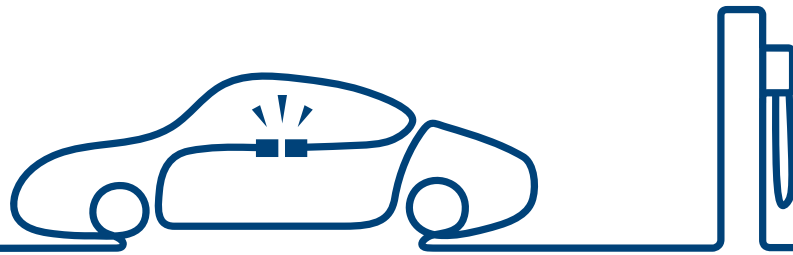


Automotive, Connected by HIROSE



Product catalogue

Products

01

ZE064W Series

Highly Reliable Interface Connector



The balance between space-saving and high reliability is difficult to achieve.

The most difficult part of the design process was incorporating both space-saving and high vibration resistance characteristics. The connector is able to withstand intense vibration in the engine room due to the double-layer spring terminal that prevents damage. Board thickness and length of the female terminals are shortened as much as possible, resulting in an 80% size reduction compared to competing products. Additionally the use of special heat resistant materials results in an operating temperature up to 125°C,

a requirement for automotive applications. IP67/IP69K waterproof ratings are supported so it can be used for various interface connections. We have visited customers multiple times to create this high-spec product that meets the strict demands for automotive connectors.

IP67/IP69K...The degree of protection against dust and water intrusion into electric devices published by IEC (International Electrotechnical Commission) and JIS (Japanese Industrial Standard)



Waterproof



High Temp



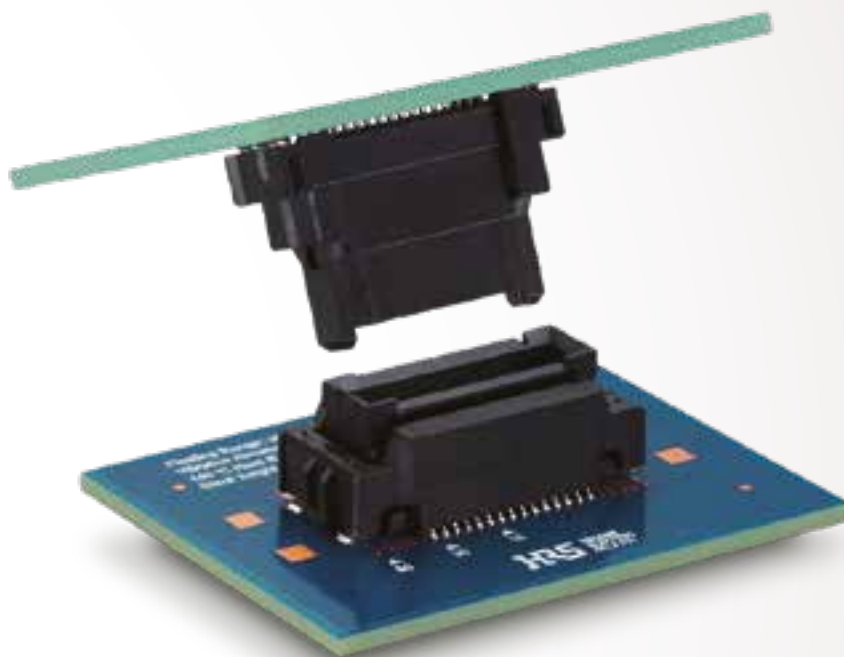
Vibration-Proof

- Operation temperature: - 40 to + 125°C (*2) ● Rated Current: 5A (Single pin)/2A (All pins)
- Rated voltage: 250V AC ● Terminal tab size: 0.64mm, 2.2mm pitch ● Mating Cycle: 30 times

Products
02

FX26 Series

140°C Heat Resistant, Vibration Absorbing Floating Connector



Internal board-to-board connector for powertrains

The FX26 series is high-spec product durable up to 140°C developed for use in the engine room. The product features include a vibration absorbing, floating design with a small size (1mm pitch) and 2-point contacts. I have experience developing connectors for industrial equipment and consumer devices, but automotive connectors are extremely difficult because of the harsh operating environment. However after we launched the product concept in 2016 our analysis team conducted vibration evaluations and trial production repeatedly and cleared

issues one-by-one together with the development team. Production quality has also further improved by using a fully automated production line. This is a reliable product that has been completed with repeated design verification and reflects the advice of automobile manufacturers.



