Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

OMRON

Solid State Relays for Industrial I/O
G3TC

Reliable SSRs for I/O Module Mounting Boards

- Use I/O SSRs as an interface between logic circuitry and the load.
- Variety of AC/DC input and output modules with industry-standard footprint and color coding.
- Built-in hold down screw fastens relay to board to eliminate loosening by vabration.
- Optical Isolation - Dielectric strength of 4 kV between input and output terminals.
- Zero cross function on AC output models.
- AC and DC input versions incorporate a rectifier to accept both AC or DC inputs.
- UL, CSA and TUV approved; marked with CE.

Ordering Information

■ Input Module

Function	Color	Isolation	Input operating voltage range	Logic level output supply voltage	Model
AC input	Yellow	Photo-coupler	90-140 VDC/AC	5 VDC	**G3TC-IAC5 AC/DC120**
				15 VDC	**G3TC-IAC15 AC/DC120**
				24 VDC	**G3TC-IAC24 AC/DC120**
			180-280 VDC/AC	5 VDC	**G3TC-IAC5A AC/DC120**
				15 VDC	**G3TC-IAC15A AC/DC120**
				24 VDC	**G3TC-IAC24A AC/DC120**
DC input	White		10-32 VDC/AC	5 VDC	**G3TC-IDC5 DC/AC24**
				15 VDC	**G3TC-IDC15 DC/AC24**
				24 VDC	**G3TC-IDC24 DC/AC24**

■ Output Module

Function	Color	Isolation	Rated input voltage	Rated output voltage (Applicable output voltage)	Model
AC output	Black	Photo-triac	5 VDC	3 A at 120 VAC (3 A at 75-140 VAC)	**G3TC-OAC5 DC5**
			15 VDC		**G3TC-OAC15 DC15**
			24 VDC		**G3TC-OAC24 DC24**
			5 VDC	3 A at 240 VAC (3 A at 75-280 VAC)	**G3TC-OAC5A DC5**
			15 VDC		**G3TC-OAC15A DC15**
			24 VDC		**G3TC-OAC24A DC24**
DC output	Red	Photo-coupler	5 VDC	3 A at 60 VDC (3 A at 5-60 VDC)	**G3TC-ODC5 DC5**
			15 VDC		**G3TC-ODC15 DC15**
			24 VDC		**G3TC-ODC24 DC24**
			5 VDC	1 A at 200 VDC (1 A at 5-200 VDC)	**G3TC-ODC5 DC5**
			15 VDC		**G3TC-ODC15 DC15**
			24 VDC		**G3TC-ODC24 DC24**

■ Typical Applications

- HVAC, refrigeration equipment
- Automation controls
- Injection molding machines
- Packaging equipment

■ I/O Classification by Color

| AC equipment | 90 to 140 VAC/DC 180 to 280 VAC/DC | G3TC-IAC5 AC/DC120 G3TC-IAC15 AC/DC120 G3TC-IAC24 AC/DC120 | Yellow | 5 to 24 VDC | |
| | | AC input module | | | |

| DC equipment | 10 to 32 VDC/AC | G3TC-IDC5 DC/AC24 G3TC-IDC15 DC/AC24 G3TC-IDC24 DC/AC24 | White | 5 to 24 VDC | |
| | | DC Input module | | | |

| AC equipment | 75 to 140 VAC, 3 A 75 to 280 VAC, 3 A | G3TC-OAC5 DC5 G3TC-OAC15 DC15 G3TC-OAC24 DC24 G3TC-OAC5A DC5 G3TC-OAC15A DC15 G3TC-OAC24A DC24 | Black | 5 to 24 VDC | PC or logic circuitry |
| | | AC output module | | | |

| DC equipment | 5 to 60 VDC, 3 A; 5 to 200 VDC, 1 A | G3TC-ODC5 DC5 G3TC-ODC15 DC15 G3TC-ODC24 DC24 G3TC-ODC5A DC5 G3TC-ODC15A DC15 G3TC-ODC24A DC24 | Red | 5 to 24 VDC | |
| | | DC output module | | | |

