

MULTI-RATE OC-48/STM-16 LR-2/L-16.2 SFP DWDM TRANSCEIVERS WITH DIGITAL DIAGNOSTICS

TRD148xL2/E2/X2-G



Product Description

The TRD148xL2/E2/X2-G DWDM SFP series of multi-rate fiber optic transceivers with digital diagnostics monitoring functionality provide a quick and reliable interface for long reach applications. Diagnostics monitoring functionality (alarm and warning features) is integrated into the design via an I²C serial interface per the Multi-Source Agreement (MSA) on DWDM SFP transceivers.

Products under this series are compatible with SONET/SDH standards for OC-48/STM-16 (2.67Gb/s) Forward Error Correction and OC-48/STM-16 (2.488Gb/s) applications, OC-3/STM-1 (156Mb/s) and OC-12/STM-4 (622Mb/s) applications; Gigabit Ethernet LX (1.25Gb/s) applications per IEEE 802.3; and Fibre Channel 200-SM-LC-L (2.125Gb/s) and 100-SMLC-L (1.062Gb/s) applications per FC-PI standards. The transmitter incorporates a highly reliable 1550nm DFB laser with an operating wavelength in full compliance with 100GHz (0.8nm) spacing per ITU-grid. All transceivers are Class I Laser products per U.S. FDA/CDRH and international IEC-60825 standards.

The TRD148xL2/E2/X2-G DWDM transceivers connect to standard 20-pad SFP connectors for hot plug capability. This allows the system designer to make configuration changes or maintenance by simply plugging in different types of transceivers without removing the power supply from the host system.

The transceivers have blue bail-type latches, which offer an easy and convenient way to release the modules. The latch is compliant with the SFP MSA.

The transmitter and receiver DATA interfaces are AC-coupled internally. LV-TTL Transmitter Disable control input and Loss of Signal (LOS) output interfaces are also provided. The transceiver operate from a single +3.3V power supply over operating case temperature range of -5°C to +70°C (Commercial), -5°C to +85°C (Extended) or -40°C to +85°C (Industrial). The housing is made of metal designed for optimum thermal performance and electromagnetic compatibility.



Features

- Compliant with DWDM SFP MSA
- Multi-rate Operations from 125Mb/s to 2.67Gb/s
- 1550nm DFB Laser Transmitter & APD Receiver
- Transmission Distance of 80km, 120km or 200km
- Compliant with G.692
- 100GHz Channel Spacing
- Optical Link Power Budget of 28dB or 32dB Minimum
- Digital Diagnostics through Serial Interface
- Internal Calibration for Digital Diagnostics
- Eye Safe (Class I Laser Safety)
- Hot-pluggable
- TX Fault & Loss of Signal Outputs
- TX Disable Input
- Fully RoHS Compliant

Absolute Maximum Ratings

Parameter		Symbol	Minimum	Maximum	Units
Storage Temperature		T_{ST}	- 40	+ 85	°C
Operating Case Temperature ¹	Commercial	T_{OP}	- 5	+ 70	°C
	Extended		- 5	+ 85	
	Industrial ²		- 40	+ 85	
Supply Voltage		V_{CC}	0	+ 4.5	V
Maximum Input Optical Power (30 seconds max.)		$P_{in,max}$	-	+ 3.0	dBm
Input Voltage		V_{IN}	0	V_{CC}	V

¹ Measured on top side of SFP module at the front center vent hole of the cage.
² -40°C is specified as ambient temperature.

Transmitter Performance Characteristics (Over Operating Case Temperature. $V_{CC} = 3.13$ to $3.47V$)

Parameter ¹		Symbol	Minimum	Typical	Maximum	Units
Operating Data Rate		B	0.125	-	2.67	Gb/s
Average Optical Output Power (50% duty cycle)	80km, 120km	P_O	0	-	+ 4.0	dBm
	200km		+ 3.0	-	+ 7.0	
Extinction Ratio ²		ER	8.2	-	-	dB
Center Wavelength ³		λ_C	see Ordering Information Table			-
Spectral Width (-20dB) ⁴		$\Delta\lambda_{20}$	-	-	0.4	nm
Transmitter OFF Power		P_{OFF}	-	-	- 45.0	dBm
Side Mode Suppression Ratio		$SMSR$	30	-	-	dB
Optical Rise/Fall Time (20% to 80%)		t_N, t_f	-	-	0.16	ns
Relative Intensity Noise		RIN	-	-	- 117	dB/Hz
Jitter Generation	OC-48	JG	-	-	0.07	Ulp-p
Optical Output Eye		Compliant with Telcordia GR-253-CORE and ITU-T Recommendation G.957				
¹ Specified through EOL. ² Measured at 2.48832Gb/s, with 4th order Bessel Thomson filter ³ BOL: +/-0.05nm from ITU grid. EOL: +/-0.1nm from ITU grid. ⁴ Measured with OSA and 0.1nm resolution bandwidth.						

