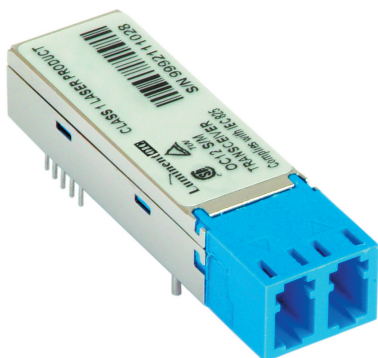


C-13-155(C)-F-SLCX



Features

- Duplex LC Single Mode Transceiver
- Small Form Factor Multi-sourced 2x5 Pin Package
- Ultra Long reach SONET OC-3/SDH STM-1 Compliant
- Single +3.3V Power Supply
- LVPECL Differential Inputs and Outputs
- LVTTTL Signal Detection Output (C-13-155C-F-SLCX)
- LVPECL Signal Detection Output (C-13-155-F-SLCX)
- Temperature Range: 0 to 70 °C [C-13-155(C)-F-SLCX]
- Temperature Range: -40 to 85 °C [C-13-155(C)-F-SLCXA]
- Class 1 Laser International Safety Standard IEC 825 Compliant
- Solder ability to MIL-STD-883, Method 2003
- Pin coating is Sn/Pb with minimum 2% Pb content
- Flammability to UL94V0
- Humidity RH 5-85% (5-95% short term) to IEC 68-2-3
- Complies with Telcordia(Bellcore) GR-468-CORE
- Uncooled laser diode with MQW structure
- EMI Shielding Finger Optional
- ATM 155 Mbps links
- RoHS compliance available

Absolute Maximum Rating

Parameter	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{cc}	0	3.6	V	
Output Current	I_{out}	0	30	mA	
Soldering Temperature	-	-	260	°C	10 seconds on leads only
Operating Temperature	T_{opr}	0	70	°C	C-13-155(C)-F-SLCX
Operating Temperature	T_{opr}	-40	85	°C	C-13-155(C)-F-SLCXA
Storage Temperature	T_{stg}	-40	85	°C	

Recommended Operating Condition

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	V_{cc}	3.1	3.3	3.5	V	
Operating Temperature (Case)	T_{opr}	0	-	70	°C	C-13-155(C)-F-SLCX
Operating Temperature (Case)	T_{opr}	-40	-	85	°C	C-13-155(C)-F-SLCXA
Data Rate	-	-	155	-	Mbps	

C-13-155(C)-F-SLCX

Transmitter Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical						
Optical Transmit Power	P_o	-19	-	-12	dBm	C-13-155(C)-F-SLC
Optical Transmit Power	P_o	-15	-	-8	dBm	C-13-155(C)-F-SLC3
Optical Transmit Power	P_o	-5	-	0	dBm	C-13-155(C)-F-SLC5
Optical Transmit Power	P_o	-3	-	+2	dBm	C-13-155(C)-F-SLC7
Optical Transmit Power	P_o	0	-	+5	dBm	C-13-155(C)-F-SLC9
Output Center Wavelength	λ_p	1261	1310	1360	nm	C-13-155(C)-F-SLC/C-13-155(C)-F-SLC3
Output Center Wavelength	λ_p	1263	1310	1360	nm	C-13-155(C)-F-SLC5
Output Center Wavelength	λ_p	1270	1310	1350	nm	C-13-155(C)-F-SLC7
Output tCenter Wavelength	λ_p	1275	1310	1345	nm	C-13-155(C)-F-SLC9
Output Spectrum Width	$\Delta\lambda_{rms}$	-	-	7.7	nm	RMS(σ), C-13-155(C)-F-SLC/C-13-155(C)-F-SLC3
Output Spectrum Width	$\Delta\lambda_{rms}$	-	-	3	nm	RMS(σ), C-13-155(C)-F-SLC5
Output Spectrum Width	$\Delta\lambda_{rms}$	-	-	2.5	nm	RMS(σ), C-13-155(C)-F-SLC7/9
Extinction Ratio	ER	8.2	-	-	dB	C-13-155(C)-F-SLC/C-13-155(C)-F-SLC3
Extinction Ratio	ER	10	-	-	dB	C-13-155(C)-F-SLC5/7/9
Output Eye	Compliant with Bellcore GR-253-CORE and ITU recommendation G.957					
Optical Rise Time	t_r	-	-	2	ns	10% to 90% Values
Optical Fall Time	t_f	-	-	2	ns	10% to 90% Values
Relative Intensity Noise	RIN	-	-	-116	dB/Hz	
Total Jitter	TJ	-	-	1.2	ns	Measured with 2 ²³ -1 PRBS with 72 ones and 72 zeros.

