

# Solid State Relays DC Switching

## Types RGC1D Solid State Contactor RGS1D Solid State Relay



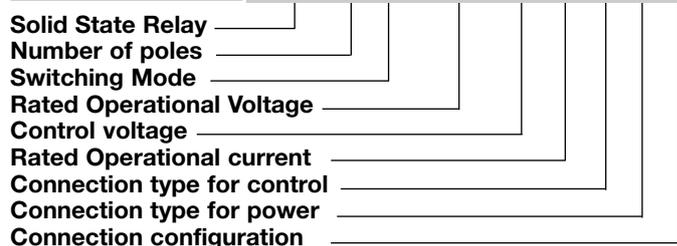
- IGBT power semiconductor
- 17.5mm product width, with or without integrated heatsink
- Rated Operational voltage: 1000 VDC
- Rated Operational current: Up to 25 ADC
- Control voltage: 4.5-32 VDC
- UL508, CSA22.2 No. 14-10
- Input polarity protection
- Removable IP20 cover
- Integrated free-wheeling diode for output protection
- Max. transient peak voltage: 1200V
- RoHS compliant

### Product Description

This contactor is mainly intended to switch a string of photovoltaic panels with a maximum string voltage of 1000Vp and up to 25 ADC in only 17.5mm width. It may be used in other DC application as well. The control port is protected against reverse polarity while

the IGBT at the output is protected against back voltage with an integrated free-wheeling diode. RGS1D is the panelmount version while the RGC1D has an integrated heatsink. Specifications are stated at 25°C unless otherwise noted.

### Ordering Key RGC 1 D 1000 D 15 K K E



### Ordering Key

1Phase SSR with heatsink	Rated Voltage	Control Voltage	Rated Current	Connection Control	Power	Connection configuration
RGC1D: Contactor RGS1D:SSR	1000: 1000 VDC	D: 4.5 - 32 VDC	15: 15 ADC 25: 25 ADC	K: Screw	K: Screw	E: Contactor

### Selection Guide (Solid State Contactor with integrated heatsink)

Rated Output	Max. transient peak voltage	Control Voltage	Rated Operational Current
1000 VDC	1200Vp	4.5 - 32 VDC	15 ADC RGC1D1000D15KKE

### Selection Guide (Panel-mount Solid State Relay)

Rated Output	Max. transient peak voltage	Control Voltage	Rated Operational Current				
1000 VDC	1200Vp	4.5 - 32 VDC	15 ADC RGS1D1000D15KKE				25 ADC RGS1D1000D25KKE
			25 ADC RGS1D1000D25KKE				

## Output Voltage Specifications

Operational Voltage Range CE	24 - 1000 VDC
UL508	24 - 600 VDC
Maximum transient peak voltage	1200 VDC
Maximum Onstate Voltage Drop	1.6 VDC

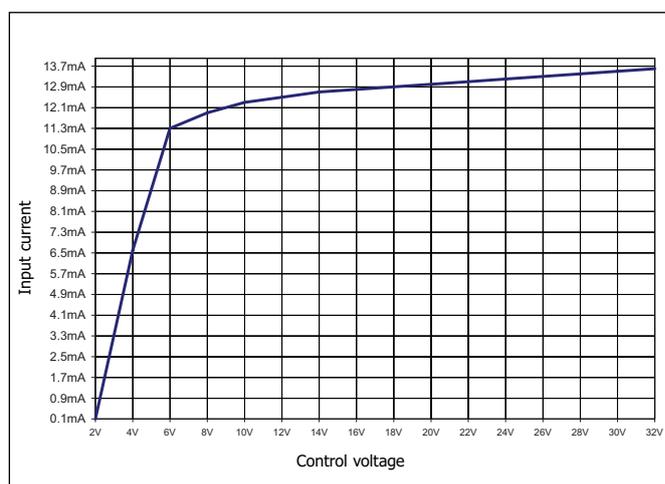
## General Specifications

Finger Protection	IP20
Control input status	continuously ON Green LED, when control input is applied
Pollution degree	2 (non-conductive pollution with possibilities of condensation)
Over-voltage category	III (fixed installations)
Isolation Input to Output Input&Output to Case	4kVrms 4kVrms

