



EMCORE's Model 3955 DFB laser in TO-can offers a low cost solution for linear fiberoptic links. These components can be cooled with external thermo-electric coolers for high stability, or run without TEC's to reduce power consumption. The DFB laser in TO-can builds upon Ortel's long history of high performance, leading edge designs in CATV, CWDM, wireless, and high speed digital applications. The laser diode chip is mounted on a compact hermetic TO-can assembly together with monitor photodiode and isolator, for flexible integration into the pigtail package configuration.

## Applications

- Video Signal Distribution in HFC and FTTx Nodes
- CWDM
- Signal Distribution in L-Band and Wireless Remoting Links
- High Linearity, Low Power Fiber Links

## Features

- Linear DFB Laser Design
- Bandwidth > 4000 MHz
- RoHS Compliance
- Optical Isolator
- Monitor Photodiode
- Aspheric Lens
- High Slope Efficiency

## Performance Highlights

Parameters	Min	Typical	Max	Units
Operating Case Temperature Range	-40	-	85	°C
Frequency Range	5	-	4000	MHz
Slope Efficiency	0.35	-	-	mW/mA
Center Wavelength	1467	-	1610	nm
Side Mode Suppression Ratio, CW	30	-	-	dB

## Absolute Maximum Ratings<sup>1</sup>

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameters	Symbol	Condition/Notes	Min	Max	Unit
Storage Temperature	T <sub>STG</sub>	Non-Operating	-40	85	°C
Operating Case Temperature	T <sub>OP</sub>	Continuous	-40	85	°C
Laser Diode Forward Current	I <sub>OP</sub>	CW	-	150	mA
Laser Diode Reverse Voltage	V <sub>R</sub>	Continuous	-	1.0	V
Photodiode Forward Current	I <sub>MPD</sub>	Continuous	-	2	mA
Photodiode Reverse Voltage	V <sub>MPD,R</sub>	Continuous	-	10	V
Average RF Input Power	PIN	60 Seconds	-	62	dBmV
Lead Soldering Temperature/Time	-	-	-	260/10	°C/sec
Relative Humidity	RH	Continuous	-	85	%
ESD	-	Human Body Model	-500	+500	V

1. Absolute maximum data are limited to system design only; proper device performance is not guaranteed over rating listed above. Operation beyond these maximum conditions may degrade device performance, lead to device failure, shorter lifetime, and will invalidate the device warranty.

## Electrical/Optical Characteristics

Parameters	Symbol	Conditions/Notes	Min	Typ	Max	Unit	Note
Series Resistance	R <sub>S</sub>	Between I <sub>F</sub> = 20 and 80 mA	2	-	8	Ohm	
Forward Voltage	V <sub>F</sub>	At laser threshold	-	-	1.8	V	
Threshold Current	I <sub>Th</sub>	-	-	8	15	mA	
Slope Efficiency	SE	-	0.35	-	-	W/A	1
Monitor Current	I <sub>Mon</sub>	I <sub>f</sub> = 40 mA, V <sub>MPD</sub> = 5 Vdc	200	-	2000	μA	
Monitor Dark Current	I <sub>Mon,dark</sub>	V <sub>MPD</sub> = 5 Vdc	-	-	50	nA	
Linearity	L <sub>η</sub>	Between 30 and 80 mA			1		2
Center Emission Wavelength	λ <sub>C</sub>	I <sub>OP</sub> , Top = 25°C	-	-	-	±2 nm	3,4
Spectral Width	Δλ	-	-	-	1.0	nm	3,4
Side Mode Suppression Ratio	SMSR	-	30	40	-	dB	3,4

1. Slope efficiency is measured in a current range between I<sub>th</sub> + 5 mA and I<sub>th</sub> + 65 mA.

2. Linearity is calculated by first determining slopes of five sequential pairs of points along the linear portion of the P<sub>OC</sub> vs. I<sub>F</sub> curve (η<sub>1</sub>, η<sub>2</sub>, ..., η<sub>5</sub>) in the drive current range (30mA and 80 mA). The difference between the maximum and minimum of these slopes divided by the slope efficiency (defined as the slope of linear regression) defines Linearity.

