T-41-91

EPITAXX INC.
OPTOELECTRONIC DEVICES

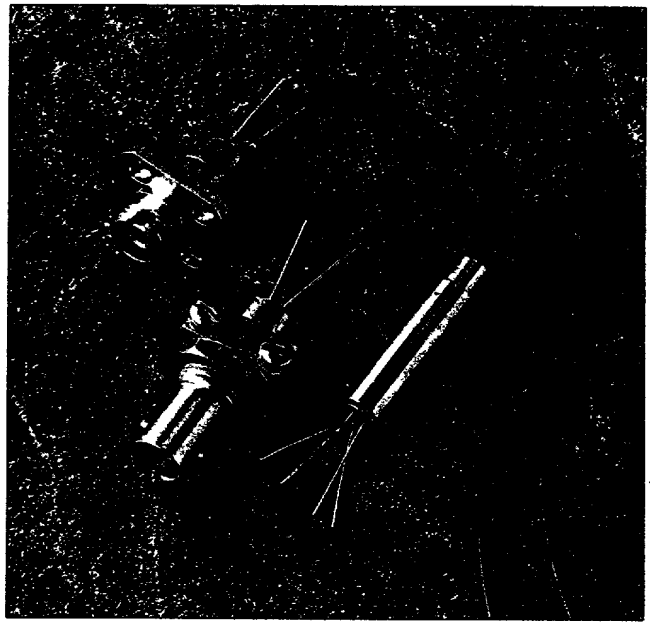
ERM506

Sonet OC-24
PIN-Transimpedance Amplifier
Receiver Modules

Preliminary Product Specification

FEATURES

* InGaAs PIN Photodiode and GaAs Transimpedance Amplifier
* Meets Sonet sensitivity and overload requirements
* Automatic Gain Control
* Integrated 4-pin Package
* Connector receptacle and fiber pigtailed versions



APPLICATIONS

* Sonet receivers
  - Add/Drop Multiplexers
  - Digital Loop Carriers
  - Digital Crossconnects
  - Optical Network Units
* HIPPI
* Fiber optic receivers from 10 Mb/s to 1.5 Gb/s

DESCRIPTION

The ERM506 is an optical receiver module that incorporates a high-speed PIN photodetector coupled with a low noise transimpedance amplifier (TIA) for 1300 or 1550 nm optical communications. The function of the PIN-TIA module is to detect input optical power, to transduce the incident radiation into current, and to convert the current into a voltage. The ERM506 receiver module is compliant with the OC-24 transmission rate of the Synchronous Optical Network (SONET) standard.

The ERM506 is mounted in a variety of rugged coaxial packages. It is available within a connector receptacle or with a fiber pigtail. Standard choices for connector receptacles are ST and FC. The customer can specify the pigtail to be either fiber jacketed (FJ) or cabled fiber (FC) and the fiber to be singlemode or multimode. EPITAXX engineers are available for evaluating any special packaging requirements.

3490 U.S. ROUTE ONE • PRINCETON, NJ 08540 • (609) 452-1188 • FAX (609) 452-0824 • TELEX 759363

AC/OPTICAL CHARACTERISTICS

(V_{DD} = +5.0V, V_{PD} = -5.0V, T_A = 25°C, R_L = 50 Ohms)

Model	ERM506FJ-S/M			ERM506RFC/RST			
Parameter	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Gain	0.75	1.2		0.75	1.0		V/mW
Bandwidth[1]	850	1000		850	1000		MHz
Sensitivity[2]	-28	-29.5		-27.5	-29		dBm
Overload[2]	-3	0		-3	0		dBm
AGC Threshold Power		50			50		uW
Output Impedance		50			50		Ohms

DC ELECTRICAL CHARACTERISTICS

Model	All Models			
Parameter	Min.	Typ.	Max.	Units
Supply Voltage V_{DD}	4.5	5.0	6.0	V
Detector Voltage V_{PD}	0	-5.0	-25.0	V
Output Offset Voltage	1.3	1.8	2.2	V
Supply Current I_{DD}		35		mA

