DTC-12-MM
OC-12/STM-4 Multimode Transceiver with Clock Recovery

Features

- ☑ *Designed for ATM/SONET/SDH OC-12/STM-4 Applications*
- ☑ *Supports 500 meter Link Distance*
- ☑ *Multi-sourced 2x9 package style*
- ☑ *Duplex SC or ST or FC connector*
- ☑ *- 40°C to +85°C Operating Temperature ("A" option)*
- ☑ *Single +5 V supply & PECL interface*
- ☑ *Conductive Plastic or Metal Package*
- ☑ *Wave Solder & Aqueous Wash Process Compatible*

Description

The DTC-12-MM fiber optic transceivers with clock recovery offer a simple, convenient way to interface ATM/SONET/SDH OC-12/STM-4 PCBs to multimode fiber optic cables running at 1300 nm wavelength.

The transmit and receive functions are contained in a two-row, 18-pin (2x9) package with a Duplex SC or ST or FC connector interface. The transmitter uses a high performance InGaAsP LED and incorporates all the necessary control and driver circuit for converting PECL data to light. The receiver uses an InGaAs/InP PIN photodiode to convert the light signal into an electrical current which is amplified and resampled using internal clock recovery (PLL) to generate PECLdata and clock.

The transceiver operates from a single +5V supply over an operating temperature range of 0°C to +70°C ("B" option) or - 40°C to +85°C ("A" option). The package is made of either *conductive* plastic with black color (Duplex-SC version) or metal (FC and ST version) for excellent EMI shielding. For even extra protection, an optional EMI shield for making direct contact from the SC connector to the equipment chassis opening is also available.

Related OC-12/STM-4 tranceivers with clock recovery

DTC-12-3.3-MM: 3.3 volt LED multimode transceivers

DTC-12, DTC-12-H, DTC-12-S & DTC-12-3.3 &

DTC-12-3.3-S: 5 V & 3.3 V laser single mode transceivers

Absolute Maximum Ratings

Parameter		Symbol	Minimum	Maximum	Units
Storage Temperature		T_{st}	- 40	+ 85	°C
Operating Temperature	"A" option	T_{op}	- 40	+ 85	°C
	"B" option		0	+ 70	
Supply Voltage		V_{CC}	0	+ 6.0	V
Input Voltage		V_{in}	0	V_{CC}	V
Output Current		I_O	-	50	mA
Lead Soldering Temperature & Time		-	-	260°C, 10 sec	

DTC-12-MM

Transmitter Performance Characteristics (over Operating Case Temperature Range)

Parameter	Symbol	Minimum	Typical	Maximum	Units
Data Rate	B	DC	622	700	Mb/s
Optical Output Power [1]	P_o	- 20.0	- 18.0	- 14.0	dBm
Center Wavelength	λ_c	1270	-	1380	nm
Spectral Width (FWHM)	$\Delta\lambda_{FWHM}$	-	140	200	nm
Optical Rise and Fall Time (10% to 90%)	t_r, t_f	-	1.0	1.25	ns
Extinction Ratio	P_{hi}/P_{lo}	10	-	-	dB
Random Jitter (peak-to-peak)	RJ	-	-	0.13	ns
Duty Cycle Distortion (peak-to-peak)	DCD	-	-	0.4	ns

[1] Measured average power coupled into 62.5/125 μm, 0.275 NA graded-index multimode fiber. The minimum power specified is at Beginning-of-Life (BOL).

Receiver Performance Characteristics (over Operating Case Temperature Range)

Parameter		Symbol	Minimum	Typical	Maximum	Units
Data Rate		B	622.08 - 50 ppm	622.08	622.08 + 50 ppm	Mb/s
Receiver Sensitivity (10^{-10} BER) [1]		P_{min}	- 26.0	- 28.0	-	dBm
Maximum Input Optical Power (10^{-10} BER) [1]		P_{max}	- 14.0	- 12.0	-	dBm
Signal Detect Thresholds	Increasing Light Input	P_{sd+}	-	-	- 26.0	dBm
	Decreasing Light Input	P_{sd-}	- 40.0	-	-	
Signal Detect Hysteresis			-	1.0	-	dB
Wavelength of Operation		λ	1100	-	1600	nm
Output Clock Jitter		CLK_J	-	-	0.01	Ulrms
Jitter Tolerance & Transfer Function		compliant with ITU Recommendation G.958				

[1] Specified in Average Optical Input Power and measured at 622 Mb/s and 1300 nm wavelength with 2^{23}-1 PRBS.