Receiver Performance Characteristics (Over Operating Case Temperature. $V_{CC} = 3.13$ to $3.47V$)

Parameter ¹		Symbol	Minimum	Typical	Maximum	Units
Operating Data Rate		B	0.125	-	2.67	Gb/s
Receiver Sensitivity (10 ⁻¹⁰ BER) ²	OC-3/12/48, 2.67Gb/s	P_{min}	-	-	- 28.0	dBm
Receiver Sensitivity (10 ⁻¹² BER) ³	2.125Gb/s, 1.25Gb/s, 1.062Gb/s, 0.125Gb/s	P_{min}	-	-	- 28.0	dBm
Receiver Sensitivity with fiber (10 ⁻¹⁰ BER) ²	OC-3/12/48, 2.67Gb/s	P_{min}	1600ps/nm (80km)	-	-	- 26.0
			2400ps/nm (120km)			- 26.0
			4000ps/nm (200km)			- 25.0
Receiver Sensitivity with fiber (10 ⁻¹² BER) ³	2.125Gb/s, 1.25Gb/s, 1.062Gb/s, 0.125Gb/s	P_{min}	1600ps/nm (80km)	-	-	- 26.0
			2400ps/nm (120km)			- 26.0
			4000ps/nm (200km)			- 25.0
Maximum Input Power (10 ⁻¹² BER)		P_{max}	- 8.0	-	-	dBm
LOS Thresholds	Increasing Light Input	P_{los+}	-	-	- 28.0	dBm
	Decreasing Light Input	P_{los-}	- 45.0	-	-	
LOS Timing Delay	Increasing Light Input	$t_{loss\ off}$	-	-	100	μs
	Decreasing Light Input	$t_{loss\ on}$	2.3	-	100	
LOS Hysteresis		-	0.5	1.5	-	dB
Wavelength of Operation		λ	1260	-	1570	nm
Receiver Reflectance		-	-	-	-27.0	dB
¹ Specified through EOL. ² Measured with 2 ²³ -1 PRBS. ³ Measured with 2 ⁷ -1 PRBS.						

Transmitter Performance Characteristics (Over Operating Case Temperature. $V_{CC} = 3.13$ to $3.47V$)

Parameter	Symbol	Minimum	Typical	Maximum	Units
Input Voltage Swing (TD+ & TD-) ¹	V_{PP-DIF}	0.5	-	2.4	V
Input HIGH Voltage (TX Disable) ²	V_{IH}	2.0	-	V_{CC}	V
Input LOW Voltage (TX Disable) ²	V_{IL}	0	-	0.8	V
Output HIGH Voltage (TX Fault) ³	V_{OH}	2.0	-	$V_{CC} + 0.3$	V
Output LOW Voltage (TX Fault) ³	V_{OL}	0	-	0.8	V

¹Differential peak-to-peak voltage.
²There is an internal 4.7 to 10kΩ pull-up resistor to VccT.
³Open collector compatible, 4.7 to 10kΩ pull-up resistor to Vcc (Host Supply Voltage).

Receiver Electrical Interface (Over Operating Case Temperature. $V_{CC} = 3.13$ to $3.47V$)

Parameter	Symbol	Minimum	Typical	Maximum	Units
Output Voltage Swing (RD+ & RD-) ¹	V_{PP-DIF}	0.37	-	2.0	V
Output HIGH Voltage (LOS) ²	V_{OH}	2.0	-	$V_{CC} + 0.3$	V
Output LOW Voltage (LOS) ²	V_{OL}	0	-	0.8	V

