

2.5 Gb/s DWDM Transceiver Module

The Bookham Technology MQ25EW 2.5 Gb/s DWDM Transceiver Module is a very low power, small form factor module enabling high port density. It is designed to provide a SONET OC48/SDH STM-16 compliant interface between the photonic layer and the electrical layer for applications requiring up to 175km and 360km reach. This module is compliant to the DWDM Hot-pluggable MSA.

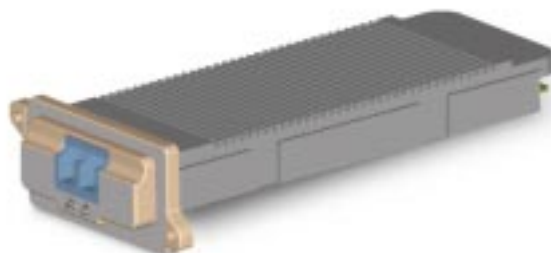
Typical power dissipation of 2.2 W coupled with the small footprint significantly simplifies card design. This results in significant savings in card space and development time, and greatly improved time to market.

The module provides wavelengths on the 100 GHz ITU grid in the C band. A two-wire communication interface (I²C) is available for extended monitoring and alarm information to complement the hardware alarms and monitors. These include bias and modulation current, power, wavelength, laser and APD temperature, LOS, and APD photocurrent.

The MQ25EW 2.5 Gb/s DWDM Transceiver module can be used for existing OC48 as well as emerging Gigabit Ethernet ports. The MQ25EW is optimized for links spans of up to 360km using an APD receiver.

The compact size, low power transceiver interfaces to the host board through a 70 pin standard connector, with hot-plug capabilities. The module comprises a hermetically packaged laser device with optical isolation and wavelength stabilisation. This ensures that the optical source remains within optical power and wavelength limits over variations in temperature and over life. A microprocessor coupled with internal circuitry and a Thermo-Electric Cooler (TEC) controls the operation of the module and ensures the correct laser temperature to achieve constant wavelength. A un-cooled APD receiver with post amp allows for link lengths up to 3100 ps/nm and beyond.

A wavelength tagging function allows for easy channel identification by applying low frequency (50-500 kHz) amplitude modulation of the "1"s level. The tagging signal is an output on the receive portion of the module.



Features

- DWDM 2.5 Gb/s optical transmitter and APD receiver
- C band operation (100 GHz spacing) with integrated Etalon locker
- High optical output power, +4 dBm
- Very low power dissipation, 1 W typical
- Single supply rail, +3.3 V
- Supports serial line rates from 50 Mb/s to 2.7 Gb/s (OC3, OC12, GE, OC48, and OC48+FEC)
- 1550 nm b-HET directly modulated laser for reaches up to 175km and 360km
- APD pre-amp receiver for excellent sensitivity, -28dBm EOL
- Micro controller with I²C interface for wavelength locking, control, and alarms
- Compliant with Telcordia GR-253, ITU-T G.691, G.692, G.783, and G.957
- Case operating temperature range +0°C to +70°C

