

GW5BxF15Lxx Series

Light Emitting Diode Module



■ Features

1. High output (ex: GW5BWF15L00: 540 lm at $I_F = 640$ mA)
2. 48 LEDs in series-parallel array
3. White from InGaN Blue LED chip + Phosphor (varies by color)

■ Part Numbering

Letters	Emission Color	Part Number
BD	Tungsten (2800°K)	GW5BDF15L00
BN	High Color Rendering (5000°K)	GW5BNF15L00
BN	High Color Rendering (6500°K)	GW5BNF15L10
BW	Normal White (5000°K)	GW5BWF15L00

■ Agency Approvals/Compliance

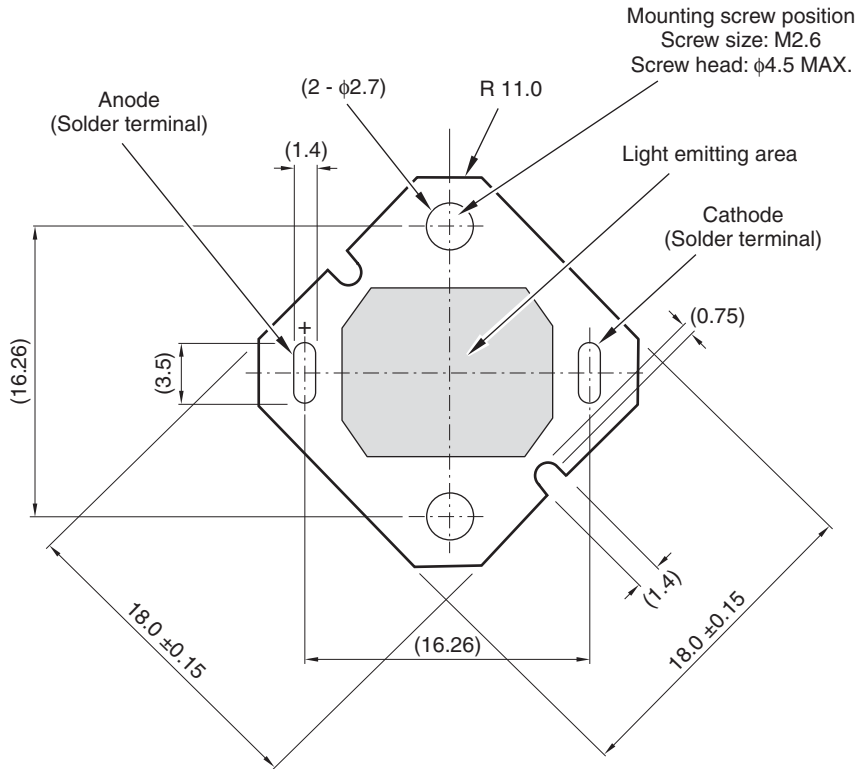
1. RoHS compliant

■ Applications

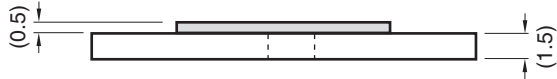
1. Illumination

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■ Outline Dimensions and Terminal Connections



Side View

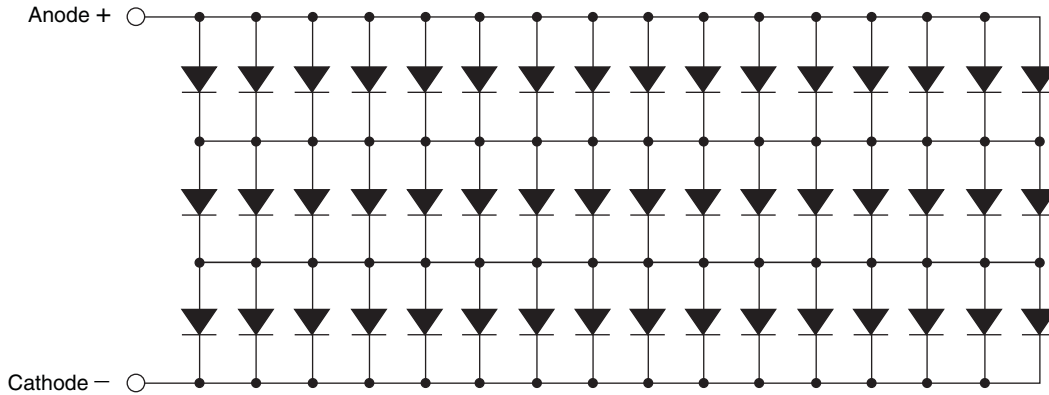


NOTES:

1. Dimensions are in mm
2. (): Reference dimensions

GW5xxF15L-1

Internal Circuit Diagram



GW5xxF15L-2

Absolute Maximum Ratings

(Ta = 25°C)

Parameter	Symbol	Rating	Unit
Power dissipation *1	P	8.0	W
Forward current *1	I _F	720	mA
Reverse voltage	V _R	-15	V
Operating temperature *2	T _{opr}	-30 to +90	°C
Storage temperature	T _{stg}	-40 to +100	°C

*1 This value of Power Dissipation assumes the use of an adequate heat sink to keep the module within its rated Operating temperature range at the rated current. Sharp recommends designing to a maximum allowable T_c of 80°C.

*2 Operating Temperature is fixed by the module's external temperature, and is measured at the point shown in Figure 7. Follow the derating curve given in Figure 1.

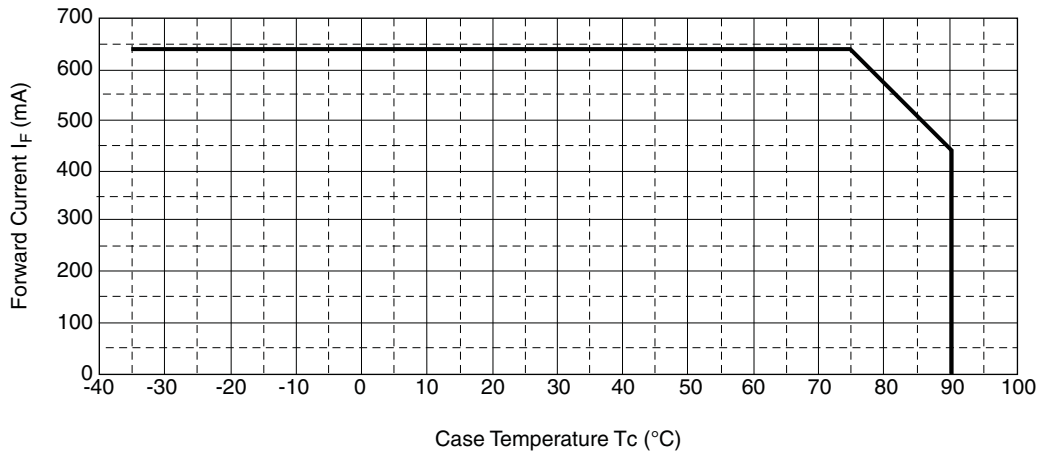
(Ta = 25°C)

■ Electro-optical Characteristics

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Forward Voltage		V_F	$I_F = 640 \text{ mA}$	9.0	10.5	12.0	V
Luminous Flux *1	BW: Normal White	ϕ	$I_F = 640 \text{ mA}$	400	540	–	lm
	BD: Tungsten	ϕ	$I_F = 640 \text{ mA}$	300	400	–	lm
	BN: High Color Rendering	ϕ	$I_F = 640 \text{ mA}$	260	350	–	lm
Chromaticity *2	BD: Tungsten (2800°K)	x	$I_F = 640 \text{ mA}$	–	0.45	–	
		y		–	0.41	–	
		T_c		2550	2800	3050	K
	BW: Normal white (5000°K)	x	$I_F = 640 \text{ mA}$	–	0.35	–	
		y		–	0.36	–	
		T_c		4700	5000	5300	K
	BN: High Color Rendering (5000°K)	x	$I_F = 640 \text{ mA}$	–	0.35	–	
		y		–	0.35	–	
		T_c		4700	5000	5300	K
	BN: High Color Rendering (6500°K)	x	$I_F = 640 \text{ mA}$	–	0.31	–	
		y		–	0.32	–	
		T_c		6000	6500	7000	K