Transmitter Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Electrical						
Power Supply Current	I_{CC}	-	-	180	mA	Maximum current is specified at Vcc= Maximum @ maximum temperature
Transmitter Enable Voltage	V_{EN}	0	-	0.8	V	
Transmitter Disable Voltage	V_D	2	-	Vcc	V	
Data Input Current-Low	I_{IL}	-200	-	-	μA	
Data Input Current-High	I_{IH}	-	-	200	μA	
Data Input Voltage-Low	$V_{IL}-V_{CC}$	-2.0	-	-1.58	V	These inputs are compatible with 10K, 10KH and 100K ECL and PECL inputs
Data Input Voltage-High	$V_{IH}-V_{CC}$	-1.1	-	-0.74	V	

C-13-155(C)-F-SLCX

Receiver Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical						
Sensitivity ¹	-	-	-	-30	dBm	C-13-155(C)-F-SLC
Sensitivity ¹	-	-	-	-34	dBm	C-13-155(C)-F-SLC3
Sensitivity ¹	-	-	-	-35	dBm	C-13-155(C)-F-SLC5
Sensitivity ¹	-	-	-	-36	dBm	C-13-155(C)-F-SLC7
Sensitivity ¹	-	-	-	-37	dBm	C-13-155(C)-F-SLC9
Maximum Input Power	P _{in}	-7	-	-	dBm	C-13-155(C)-F-SLC/C-13-155(C)-F-SLC3
Maximum Input Power	P _{in}	-3	-	-	dBm	C-13-155(C)-F-SLC5/C-13-155(C)-F-SLC7
Maximum Input Power	P _{in}	0	-	-	dBm	C-13-155(C)-F-SLC9
Signal Detect-Asserted	Pa	-	-	-30	dBm	C-13-155(C)-F-SLC Measured on transition: low to high
Signal Detect-Asserted	Pa	-	-	-34	dBm	C-13-155(C)-F-SLC3 Measured on transition: low to high
Signal Detect-Asserted	Pa	-	-	-35	dbm	C-13-155(C)-F-SLC5 Measured on transition: low to high
Signal Detect-Asserted	Pa	-	-	-36	dbm	C-13-155(C)-F-SLC7 Measured on transition: low to high
Signal Detect-Asserted	Pa	-	-	-37	dbm	C-13-155(C)-F-SLC9 Measured on transition: low to high
Signal Detect-Deasserted	Pd	-48	-	-	dBm	Measured on transition: high to low
Signal Detect-Hysteresis		1	-	4	dB	
Wavelength of Operation		1100	-	1600	nm	

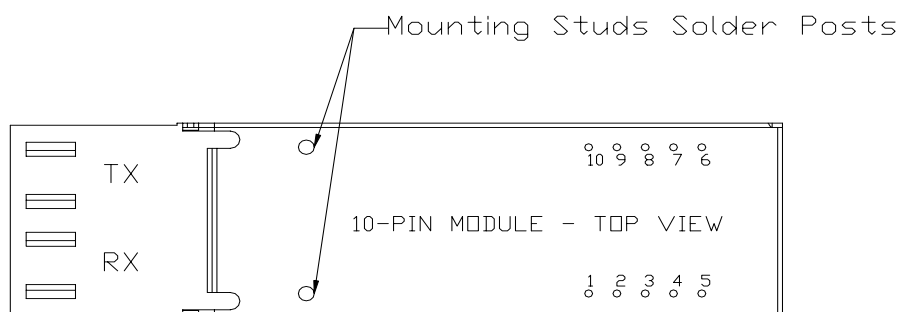
Note1: Measured with 2²³-1 PRBS/BER=10⁻¹⁰

Receiver Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Note
Electrical						
Power Supply Current	I _{CC}	-	-	100	mA	The current excludes the output load current
Data Output Voltage-Low	V _{OL} -V _{CC}	-2.0	-	-1.58	V	These outputs are compatible with 10K, 10KH and 100KECL and LVPECL outputs
Data Output Voltage-High	V _{OH} -V _{CC}	-1.1	-	-0.74	V	
Signal Detect Output Voltage-Low	V _{SDL} -V _{CC}	-2.0		-1.58	V	LVPECL, C-13-155-F-SLCX
Signal Detect Output Voltage-High	V _{SDH} -V _{CC}	-1.1		-0.74	V	
Signal Detect Output Voltage-Low	V _{SDL} -V _{CC}	-	-	0.5	V	LVTTTL, C-13-155C-F-SLCX
Signal Detect Output Voltage-High	V _{SDH} -V _{CC}	2.0	-	-	V	