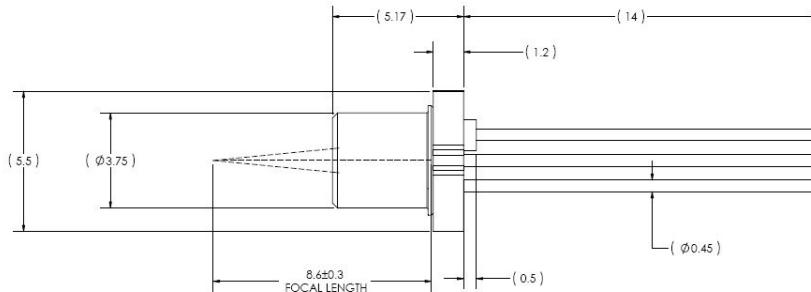
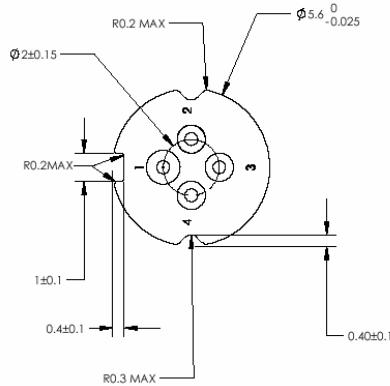
$$L_{\eta} = \frac{\text{Max}\{\eta_1, \eta_2, \dots, \eta_5\} - \text{Min}\{\eta_1, \eta_2, \dots, \eta_5\}}{\eta}$$

3. Spectrum is measured using an optical spectrum analyzer with a spectral resolution better than 0.1 nm.

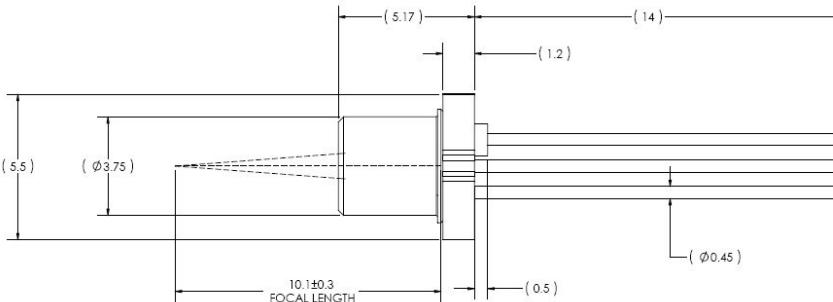
4. Lot sample test at 20%.

## Package Outline Drawing

### 8.6mm Focal Length Option



### 10.1mm Focal Length Option



1. All the isolated pins (2, 3, and 4) shall be completed isolated from the case, no shortage between the ground pin (pin 1) and all other three pins.

2. Dimensional tolerances

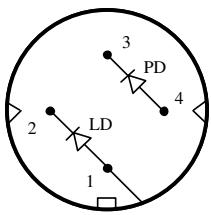
- a. Chip location in relative to the TO header center shall be within  $\pm 30\text{um}$  in both X & Y direction, and  $\pm 30\text{ um}$  in z-direction (axial).
- b. Cap concentricity in relative to the TO header shall be within 50 um in radius.
- c. Lead length: 14mm  $\pm 0.5\text{mm}$

All parts will have ink marking on the side of the base of the TO-56 with the following description.

Ink Marking	Part Description
<b>A38</b>	TO-can, CWDM DFB, RoHS, 8.6mm, Pinout A
<b>A41</b>	TO-can, CWDM DFB, RoHS, 8.6mm, Pinout C
<b>A46</b>	TO-can, CWDM DFB, RoHS, 10.1mm, Pinout A
<b>A47</b>	TO-can, CWDM DFB, RoHS, 10.1mm, Pinout C

## Pinout Configurations

### Schematic and Pinout A

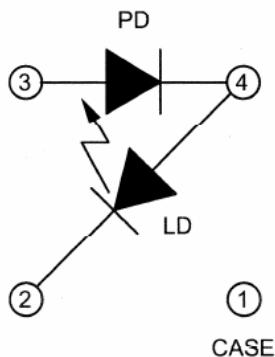


Pinout A  
Bottom View

### Pin Definitions for Pinout A

Pin	Description
1	LD Anode, Case Ground
2	LD Cathode
3	PD Cathode
4	PD Anode

### Schematic and Pinout C



Bottom View

### Pin Definitions for Pinout C

Pin	Description
1	Case
2	LD Cathode
3	PD Anode
4	LD Anode, PD Cathode

## Laser Safety

This product meets the appropriate standard in Title 21 of the Code of Federal Regulations (CFR). FDA/CDRH Class 1 laser product. This device has been classified with the FDA/CDRH under accession number 0220191.

