

# Dual Drive 10Gb/s LN Modulator with Monitor PD

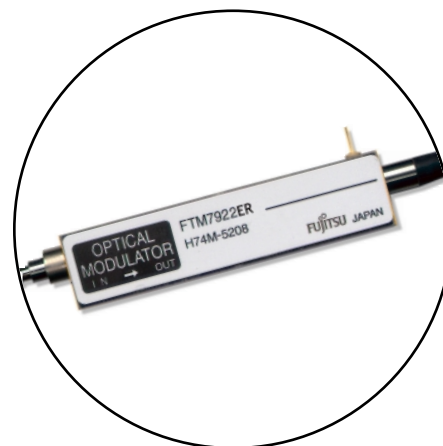
# FTM7922ER

## FEATURES

- Z-Cut Design Supports Low Drive Voltages
- Zero Chirp Differential Input Design
- Integrated Monitor Photodiode
- GPO RF Input Connectors

## DESCRIPTION

The FTM7922ER is a Ti:LiNbO<sub>3</sub> Dual Drive Mach-Zehnder modulator with a modulation speed of up to 10.7 Gb/s. This optical modulator integrates a monitor PD chip and coupler function for the automatic bias control (ABC) to compensate for DC-drift and other phenomena.



## ABSOLUTE MAXIMUM RATINGS (Tc=25°C, Unless otherwise specified)

| Parameter                   | Symbol                | Condition | Limits |      |      | Unit |
|-----------------------------|-----------------------|-----------|--------|------|------|------|
|                             |                       |           | Min.   | Typ. | Max. |      |
| Storage Temperature         | T <sub>stg</sub>      | Ambient   | -40    | -    | 85   | °C   |
| Operating Case Temperature  | T <sub>op</sub>       | Case      | -5     | -    | 75   | °C   |
| Storage Relative Humidity   | RH <sub>stg</sub>     |           | 30     | -    | 85   | %    |
| Operating Relative Humidity | RH <sub>op</sub>      |           | 30     | -    | 85   | %    |
| DC Input Voltage            | V <sub>in</sub> (DC)  |           | -      | -    | ±16  | V    |
| Optical Input Power         | P <sub>in</sub> (opt) |           | -      | -    | 50   | mW   |
| Monitor PD Reverse Voltage  | V <sub>RM</sub>       |           | -      | -    | 20   | V    |
| Monitor PD Reverse Current  | I <sub>RM</sub>       |           | -      | -    | 1    | mA   |
| Monitor PD Forward Current  | I <sub>FM</sub>       |           | -      | -    | 3    | mA   |

## ELECTRICAL CHARACTERISTICS (Tc = -5 ~ 75°C, 20 years Unless otherwise specified)

| Parameter          | Symbol            | Condition                                                   | Limit |      |      | Unit |
|--------------------|-------------------|-------------------------------------------------------------|-------|------|------|------|
|                    |                   |                                                             | Min.  | Typ. | Max. |      |
| Operating Bit Rate | -                 |                                                             | 10.7  | -    | -    | Gb/s |
| Drive Voltage      | V <sub>π</sub>    | At 10.7 Gb/s,<br>Complementary Drive                        | -     | -    | 2.6  | V    |
| Drive Voltage      | V <sub>π</sub>    | At low frequency,<br>single drive,<br>and at each electrode | -     | -    | 4.0  | V    |
| DC Bias Voltage    | V <sub>Bias</sub> | Note (1), Tc=45°C, 20 years                                 | -6.0  | -    | 6.0  | V    |
| RF Input Impedance | Z <sub>in</sub>   | Internally Terminated                                       | 39    | 50   | -    | Ω    |
| RF Return Loss     | S <sub>11</sub>   | 130MHz ~ 5GHz                                               | 13    | -    | -    | dB   |
|                    |                   | 5GHz ~ 10GHz                                                | 10    | -    | -    |      |

Note 1. The DC bias can be applied to either electrode separately or both electrodes simultaneously. The total DC bias voltage is equal to |V<sub>op1</sub>-V<sub>op2</sub>|.