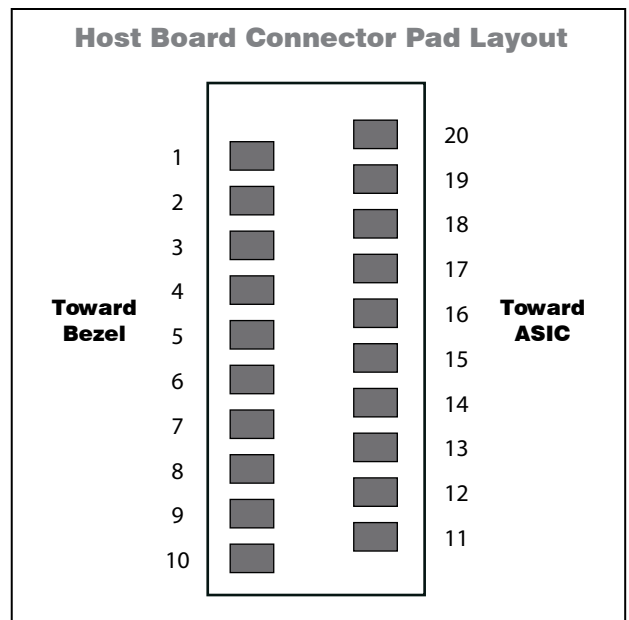
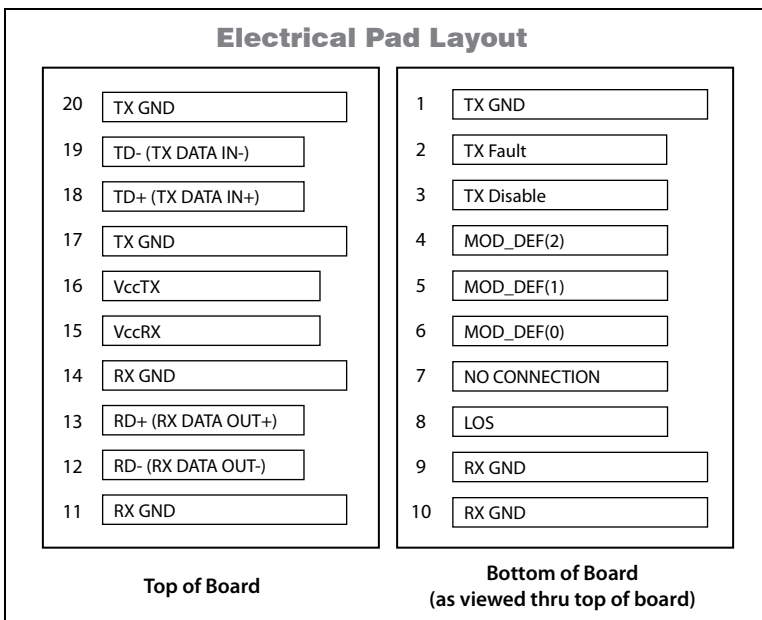
¹Differential peak-to-peak voltage across external 100Ω load.
²Open collector compatible, 4.7 to 10kΩ pull-up resistor to Vcc (Host Supply Voltage).

Electrical Power Supply Characteristics (Over Operating Case Temperature. $V_{CC} = 3.13$ to $3.47V$)

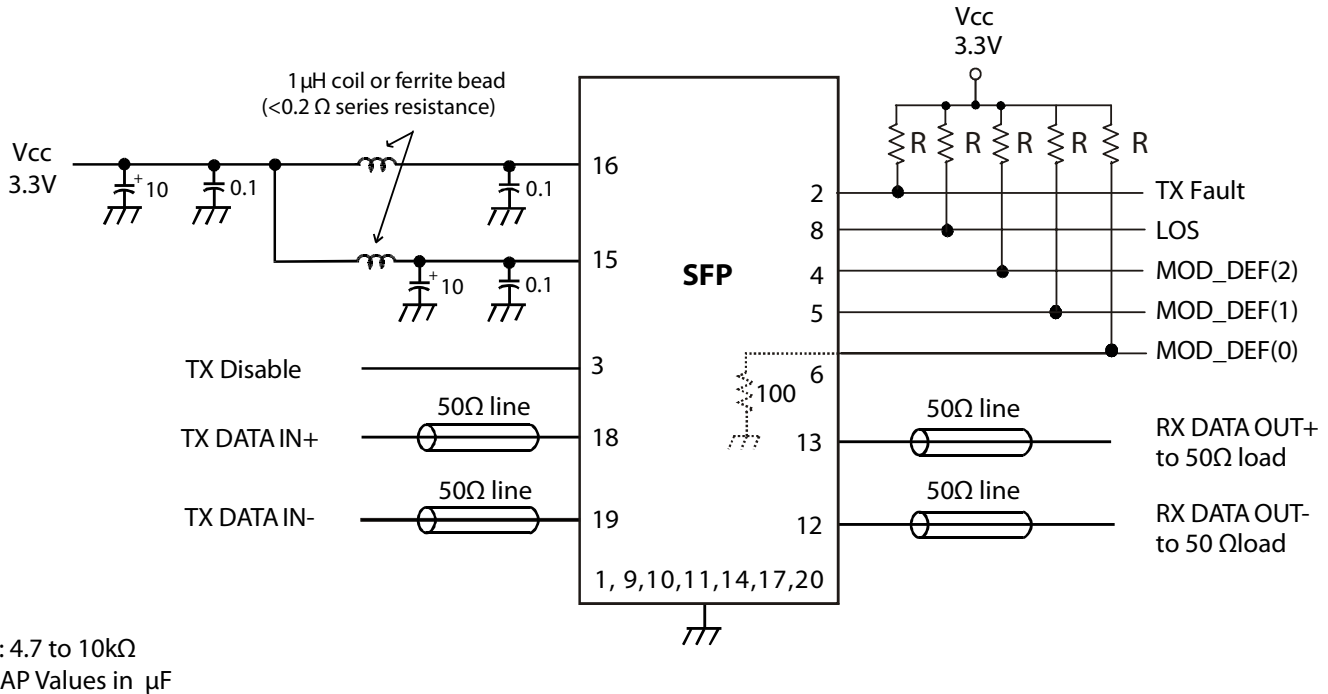
Parameter	Symbol	Minimum	Typical	Maximum	Units
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V
Supply Current	Commercial	-	245	350	mA
	Industrial, Extended	-	245	430	

