



# iSFC<sup>®</sup> Micro-OTDR Transceiver Series

## Fast Fiber Fault Finder<sup>™</sup>

SFP with integrated Micro-OTDR ( $\mu$ OTDR<sup>™</sup>) – iSFC<sup>®</sup>  
 Automatically Detects, Locates and Reports Optical Fiber Faults

### Major Features

- Integral Micro-OTDR ( $\mu$ OTDR<sup>™</sup>) - iSFC<sup>®</sup>
  - Reflection Immune Operation - RIO<sup>®</sup>
  - Full Duplex, Single Wavelength
  - -20°C to +70°C T<sub>OP</sub> Commercial
  - -40°C to +85°C T<sub>OP</sub> Industrial \*
  - TIA-598-C ZonuColor<sup>™</sup> Code
  - Dead Zone of 50 meters or Less
  - Resolution of 10 meters or Better
  - Accuracy of  $\pm$  50 meters or Better
  - Minimum 20 dB Optical Link Budget
  - 55 dB Dynamic Range for the  $\mu$ OTDR<sup>™</sup>
  - Automatically Measures ORL and Optical SNR
  - Reflection Immune Operation – Any Network Type
- \* CWDM Operation Limited by Optical Mux/Dmux Pass-Band.

### Major Benefits

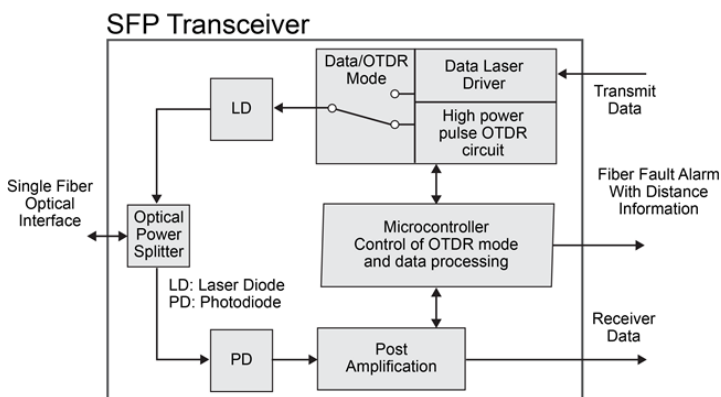
- Single Wavelength Operation in Legacy and UPC (Blue) Connector Networks
- Physical Layer Fault Detection
- Distributed Remote Fiber Monitoring
- Lower Mean-Time-To-Repair (MTTR)
- No Additional Special Equipment
- Half the Fiber, Passives, Splices

### Recommended Applications

- Network Monitoring
- Network Maintenance
- Business Class Service
- Metro-Ethernet Direct
- Wireless Fronthaul / Backhaul

iSFC<sup>®</sup> Transceivers transmit and receive at the same wavelength, doubling the optical fiber plant capacity. Upon disruption of data link, or failure to connect, the unit switches into  $\mu$ OTDR<sup>™</sup> Mode. **Reflection Immune Operation - RIO<sup>®</sup>** resolves self-reflection from an open connector and/or other reflectors. Only remote data is transferred into the host equipment. Fiber faults and intermittent connections present optical reflections of varying intensities. The reflection intensity of a fiber break has a known statistical distribution. Monitoring multiple fibers in the same trunk increases the detection probability (each fiber breaks differently). Fiber link may be monitored from one side, or both sides, when ring topology is utilized. (See Chart on last page.)

The new **ORL/OSNR Measurement** feature of the Micro-OTDR SFPs measures the optical fiber link ORL during the normal Micro-OTDR start-up “handshaking” routine of the SFPs before the data link is made. The receiver also measures the signal received. Internally the Micro-OTDR SFP calculates the actual SNR. If the SNR is deemed to be dangerously low a Warning bit is activated, and when it is too low (i.e. the optical data link bit error rate will be high), an Alarm bit is set and optionally (factory setting based on customer request) the link can be shut-down.



### Model Selection Guide

(See Performance Specifications on next page.)