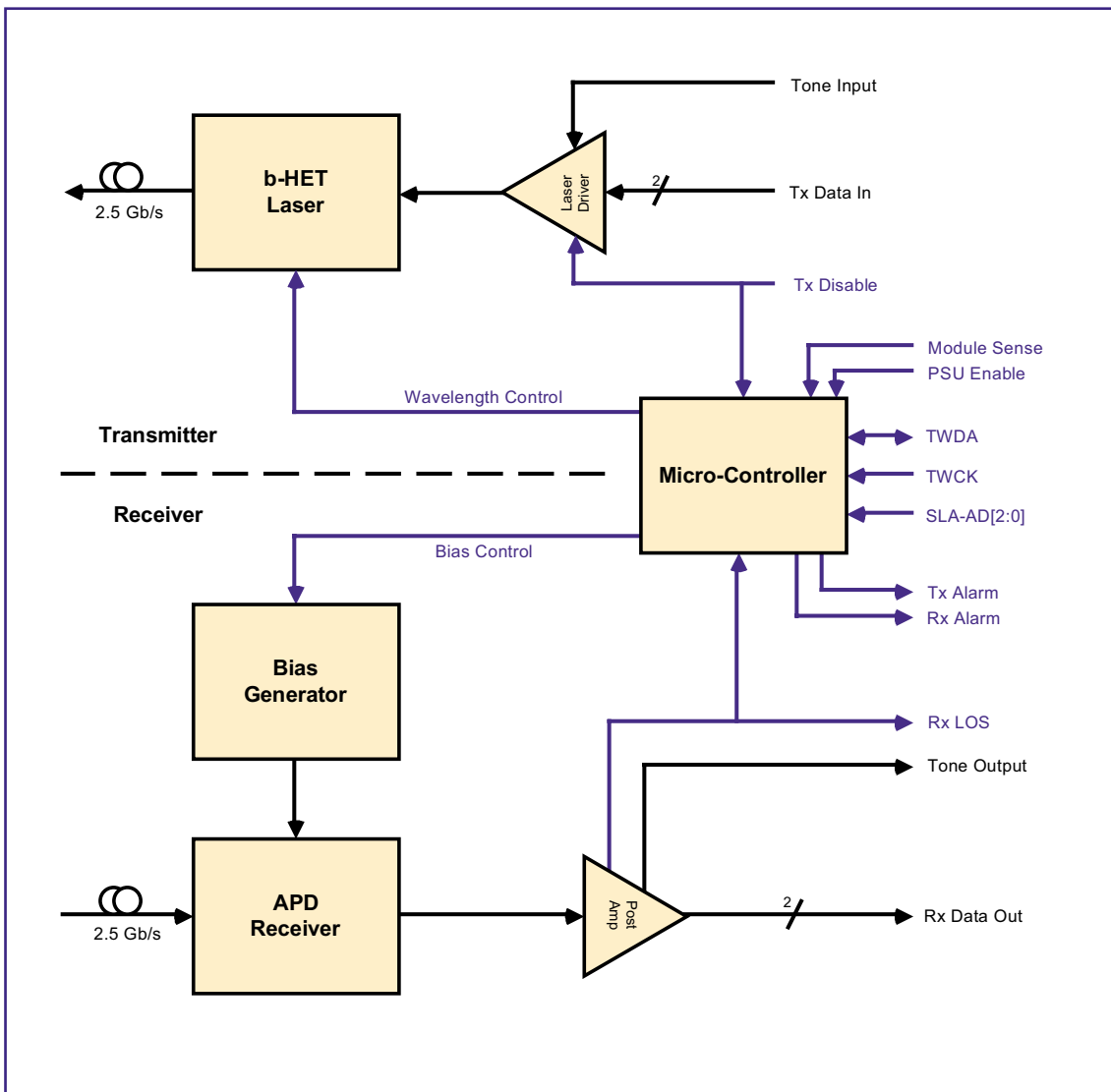


Figure 2: Module block diagram

Absolute Maximum Ratings

Parameter	Description	Min	Max	Unit
	Storage temperature	-40	+85	°C
R _H	Humidity/temperature test condition ¹		95	% / °C
V _{CC}	Supply voltage (+3.3V)	-0.5	+4.5	V
V _{CML}	CML input voltage	0	V _{CC} + 0.5	V
I _{CML}	CML output Current		50	mA
ESD	ESD resistance ²	Class 2 precautions ³	TBD	V

- Note: 1. Non condensing
 2. Human body model
 3. In accordance with Bellcore TR-NWT-000870, ESD Class 2 Handling

Power Consumption

Symbol	Parameter	Min	Typ	Max	Unit
V _{CC}	+3.3 V supply range (Tx and Rx)	3.135	3.3	3.465	V
I _{CC-Tx}	Tx supply current		120	150	mA
I _{CC-TEC}	TEC supply current	0	0.4	1.5	A
I _{CC-Rx}	Rx supply current		130	150	mA
	Power consumption ¹		2.2	4.5 ²	W