Specifications

■ Common Characteristics

Insulation resistance	100 MΩ min at 500 VDC
Dielectric strength	4000 VAC, 50/60 Hz for 1 minute between input and output
Vibration resistance	Malfunction: 10 to 55 Hz, 1.5 mm double amplitude
Shock resistance	Malfunction: 1,000 m/s^2
Ambient temperature	Operating: -30°C to 80°C with no icing or condensation
	Storage: -30°C to 100°C with no icing or condensation
Ambient humidity	Operating: 45% to 85%
Approved standards	UL508, UL60950, CSA22.2 No 14, No 950, EN60950

■ AC Input Module G3TC-IAC

Ratings (Ambient Temperature 25°C)

Input

Item	G3TC-IAC5	G3TC-IAC15	G3TC-IAC24	G3TC-IAC5A	G3TC-IAC15A	G3TC-IAC24A
Rated voltage	120 VAC/DC			240 VAC/DC		
Operating voltage	90-140 VAC/DC			180-280 VAC/DC		
Must operate voltage	90 VAC/DC max.			180 VAC/DC max.		
Must release voltage	25 VAC/DC min.			45 VAC/DC min.		
Input current at rated voltage	5 mA max.			5 mA max.		
Input resistance (see note 1)	30k Ω			69k Ω		

Output

Item	G3TC-IAC5	G3TC-IAC15	G3TC-IAC24	G3TC-IAC5A	G3TC-IAC15A	G3TC-IAC24A
Output supply voltage-nominal	5 VDC	15 VDC	24 VDC	5 VDC	15 VDC	24 VDC
Output supply voltage-range	4.5-6 VDC	12-18 VDC	20-30 VDC	4.5-6 VDC	12-18 VDC	20-30 VDC
Output supply current at rated input voltage (see note 2)	12 mA max.	15 mA max.	18 mA max.	12 mA max.	15 mA max.	18 mA max.
Control resistance (Rc in circuit configuration - see note 1)	240 Ω	1k Ω	2.2k Ω	240 Ω	1k Ω	2.2k Ω
Output current	50 mA max.					

Characteristics

Item	G3TC-IAC5	G3TC-IAC15	G3TC-IAC24	G3TC-IAC5A	G3TC-IAC15A	G3TC-IAC24A
Operate time (see note 3)	20 ms max.					
Release time (see note 3)	20 ms max.					
Output ON voltage drop	0.4 V max.					
Leakage current	100 μA max.					
Weight	Approx. 40g					

Note: 1. Resistance values are reference.

2. The input module supplies the current on I/O circuit board at nominal ouput voltage.

3. At nominal output supply voltage, rated input voltage and 25°C.

■ DC Input Module G3TC-IDC

Ratings (Ambient Temperature 25°C)

Input

Item	G3TC-IDC5	G3TC-IDC15	G3TC-IDC24
Rated voltage	24 VDC/AC		
Operating voltage	10-32 VDC/ 15-32 VAC		
Must operate voltage	10 VDC/15 VAC max.		
Must release voltage	3 VDC/ 3 VAC min.		
Input current rated voltage	25 mA max.		
Input resistance	1.5k Ω		

Output

Item	G3TC-IDC5	G3TC-IDC15	G3TC-IDC24
Output supply voltage-nominal	5 VDC	15 VDC	24 VDC
Output supply voltage-range	4.5-6 VDC	12-18 VDC	20-30 VDC
Output supply current at rated input voltage (see note 2)	12 mA max.	15 mA max.	18 mA max.
Control resistance (Rc in circuit configuration - see note 1)	240 Ω	1k Ω	2.2k Ω
Output current	50 mA max.		

Characteristics

Item	G3TC-IDC5	G3TC-IDC15	G3TC-IDC24
Operate time (see note 3)	5 ms max.		
Release time (see note 3)	5 ms max.		
Output ON voltage drop	0.4 V max.		
Leakage current	100 μA max.		
Weight	Approx. 40g		

Note: 1. Resistance values are reference.