Transmitter Electrical Interface (over Operating Case Temperature Range)

Parameter	Symbol	Minimum	Typical	Maximum	Units
Input HIGH Voltage	V_{IH}	V_{CC} - 1.165	-	V_{CC} - 0.700	V
Input LOW Voltage	V_{IL}	V_{CC} - 1.890	-	V_{CC} - 1.475	V
Data Input Current - HIGH	I_H	-	-	350	μA
Data Input Current - LOW	I_L	-	-	250	μA

Receiver Electrical Interface (over Operating Case Temperature Range)

Parameter	Symbol	Minimum	Typical	Maximum	Units
Output HIGH Voltage	V_{OH}	V_{CC} - 1.200	-	V_{CC} - 0.700	V
Output LOW Voltage	V_{OL}	V_{CC} - 2.000	-	V_{CC} - 1.620	V
Output Current	I_O	-	-	25	mA

Electrical Power Supply Characteristics (over Operating Case Temperature Range)

Parameter		Symbol	Minimum	Typical	Maximum	Units
Supply Voltage		V_{CC}	4.75	5.0	5.25	V
Supply Current	TX	I_{CC}	-	120	150	mA
	RX	I_{CC}	-	160	220	mA
Power Dissipation		P	-	1400	1950	mW

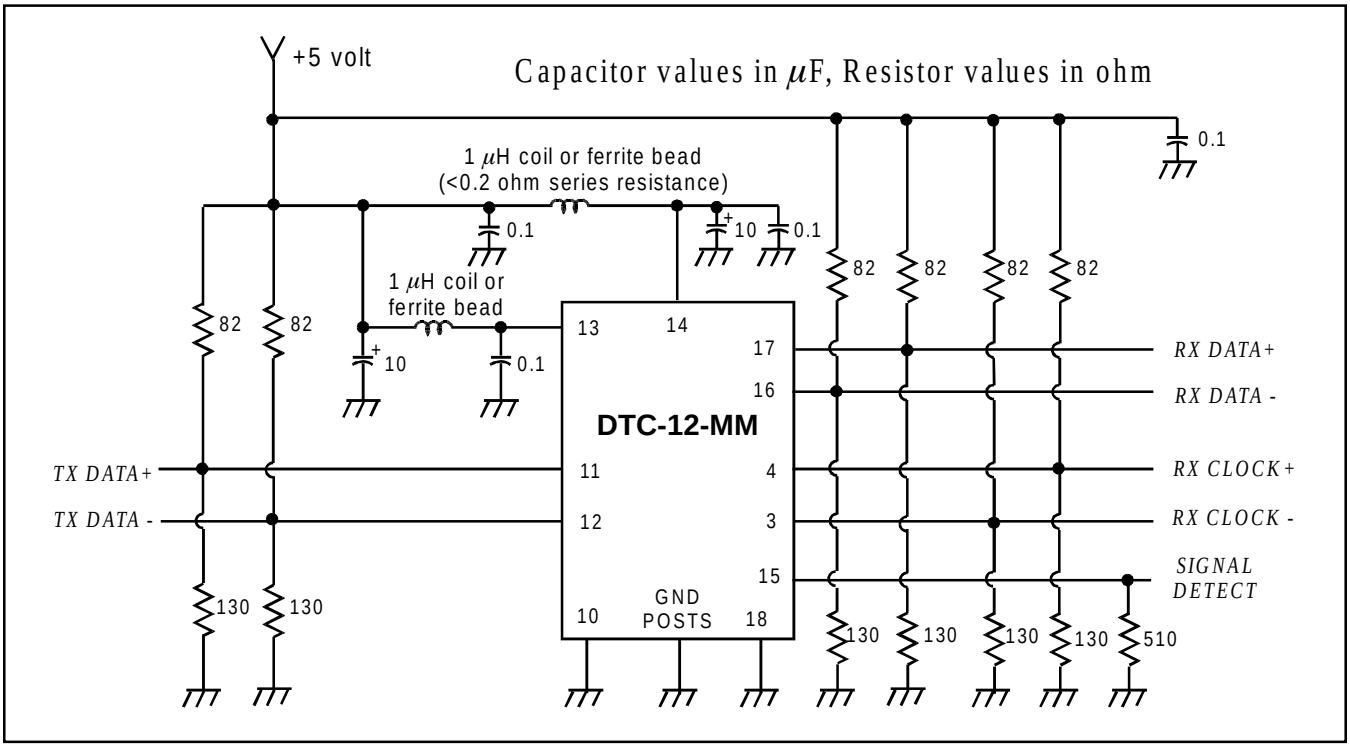
Application Notes

Transmitter: When the DATA+ input is at logic HIGH and DATA- input is at logic LOW, the LED is ON; and vice versa. In single-ended applications, the unused input pin should be biased to V_{CC} - 1.29 V.

