Technical Specification
for
Optical Transceiver Module

SCM6008-GL

☐ 155.52Mbps	☐ 622.08Mbps	☑ other 2488.32Mbps
☑ Short Haul Intermediate Reach	☐ Long Haul Long Reach	☐ other _____
☐ Single 5.0 V	☑ Single 3.3 V	☐ other _____
☑ 1.3 μm	☐ 1.55 μm	☐ other _____
☐ Transmitter	☐ Receiver	☑ Transceiver
	(☐ 2R / ☐ 3R)	(☑ 2R / ☐ 3R)

Applicable Part Numbers : SCM6008-GL-ZN, SCM6008-GL-CN

SUMITOMO ELECTRIC

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 and applications of SCM6008-GL are listed below.

Features

* Multi Bit Rate Operation 155Mbps ~ 2.5Gbps
* 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 LVTTL for Signal Detect and Laser Disable
* Fiber Coupled Power -5 ~ 0dBm into SMF
* Input Power Range 0 ~ -18dBm
* Monitor Functions Laser Bias Monitor, Rear Facet Monitor
* Laser Disable Function
* Signal Detect (SD) Function
* Connector Interface LC Duplex Connector

Applications

*Telecommunications
> SONET/IR, SDH/SH Application
> ATM Application
> Shelf-to-Shelf Multi Bit Rate Application
> Subscriber Loop
> Metropolitan Area Network

*Data communications
>High Speed Rack-to-Rack Data Links

2. Block Diagram

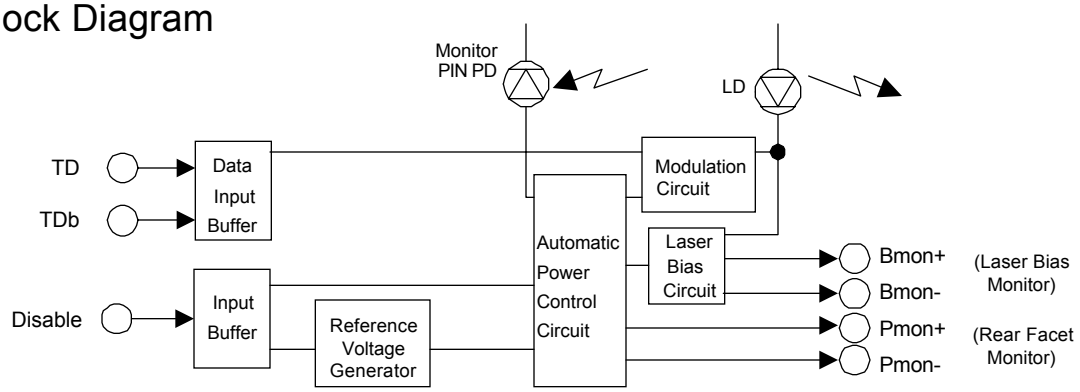


Figure 1-1. Block Diagram (Transmitter)

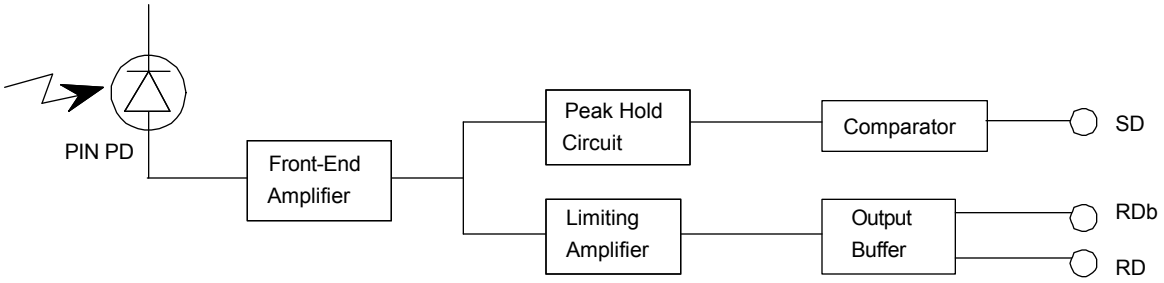


Figure 1-2. Block Diagram(Receiver)

⚠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

All dimensions are in mm.