## Input specifications (@ 60°C)

Control voltage range	4.5 - 32 VDC
Pick-up voltage	4 VDC
Drop-out voltage	1 VDC
Maximum Reverse voltage	32 VDC
Maximum response time pick-up	1.5ms
Maximum response time drop-out	1.5ms
Input current *	See diagram below

Note: Ideally control should be switched with a contactless switch (eg: open collector)



## Output specifications (@ 40°C unless otherwise specified)

	RGC1D..15	RGS1D..15	RGS1D..25
Current Rating	DC-1 @ 60°C 8 ADC DC-1 @ 40°C 15 ADC	15 ADC	25 ADC
Maximum offstate leakage at rated voltage	1.5mA	1.5mA	1.5mA
Min. operational current	20 mADC	20 mADC	20 mADC
Maximum Transient Surge Current (10 µs)	200 ADC	200 ADC	200 ADC

## Agency Approvals and Conformances

Agency Approvals	UL508 Listed (pending) CUL Listed (pending)
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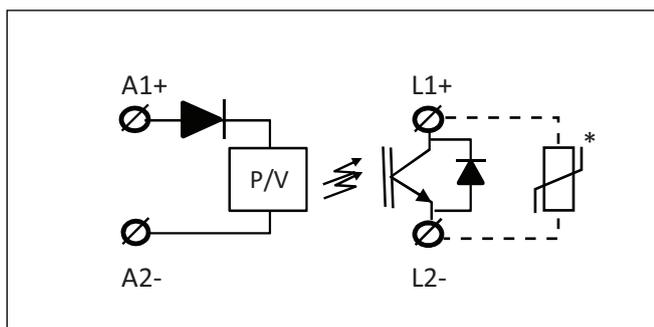
## Electromagnetic Compatibility

<b>EMC Immunity</b>	IEC/EN 61000-6-4	<b>Radiated Radio Frequency Immunity</b>	IEC/EN 61000-4-3
<b>Electrostatic Discharge (ESD) Immunity</b>	IEC/EN 61000-4-2	10V/m, 80 - 1000 MHz	Performance Criteria 1
Air discharge, 8kV	Performance Criteria 2	10V/m, 1.0 - 2.7GHz	Performance Criteria 1
Contact, 4kV	Performance Criteria 2	<b>Conducted Radio Frequency Immunity</b>	IEC/EN 61000-4-6
<b>Electrical Fast Transient (Burst) Immunity</b>	IEC/EN 61000-4-4	10V/m, 0.15 - 80 MHz	Performance criteria 1
Output: 4kV, 5kHz	Performance Criteria 2	<b>Voltage Dips Immunity</b>	IEC/EN 61000-4-11
Input: 1kV, 5kHz	Pending	40% for 200ms	Performance Criteria 2
<b>Electrical Surge Immunity</b>	IEC/EN 61000-4-5	<b>Voltage Dips Immunity</b>	IEC/EN 61000--4-29
Output, line to line, 1kV	Performance Criteria 1	30% @ 10,30,100,300,1000ms	Performance Criteria 2
Output, line to earth, 2kV	Performance Criteria 1	60% @ 10,30,100,300,1000ms	Performance Criteria 2
AC signal, line to line, 1kV	Pending	70% @ 10,30,100,300,1000ms	Performance Criteria 2
AC signal, line to earth, 2kV	Pending	<b>Voltage Interruptions Immunity</b>	IEC/EN 61000-4-11
		0% for 5000ms	Performance Criteria 2
<b>EMC Emission</b>	(EN/IEC 61000-6-2)	<b>Radio Interference field emission (radiated)</b>	
<b>Radio Interference Voltage Emission (Conducted)</b>	IEC/EN 55011	<b>IEC/EN 55011</b>	IEC/EN 55011
0.15 - 30MHz	Class B	30 - 1000MHz	Class B