C-13-155(C)-F-SLCX

Connection Diagram

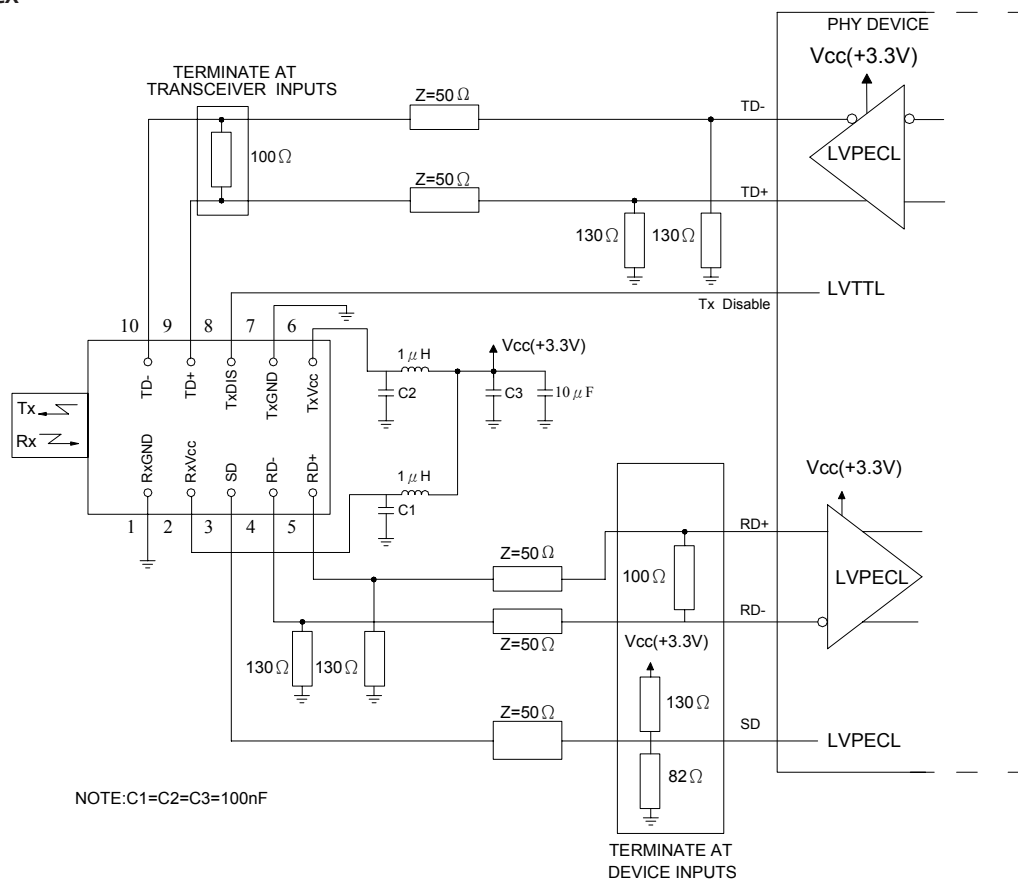


PIN	Symbol	Notes
1	RxGND	Directly connect this pin to the receiver ground plane
2	RxVcc	+3.3V dc power for the receiver section
3	SD	Active high on this indicates a received optical signal(LVPECL/LVTTL)
4	RD-	Receiver Data Out Bar (LVPECL)
5	RD+	Receiver Data Out (LVPECL)
6	TxVcc	+3.3V dc power for the trasmitter section
7	TxGND	Directly connect this pin to the transmitter ground plane
8	TxDIS	Transmitter disable (LVTTL)
9	TD+	Transmitter Data In (LVPECL)
10	TD-	Transmitter Data In Bar (LVPECL)
Attaching Posts		The attaching posts are at case potential and may be connected to chassis ground. They are isolated from circuit ground.