Floating



Vibration Absorbing



Compact

- Operation temperature: - 40 to + 140°C (*2)
- Rated Current: 0.5A
- Rated voltage: 125V AC/DC
- Pitch: 1mm
- Durability: 10 mating cycles
- Length: 26.7mm (30pos. longitudinal direction)

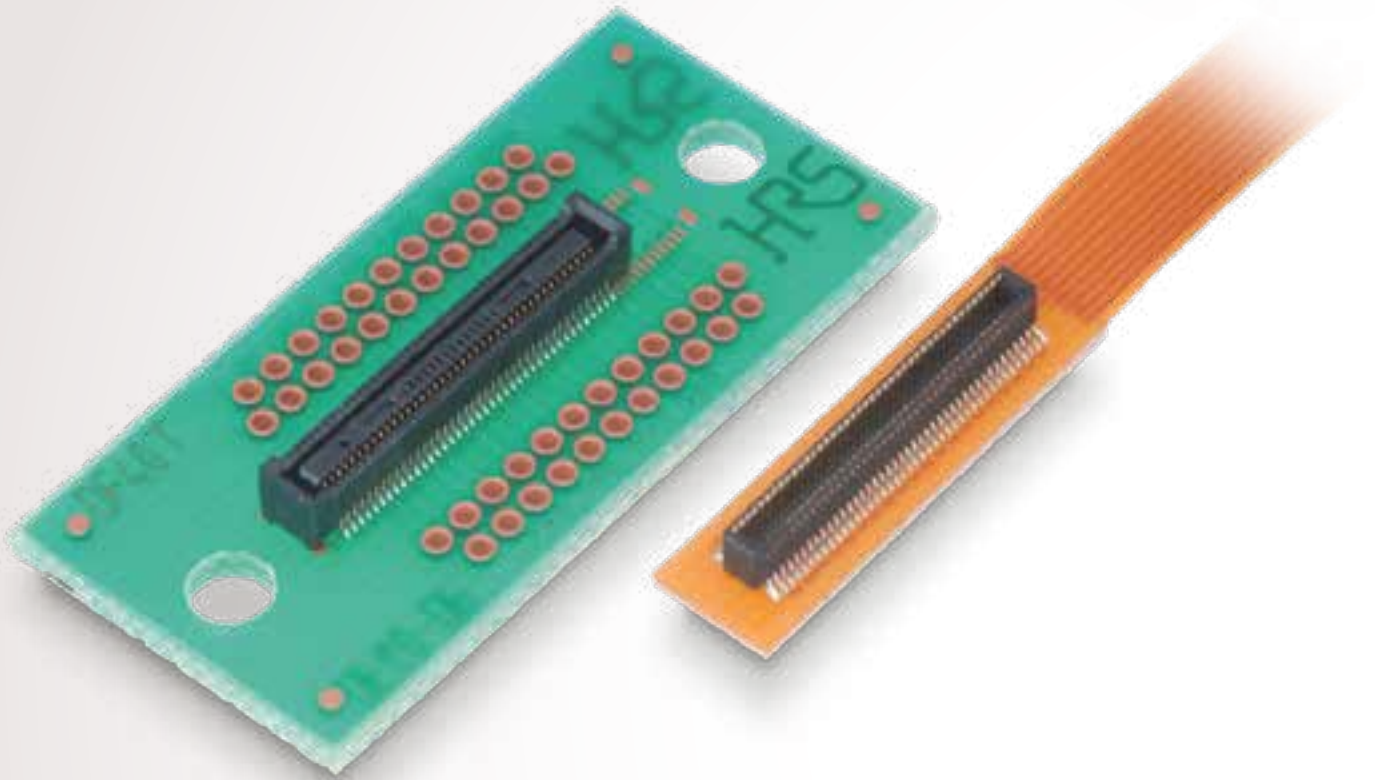
RECOMMENDED

Products

01

DF40T/GT Series

125°C Heat Resistance



Board-to-Board Small Connector for Automotive

Automobiles are being equipped with many driving support sensors such as camera, radar and LiDAR. As these devices become smaller and more sophisticated, there is a need for connectors to have both space-saving, high reliability and functionality. The development for the automotive connector's DF40T/DF40GT is based on the Hirose DF40 series connector's, a successful connector that has seen wide use as a compact connector for consumer applications. DF40T "automotive use" series adopts a highly reliable terminal structure while being a compact

design with 0.4mm pitch and can operate at 125°C. It is also capable of 16 Gbps high-speed transmission and supports a variety of transmission standards. Furthermore DF40GT series offers also shielding function. With high reliability, this product can be used safely even in an in-vehicle environment. It has already been widely used in sensors internal connections due to its wide pos. and height varieties and we believe this product will contribute to the spread of autonomous driving needed applications.



