OC-3 Multimode SFF MT-RJ Transceiver

Product Facts

- Fully compliant with ATM SONET STS-3c (OC-3) Physical Layer Interface Specification
- Single +3.3V power supply
- Complies with Small Form Factor (SFF) Multi-Source Agreement (MSA)
- High-density MT-RJ connector interface
- High reliability 1300 nm optics
- PECL and LVPECL compatible data interface
- Wave Solder and Aqueous Wash compatible
- UL 60950 recognized

Applications

- ATM 155 Mb/s links
- SDH STM-1 links
- Switches
- Hubs
- Routers

Tyco Electronics' OC-3 SFF MT-RJ Transceiver 269146-3 is an LED based 1300 nm fiberoptic transceiver module intended for use in SONET OC-3 (SDH STM-1) multimode fiber physical layers that provide ATM and other data communications services. The transceiver sends and receives pre-encoded data over a pair of 62.5 µm or 50 µm core multimode optical fibers. The module, which operates from a single +3.3V power supply, contains separate transmitter and receiver sections with PECL and LVPECL compatible data interfaces.

Technological advancements in precision optical design and ASIC design have enabled Tyco Electronics to produce low cost SFF transceivers. Package style is the multi-sourced 2 x 5 DIP style with integral MT-RJ connector interface. This new small form factor is approximately half the width of a duplex SC 1 x 9 module, providing an effective center line spacing of 0.55-inches from port to port, allowing the equipment designer to double the port density of a given product. The transceiver has a DC-coupled data interface that provides the highest degree of flexibility for use in a wide variety of circuit architectures. It has been extensively tested to comply with the ATM Forum User-Network Interface SONET OC-3 Multimode Fiber Physical Layer Specification. This ATM document references the ANSI T1.416.01-1999 specification for transmission distances up to 2km over multimode fiber links.

The transceiver module meets Class 1 Eye Safety requirements, as defined by IEC 60825-1. The module has been designed with grounding and shielding features that minimize EMI susceptibility and radiated emissions. Units are supplied with process plugs.

OC-3 Multimode SFF MT-RJ Transceiver (Continued)

OC-3 Multimode SFF MT-RJ Transceiver

Part Number 269146-3

Transmitter Performance Specifications:

(T_C=0 to 70°C, V_{CC}-V_{EE}=3.135 to 3.465V DC)

Parameter	Symbol	Notes	Min	Typ	Max	Units
Data Rate (NRZ)	B	—	10	—	156	Mb/s
Optical Output (avg.)	P_{OUT}	1,2	-20	—	-14	dBm
Extinction Ratio	—	3	10	—	—	dB
Optical Power at Logic Low “0” State	P_{OUT}(“0”)	—	—	—	-45	dBm
Center Wavelength	λ_{OUT}	4	1270	1320	1380	nm
Spectral Width (FWHM)	$\Delta\lambda$	4	—	130	200	nm
Systematic Jitter	t_{SJ}	5	—	—	1.6	ns
Random Jitter	t_{RJ}	5	—	—	0.6	ns
Output Rise Time	t_{TLH}	4,6	0.6	1.2	3.0	ns
Output Fall Time	t_{THL}	4,6	0.6	1.2	3.0	ns
Data Input Voltage Levels	V_{IL} V_{IH}	7,8 7,8	V_{CC}-1.810 V_{CC}-1.165	— —	V_{CC}-1.475 V_{CC}-0.880	V V
Data Input Current Levels	I_{IL} I_{IH}	— —	-400 —	— —	— 400	µA µA
Power Supply Voltage	V_{CC} - V_{EE}	—	3.135	3.3	3.465	V
Supply Current	I_{CC}	—	—	—	120	mA
Operating Temperature	T_C	—	0	—	70	°C

Note: All optical measurements made through a short patch cable, between 2 and 5 meters in length, using 62.5 µm multimode fiber unless stated otherwise.

1. Meets Class I LED safety requirements of IEC 60825-1 when operated within the specified temperature and power supply ranges.
2. Specification applies to 0.275 NA 62.5/125 µm multimode fiber.
3. Extinction ratio measured per TIA/EIA 526-4A with a repeating K28.7 data pattern.
4. The output rise and fall time and spectral performance conform to ANSI T1.416.01-1999.
5. Driven with a differential signal.
6. Measured from 10% to 90% points on rising and falling edge of transmitted waveform.
7. When V_{BB} is used as the reference voltage.
8. Configured for LVPECL. Compatible with 10 K, 10 KH and 100 K ECL and PECL.