Module Definition

MOD_DEF(0) pin 6	MOD_DEF(1) pin 5	MOD_DEF(2) pin 4	Interpretation by Host
TTL LOW	SCL	SDA	Serial module definition protocol



Host Board Termination & Coupling



Application Notes

Electrical interface: All signal interfaces are compliant with the SFP MSA specification. The high speed DATA interface is differential AC-coupled internally with 0.1 μ F and can be directly connected to a 3.3V SERDES IC. All low speed control and sense output signals are open collector TTL compatible and should be pulled up with a 4.7 - 10k Ω resistor on the host board

Loss of Signal (LOS): The Loss of Signal circuit monitors the level of the incoming optical signal and generates a logic HIGH when an insufficient photocurrent is produced.

TX Start-up: During power up or hot plugging the DWDM SFP module will initially set the TX to the correct operating temperature. Depending on the ambient temperature this may take several seconds to 1 minute. When the Tx has reached the required temperature the Tx is switched on and active. At this point the Tx is guaranteed to be within +/-0.2nm of the appropriate ITU wavelength and will settle to +/-0.05nm within the time limit set by the MSA.

TX_Fault: The output indicates LOW when the transmitter is operating normally, and HIGH with a laser fault including laser end-of-life. TX Fault is an open collector/drain output that should be pulled up with a 4.7 - 10k Ω resistor on the host board. TX Fault is latched per SFP MSA.

TX_Disable: When the TX Disable pin is at logic HIGH, the

transmitter optical output is disabled (less than -45dBm).

Serial Identification and Monitoring: The module definition of SFP is indicated by the three module definition pins, MOD_DEF(0), MOD_DEF(1) and MOD_DEF(2). Upon power up, MOD_DEF(1:2) appear as NC (noconnection), and MOD_DEF(0) is TTL LOW. When the host system detects this condition, it activates the serial protocol (standard two-wire I²C serial interface) and generates the serial clock signal (SCL). The positive edge clocks data into the EEPROM segments of the SFP that are not write protected, and the negative edge clocks data from the SFP.

The serial data signal (SDA) is for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The supported monitoring functions are internal temperature, supply voltage, bias current, transmitter power, average receiver signal, all alarms and warnings and software monitoring of TX Fault/LOS. The device is internally calibrated.

The data transfer protocol and the details of the mandatory and vendor specific data structures are defined in the MSA.

Power supply and grounding: The power supply line should be well-filtered. All 0.1 μ F power supply bypass capacitors should be as close to the transceiver module as possible.

Laser Safety: All transceivers are Class I Laser products per FDA/CDRH and IEC-60825 standards. They must be operated under specified operating conditions.

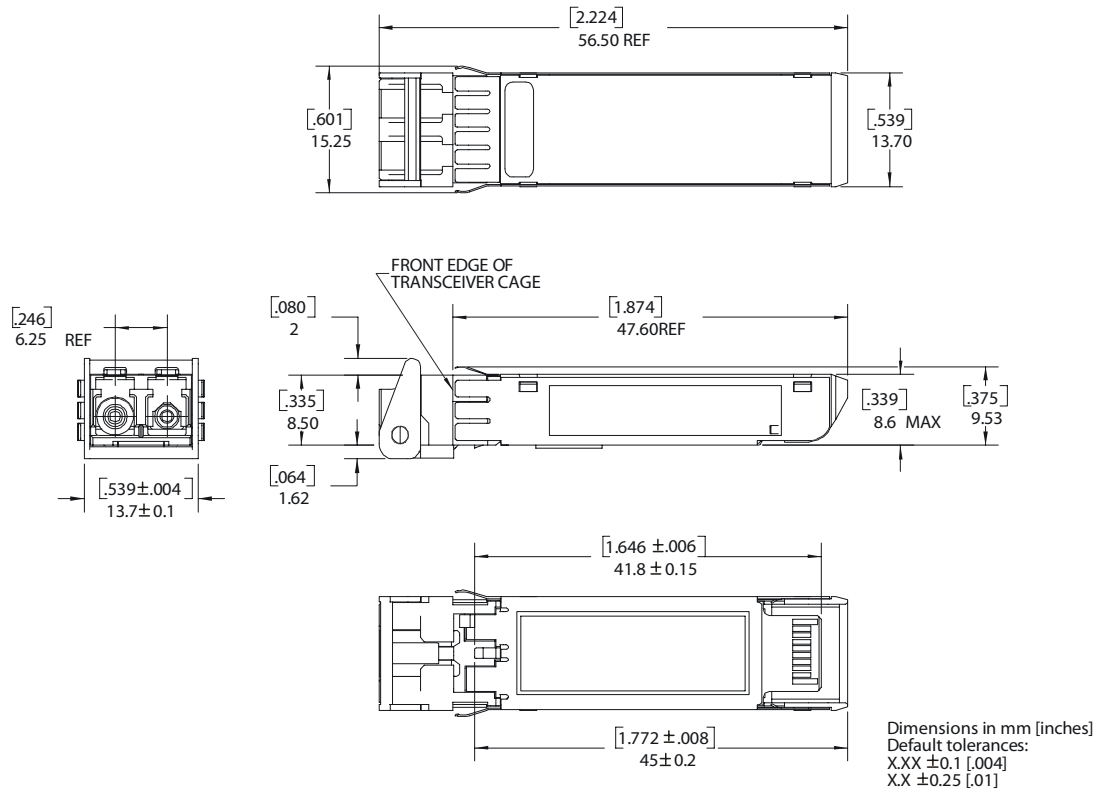
Oplink Communications, Inc.



