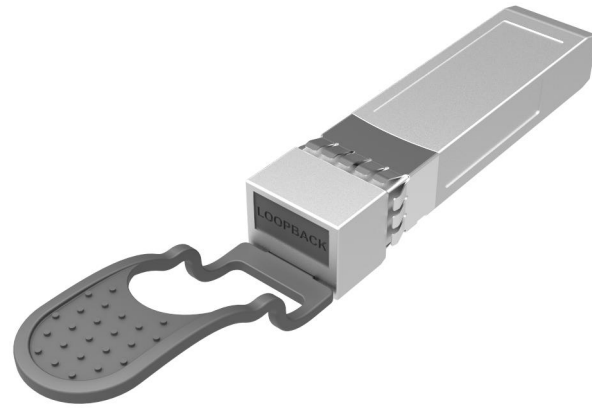


# 25G SFP28 Active Electrical Loopback Module

## FLPC-E25

### Features

- Hot-pluggable SFP28 form factor
- 1 channels Electrical Loopback Module
- Supports 25Gbps data rate
- Low power dissipation <1W
- RoHS compliant (lead-free)
- Case temperature range of 0°C to 70°C
- Single 3.3V power supply
- SFP28 MSA compliant



### Applications

- 25G Ethernet
- Support 10G by CDR bypass

### Description

FIBERSTAMP's FLPC-E25 SFP28 active electrical loopback is used for testing 25G SFP28 transceiver ports in board level test. By substituting for a full-featured SFP28 transceiver, the electrical loopback provides a cost effective low loss method for SFP28 port testing.

The FLPC-E25 is packaged in a standard MSA housing compatible with all SFP28 ports. Transmit data from the host is electrically routed (internal to the loopback module) to the receive data outputs and back to the host. Since the loopback module does not contain laser diodes, photodiodes, laser driver or transimpedance amplifier chips, etc., it provides an economical way to exercise SFP28 ports during R&D validation, production testing and field testing.

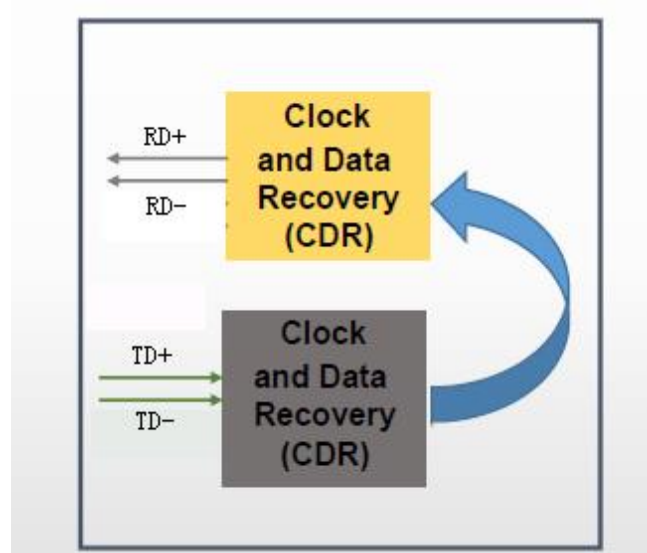


Figure 1. Module Block Diagram



### Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	$V_{cc}$	-0.3	3.6	V
Input Voltage	$V_{in}$	-0.3	$V_{cc}+0.3$	V
Storage Temperature	$T_s$	-40	85	°C
Case Operating Temperature	$T_c$	0	70	°C
Humidity (non-condensing)	Rh	5	95	%

### Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	$V_{cc}$	3.13	3.3	3.47	V
Operating Case Temperature	$T_c$	0		70	°C
Data Rate Per Lane	fd		25.78125		Gb/s
Humidity	Rh	5		85	%
Power Dissipation	$P_m$			1	W

### Electrical Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Differential Input Impedance	$Z_{in}$	90	100	110	ohm
Differential Output Impedance	$Z_{out}$	90	100	110	ohm
Differential Input Voltage Amplitude	$\Delta V_{in}$	300		900	mVpp
Differential Output Voltage Amplitude	$\Delta V_{out}$	300		800	mVpp
Bit Error Rate	BER			E-12	
Input Logic Level High	$V_{IH}$	2.0		$V_{cc}$	V
Input Logic Level Low	$V_{IL}$	0		0.8	V
Output Logic Level High	$V_{OH}$	$V_{cc}-0.5$		$V_{cc}$	V
Output Logic Level Low	$V_{OL}$	0		0.4	V