## Environmental Specifications

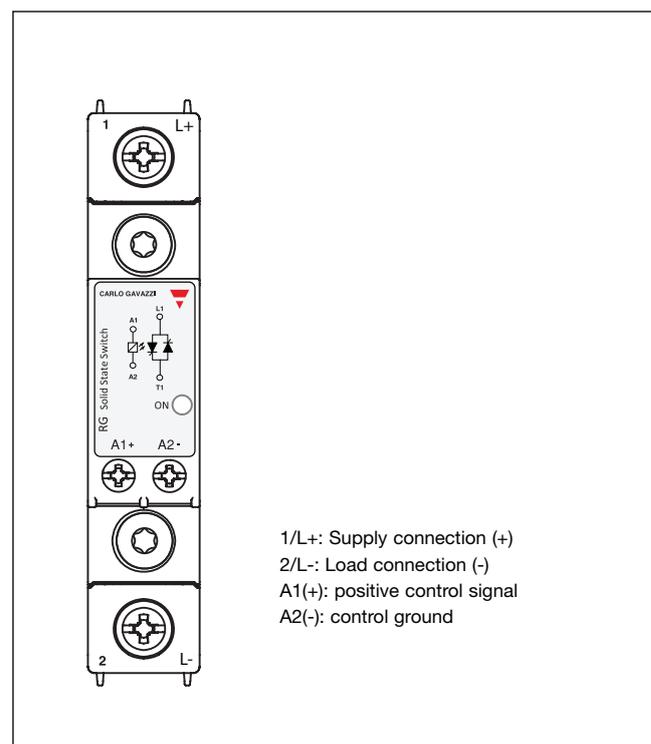
Operating Temperature	-40°C to 80°C (-40°F to +176°F)
Storage Temperature	-40°C to 100°C (-40°F to +212°F)
RoHS (2002/95/EC)	Compliant
Impact resistance (IEC/EN50155)	15/11 g/ms
Vibration resistance (2-100Hz, EN50155)	2g
Relative humidity	95% non-condensing @ 40°C
UL flammability rating (housing)	UL 94 V0

