SFP56 50G 850nm 100M MMF Dual CDR Duplex LC

AE-SFP56-SR

Features

- Operating Data Rate up to 53.125Gbps (26.5625GBd PAM4)
- 850nm VCSEL Transmitter
- Distance up to 100m @50/125μm OM4
- Distance up to 70m @50/125μm OM3
- Single 3.3V Power Supply
- Duplex LC Connector Interface, Hot Pluggable
- Built-in Re-timer, DSP Based
- Power Dissipation < TBD
- Operating Case Temperature Standard: 0℃~+70℃
- Safety Certification: TUV/UL/FDA*Note1
- RoHS Compliant

Applications

- IEEE 802.3cd 50GBASE-SR
- Other Optical Link

Description

The AE-SFP56-SR series multi-mode transceiver is SFP56 module for duplex optical data communications up to 53.125Gb/s. It is with the SFP+ 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I2C. It has built-in clock re-timer based on DSP. This module is designed for multi-mode fiber and operates at a nominal wavelength of 850nm.

The transmitter section uses a Vertical Cavity Surface Emitted Laser (VCSEL) and is a Class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated GaAs detector preamplifier (IDP) mounted in an optical header and a limiting post- amplifier IC.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	TS	-40	+85	°C
Supply Voltage	VCC	-0.5	3.6	V

Note: Exceeding any one of these values may destroy the device permanently.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating Case Temperature	TC	0		70	°C
Power Supply Voltage	VCC	3.135	3.3	3.465	V
Relative Humidity*Note4	RH	5		85	%
Power Dissipation	PD			TBD	W

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Input Electrical Specifications						
Differential pk-pk Input Voltage Tolerance		900			mVp-p	
Differential Input Impedance	Zin	90	100	110	ohm	
AC Common Mode Voltage				17.5	mVrms	
DC Common Mode Voltage		-350		2850	mV	
TX Disable, RS0, RS1	VIL	-0.3		0.8	V	
	VIH	2.0		Vcc+0.3	V	
Output Electrical Specifications						
Differential Output Amplitude				900	mVp-p	
Differential Output Impedance	Zout	90	100	110	ohm	
AC Common Mode Voltage				17.5	mVrms	
Eye Width		0.265			UI	@TP4, all 3 PAM4 eyes, 1E-5
Eye Height Differential		70			mV	@TP4, all 3 PAM4 eyes, 1E-5
TX Fault, RX LOS	VOL	-0.3		0.4	V	
	VOH	2.0		Vcc+0.3	V	

Optical Characteristics

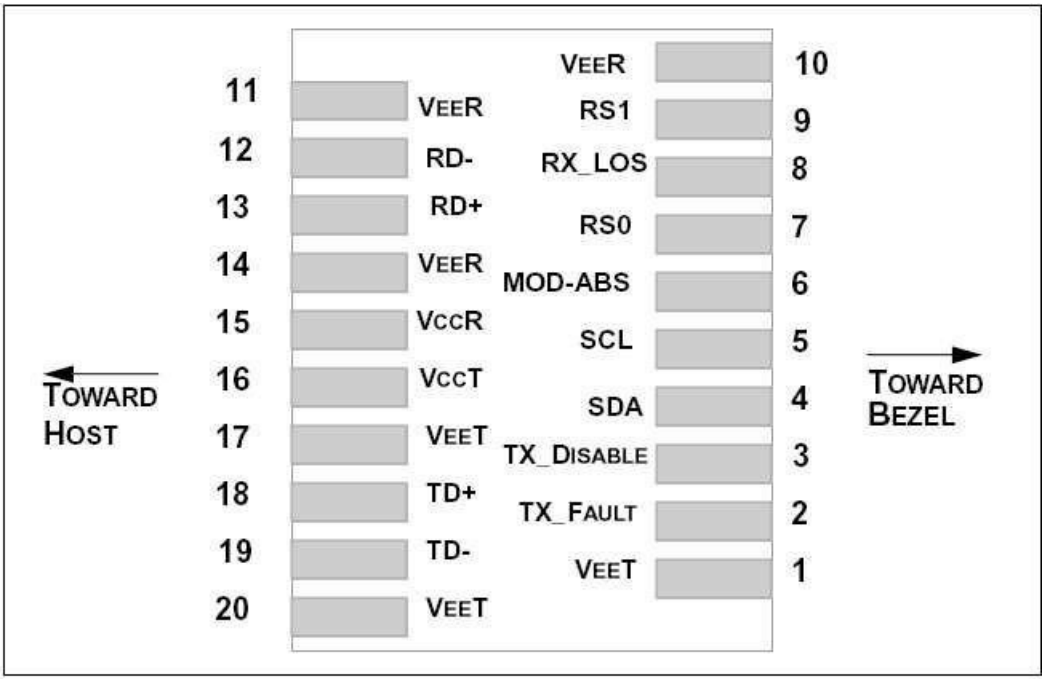
Parameter	Symbol	Min.	Typ.	Max.	Unit
50/125μm MMF OM3		2		70	m
50/125μm MMF OM4		2		100	m
Signaling Rate			26.5625 ±100ppm		GBd
Modulation Format			PAM4		
Transmitter					
Centre Wavelength	λ_C	840	850	860	nm
RMS Spectral Width	$\Delta\lambda$			0.6	nm
Average Launch Power	PAVG	-6.5		4	dBm
Outer Optical Modulation Amplitude*note5	POMA	-4.5		3	dBm
Launch Power in OMA_{outer} minus TDECQ		-5.9			dB
Transmitter and Dispersion Eye Closure	TDECQ			4.5	dB
TDECQ-$10\log_{10}(C_{eq})$				4.5	dB
Average Launch Power of OFF Transmitter	POFF			-30	dB
Extinction Ratio	ER	3			dB
Transmitter Transition Time				34	ps
$RIN_{12}OMA$				-128	dB/Hz
Optical Return Loss tolerance				12	dB
Encircled flux			≥86% at 19um ≤30% at 4.5um		
Receiver					
Centre Wavelength	λ_C	840	850	860	nm
Damage threshold		5			dBm
Average Receive Power	R_{AVG}	-8.4		4	dBm
Receiver Power,	R_{OMA}			3	dBm