C-13-155(C)-F-SLCX

Recommended Circuit Schematic

C-13-155-F-SLCX



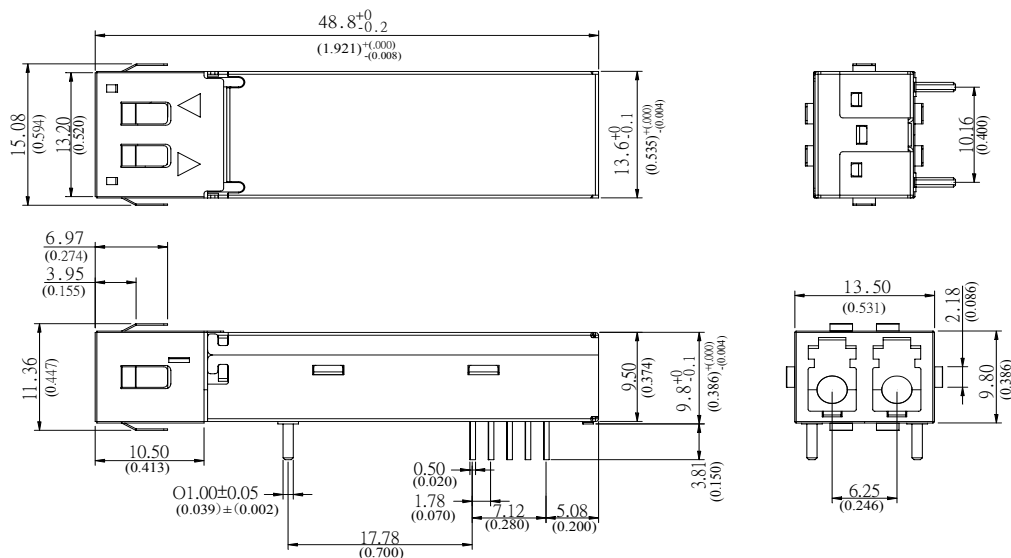
The schematic diagram illustrates the electrical connections for a PHY device interface. It includes the following components and connections:

- Transceiver Inputs:** Labeled "TERMINATE AT TRANSCEIVER INPUTS", this block contains a 100 Ω resistor and two 50 Ω termination resistors (Z=50 Ω) connected to the TD- and TD+ lines.
- PHY Device:** A central component with pins 1 through 10.
 - Pins 10 (TD-) and 9 (TD+) are connected to the transceiver inputs.
 - Pins 8 (TxDIS) and 7 (TxGND) are connected to a common TxVcc line.
 - Pins 6 (TxVcc), 5 (RD+), and 4 (RD-) are connected to a common RD+ line.
 - Pins 3 (SD) and 2 (RxVcc) are connected to a common SD line.
 - Pins 1 (RxGND) and 10 (TD-) are connected to ground.
- Signal Lines and Termination:**
 - TD- and TD+:** These lines are terminated at the PHY device inputs with 130 Ω resistors to ground.
 - RD+ and RD-:** These lines are terminated at the PHY device inputs with 130 Ω resistors to ground. The RD- line is also terminated at the device input with a 50 Ω resistor (Z=50 Ω).
 - SD:** This line is terminated at the PHY device input with a 50 Ω resistor (Z=50 Ω).
- Power and Control:**
 - Vcc(+3.3V):** A common power supply line connected to pins 6, 5, and 2.
 - Capacitors:** C1, C2, and C3 are 100 nF capacitors connected to ground at the power supply pins.
 - Inductors:** Two 1 μ H inductors are connected in series between the power supply and the pins.
- LVPECL Drivers:** Two LVPECL drivers are shown, each connected to a signal line (TD+ and RD-) and terminated with a 100 Ω resistor to Vcc(+3.3V).
- LVTTTL Signals:** Two LVTTTL signals are shown, one connected to the TxDIS pin and the other to the SD pin.

NOTE: C1=C2=C3=100nF

6

Units: mm (inches)

