

SPECIFICATION

FOR APPROVAL

CUSTOMER	
DESCRIPTION	Photo Sensor Drive IC
MODEL NO.	MIC-3324 Series
ISSUED DATA	28-JAN-2026
DOCUMENT NO.	MJQC-MPIC3324-260128

[MJ-CHIP CO.,LIMITED.]

ISSUE DEPT.			
ISSUE	REVIEW	Q/A	APPR'L

[CUSTOMER APPROVAL]

ISSUE DEPT.					
ISSUE	REVIEW				

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ASIC for Photo interrupter Driver

■ Description

The MIC-3324 Series is an NPN-output photo sensor IC specifically designed for factory automation systems.

It supports dual output modes, Light ON and Dark ON, providing flexible configuration for various sensing applications.

The device integrates an IRED constant-current driver, an LED constant-current driver, and an open-collector output driver. In addition, built-in reverse power supply protection and short-circuit protection ensure stable and reliable operation under harsh industrial environments.

To offer greater flexibility for diverse user applications, the MIC-3324 is available in DFN (2 × 2 mm), DFN (3 × 3 mm), and SOP-8 packages

■ Features

- Maximum supply voltage : Max. 25V
- Maximum output current : Max. 50mA
- Quiescent current : Typ. 10mA
- IRED constant current : Typ. 5mA
- Output saturation voltage Typ. 0.2V
- Short circuit current Typ. 8mA
- EFT (at 2kV, 5kHz) Level: B

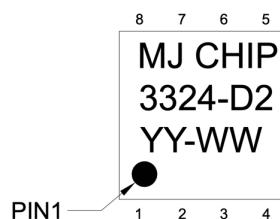
■ Applications

- Industrial automation systems for position, limit, and motion detection.
- Office automation equipment such as printers, copiers, and scanners.
- Consumer electronics for optical switching and position sensing.
- Automotive electronics for actuator and position feedback (non-safety critical).
- Smart devices and IoT applications requiring compact optical detection.
- Medical and healthcare equipment for optical trigger and insertion detection
- Energy metering and infrastructure equipment for optical counting and rotation sensing.

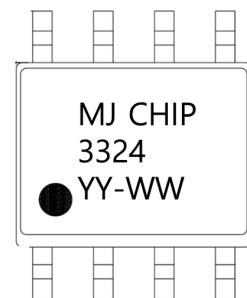
■ Marking Diagram & Product Numl

- MJ CHIP : Company LOGO
- 3324 : Device Code
- D2 : DFN2X2
- D3 : DFN3X3
- S8 : SOP8
- YY-MM : Year & Week Code

