

Optribution® Modules L-Band



Products:

DEV 7231	Basic Optribution® Transmitter; 950...2150 MHz
DEV 7232	Advanced Optribution® Transmitter; 950...2150 MHz
DEV 7233	Top Performance Optribution® Transmitter; 700...2300 MHz
DEV 7241	Basic Twin Optribution® Transmitter; 950...2150 MHz
DEV 7331	Basic Optribution® Receiver; 950...2150 MHz
DEV 7332	Advanced Optribution® Receiver; 950...2150 MHz
DEV 7333	Top Performance Optribution® Receiver; 700...2300 MHz
DEV 7341	Basic Twin Optribution® Receiver; 950...2150 MHz

Features:

- ▀ Various optical transmitter (Tx) modules and optical receiver (Rx) modules for (extended) L-Band applications
- ▀ Adjustable gain and tilt feature for selected optical modules
- ▀ Limiter functionality to prevent clipping of laser diode (DEV 7232)
- ▀ Automatic OMI optimization (DEV 7233)
- ▀ RF sensing feature for all optical modules
- ▀ RF monitoring port for selected optical modules
- ▀ Bias supply with bias current monitoring for Tx modules
- ▀ Available wavelength options for CWDM applications
- ▀ Selectable optical connector types:
FC/APC, E2000 HRL, or SC/APC

Technical Data

Common Specifications

Laser & Optical Connector

Laser type	DFB
Laser class (according to IEC 60 825-1)	Class 1M (low risk to eyes, no risk to skin)
Fiber type	Single mode 9/125 μ m
Connector options	Option 07: FC/APC Option 08: E2000 HRL Option 09: SC/APC
Wavelength Rx modules	1100...1650 nm
Available wavelength Tx modules	Option λ 0: 1310 nm (available for DEV 7232 and DEV 7233) Option λ 1: 1470 nm (available for DEV 7233) Option λ 2: 1490 nm (available for DEV 7233) Option λ 3: 1510 nm (available for DEV 7233) Option λ 4: 1530 nm (available for DEV 7233) Option λ 5: 1550 nm (available for DEV 7232 and DEV 7233) Option λ 6: 1570 nm (available for DEV 7233) Option λ 7: 1590 nm (available for DEV 7233) Option λ 8: 1610 nm (available for DEV 7233)

Bias & Bias Current Alarm (Tx modules, only)

Bias	15+3/-0 V; max. 500 mA
Adjustable level setting:	
• Upper alarm level	max. 400 mA (DEV factory setting: 350 mA)
• Lower alarm level	min. 50 mA (DEV factory setting: 100 mA)
Alarm indication	Via LED on the front panel & via remote communication

RF Sensing

Adjustable threshold level	0 dBm > threshold level > -50 dBm (DEV factory setting: -40 dBm)
Threshold level accuracy	\pm 3 dBm
Threshold repeatability	<0.5 dB
Alarm indication	Via LED on the front panel & via remote communication

General Specifications

Power consumption	DEV 7231: 15 V; 200 mA (without bias) DEV 7232: 15 V; 250 mA (without bias) DEV 7232: 15 V; 250 mA (without bias) DEV 7241: 15 V; 400 mA (without bias) DEV 7331: 15 V; 200 mA DEV 7332: 15 V; 250 mA DEV 7333: 15 V; 250 mA DEV 7341: 15 V; 400 mA
Size	3 RU (133 mm), 4 HP (20 mm), 100 mm depth
Weight	~0.5 kg (Tx) ~0.3 kg (Rx)
Environmental conditions	ETS 300019 Part 1-3 Class 3.1

Technical Data (cont.)