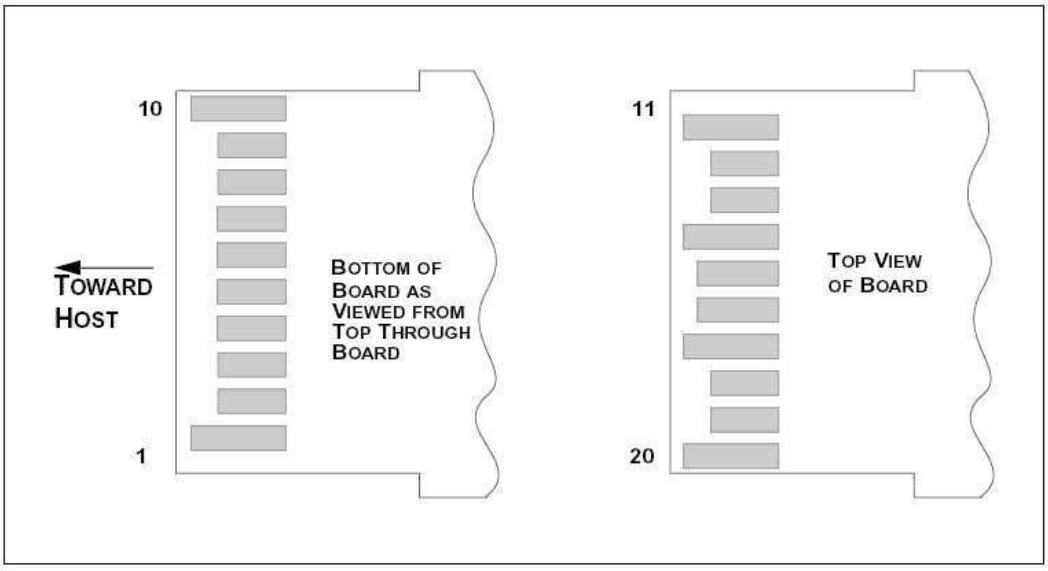
OMA_{outer}					
Receiver Reflectance				-12	dBm
Stressed Receiver Sensitivity, OMA_{outer}				-3.4	dBm
Receiver Sensitivity, OMA_{outer}	Sen_{OMA}	Note6			
LOS Assert	LOS_A	-17			dBm
LOS De-Assert	LOS_D			-11	dBm
LOS Hysteresis		0.5			dB
Condition of Stressed Receiver Sensitivity Test					
Stressed Eye Closure for PAM4	SECQ			4.5	dB
SECQ-$10log_{10}(C_{eq})$				4.5	dB

Note

1. Even if the TDECQ<1.4dB, the OMA (min) must exceed this value.
2. Sensitivity=max(-6.5, SECQ-7.9)dB with BER<$2.4x10^{-4}$ pre-FEC

Transceiver Electrical Pad Layout





Pin Function Definitions

Pin Num.	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	Note 5
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	SDA	Module Definition 2	3	Data line for Serial ID.
5	SCL	Module Definition 1	3	Clock line for Serial ID.
6	MOD-ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTL).	3	Rate Select 0, optionally controls SFP56 module receiver. This pin is pulled low to VeeT with a >30K resistor.
8	RX LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTL).	1	Rate Select 1, optionally controls SFP56 module transmitter. This pin is pulled low to VeeT with a >30K resistor.
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 6
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3V ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3V ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5

18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Ordering information

Part Number	Description
AE-SFP56-SR	SFP56 50G 850nm 100M MMF LC DDM with Dual CDR 0℃~+70℃