



Technical Specification for Optical Transceiver Module

SCM6202

- | | | |
|------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------|
| <input type="checkbox"/> 155.52Mb/s | <input checked="" type="checkbox"/> 622.08Mb/s | <input type="checkbox"/> other _____ |
| <input checked="" type="checkbox"/> Short Haul | <input type="checkbox"/> Long Haul | <input type="checkbox"/> other _____ |
| <input type="checkbox"/> Intermediate Reach | <input type="checkbox"/> Long Reach | <input type="checkbox"/> other _____ |
| <input type="checkbox"/> Single 5.0 V | <input checked="" type="checkbox"/> Single 3.3 V | <input type="checkbox"/> other _____ |
| <input checked="" type="checkbox"/> 1.3 μm | <input type="checkbox"/> 1.55 μm | <input type="checkbox"/> other _____ |
| <input type="checkbox"/> Transmitter | <input type="checkbox"/> Receiver | <input checked="" type="checkbox"/> Transceiver (2 X 5) |
| | (<input type="checkbox"/> 2R / <input type="checkbox"/> 3R) | (<input checked="" type="checkbox"/> 2R / <input type="checkbox"/> 3R) |

Applicable Part Numbers : SCM6202-GL-ZN(A), SCM6202-GL-CN(A), SCM6202-GL-DN(A)
 SCM6202-GL-ZW(A), SCM6202-GL-CW(A), SCM6202-GL-DW(A)
 SCM6202-JL-ZN(A), SCM6202-JL-CN(A), SCM6202-JL-DN(A)
 SCM6202-JL-ZW(A), SCM6202-JL-CW(A), SCM6202-JL-DW(A)



Sumitomo Electric reserves the right to make changes in this specification without prior notice.

#Safety Precaution Symbols This specification uses various picture symbols to prevent possible injury to operator or other persons or damage to properties for appropriate use of the product. The symbols and definitions are as shown below. Be sure to be familiar with these symbols before reading this specification.

- | | |
|--|----------------------------------------------------------------------------------------------------------------|
| | Warning Wrong operation without following this instruction may lead to human death or serious injury. |
| | Caution Wrong operation without following this instruction may lead to human injury or property damage. |

Example of picture symbols

indicates prohibition of actions. Action details are explained thereafter.

indicates compulsory actions or instructions. Action details are explained thereafter.

1. General

Features of SCM6202 are listed below.

- * SDH STM-4 S-4.1 / SONET OC-12 IR-1 Compliant
- * Power Supply Voltage Single +3.3V
- * Compact Package Size 49.0 X 13.59 X 9.8 mm (max.)
- * Electrical Interface LVPECL for DATA and LVTTTL for Laser Disable, Both LVPECL and LVTTTL options available for Signal Detect.
- * Fiber Coupled Power -8 ~ -15dBm (Typ. -11dBm) into SMF
- * Input Power Range -8 ~ -28dBm (Typ. Sensitivity -33dBm)
- * Laser Disable Function
- * Signal Detect (SD) Function
- * Connector Interface LC Duplex Receptacle

2. Block Diagram

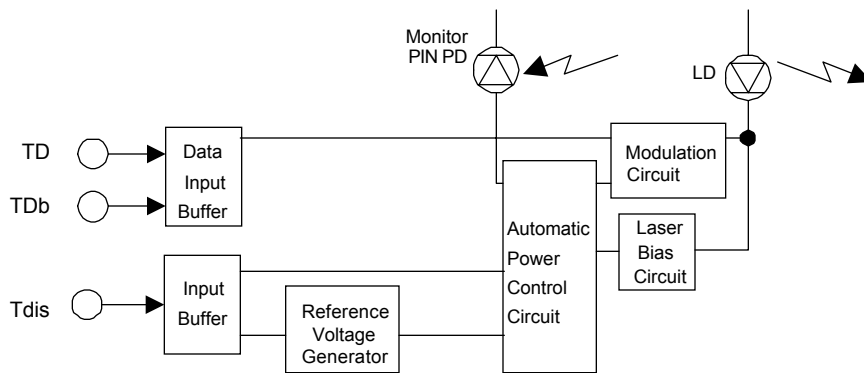


Figure 1. Block Diagram (Transmitter)

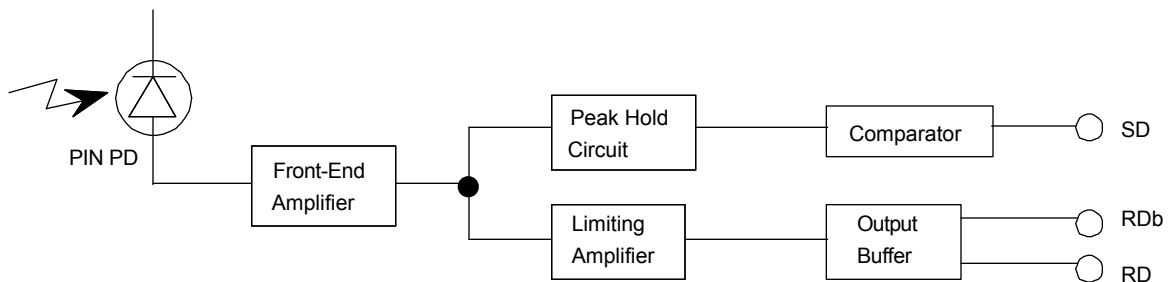


Figure 2. Block Diagram (Receiver)

⚠ Caution



Do not disassemble this product. Otherwise, failure, electrical shock, overheating or fire may occur.

Handle the lead pins carefully. Use assisting tools or prospective aids as required. A lead pin may injure skin or human body

3. Package Dimension

3.1 SCM6202-GL-##(A) (With Housing Leads)

All dimensions are in mm.