Reach Category:		EX Reach – 40 Km Class CWDM
Model Series:		C-Series (Fast Ethernet; SONET OC-3; SDH STM-1)
Part Nomenclature:	SC/UPC Receptacle:	AF6-1xxG1-SU
	LC/UPC Receptacle:	AF6-1xxG1-LU

# iSFC® Transceiver Characteristics

Specific Characteristics (-20°C to +70°C)					
Reach Category:		Medium Reach		40 Km Class	
Model Series:		C-Series (GbE)			
Part Nomenclature:	SC/UPC Receptacle:	AF6-1xxG1-SU			
	LC/UPC Receptacle:	AF6-1xxG1-LU			
Transmitter					
Parameter	Sym	Min	Typ	Max	Units
Average Optical Output Power – GbE	P <sub>O</sub>	-2	0	1	dBm
Output Eye Conformance		IEEE 802.3-2008			
Receiver (GbE Sensitivity/Overload referenced to BER < 10E-12 with 2 <sup>7</sup> -1 PRBS)					
Parameter	Sym	Min	Typ	Max	Units
Average Optical Input Power – GbE	P <sub>Min</sub>	-	-	-22	dBm
Loss Of Signal De-Asserted – GbE	P <sub>D</sub>	-	-21	-	dBm
Loss Of Signal Asserted – GbE	P <sub>A</sub>	-	-22	-	dBm
Output Eye Conformance		IEEE 802.3-2008			
Link					
Parameter at Specified Bit Rate (Mbps)	Sym	-	1250	-	Mbps
Minimum Data Sheet Optical Power Budget		-	20	-	dB
Minimum Planning Optical Power Budget		-	18	-	dB
Minimum Required Optical Return Loss	ORL	-	24	-	dB

Micro-OTDR Mode Characteristics (-20°C to +70°C)					
Parameter	Sym	Min	Typ	Max	Units
Dynamic Range		55	-	-	dB
Dead Zone		-	-	50	m
Resolution		-	-	10	m
Accuracy		-	-	±50	m

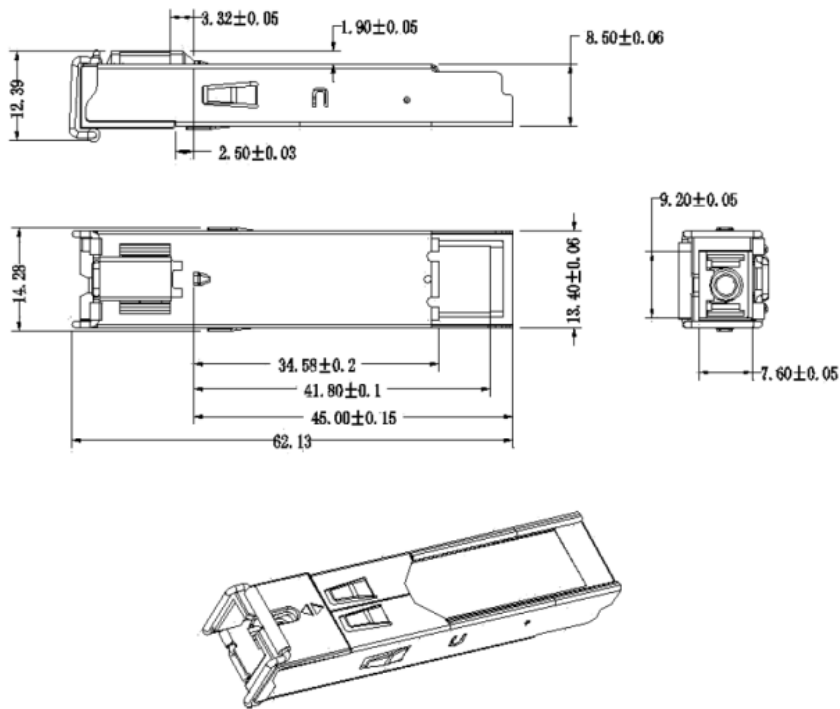
Absolute Maximum Ratings				
Parameter	Sym	Min	Max	Units
Storage Temperature (Case)	T <sub>s</sub>	-40	85	°C
Operating Temperature (Case)	T <sub>O</sub>	-20	70	°C
Relative Humidity	RH	5	95	%
Power Supply Voltage	V <sub>CC</sub>	0	3.6	V
Input Voltage		GND	V <sub>CC</sub>	V

Laser Δλ = 0.1 nm per °C			
T <sub>OP</sub>	°C	Δλ <sub>C</sub> (nm)	Δλ (nm)
High	+ 85	λ <sub>C</sub> + 6.0	+ 6.0
Room	+ 25	λ <sub>C</sub>	-
Low	- 40	λ <sub>C</sub> - 6.5	- 6.5