Note: 1. Includes Tx, Rx, TEC, and control electronics
2. End of life parameter

Optical Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
Transmitter					
λ_c	Wavelength (C band)	1527.22		1563.05	nm
	Wavelength stability with temperature	-30		+30	pm
	Wavelength stability over life	-50		+50	pm
	Spectral width (-20 dBm)			1.0	nm
SMSR	Side mode suppression ratio	30			dB
P _o (SOL)	Optical output power (SOL) ¹	3.8		4.0	dBm
P _o (EOL)	Optical output power (EOL)	3.0		4.8	dBm
	Power variation over temperature	-0.2		+0.2	dBm
ER	Extinction ratio	8.2			dB
	Optical rise/fall times		150		ps
	Dispersion penalty			2	dB
	SONET eye mask	Compliant to GR-253 and ITU-T G.691			
	Jitter generation	Compliant to GR-253 and ITU-T G.691			
Receiver					
P _{OL}	Optical overload	-9	-6		dBm
P _{IN}	Sensitivity ² (BER not worse than 10 ⁻¹²)			-28	dBm
	Optical path penalty			2	dB
R _{LRX}	Optical return loss			-27	dB
	Jitter tolerance	Compliant to ITU-T G.783 and G.692			
	Jitter transfer	Compliant to ITU-T G.783 and G.692			

Notes: 1. 5 mW peak power.
2. Guaranteed sensitivity with worst case conditions

Environmental Conditions

Parameter	Min	Typ	Max	Unit
Ambient temperature	TBD	TBD	TBD	°C
Case operating temperature	0		70	°C
Airflow (based on typical ambient temp)		TBD		LFPM

