

C-13-155(C)-T(3)-SSC3(5/7/9)



Features

- Duplex SC Single Mode Transceiver
- Industry Standard 1x9 Footprint
- Intermediate reach SONET OC-3 SDH STM-1 Compliant
- Single +5V/3.3V Power Supply
- PECL/LVPECL Differential Inputs and Outputs
- TTL/LVTTL Signal Detection Output [C-13-155C-T(3)-SSC3(5/7/9)]
- PECL/LVPECL Signal Detection Output [C-13-155-T(3)-SSC3(5/7/9)]
- Wave Solderable and Aqueous Washable
- LED Multisourced 1x9 Transceiver Interchangeable
- Class 1 Laser Int. Safety Standard IEC 825 compliant
- Uncooled laser diode with MQW structure
- Complies with Telcordia (Bellcore) GR-468-CORE
- ATM 155 Mbps links
- RoHS compliance available

Absolute Maximum Rating

Parameter	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{cc}	0	6	V	C-13-155(C)-T-SSC3(5/7/9)
Power Supply Voltage	V_{cc}	0	3.6	V	C-13-155(C)-T3-SSC3(5/7/9)
Output Current	I_{out}	-	30	mA	
Soldering Temperature	-	-	260	°C	10 seconds on leads only
Storage Temperature	T_{stg}	-40	85	°C	

Recommended Operating Condition

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage ¹	V_{cc}	4.75	5	5.25	V
Power Supply Voltage ¹	V_{cc}	3.1	3.3	3.5	V
Operating Temperature ¹ (Case)	T_{opr}	0	70	°C	
Operating Temperature ¹ (Case)	T_{opr}	-40	85	°C	
Data Rate	-	-	155	-	Mbps

Note 1 : Please refer to ordering information

C-13-155(C)-T(3)-SSC3(5/7/9)

Transmitter Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical						
Optical Transmit Power	P_o	-15	-	-8	dBm	Output power is coupled into a 9/125 μ m single mode fiber, C-13-155(C)-T(3)-SSC3
Optical Transmit Power	P_o	-5	-	0	dBm	Output power is coupled into a 9/125 μ m single mode fiber, C-13-155(C)-T(3)-SSC5
Optical Transmit Power	P_o	-3	-	+3	dBm	Output power is coupled into a 9/125 μ m single mode fiber, C-13-155(C)-T(3)-SSC7
Optical Transmit Power	P_o	0	-	+5	dBm	Output power is coupled into a 9/125 μ m single mode fiber, C-13-155(C)-T(3)-SSC9
Output center Wavelength	λ	1261	1310	1360	nm	C-13-155(C)-T(3)-SSC3
Output center Wavelength	λ	1263	1310	1360	nm	C-13-155(C)-T(3)-SSC5
Output center Wavelength	λ	1290	1310	1330	nm	C-13-155(C)-T(3)-SSC7(9)
Output Spectrum Width	$\Delta\lambda$			7.7	nm	RMS(σ), C-13-155(C)-T(3)-SSC3
Output Spectrum Width	$\Delta\lambda$			3	nm	RMS(σ), C-13-155(C)-T(3)-SSC5
Output Spectrum Width	$\Delta\lambda$			2.5	nm	RMS(σ), C-13-155(C)-T(3)-SSC7(9)
Extinction Ratio	ER	8.2	-	-	dB	C-13-155(C)-T(3)-SSC3
Extinction Ratio	ER	10	-	-	dB	C-13-155(C)-T(3)-SSC5(7/9)
Output pulse Mask	Compliant with FDDI SMF-PMD1					
Output Eye	Compliant with ITU-T 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}	-	-	160	mA	Maximum current is specified at Vcc= Maximum @ maximum temperature
Data Input Current-Low	I_{IL}	-350	-	-	μ A	
Data Input Current-High	I_{IH}	-	-	350	μ A	
Differential Input Voltage	$V_{IH}-V_{IL}$	300	-	-	mV	
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	