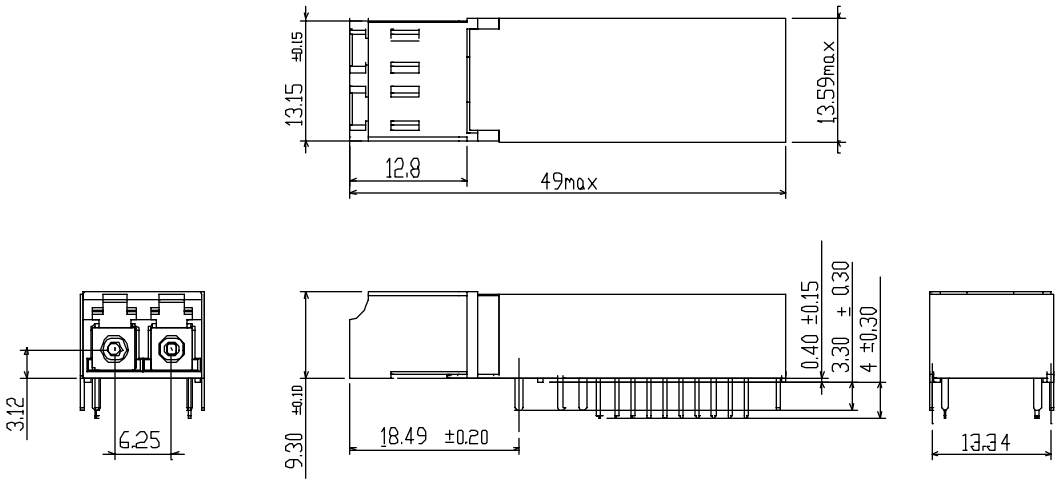


Figure 2-1. Outline Dimensions (SCM6008-GL-ZN)

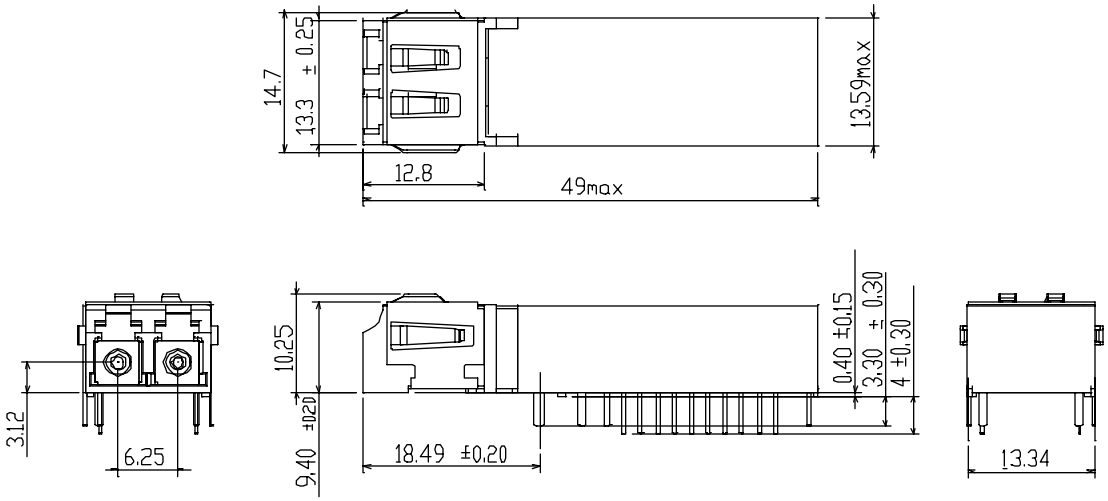


Figure 2-2. Outline Dimensions (SCM6008-GL-CN)