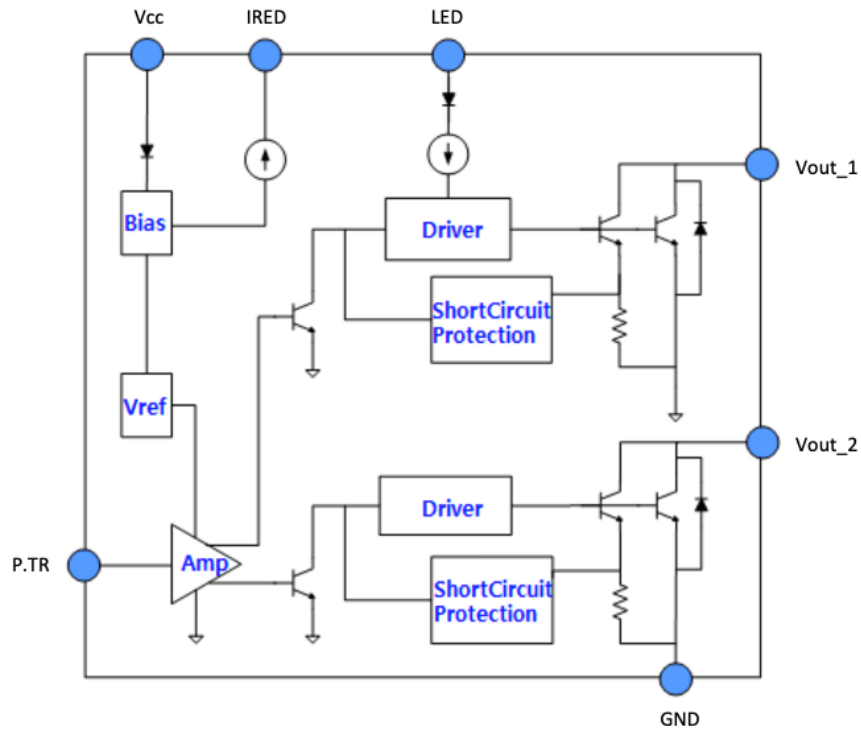
DFN Package



SOP-8 Package



Functional Block Description



PIN Description

Symbol	I/O	Description
Vout1	O	Light ON Output1
Vout2	O	Dark ON Output2
GND	GND	Ground
PTR	I/O	Input Signal(External Photo NPN TR)
IRED	O	IRED Driver (External IRED)
LED	O	Indicator LED Driver(External LED)
Vcc	Pwr	Power Supply

Operating MODE

Photo TR	Indicator LED	Vout_1	Vout_2
ON(Low)	ON	ON(Low)	OFF(High)
OFF(High)	OFF	OFF(High)	ON(Low)

Absolute Maximum Ratings

Characteristic	Symbol	Ratings	Unit
Supply Voltage	VCC	24	V
Output Current	Iout	50	mA
Power Dissipation	PD(DFN3X3)	510	mW
	PD(DFN2X2)	450	mW
	PD(SOP-8)	600	mW
Operating Temperature ¹⁾	Topr	-40 ~ +70	°C
Storage Temperature	Tstg	-55 ~ 150	°C