All Versions of this laser are Class 1 laser product, tested according to IEC 60825-1:2007/EN 60825-1:2007

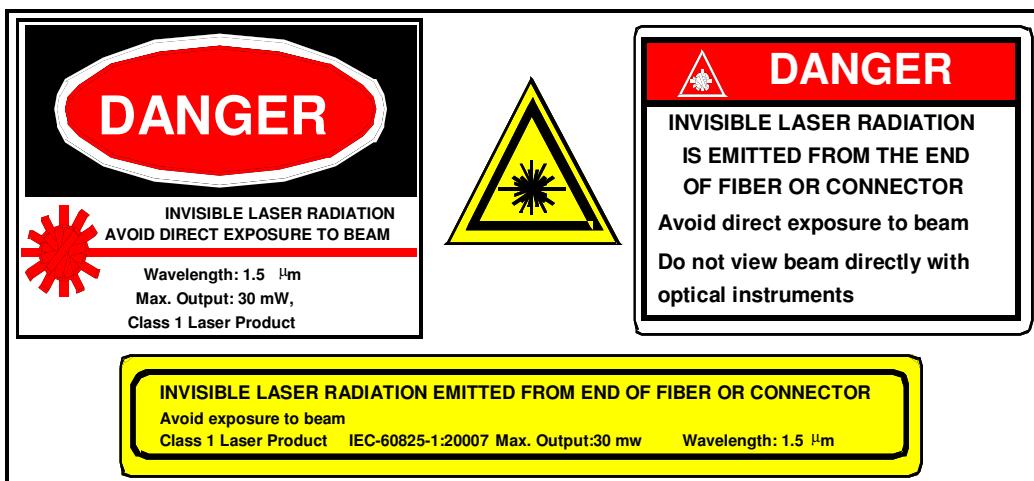
Wavelength = 1.5  $\mu$ m.

Maximum power = 50 mW.

Because of size constraints, laser safety labeling (including an FDA class 1 label) is not affixed to the module, but attached to the outside of the shipping carton.

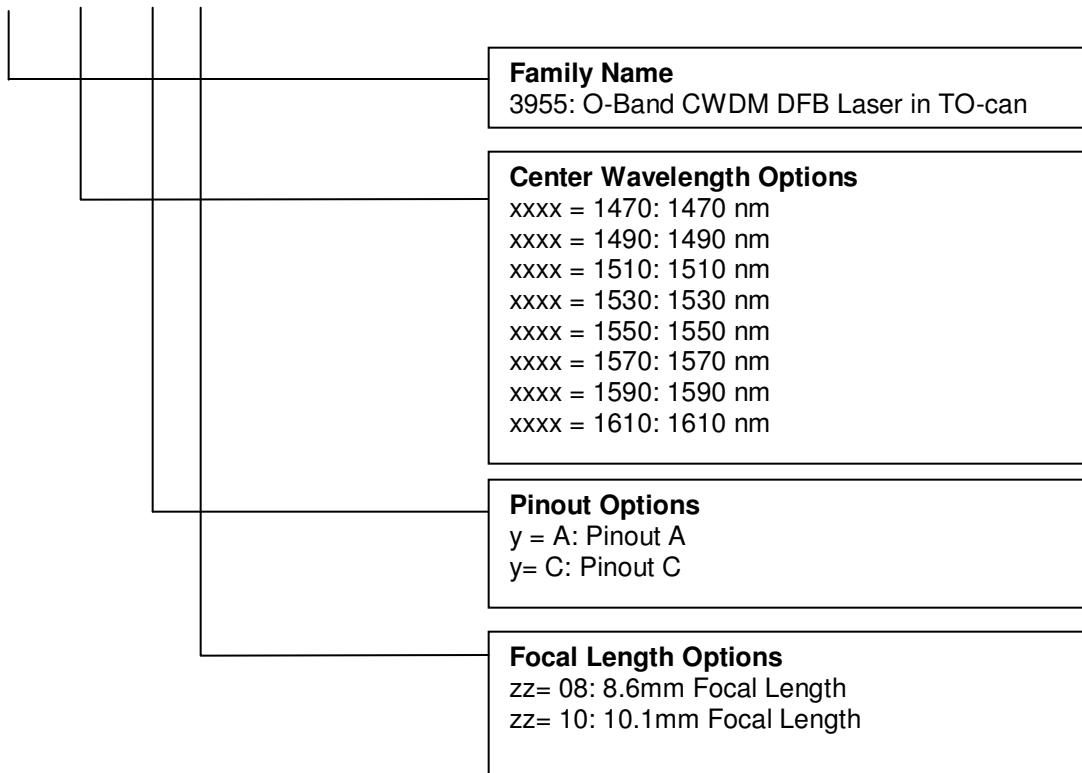
Product is not shipped with power supply.

**Caution: Use of controls, adjustments and procedures other than those specified herein may result in hazardous laser radiation exposure.**



## Ordering Code Definitions

3955 – xxxx – y – zz



## Example

3955-1550-A-08: 1550nm Laser in TO-can, Pinout A, 8.6mm Focal Length.

3955-1550-A-10: 1550nm Laser in TO-can, Pinout A. 10.1mm Focal Length