Link Specifications DEV 7231 & DEV 7331 or DEV 7241 & DEV 7341

RF Specifications

Frequency range	950...2150 MHz	
Link gain	5±2 dB	
Amplitude frequency response	±1.5 dB ±0.2 dB	(950...2150 MHz) (in any 36 MHz window)
Return loss	>14 dB, typ. 16 dB	
Gain stability	±2 dB	(0...+50 °C / 32...122 °F)
Group delay distortion	<2 ns	
Nominal RF input level	-10 dBm	(total power)
Noise figure	24 dB	
SFDR _{2/3} ¹	107 dBc	
CNR ^{2 3 4}	74 dB	
Output IP3	16 dBm	
OP1dB	-1 dBm	
Intermodulation distortion	>40 dBc	(@ 2 tones, -13 dBm each)
Input dynamic range ³	-45...-6 dBm	(total power)
Damage RF input level	12 dBm	(total power)
Damage optical input level	10 dBm	
Optical power output	1 mW / 0 dBm	
Maximum theoretical optical budget ^{2 3 5}	20 dB	

- ¹ P_{in} = -15 dBm, IM3 = 48 dBc
- ² P_{in} = -15 dBm
- ³ 36 MHz window
- ⁴ with back to back fiber connection (2 m)
- ⁵ minimum 10 dB CNR margin

Technical Data (cont.)

Link Specifications DEV 7231 & DEV 7332

RF Specifications

Frequency range	950...2150 MHz	
Link gain	6±2 dB	
Adjustable gain	15 dB	
Amplitude frequency response	±1.5 dB ±0.2 dB	(950...2150 MHz) (in any 36 MHz window)
Return loss	>14 dB, typ. 16 dB	
Gain stability	±2 dB	(0...+50 °C / 32...122 °F)
Group delay distortion	<2 ns	
Nominal RF input level	-10 dBm	(total power)
Noise figure	25 dB	
SFDR _{2/3} ¹	106 dBc	
CNR ^{2 3 4}	73 dB	
Output IP3	16 dBm	
OP1dB	+11 dBm	
Intermodulation distortion	>40 dBc	(@ 2 tones, -13 dBm each)
Input dynamic range ³	-60...-6 dBm	(total power)
Damage RF input level	12 dBm	(total power)
Damage optical input level	10 dBm	
Optical power output	1 mW / 0 dBm	
Maximum theoretical optical budget ^{2 3 5}	26 dB	

Monitoring Port (DEV 7332)

Impedance, connector	50 Ohm, SMA (f)
Return loss	>18 dB typ.
Frequency response	= output level – 20 dB ±1 dB

1 P_{in} = -15 dBm, IM3 = 44 dBc
 2 P_{in} = -15 dBm
 3 36 MHz window
 4 with back to back fiber connection (2 m)
 5 minimum 10 dB CNR margin

Technical Data (cont.)

Link Specifications DEV 7232 & DEV 7332

RF Specifications

Frequency range	950...2150 MHz	
Link gain	2±2 dB	
Adjustable gain	15 dB	
Amplitude frequency response	±1.5 dB ±0.15 dB	(950...2150 MHz) (in any 36 MHz window)
Return loss	>14 dB, typ. 16 dB	
Gain stability	±2 dB	(0...+50 °C / 32...122 °F)
Group delay distortion	<2 ns	
Nominal RF input level	0 dBm	(total power)
Noise figure	30 dB	
SFDR _{2/3} ¹	109 dBc	
CNR ^{2 3 4}	70 dB	
Output IP3	34 dBm	
OP1dB	+11 dBm	
Intermodulation distortion	>40 dBc	(@ 2 tones, -3 dBm each)
Input dynamic range	-50...+15 dBm	(total power)
Damage RF input level	15 dBm	(total power)
Damage optical input level	10 dBm	
Optical power output	2 mW / 3 dBm	
Maximum theoretical optical budget ^{2 3 5}	25 dB	

Monitoring Port

Impedance, connector	50 Ohm, SMA (f)
Return loss	>18 dB typ.
Frequency response	= input level – 24 dB ±1 dB (Tx) = output level – 20 dB ±1 dB (Rx)

1 P_{in} = -15 dBm, IM3 = 49 dBc
 2 P_{in} = -15 dBm
 3 36 MHz window
 4 with back to back fiber connection (2 m)
 5 minimum 10 dB CNR margin

Technical Data (cont.)