This product complies with
21 CFR 1040.10 and 1040.11
Meets Class I Laser Safety Requirements



Package Outline



Ordering Information (80km)

Model Name			Center Wavelength (nm)	ITU Frequency (THz)	Wavelength Reference	Distance
Commercial Temp. -5°C to +70°C	Extended Temp. -5°C to +85°C	Industrial Temp. -40°C to +85°C				
TRD148JL2C00061G	TRD148JL2E00061G	TRD148JL2I00061G	1528.77	196.1	61	80km
TRD148JL2C00060G	TRD148JL2E00060G	TRD148JL2I00060G	1529.55	196.0	60	80km
TRD148JL2C00059G	TRD148JL2E00059G	TRD148JL2I00059G	1530.33	195.9	59	80km
TRD148JL2C00058G	TRD148JL2E00058G	TRD148JL2I00058G	1531.12	195.8	58	80km
TRD148JL2C00057G	TRD148JL2E00057G	TRD148JL2I00057G	1531.90	195.7	57	80km
TRD148JL2C00056G	TRD148JL2E00056G	TRD148JL2I00056G	1532.68	195.6	56	80km
TRD148JL2C00055G	TRD148JL2E00055G	TRD148JL2I00055G	1533.47	195.5	55	80km
TRD148JL2C00054G	TRD148JL2E00054G	TRD148JL2I00054G	1534.25	195.4	54	80km
TRD148JL2C00053G	TRD148JL2E00053G	TRD148JL2I00053G	1535.04	195.3	53	80km
TRD148JL2C00052G	TRD148JL2E00052G	TRD148JL2I00052G	1535.82	195.2	52	80km
TRD148JL2C00051G	TRD148JL2E00051G	TRD148JL2I00051G	1536.61	195.1	51	80km
TRD148JL2C00050G	TRD148JL2E00050G	TRD148JL2I00050G	1537.40	195.0	50	80km
TRD148JL2C00049G	TRD148JL2E00049G	TRD148JL2I00049G	1538.19	194.9	49	80km
TRD148JL2C00048G	TRD148JL2E00048G	TRD148JL2I00048G	1538.98	194.8	48	80km
TRD148JL2C00047G	TRD148JL2E00047G	TRD148JL2I00047G	1539.77	194.7	47	80km
TRD148JL2C00046G	TRD148JL2E00046G	TRD148JL2I00046G	1540.56	194.6	46	80km
TRD148JL2C00045G	TRD148JL2E00045G	TRD148JL2I00045G	1541.35	194.5	45	80km
TRD148JL2C00044G	TRD148JL2E00044G	TRD148JL2I00044G	1542.14	194.4	44	80km