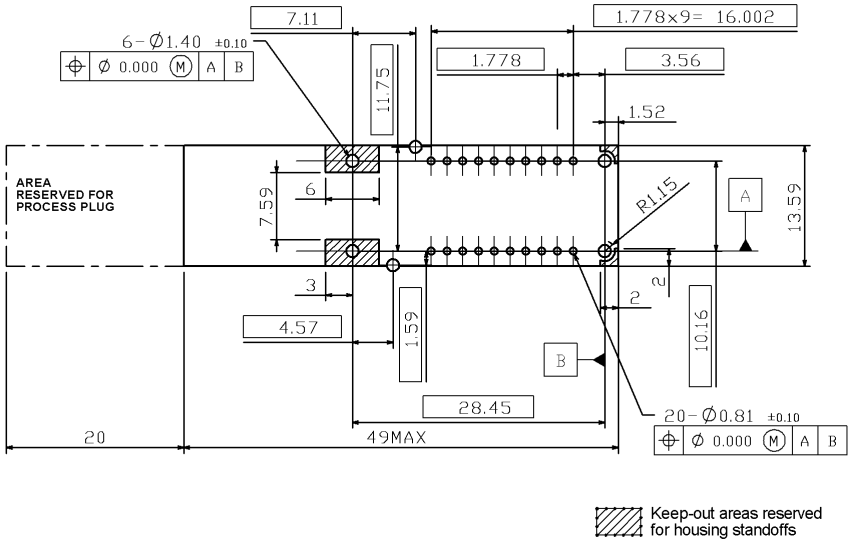


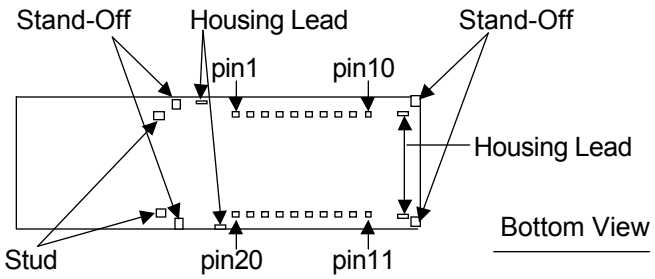
Figure 2-3. Recommended Footprint

4. Pin Assignment

No.	Symbol	I/O/P	Level	Description
1	VpdR	P	+3.3V DC	**DC Bias Supply for Receiver PIN-PD.**
2	VeeR	P	GND	**Power Supply (-) for Receiver.**
3	VeeR	P	GND	**Power Supply (-) for Receiver.**
4	NC			**No User Connection.**
5	NC			**No User Connection.**
6	VeeR	P	GND	**Power Supply (-) for Receiver.**
7	VccR	P	+3.3V DC	**Power Supply (+) for Receiver.**
8	SD	O	LVTTL	**Signal Detect.** High level indicates presence of optical input signal (Active High).
9	RDb	O	LVPECL	**Inverted Receiver Output Data.** No internal terminations are provided.
10	RD	O	LVPECL	**Non-Inverted Receiver Output Data.** No internal terminations are provided.
11	VccT	P	+3.3V DC	**Power Supply (+) for Transmitter.**
12	VeeT	P	GND	**Power Supply (-) for Transmitter.**
13	Tdis	I	LVTTL/LVCMOS	**Transmitter Disable (Active High).** Defaults to logic 0 (enable TX) when left open.
14	TD	I	LVPECL	**Non-Inverted Transmitter Input Data.** Self biased and internally terminated.
15	TDb	I	LVPECL	**Inverted Transmitter Input Data.** Self biased and internally terminated.
16	VeeT	P	GND	**Power Supply (-) for Transmitter.**
17	Bmon-	O	Analog Voltage	**LD Bias Current Monitor**. Voltage difference between pins 17 and 18 is proportional to the laser bias current.
18	Bmon+	O		
19	Pmon-	O	Analog Voltage	**Rear Facet Monitor**. Transmitter output power can be monitored, in terms of rear facet monitor PD current, by measuring voltage difference between pins 19 and 20.
20	Pmon+	O		

Notes:

1. I/O/P stand for signal input, signal output, and DC power/bias supply, respectively.
2. Refer to figure 3 for details of Bmon and Pmon outputs.



5. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Case Temperature	Ts	-40	-	85	°C	1
Operating Case Temperature	Tc	-5	-	70	°C	1
Supply Voltage	Vcc	0.0	-	4.0	V	
PIN-PD Bias Voltage	VpdR	-	-	7.0	V	
Input Voltage	Vi	0.0	-	Vcc+0.5	V	2
Lead Soldering (Temperature)				260	°C	
(Time)				10	sec.	

