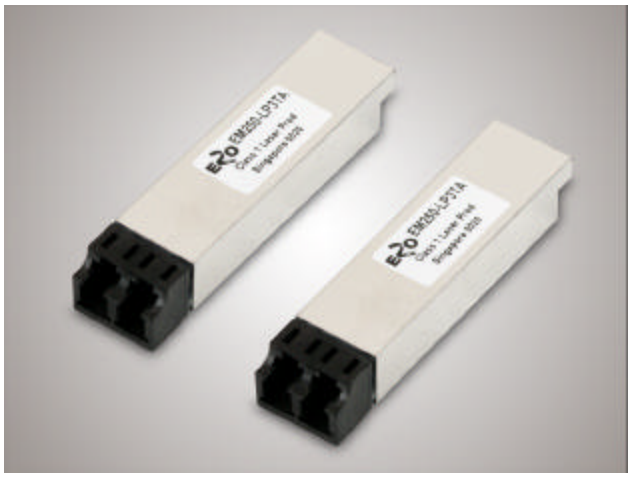
EM250-LP3TA
Preliminary Data Sheet



Features

- **Applicable for Operations Up to 2.5 Gb/s**
- **2.5 Gb/s Operation Compliant with Fibre Channel Standards**
- **LC Receptacle Compatible with Industry Standard LC Optical Connector**
- **Compatible with Industry Standard RFT Electrical Connector & Cage**
- **850nm Vertical Cavity Surface Emitting Laser (VCSEL) Source Technology**
- **Operates with 50 mm and 62.5 mm multimode optical fibers**
- **Compliant with Small Form-factor Pluggable (SFP) Multi-Source Agreement**
- **Class 1 Laser Safety Compliant**
- **Single +3.3V Power Supply**
- **EEPROM with Serial ID Functionality**

Product Description

The EM250-LP3 from E2O Communications is a hot-pluggable 3.3V Small Form-Factor transceiver designed for use in applications up to 2.5 Gb/s. The EM250-LP3 transceivers provide the LC optical receptacle that is compatible with the industry standard LC connector. The transceiver is also compatible with industry standard RFT connector and cage. The transceiver conforms to the Small Form-factor Pluggable (SFP) multi-source agreement (MSA). Each EM250-LP3 transceiver consists of an optical subassembly housing both the transmitter and the receiver, and an electrical subassembly. All are housed within a plastic/metal package.

The transmitter consists of a high-performance 850-nm VCSEL and the receiver consists of a GaAs PIN and a pre-amplifier.

At the same time, a serial EEPROM in the transceiver allows the user to access information. Details of the Serial Identification Protocol will be contained in the SFP Multi-Source Agreement.

All EM250-LP3 transceivers also include a Lost Signal Detect circuit, which provides a TTL logic high output when an unusable input optical signal level is detected.

Electromagnetic Interference (EMI) & Immunity
To assist the customer in managing the overall equipment EMI performance, the EM250-LP3 transceivers is designed to be compatible with the industry-standard RFT cage. The RFT cage is designed to provide protection for EMI emission and EMI susceptibility. All transceivers comply with the FCC Class B limits.

Eye Safety
The EM250-LP3 850-nm VCSEL-based transceivers have been designed to meet Class 1 eye safety and comply with FDA 21CFR 1040.10 and 1040.11and the IEC 825-1.

Ordering Information

EM250-LP3 T A

- A (Coupling)
  - A = AC
- T (Signal Detect)
  - T = TTL

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
Storage Temperature	T_S	-40		85	°C	
Supply Voltage	V_{CC}			6.0	V	Vcc – ground

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
Ambient Operating Temperature	T_A	0		70	°C	
Supply Voltage	V_{CC}	3.1		3.5	V	
Transmitter Differential Input Voltage	V_D	0.5		2.4	V	

ELECTRICAL CHARACTERISTICS (T_A = 0°C to 70°C, V_{CC} = 3.15V to 3.45V)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
TRANSMITTER						
Supply Current	I_{CCT}			100	mA	
RECEIVER						
Supply Current	I_{CCR}			130	mA	
Data Output Peak-to-Peak Differential Voltage	$V_{O,P-P}$	0.7		2.4	V	
Data Output Rise & Fall Times	t_r,t_f			0.15	ns	20-80%
TTL Signal Detect Output – High	Voh,TTL	2.4		Vcc	V	
TTL Signal Detect Output - Low	Vol,TTL	0.0		0.4	V	