Ordering Information (80km) - cont'd

Model Name			Center Wavelength (nm)	ITU Frequency (THz)	Wavelength Reference	Distance
Commercial Temp. -5°C to +70°C	Extended Temp. -5°C to +85°C	Industrial Temp. -40°C to +85°C				
TRD148JL2C00043G	TRD148JL2E00043G	TRD148JL2I00043G	1542.94	194.3	43	80km
TRD148JL2C00042G	TRD148JL2E00042G	TRD148JL2I00042G	1543.73	194.2	42	80km
TRD148JL2C00041G	TRD148JL2E00041G	TRD148JL2I00041G	1544.53	194.1	41	80km
TRD148JL2C00040G	TRD148JL2E00040G	TRD148JL2I00040G	1545.32	194.0	40	80km
TRD148JL2C00039G	TRD148JL2E00039G	TRD148JL2I00039G	1546.12	193.9	39	80km
TRD148JL2C00038G	TRD148JL2E00038G	TRD148JL2I00038G	1546.92	193.8	38	80km
TRD148JL2C00037G	TRD148JL2E00037G	TRD148JL2I00037G	1547.72	193.7	37	80km
TRD148JL2C00036G	TRD148JL2E00036G	TRD148JL2I00036G	1548.51	193.6	36	80km
TRD148JL2C00035G	TRD148JL2E00035G	TRD148JL2I00035G	1549.32	193.5	35	80km
TRD148JL2C00034G	TRD148JL2E00034G	TRD148JL2I00034G	1550.12	193.4	34	80km
TRD148JL2C00033G	TRD148JL2E00033G	TRD148JL2I00033G	1550.92	193.3	33	80km
TRD148JL2C00032G	TRD148JL2E00032G	TRD148JL2I00032G	1551.72	193.2	32	80km
TRD148JL2C00031G	TRD148JL2E00031G	TRD148JL2I00031G	1552.52	193.1	31	80km
TRD148JL2C00030G	TRD148JL2E00030G	TRD148JL2I00030G	1553.33	193.0	30	80km
TRD148JL2C00029G	TRD148JL2E00029G	TRD148JL2I00029G	1554.13	192.9	29	80km
TRD148JL2C00028G	TRD148JL2E00028G	TRD148JL2I00028G	1554.94	192.8	28	80km
TRD148JL2C00027G	TRD148JL2E00027G	TRD148JL2I00027G	1555.75	192.7	27	80km
TRD148JL2C00026G	TRD148JL2E00026G	TRD148JL2I00026G	1556.55	192.6	26	80km
TRD148JL2C00025G	TRD148JL2E00025G	TRD148JL2I00025G	1557.36	192.5	25	80km
TRD148JL2C00024G	TRD148JL2E00024G	TRD148JL2I00024G	1558.17	192.4	24	80km
TRD148JL2C00023G	TRD148JL2E00023G	TRD148JL2I00023G	1558.98	192.3	23	80km
TRD148JL2C00022G	TRD148JL2E00022G	TRD148JL2I00022G	1559.79	192.2	22	80km
TRD148JL2C00021G	TRD148JL2E00021G	TRD148JL2I00021G	1560.61	192.1	21	80km
TRD148JL2C00020G	TRD148JL2E00020G	TRD148JL2I00020G	1561.42	192.0	20	80km
TRD148JL2C00019G	TRD148JL2E00019G	TRD148JL2I00019G	1562.23	191.9	19	80km
TRD148JL2C00018G	TRD148JL2E00018G	TRD148JL2I00018G	1563.05	191.8	18	80km
TRD148JL2C00017G	TRD148JL2E00017G	TRD148JL2I00017G	1563.86	191.7	17	80km
TRD148JL2C00010G	TRD148JL2E00010G	TRD148JL2I00010G	1569.59	191.0	10	80km

Ordering Information (120km)

Model Name			Center Wavelength (nm)	ITU Frequency (THz)	Wavelength Reference	Distance
Commercial Temp. -5°C to +70°C	Extended Temp. -5°C to +85°C	Industrial Temp. -40°C to +85°C				
TRD148JE2C00061G	TRD148JE2E00061G	TRD148JE2I00061G	1528.77	196.1	61	120km
TRD148JE2C00060G	TRD148JE2E00060G	TRD148JE2I00060G	1529.55	196.0	60	120km
TRD148JE2C00059G	TRD148JE2E00059G	TRD148JE2I00059G	1530.33	195.9	59	120km
TRD148JE2C00058G	TRD148JE2E00058G	TRD148JE2I00058G	1531.12	195.8	58	120km
TRD148JE2C00057G	TRD148JE2E00057G	TRD148JE2I00057G	1531.90	195.7	57	120km
TRD148JE2C00056G	TRD148JE2E00056G	TRD148JE2I00056G	1532.68	195.6	56	120km
TRD148JE2C00055G	TRD148JE2E00055G	TRD148JE2I00055G	1533.47	195.5	55	120km
TRD148JE2C00054G	TRD148JE2E00054G	TRD148JE2I00054G	1534.25	195.4	54	120km
TRD148JE2C00053G	TRD148JE2E00053G	TRD148JE2I00053G	1535.04	195.3	53	120km
TRD148JE2C00052G	TRD148JE2E00052G	TRD148JE2I00052G	1535.82	195.2	52	120km
TRD148JE2C00051G	TRD148JE2E00051G	TRD148JE2I00051G	1536.61	195.1	51	120km