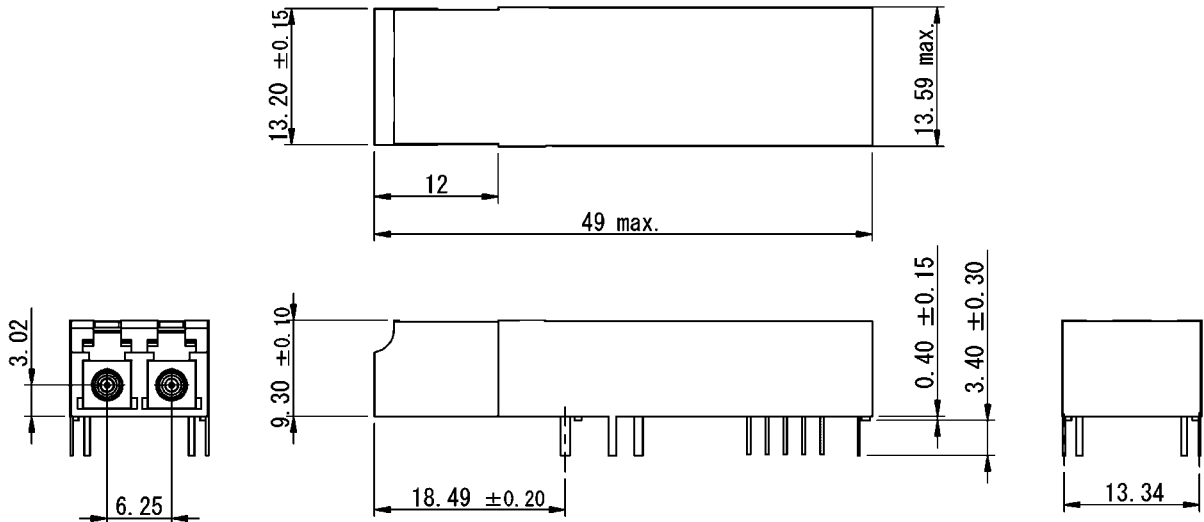
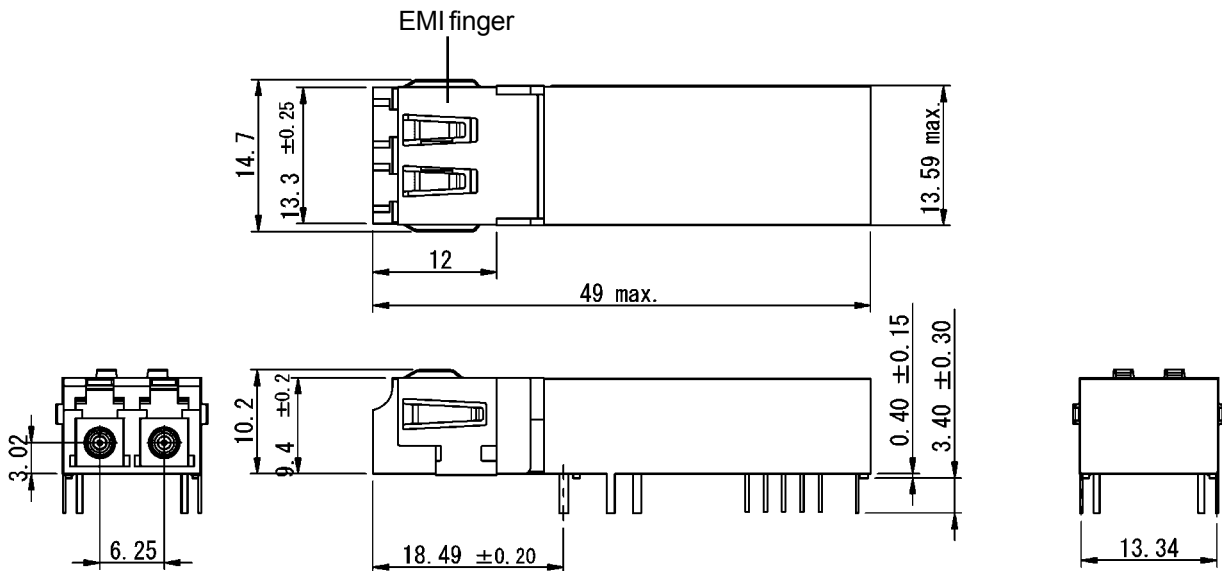


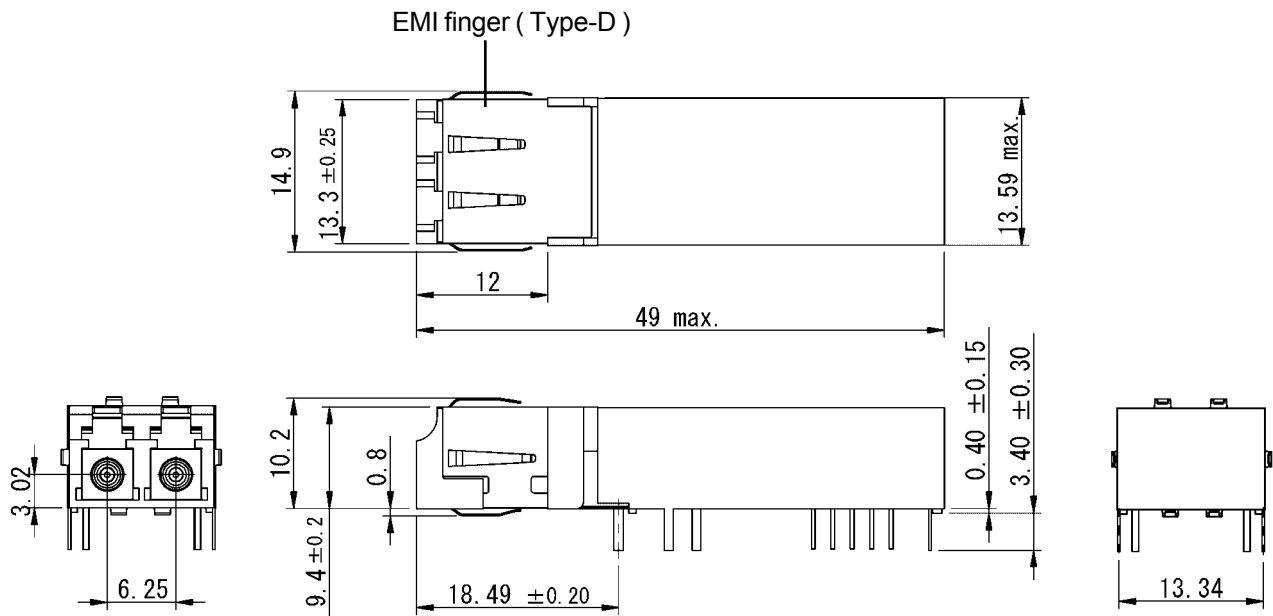
Figure 3. Outline Dimensions [SCM6202-GL-Z#(A)]



EMI fingers are an option for transceivers to be used on the card-edge with the receptacle protruding through a panel opening. The fingers make contact with the sides of the bezel opening for grounding purposes.