Common Characteristics (-20°C to +70°C)					
Transmitter					
Parameter	Sym	Min	Typ	Max	Units
Power Supply Voltage	V <sub>CC<sub>TX</sub></sub>	3.15	3.3	3.45	V
Power Supply Current	I <sub>CC<sub>TX</sub></sub>	-	-	140	mA
Operating Wavelength	λ	-	CC	-	nm
Spectral Width (RMS)	Δλ <sub>RMS</sub>	-	-	0.1	nm
Optical Power When Disabled	P <sub>ODISABLE</sub>	-	-	-30	dBm
TX Enable Timing		-	-	0.1	ms
TX Enable Voltage		-	V <sub>CC<sub>TX</sub></sub>	-	V
TX Disable Voltage		0	-	0.8	V
TX Alarm Voltage (No Alarm Condition)		0	-	0.8	V
TX Alarm Voltage (Alarm Condition)		-	V <sub>CC<sub>TX</sub></sub>	-	V
Optical Extinction Ratio	E <sub>R</sub>	9	-	-	dB
Total Jitter	T <sub>J</sub>	-	-	0.3	UI

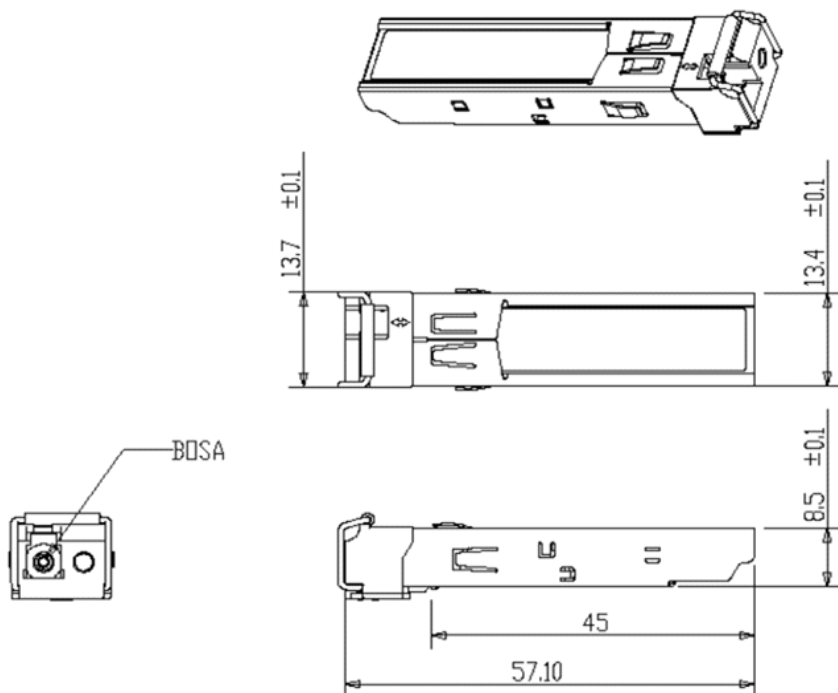
Common Characteristics (-20°C to +70°C)					
Receiver					
Parameter	Sym	Min	Typ	Max	Units
Power Supply Voltage	V <sub>CC<sub>RX</sub></sub>	3.15	3.3	3.45	V
Power Supply Current	I <sub>CC<sub>RX</sub></sub>	-	-	110	mA
Operating Wavelength	λ	1260	-	1635	nm
Average Maximum Input Power	P <sub>MAX</sub>	1	-	-	dBm
Loss Of Signal Hysteresis	P <sub>D</sub> - P <sub>A</sub>	1	-	-	dB
CML Data Output Level HIGH	R <sub>D</sub>	V <sub>CC<sub>RX</sub></sub> -0.020	V <sub>CC<sub>RX</sub></sub> -0.005	V <sub>CC<sub>RX</sub></sub>	V
CML Data Output Level LOW	R <sub>D</sub>	V <sub>CC<sub>RX</sub></sub> -0.475	V <sub>CC<sub>RX</sub></sub> -0.400	V <sub>CC<sub>RX</sub></sub> -0.350	V
Total Jitter	T <sub>J</sub>	-	-	0.35	UI