Ordering Information (120km) - Cont'd

Model Name			Center Wavelength (nm)	ITU Frequency (THz)	Wavelength Reference	Distance
Commercial Temp. -5°C to +70°C	Extended Temp. -5°C to +85°C	Industrial Temp. -40°C to +85°C				
TRD148JE2C00050G	TRD148JE2E00050G	TRD148JE2I00050G	1537.40	195.0	50	120km
TRD148JE2C00049G	TRD148JE2E00049G	TRD148JE2I00049G	1538.19	194.9	49	120km
TRD148JE2C00048G	TRD148JE2E00048G	TRD148JE2I00048G	1538.98	194.8	48	120km
TRD148JE2C00047G	TRD148JE2E00047G	TRD148JE2I00047G	1539.77	194.7	47	120km
TRD148JE2C00046G	TRD148JE2E00046G	TRD148JE2I00046G	1540.56	194.6	46	120km
TRD148JE2C00045G	TRD148JE2E00045G	TRD148JE2I00045G	1541.35	194.5	45	120km
TRD148JE2C00044G	TRD148JE2E00044G	TRD148JE2I00044G	1542.14	194.4	44	120km
TRD148JE2C00043G	TRD148JE2E00043G	TRD148JE2I00043G	1542.94	194.3	43	120km
TRD148JE2C00042G	TRD148JE2E00042G	TRD148JE2I00042G	1543.73	194.2	42	120km
TRD148JE2C00041G	TRD148JE2E00041G	TRD148JE2I00041G	1544.53	194.1	41	120km
TRD148JE2C00040G	TRD148JE2E00040G	TRD148JE2I00040G	1545.32	194.0	40	120km
TRD148JE2C00039G	TRD148JE2E00039G	TRD148JE2I00039G	1546.12	193.9	39	120km
TRD148JE2C00038G	TRD148JE2E00038G	TRD148JE2I00038G	1546.92	193.8	38	120km
TRD148JE2C00037G	TRD148JE2E00037G	TRD148JE2I00037G	1547.72	193.7	37	120km
TRD148JE2C00036G	TRD148JE2E00036G	TRD148JE2I00036G	1548.51	193.6	36	120km
TRD148JE2C00035G	TRD148JE2E00035G	TRD148JE2I00035G	1549.32	193.5	35	120km
TRD148JE2C00034G	TRD148JE2E00034G	TRD148JE2I00034G	1550.12	193.4	34	120km
TRD148JE2C00033G	TRD148JE2E00033G	TRD148JE2I00033G	1550.92	193.3	33	120km
TRD148JE2C00032G	TRD148JE2E00032G	TRD148JE2I00032G	1551.72	193.2	32	120km
TRD148JE2C00031G	TRD148JE2E00031G	TRD148JE2I00031G	1552.52	193.1	31	120km
TRD148JE2C00030G	TRD148JE2E00030G	TRD148JE2I00030G	1553.33	193.0	30	120km
TRD148JE2C00029G	TRD148JE2E00029G	TRD148JE2I00029G	1554.13	192.9	29	120km
TRD148JE2C00028G	TRD148JE2E00028G	TRD148JE2I00028G	1554.94	192.8	28	120km
TRD148JE2C00027G	TRD148JE2E00027G	TRD148JE2I00027G	1555.75	192.7	27	120km
TRD148JE2C00026G	TRD148JE2E00026G	TRD148JE2I00026G	1556.55	192.6	26	120km
TRD148JE2C00025G	TRD148JE2E00025G	TRD148JE2I00025G	1557.36	192.5	25	120km
TRD148JE2C00024G	TRD148JE2E00024G	TRD148JE2I00024G	1558.17	192.4	24	120km
TRD148JE2C00023G	TRD148JE2E00023G	TRD148JE2I00023G	1558.98	192.3	23	120km
TRD148JE2C00022G	TRD148JE2E00022G	TRD148JE2I00022G	1559.79	192.2	22	120km
TRD148JE2C00021G	TRD148JE2E00021G	TRD148JE2I00021G	1560.61	192.1	21	120km
TRD148JE2C00020G	TRD148JE2E00020G	TRD148JE2I00020G	1561.42	192.0	20	120km
TRD148JE2C00019G	TRD148JE2E00019G	TRD148JE2I00019G	1562.23	191.9	19	120km
TRD148JE2C00018G	TRD148JE2E00018G	TRD148JE2I00018G	1563.05	191.8	18	120km
TRD148JE2C00017G	TRD148JE2E00017G	TRD148JE2I00017G	1563.86	191.7	17	120km

Ordering Information (200km)

Model Name			Center Wavelength (nm)	ITU Frequency (THz)	Wavelength Reference	Distance
Commercial Temp. -5°C to +70°C	Extended Temp. -5°C to +85°C	Industrial Temp. -40°C to +85°C				
TRD148MX2C00061G	TRD148MX2E00061G	TRD148MX2I00061G	1528.77	196.1	61	200km
TRD148MX2C00060G	TRD148MX2E00060G	TRD148MX2I00060G	1529.55	196.0	60	200km
TRD148MX2C00059G	TRD148MX2E00059G	TRD148MX2I00059G	1530.33	195.9	59	200km
TRD148MX2C00058G	TRD148MX2E00058G	TRD148MX2I00058G	1531.12	195.8	58	200km
TRD148MX2C00057G	TRD148MX2E00057G	TRD148MX2I00057G	1531.90	195.7	57	200km