Figure 4. Outline Dimensions [SCM6202-GL-C#(A)]

All dimensions are in mm.



Type-D EMI finger is an option for transceivers to be used on the card-edge with the receptacle protruding through a panel opening. It has fingers on four sides to make electrical contact with the sides of the bezel opening for grounding purpose.

Figure 5. Outline Dimensions [SCM6202-GL-D#(A)]

3.2 SCM6202-JL-##(A) (Without Housing Leads)

All dimensions are in mm.

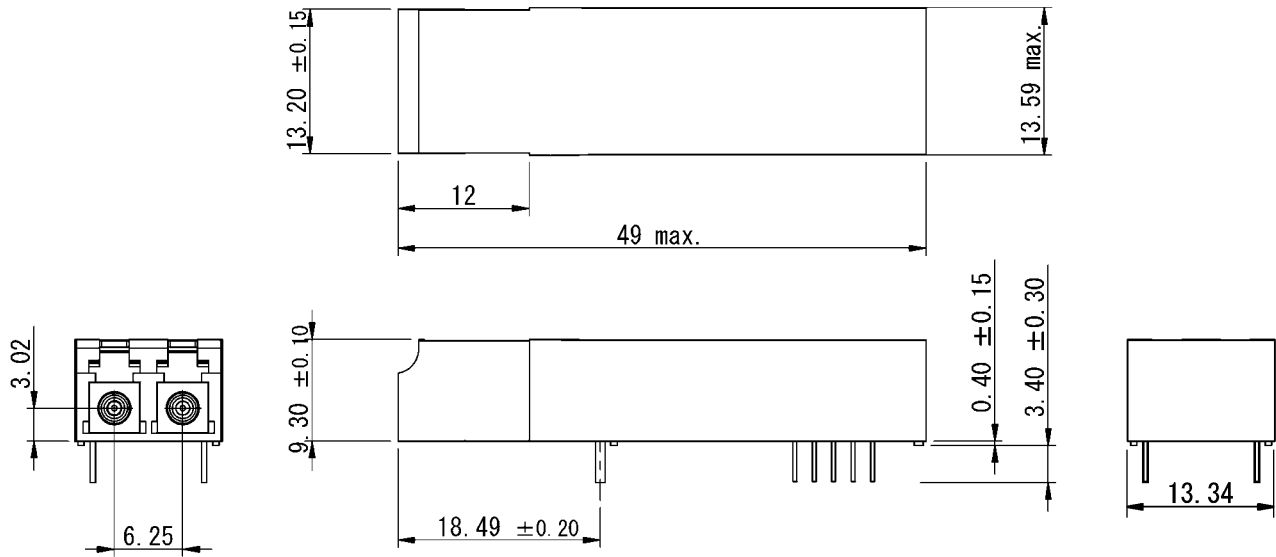
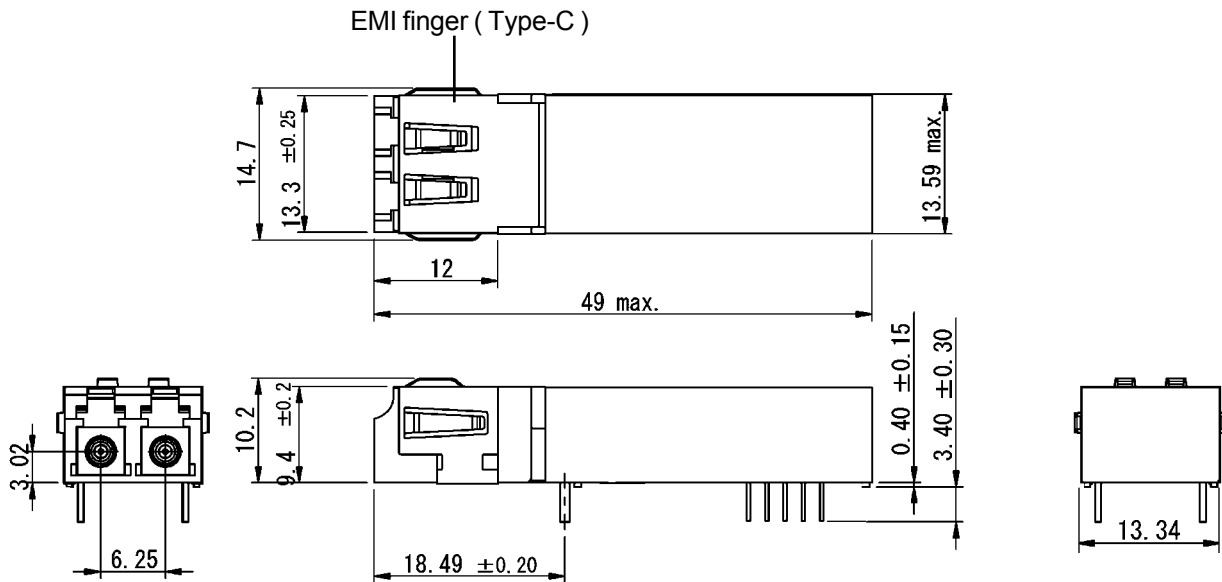