MAXIMUM RATINGS

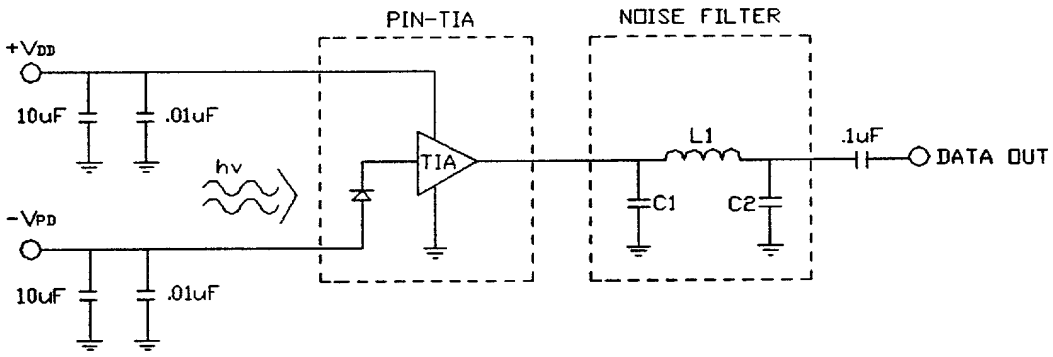
Parameter	All Models	Units
Supply Voltage V_{DD}	7.0	V
Detector Voltage V_{PD}	-25.0	V
Optical Power[3]	2.0	mW
Operating Temp. T_A	-40/+85	°C
Storage Temp.	-40/+85	°C

Notes :

1. Input optical power below AGC Threshold.
2. Bit Error Rate of 1E-10. Noise bandwidth of 830 MHz.
3. Damage may occur if maximum power rating is exceeded.

T-41-91

TYPICAL APPLICATION CIRCUITRY



Low-Pass Noise Filter Design (R_L = 50 Ohms)

Cutoff Freq.(MHz)	C1,C2 (pF)	L1 (nH)
700	6.8	18
830	5.6	15
900	4.7	15

EXTERNAL CIRCUITRY REQUIREMENTS

When designing the ERM506 into an optical receiver, standard high speed PC board design practices should be observed. Both power supplies should be properly bypassed as shown in the above circuit, with the capacitors placed as close to the PIN-TIA leads as possible. If signal traces are relatively long, impedance matching techniques should be used to maximize power transfer from the PIN-TIA to its load. For microstrip design, assume the output impedance of the PIN-TIA is 50 ohms.

Note as well that the output of the PIN-TIA is DC coupled, and should be externally AC coupled so that its DC bias point is not disturbed. A 0.1uF chip capacitor should be sufficient to avoid excessively attenuating low frequency components of the transmitted data. To eliminate the possibility of oscillations, the PIN-TIA should be mounted on a circuit board with a large, low impedance ground plane. The module's leads should be kept as short as possible to reduce excess inductances.

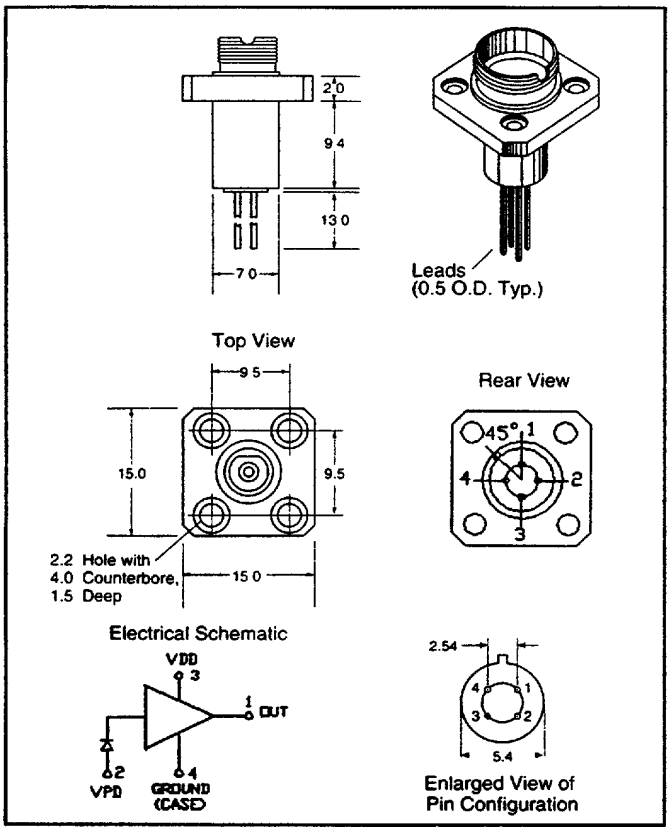
NOISE FILTERING

The bandwidth of the ERM506 is greater than that required for receiving an OC-24 signal. The ERM506 has a typical bandwidth of 1.0 GHZ, whereas reception of an OC-24 transport at 1.24 Gb/s requires a bandwith of approximately 830 MHz from the relation : Data Rate = 1.5 * Bandwidth. Any frequency component above this bandwidth contributes excess noise to the output. A simple 3-pole noise filter as shown above will properly attenuate high frequency noise components and provide maximum receiver sensitivity.