2. The input module supplies the current on I/O circuit board at nominal ouput voltage.

3. At nominal output supply voltage, rated input voltage and 25°C.

■ AC Output Module G3TC-OAC

Ratings (Ambient Temperature 25°C)

Input

Item	G3TC-OAC5	G3TC-OAC15	G3TC-OAC24	G3TC-OAC5A	G3TC-OAC15A	G3TC-OAC24A
Rated voltage	5 VDC	15 VDC	24 VDC	5 VDC	15 VDC	24 VDC
Operating voltage	2.5-8 VDC	9-16 VDC	18-32 VDC	2.5-8 VDC	9-16 VDC	18-32 VDC
Must operate voltage	2.5 VDC max.	9 VDC max.	18 VDC max.	2.5 VDC max.	9 VDC max.	18 VDC max.
Must release voltage	1 VDC min.					
Input current at rated voltage (see note 1)	18 mA max.					
Control resistance (Rc in circuit configuration - see note 2)	240 Ω	1k Ω	2.2k Ω	240 Ω	1k Ω	2.2k Ω

Output

Item	G3TC-OAC5	G3TC-OAC15	G3TC-OAC24	G3TC-OAC5A	G3TC-OAC15A	G3TC-OAC24A
Rated load voltage	120 VAC			240 VAC		
Load voltage range	75-140 VAC			75-280 VAC		
Load current	0.05 to 3 A					
Inrush current	45 A (60 Hz, 1 cycle)					

Characteristics

Item	G3TC-OAC5	G3TC-OAC15	G3TC-OAC24	G3TC-OAC5A	G3TC-OAC15A	G3TC-OAC24A
Operate time (see note 3)	1/2 of load power source cycle + 1 ms max.					
Release time (see note 3)	1/2 of load power source cycle + 1 ms max.					
Output ON voltage drop	1.6 V (RMS) max.					
Leakage current	2.5 mA max. (at 120 VAC)			5 mA max. (at 240 VAC)		
Weight	Approx. 45g					

Note: 1. Resistance values are reference.

2. The input module supplies the current on I/O circuit board at nominal ouput voltage.

3. At nominal output supply voltage, rated input voltage and 25°C.

■ DC Output Module G3TC-ODC

Ratings (Ambient Temperature 25°C)

Input

Item	G3TC-ODC5	G3TC-ODC15	G3TC-ODC24	G3TC-ODC5A	G3TC-ODC15A	G3TC-ODC24A
Rated voltage	5 VDC	15 VDC	24 VDC	5 VDC	15 VDC	24 VDC
Operating voltage	2.5-8 VDC	9-16 VDC	18-32 VDC	2.5-8 VDC	9-16 VDC	18-32 VDC
Must operate voltage	2.5 VDC max.	9 VDC max.	18 VDC max.	2.5 VDC max.	9 VDC max.	18 VDC max.
Must release voltage	1 VDC min.					
Input current at rated voltage (see note 1)	18 mA max.					
Control resistance (Rc in circuit configuration - see note 2)	240 Ω	1k Ω	2.2k Ω	240 Ω	1k Ω	2.2k Ω

Output

Item	G3TC-ODC5	G3TC-ODC15	G3TC-ODC24	G3TC-ODC5A	G3TC-ODC15A	G3TC-ODC24A
Rated load voltage	60 VDC			200 VDC		
Load voltage range	5-60 VDC			5-200 VDC		
Load current	0.01 to 3 A			0.01 to 1.0 A		
Inrush current	18 A (10 ms)			9 A (10 ms)		

Characteristics

Item	G3TC-ODC5	G3TC-ODC15	G3TC-ODC24	G3TC-ODC5A	G3TC-ODC15A	G3TC-ODC24A
Operate time (see note 3)	50 μs max.			100 μs max.		
Release time (see note 3)	50 μs max. (see note 4)			750 μs max.		
Output ON voltage drop	1.6 V (RMS)max.					
Leakage current	1 mA max. (at 60 VAC)			1 mA max. (at 200 VAC)		
Weight	Approx. 45g			Approx. 40g		

Note: 1. The output module supplies the current on I/O circuit board at nominal input voltage.