*1 Measured with the use of an integrating sphere, after 20 ms drive. Accuracy $\pm 20\%$
 *2 Measured with Ohtsuka Electronics Model MCPD-2000. Accuracy: x, y ± 0.02

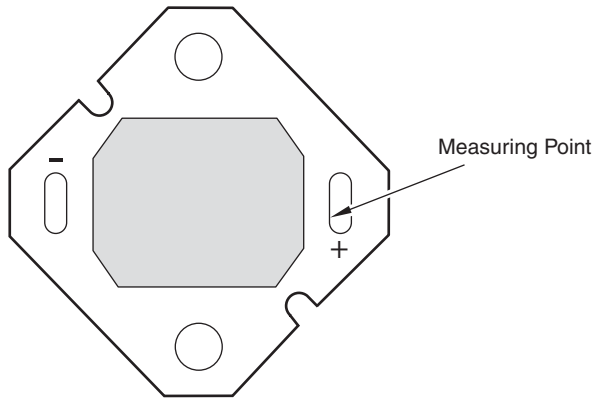
Fig. 1 Derating Curve



NOTE: To keep this part within its rating, enough heatsinking capability must be employed.

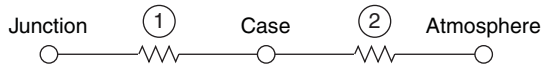
GW5xxF15L-3

Fig. 2 Case Temperature Measurement Point



GW5xxF15L-4

Fig. 3 Thermal Resistance

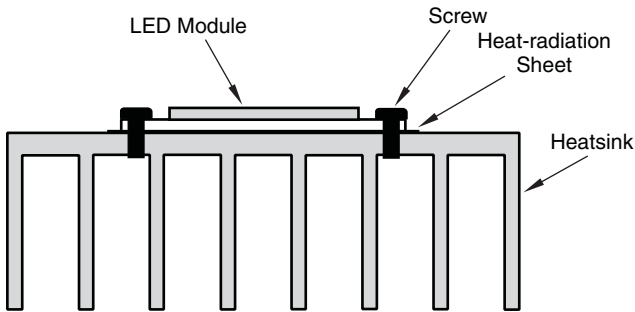


NOTES:

- ① Thermal resistance: 6.5°C/W (Reference value) (Junction to Case)
- ② Thermal resistance: Depends on the performance of any attached heat sink. (Case to Atmosphere)