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Receiver Specifications

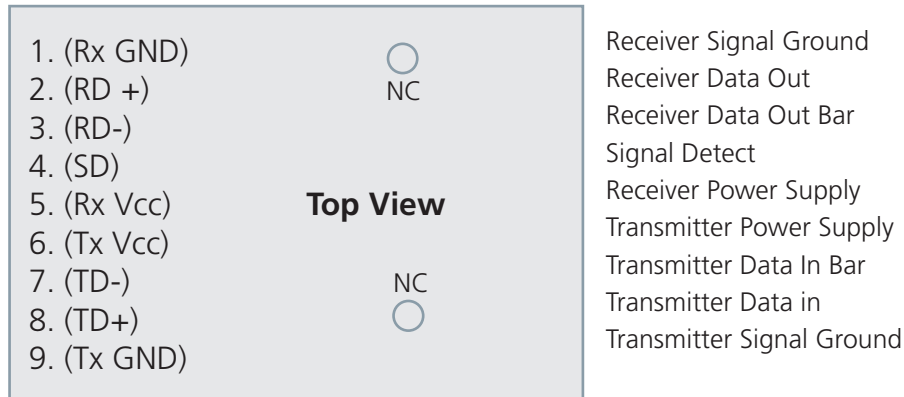
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Optical						
Sensitivity	-	-	-	-34	dBm	Measured with 2 ²³ -1 PRBS with 72 ones and 72 zeros. C-13-155(C)-T(3)-SSC3
Sensitivity	-	-	-	-35	dBm	Measured with 2 ²³ -1 PRBS with 72 ones and 72 zeros. C-13-155(C)-T(3)-SSC5
Sensitivity	-	-	-	-37	dBm	Measured with 2 ²³ -1 PRBS with 72 ones and 72 zeros. C-13-155(C)-T(3)-SSC7(9)
Maximum Input Power	P _{in}	-7	-	-	dBm	C-13-155(C)-T(3)-SSC3
Maximum Input Power	P _{in}	0	-	-	dBm	C-13-155(C)-T(3)-SSC5(7/9)
Signal Detect-Asserted	Pa	-	-	-34	dBm	Measured on transition: low to high, C-13-155(C)-T(3)-SSC3
Signal Detect-Asserted	Pa	-	-	-35	dBm	Measured on transition: low to high, C-13-155(C)-T(3)-SSC5
Signal Detect-Asserted	Pa	-	-	-37	dBm	Measured on transition: low to high, C-13-155(C)-T(3)-SSC7(9)
Signal Detect-Deasserted	Pd	-47	-	-	dBm	Measured on transition: high to low
Signal Detect-Hysteresis		1.0	-	4.0	dB	
Wavelength of Operation		1100	-	1600	nm	

Receiver Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Electrical						
Power Supply Current	I _{CC}	-	-	100	mA	The current excludes the output load current
Data Input Voltage-Low	V _{OL} -V _{CC}	-2	-	-1.58	V	These outputs are compatible with 10K, 10KH and 100KECL and PECL outputs.
Data Input Voltage-High	V _{OH} -V _{CC}	-1.1	-	-0.74	V	
Signal Detect Output Voltage-Low	V _{SDL} -V _{CC}	-2	-	-1.58	V	C-13-155-T(3)-SSC3(5/7/9)
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	C-13-155C-T(3)-SSC3(5/7/9)
Signal Detect Output Voltage-High	V _{SDH} -V _{CC}	2.0	-	-	V	

C-13-155(C)-T(3)-SSC3(5/7/9)

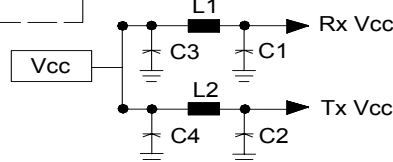
Connection Diagram



PIN	Symbol	Notes
1	RxGND	Directly connect this pin to the receiver ground plane
2	RD+	See recommended circuit schematic
3	RD-	See recommended circuit schematic
4	SD	Active high on this indicates a received optical signal
5	RxVcc	Dc power for the receiver section
6	TxVcc	Dc power for the transmitter section
7	TD-	See recommended circuit schematic
8	TD+	See recommended circuit schematic
9	TxGND	Directly connect this pin to the transmitter ground plane