1) This temperature range applies to the device in a **standalone configuration (8SOP package)**.
When specific configurations or application settings are applied, the allowable operating temperature range may be reduced. *Example: 8DFN package or module configuration: -25 °C to +55 °C*

Recommended operating conditions

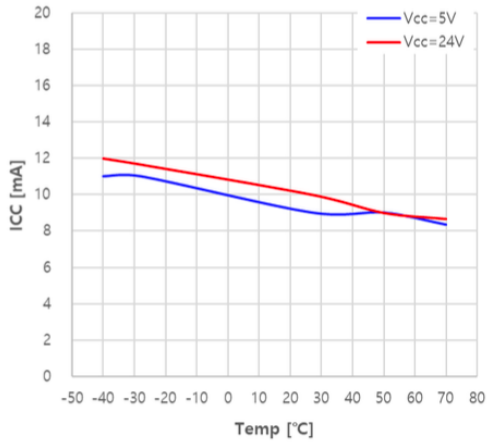
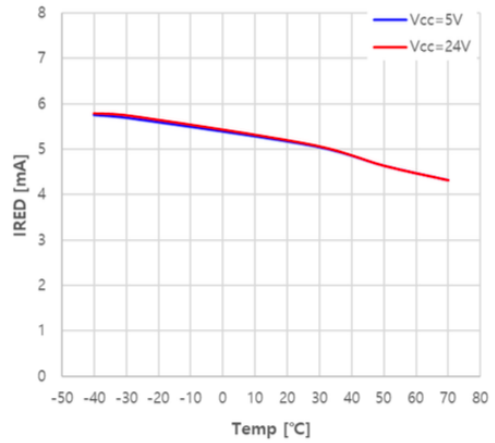
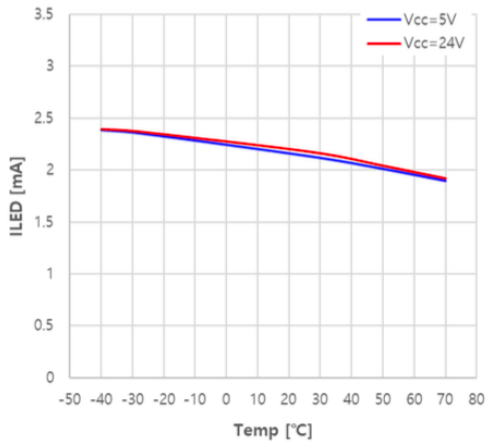
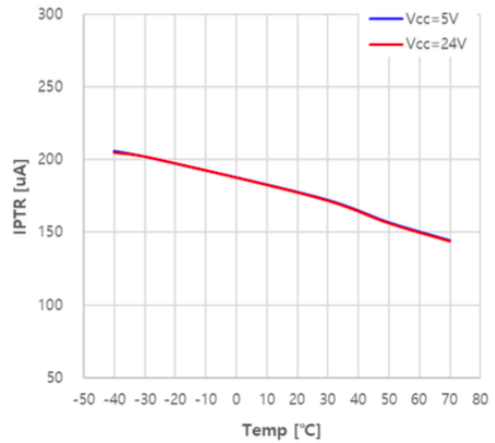
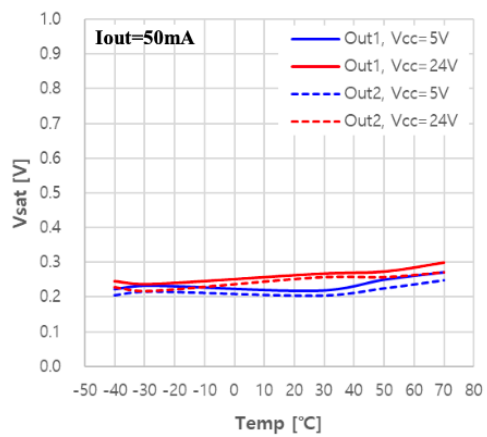
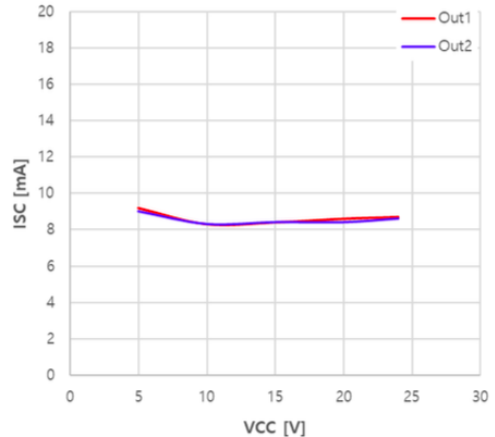
Characteristic	Symbol	Ratings	Unit
Supply Voltage	VCC	5~24	V
Output Current	Iout	50	mA
Power Dissipation	PD(DFN3X3)	510	mW
	PD(DFN2X2)	450	mW
	PD(SOP-8)	600	mW