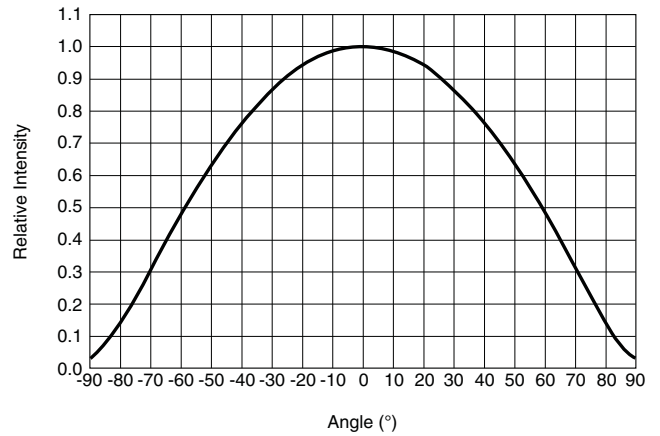
GW5xxF15L-6

Fig. 4 Heatsink Attachment



GW5xxF15L-5

Fig. 5 Relative Intensity vs. Viewing Angle



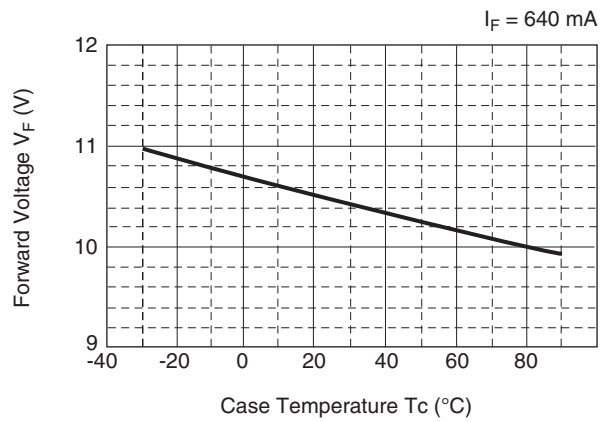
GW5xxF15L-18

■ Characteristics Diagrams

● GW5BWC15L02 (5000°K White)

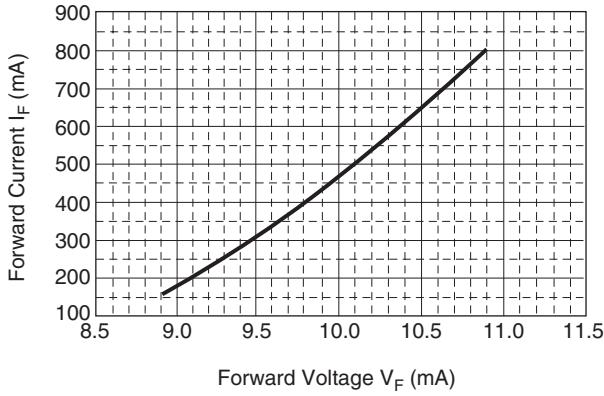
*Characteristics data are typical data and are not guaranteed data.