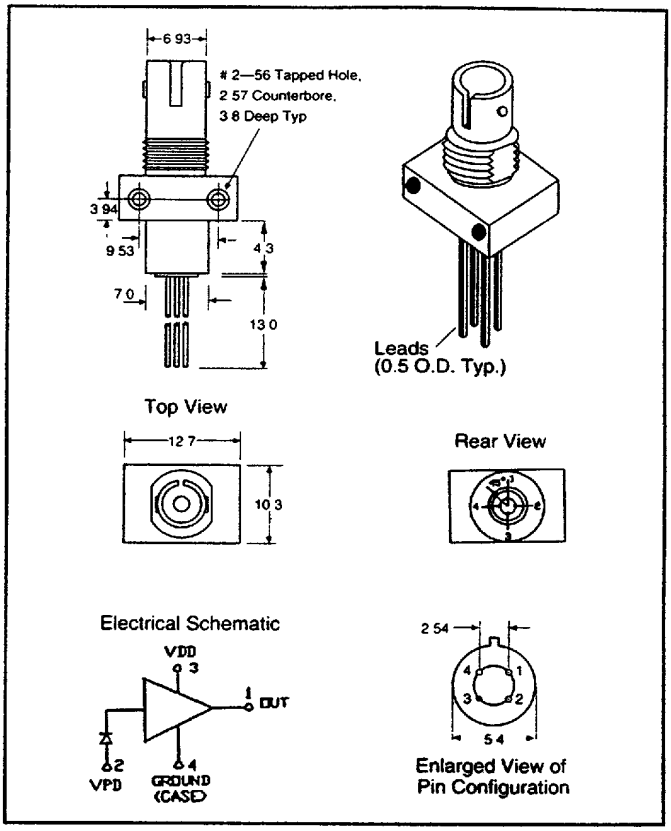
T-41-91

MECHANICAL DIMENSIONS - All Dimensions in mm

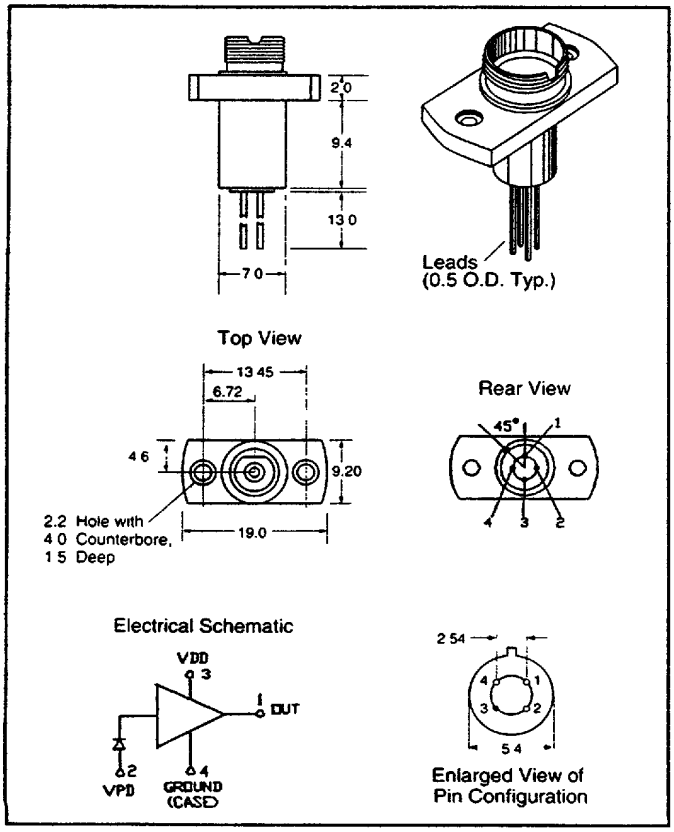
ERM506RFC



ERM506RST



ERM506RFC2



ERM506FJ/FC