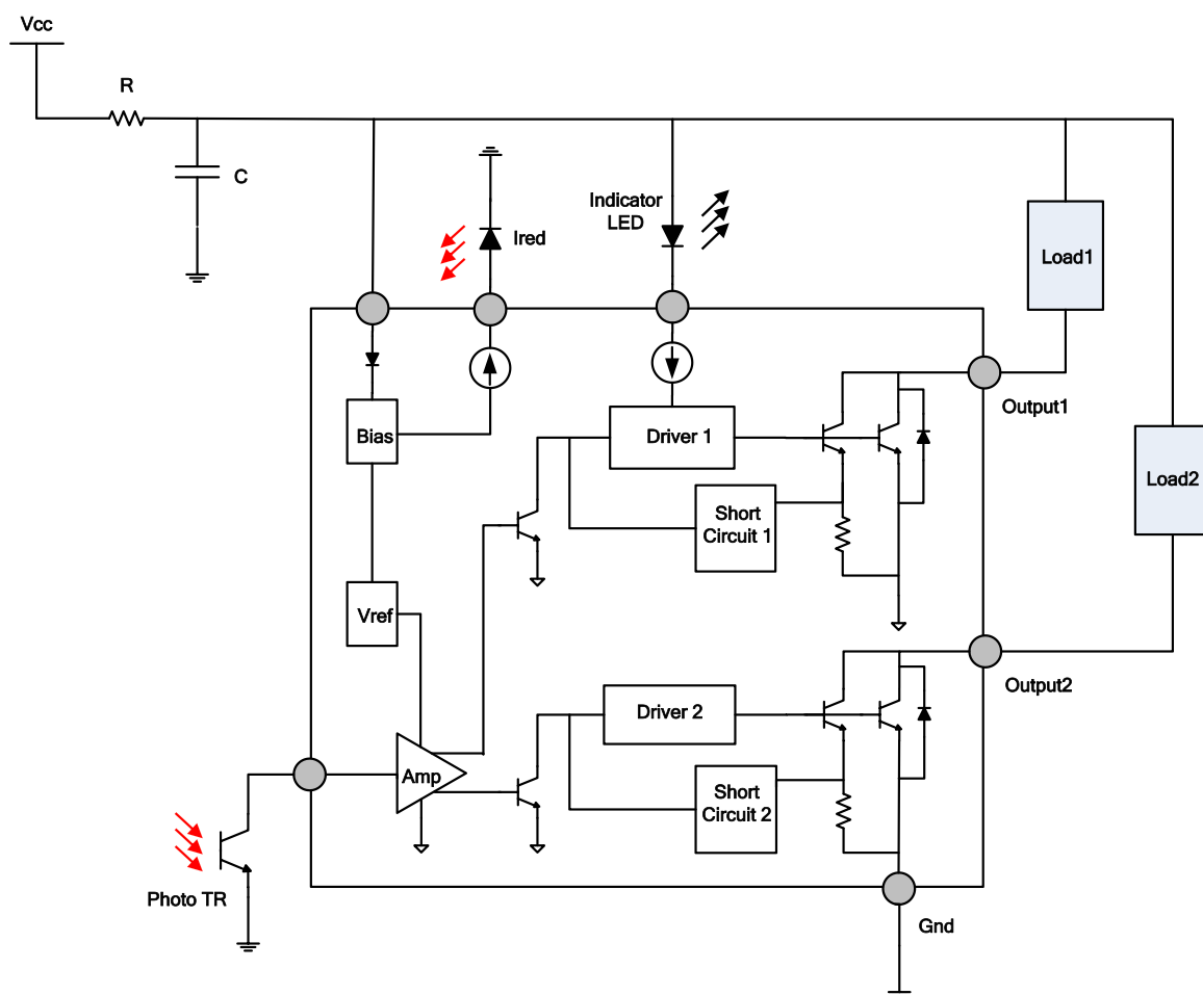
Electro-optical Characteristics

(Unless otherwise specified. VCC = 5~24V , Temp= -40 °C ≤ Ta ≤ +70 °C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Quiescent Current	Icc	Output1,2=Open	5	10	15	mA
IRED Constant Current	IRED	IRED=Gnd	3	5	7	mA
LED Constant Current	ILED	LED=Vcc, PTR=ON	1	2	4	mA
PTR Constant Current	IPTR	PTR=ON	75	150	225	uA
Output1 Saturation Voltage	Vsat1	PTR=ON, Iout1=50mA	-	0.2	1	V
Output2 Saturation Voltage	Vsat2	PTR=OFF, Iout2=50mA	-	0.2	1	V
Output1 Leakage Current	Ileak1	PTR=OFF	-	-	1	uA
Output2 Leakage Current	Ileak2	PTR=ON	-	-	1	uA
Vcc Reverse Voltage Current	VCCIR	Vcc=Gnd, Gnd=5~24V	-	-	1	uA
LED Leakage Current	IILED1	LED=Vcc, PTR=OFF	-	-	0.5	uA
Output1 Short circuit Current	Isc1	Output1=Vcc	-	8	20	mA
Output2 Short circuit Current	Isc2	Output2=Vcc	-	8	20	mA
Output1 Response Frequency	fR1	PTR=3kHz Signal	-	3	-	kHz
Output2 Response Frequency	fR2	PTR=3kHz Signal	-	3	-	kHz

