

**10G-SFPP-ER-AO**  
10Gbase SFP+ Transceiver

## Features

- Compliant to SFP+ Electrical MSA SFF-8431
- Compliant to SFP+ Mechanical MSA SFF-8432
- Multi-rate compliance for Ethernet and Fiber Channel
- Transmission distance up to 40km over SMF
- 0°C to +70°C case operating temperature range
- 1550nm EA-DFB Transmitter
- RoHS 6/6 compliant
- Operating data rate up to 10.3Gbps



## Product Description

The 10G-SFPP-ER-AO Transceiver is a single mode transceiver is small form factor pluggable module for duplex optical data communications such as 10GBASE-ER/EW defined by IEEE 802.3ae. It is with the SFP+ 20-pin connector to allow hot plug capability.

## Functional Description

This module is designed for single mode fiber and operates at a nominal wavelength of 1550 nm. The transmitter section uses a 1550nm multiple quantum well DFB, which is class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

## Electrical and Optical Characteristics

Rating	Conditions	Symbol	Min	Max	Units
Storage Ambient Temperature Range		Ts	-40	+85	°C
Powered Case Temperature Range		Jc	0	+75	°C
Operating Relative Humidity	Non condensing	RH	0	95	%
Supply Voltage Range @ 3.3V		VCC3	-0.5	3.6	V
Power Supply Current		Icc		<1.5	W
Static Discharge Voltage Speed Pins on High	HBM human body model per JEDEC JESD22-A114-B			1	kV
Static Discharge Voltage excluding High Speed Pins	HBM human body model			2	kV
Static Discharge Voltage Module on SFP+	EN61000-4-2 Criterion B: Air Discharge Direct Contact discharge			15 8	kV

Any stress beyond the maximum ratings may result in permanent damage to the device. Specifications are guaranteed only under recommended operating conditions.

## Optical Transmitter

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Nominal Wavelength		$\lambda_{TPII}$	1480	1550	1600	nm

## Optical Receiver

Parameter	Conditions	Symbol	Min	Typ	Max	Units
Maximum Input Power		P <sub>MAX</sub>			0	dBm
Center Wavelength		$\lambda_X$	1260	1550	1600	nm
Receiver Sensitivity		Se	-16		0	dBm

## Digital Optical Monitoring

Transceivers offer the ability to monitor important module parameter during operation. The five parameters listed below are continuously monitored for getting information about the current module status. All data is calibrated internally; there is no need for external post processing.

## Temperature

Internally measured temperature data is represented as two's complement of a signed 16-bit value in increments of 1/256 °C over a range of -40 to +100°C. Accuracy is better than +/-3%.

## Supply Voltage (VCC)

Internally measured supply voltage. Represented as a 16-bit unsigned integer with the voltage defined as the full 16 bit value (0 – 65535) with LSB equal to 100 µVolt, which yields to a total range of 0 to +6.55 Volts. Accuracy is better than +/-3%.

## Laser Bias Current

VCSEL bias current. Represented as a 16 bit unsigned integer with the current defined as the full 16-bit value (0 – 65535) with LSB equal to 2 µA, valid range is 0 to 20 mA. Accuracy is better than +/-10%.

## Optical Transmitter Power

TX output power measurement is based on internal monitor diode feedback. Represented as a 16-bit unsigned integer with the power defined as the full 16 bit value (0–65535) with LSB equal to 0.1µW. Accuracy is better than +/-3dB over a range of Pavmin to Pavmax.

## Receiver Optical Power

RX input power measurement is based on photodiode diode current. Represented as a 16-bit unsigned integer with the power defined as the full 16 bit value (0 – 65535) with LSB equal to 0.1 µW. Accuracy is better than +/-3dB over a range of -12dBm to -1dBm.

Note: The specified characteristics are met within the recommended range of operating conditions regarding temperature and voltage.

## Regulatory Compliance

### Module Safety

Add-On Computer Peripherals SFP+ modules are designed to meet international requirements and standards in terms of product safety. Tests were performed according to IEC 60950-1:2001 (CB scheme). The module is RoHS compliant according to the European Parliament requirements on the restriction of the use of hazardous substances in electrical and electronic equipment (RoHS). The modules optical output power meet Class 1 requirements for laser safety.

Requirements	Standard	Status
Module Safety	IEC 60950-1:2001 EN 60950-1:2001	TUV Report / Certificate available CB Report / Certificate available
RoHS	RoHS Directive 2002/95/EC	RoHS 6/6 compliant Certificate of
Compliance	Amendment 4054 (2005/747/EC)	compliance available

Laser Eye	CDRH 21 CFR 1040.10 and	Laser Class 1 according to FDA
Safety	1040.11 IEC 60825-1 Rev2 2007	Laser Class 1 according to IEC Rev2

## ESD & Electromagnetic compatibility

Add-On Computer Peripherals SFP+ modules are designed to withstand high ESD voltages. Its excellent performances in terms of EMI allow system designers to integrate the module in high density applications.

Requirements	Standard	Status
Electro Static Discharge to the Electrical Pins (ESD)	EIA/JESD22-A114-B MIL-STD 883C Method 3015.7	Exceeds requirements Class 1B (>1000V)
		Exceeds requirements
Immunity to ESD (housing, receptacle)	IEN 61000-4-2	Discharges ranging from 2kV to 25kV without damages to the transceiver
	IEC61000-4-2	
Electromagnetic Emission (EMI)	FCC Part 15, Class B EN	Exceeds requirements Class B
	55022 Class B CISPR 22	with more than 6dB margin

## Contact Information

Add-On Computer Peripherals is a leading supplier of Memory Upgrade, Network Transceivers and Network connectivity products to Channel Partners, Resellers and OEMs, with more than seventeen years of direct industry experience. Add-On Computer Peripherals (ACP) has been the exclusive supplier to Ingram Micro's "Memory Upgrades" program for the past nine years.

ACP maximizes profitable opportunities for our partners. Our ability to source product worldwide, ensures that our pricing will always be competitive. Offering turnkey solutions, ACP has forged a reputation as a solutions provider, delivering high quality, cost effective product in a timely and reliable manner.

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