OC-3 Multimode SFF MT-RJ Transceiver (Continued)

OC-3 Multimode SFF MT-RJ Transceiver

Part Number 269146-3

Receiver Performance Specifications:

(T_C=0 to 70°C, V_{CC}-V_{EE}=3.135 to 3.465V DC)

Parameter	Symbol	Notes	Min	Typ	Max	Units
Data Rate (NRZ)	B	—	10	—	156	Mb/s
Optical Input (avg.) Sensitivity	P_{IN}	1	-30	—	-14.0	dBm
Optical Wavelength	λ_{IN}	—	1270	—	1380	nm
Systematic Jitter	t_{SJ}	—	—	—	2	ns
Random Jitter	t_{RJ}	—	—	—	0.6	ns
Output Rise Time	t_{TLH}	2	0.5	—	5	ns
Output Fall Time	t_{THL}	2	0.5	—	5	ns
Output Voltage Levels	V_{OH} V_{OL}	3 3	V_{CC}-1.025 V_{CC}-1.810	— —	V_{CC}-0.880 V_{CC}-1.620	V V
Signal Detect Output Voltage	SD					
Assert	V_A	3	V_{CC}-1.025	—	V_{CC}-0.880	V
Deassert	V_D	3	V_{CC}-1.810	—	V_{CC}-1.620	V
SD Power Levels (avg.)						
Assert	P_A	—		—	-31	dBm
Deassert	P_D	—	-45	—	—	dBm
Hysteresis	—	—	1.5	—	—	dB
SD Delay Time						
Assert	—	—	0	—	100	µs
Deassert	—	—	0	—	350	µs
Power Supply Voltage	V_{CC} - V_{EE}	—	3.135	3.3	3.465	V
Supply Current	I_{CC}	—	—	—	110	mA
Operating Temperature	T_C	—	0	—	70	°C

Note: All optical measurements made through a short patch cable, between 2 and 5 meters in length, using 62.5 µm multimode fiber unless stated otherwise.

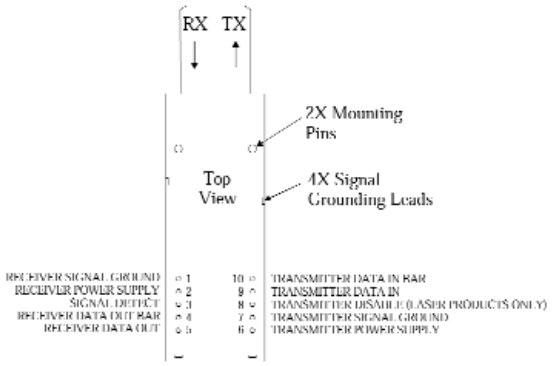
1. Measurement made at center of the eye. Input is 155.52 Mb/s, 2E23-1 PRBS data pattern with 72 “1”s and 72 “0”s inserted per ITU-T G.958 Appendix 1. BER = 10E-10.
2. Receiver electrical output rise and fall times measured from 10 to 90% points on rising and falling edge of waveform with 50 ohm load to V_{CC} -2V.
3. Measured with a 50 ohm load to V_{CC} -2V.

Absolute Maximum Ratings:

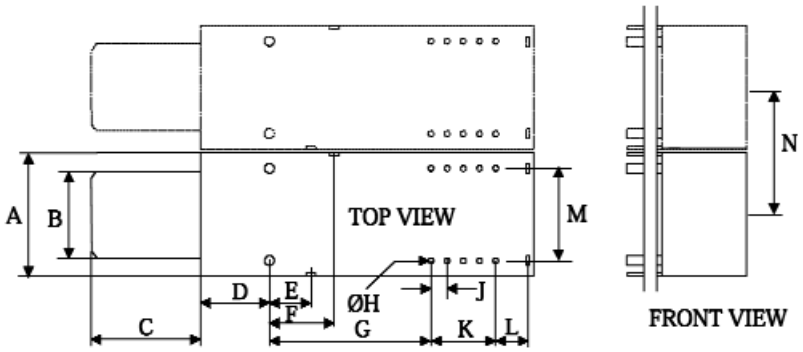
Parameter	Symbol	Units	Min	Max
Storage Temperature	T_S	°C	-40	85
Lead Soldering Limits/Time	—	°C/s	—	240/10
Data Input Voltage	V_{INPUT}	V	-0.5	V_{CC}
Differential Input Voltage	V_{DIFF}	V	—	2.0
Supply Voltage	V_{CC}-V_{EE}	V	-0.2	5.0