Compact



High Temp



Vibration-Proof

● Operation temperature: - 55 to + 125°C ● Rated Current: 0.3A

● Rated voltage: AC/DC 30 ● 0.4mm pitch ● Mating Cycle: 10/30

Products

02

FX23/L Series

Supports up to 8+Gbps



FunctionMAX™



Floating Board-to-Board Connector with Power Contacts

In recent years, many automobiles have been equipped with driving support functions such as lane departure prevention and automatic emergency braking. The introduction of autonomous vehicles is also in sight. As a result, the number of cameras, radars, LiDAR and other devices has increased and their performance has improved significantly. However, ECU that integrity controls these applications also requires a high processing power. Therefore, connectors for the internal connection need various functions including high-speed transmission. FX23/23L series is a floating board-to-board connector that combines 8+Gbps (PCI express 3.0 compliant) high-speed transmission with in-vehicle quality and is widely

used in automotive applications. The floating amount of $\pm 0.6\text{mm}$ absorbs misalignment at mounting. It is also equipped with a power contact capable of handling up to 5A per pos., which contributes to possible space-saving.

The connector provides space saving opportunities with a variety in different stacking height from 8mm to 30mm including Rigid type and Double floating option. Pin count variations start from 20 to 120 pos in Horizontal and Vertical direction. With this series line-up we serve a wide range of applications. It is an excellent, high reliable product that will contribute to the spread of autonomous vehicles in the future, so please consider it.



Floating



Vibration Absorbing



Compact

- Operation temperature: - 55 to + 105°C ● Rated Current: 0.5A (signal), 3A (power)
- Rated voltage: AC 50 (signal), AC 200 (power) ● Pitch: 0.5mm ● Mating cycles: 100

RECOMMENDED

Products

03

ZE05 Series

High Vibration Resistant



125°C Heat Resistant and Compact Wire-to-Board Connector

The standout features of this product are vibration and heat resistance. Since smaller connectors have been required as powertrains become increasingly compact, it was most difficult to maintain high reliability in a limited space. If the terminal spring material gets thinner, its performance will be degraded and vibration resistance will be lowered too. However, after repeated trial and error, we came up with the double layer spring design.

As a result, we were able to achieve both space-saving and high reliability.

Furthermore, we utilized Hirose's technological expertise to clear heat resistance testing of 125°C.



Vibration Absorbing



Compact



High Temp

● Operation temperature: - 40 to + 125°C ● Rated Current: 5A

● Rated voltage: AC/DC 60 ● Mating Cycle: 30 ● Tested according to LV-214 / US car

Products

04

ZH05 Series

Short Circuit and Electrical Shock Prevention Design



Wire-to-Board Connector

HRS has developed a product that prevents possible short circuit and electric shock. ZH05 uses female terminals on the board side and the live electrical circuits are completely separated by the connector housing. Our battery manufacturing customers were having trouble with short circuits. With our experience in the field we came up with the idea for this product. We created this product that can prevent short circuit and electric shock and ensure worker safety.

We utilized our accumulated know-how during the development of the ZE and ZG Series lines. You can call ZH05 the culmination of a consistent production line. Consistent production lines provide quick feedback and allow for easy improvements, making it beneficial for quality control.



Vibration Absorbing



Compact

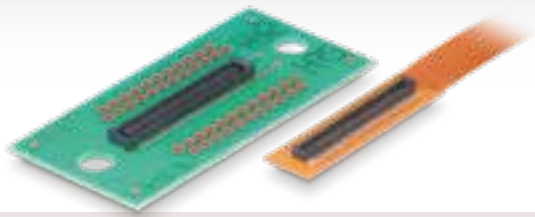


High Temp

- Operation temperature: - 40 to + 125°C ● Rated Current: 2A
- Rated voltage: AC/DC 60 ● Mating Cycle: 30

→ DF40T Series

Board-to-Board Connector supporting 125°C

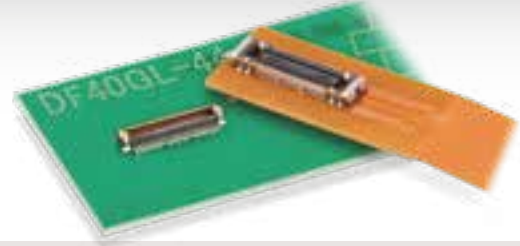


- 1 125°C high heat resistance for automotive
- 2 Small-sized design with 0.4mm pitch and 3.38mm depth

● Rated current: 0.3A ● Operating temperature: -55 to +125°C (*2)
● No. of pos.: 10 to 50 ● Height: 1.5mm - 4.0mm ● Depth: 3.38mm

→ DF40GT / DF40GK Series

Shielded FPC-to-Board Connector compatible up to 10+Gbps

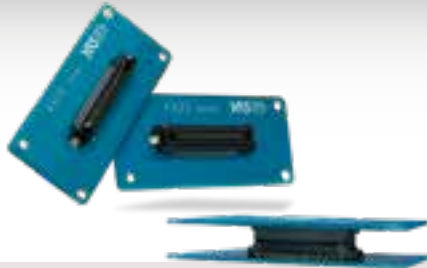


- 1 USB 3.1 gen.2 (10Gbps) transmission
- 2 Shield and grounding prevents EMI

● Rated current: 0.3A ● Operating temperature: -55 to +125°C (*2)
● Height: 1.5mm(Supporting type-C) ● Depth: 3.68mm ● No. of pos.: 10 to 44pos.