Ordering Information (200km) - Cont'd

Model Name			Center Wavelength (nm)	ITU Frequency (THz)	Wavelength Reference	Distance
Commercial Temp. -5°C to +70°C	Extended Temp. -5°C to +85°C	Industrial Temp. -40°C to +85°C				
TRD148MX2C00056G	TRD148MX2E00056G	TRD148MX2I00056G	1532.68	195.6	56	200km
TRD148MX2C00055G	TRD148MX2E00055G	TRD148MX2I00055G	1533.47	195.5	55	200km
TRD148MX2C00054G	TRD148MX2E00054G	TRD148MX2I00054G	1534.25	195.4	54	200km
TRD148MX2C00053G	TRD148MX2E00053G	TRD148MX2I00053G	1535.04	195.3	53	200km
TRD148MX2C00052G	TRD148MX2E00052G	TRD148MX2I00052G	1535.82	195.2	52	200km
TRD148MX2C00051G	TRD148MX2E00051G	TRD148MX2I00051G	1536.61	195.1	51	200km
TRD148MX2C00050G	TRD148MX2E00050G	TRD148MX2I00050G	1537.40	195.0	50	200km
TRD148MX2C00049G	TRD148MX2E00049G	TRD148MX2I00049G	1538.19	194.9	49	200km
TRD148MX2C00048G	TRD148MX2E00048G	TRD148MX2I00048G	1538.98	194.8	48	200km
TRD148MX2C00047G	TRD148MX2E00047G	TRD148MX2I00047G	1539.77	194.7	47	200km
TRD148MX2C00046G	TRD148MX2E00046G	TRD148MX2I00046G	1540.56	194.6	46	200km
TRD148MX2C00045G	TRD148MX2E00045G	TRD148MX2I00045G	1541.35	194.5	45	200km
TRD148MX2C00044G	TRD148MX2E00044G	TRD148MX2I00044G	1542.14	194.4	44	200km
TRD148MX2C00043G	TRD148MX2E00043G	TRD148MX2I00043G	1542.94	194.3	43	200km
TRD148MX2C00042G	TRD148MX2E00042G	TRD148MX2I00042G	1543.73	194.2	42	200km
TRD148MX2C00041G	TRD148MX2E00041G	TRD148MX2I00041G	1544.53	194.1	41	200km
TRD148MX2C00040G	TRD148MX2E00040G	TRD148MX2I00040G	1545.32	194.0	40	200km
TRD148MX2C00039G	TRD148MX2E00039G	TRD148MX2I00039G	1546.12	193.9	39	200km
TRD148MX2C00038G	TRD148MX2E00038G	TRD148MX2I00038G	1546.92	193.8	38	200km
TRD148MX2C00037G	TRD148MX2E00037G	TRD148MX2I00037G	1547.72	193.7	37	200km
TRD148MX2C00036G	TRD148MX2E00036G	TRD148MX2I00036G	1548.51	193.6	36	200km
TRD148MX2C00035G	TRD148MX2E00035G	TRD148MX2I00035G	1549.32	193.5	35	200km
TRD148MX2C00034G	TRD148MX2E00034G	TRD148MX2I00034G	1550.12	193.4	34	200km
TRD148MX2C00033G	TRD148MX2E00033G	TRD148MX2I00033G	1550.92	193.3	33	200km
TRD148MX2C00032G	TRD148MX2E00032G	TRD148MX2I00032G	1551.72	193.2	32	200km
TRD148MX2C00031G	TRD148MX2E00031G	TRD148MX2I00031G	1552.52	193.1	31	200km
TRD148MX2C00030G	TRD148MX2E00030G	TRD148MX2I00030G	1553.33	193.0	30	200km
TRD148MX2C00029G	TRD148MX2E00029G	TRD148MX2I00029G	1554.13	192.9	29	200km
TRD148MX2C00028G	TRD148MX2E00028G	TRD148MX2I00028G	1554.94	192.8	28	200km
TRD148MX2C00027G	TRD148MX2E00027G	TRD148MX2I00027G	1555.75	192.7	27	200km
TRD148MX2C00026G	TRD148MX2E00026G	TRD148MX2I00026G	1556.55	192.6	26	200km
TRD148MX2C00025G	TRD148MX2E00025G	TRD148MX2I00025G	1557.36	192.5	25	200km
TRD148MX2C00024G	TRD148MX2E00024G	TRD148MX2I00024G	1558.17	192.4	24	200km
TRD148MX2C00023G	TRD148MX2E00023G	TRD148MX2I00023G	1558.98	192.3	23	200km
TRD148MX2C00022G	TRD148MX2E00022G	TRD148MX2I00022G	1559.79	192.2	22	200km
TRD148MX2C00021G	TRD148MX2E00021G	TRD148MX2I00021G	1560.61	192.1	21	200km
TRD148MX2C00020G	TRD148MX2E00020G	TRD148MX2I00020G	1561.42	192.0	20	200km
TRD148MX2C00019G	TRD148MX2E00019G	TRD148MX2I00019G	1562.23	191.9	19	200km
TRD148MX2C00018G	TRD148MX2E00018G	TRD148MX2I00018G	1563.05	191.8	18	200km
TRD148MX2C00017G	TRD148MX2E00017G	TRD148MX2I00017G	1563.86	191.7	17	200km

Oplink Communications, Inc. reserves the right to make changes in equipment design or specifications without notice. Information supplied by Oplink Communications, Inc. is believed to be accurate and reliable. However, no responsibility is assumed by Oplink Communications, Inc. for its use nor for any infringements of third parties, which may result from its use. No license is granted by implication or otherwise under any patent right of Oplink Communications, Inc.