TOSHIBA

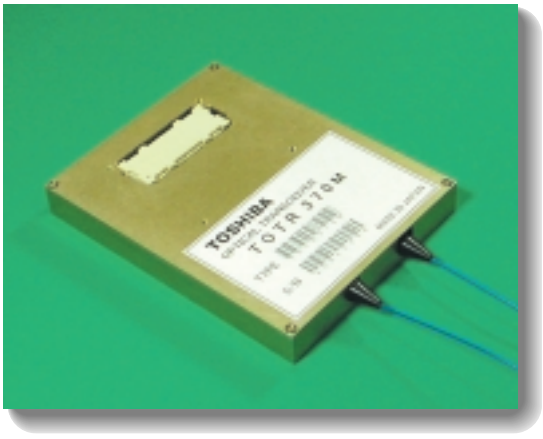
March 2001

Optical Communication Devices

10 Gb/s Optical Transponder

TOTR370M Series

(PRELIMINARY)



APPLICATION

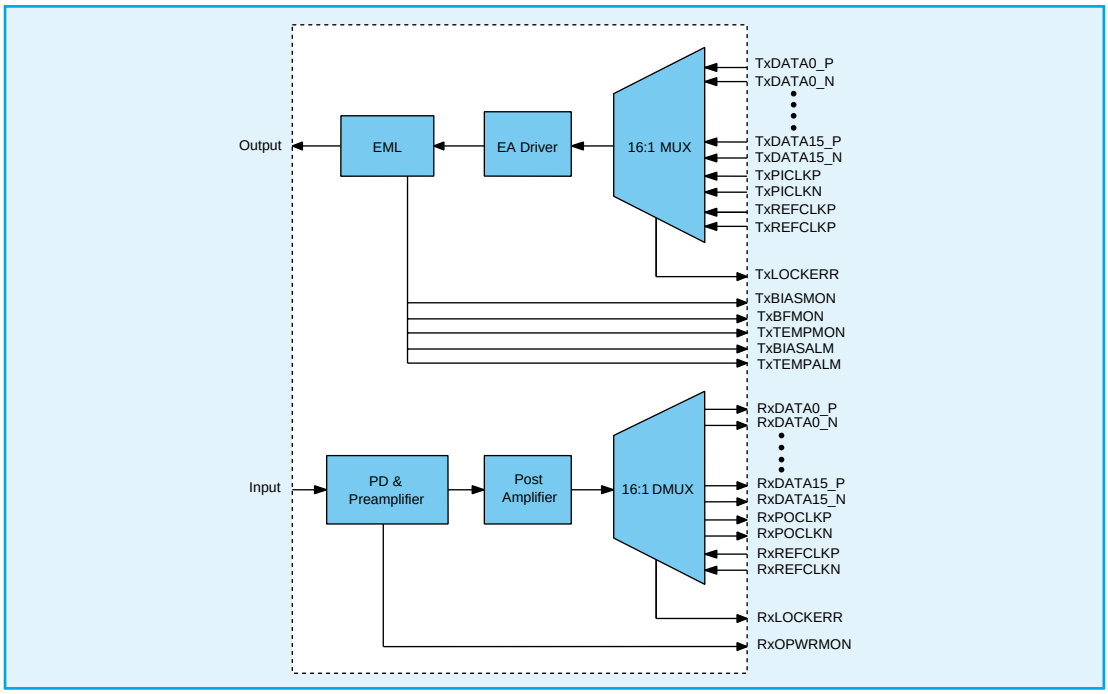
- SONET / SDH (OC-192 / STM-64) applications

FEATURES

- 10 Gb/s optical transceiver with 16:1 MUX/DMUX
- Differential LVDS 622 Mb/s data and 622 MHz clock interface
- Tc: –5 ˚C to 70 ˚C
- Power supply: +5.0 V / +3.3 V / –5.2 V
- Package size: 114 x 88.7 x 13.4 (mm)

TOTR370M Series

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Item	Min	Max	Unit
Storage temperature range	–40	85	˚C
Operating temperature range	–5	70	˚C
Input data signal voltage	0	V_{CC2} +0.5	V
Maximum input optical peak power	—	3	dBm
Maximum input optical average power	—	0	dBm
Positive supply voltage (V_{CC1})	0	6	V
Positive supply voltage (V_{CC2}, V_{TEC})	0	4	V
Negative supply voltage (V_{EE})	–6	0	V

POWER SUPPLY CHARACTERISTICS

Item	Min	Typ.	Max	Unit
Positive supply voltage (V_{CC1})	4.75	5.0	5.25	V
Positive supply voltage (V_{CC2}, V_{TEC})	3.14	3.3	3.47	V
Negative supply voltage (V_{EE})	–5.4	–5.2	–5.0	V