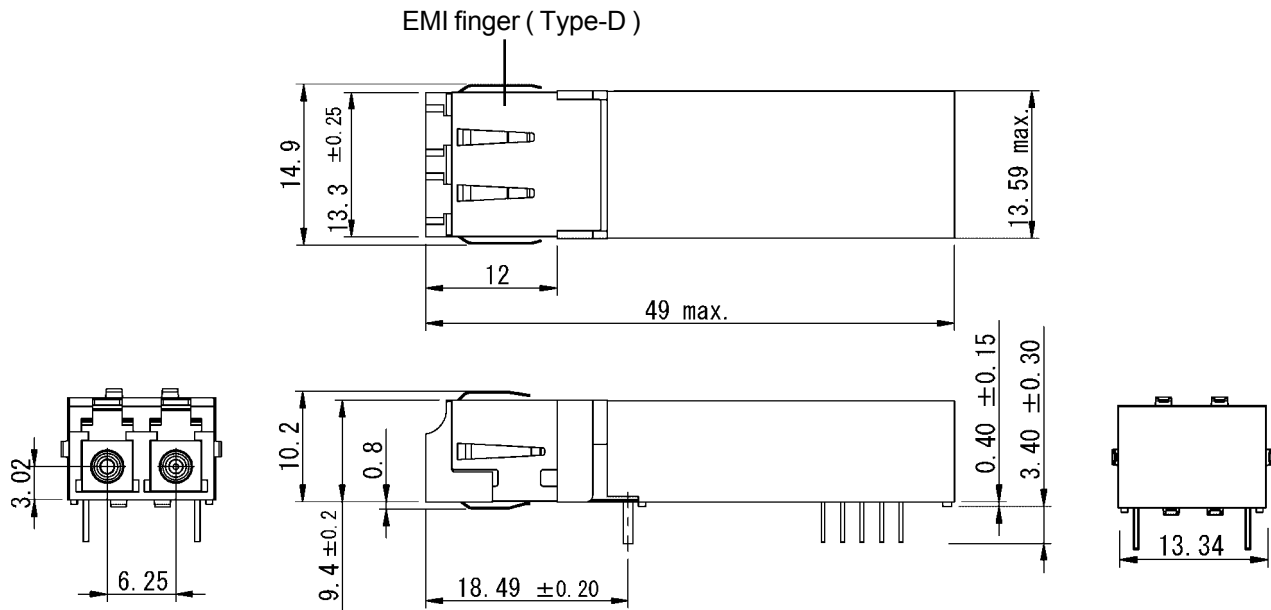
Figure 6. Outline Dimensions [SCM6202-JL-Z#(A)]



EMI fingers are an option for transceivers to be used on the card-edge with the receptacle protruding through a panel opening. The fingers make contact with the sides of the bezel opening for grounding purposes.

Figure 7. Outline Dimensions [SCM6202-JL-C#(A)]

All dimensions are in mm.



Type-D EMI finger is an option for transceivers to be used on the card-edge with the receptacle protruding through a panel opening. It has fingers on four sides to make electrical contact with the sides of the bezel opening for grounding purpose.

Figure 8. Outline Dimensions [SCM6202-JL-D#(A)]