Fig. 6 Forward Voltage vs. Case Temperature



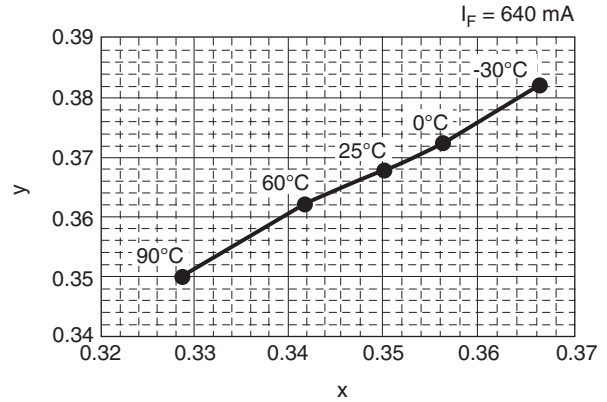
GW5xxF15L-10

Fig. 7 Forward Current vs. Forward Voltage



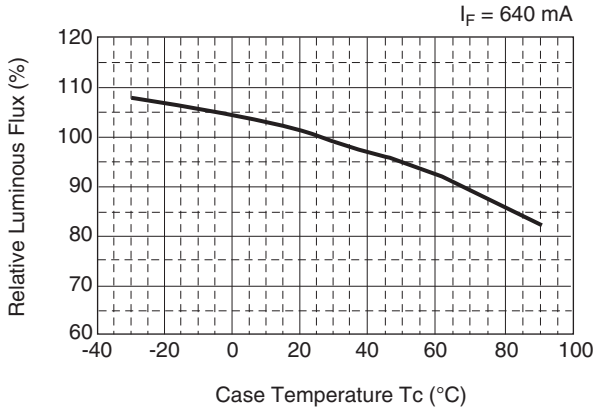
GW5xxF15L-8

Fig. 10 Chromaticity Coordinate vs. Case Temperature



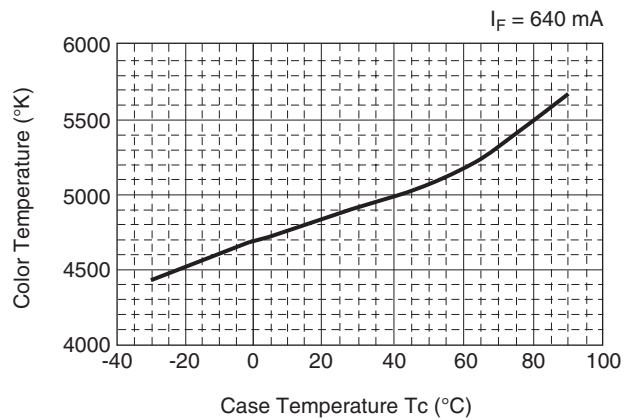
GW5xxF15L-11

Fig. 8 Relative Luminous Flux vs. Case Temperature



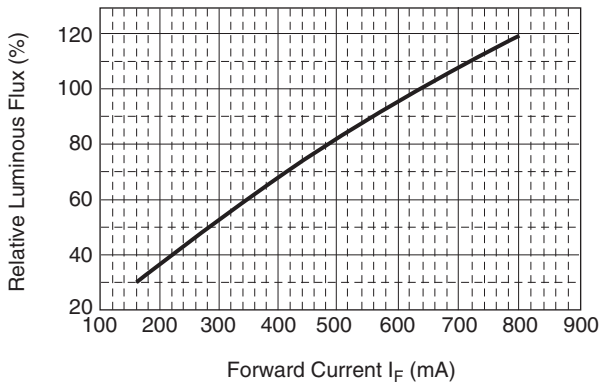
GW5xxF15L-9

Fig. 11 Color Temperature vs. Case Temperature



GW5xxF15L-12

Fig. 9 Relative Luminous Flux vs. Forward Current



GW5xxF15L-7

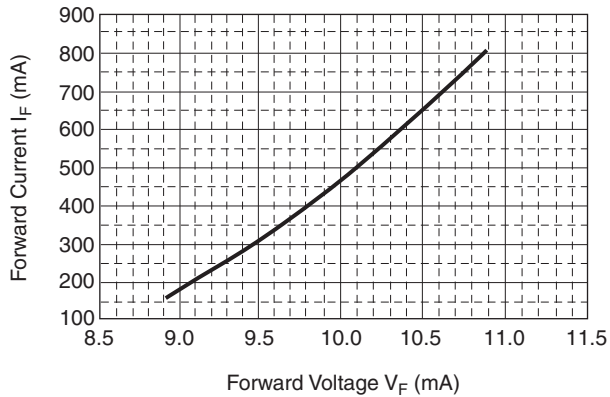
● **GW5BDC15L02 (2800°K Tungsten)**

*Characteristics data are typical data and are not guaranteed data.