Pin Definitions

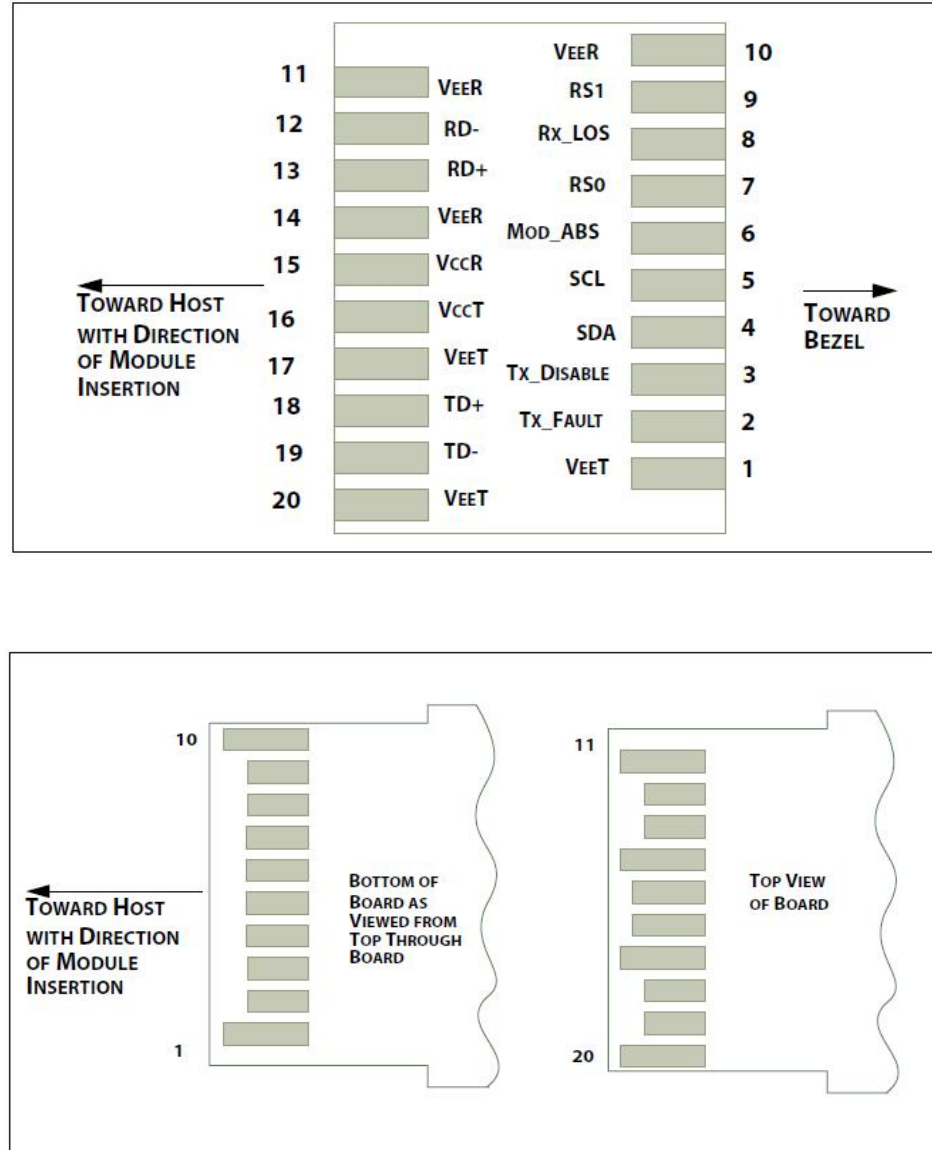


Figure 2. Electrical Pin-out Details

Pin Descriptions

PIN	Logic	Symbol	Name / Description	Note
1		VeeT	Module Transmitter Ground	1
2	LV TTL-O	TX_Fault	Module Transmitter Fault	2
3	LV TTL-I	TX_Dis	Transmitter Disable; Turns off transmitter laser output	
4	LV TTL-I/O	SDA	2-Wire Serial Interface Data Line	2
5	LV TTL-I	SCL	2-Wire Serial Interface Clock	2
6		MOD_ABS	Module Definition, Grounded in the module	
7	LV TTL-I	RS0	Receiver Rate Select	
8	LV TTL-O	RX_LOS	Receiver Loss of Signal Indication Active LOW	
9	LV TTL-I	RS1	Transmitter Rate Select (not used)	
10		VeeR	Module Receiver Ground	1
11		VeeR	Module Receiver Ground	1
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Data Output	
14		VeeR	Module Receiver Ground	1
15		VccR	Module Receiver 3.3 V Supply	
16		VccT	Module Receiver 3.3 V Supply	