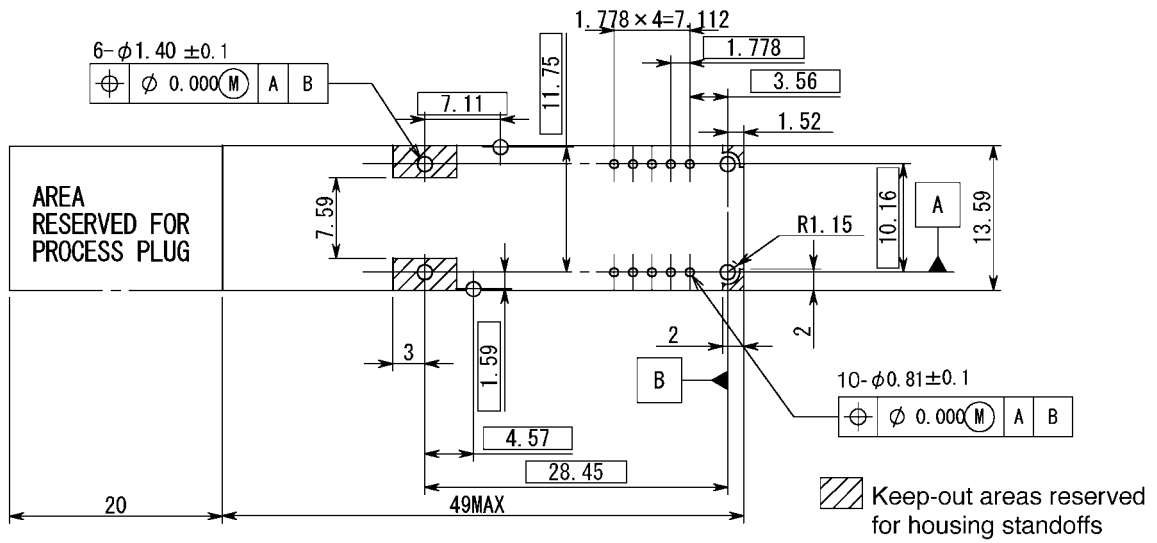


Figure 9. Recommended Footprint

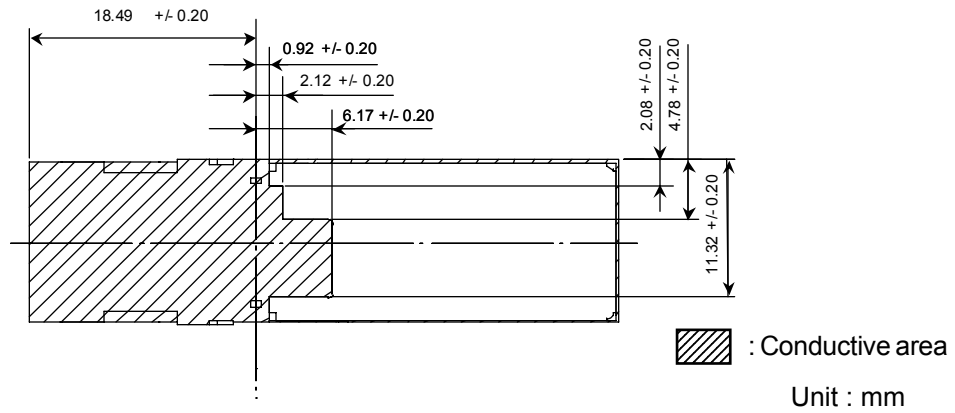


Figure 10. Package Bottom View

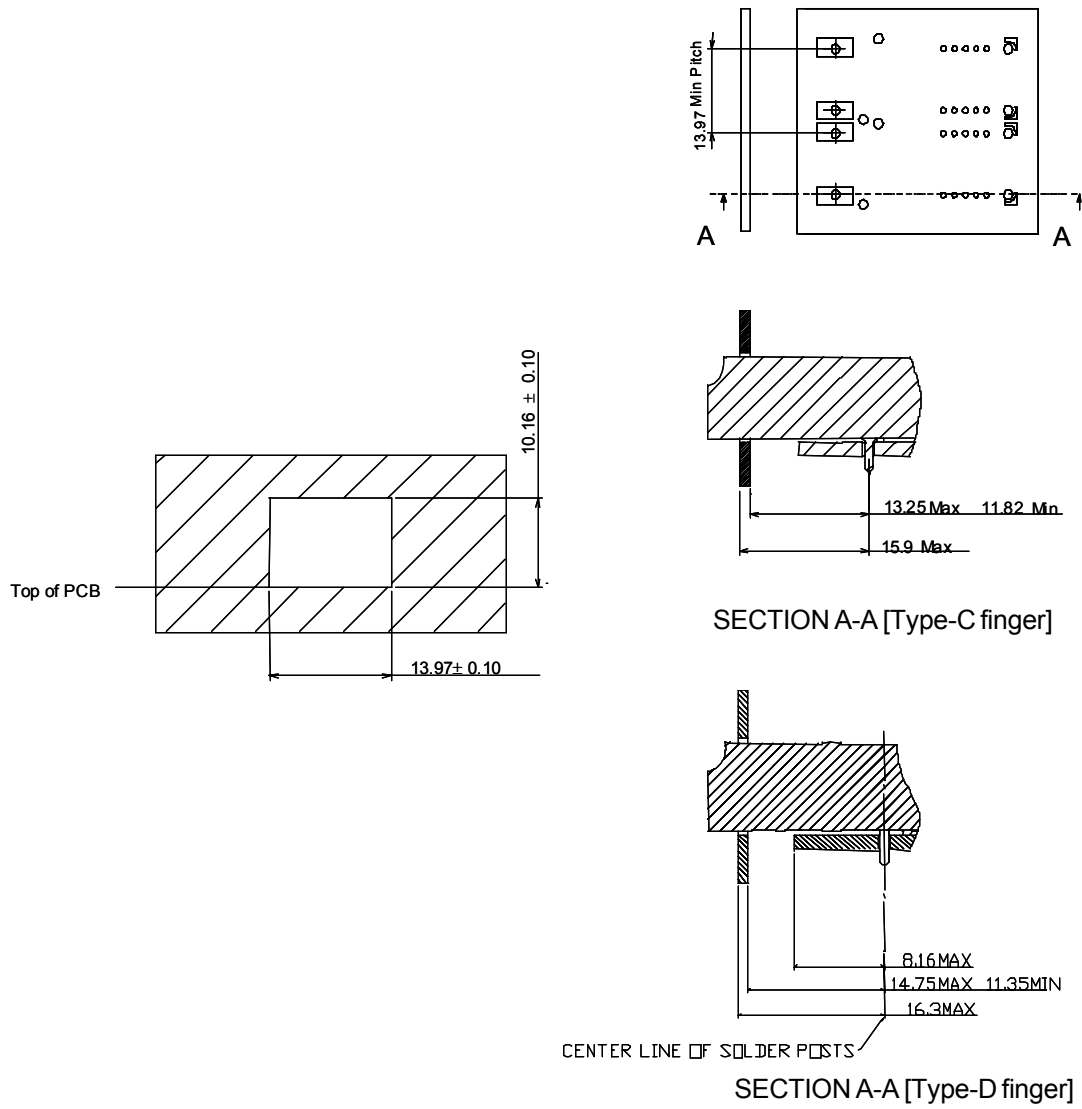


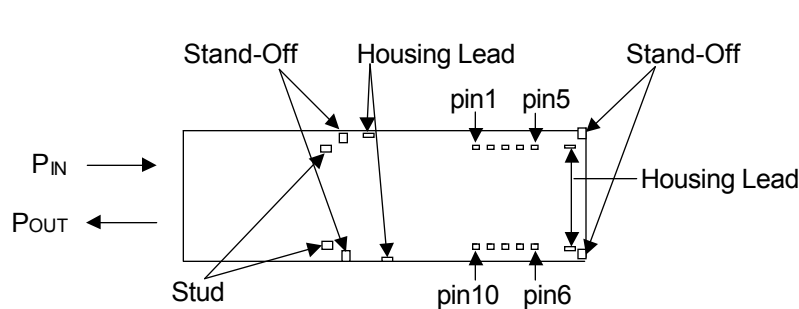
Figure 11. Recommended Bezel Design for Systems Using SFF Transceivers

4. Pin Assignment

| No. | Symbol | I/O/P ¹ | Level | Description |
|-----|--------|--------------------|---------------------------|--------------------------------------------------------------------------------------------|
| 1 | VeeR | P | GND | Power Supply (-) for Receiver. |
| 2 | VccR | P | +3.3V DC | Power Supply (+) for Receiver. |
| 3 | SD | O | LVPECL/LVTTL ² | Signal Detect. High level indicates presence of optical input signal (Active High). |
| 4 | RDb | O | LVPECL | Inverted Receiver Output Data. No internal terminations are provided. |
| 5 | RD | O | LVPECL | Non-Inverted Receiver Output Data. No internal terminations are provided. |
| 6 | VccT | P | +3.3V DC | Power Supply (+) for Transmitter. |
| 7 | VeeT | P | GND | Power Supply (-) for Transmitter. |
| 8 | Tdis | I | LVTTL/LVCMOS | Transmitter Disable (Active High). Defaults to logic 0 (enable TX) when left open. |
| 9 | TD | I | LVPECL | Non-Inverted Transmitter Input Data. Self biased. Not internally terminated. |
| 10 | TDb | I | LVPECL | Inverted Transmitter Input Data. Self biased. Not internally terminated. |