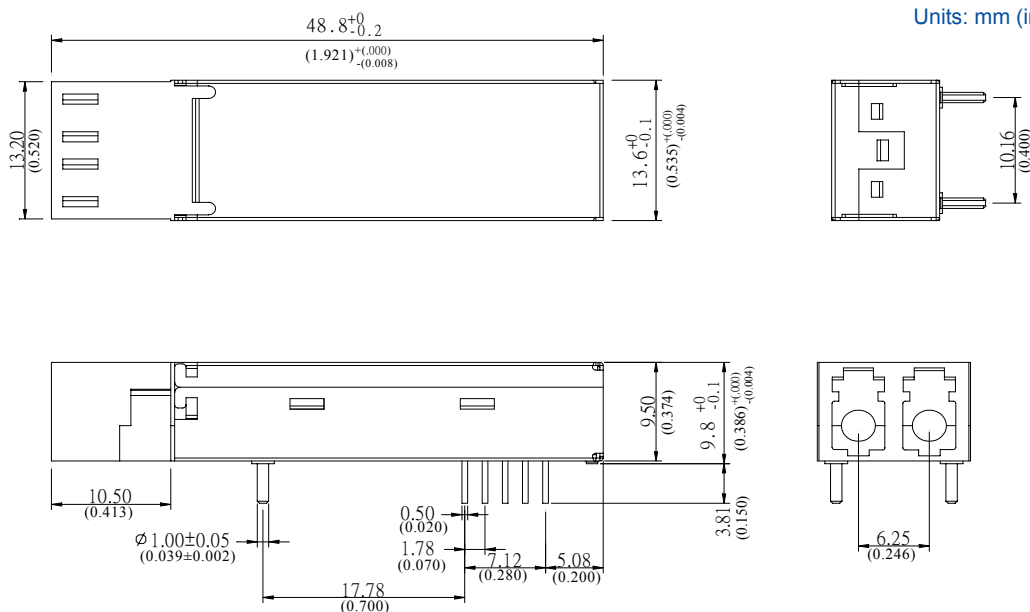


Case with metal shielding finger

Package Diagram

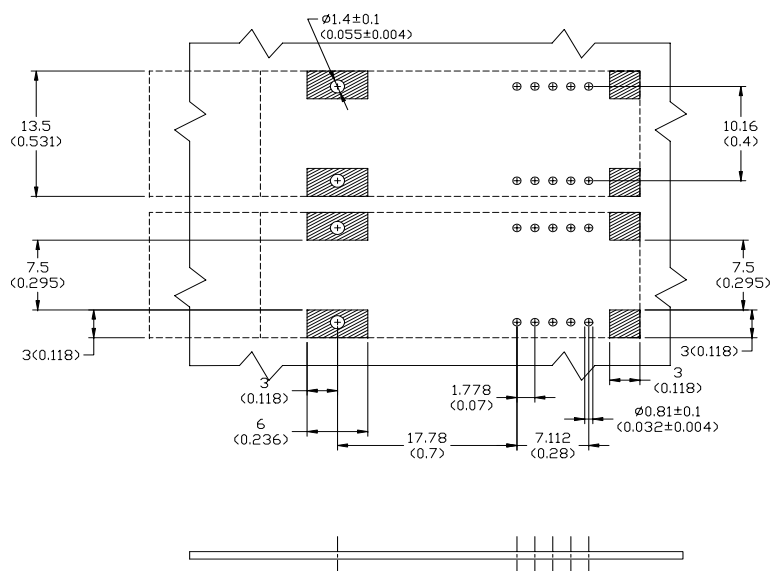
C-13-155(C)-F-SLCX(A)

Units: mm (inches)