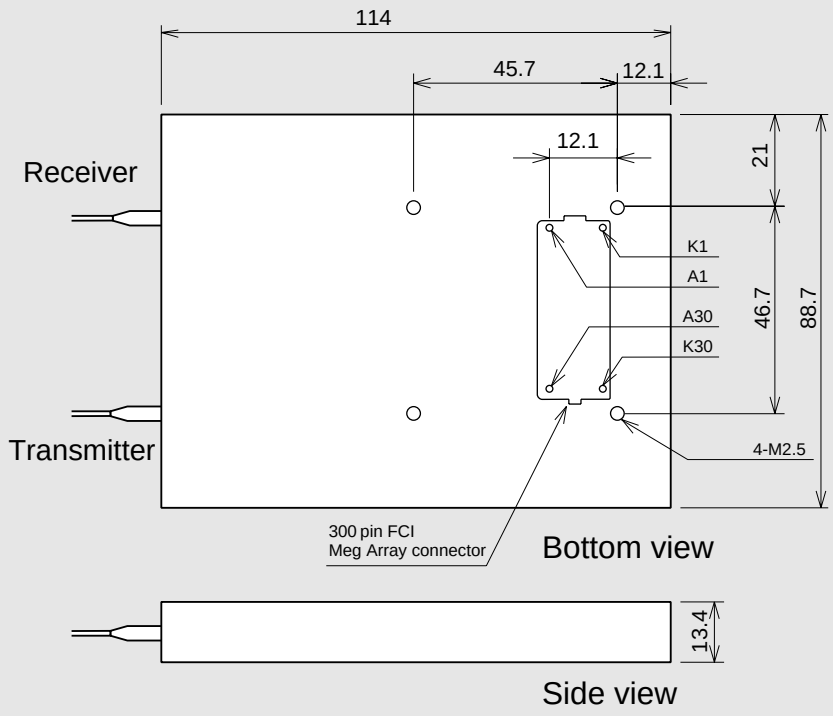
OPTICAL AND ELECTRICAL CHARACTERISTICS (Transmitter)

Item	Min	Typ.	Max	Unit
Operating wavelength range	1530	—	1565	nm
Nominal operating data rate	—	10	—	Gb/s
Optical output power	–5	—	–1	dBm
Side mode suppression ratio	30	—	—	dB
Extinction ratio	10	—	—	dB
Optical return loss	30	35	—	dB
Clock / Data input voltage range	0.6	1.2	2.0	V
Input peak differential voltage	100	—	800	mV
Output differential voltage	250	—	400	mV

OPTICAL AND ELECTRICAL CHARACTERISTICS (Receiver)

Item	Min	Typ.	Max	Unit
Operating wavelength range	1290	—	1600	nm
Nominal operating data rate	—	10	—	Gb/s
Minimum sensitivity	—	–17	–14	dBm
Minimum overload	–1	0	—	dBm
Optical return loss	27	35	—	dB
Clock / Data output voltage High	—	—	1475	mV
Clock / Data output voltage Low	925	—	—	mV