    2. Resistance values are reference.

    3. At rated load voltage, maximum rated load current, rated input voltage and 25°C.

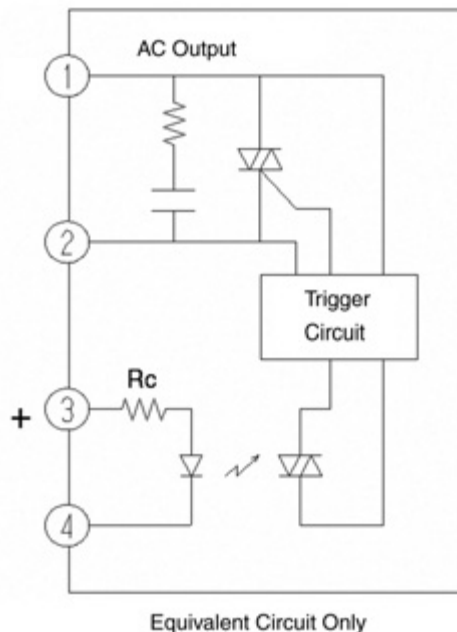   **4.** At 24 VDC load voltage, 3 A load current and 25°C.

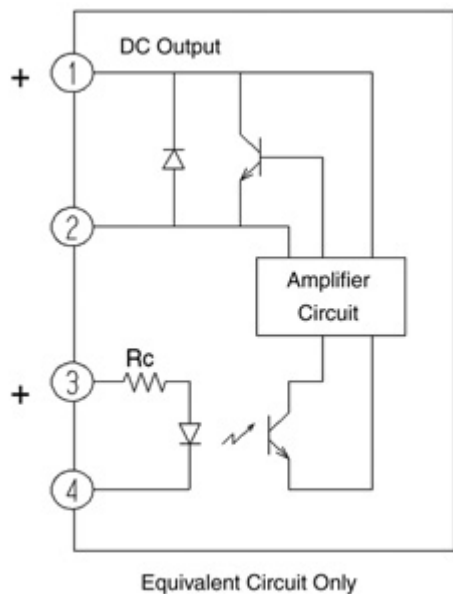# Engineering Data

■ Internal Circuit

G3TC-IAC/IDC
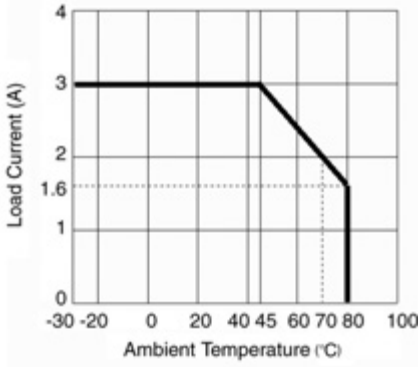

Equivalent Circuit Only
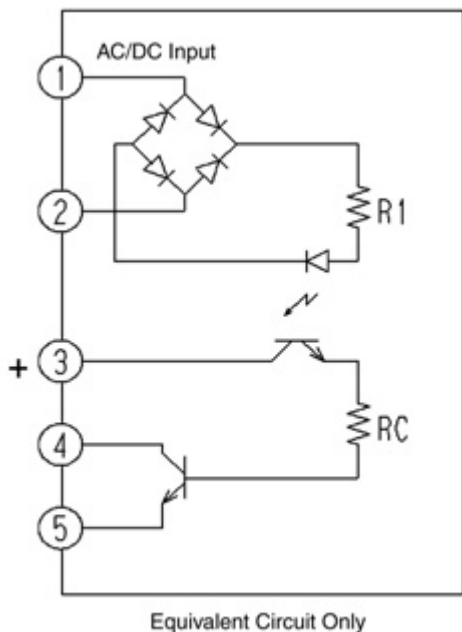
Note: Internal biasing circuitry is different between AC input and DC input modules