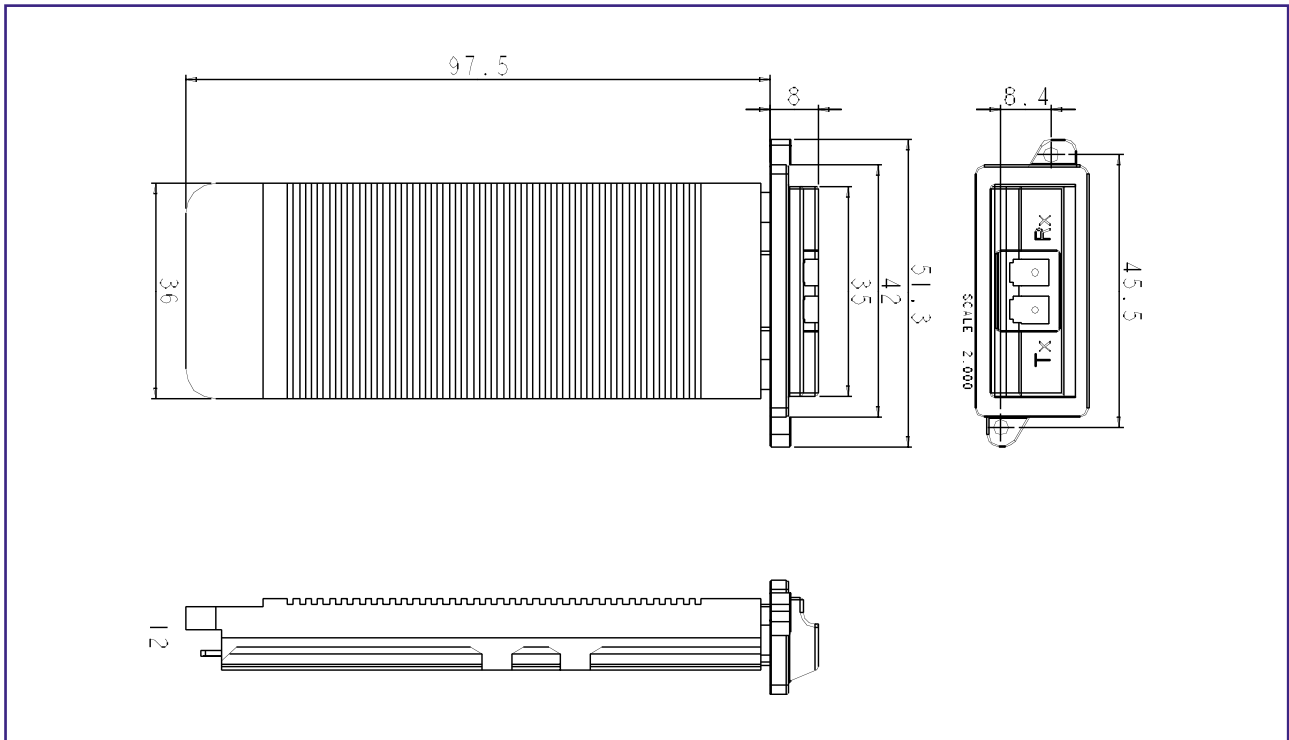


Figure 2: Module block diagram

Pin Assignment

Tx and Rx Pin out

Mating sequence	Pin	Description	Description	Pin	Mating sequence
1	70	Gnd (Tx)	Vcc (TEC)	1	2
1	69	Gnd (Tx)	Vcc (TEC)	2	2
3	68	Reserved (No User Connect)	Vcc (TEC)	3	2
3	67	Reserved (No User Connect)	Gnd (TEC)	4	1
1	66	Gnd (Tx)	Gnd (TEC)	5	1
3	65	Reserved (No User Connect)	Gnd (TEC)	6	1
3	64	Reserved (No User Connect)	Vcc (Tx)	7	2
1	63	Gnd (Tx)	Vcc (Tx)	8	2
3	62	Reserved (No User Connect)	Gnd (Digital)	9	1
3	61	Reserved (No User Connect)	TWDA	10	3
1	60	Gnd (Tx)	TWCK	11	3
3	59	Reserved (No User Connect)	PSU Enable	12	3
3	58	Reserved (No User Connect)	Vcc (Digital)	13	2
1	57	Gnd (Tx)	Gnd (Digital)	14	1
3	56	Tx Data (- ve)	Tx Disable	15	3
3	55	Tx Data (+ ve)	Tx Alarm	16	3
1	54	Gnd (Tx)	Tone Input	17	3
1	53	Gnd (Tx)	Tone Output	18	3
1	52	Gnd (Rx)	Rx Alarm	19	3
3	51	Reserved (No User Connect)	Rx LOS	20	3
3	50	Reserved (No User Connect)	SLA- AD2	21	3
1	49	Gnd (Rx)	SLA- AD1	22	3
3	48	Reserved (No User Connect)	SLA- AD0	23	3
3	47	Reserved (No User Connect)	Vendor Specific	24	3
1	46	Gnd (Rx)	Vendor Specific	25	3
3	45	Reserved (No User Connect)	Vendor Specific	26	3
3	44	Reserved (No User Connect)	Vendor Specific	27	3
1	43	Gnd (Rx)	Vendor Specific	28	3
3	42	Rx Data (- ve)	Module Sense	29	3
3	41	Rx Data (+ ve)	Vcc (Rx)	30	2
1	40	Gnd (Rx)	Vcc (Rx)	31	2
3	39	Reserved (No User Connect)	Vcc (Rx Bias)	32	2
3	38	Reserved (No User Connect)	Gnd (Rx)	33	1
1	37	Gnd (Rx)	Gnd (Rx)	34	1
1	36	Gnd (Rx)	Gnd (Rx)	35	1

Module Status Outputs	Management Input/ Output
Module Control Inputs	Positive Supply Voltage
Clock/ Data Input/ Output	Negative Supply Voltage
Vendor Specific Functions	Reserved Functionality (MSA)