Notes

1. No condensation allowed.
2. TD, TDb, Tdis

⚠ 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

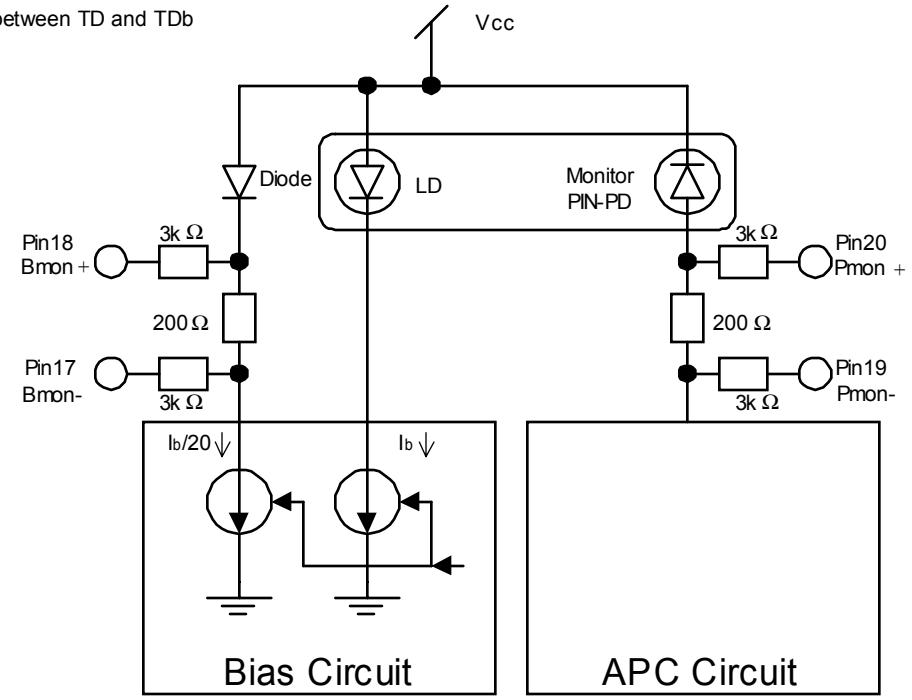
(Unless otherwise specified, Vcc = 3.14 to 3.47 V and all operating temperature shall apply.)

6-1. Transmitter side

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	Vcc	3.14	3.30	3.47	V	
Supply Current	Idtx		95	200	mA	1
Differential Input Voltage Swing (TD,TDb)	Vin	0.60		2.00	Vp-p	2
Input Impedance	Rin	75	100	125	Ω	3
Signal Input Rise/Fall Time	tr / tf			120	psec	4

Notes

1. Input bias current is not included. 50% duty cycle data. 2488.32Mbps
2. Vcc=3.3V, Tc=25°C
3. Measured between TD and TDb
4. 20 ~ 80%



Resistance values are typical.

Figure 3. Bmon / Pmon Circuit Detail

6-2. Receiver side

Parameter		Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage		Vcc	3.14	3.30	3.47	V	
Supply Current		Idrx		80	130	mA	1
PIN-PD Bias Voltage		VpdR	2.40	3.3	5.25	V	
RD and RDb Output Voltage	High	Vdoh	Vcc-1.10		Vcc-0.65	V	2
	Low	Vdol	Vcc-1.80		Vcc-1.30		
SD Output Voltage	High	Vsoh	2.40		Vcc	V	
	Low	Vsol	0.0		0.5		
Data Rise / Fall Time		tr / tf		140 / 120		psec	
SD Assert Time		ta	2.3		100	µsec	3
SD Deassert Time		td	2.3		350	µsec	

Notes

1. Output current is not included.
2. Vcc=+3.3V, Tc=25°C, Output load resistance Rl=50Ω to Vcc-2V for RD, RDb.
3. 2488.32Mbps, PRBS 2^23-1, NRZ

7. Optical Interface

(Unless otherwise specified, Vcc = 3.14 to 3.47 V and all operating temperature shall apply.)

