

## Optical Connector for Automobiles

### 1. INTRODUCTION

With the widespread use of car navigation systems and the start of ITS (intelligent transport systems) services, there is a growing need for in-vehicle LANs that carry out information data transmission in vehicles to have greater transmission capacity for moving pictures and audio signals. Greater data transmission speed, however, incurs noise radiation from the wire harness, creating a need for noise suppression measures and thus resulting in cost increase. It is known that optical fibers can effectively prevent the noise radiation, and POF (plastic optical fiber), in particular, are easy to be spliced, so that they can configure a high-speed transmission system at a relatively modest cost.

Currently, the development of high-speed data transmission systems is under way on a worldwide scale. In Europe, a transmission system called "MOST<sup>®</sup>" (Media Oriented System Transport) has been developed accompanied by the establishment of MOST Cooperation, and cars using MOST with POF have been launched into market since the last half of 2001.

The MOST standards specify the connector configuration together with the electrical and optical characteristics, and Table 1 shows the class of MOST optical connectors specified. They are comprised of an LED/PD pair to effect optical transmission, a housing to be fitted with a plug connector on the harness, and electrical contacts, permitting simultaneous fitting of the optical and electrical contacts. Furukawa Electric has developed and

**Table 1 MOST optical connector family.**

Nickname	Number of optical contacts	Number of electrical contacts
2+0	2	0
2+4	2	4
2+12	2	12
2+20	2	20
4+40	4	40

† MOST<sup>®</sup> is a registered trademark of OASIS Silicon Systems.



**Photo 1 Appearance of MOST2+0 connector.**



**Photo 2 Appearance of MOST2+4 connector.**

brought into the marketplace the MOST optical connectors 2+0 and 2+4 in conformity to the MOST standards, which will be introduced as follows.

### 2. CONSTRUCTION AND APPEARANCE

Photo 1 shows the appearance of MOST2+0 connector with two optical contacts, comprising of LED/PD optical devices, intermediate optical conductors, a socket housing, and a metal case.

Photo 2 shows the appearance of MOST2+4 connector having a hybrid structure of two optical contacts and four electrical contacts. It is comprised of LED/PD optical devices, intermediate optical conductors, a socket housing, electrical contacts, and a metal case.

**Table 2 Specifications of MOST optical connectors.**

Item	Specifications
Operating temperature	-40~85°C
Data rate	45 Mbps (NRZ)

**Table 3 Optical characteristics of MOST optical connector.**

Item	Unit	Minimum	Maximum
Peak wavelength	nm	630	685
Spectral half bandwidth	nm	—	30
Optical output	dBm	-10	-3.1
Sensitivity	dBm	-24	-2

### 3. SPECIFICATIONS

Tables 2 and 3 show the specifications and the typical optical characteristics of MOST optical connectors, respectively.

### 4. FEATURES

Furukawa's MOST optical connectors have the following features.

- 1) High-efficiency optical intermediate conductors: A dedicated plastic lens designed by our proprietary technique is used as an intermediate optical conductor between the optical device and POF, realizing high-efficiency coupling of the incident light from the optical device to the POF as well as the low splicing loss of the POF.
- 2) Enhanced EMI resistance: Noise resistance has been enhanced due to the use of electric conductive resin for the socket housing, in addition to the shielding of the optical devices using a metal case.
- 3) Downsizing: The compact connector employs a header-type structure integrating the optical devices conforming to the MOST standards with the socket housing.
- 4) Hybrid structure: Connectors of hybrid structure accommodating optical as well as electrical contacts are available allowing suitable selection according to applications.
- 5) Prevention of wrong fitting: Inner ribs of several different forms are provided in the socket housing to prevent wrong fitting.

### 5. IN CONCLUSION

We have developed MOST2+0 and MOST2+4 connectors conforming to the MOST standards in terms of configuration and characteristics. They are efficient, compact, and EMI resistant. The products developed here have been in mass production since the summer of 2002.

We plan to develop hereafter the following MOST connectors.

- 1) MOST2+12 with two optical and 12 electrical contacts
- 2) MOST2+20 with two optical and 20 electrical contacts
- 3) MOST4+40 with four optical and 40 electrical contacts

By developing these products we intend to build up our product lineup, thereby responding to the diversified market needs.

For more information, please contact:

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