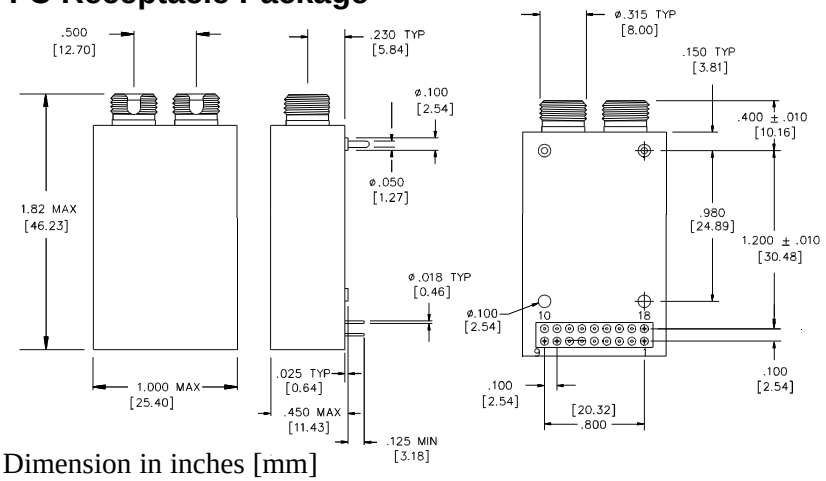
Receiver: Both differential outputs (DATA+ and DATA-, CLOCK+ and CLOCK-) are PECL levels requiring termination (50 ohms to V_{CC} - 2 volts or 510 ohms to *GRD* is recommended). For optimum performance, both outputs should be terminated in the same manner, even if only one is used.

The Signal Detect circuit monitors the level of the incoming optical signal and generates a PECL logic LOW signal when insufficient photocurrent is produced. When this happens, the clock is locked to an internal reference frequency and provides an output CLOCK frequency of 622.08 ± 0.2 MHz. In addition, the DATA+ output is held at static logic LOW and the DATA- output is held at static logic HIGH. The SIGNAL DETECT output is PECL level requiring termination (510 ohms to *GND* is recommended).

Interface circuit: The power supply line should be well-filtered. All 0.1 μF power supply bypass capacitors should be as close to the DTC transceiver module as possible. The two front GND posts should be grounded to Circuit Ground or Chassis Ground.