Typical Characteristics Curves

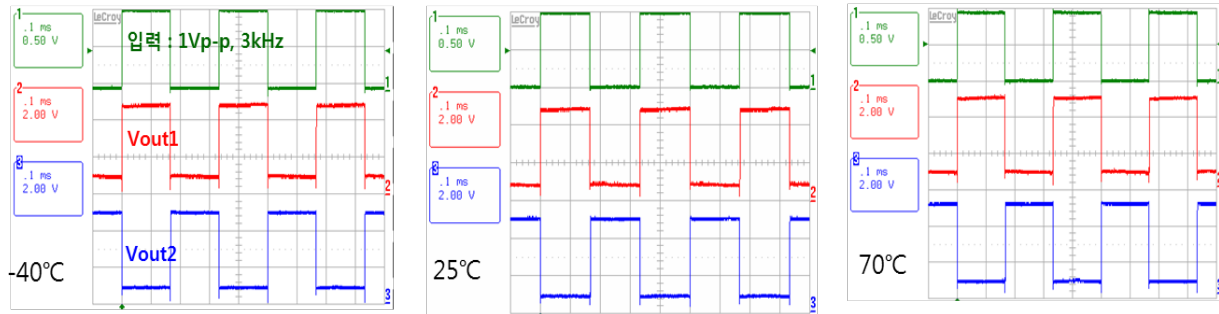
Fig.1 Quiescent Current

Fig.2 IRED Constant Current

Fig.3 LED Constant Current

Fig.4 PTR Constant Current

Fig.5 Output Saturation Voltage

Fig.6 Shortcircuit Current




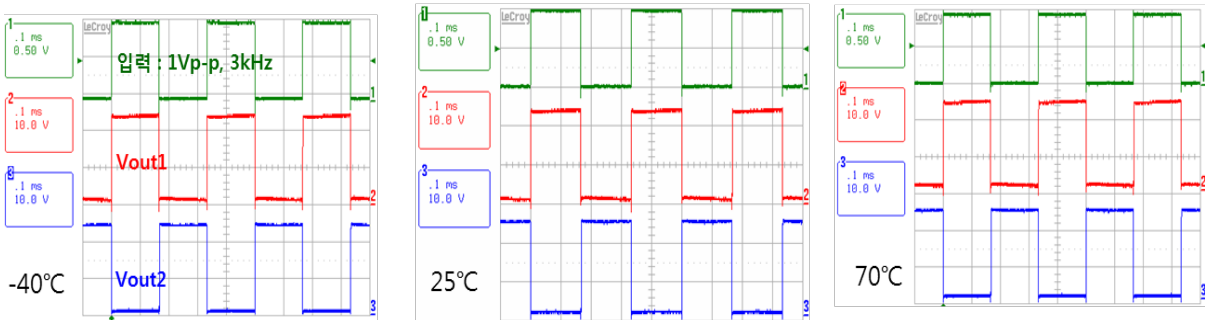
- **Indicator LED**
 - Forward Voltage : Typ. 1.6V(@IF=1mA) / Reverse Voltage : Typ. 8V
 - Brightness : Typ. 200mcd(@IF=20mA)
 - Wavelength : Typ. 618 nm(@IF=20mA)
- **IRED**
 - Forward Voltage : Typ. 1.5V(@IF=100mA) / Reverse Voltage : Typ. 8V
 - Wavelength : Typ.940 nm(@IF=20mA)
- **Photo TR**
 - Collector–Emitter Voltage : 35V / Emitter – Collector Voltage : 6V
 - DC Current Gain : Min. 240(@Ic=0.1mA)
 - Wavelength : Typ.880 nm
- **R,C Low Pass Filter for EFT**
 - Adding a resistor $R(=100\Omega)$ and capacitor $C(=0.47\mu F)$ to the application circuit protects the product from group Pulses of EFT Test (Test Conditions : 2kV, 5kHz / Result Level : B)

■ Operating Characteristic Waveform

[Vcc=5V, Output Response]



[Vcc=24V, Output Response]