## Connection Diagram



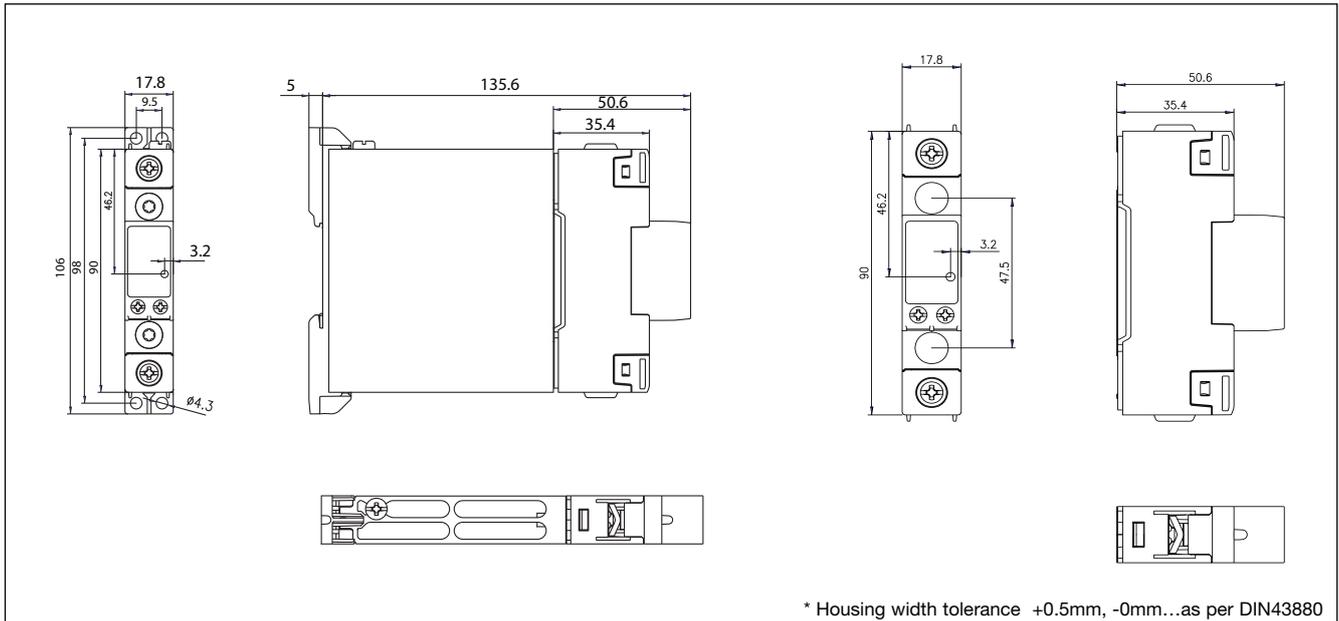
\* varistor not included

## Terminal Layout



1/L+: Supply connection (+)  
 2/L-: Load connection (-)  
 A1(+): positive control signal  
 A2(-): control ground

## Dimensions



All dimensions in mm

## Connection Specifications

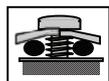
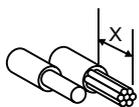
### POWER CONNECTIONS: 1/L+, 2 /L-

#### Torque specifications

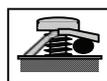
-  2 Nm (17.7 in-lb)
- M4, Pozidriv 2
- Use 75°C copper (Cu) conductors
- Stripping Length (X) = 11mm

#### Rigid (Solid & Stranded)

UL/ CSA rated data



2 x 2.5..6 mm<sup>2</sup>  
2 x 14..10 AWG



2 x 2.5..6 mm<sup>2</sup>  
1 x 14..10 AWG

#### Flexible with end sleeve



2 x 2.5..4mm<sup>2</sup>    2 x 2.5..4mm<sup>2</sup>  
2 x 14..12AWG    1 x 14..12AWG

#### Flexible without end sleeve



2 x 2.5..6 mm<sup>2</sup>    1 x 2.5..6 mm<sup>2</sup>  
2 x 14..10 AWG    1 x 14..10 AWG

#### Aperture for termination lug

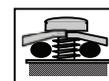
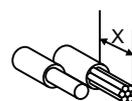
12.3mm

### CONTROL CONNECTIONS: A1(+), A2(-)

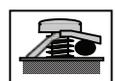
#### Torque specifications

-  0.5 Nm (4.4 in-lb)
- M3, Pozidriv 1
- Use 60/75°C copper (Cu) conductors
- Stripping Length (X) = 6mm

#### Rigid (Solid & Stranded)



2 x 0.5..2.5mm<sup>2</sup>  
2 x 18..12 AWG



1 x 0.5..2.5mm<sup>2</sup>  
1 x 18..12 AWG

#### Flexible with end sleeve



2 x 0.5..2.5mm<sup>2</sup>    1 x 0.5..2.5mm<sup>2</sup>  
2 x 18..12AWG    1 x 18..12AWG