→ FX23 Series

Floating Board-to-Board Connector with Power Contacts



- 1 Floating: ± 0.6 mm in XY directions
- 2 High-speed transmission capability (Supports up to 8Gbps)
- 3 Power contacts on each side of the connector (3A/pin x 4pins)

● Floating: 0.6mm in XY directions ● Rated current: signal 0.5A/pin, power 3A/pin
● Rated voltage: 50V AC ● Operating temperature: -55 to +105°C (*2)

→ FX23L Series

Floating Board-to-Board Connector with Power Contacts



- 1 Floating: ± 0.6 mm in XY directions
- 2 High-speed transmission capability (Supports up to 8Gbps)
- 3 Power contacts on each side of the connector (3A/pin x 4pins)

● Floating: 0.6mm in XY directions ● Rated current: signal 0.5A/pin, power 3A/pin
● Rated voltage: 50V AC ● Operating temperature: -55 to +105°C (*2)

→ FX20 Series

Board-to-Board Connector with Floating Structure



- 1 Floating: ± 0.6 to 0.8 mm in X direction
- 2 Floating: ± 0.6 mm in Y direction

● Rated current: 0.5A ● Operating temperature: -55 to +85°C (*2)
● No. of pos.: 20 to 140pos. ● Height: 15mm - 30mm ● Effective mating length of 1.5mm

→ FX26 Series

140°C Heat and Vibration Resistant Board-to-Board Connector



- 1 Floating: ± 0.7 mm in XY directions
- 2 High Heat Resistance up to 140°C
- 3 Z direction: Effective mating length ± 0.75 mm

● Rated current: 0.5A ● Operating temperature: -40 to +140°C (*2)
● Height: 18mm - 23mm ● No. of pos.: 20 to 60pos.

Board-to-Wire Connectors

→ ZE05 Series

Automotive Interface Connector, High Heat and Vibration Resistance

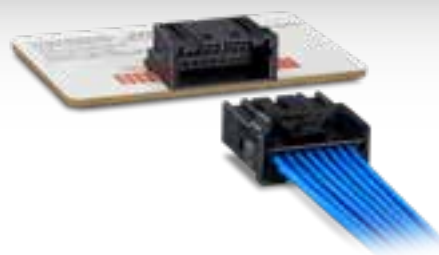


- 1 Space-saving: 0.5 size terminal, 2mm Pitch
- 2 Heat Resistant up to 125°C
- 3 Retainer Guarantees 40N Tensile Strength

● Rated current: 5A ● Rated voltage: 60V AC/DC ● Operating temperature: -40 to +125°C (*2)
● Mating Cycles: 30 ● No. of pos.: 2 to 24pos.

→ ZH05 Series

Short Circuit and Electrical Shock Prevention Wire-to-Board Connector



- 1 High Vibration Resistance
- 2 High Contact Reliability
- 3 Shock Resistant Design

● Rated current: 2A ● Rated voltage: 60V AC/DC ● Operating temperature: -40 to +125°C (*2)
● Mating Cycles: 30 ● No. of pos.: 16pos.

→ ZG05L2 Series

Low profile Wire-to-Board Connector



- 1 Low profile and space-saving design with 1.8mm pitch
- 2 High Contact Reliability due to double-layered spring design

● Rated current: 1A ● Rated voltage: 60V AC/DC ● No. of pos.: 4 to 16pos.
● Operating temperature: -40 to +120°C (*2) ● Mounted Height: 5.8mm

→ GT25H2 Series

0.64mm Terminal, Wire-to-Board Connector SMT compatible



- 1 Saves PCB Space
- 2 Strong Prying Force: 98N Min

● Rated current: 3A ● Rated voltage: 250V AC
● Operating temperature: -40 to +105°C (*2) ● No. of pos.: 4 to 40pos.

→ HVH-280 Series

High Current Power Connector for Internal Automotive Connection



- 1 Firm and clear tactile click confirms lock completion
- 2 125°C heat resistant connector to satisfy severe automotive requirements.