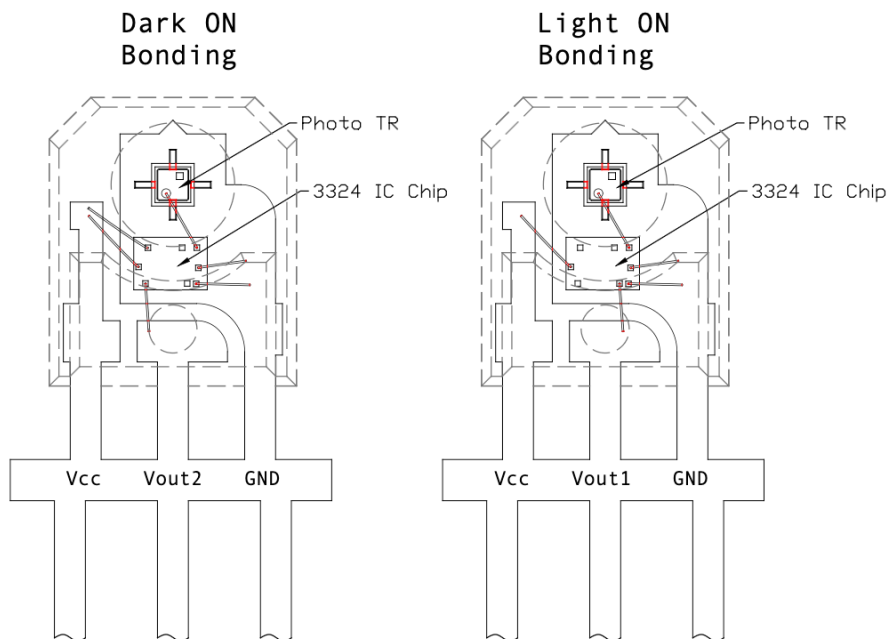


■ Applications Examples - 1

2-in-1 Package Assembly

The Photo Transistor (Photo TR) and the 3324 IC are integrated into a single package to simplify application design and reduce the number of external components, thereby improving overall system efficiency.

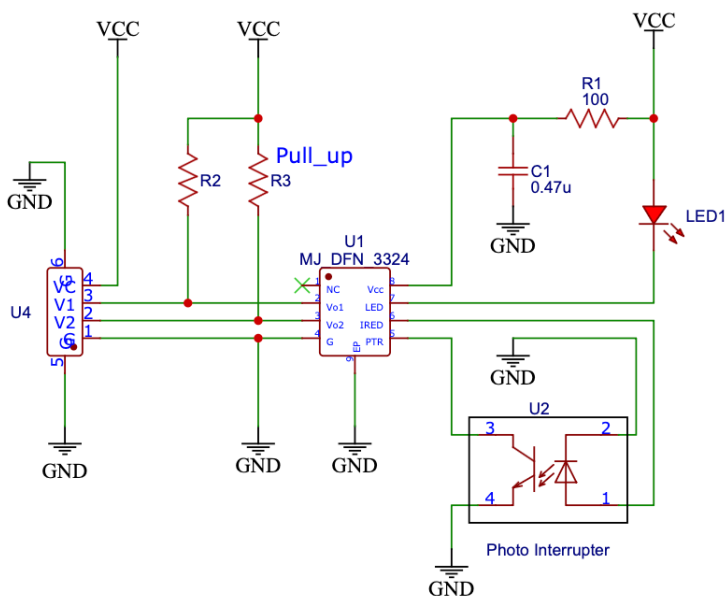
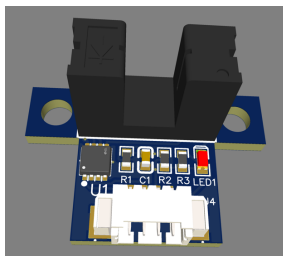
The device supports both **Light ON** and **Dark ON** operating modes. Mode selection is configurable during manufacturing through internal wire-bonding options.



■ Application Circuits and Examples - 2

DFN Package Module Implementation (PCBA)

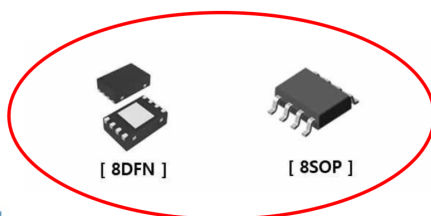
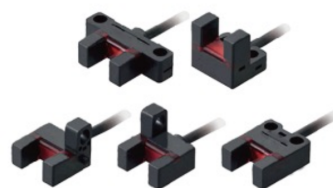
The DFN package module can be configured to match the structural requirements of automated equipment and is especially suitable as a replacement solution for photo micro sensors.