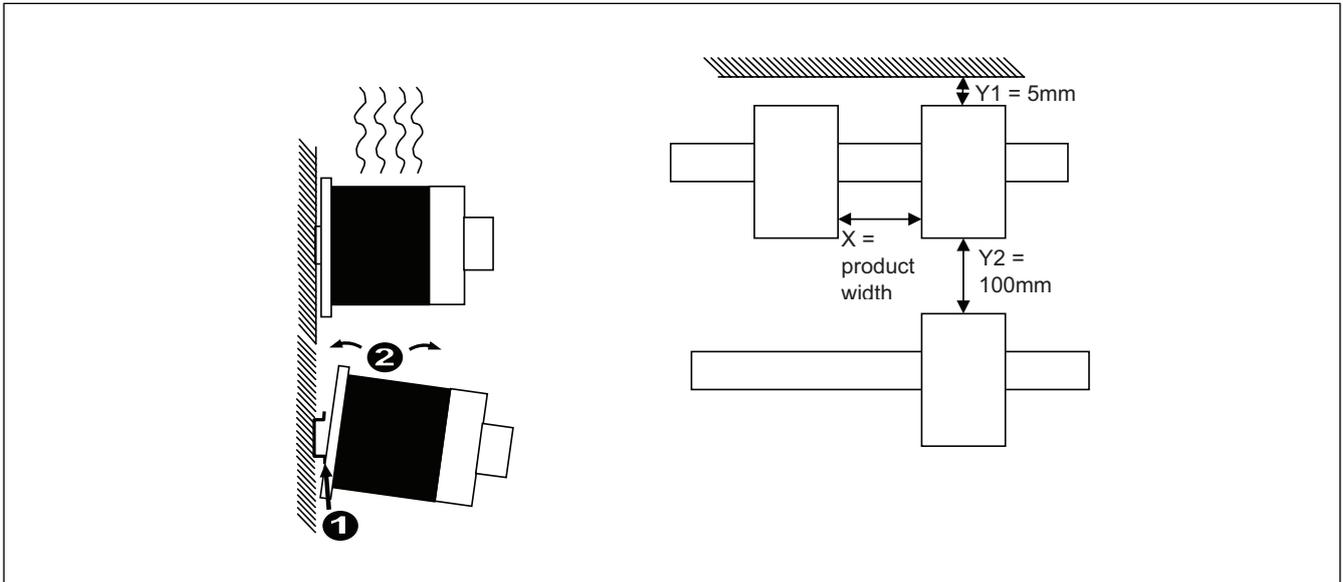
#### Protective Earth Connection



M4;  
1.5Nm (13.3 in-lb)

Note: Protective Earth connection must be connected whenever the product is intended to be used in Class 1 applications according to EN/IEC 61140.