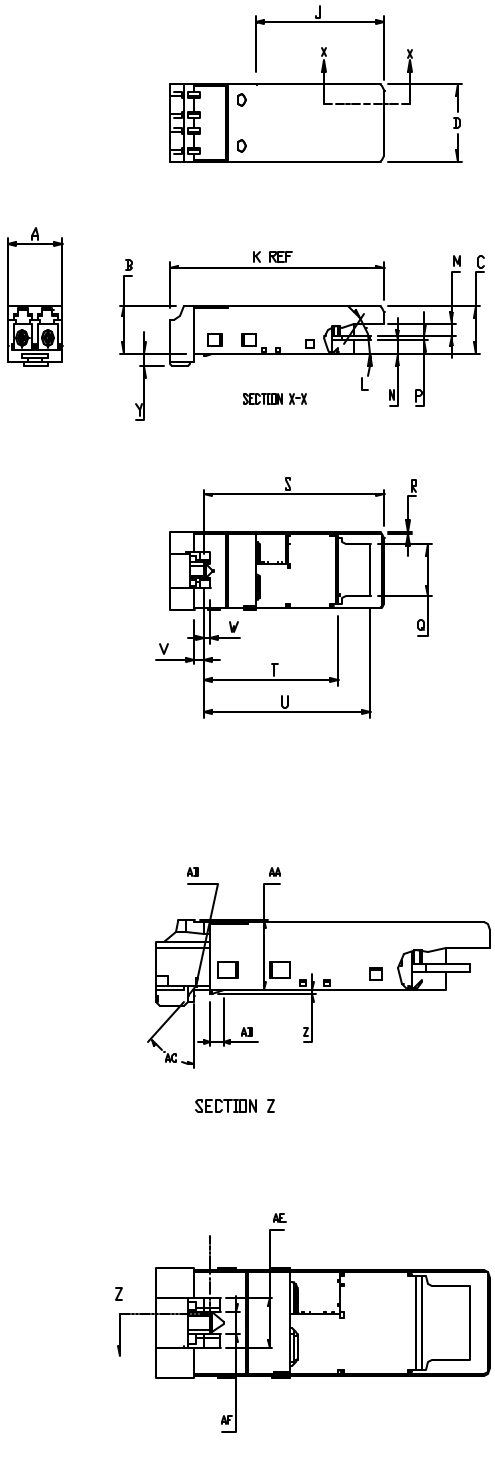
OPTICAL CHARACTERISTICS (T_A = 0°C to 70°C, V_{CC} = 3.15V to 3.45V)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNITS	NOTES
TRANSMITTER						
Output Optical Power 50/125 µm, NA = 0.20 fiber	P_{OUT}	-9.5		-4	dBm avg.	
Output Optical Power 62.5/125 µm, NA = 0.275 fiber	P_{OUT}	-9.5		-4	dBm avg.	
Optical Extinction Ratio		9			dB	
Center Wavelength	λ_C	840	850	860	nm	
Spectral Width – rms	σ			0.85	nm	
Optical Rise/Fall Time	t_r / t_f			0.22	ns	20-80%
RIN			-122	-117	dB/Hz	
Transmitter Optical Contributed Jitter (TOTAL)	TJ			150	ps	
RECEIVER						
Input Optical Power Minimum	P_{IN}	-16			dBm avg.	@2.5 Gb/s
Input Optical Power Maximum	P_{IN}	0.5			dBm avg.	
Operating Center Wavelength	λ_c	770		860	nm	
Return Loss		12			dB	
Signal Detect – Asserted	P_A			-16	dBm avg.	
Signal Detect – Deasserted	P_D	-30			dBm avg.	
Signal Detect – Hysteresis	P_A - P_D	0.5			dB	

TABLE 1: SFP PIN DEFINITION

PIN	SYMBOL	DESCRIPTION OF FUNCTION
1	VeeT	Transmitter Signal 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	Rate Select	Select between full or reduced receiver bandwidth
8	LOS	Loss of Signal
9	VeeR	Receiver Signal Ground
10	VeeR	Receiver Signal Ground
11	VeeR	Receiver Signal Ground
12	RD-	Received Data Inverted Differential Output
13	RD+	Received Data Non-Inverted Differential Output
14	VeeR	Receiver Signal Ground
15	VccR	+3.3V Receiver Power Supply
16	VccT	+3.3V Transmitter Power Supply
17	VeeT	Transmitter Signal Ground
18	TD+	Transmitter Data Non-Inverted Differential Input
19	TD-	Transmitter Data Inverted Differential Input
20	VeeT	Transmitter Signal Ground

SFP Transceiver Package Dimensions



Dimension Table for SFP Transceiver

Designator	Dimension (mm)	Tolerance (mm)
A	13.70	± 0.10
B	8.60	± 0.10
C	8.45	± 0.10
D	13.40	± 0.10
J	32.00	± 0.10
K	53.50	Reference
L	1.20 x 45°	Minimum
M	2.00	± 0.25
N	2.35	+0.00/-0.10
P	1.00	± 0.10
Q	9.20	± 0.10
R	0.25	Maximum
S	45.00	± 0.20
T	34.30	± 0.30
U	41.80	± 0.15
V	2.50	± 0.05
W	1.70	± 0.10
Y	1.98	Maximum
Z	0.45	± 0.10
AA	8.60	± 0.10
AB	2.30	± 0.10
AC	45°	± 3°
AD	0.10	Reference
AE	6.30	Reference
AF	2.60	± 0.05