● Rated current: 30A ● Rated voltage: 600V AC/DC
● Operating temperature: -40 to +125°C (*2) ● Pitch: 6.5mm

→ GT50 Series COMING SOON

Single-row Board-to-Wire Positive lock Connector



- 1 Space saving: 1mm Pitch Design
- 2 High Heat (125°C) and Vibration Resistance

● Rated current: 1.5 to 2A ● Rated voltage: 60V AC/DC ● No. of pos.: 2 to 16pos.
● Operating temperature: -40 to +125°C (*2)

→ FH28K Series

125°C heat resistant, FPC/FFC Connector



- 1 Firm and clear tactile click confirms lock completion
- 2 125°C heat resistant connector to satisfy severe automotive requirements.

● Rated current: 0.5A ● Rated voltage: 50V AC/DC
 ● Operating temperature: -40 to +125°C (*2) ● Pitch: 0.5mm ● Height: 2.55mm
 ● Depth: 6.4mm ● FPC/FFC Contact area thickness: 0.3±0.05mm

→ FH52K Series

125°C heat resistant, robust FPC/FFC Connector



- 1 Robust lock design with unique contacts
- 2 125°C heat resistant connector to satisfy severe automotive requirements.

● Rated current: 0.5A ● Rated voltage: 50V AC/DC
 ● Operating temperature: -40 to +125°C (*2) ● Pitch: 0.5mm ● Height: 2mm
 ● Depth: 5.7mm ● FPC/FFC Contact area thickness: 0.3±0.05mm

→ FH41 Series

0.5mm Pitch, High-Speed for Shielded FFC



- 1 High-Speed 3.75Gbps
- 2 One-finger operation of the actuator

● Rated voltage: 50V AC/DC ● Rated current: 0.5A
 ● Operating temperature: -40 to +105°C (*2)

→ FH48 Series

Shielded FFC High-Speed Connector, Vertical Mount



- 1 Simplified operations with a Flip lock system
- 2 High-speed transmission capability
- 3 Suitable for automatic pick-n-place mounting

● No. of pos.: 20 to 68pos. ● Rated current: 0.5A
 ● Rated voltage: 50V AC/DC ● Operating temperature: -40 to +85°C (*2)

→ FH40 Series

Vertical Connector for FPC



- 1 One-finger operation of the actuator
- 2 Robust Design

● Rated current: 0.5A ● Rated voltage: 50V AC/DC
 ● Operating temperature: -40 to +105°C (*2) ● No. of pos.: 10 to 80pos.

→ FH34SRJ Series

Back flip lock, Top and Bottom contact Connector



- 1 Low Profile: 1mm Height
- 2 High FPC/FFC retention force

● Rated current: 0.5A ● Rated voltage: 50V AC/DC
 ● Operating temperature: -55 to +105°C (*2) ● Depth: 3.68mm ● No. of pos.: 4 to 50pos.

→ FH63S Series

One-action lock, FPC/FFC Connector with horizontal interface



- 1 One-action lock improves operability and is suitable for robotic assembly system.
- 2 105°C heat resistant connector to satisfy severe automotive requirements.
- 3 Mating the horizontal (FH63) and vertical (FH67) types together contributes to design flexibility.

● Rated current: 0.5A ● Rated voltage: 50V AC/DC ● Operating temperature: -55 to +125°C (*2)
● Pitch: 0.5mm ● Height: 2.8mm ● Depth: 5.15mm ● FPC/FFC Contact area thickness: 0.3 ± 0.03 mm

→ FH67 Series

One-action lock, FPC/FFC Connector with vertical interface



- 1 One-action lock improves operability and is suitable for robotic assembly system.
- 2 105°C heat resistant connector to satisfy severe automotive requirements.
- 3 Mating the horizontal (FH63) and vertical (FH67) types together contributes to design flexibility.

● Rated current: 0.5A ● Rated voltage: 50V AC/DC ● Operating temperature: -55 to +125°C (*2)
● Pitch: 0.5mm ● Height: 5.2mm
● FPC/FFC Contact area thickness: 0.3 ± 0.03 mm (0.30 ± 0.05 mm is planned to support)

→ FH65 Series

125°C heat resistant, low profile and space-saving FPC/FFC Connector



- 1 Low profile and space-saving design with 0.5mm pitch and 1.2mm height.
- 2 125°C heat resistant connector to satisfy severe automotive requirements.

● Rated current: 0.5A ● Rated voltage: 50V AC/DC ● No. of pos.: 8, 10, 15, 34pos.
● Operating temperature: -40 to +125°C (*2) ● Pitch: 0.5mm ● Height: 1.2mm
● Depth: 5.7mm ● FPC/FFC Contact area thickness: 0.3 ± 0.05 mm

→ FH55/FH55M Series

FPC/FFC Connector supporting 10+Gbps



- 1 High-speed transmission FPC/FFC connector with ground contacts
- 2 Impedance controlled contact design (up to 10+Gbps)

● Rated current: 0.5A ● Rated voltage: 50V AC/DC ● No. of pos.: 10, 22, 31, 40pos.
● Operating temperature: -40 to +125°C (*2) ● Pitch: 0.5mm ● Height: 1.2mm
● Depth: 5.7mm ● FPC/FFC Contact area thickness: 0.3 ± 0.05 mm