OC-3 Multimode SFF MT-RJ Transceiver (Continued)

Transceiver Pin Descriptions



Package Outline Drawing



Notes:

1. This figure describes the package outline, mounting studs, pins and their relationships to each other.
2. Toleranced to accommodate round or rectangular leads.
3. All 12 pins and posts are to be treated as a single pattern.
4. The MT-RJ optical connector has a 750 µm fiber spacing.
5. Refer to the MT-RJ Transceiver Pin Out Diagram for additional information.
6. This transceiver is supplied with an EMI gasket that fits onto the nose-piece and ensures an intimate fit between the nose-piece and the MSA defined customer front panel cut-out shown in Figure 4. Please refer to the Tyco Electronics' Customer Drawing number 269146-3 for additional details on these gasket dimensions.

	Millimeters			Inches				Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.		Min.	Typ.	Max.	Min.	Typ.	Max.
A			13.59			0.535	L		3.56			0.140	
B		9.53			0.375		M		10.16			0.400	
C		12.40			0.488		N	13.97			0.550		
D		7.59			0.299		P		9.53			0.375	
E		4.57			0.180		Q		48.72			1.918	
F		7.11			0.280		R		36.42			1.434	
G		17.78			0.700		ØS	0.97		1.07	0.038		0.042
ØH	0.41		0.61	0.016		0.024	T		1.02			0.040	
J		1.78			0.070		U		0.25			0.010	
K		7.12			0.280		V		3.30			0.130	

IMPORTANT: PLEASE SEE THE TYCO ELECTRONICS' CUSTOMER DRAWING 269146 FOR TRANSCEIVER HOUSING DIMENSIONS AND TOLERANCES. DRAWINGS CAN BE OBTAINED ON OUR WEBSITE AT: http://www.tycoelectronics.com OR CALL AMPFAX AT 1-800-522-6752 FOR 24HR FAX SERVICE.

Pin-Out Description:

Symbol	Pin No.	Function
Two Front Mounting Studs		Provided for mechanical attachment to the PCB and ensure mechanical strength. The holes on the PCB that they attach to must be connected to chassis ground.
Four Holes for Signal Grounding Leads		Connect to signal ground.
V_{EEr}	1	Receiver Signal Ground. Connect to receiver signal ground plane.
V_{CCr}	2	Receiver Power Supply.
SD	3	Signal detect. Normal Operation: Logic “1” Output. Fault Condition: Logic “0” Output.
RD-	4	Received Data Out Bar. No internal terminations are provided.
RD+	5	Received Data Out. No internal terminations are provided.
V_{CCt}	6	Transmitter Power Supply.
V_{EEt}	7	Transmitter Signal Ground.
V_{DIS}	8	No internal connection is provided. Transmitter Disable Input. Optional feature for laser based products only.
TD+	9	Transmitter Data In and Data In Bar. No internal terminations are provided. See recommended circuit schematic.
TD-	10	Transmitter Data In Bar. No internal terminations are provided. See recommended circuit schematic.

Note:

1. V_{EEr} and V_{EEt} are connected together inside the transceiver module.

Regulatory Compliance:

Agency	Test Method	Listing Document
TUV	EN60825-1:1994_A11:1996 EN60825-2:1994+A1 EN60950:1992+A1+A2+A3+A4+A11	TUV Product Services LED Class I Protection Class III TUV Certification Number: B020546940002
UL/ c UL us	UL60950	E141081