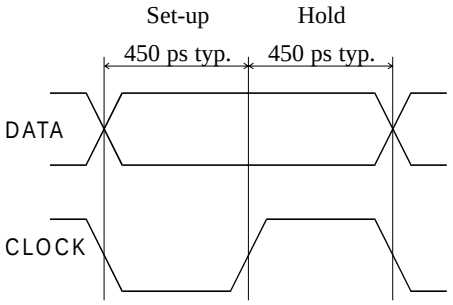


FC Receptacle Package



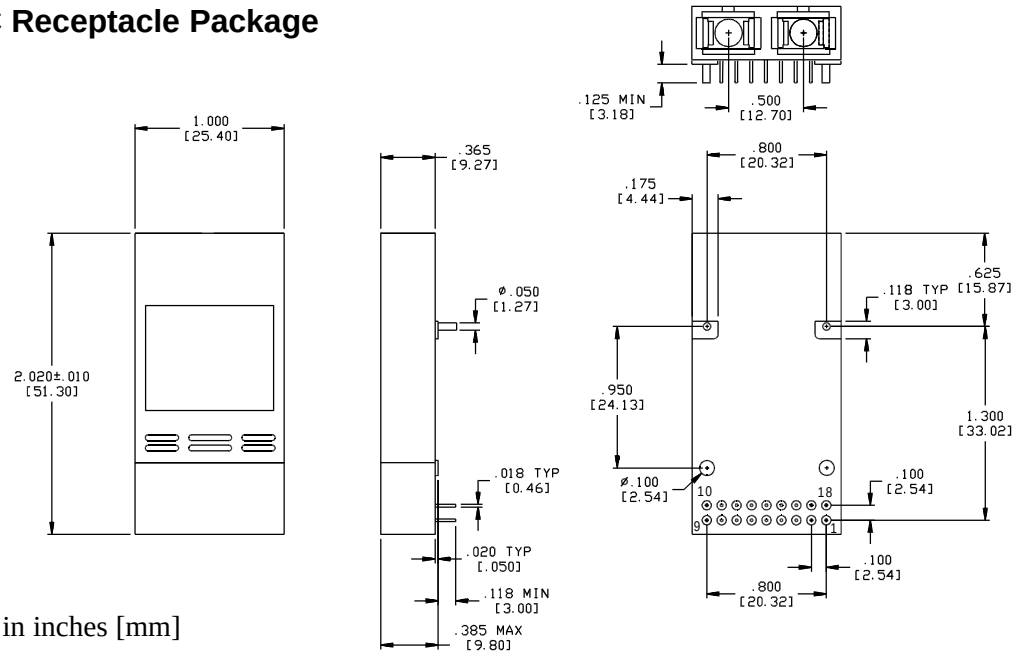
Dimension in inches [mm]

DATA & CLOCK Timing



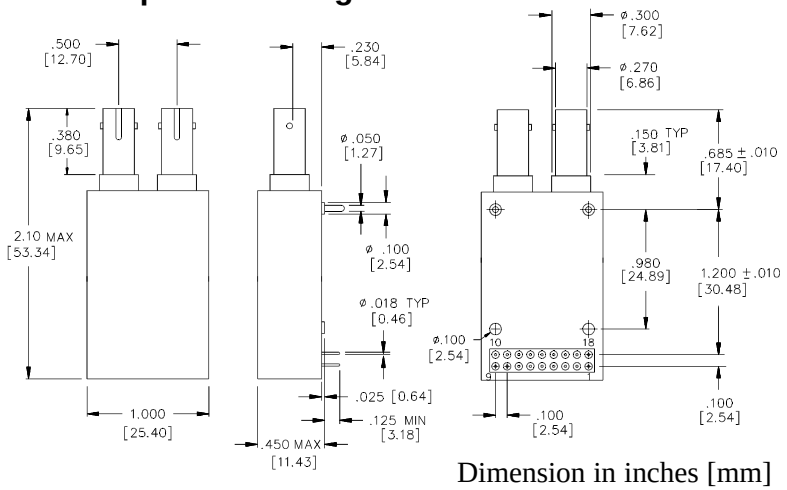
DTC-12-MM

Duplex SC Receptacle Package



Dimension in inches [mm]

ST Receptacle Package



Dimension in inches [mm]

PIN	FUNCTION	PIN	FUNCTION
1	N/C	10	TX GND
2	N/C	11	TD+ (TX DATA IN +)
3	CLOCK -	12	TD- (TX DATA IN -)
4	CLOCK +	13	V_{CC}TX
5	N/C	14	V_{CC}RX
6	N/C	15	SD (RX SIGNAL DETECT)
7	N/C	16	RD- (RX DATA OUT -)
8	N/C	17	RD+ (RX DATA OUT +)
9	N/C	18	RX GND

Related Products

DTR-622: OC-12/STM-4 1300 nm LED-based Transceivers without Clock Recovery (1x9 package)
DTR-622-SM, DTR-622-SM2: OC-12/STM-4 Laser based Transceivers without Clock Recovery (1x9 or 2x9 pkg)
STX-12 & STX-12-LED: OC-12/STM-4 Laser Transmitter or LED Transmitter (multi-sourced 20-pin DIP)
SRC-12, SRX-12, SRX-12-L: OC-12/STM-4 Receivers with or without Clock Recovery (multi-sourced 20-pin DIP)

Ordering Information

DTC - 12 - MM - *XX* -*T*

Receptacle
"Blank" : SC Receptacle
ST : ST Receptacle
FC : FC Receptacle

Temperature Range
A: - 40°C to 85°C
B: 0°C to 70°C

Note: If the optional EMI shield is required, the Part Description is DTC-12-MM-*XX*-*T*-ES

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Contents