Notes:

- I/O/P stands for signal input, signal output, and DC power/bias supply, respectively.
- LVPECL : SCM6202-#L-##, LVTTL : SCM6202-#L-##A



- * Mounting Studs are provided for mechanical support to the circuit board. It is recommended that the holes in the circuit board be connected to frame ground.
- * Housing Leads are internally connected to VeeR and VeeT. **(SCM6202-JL-##(A) has no Housing Leads.)**
- * Stand-Offs provide gap between the circuit board and the module to help escape residual water after aqueous wash.

Figure 12. Bottom View

5. Absolute Maximum Ratings

| Parameter | Symbol | min. | Max | Unit | Note |
|----------------------------|-------------|------|---------|------|------|
| Storage Case Temperature | Ts | -40 | 85 | °C | 1 |
| Operating Case Temperature | Tc | -5 | 70 | °C | 2 |
| | | -40 | 85 | | 3 |
| Supply Voltage | Vcc | 0.0 | 4.0 | V | |
| Input Voltage | Vi | 0.0 | Vcc+0.5 | V | 4 |
| Lead Soldering Conditions | Temperature | | 260 | °C | 5 |
| | Time | | 10 | sec. | |

Notes:

- No condensation allowed.
- SCM6202-#L-#N(A)
- SCM6202-#L-#W(A)
- TD, TDb, Tdis
- Measured on lead pin at 2mm (0.079in.) off the package bottom

⚠ Warning

- ⚠ Use the product with the rated voltage described in the specification. If the voltage exceeds the maximum rating, overheating or fire may occur.

⚠ Caution

- ⚠ Do not store the product in the area where temperature exceeds the maximum rating, where there is too much moisture or dampness, where there is acid gas or corrosive gas, or other extreme conditions. Otherwise, failure, overheating or fire may occur.

6. Electrical Interface

(Unless otherwise specified, Vcc = 3.135 to 3.465 V and all operating temperature shall apply.)

6-1. Transmitter side

| Parameter | Symbol | min. | Typ. | Max. | Unit | Note |
|-------------------------------|--------|-------|----------|----------|-------|---------|
| Supply Voltage | Vcc | 3.135 | 3.30 | 3.465 | V | |
| Supply Current | Idtx | | 70 | 150 | mA | 1, 2, 3 |
| TD, TDb Input Voltage | High | Vih | Vcc-1.17 | Vcc-0.73 | V | 4 |
| | Low | Vil | Vcc-1.95 | Vcc-1.45 | V | |
| Signal Input Rise / Fall Time | | | | 0.5 | nsec. | 5 |
| Tdis Input Voltage | High | Vdi | 2.0 | Vcc | V | 6 |
| | Low | Veil | 0.0 | 0.8 | V | |
| Tdis Input Current | High | Idi | -10 | 140 | μA | |

Notes:

1. Input current is not included. 2. 50% duty cycle data. 3. 622.08Mbps, PRBS2²³-1, NRZ.
4. Input Terminal is biased internally, as shown in the figure13. 5. 20-80%.
6. LVTTTL input.Refer to Section 8, "Relation between Disable Input Voltage and Optical Output Power", for detail.

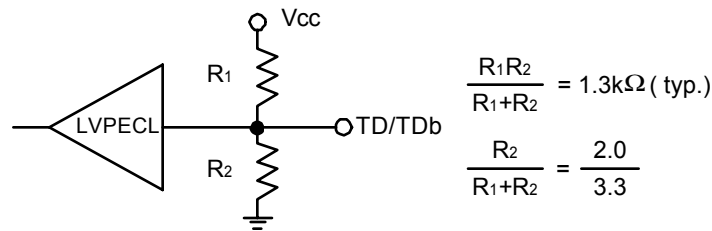


Figure 13. Internal Bias of Input Terminal

6-2. Receiver side

| Parameter | Symbol | min. | Typ. | Max. | Unit | Note |
|------------------------|---------|-------|----------|----------|-------|------|
| Supply Voltage | Vcc | 3.135 | 3.30 | 3.465 | V | |
| Supply Current | Idrx | | 75 | 125 | mA | 1 |
| RD, RDb Output Voltage | High | Vdoh | Vcc-1.10 | Vcc-0.86 | V | 2 |
| | Low | Vdol | Vcc-1.86 | Vcc-1.62 | V | |
| SD Output Voltage | High | Vsoh | Vcc-1.10 | Vcc-0.86 | V | 3 |
| | Low | Vsol | Vcc-1.89 | Vcc-1.65 | V | |
| SD Output Voltage | High | Vstoh | 2.2 | Vcc | V | 4 |
| | Low | Vstol | 0.0 | 0.5 | V | |
| Data Rise / Fall Time | Tr / Tf | | | 0.5 | nsec. | 5 |
| SD Assert Time | Ta | 2.3 | | 100 | μsec | 6 |
| SD Deassert Time | Td | 2.3 | | 100 | μsec | |

Notes:

1. Output current is not included. 622.08Mbps, PRBS2²³-1, NRZ.
2. Output load resistance RL=50Ω to Vcc-2V for RD, RDb.
3. LVPECL Output. (SCM6202-#L-##) 270Ω to GND.
4. LVTTTL Output. (SCM6202-#L-##A)
5. 20-80%.
6. 622.08Mbps, PRBS2²³-1, NRZ.