G3TC-OAC

Equivalent Circuit Only

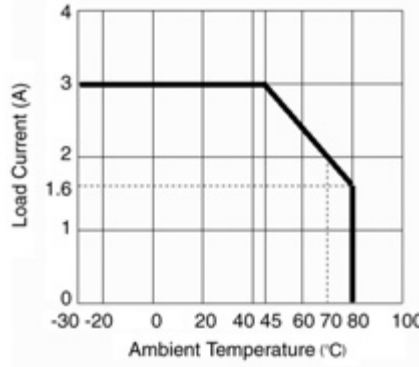### G3TC-ODC

Equivalent Circuit Only

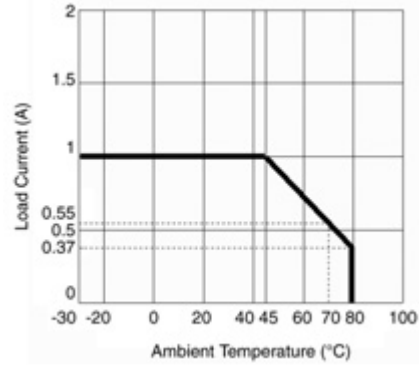## ■ Load Current vs. Ambient Temperature Characteristics

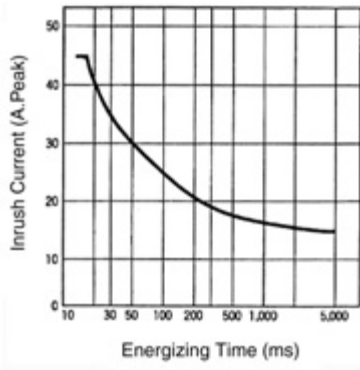**G3TC-OAC5, -OAC15, -OAC24, -OAC5A, -OAC15A, -OAC24A**

G3TC-ODC5, -ODC15, -ODC24
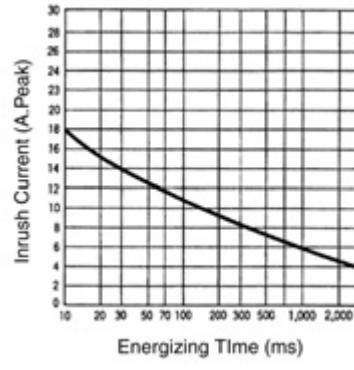

G3TC-ODC5A, -ODC15A, -ODC24A

■ Inrush Current Resitivity

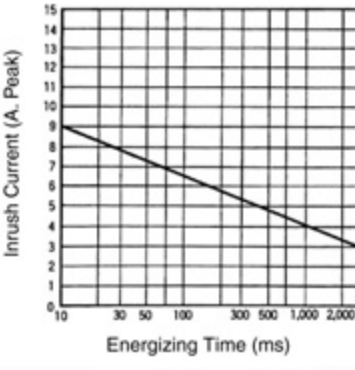Non-repetitive (Keep inrush current to half the rated value if it occurs.)

G3TC-OAC5, -OAC15, -OAC24, -OAC5A, -OAC15A, -OAC24A
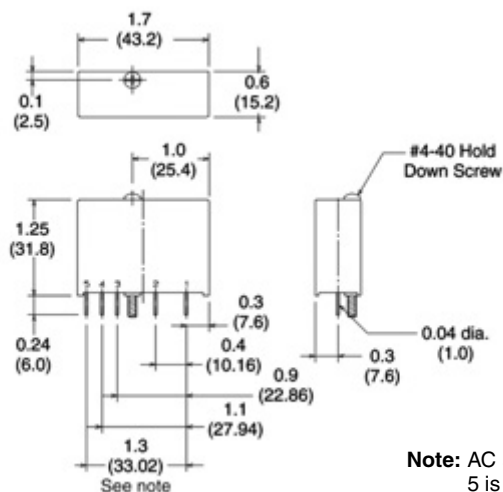

G3TC-ODC5, -ODC15, -ODC24

G3TC-ODC5A, -ODC15A, -ODC24A

Dimensions

Unit: mm (inch)

Note: AC and DC input versions only; pin 5 is not present on output modules.