7-1. Transmitter side

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Average Output Power	Po	-5.0		0.0	dBm	1
Extinction Ratio	Er	8.2			dB	1
Center Wavelength	λc	1260		1360	nm	
Spectral Width (-20dB Width)	Δλ			1	nm	
Side Mode Suppression Ratio	Sr	30			dB	
Eye Mask for Optical Output	Refer to Figure 4					

Note 1. Measured at 2488.32Mbps PRBS2^23-1, 50% duty cycle, NRZ.

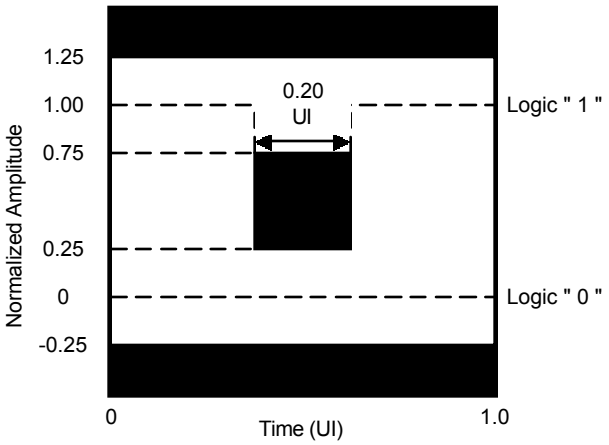


Figure 4 Eye Diagram Mask for Optical Output

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

⚠ 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
Center Wavelength	-	1260		1360	nm	
Minimum Sensitivity	Pmin			-18.0	dBm	1, 2
Overload	Pmax	0			dBm	1, 2
SD Assert Level	Pa		-22		dBm	2
SD Deassert Level	Pd		-25		dBm	
SD Hysteresis	Phys	0.5	3		dB	
Reflectance	REFr		-14		dB	

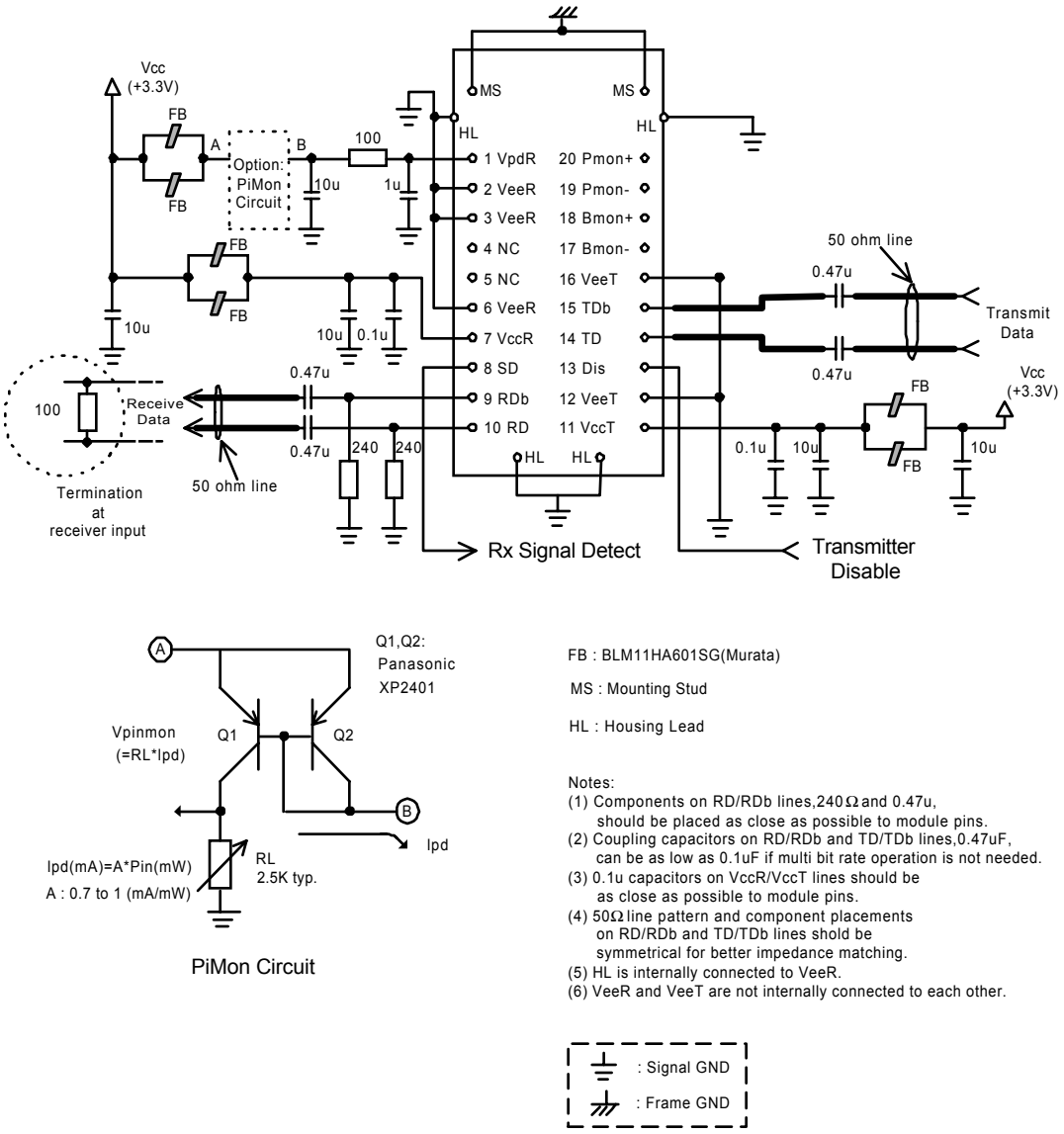
Note 1. BER=10^-10
2. Measured at 2488.32Mbps, PRBS 2^23-1, NRZ