## OPTICAL SPECIFICATIONS (Tc=-5 ~ 75°C, 20 years)

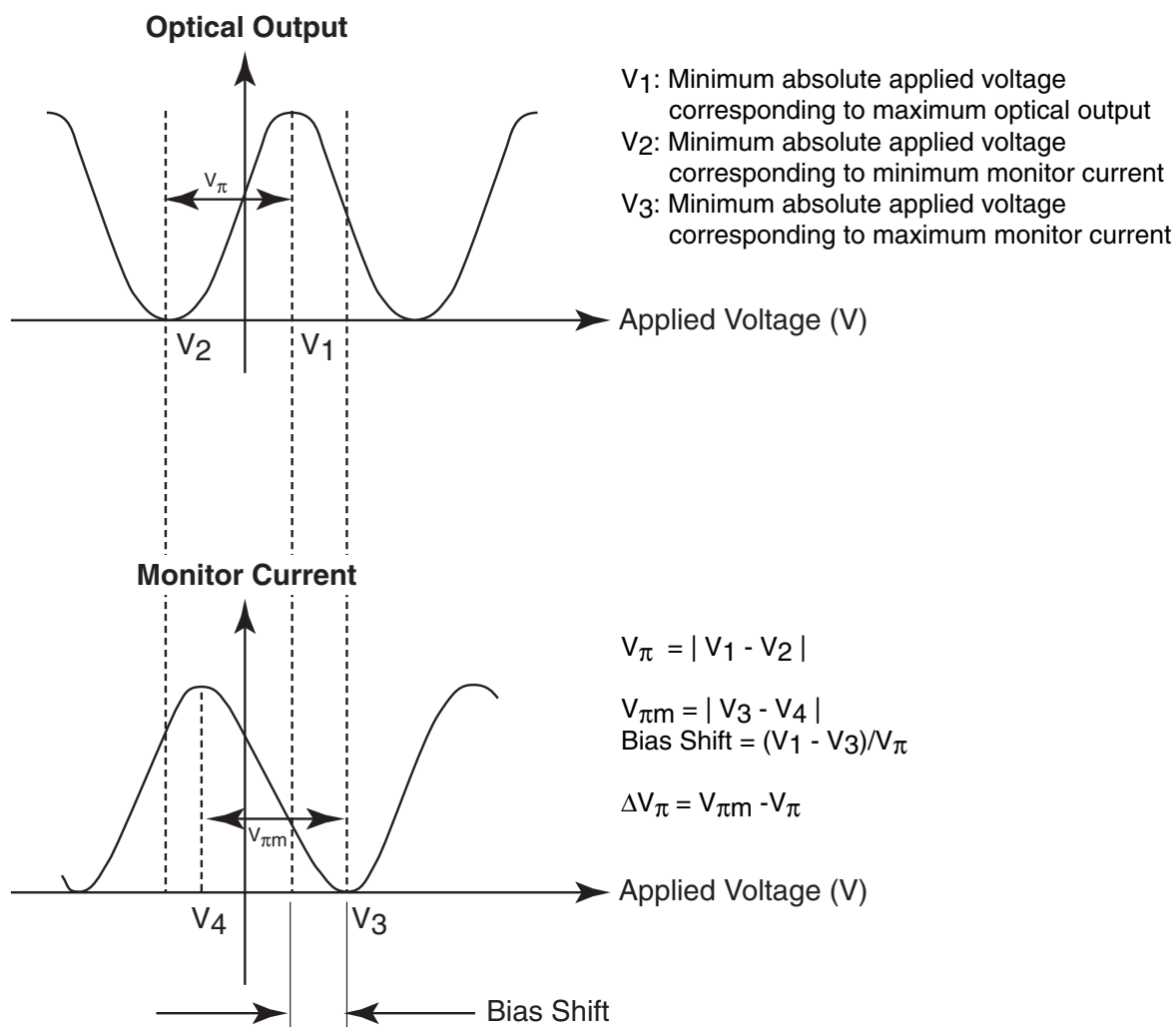
| Parameter               | Symbol         | Condition                                 | Limit |      |      | Unit |
|-------------------------|----------------|-------------------------------------------|-------|------|------|------|
|                         |                |                                           | Min.  | Typ. | Max. |      |
| Optical Bandwidth       | BW             | 3dB Down Relative to 130MHz, Small-signal | 8.5   | -    | -    | GHz  |
| Operating Wavelength    | $\lambda_{op}$ | C Band                                    | 1530  | -    | 1570 | nm   |
|                         |                | L Band                                    | 1570  | -    | 1610 |      |
| On/Off Extinction Ratio | $R_{ext}$      | At Low Frequency                          | 18    | -    | -    | dB   |
|                         |                | At 10.7Gb/s Complementary Drive           | 12    | -    | -    |      |
| Optical Return Loss     | ORL            | BOL, Input Port                           | 35    | -    | -    | dB   |
|                         |                | EOL, Input Port                           | 30    |      |      |      |
| Optical Insertion Loss  | IL             | C Band, No Connector                      | -     | -    | 6.0  | dB   |
|                         |                | L Band, No Connector                      | -     | -    | 7.0  |      |