→ FH75M Series

Two-point contacts, 125°C heat resistant, FPC/FFC Connector

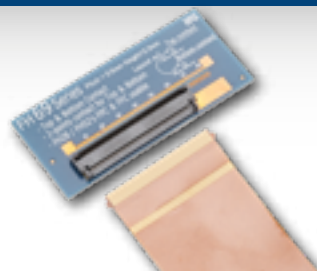


- 1 Firm and clear tactile click confirms lock completion
- 2 High FPC retention force

● Rated current: 0.5A ● Rated voltage: 50V AC/DC
● Operating temperature: -40 to +125°C (*2) ● Pitch: 0.5mm ● Height: 2.55mm
● Depth: 6.4mm ● FPC/FFC Contact area thickness: 0.3 ± 0.05 mm

→ FH69 Series COMING SOON

Two-point contacts, Back flip lock FPC/FFC Connector

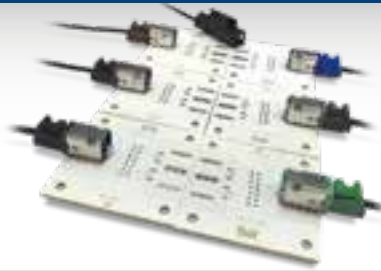


- 1 Stronger FPC retention force vertically by Back flip lock
- 2 Two-point contacts for each top and bottom contacts

● Rated current: 0.5A ● Rated voltage: 50V AC/DC ● No. of pos.: 6pos.
● Operating temperature: -40 to +125°C (*2) ● Pitch: 0.5mm ● Height: 1.2mm

→ GT43 Series

One-step crimp termination, low noise Connector for automotive (*3)

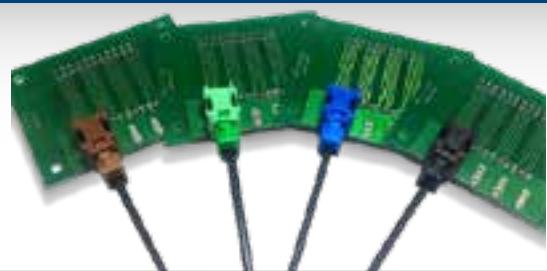


- 1 Small-sized and low-profile design
- 2 Design passes strict tests for noise resistance
- 3 6 key varieties

● Rated current: 1A ● Rated voltage: 50V AC
 ● Operating temperature: -40 to +105°C (*2) ● Frequency: 3GHz

→ GT36S Series

Small-sized automotive antenna Connector support 3GHz



- 1 Compact and space-saving design
- 2 One-step crimp termination
- 3 High-speed transmission up to 3GHz

● Rated current: 1A ● Rated voltage: 50V DC
 ● Operating temperature: -40 to +105°C (*2)

→ GT21 Series

Connector for automotive antenna supporting 2.5GHz



- 1 Compact and space-saving design
- 2 High-speed transmission
- 3 V.S.W.R.: 1.5 max.

● Rated current: 1A ● Rated voltage: 250V DC
 ● Operating temperature: -30 to +105°C (*2)

→ GT36A Series

Small-sized, low profile automotive antenna Connector supporting 5.9GHz



- 1 Small-sized and low profile design (12mm height)
- 2 4pos. coaxial connector
- 3 Wide key and pos. varieties

● Rated current: 1A ● Rated voltage: 50V DC
 ● Operating temperature: -40 to +105°C (*2)

→ GT16G Series

Connector for automotive antenna supporting 6GHz

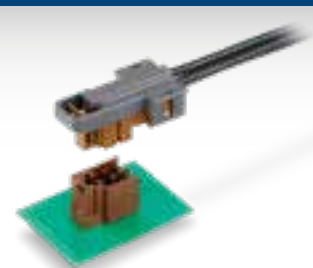


- 1 High-speed transmission: V.S.W.R. 1.5 max.
- 2 Waterproof version: GT16GW

● Rated current: 1A ● Rated voltage: 250V AC
 ● Operating temperature: -30 to +105°C (*2)

→ GT36 Series

Small multi-pin board-to-wire Connector



- 1 Connection of multiple coaxial cables to PCB on roof antenna module with one-setup
- 2 Small design and easy mating
- 3 Excellent high frequency performance

● Rated current: 1A ● Rated voltage: 50V AC
 ● Operating temperature: -40 to +105°C (*2)

This catalogue is current as of July 2021. Specifications may change without notice due to product improvement.
 (*2) Includes the temperature rise by current flow. (*3) Please consider GT36S/GT21 for uses other than automotive camera