8. Relation between Disable Input Voltage and Optical Output Power

Disable Input Voltage	Optical Output Power
"L"(0 ~ 0.8V)	Enabled
"H"(2.0V ~ Vcc)	Disabled (<-45dBm)

*Note : Enabled for no Disable input (Pin 13 open)

9. Recommended Interface Circuit



PiMon Circuit

FB : BLM11HA601SG(Murata)

MS : Mounting Stud

HL : Housing Lead

Notes:
(1) Components on RD/RDb lines,240Ω and 0.47u, should be placed as close as possible to module pins.
(2) Coupling capacitors on RD/RDb and TD/TDb lines,0.47uF, can be as low as 0.1uF if multi bit rate operation is not needed.
(3) 0.1u 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 shold be symmetrical for better impedance matching.
(5) HL is internally connected to VeeR.
(6) VeeR and VeeT are not internally connected to each other.

: Signal GND
: Frame GND

Figure 5. Recommended Interface Circuit

10. Reliability Test Program

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

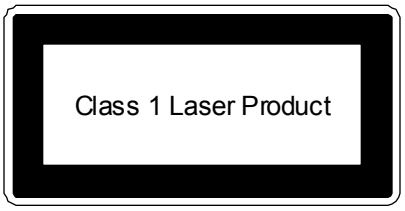
HEADING	TEST	REFERENCE	CONDITIONS	SAMPLING		
				LTPD	SS	C
Mechanical Integrity	Mechanical Shock	MIL-STD-883 Method 2002	5 times/axis 1,500G, 0.5ms	20	11	0
	Vibration	MIL-STD-883 Method 2007	Cond. A 20G, 20-2,000G Hz, 4min/cy, 4cy/axis	20	11	0
	Thermal Shock	MIL-STD-883 Method 1011	Delta T=100°C 0°C 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 acc. FDA, complies with 21CFR 1040. 10 and 1040.11. Also this product is a laser class 1 product acc. IEC 60825-1.



⚠ Caution

⃠ If this product is used under conditions not recommended in the specification or this product is used with unauthorized revision, classfication 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.
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 contaions 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

Ordering Number	Connector Type	EMI Shield Finger Option	Operating Case Temperature
SCM6008-GL-ZN	LC Duplex Receptacle,Metallized	Without Finger	-5°C ~ 70°C
SCM6008-GL-CN	LC Duplex Receptacle,Metallized	With Type-C Finger	

14. For More Information

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