7. Optical Interface

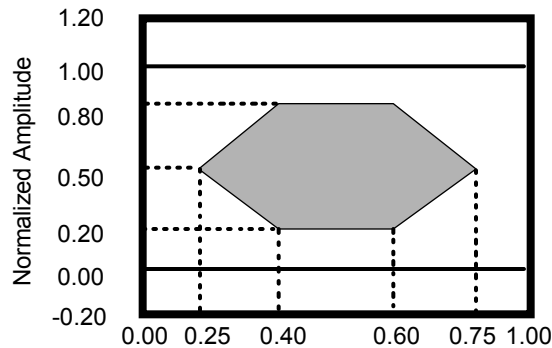
(Unless otherwise specified, $V_{cc} = 3.135$ to 3.465 V and all operating temperature shall apply.)

7-1. Transmitter side

| Parameter | Symbol | min. | Typ. | Max. | Unit | Note |
|-----------------------------|----------------------------------------------------|-------|-------|------|------|------|
| Average Output Power | Po | -15.0 | -11.0 | -8.0 | dBm | 1 |
| Extinction Ratio | Er | 8.2 | | | dB | 1 |
| Center Wavelength | λ_c | 1274 | | 1356 | nm | |
| Spectral Width (RMS) | $\Delta\lambda$ | | | 2.5 | nm | |
| Eye Mask for Optical Output | Compliant with Telcordia GR-253 CORE and ITU G.957 | | | | | |

Notes:

1. Measured at 622.08Mbps PRBS2*23-1



Relation between Input Signal and Optical Output Signal

| Input Signal | | Optical Output Signal |
|--------------|------|-----------------------|
| TD | TDb | |
| High | Low | ON (High) |
| Low | High | OFF (Low) |
| High | High | Undefined |
| Low | Low | Undefined |

Figure 14. Optical Pulse Mask with Fourth Order

Bessel-Thomson Filter Specified in ITU-T G.957

⚠ Warning



Do not look at the laser beam projection area (e.g. end of optical connector) with naked eyes or through optical equipment while the power is supplied to this product. Otherwise, your eyes may be injured.

7-2. Receiver side

| Parameter | Symbol | min. | Typ. | Max. | Unit | Note |
|--------------------------|--------|-------|-------|-------|------|------|
| Optical Input Wavelength | - | 1260 | | 1580 | nm | |
| Minimum Sensitivity | Pmin | | -33.0 | -28.0 | dBm | 1, 2 |
| Overload | Pmax | -8.0 | | | dBm | 1, 2 |
| SD Assert Level | Pa | -45.0 | | -28.0 | dBm | 2 |
| SD Deassert Level | Pd | -45.0 | | -29.0 | dBm | |
| SD Hysteresis | Phys | 1.0 | | 6.0 | dB | |

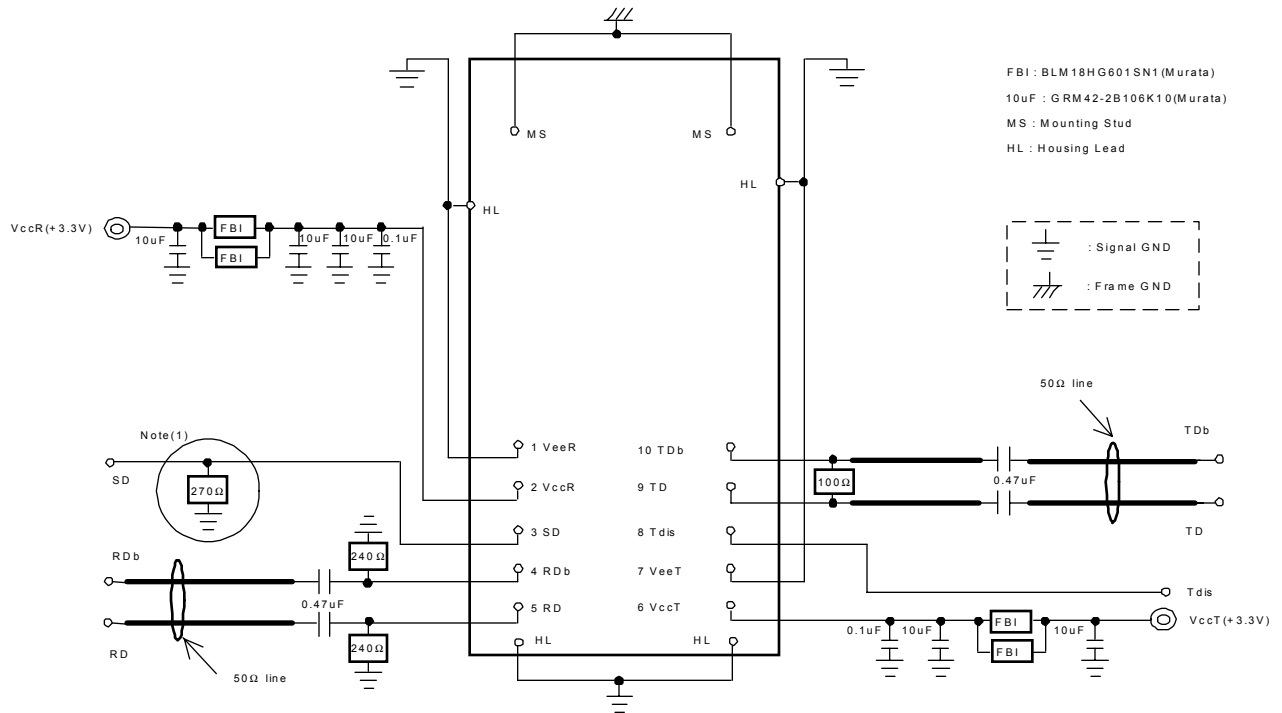
Notes:

1. BER=10⁻¹⁰
2. Measured at the bit rate of 622.08Mbps, PRBS 2*23-1, NRZ

8. Relation between Disable Input Voltage and Optical Output Power

| Tdis Input Voltage | Optical Output Power |
|--------------------|----------------------|
| "L"(0.0 ~ 0.8V) | Enabled |
| "H"(2.0V ~ Vcc) | Disabled (<-45dBm) |
| Open | Enabled |

9. Recommended User Interface



Notes:

(1) SD Interface

270Ω pulldown resistor required for SCM6202-#L-## (LVPECL SD Output)

No pulldown resistor required for SCM6202-#L-##A (LVTTTL SD Output)

(2) Components on RD / RDb lines, 240Ω and 0.47uF, should be placed as close as possible to module pins.