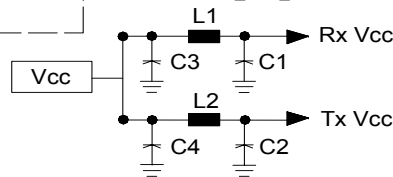
The diagram shows the top view of a transceiver IC. It is divided into three main sections: Tx (Transmit), a central core, and Rx (Receive).
Tx Section: Features a Tx Vcc supply pin at the top. A capacitor C5 is connected to Tx Vcc. Two resistors, R1 and R3, are connected to Tx Vcc. The junction of R1 and R3 is connected to pin 9 (labeled TD+). The junction of R3 and R2 is connected to pin 8 (labeled TD-). Resistors R2 and R4 are connected to ground. Tx Vcc is also connected to pin 5 (labeled Tx Vcc) and pin 4 (labeled Rx Vcc).
Core Section: A dashed box contains pins 9 through 1. Pin 9 is connected to TD+. Pin 8 is connected to TD-. Pin 5 is connected to Tx Vcc. Pin 4 is connected to Rx Vcc. Pins 3, 2, and 1 are connected to the Rx section. Below this section, two circles indicate 'No internal connection' for pins 6 and 7.
Rx Section: Features an Rx Vcc supply pin at the top. A capacitor C6 is connected to Rx Vcc. Three resistors, R9, R5, and R7, are connected to Rx Vcc. The junction of R9 and R10 is connected to pin 3 (labeled RD+). The junction of R5 and R6 is connected to pin 2 (labeled RD-). The junction of R7 and R8 is connected to pin 1 (labeled SD). Resistors R10, R6, and R8 are connected to ground. The label L1 is placed below the ground connections.

Notes +5V:
 $R1=R3=R5=R7=R9=82\ \Omega$
 $R2=R4=R6=R8=R10=130\ \Omega$
 $C1=C2=C3=C5=C6=0.1\ \mu F$
 $C4=10\ \mu F$
 $L1=L2=1\ \mu H$



The diagram illustrates the top view of a transceiver IC. It is divided into three main sections: a Tx (Transmit) section on the left, a central Transceiver section, and an Rx (Receive) section on the right. The Tx section includes a capacitor C5, resistors R1, R2, R3, and R4, and signal pins TD+ and TD-. The central Transceiver section features a 9-pin connector with pins 1 through 9, labeled Tx Vcc, Tx Vcc, Rx Vcc, and Rx Vcc. It also includes two circular symbols indicating 'No internal connection'. The Rx section includes a capacitor C6, resistors R5, R6, R7, and R8, and signal pins RD+, RD-, and SD. The diagram is labeled 'Transceiver Top view' at the bottom center.

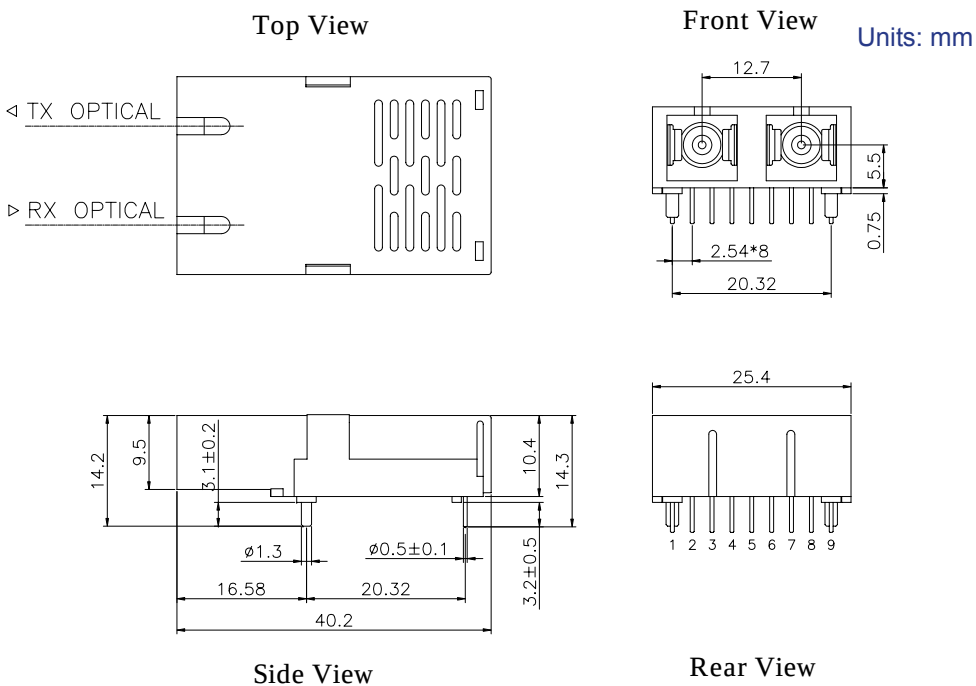
Notes +5V:
 $R1=R3=R5=R7=82\ \Omega$
 $R2=R4=R6=R8=130\ \Omega$
 $C1=C2=C3=C5=C6=0.1\ \mu F$
 $C4=10\ \mu F$
 $L1=L2=1\ \mu H$