C-13-155(C)-F-SLCX

Recommended Board Layout Hole Pattern

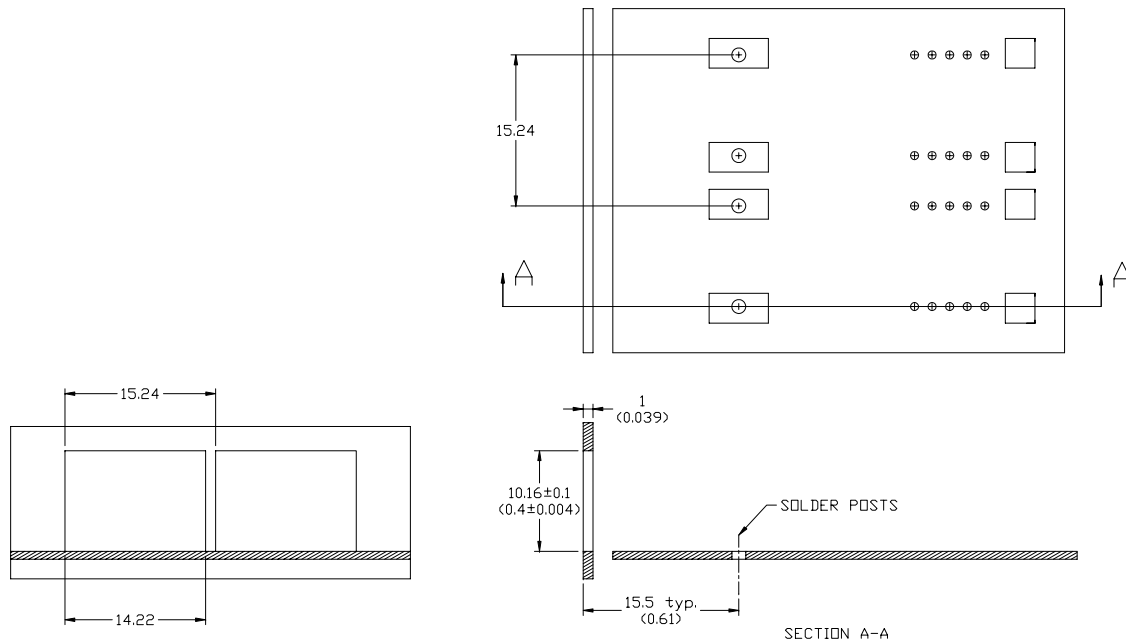


DIMENSION IN MILLIMETER (INCHES)

NOTES:

1. THIS FIGURE DESCRIBE THE RECOMMAND CIRCUIT BOARD LAYOUT FOR THE SFF TRANSCEIVER.
2. THE HATCHED AREAS ARE KEEP-OUT AREAS RESERVED FOR HOUSING STANDOFF. NO METAL TRACES OR GROUND CONNECTION IN KEEP-OUT AREAS.
3. THE MOUNTING STUDS SHOULD BE SOLDERED TO CHASSIS GROUND FOR MECHANICAL INTEGRITY.

Recommended Panel mounting



DIMENSION IN MILLIMETER (INCHES)

C-13-155(C)-F-SLCX

Ordering Information

Available Options:

C-13-155-F-SLC(S)	C-13-155-F-SLCA(S)	C-13-155-F-SLC(S)-G5	C-13-155-F-SLCA(S)-GR
C-13-155-F-SLC3(S)	C-13-155-F-SLC3A(S)	C-13-155-F-SLC3(S)-G5	C-13-155-F-SLC3A(S)-GR
C-13-155-F-SLC5(S)	C-13-155-F-SLC5A(S)	C-13-155-F-SLC5(S)-G5	C-13-155-F-SLC5A(S)-GR
C-13-155-F-SLC7(S)	C-13-155-F-SLC7A(S)	C-13-155-F-SLC7(S)-G5	C-13-155-F-SLC7A(S)-GR
C-13-155-F-SLC9(S)	C-13-155-F-SLC9A(S)	C-13-155-F-SLC9(S)-G5	C-13-155-F-SLC9A(S)-GR
C-13-155C-F-SLC(S)	C-13-155C-F-SLCA(S)	C-13-155C-F-SLC(S)-G5	C-13-155C-F-SLCA(S)-GR
C-13-155C-F-SLC3(S)	C-13-155C-F-SLC3A(S)	C-13-155C-F-SLC3(S)-G5	C-13-155C-F-SLC3A(S)-GR
C-13-155C-F-SLC5(S)	C-13-155C-F-SLC5A(S)	C-13-155C-F-SLC5(S)-G5	C-13-155C-F-SLC5A(S)-GR
C-13-155C-F-SLC7(S)	C-13-155C-F-SLC7A(S)	C-13-155C-F-SLC7(S)-G5	C-13-155C-F-SLC7A(S)-GR
C-13-155C-F-SLC9(S)	C-13-155C-F-SLC9A(S)	C-13-155C-F-SLC9(S)-G5	C-13-155C-F-SLC9A(S)-GR

Part numbering Definition:

	C	13	-	155(C)	-	F	-	S	LC	TxPower	Temperature	Package	-RoHS
• 13 = Wavelength 1310nm													
• Communication protocol (155Mbps) 155 = PECL Signal Detection Output 155C = TTL Signal Detection Output													
• F = +3.3V SFF Transceiver, FP													
• Single mode fiber													
• Connector options													
• Tx Power range Blank = -19 to -12 dBm 3 = -15 to -8 dBm 5 = -5 to 0 dBm 7 = -3 to +2 dBm 9 = 0 to +5 dBm													
• Temperature Blank = 0 to 70 °C A = -40 to 85 °C													
• Package Blank = Standard package S = EMI Shielding Finger package													
• Ordering Information Blank = RoHS non-compliant product G5 = RoHS 5/6-compliant product (lead exemption) GR = Full RoHS compliant product (no exemption)													

Warnings:

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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