(3) 0.1uF capacitors on VccR / VccT lines should be as close as possible to module pins.

(4) 50Ω line pattern and component placements on RD / RDb and TD / TDb lines should be symmetrical for better impedance matching.

(5) HL is internally connected to VeeR and VeeT.

(SCM6202-JL-##(A) has no Housing Leads.)

Figure 15. Recommended Interface Circuit

10. Reliability Test Program

GR-468-CORE Issue 1, December 1998 Laser Module

| HEADING | TEST | REFERENCE | CONDITIONS | SAMPLING | | |
|----------------------|---------------------------|-----------------------------------------|------------------------------------------------------------------------------|----------|----------|--------|
| | | | | LTPD | SS | C |
| Mechanical Integrity | Mechanical Shock | MIL-STD-883 Method 2002 | 5 times/axis 1,500G, 0.5ms | 20 | 11 | 0 |
| | Vibration | MIL-STD-883 Method 2007 | Cond. A 20G, 20-2,000 Hz, 4min/cy, 4cy/axis | 20 | 11 | 0 |
| | Thermal Shock | MIL-STD-883 Method 1011 | Delta T=100°C 0°C to 100°C | 20 | 11 | 0 |
| | Solderability | MIL-STD-883 Method 2003 | (steam aging not required) | 20 | 11 | 0 |
| Endurance | Accel. Aging (High Temp.) | (R)-4-53 Section 5.18 | 85°C; rated power 1,000 hrs. for pass/fail 2,000, 5,000 hrs. for info. | - | 25 10 | - |
| | Low Temp. Storage | - | min. storage T 1,000 hrs. for pass/fail 2,000 hrs. for info. | 20 | 11 | 0 |
| | Temperature Cycling | Section 5.20 | -40°C to +85°C 500 for pass/fail 1,000 for info. | 20 - | 11 11 | 0 - |
| | Damp Heat | MIL-STD-202 Method 103 or IEC-60068-2-3 | 85°C/85%RH 1,000hrs. | 20 | 11 | 0 |
| | Cyc. Moist. Res. | Sec. 5.23 | - | 20 | 11 | 0 |
| Special Tests | Internal Moisture | MIL-STD-883 Method 1018 | Max. 5,000ppm water vapour | 20 | 11 | 0 |
| | ESD Threshold | Section 5.22 | - | - | 6 | - |

SS : Sample Size

C : Maximum number of failure allowed to pass the test.

11. Laser Safety

This product uses a semiconductor laser system and is a laser class 1 product acceptable FDA, complies with 21CFR 1040. 10 and 1040.11. Also this product is a laser class 1 product acceptable IEC 60825.



Class 1 Laser Product

⚠ Caution



If this product is used under conditions not recommended in the specification or this product is used with unauthorized revision, classification for laser product safety standard is invalid. Classify the product again at your responsibility and take appropriate actions.

12. Other Precaution

Under such a strong vibration environment as in automobile, the performance and reliability are not guaranteed. The governmental approval is required to export this product to other countries. To dispose of these components, the appropriate procedure should be taken to prevent illegal exportation.

This module must be handled, used and disposed of according to your company's safe working practice.

⚠ Warning

- ❗ Be sure to carry out correct soldering for connection to peripheral circuits in order to prevent contact failure or short-circuit. Otherwise, a strong laser beam may cause eye injury, overheating or fire.
- 🚫 Do not put this product or components of this product into your mouth. This product contains material harmful to health.

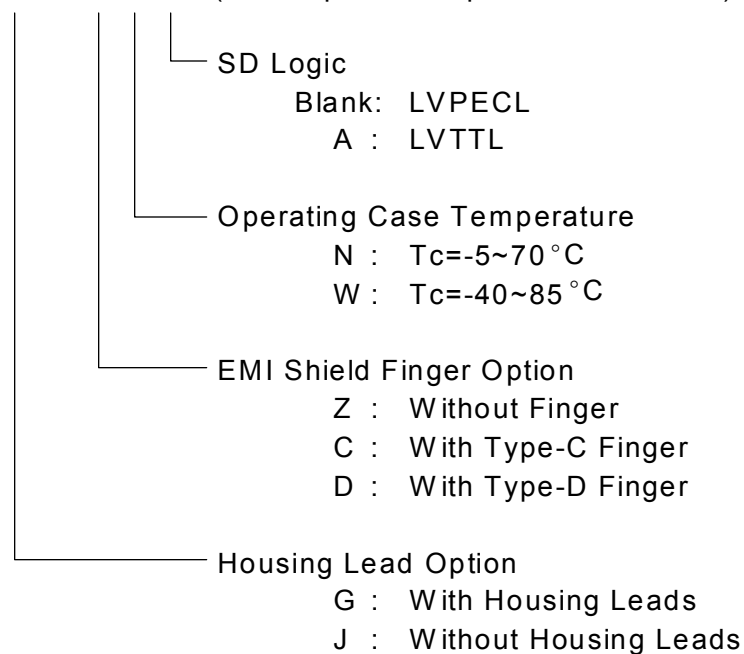
⚠ Caution

- ❗ Be sure to turn the power off when you touch this product connected to the printed circuit boards. Otherwise, electric shock may occur.
- 🚫 Dispose this product or equipment including this product properly as an industrial waste according to the regulations.

13. Ordering Information

13-1. Ordering Number

SCM6202 - a L - b c d (LC Duplex Receptacle, Metallized)



13-2. Part Number on Label

| Part Number on Label | Operating Temperature |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| SCM6202 - a L - d | T _c =-5~70°C |
| SCM6202 - a L - W d | T _c =-40~85°C |

14. For More Information

U.S.A.

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