Link Specifications DEV 7233 & DEV 7333

RF Specifications

Frequency range	700...2300 MHz	
Link gain	22±2 dB	
Adjustable gain	15 dB	
Adjustable tilt	3 dB	
Amplitude frequency response	±1.5 dB ±0.15 dB	(700...2300 MHz) (in any 36 MHz window)
Return loss	>14 dB, typ. 16 dB	
Gain stability	±2 dB	(0...+50 °C / 32...122 °F)
Group delay distortion	<2 ns	
Nominal RF input level	-25 dBm	(total power)
Noise figure	14 dB	
SFDR _{2/3} ¹	117 dBc	
CNR ^{2 3 4}	98 dB	
Output IP3	31 dBm	
OP1dB	+11 dBm	
Intermodulation distortion	>40 dBc	(@ 2 tones, -13 dBm each)
Input dynamic range	-78...+15 dBm	(total power)
Dynamic range		
automatic OMI optimization	-27...+15 dBm	(total power)
Damage RF input level	15 dBm	(total power)
Damage optical input level	10 dBm	
Optical power output	2 mW / 3 dBm	
Maximum theoretical optical budget ^{2 3 5}	35 dB	

Monitoring Port

Impedance, connector	50 Ohm, SMA (f)
Return loss	>18 dB typ.
Frequency response	= input level – 24 dB ±1 dB (Tx) = output level – 20 dB ±1 dB (Rx)

- 1 $P_{in} = -15$ dBm, IM3 = 41 dBc
- 2 $P_{in} = -15$ dBm
- 3 36 MHz window
- 4 with back to back fiber connection (2 m)
- 5 minimum 10 dB CNR margin

Order Information

Optical Transmitter Modules L-Band

DEV 7231	Basic Optribution® Transmitter; 950...2150 MHz
DEV 7232	Advanced Optribution® Transmitter; 950...2150 MHz
Option Lambda 0	λ0: 1310 nm
Option Lambda 5	λ5: 1550 nm
DEV 7233	Top Performance Optribution® Transmitter; 700...2300 MHz
Option Lambda 0	λ0: 1310 nm
Option Lambda 1	λ1: 1470 nm
Option Lambda 2	λ2: 1490 nm
Option Lambda 3	λ3: 1510 nm
Option Lambda 4	λ4: 1530 nm
Option Lambda 5	λ5: 1550 nm
Option Lambda 6	λ6: 1570 nm
Option Lambda 7	λ7: 1590 nm
Option Lambda 8	λ8: 1610 nm
DEV 7241	Basic Twin Optribution® Transmitter; 950...2150 MHz
Optical Connectors for Optical Transmitter Modules	
Option 07	Optical connectors FC/APC
Option 08	Optical connectors E2000 HRL
Option 09	Optical connectors SC/APC

Optical Receiver Modules L-Band

DEV 7331	Basic Optribution® Receiver; 950...2150 MHz
DEV 7332	Advanced Optribution® Receiver; 950...2150 MHz
DEV 7333	Top Performance Optribution® Receiver; 700...2300 MHz
DEV 7341	Basic Twin Optribution® Receiver; 950...2150 MHz
Optical Connectors for Optical Receiver Modules	
Option 07	Optical connectors FC/APC
Option 08	Optical connectors E2000 HRL
Option 09	Optical connectors SC/APC

Contact

DEV Systemtechnik GmbH & Co. KG
 Grüner Weg 4A
 61169 Friedberg
 GERMANY
 Phone: +49 6031 6975 100
 Fax: +49 6031 6975 114
 info@dev-systemtechnik.com
 www.dev-systemtechnik.com

DEV America LP
 info@dev-america.com
 www.dev-america.com

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Technical specifications are subject to change