PIN	Logic	Symbol	Name / Description	Note
17		VeET	Module Transmitter Ground	1
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		VeET	Module Transmitter Ground	1

**Notes:**

1. Module ground pins GND are isolated from the module case.
2. Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

**Recommended Interface Circuit**

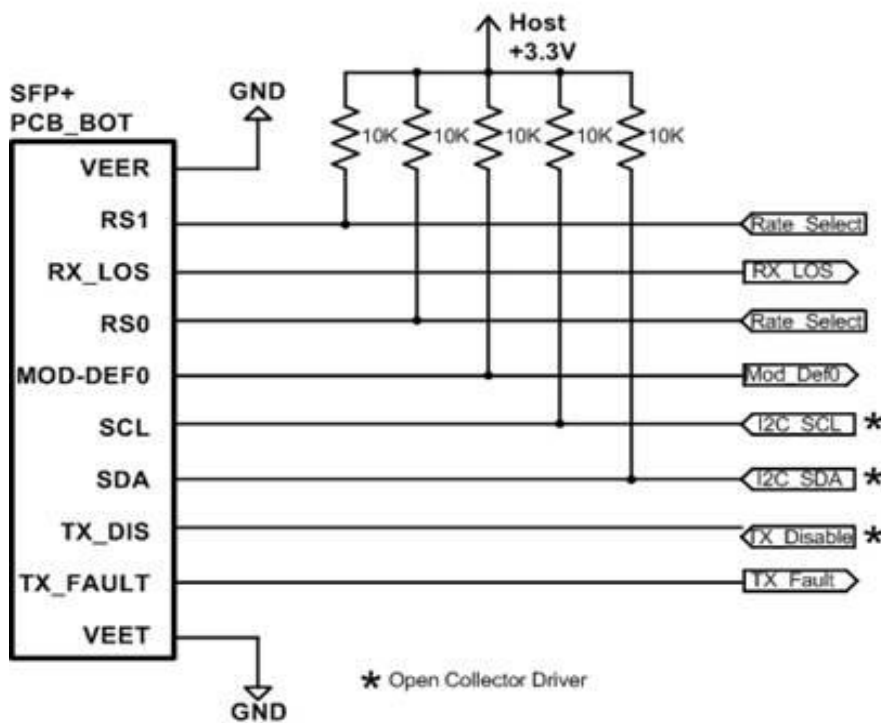
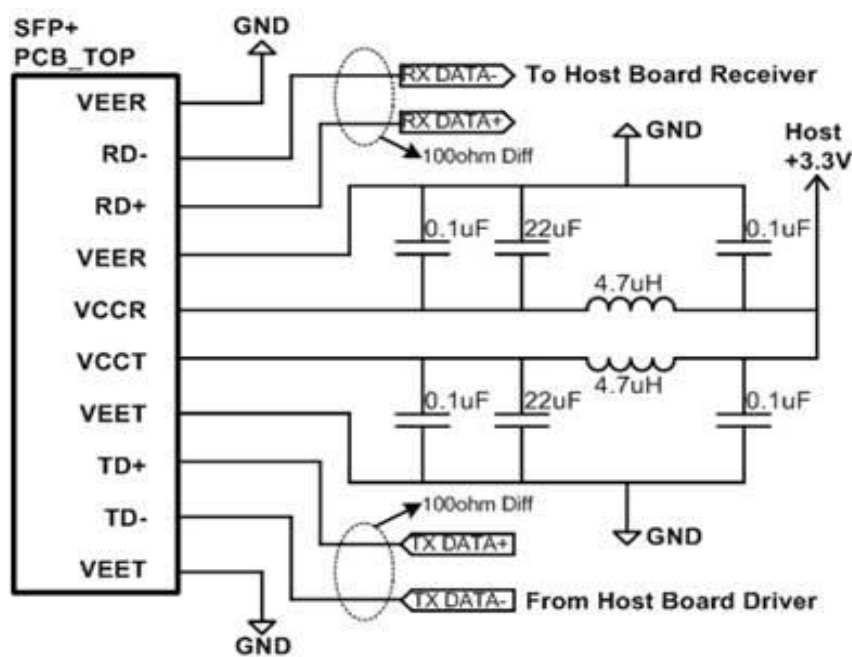


Figure 3. Host Board Power Supply Filtering



**Memory Organization**

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA). The memory map specific data field defines as following.