## SC Receptacle Configuration: AF6-1xxG1-SU



Pin Assignments		
Pin #	Pin Name	Pin Function
1	VeeT	Transmitter Ground
2	TX Fault	Transmitter Fault Indication
3	TX Disable	Transmitter Disable
4	MOD-DEF2	Module Definition 2
5	MOD-DEF1	Module Definition 1
6	MOD_DEF0	Module Definition 0
7	NC	(No Connection)
8	LOS	Loss of Signal
9	VeeR	Receiver Ground
10	VeeR	Receiver Ground
11	VeeR	Receiver Ground
12	RD-	Inverted Received Data Out
13	RD+	Received Data Out
14	VeeR	Received Ground
15	VccR	Receive Power
16	VccT	Transmitter Power
17	VeeT	Transmitter Ground
18	TD+	Transmitted Data In
19	TD-	Inverted Transmit Data In
20	VeeT	Transmitter Ground

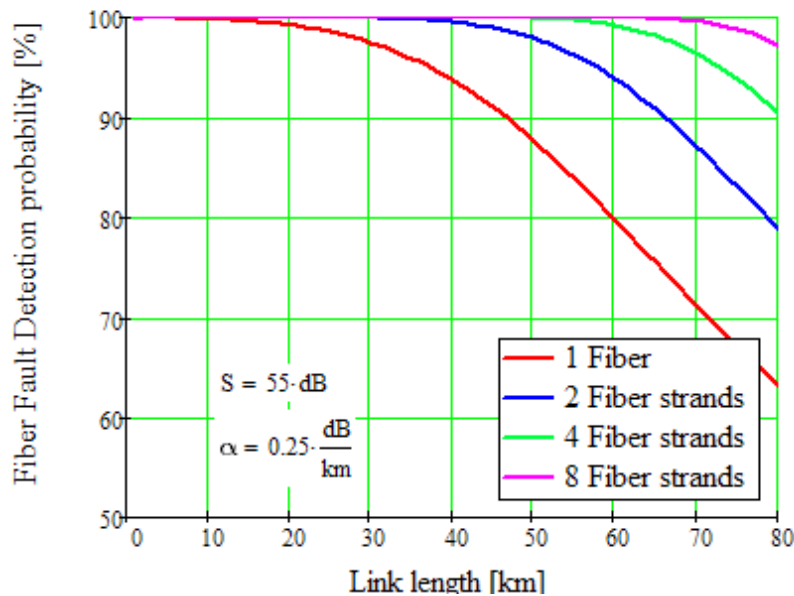
## LC Receptacle Configuration: AF6-1xxG1-LU



## Ordering Information: Part Numbers and ZonuColor™ Code – CWDM

ITU Ch	$\lambda_c$ nm	OZC PN	Color	Verbal	Laser
-	1625	AF6-162G1-SU/LU	MA	Magenta	DFB
18	1611	AF6-161G1-SU/LU	BR	Brown	DFB
17	1591	AF6-159G1-SU/LU	YL	Yellow	DFB
16	1571	AF6-157G1-SU/LU	OR	Orange	DFB
15	1551	AF6-155G1-SU/LU	BK	Black	DFB
14	1531	AF6-153G1-SU/LU	RD	Red	DFB
13	1511	AF6-151G1-SU/LU	WH	White	DFB
12	1491	AF6-149G1-SU/LU	BL	Blue	DFB
11	1471	AF6-147G1-SU/LU	SL	Slate	DFB
10	1451	AF6-145G1-SU/LU	GR	Green w Black Tracer	DFB
9	1431	AF6-143G1-SU/LU	BR	Brown w Black Tracer	DFB
8	1411	AF6-141G1-SU/LU	YL	Yellow w Black Tracer	DFB
7	1391	AF6-139G1-SU/LU	OR	Orange w Black Tracer	DFB
6	1371	AF6-137G1-SU/LU	BK	Black w Yellow Tracer	DFB
5	1351	AF6-135G1-SU/LU	RD	Red w Black Tracer	DFB
4	1331	AF6-133G1-SU/LU	WH	White w Black Tracer	DFB
3	1311	AF6-131G1-SU/LU	GR	Green	DFB
2	1291	AF6-129G1-SU/LU	BL	Blue w Black Tracer	DFB
1	1271	AF6-127G1-SU/LU	SL	Slate w Black Tracer	DFB

Fiber Fault Detection from at least one end



For More Information

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