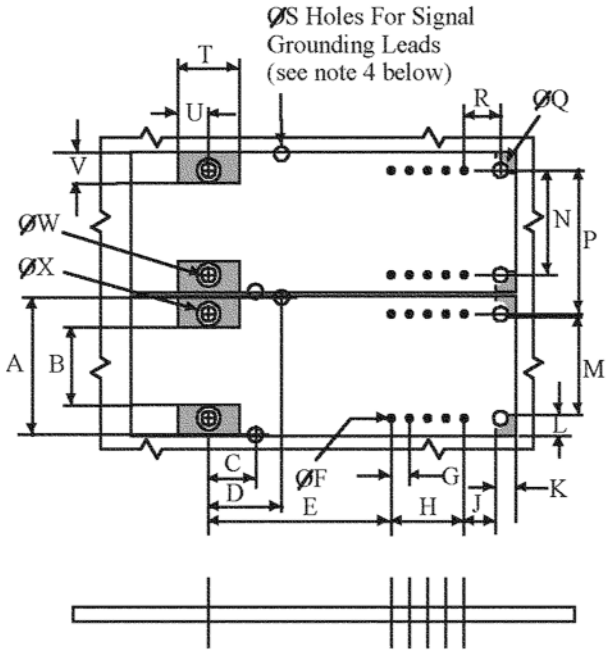
ESD Testing:

Test	Test Method	Procedure
ESD1	JEDEC/EIA JESD22-A114-A (C=100 pF, R=1500 ohm - Human body model)	Pulses applied to each pin and Ground at 1 KV
ESD2	25 KV maximum air discharge (simulates human body discharge into a DUT)	40 discharges are applied per DUT (10 at each of the top, nose, right, and left). Each module is tested with both power ON and OFF.

Related Documents:

OC-3 Multimode SFF MT-RJ Transceiver Application Specification #114-1307144

Figure 3: MSA Recommended Circuit Board Layout



Notes:

1. This figure describes the recommended circuit board layout for the MT-RJ Transceiver placed at a 0.550 inch spacing.
2. The shaded areas are keep-out areas reserved for housing standoffs. No metal traces or Ground connection in keep-out areas.
3. The 10 pin module implementation requires only 16 PCB holes.
4. These four holes for signal grounding leads must be connected to signal ground on the PCB.
5. Solder Posts should be soldered to the PCB for mechanical strength and these PCB holes should be connected to chassis ground.

	Millimeters			Inches				Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.		Min.	Typ.	Max.	Min.	Typ.	Max.
A		13.34			0.525		M		9.59			0.378	
B		7.59			0.299		N		10.16			0.400	
C		4.57			0.180		P	13.97			0.550		
D		7.11			0.280		ØQ			2.29			0.090
E		17.78			0.700		R		3.56			0.140	
ØF	0.71	0.81	0.91	0.028	0.032	0.036	ØS	1.3	1.4	1.5	0.051	0.055	0.059
G		1.78			0.070		T		6.00			0.236	
H		7.12			0.280		U		3.00			0.118	
J		3.08			0.121		V		3.00			0.118	
K		2.00			0.079		ØW	1.3	1.4	1.5	0.051	0.055	0.059
L		2.00			0.079		ØX			2.29			0.090

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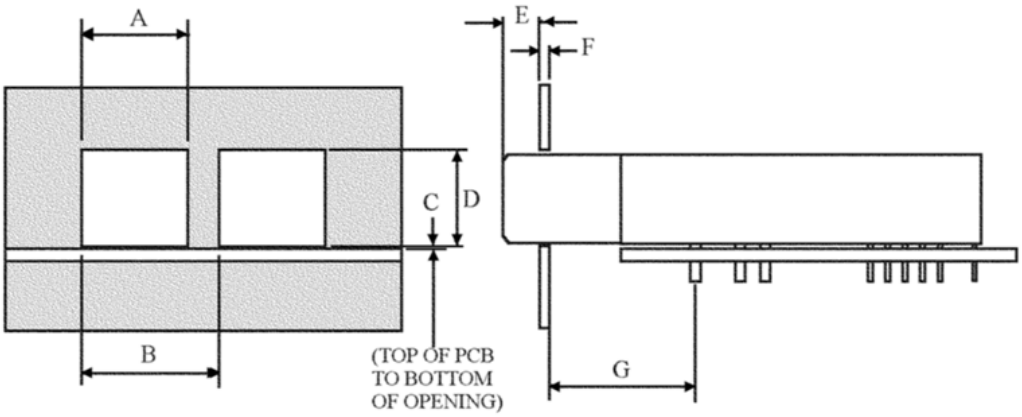
Figure 4: MSA Recommended MT-RJ Front Panel Opening



	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	10.70	10.80	10.90	0.421	0.425	0.429
B	13.97			0.550		
C		0.25			0.010	
D	9.70	9.80	9.90	0.382	0.386	0.390
E		1.00			0.039	
F	15.50		16.25	0.610		0.640