■ Approvals

UL (File No. E64562)/CSA (File No. 35535)

Input

Model	Input voltage
G3TC-IAC5, -IAC15, -IAC24	90-140 V AC/DC
G3TC-IAC5A, -IAC15A, -IAC24A	180-280 V AC/DC
G3TC-IDC5, -IDC15, -IDC24	10-32 VDC, 12-32 VAC
G3TC-ODC5, -ODC5A, -OAC5, -OAC5A	5 VDC
G3TC-ODC15, -ODC15A, -OAC15, -OAC15A	15 VDC
G3TC-ODC24, -ODC24A, -OAC24, -OAC24A	24 VDC

Output

Model	Load voltage	Load current
G3TC-IAC5, -IAC15, -IAC24	5/15/24 VDC	50 mA
G3TC-IAC5A, -IAC15A, -IAC24A	5/15/24 VDC	50 mA
G3TC-IDC5, -IDC15, -IDC24	5/15/24 VDC	50 mA
G3TC-ODC5, -ODC15, -ODC24	5-60 VDC	3 A
G3TC-ODC5A, -ODC15A, -ODC24A	5-200 VDC	1 A
G3TC-OAC5, -OAC15, -OAC24	75-140 VAC	3 A
G3TC-OAC5A, -OAC15A, -OAC24A	75-280 VAC	3 A

Note: The rated values approved by each of the safety standards (e.g., UL, CSA and TUV) may be different from the performance characteristics individually defined in this catalog.

Precautions

!

Do not touch the relay while power is supplied or immediately after G3TC is turned OFF. Doing so may result in burns.

!

Do not touch the load terminal of the G3TC immediately after the power is turned OFF, otherwise an electric shock may be received due to the residual charge of the built-in C/R circuit.

!

Be sure to turn OFF the power supply to the G3TC before wiring, otherwise an electric shock may result.

!

Ensure that a short-circuit current does not flow on the load side of the SSR, otherwise the G3TC may be damaged.

■ General Precautions

At OMRON, we are constantly working to improve the quality and reliability of our products. SSRs, however, use semiconductors, which are prone to malfunction. Be sure to use SSRs within their rated value. Use the SSR only in systems that are designed with redundancies, flame protection, counter measures to prevent operation errors, and other countermeasures to prevent accidents involving human life or fires.

1. Do not apply excessive voltage or current to the input or output circuit of the G3TC. Doing so may result in malfunction or burning.
2. Do not connect the input and output circuits incorrectly. Doing so may result in malfunction or burning.
3. Do not obstruct the flow of air around the G3TC. Abnormal heating of the G3TC may result in short-circuiting of output elements and burning.

■ Correct Use

Before Actual Operation

1. In actual operation, the G3TC may cause accidents that were unforeseeable at the theoretical stage. Therefore, it is necessary to test the G3TC under a variety of conditions that are possible. As for the characteristics of the G3TC, it is necessary to consider the differences between G3TC models.
2. The ratings in this datasheet are for testing in a temperature range of 15 to 30°C, a relative humidity range of 25% to 85%, and an atmospheric pressure range of 88 to 106kPa. When testing operation, it is necessary to confirm correct operation not only with the actual load that will be used, but also at the same ambient conditions as for actual operation.
3. The input circuitry does not incorporate a circuit protecting the SSR from being damaged due to a reversed connection. Make sure that the polarity is correct when connecting the input lines.
4. Only use the G3TC with loads that are within the rated values. Using the G3TC with loads outside the rated values may result in malfunction, damage, or burning.
5. Use a power supply within the rated frequency range. Using a power supply outside the rated frequency range may result in malfunction, damage, or burning.
6. No over-voltage absorption element is built in. Therefore, if the G3TC is connected to an inductive load, be sure to connect an over-voltage absorption element.
7. As protection against accidents due to short-circuiting, be sure to install protective devices, such as fuses on the power supply side.
8. Keep wiring separate from high-voltage power lines and use wires of an appropriate length, otherwise malfunction and damage may result due to induction.