Wire-to-Wire Connectors

→ HVH-280 Series

Small, Waterproof Connector for high-voltage that supports 120°C



- 1 For high voltage (600V AC/DC)
- 2 30A Rated current. Small, Low profile

● Rated current: 30A (Depending on the ambient temperature)
● Rated voltage: 600V AC/DC ● Operating temperature: -40 to +120°C (*2)
● Height: 26.35mm ● Depth: 70.65mm ● Width: 50.70mm

→ ZE064W Series

Small, Waterproof Connector for Automotive Interface

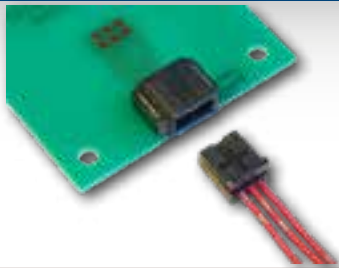


- 1 Space-saving design
- 2 High vibration resistance
- 3 Waterproof IP67/IP69

● Rated current: 5A ● Rated voltage: 60V AC/DC
● Operating temperature: -40 to +125°C (*2)

→ GT8E Series

2mm Pitch, SMT type Wire-to-Wire Connector



- 1 Prevents oxidation of the contact section
- 2 Design prevents mis-insertions
- 3 High PCB retention force

● Mating Cycle: 30
● Operating temperature: -40 to +105°C (*2)

High Speed Antenna Connectors

→ GT32 Series

Shielded in-vehicle, high-speed transmission Connector supporting 5Gbps



- 1 High-speed transmission up to 5Gbps and enhanced EMI prevention
- 2 Firm and clear tactile click confirms lock completion
- 3 Two-point contacts design for high contact reliability

● Rated current: 1A ● Rated voltage: 30V AC
● Operating temperature: -40 to +105°C (*2)

→ GT17 Series

Shielded in-vehicle, high-speed transmission Connector



- 1 High-speed transmission
- 2 Supports USB, LVDS, Ethernet

● Rated current: 3A ● Rated voltage: 250V AC
● Operating temperature: -40 to +105°C (*2)

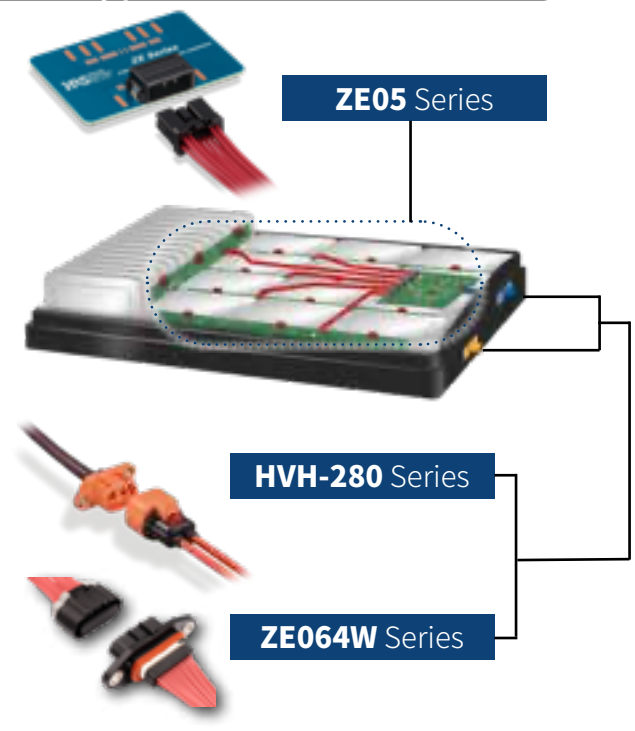
EV HEV Powertrain

Hirose's in-vehicle connectors were designed in the pursuit of higher reliability based on the requirements for heat and vibration in the automotive industry. Hirose provides outstanding solutions based on our extensive experience and advanced technological capabilities.