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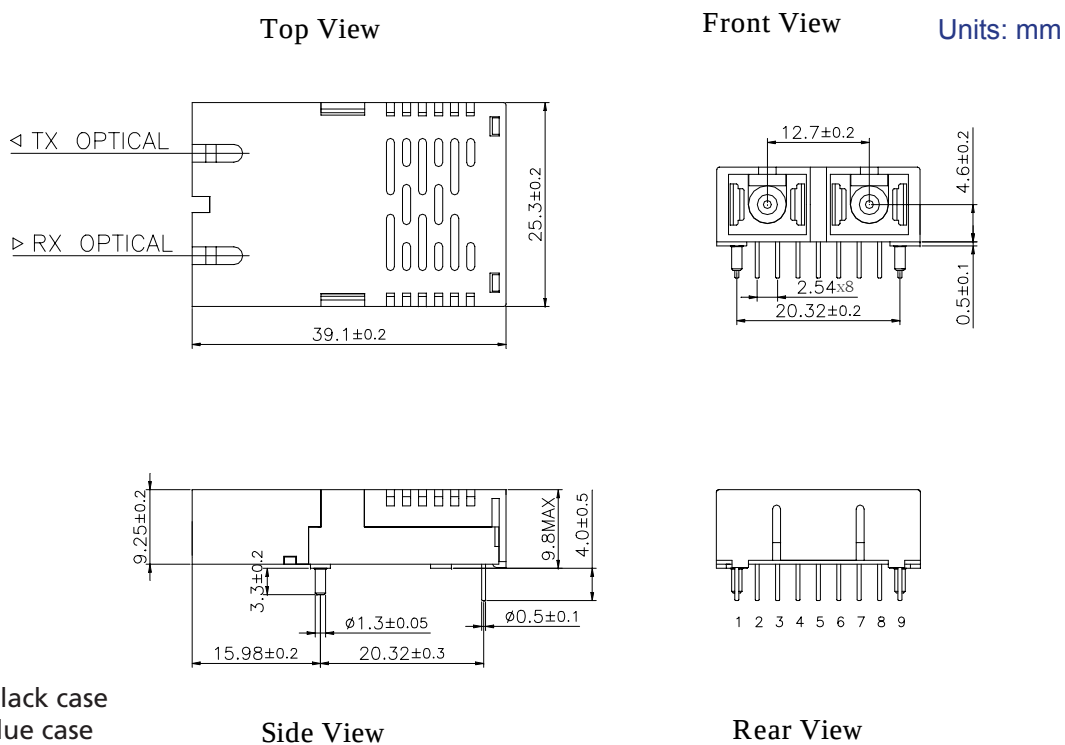
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Package Diagram (10.4 mm SC transceiver assembly)



Blank/A: Black case

Package Diagram (9.8 mm SC transceiver assembly)


C/D: Black case
B/E: Blue case

C-13-155(C)-T(3)-SSC3(5/7/9)

Ordering Information

Available Options:

C-13-155-T(3)-SSC3	C-13-155-T(3)-SSC7	C-13-155-T(3)-SSC3-G5	C-13-155C-T(3)-SSC3-G5
C-13-155-T(3)-SSC3A	C-13-155-T(3)-SSC7A	C-13-155-T(3)-SSC3A-G5	C-13-155C-T(3)-SSC3A-G5
C-13-155-T(3)-SSC3B	C-13-155-T(3)-SSC7B	C-13-155-T(3)-SSC3B-G5	C-13-155C-T(3)-SSC3B-G5
C-13-155-T(3)-SSC3C	C-13-155-T(3)-SSC7C	C-13-155-T(3)-SSC3C-G5	C-13-155C-T(3)-SSC3C-G5
C-13-155-T(3)-SSC3D	C-13-155-T(3)-SSC7D	C-13-155-T(3)-SSC3D-G5	C-13-155C-T(3)-SSC3D-G5
C-13-155-T(3)-SSC3E	C-13-155-T(3)-SSC7E	C-13-155-T(3)-SSC3E-G5	C-13-155C-T(3)-SSC3E-G5
C-13-155C-T(3)-SSC3	C-13-155C-T(3)-SSC7	C-13-155-T(3)-SSC5-G5	C-13-155C-T(3)-SSC5-G5
C-13-155C-T(3)-SSC3A	C-13-155C-T(3)-SSC7A	C-13-155-T(3)-SSC5A-G5	C-13-155C-T(3)-SSC5A-G5
C-13-155C-T(3)-SSC3B	C-13-155C-T(3)-SSC7B	C-13-155-T(3)-SSC5B-G5	C-13-155C-T(3)-SSC5B-G5
C-13-155C-T(3)-SSC3C	C-13-155C-T(3)-SSC7C	C-13-155-T(3)-SSC5C-G5	C-13-155C-T(3)-SSC5C-G5
C-13-155C-T(3)-SSC3D	C-13-155C-T(3)-SSC7D	C-13-155-T(3)-SSC5D-G5	C-13-155C-T(3)-SSC5D-G5
C-13-155C-T(3)-SSC3E	C-13-155C-T(3)-SSC7E	C-13-155-T(3)-SSC5E-G5	C-13-155C-T(3)-SSC5E-G5
C-13-155-T(3)-SSC5	C-13-155-T(3)-SSC9	C-13-155-T(3)-SSC7-G5	C-13-155C-T(3)-SSC7-G5
C-13-155-T(3)-SSC5A	C-13-155-T(3)-SSC9A	C-13-155-T(3)-SSC7A-G5	C-13-155C-T(3)-SSC7A-G5
C-13-155-T(3)-SSC5B	C-13-155-T(3)-SSC9B	C-13-155-T(3)-SSC7B-G5	C-13-155C-T(3)-SSC7B-G5
C-13-155-T(3)-SSC5C	C-13-155-T(3)-SSC9C	C-13-155-T(3)-SSC7C-G5	C-13-155C-T(3)-SSC7C-G5
C-13-155-T(3)-SSC5D	C-13-155-T(3)-SSC9D	C-13-155-T(3)-SSC7D-G5	C-13-155C-T(3)-SSC7D-G5
C-13-155-T(3)-SSC5E	C-13-155-T(3)-SSC9E	C-13-155-T(3)-SSC7E-G5	C-13-155C-T(3)-SSC7E-G5
C-13-155C-T(3)-SSC5	C-13-155C-T(3)-SSC9	C-13-155-T(3)-SSC9-G5	C-13-155C-T(3)-SSC9-G5
C-13-155C-T(3)-SSC5A	C-13-155C-T(3)-SSC9A	C-13-155-T(3)-SSC9A-G5	C-13-155C-T(3)-SSC9A-G5
C-13-155C-T(3)-SSC5B	C-13-155C-T(3)-SSC9B	C-13-155-T(3)-SSC9B-G5	C-13-155C-T(3)-SSC9B-G5
C-13-155C-T(3)-SSC5C	C-13-155C-T(3)-SSC9C	C-13-155-T(3)-SSC9C-G5	C-13-155C-T(3)-SSC9C-G5
C-13-155C-T(3)-SSC5D	C-13-155C-T(3)-SSC9D	C-13-155-T(3)-SSC9D-G5	C-13-155C-T(3)-SSC9D-G5
C-13-155C-T(3)-SSC5E	C-13-155C-T(3)-SSC9E	C-13-155-T(3)-SSC9E-G5	C-13-155C-T(3)-SSC9E-G5

Part numbering Definition:

C - 13 - 155(C) - T(3) - S SC TxPower Temperature and Package - RoHS compliance

- 13 = Wavelength 1310nm

- Communication protocol (155 Mbps)
155 = PECL Signal Detection Output
155C = TTL Signal Detection Output

- T = +5V Transceiver, FP
T3= +3.3V Transceiver, FP

- Single mode fiber

- Connector options

- Tx Power range
3= -15 to -8 dBm
5= -5 to 0 dBm
7= -3 to +3 dBm
9= 0 to +5 dBm

- Temperature range and package
Blank = commercial temperature(0 to 70 °C), 10.4 mm, Black case
A = industrial temperature(-40 to 85 °C), 10.4 mm, Black case
B = industrial temperature(-40 to 85 °C), 9.8 mm, Blue case
C = industrial temperature(-40 to 85 °C), 9.8 mm, Black case
D = commercial temperature(0 to 70 °C), 9.8 mm, Black case
E = commercial temperature(0 to 70 °C), 9.8 mm, Blue case

- Blank = RoHS non-compliant product
G5 = RoHS 5/6-compliant product (lead 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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