## Installation Instructions

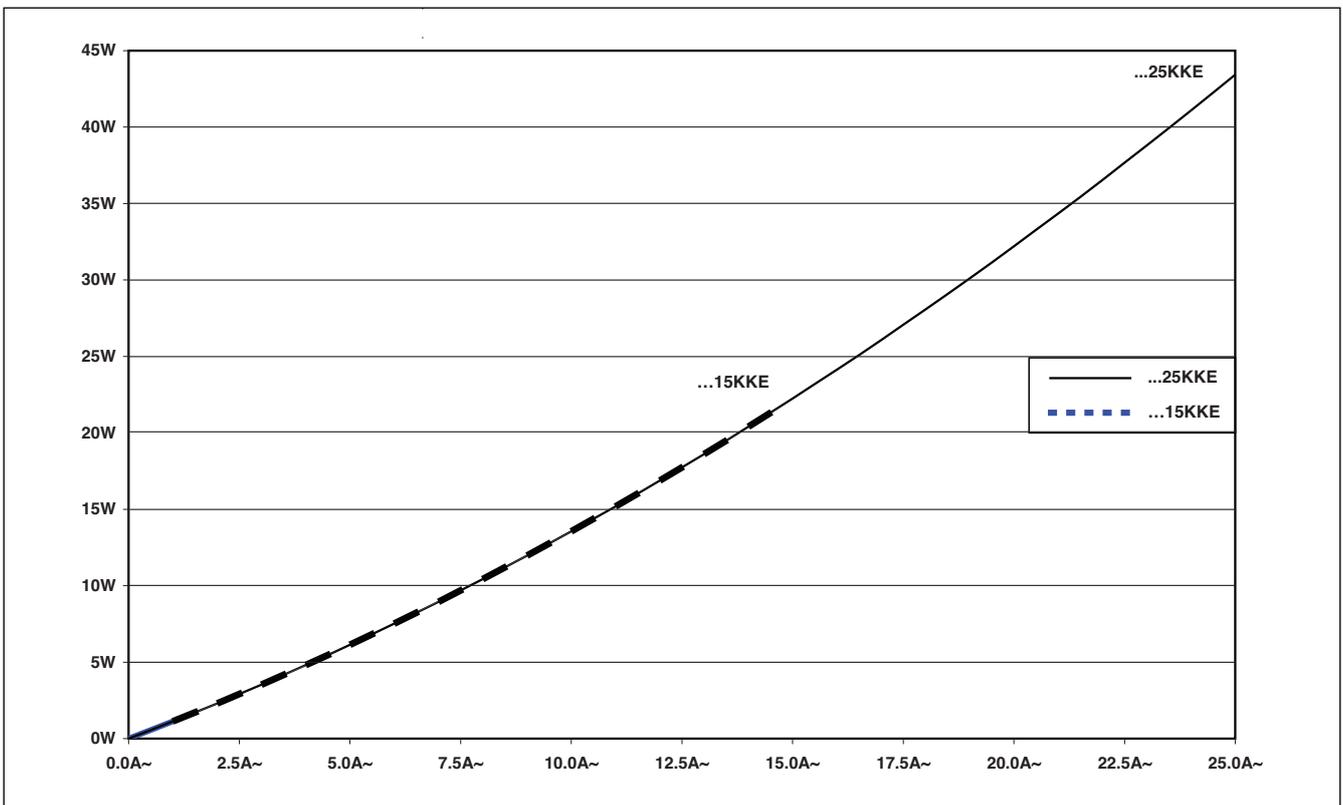


## Mounting Instructions

Thermal stress will reduce the lifetime of the SSR. Therefore it is necessary to select the appropriate heatsinks, taking into account the surrounding temperature, load current and the duty cycle. A small amount of thermally conductive silicone grease must be applied to the center of the metal baseplate. RGS should be mounted on the heatsink with

two M5 screws. Gradually tighten each screw (alternating between the two) until both are tightened with a torque of 0.75Nm. For optimal results wait one hour to allow excess grease to pressed out and then tighten both screws to their final mounting torque of 1.5Nm.

## Output Power Dissipation



## Heatsink Thermal Resistance for RGS1D

RGS1D..15

Load current [A]	Thermal resistance [K/W]							Power dissipation [W]
	20	30	40	50	60	70	80	
15	1.82	1.59	1.36	1.13	0.90	0.67	0.90	22.2
13.5	2.12	1.86	1.59	1.33	1.06	0.80	1.03	19.5
12	2.48	2.17	1.86	1.55	1.24	0.93	1.19	16.9
10.5	2.96	2.59	2.22	1.85	1.48	1.11	1.39	14.4
9	3.60	3.15	2.70	2.25	1.80	1.35	1.67	12.0
7.5	4.51	3.95	3.38	2.82	2.26	1.69	2.07	9.7
6	5.90	5.17	4.43	3.69	2.95	2.21	2.66	7.5
4.5	8.26	7.23	6.20	5.16	4.13	3.10	3.66	5.5
3	13.03	11.41	9.78	8.15	6.52	4.89	5.67	3.5
1.5	-----	-----	-----	-----	13.75	10.31	11.71	1.7

Ambient temp [°C]  $T_A$

RGS1D..25

Load current [A]	Thermal resistance [K/W]							Power dissipation [W]
	20	30	40	50	60	70	80	
25	1.82	1.59	1.36	1.13	0.90	0.67	0.44	43.4
22.5	2.12	1.86	1.59	1.33	1.06	0.80	0.53	37.7
20	2.48	2.17	1.86	1.55	1.24	0.93	0.62	32.2
17.5	2.96	2.59	2.22	1.85	1.48	1.11	0.74	27.1
15	3.60	3.15	2.70	2.25	1.80	1.35	0.90	22.2
12.5	4.51	3.95	3.38	2.82	2.26	1.69	1.13	17.7
10	5.90	5.17	4.43	3.69	2.95	2.21	1.48	13.6
7.5	8.26	7.23	6.20	5.16	4.13	3.10	2.07	9.7
5	13.03	11.41	9.78	8.15	6.52	4.89	3.26	6.1
2.5	-----	-----	-----	-----	13.75	10.31	6.87	$T_A$

Ambient temp [°C]  $T_A$

## RGx1D Connection in Application