1 Inverter / DC-DC Converter / OBC

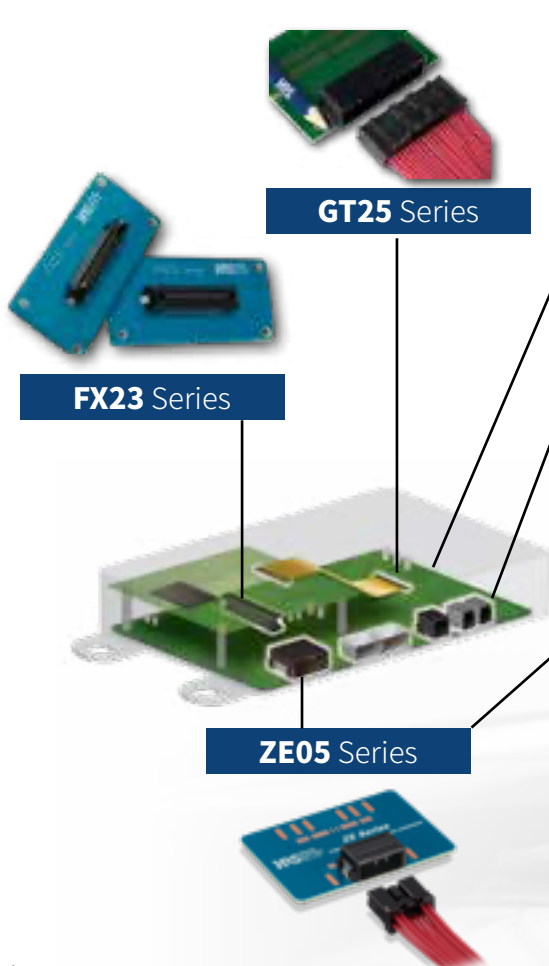


2 Battery pack

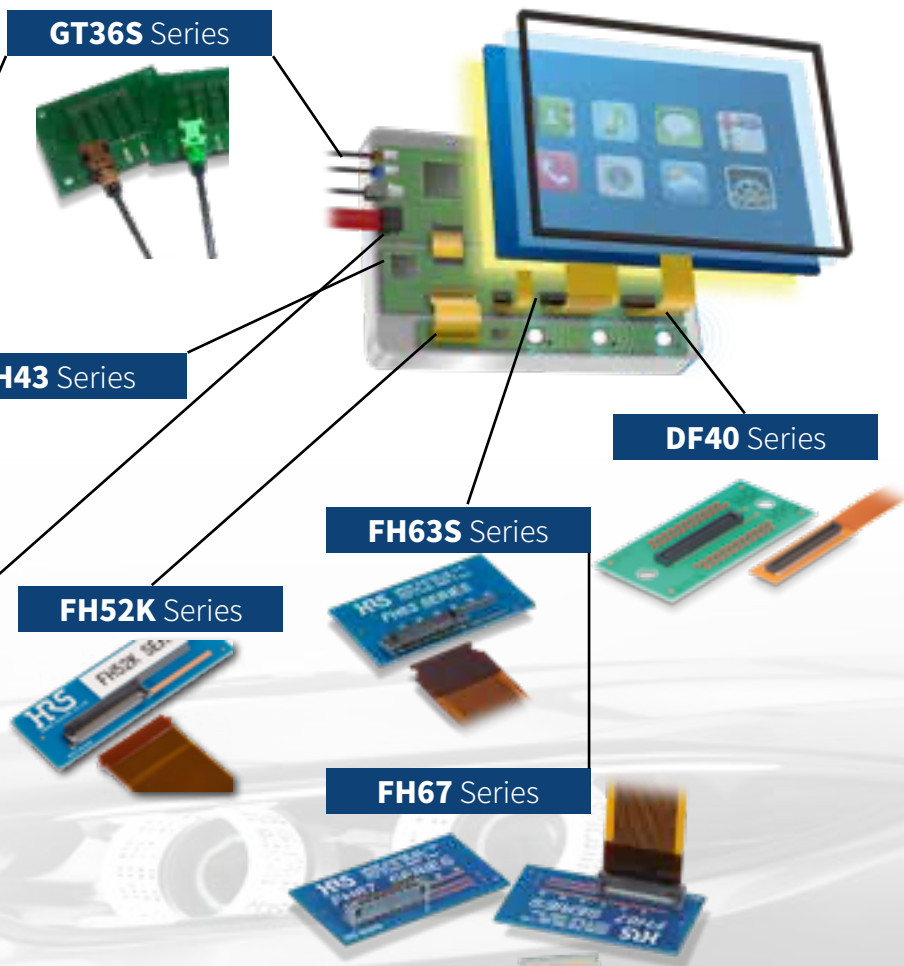


Telematics / Infotainment

1 Telematic Control Unit (TCU)



2 HMI / Display



Advanced driver-assistance systems (ADAS)

1 Radar / Lidar

DF40 Series

FH52K Series

FX23 Series

FH63S Series

FH75 Series

2 Front view / Camera

GT25 Series

DF40 Series

3 High Computing Platform (HCP)

GT43 Series

FX23 Series

4 Antenna

GT36 Series

GT36A Series

High reliability connectors sustain the future of ADAS / Autonomous Driving, Infotainment, HMI, Interfaces and Powertrain.



Interface connector with
high reliability connection
ZE Series



High reliability power supply
connector for interface connection
HVH Series



FPC/FFC connector with
one-action lock
FH Series



125°C heat resistant, small-sized
board-to-board connector
DF Series



Floating board-to-board connector
with power contacts
FX Series



Multi-pos. coaxial connector
for roof antenna
GT Series



In cases where the application will demand a high level of reliability, such as automotive, please contact a company representative for further information.

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