Fig. 12 Forward Voltage vs. Case Temperature

TBD

Fig. 13 Forward Current vs. Forward Voltage

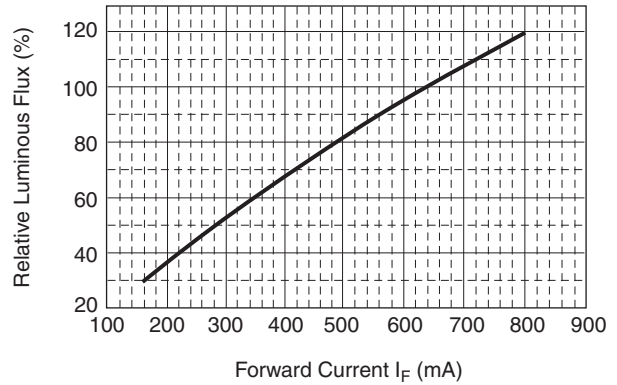


GW5xxF15L-14

Fig. 14 Relative Luminous Flux vs. Case Temperature

TBD

Fig. 15 Relative Luminous Flux vs. Forward Current



GW5xxF15L-13

Fig. 16 Chromaticity Coordinate vs. Case Temperature

TBD

Fig. 17 Color Temperature vs. Case Temperature

TBD

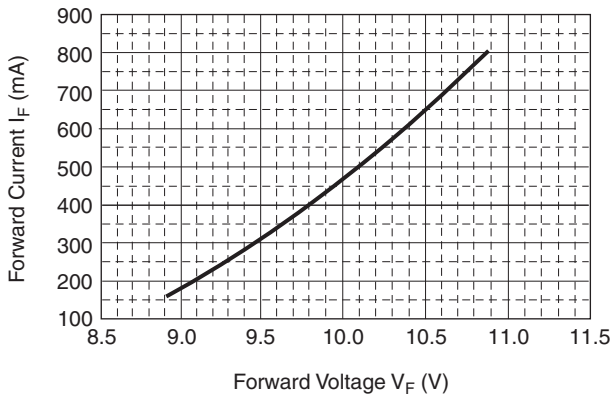
● **GW5BNC15L02 (5000°K White) and GW5BNC15L12 (6500°K White)**

*Characteristics data are typical data and are not guaranteed data.

Fig. 18 Forward Voltage vs. Case Temperature

TBD

Fig. 19 Forward Current vs. Forward Voltage

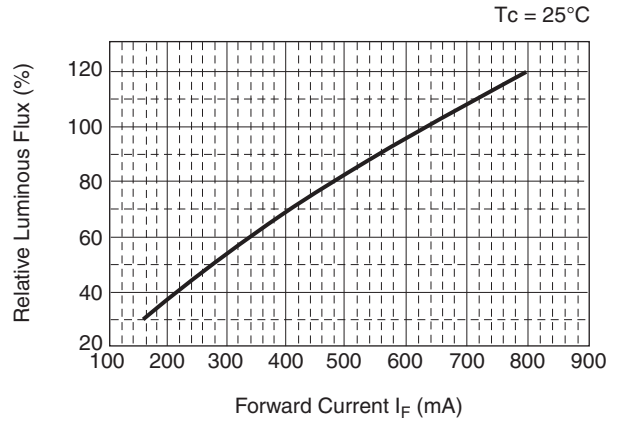


GW5xxF15L-16

Fig. 20 Relative Luminous Flux vs. Case Temperature

TBD

Fig. 21 Relative Luminous Flux vs. Forward Current



GW5xxF15L-15

Fig. 22 Chromaticity Coordinate vs. Case Temperature

TBD

Fig. 23 Color Temperature vs. Case Temperature

TBD

■ Design Considerations

Design Guidelines

1. This product is not designed to be electromagnetic- and ionized-particle-radiation resistant.
2. Always use an adequate heatsink with this part, in combination with either (or both) a thermally conductive sheet or heat-conducting grease. Sharp recommends designing such heat transfer methods to keep the part under its maximum allowable case temperature (T_c) of 80°C for the end design's real-world conditions.
3. Sharp recommends keeping the current through this device below 640 mA for best part longevity.
4. Do not allow the circuit design to apply any reverse voltage to the LEDs.
5. This module requires a constant-current source for its drive. A constant-voltage supply may provide more than the rated current due to lowered V_F created caused by part heating.
6. If currents in excess of the rated maximum are supplied to this part, hazardous conditions may be created, including excess heating, smoke emission, or a possible fire. Take appropriate measures to control excess current and voltage.
7. If the lead wire to the part comes loose, it could contact the case or heatsink, thereby creating a short circuit and possible shock hazard. Take appropriate measures to prevent the lead wire from coming into contact with other parts.

■ Manufacturing Guidelines

Cleaning Instructions

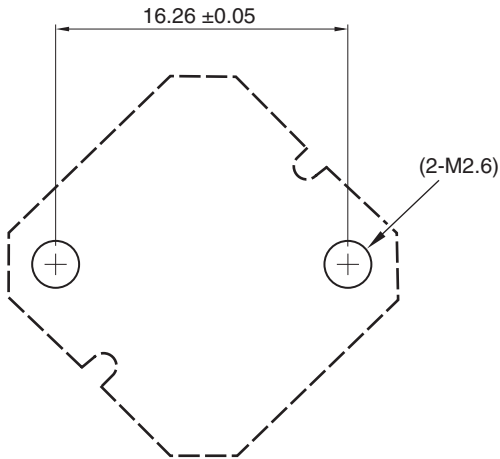
1. Sharp does not recommend cleaning this part, as the silicone resin may be corroded by solvents.