## ELECTRO-OPTICAL SPECIFICATIONS OF MONITOR PD (Tc=-5 ~ 75°C, 20 years)

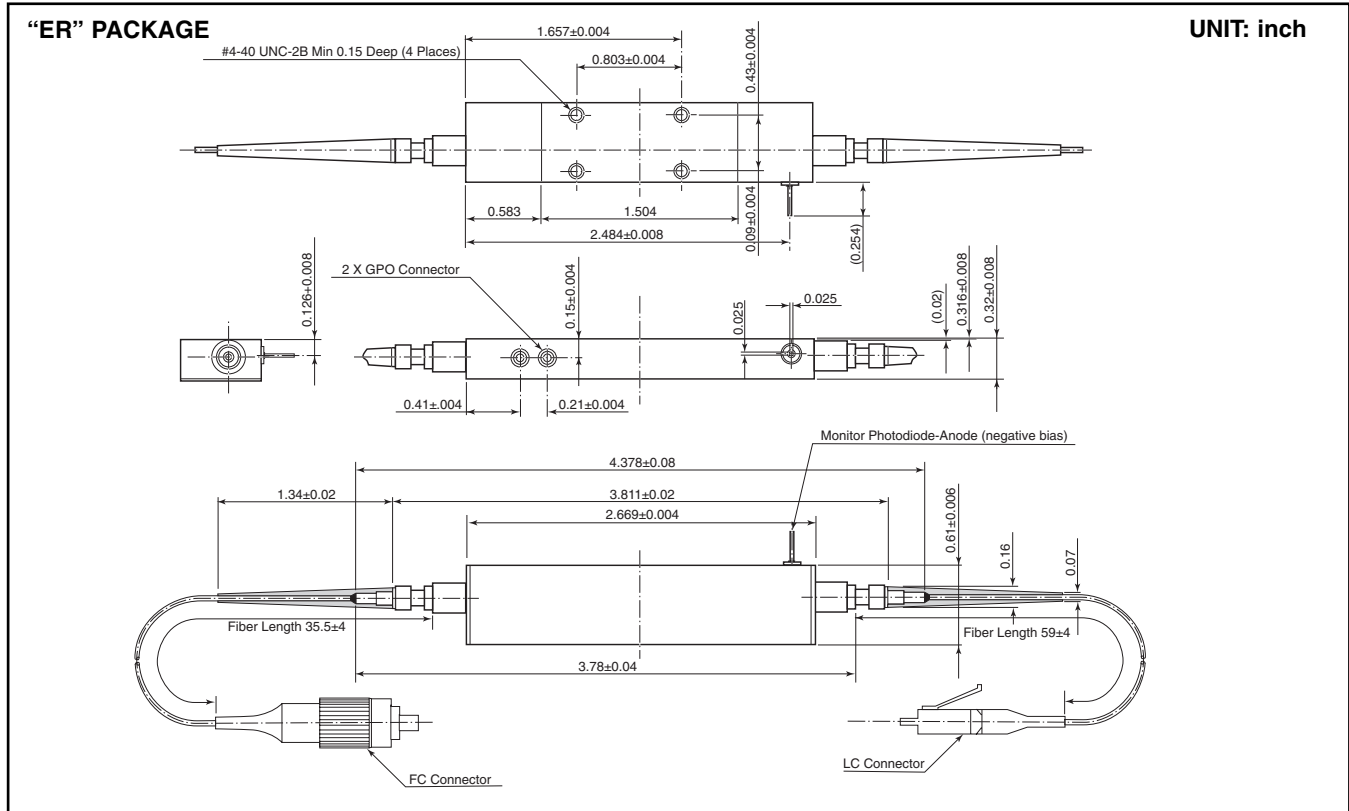
| Parameter                       | Symbol           | Condition                   | Limit  |      |       | Unit |
|---------------------------------|------------------|-----------------------------|--------|------|-------|------|
|                                 |                  |                             | Min.   | Typ. | Max.  |      |
| Responsivity                    | RmAC             | -                           | 0.0023 | -    | 0.022 | A/W  |
| Bias Shift                      | -                | Note (1)                    | -0.05  | -    | 0.05  | %    |
| Monitor PD $V_{\pi}$ Difference | $\Delta V_{\pi}$ | Difference at Low Frequency | -0.3   | -    | 0.3   | V    |

Note 1. Reference Table 1 for explanation

Table 1



Note: These measurements are performed at a low frequency of  $\leq 100\text{Hz}$ .



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