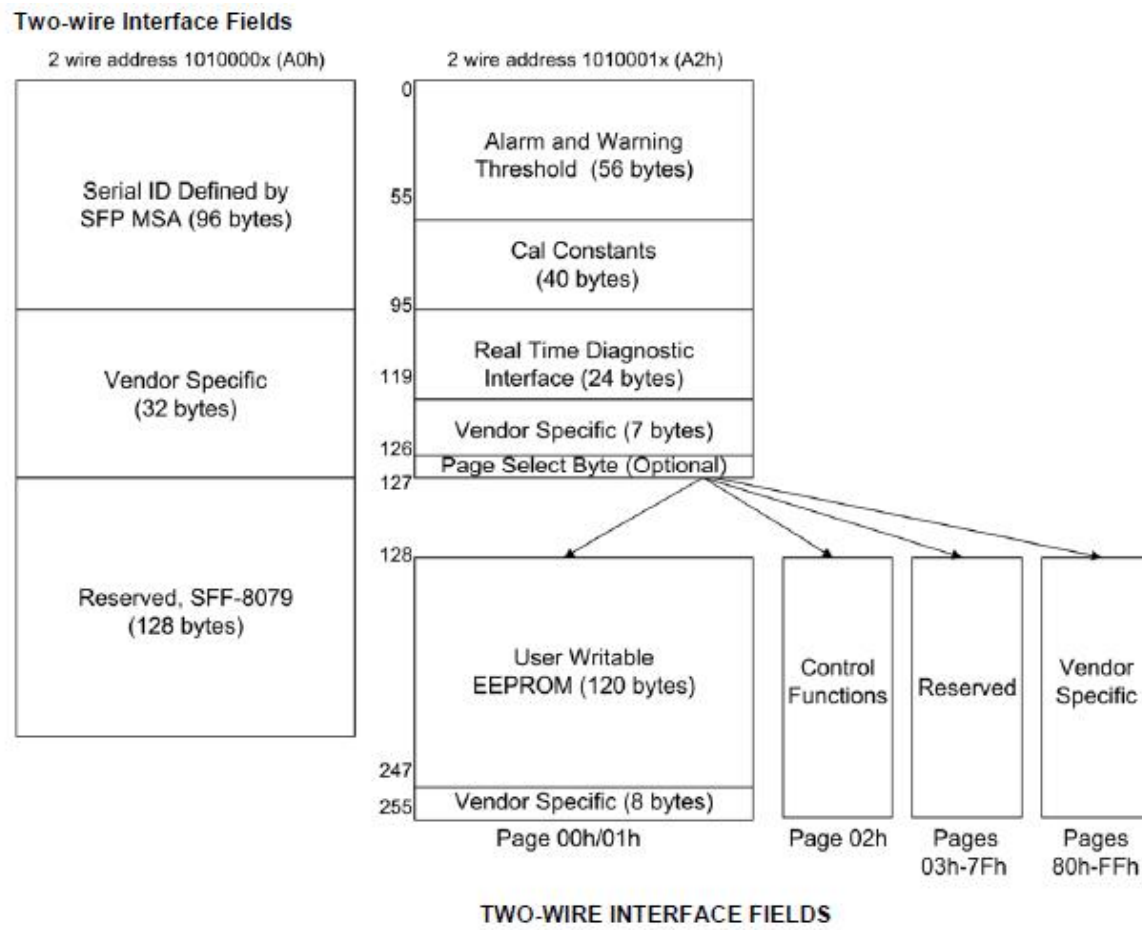


Figure4. Memory Map

**Mechanical Dimensions**

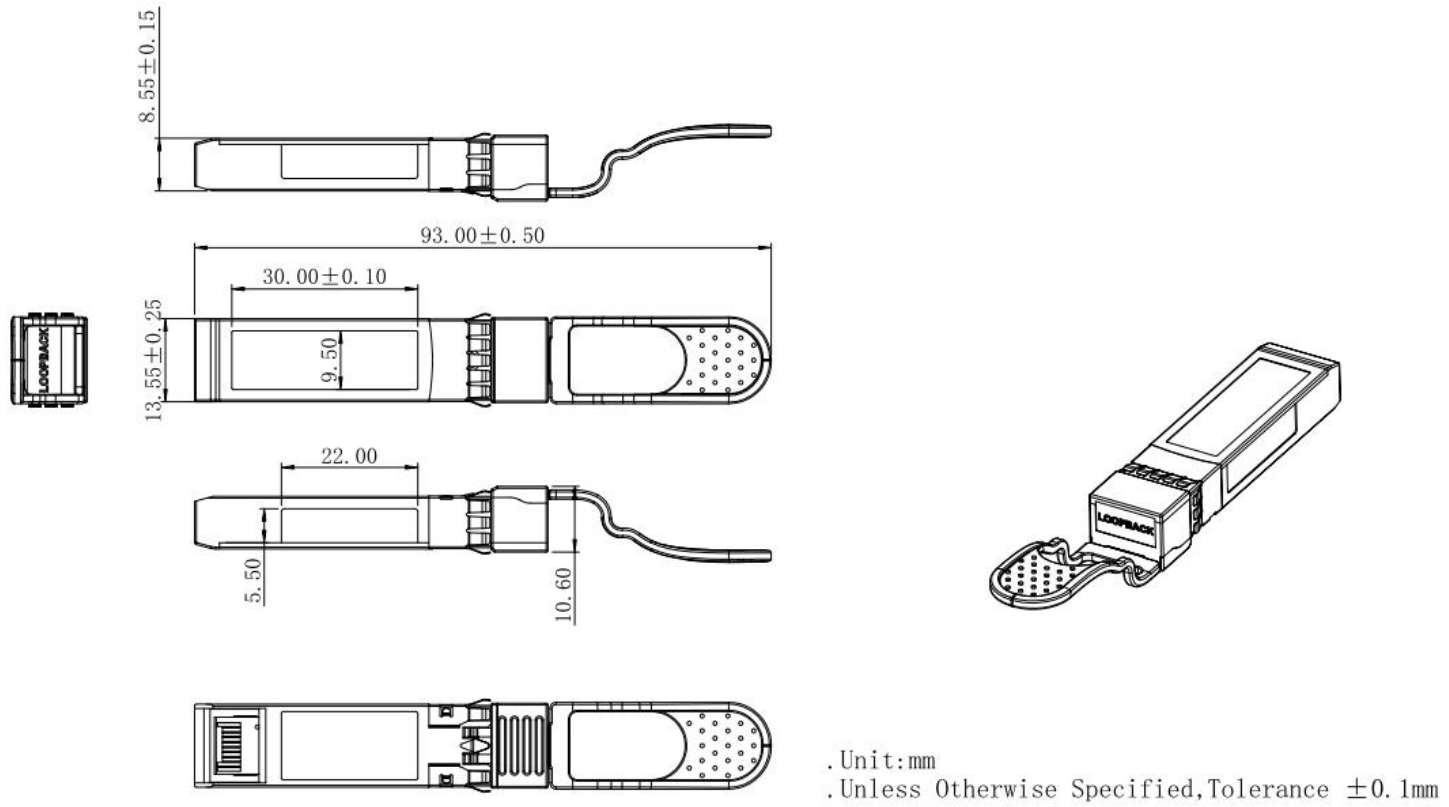


Figure 5. Mechanical Specifications

## Regulatory Compliance

FIBERSTAMP FLPC-E25SFP28 Loopback are certified per the following standards:

Feature	Standard
Electrical Safety	EN 62368-1: 2014 IEC 62368-1:2014 UL 62368-1:2014
Environmental protection	Directive 2011/65/EU with amendment(EU)2015/863
CE EMC	EN55032: 2015 EN55035: 2017 EN61000-3-2:2014 EN61000-3-3:2013
FCC	FCC Part 15, Subpart B ANSI C63.4-2014

## References

- SFP28 MSA

### CAUTION:

Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

## Ordering Information

Part Number	Product Description
FLPC-E25	25G SFP28 Active Electrical Loopback

## Important Notice

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