Soldering Instructions

1. Sharp recommends soldering by hand, with a thermally-controlled iron at 380°C; within 10 seconds for each place. Solder on a surface that does not conduct heat.
2. When soldering, do not touch the tip of the iron to the yellow phosphor.
3. This product is not designed for solder reflow or solder flow methods.
4. Do not subject the package to excessive mechanical force during soldering as it may cause deformation or defects in plated connections. Internal connections may be severed due to mechanical force placed on the package due to the PCB flexing during the soldering process.

Mechanical Installation Instructions

1. Sharp recommends taking particular notice of the installation method, as the mounting board's material is aluminumized ceramic. If incorrectly installed, problems with non-radiation may occur due to cracking of the mounting board.
2. Use screws, adhesives, or both when mounting this device to its heatsink. When using only adhesives, be sure to check their effectiveness. Use thread locking materials to prevent screws from loosening due to thermal cycling. If the part is separated from its heatsink, a catastrophic temperature rise may occur, causing self-desoldering, device deterioration if not destruction, and smoke emission.
3. When screw mounting:
 - Refer to Fig. 24 for the recommended dimensions.
 - Screw torque: within 0.2 N•m.
 - Use thread locking materials.
 - Use materials with low galvanic action, such as stainless steel.
 - Do not use flathead screws, which can cause substrate cracks due to stress at the screw holes.
 - Do not install the part into a board which is warped in a convex direction. This part can be easily damaged by torquing it to a convexly-warped mounting surface.
 - To maximize thermal efficiency between the device and its heatsink, Sharp recommends a thermally-conductive sheet and conductive grease.
 - Circuit board cracks can be caused when screws are tightened; be sure to check the actual conditions carefully.

Fig. 24 Screw-mounting Dimensions

GW5xxF15L-17

Storage and Handling

1. Store these parts between 5° and 30°C, at a relative humidity of less than 60%.
2. After breaking the package seal, maintain the environment within 5° to 30°C, at a relative humidity of less than 60%, and mount the parts within one week.
3. This part is not designed to directly resist excessive moisture, such as dew or condensation; or corrosive (salt) air or corrosive gases, such as Cl, H₂S, NH₃, SO₂, NO_x. Exposure can corrode plated connections, causing solderability problems.
4. This part can be easily damaged by external stress. Make sure it is not mechanically stressed during or after assembly.
5. This part has a very high light output. Looking directly at it during full power output can cause injury.
6. Sharp recommends taking proper personal and environmental static control precautions when handling this part.
7. Sharp recommends handling these parts in a clean, non-dusty environment since surface dust may be difficult to remove and can affect the optical performance of the part.
8. Sharp recommends confirming the part's performance, reliability, and resistance to any of these conditions, if it is to be used in any of these environments:
 - Direct sunlight, outdoor exposure, dusty conditions
 - In water, oil, medical fluids, and organic solvents
 - Excessive moisture, such as dew or condensation
 - Corrosive (salt) air or corrosive gases, such as Cl, H₂S, NH₃, SO₂, NO_x

■ Presence of ODCs (RoHS Compliance)

This product shall not contain the following materials, and they are not used in the production process for this product:

- Regulated substances: CFCs, Halon, Carbon tetrachloride, 1.1.1-Trichloroethane (Methylchloroform). Specific brominated flame retardants such as the PBBOs and PBBs are not used in this product at all.

This product shall not contain the following materials banned in the RoHS Directive (2002/95/EC).

- Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE).

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- Personal computers
- Office automation equipment
- Telecommunication equipment (terminal)
- Test and measurement equipment
- Industrial control
- Audio visual equipment
- Consumer electronics

(ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:

- Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
- Traffic signals
- Gas leakage sensor breakers
- Alarm equipment
- Various safety devices, etc.

(iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:

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- Telecommunication equipment (trunk lines)
- Nuclear power control equipment
- Medical and other life support equipment (e.g. scuba)

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