■ Application Note;

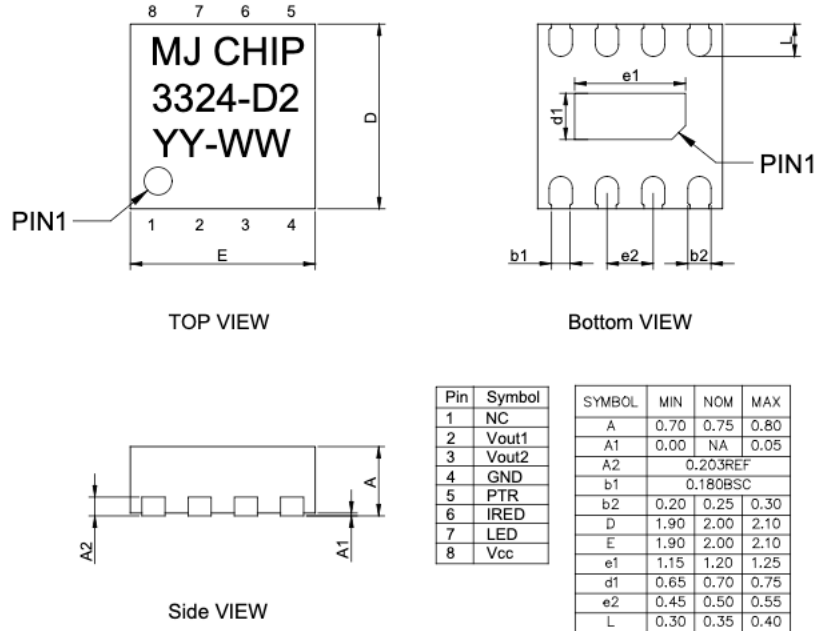
The primary application of this IC is in **photo micro sensor** systems.

With its stable performance and excellent built-in protection functions, the device is widely applied in a variety of automated equipment.

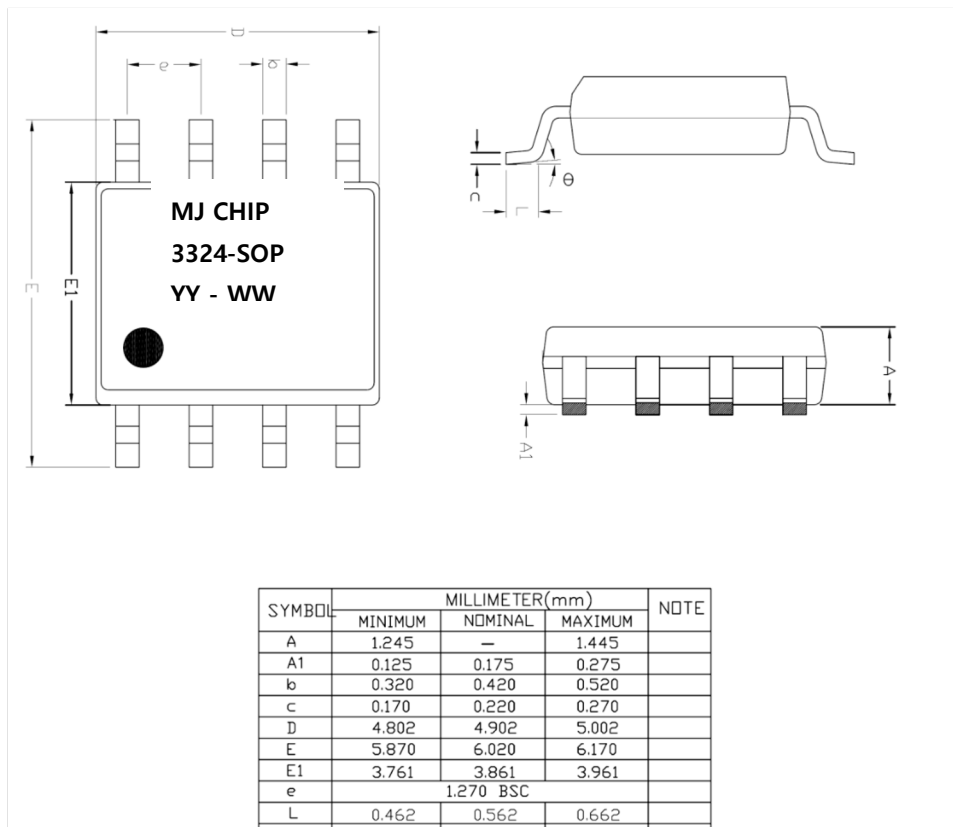


■ Outline Dimension (Unit : mm)

[DFN-8L 2X2(0.75)]



[SOP-8]



REVISION

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