3.0 × 3.0 × 0.75



WLCSP-12-ZA1  
1.76 × 2.26 × 0.65

Under  
development

### APPLICATIONS

- Various sensors
- Programmable logic controller
- Light curtain
- Actuator
- Others

## IO-Link compliant COM1/2/3 available

### General Issue

- Want (or need) to include IO-Link functionality in future sensor applications.

### Our Solution

- Nisshinbo Micro Devices' ND1160, including QCD, is the solution!



**Nisshinbo Micro Devices Inc.**

Datasheet

## ND1160

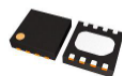
### IO-Link Device Transceiver

#### FEATURES

- IO-Link Compliant: COM1/2/3 available
- High-side, low-side, and push-pull operation can be configured
- Output Current 200 mA (min.)
- Operating Voltage Range 8.5 V to 36 V
- Over Current Protection < 500 mA
- Thermal Shutdown (TSD)
- Reverse Current Protection
- Package DFN3030-8-GG WLCSP-12-ZA1(UD)

#### GENERAL DESCRIPTION

ND1160 is an IO-Link device transceiver using Bi-CMOS process.  
The current capacity is 200 mA and the operating voltage range is guaranteed from 8.5 V to 36 V.  
High-side, low-side, and push-pull operation can be set depending on the logic of the input terminal.  
Compliant with IO-Link standard and can detect the status of connected devices.  
In addition, the ND1160 is integrated the over current protection, the thermal shutdown and reverse current protection.



DFN3030-8-GG  
3.0 mm × 3.0 mm × 0.75 mm



WLCSP-12-ZA1  
1.76 mm × 2.26 mm × 0.65 mm

#### APPLICATIONS

- Various sensors
- Programmable logic controller
- Light curtain
- Actuator
- Others

In addition to IO-Link transceivers, the lineup also includes low-current high-side switch and low-side switch for OSSDs.

※OSSD: Output Signal Switching Device

### Low side/High side switch NJW4822/NJW4832

Electric  
Component  
drive

Control  
component  
substitution

**NISSHINBO**

#### ■ Features

Open drain configuration for outputs  
Built-in **level shifter** (high-side switch)  
Built-in **active clamp** circuit

#### ■ Usage

Driving loads of electrical components  
Replacement of relays/fuses  
(power supply path disconnection)  
**Load switches** for power supply lines

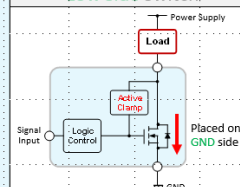
#### ■ Loads

**Motors, solenoids, actuators, LEDs, etc.**  
→ Drive resistive/inductive/capacitive loads

#### ■ Applications

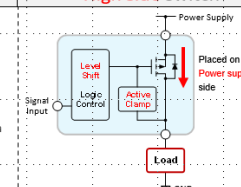
- PLC output section, LED lighting system, Sensor output section for pressure, photoelectric, flow, etc.
- Power windows, door mirrors, door locks, Power seats, blower motors, back-up lamps, Backup monitors, corner sensors, AVN
- Vending machine coin mecks, automatic doors, LEDs for station ticket gates, amusement

#### Low side switch



- Drive the load on the power supply side
- Power SW has **Nch** configuration
- Drive without level shifter

#### High side switch



- Drives the load on the GND side
- Power SW has **Pch** or **Nch** configuration

#### Appendix

##### ■ High-side switch: For in-vehicle applications

To simplify wiring, etc., loads are often connected to the car body (GND). In many cases, the load is connected to the car body (GND) to simplify wiring. This is because the load tends to ground-fault to the body. High-side switches that can detect/protect output ground faults are suitable for this environment.

##### ■ Low-side switch: For sensor applications

In Asian countries, it is customary to connect loads to the power supply side. Low-side switches are used in many cases. Unlike high-side switches, low-side switches are capable of output ground-fault detection/protection.