DIMENSIONAL OUTLINE AND PIN ASSIGNMENT



Pin Assignment

Pin	K	J	H	G	F	E	D	C	B	A
1	+5.0V_Rx	NC	GND (Frame)	RxDATA12_P	NC	RxDATA8_P	GND (Rx_Dig.)	RxDATA4_P	GND (Rx_Dig.)	RxDATA0_P
2	+5.0V_Rx	NC	GND (Frame)	RxDATA12_N	NC	RxDATA8_N	GND (Rx_Dig.)	RxDATA4_N	GND (Rx_Dig.)	RxDATA0_N
3	RxRATESEL	NC	NC	GND (Rx_Dig.)	RxOPWRMON	GND (Rx_Dig.)	NC	GND (Rx_Dig.)	NC	GND (Rx_Dig.)
4	+3.3V_Rx	NC	GND (Frame)	RxDATA13_P	+3.3V_Rx	RxDATA9_P	GND (Rx_Dig.)	RxDATA5_P	GND (Rx_Dig.)	RxDATA1_P
5	+3.3V_Rx	NC	GND (Frame)	RxDATA13_N	+3.3V_Rx	RxDATA9_N	GND (Rx_Dig.)	RxDATA5_N	GND (Rx_Dig.)	RxDATA1_N
6	RxRESET	NC	NC	GND (Rx_Dig.)	NC	GND (Rx_Dig.)	NC	GND (Rx_Dig.)	NC	GND (Rx_Dig.)
7	NC	NC	GND (Rx)	RxDATA14_P	+3.3V_Rx	RxDATA10_P	GND (Rx_Dig.)	RxDATA6_P	GND (Rx_Dig.)	RxDATA2_P
8	NC	NC	GND (Rx)	RxDATA14_N	+3.3V_Rx	RxDATA10_N	GND (Rx_Dig.)	RxDATA6_N	GND (Rx_Dig.)	RxDATA2_N
9	NC	NC	NC	GND (Rx_Dig.)	NC	GND (Rx_Dig.)	NC	GND (Rx_Dig.)	NC	GND (Rx_Dig.)
10	–5.2V_Rx	NC	GND (Rx)	RxDATA15_P	–5.2V_Rx	RxDATA11_P	GND (Rx_Dig.)	RxDATA7_P	GND (Rx_Dig.)	RxDATA3_P
11	–5.2V_Rx	NC	GND (Rx)	RxDATA15_N	–5.2V_Rx	RxDATA11_N	GND (Rx_Dig.)	RxDATA7_N	GND (Rx_Dig.)	RxDATA3_N
12	NC	NC	NC	GND (Rx_Dig.)	NC	GND (Rx_Dig.)	NC	GND (Rx_Dig.)	RxMCLKSEL	GND (Rx_Dig.)
13	–5.2V_Rx	NC	GND (Rx)	NC	–5.2V_Rx	RxPOCLKP	GND (Rx_Dig.)	RxMCLKP	GND (Rx_Dig.)	RxREFCLKP
14	–5.2V_Rx	NC	GND (Rx)	NC	–5.2V_Rx	RxPOCLKN	GND (Rx_Dig.)	RxMCLKN	GND (Rx_Dig.)	RxREFCLKN
15	NC	NC	NC	GND (Rx_Dig)	RxREFSEL0	GND (Rx_Dig.)	NC	GND (Rx_Dig.)	RxLOCKERR	GND (Rx_Dig.)
16	+5.0V_TX	NC	GND (Tx)	TxDATA12_P	NC	TxDATA8_P	GND (Tx_Dig.)	TxDATA4_P	GND (Tx_Dig.)	TxDATA0_P
17	+5.0V_TX	NC	GND (Tx)	TxDATA12_N	NC	TxDATA8_N	GND (Tx_Dig.)	TxDATA4_N	GND (Tx_Dig.)	TxDATA0_N
18	NC	NC	NC	GND (Tx_Dig)	TxBIASMON	GND (Tx_Dig.)	TxBFMON	GND (Tx_Dig.)	NC	GND (Tx_Dig.)
19	+3.3V_TX	NC	GND (Tx)	TxDATA13_P	+3.3V_Tx	TxDATA9_P	GND (Tx_Dig.)	TxDATA5_P	GND (Tx_Dig.)	TxDATA1_P
20	+3.3V_TX	NC	GND (Tx)	TxDATA13_N	+3.3V_Tx	TxDATA9_N	GND (Tx_Dig.)	TxDATA5_N	GND (Tx_Dig.)	TxDATA1_N
21	TxRATESEL	NC	NC	GND (Tx_Dig.)	TxENABLE	GND (Tx_Dig.)	TxTEMPMON	GND (Tx_Dig.)	NC	GND (Tx_Dig.)
22	+3.3V_TX	NC	GND (Tx)	TxDATA14_P	+3.3V_Tx	TxDATA10_P	GND (Tx_Dig.)	TxDATA6_P	GND (Tx_Dig.)	TxDATA2_P
23	+3.3V_TX	NC	GND (Tx)	TxDATA14_N	+3.3V_Tx	TxDATA10_N	GND (Tx_Dig.)	TxDATA6_N	GND (Tx_Dig.)	TxDATA2_N
24	TxRESET	NC	NC	GND (Tx_Dig.)	TxBIASALM	GND (Tx_Dig.)	TxPHSADJ	GND (Tx_Dig.)	NC	GND (Tx_Dig.)
25	–5.2V_TX	NC	GND (Frame)	TxDATA15_P	–5.2V_Tx	TxDATA11_P	GND (Tx_Dig.)	TxDATA7_P	GND (Tx_Dig.)	TxDATA3_P
26	–5.2V_TX	NC	GND (Frame)	TxDATA15_N	–5.2V_Tx	TxDATA11_N	GND (Tx_Dig.)	TxDATA7_N	GND (Tx_Dig.)	TxDATA3_N
27	NC	NC	NC	GND (Tx_Dig.)	TxTEMPALM	GND (Tx_Dig.)	NC	GND (Tx_Dig.)	NC	GND (Tx_Dig.)
28	–5.2V_TX	NC	GND (Frame)	TxPICLKP	–5.2V_Tx	TxPCLKP	GND (Tx_Dig.)	TxMCLKP	GND (Tx_Dig.)	TxREFCLKP
29	–5.2V_TX	NC	GND (Frame)	TxPICLKN	–5.2V_Tx	TxPCLKN	GND (Tx_Dig.)	TxMCLKN	GND (Tx_Dig.)	TxREFCLKN
30	NC	NC	NC	GND (Tx_Dig.)	TxREFSEL0	GND (Tx_Dig.)	NC	GND (Tx_Dig.)	TxLOCKERR	GND (Tx_Dig.)

PRECAUTIONS

(a) Power supply: Transient electric spike may cause a damage to the laser, the photodiode or IC chips. A surge-free power supply and a slow starter circuit should be used.
To avoid causing an electrical surge, pins should not be connected or disconnected on the test fixture before turning the power off.

(b) Safety: The laser emits invisible light harmful to the human eyes. Direct viewing should be avoided.

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