Module Characteristics

Parameter	Description	Unit
Housing	TBD	
Length housing	97.5	mm
Width housing	36.0 (51.3 including front plate)	mm
Height housing	12.0	mm
Electrical connector	70 pin edge connector Connector on user board is AMP 1367337-1	
Optical connector	Duplex LC receptacle	

Ordering Information

Module	Wavelength	Module	Wavelength
MQ25EW2722&#-\$\$\$	1527.22	MQ25EW4692&#-\$\$\$	1546.92
MQ25EW2799&#-\$\$\$	1527.99	MQ25EW4772&#-\$\$\$	1547.72
MQ25EW2877&#-\$\$\$	1528.77	MQ25EW4851&#-\$\$\$	1548.51
MQ25EW2955&#-\$\$\$	1529.55	MQ25EW4932&#-\$\$\$	1549.32
MQ25EW3033&#-\$\$\$	1530.33	MQ25EW5012&#-\$\$\$	1550.12
MQ25EW3112&#-\$\$\$	1531.12	MQ25EW5092&#-\$\$\$	1550.92
MQ25EW3190&#-\$\$\$	1531.90	MQ25EW5172&#-\$\$\$	1551.72
MQ25EW3268&#-\$\$\$	1532.68	MQ25EW5252&#-\$\$\$	1552.52
MQ25EW3347&#-\$\$\$	1533.47	MQ25EW5333&#-\$\$\$	1553.33
MQ25EW3425&#-\$\$\$	1534.25	MQ25EW5413&#-\$\$\$	1554.13
MQ25EW3504&#-\$\$\$	1535.04	MQ25EW5494&#-\$\$\$	1554.94
MQ25EW3582&#-\$\$\$	1535.82	MQ25EW5575&#-\$\$\$	1555.75
MQ25EW3661&#-\$\$\$	1536.61	MQ25EW5655&#-\$\$\$	1556.55
MQ25EW3740&#-\$\$\$	1537.40	MQ25EW5736&#-\$\$\$	1557.36
MQ25EW3819&#-\$\$\$	1538.19	MQ25EW5817&#-\$\$\$	1558.17
MQ25EW3898&#-\$\$\$	1538.98	MQ25EW5898&#-\$\$\$	1558.98
MQ25EW3977&#-\$\$\$	1539.77	MQ25EW5979&#-\$\$\$	1559.79
MQ25EW4056&#-\$\$\$	1540.56	MQ25EW6061&#-\$\$\$	1560.61
MQ25EW4135&#-\$\$\$	1541.35	MQ25EW6142&#-\$\$\$	1561.42
MQ25EW4214&#-\$\$\$	1542.14	MQ25EW6223&#-\$\$\$	1562.23
MQ25EW4294&#-\$\$\$	1542.94	MQ25EW6305&#-\$\$\$	1563.05
MQ25EW4373&#-\$\$\$	1543.73	MQ25EW6387&#-\$\$\$	1563.87
MQ25EW4453&#-\$\$\$	1544.53	MQ25EW6468&#-\$\$\$	1564.68
MQ25EW4532&#-\$\$\$	1545.32	MQ25EW6550&#-\$\$\$	1565.50
MQ25EW4612&#-\$\$\$	1546.12		

Options

Type	λ (WDM Only)	Power (&)	Reach (#)	Optical Connector (\$\$)
MQ25EW	****	A = 5 mW	A = 175 km B = 300 km C = 360 km	DLC – Duplex LC
Appears in all	5898 (1558.98)	A is standard	A - 175 km is standard	DLC is standard

Example:

A 2.5 Gb/s transceiver at a wavelength of 1556.55nm, reaching 175 km, with a LC connector would be – MQ25EW5655AA-DLC

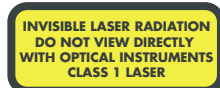
Electromagnetic Emissions and Immunity

The module will be tested for electromagnetic emissions against the requirements defined in CENELEC EN50 081 (parts 1 & 2) and FCC 15.

The module will be tested for electrostatic immunity against the requirements defined in CENELEC EN50 082 (part 1).

IMPORTANT NOTICE

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