9. For a DC inductive load, a diode should be connected in parallel with the load to absorb the counter electromotive force of the load.
10. For an I/O mounting rack that is installed horizontally, use the G3TC with loads that are within the following conditions.

G3TC-OAC5, -OAC5A, -OAC15, -OAC15A, -OAC24, -OAC24A

Horizontal mounting

G3TC-ODC5, -ODC15, -ODC24

Horizontal mounting
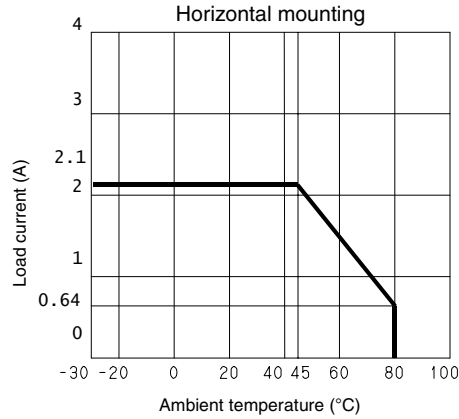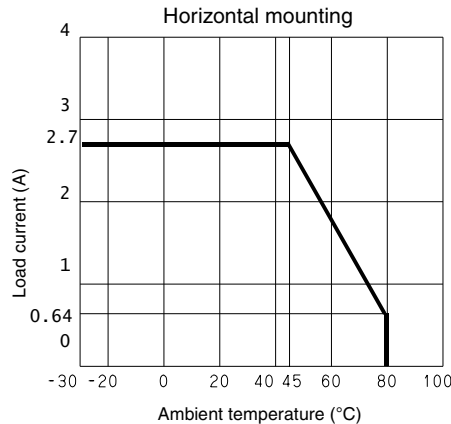
■ Operating and Storage Environments

Operating Ambient Temperature

The rated value for the ambient operating temperature of the G3TC is for when there is no built-up heat. For this, reason, under conditions where heat dissipation is not good due to poor ventilation, and where heat may build up easily, the actual temperature of the G3TC may exceed the rated value resulting in malfunction or burning.

When using the G3TC, design the system to allow heat dissipation sufficient to stay below the Load Current vs. Ambient Temperature characteristic curve. Note also that the ambient temperature of the G3TC may increase as a result of environmental conditions (e.g., climate, air-conditioning) and operating conditions (e.g., mounting in an airtight panel).

Operating and Storage Locations

Do not use or store the G3TC in the following locations. Doing so may result in damage, malfunction, or deterioration of performance characteristics.

1. Do not use or store in locations subject to direct sunlight.
2. Do not use in locations subject to ambient temperatures outside the range -30° to 80°C.
3. Do not use in locations subject to relative humidity outside the range 45% to 85% or locations subject to condensation as the result of severe change in temperature.
4. Do not store in locations subject to ambient temperatures outside the range -30° to 100°C.
5. Do not use or store in locations subject to corrosive or flammable gases.
6. Do not use or store in locations subject to dust (especially iron dust) or salts.
7. Do not use or store in locations subject to shock or vibration.
8. Do not use or store in locations subject to exposure to water, oil, or chemicals.

Transportation

When transporting the G3TC, observe the following points. Not doing so may result in damage, malfunction, or deterioration of performance characteristics.

1. Do not drop the G3TC or subject it to severe vibrations or shock.
2. Do not transport the product if it is wet.

Vibration and Shock

Do not subject the SSR to excessive vibration or shock. Otherwise the SSR may malfunction and internal components may be damaged.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters into inches, divide by 25.4

OMRON.

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