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## Specifications designed for simplicity

### General Issue

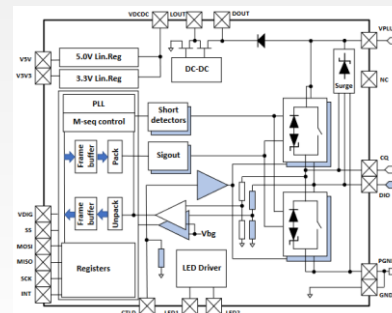
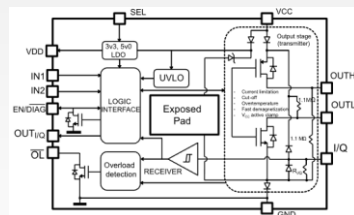
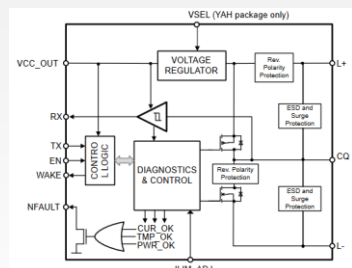
- Customers want to keep the circuit as simple as possible.

### Our Solution

- The IC is designed for simplicity by eliminating unnecessary functions.  
(Product lineups with various additional functions are also being considered.)

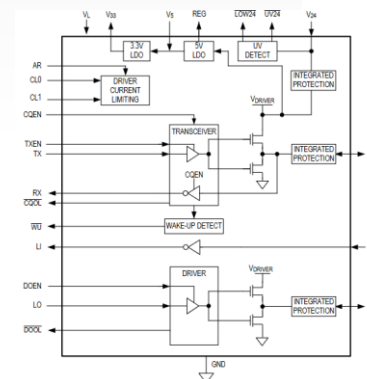
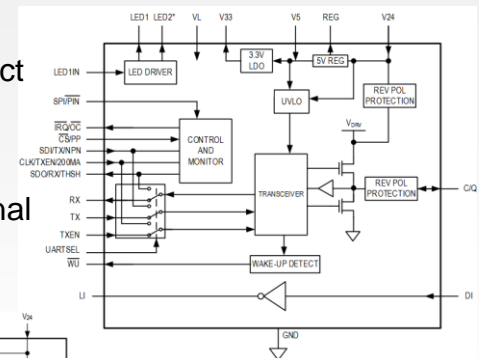
Competitors are Company A, Company S, Company T, Company R, etc.

Many competing products have excessive functions, and some types of sensors are difficult to use.



### Multifunctional product

- LED driver
- DC/DC and/or LDO
- D/I dedicated terminal etc.



Similar to ND1160

- Ultra-compact PKG: WLCSP version also available

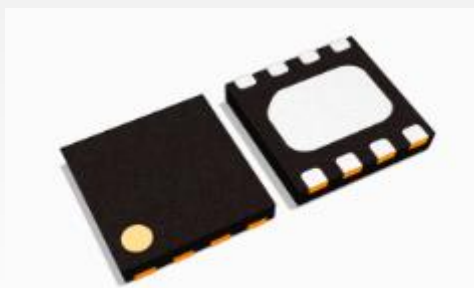
### General Issue

- As sensor modules become smaller, their mounting area becomes smaller.

### Our Solution

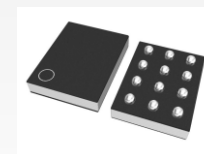
- The IC is WLCSP (wafer level chip size package) version is also available to meet miniaturization requirements.

55.8% reduction in mounting area



DFN3030-8-GG  
(3.0×3.0×0.75)

mounting area : 9.0mm<sup>2</sup>



WLCSP-12-ZA1  
(1.76×2.26×0.65)

mounting area : 3.978mm<sup>2</sup>

## ORDER INFORMATION

PRODUCT NAME	PACKAGE	QUANTITY (pcs/reel)	RoHS	HAROGEN FREE
ND1160GGAE4D	DFN3030-8-GG	3,000	✓	✓
ND1160ZAAE2D	WLCSP-12-ZA1	3,000	✓	✓

Under development

## ■ PRODUCT NAME INFORMATION

ND1160 aa c dd e

Composition	Item	Description
aa	Package Code	Indicates the package GG:DFN3030-8-GG, ZA:WLCSP-12-ZA1
c	Version	Product version A: Specified value
dd	Packing	Taping direction. Refer to the packing specifications.
e	Grade	Indicates the quality grade. D:Industrial equipment and Social infrastructures

## e : Quality grade

e	Applications	Operating Temperature Range	Test Temperature
D	Industrial equipment and Social infrastructures	-40°C to 125°C	25°C, 125°C



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