Solid State Relays
Industrial, 1Phase Peak Switching
Type RM1C



- **Ideal for switching of transformers and other highly inductive loads**
- **Direct copper bonding (DCB) technology**
- **Thyristor power units**
- **LED indication**
- **Clip-on IP20 protection cover**
- **Housing free of moulding mass**
- **Self lifting terminals**
- **Operational ratings up to 100AACrms and 600VACrms**
- **Blocking voltage up to 1400Vp**
- **Opto isolation: 4000 VACrms**

Product Description

The peak switching SSR is primarily used for transformer applications. By applying DC control voltage, the output semiconductor is activated at the peak of the line voltage.

The semiconductor switches OFF, when load current crosses zero, upon removal of the control voltage. The LED indicates when the output is activated.

Ordering Key

RM 1 C 60 D 50

- **Solid State Relay**
- **Number of poles**
- **Switching mode**
- **Rated operational voltage**
- **Control voltage**
- **Rated operational current**

Type Selection

Switching mode	Rated operational voltage	Control voltage	Rated operational current
C: Peak Switching	40: 400 VACrms 60: 600 VACrms	D: 4.25 - 32 VDC	25: 25 AACrms 50: 50 AACrms 75: 75 AACrms 100: 100 AACrms

Selection Guide

Rated operational voltage	Blocking voltage	Control voltage	Rated operational current 25 AACrms	50 AACrms	75AACrms	100 AACrms
400 VACrms	850 V_p	4.25 - 32 VDC	**RM1C40D25**	**RM1C40D50**	**RM1C40D75**	-
600 VACrms	1400 V_p	4.25 - 32 VDC	**RM1C60D25**	**RM1C60D50**	-	**RM1C60D100**

General Specifications

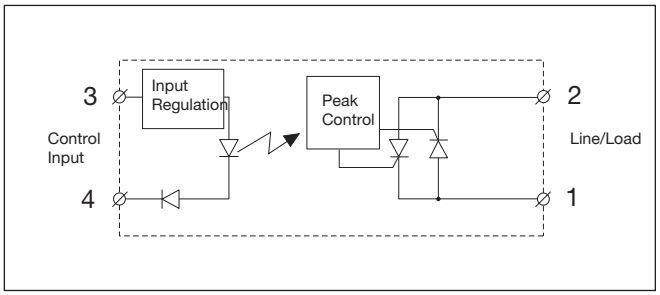
	RM1C40D..	RM1C60D..
Operational voltage range	100 to 440 VACrms	340 to 660 VACrms
Blocking voltage	850 V_p	1400 V_p
Zero voltage turn-on	< 10 V	< 10 V
Operational frequency range	45 to 65 Hz	45 to 65 Hz
Approvals	UL, cUL, CSA, EAC	UL, cUL, CSA, EAC
CE-marking	Yes	Yes*
CE-marking	Yes	Yes*

* Heatsink must be connected to ground for 600V types

Input Specifications

Control voltage	4.25 - 32 VDC
Pick up voltage	4.25 VDC
Drop out voltage	1.0 VDC
Max. input current	20 mA
Response time pick up Power output	≤ 40 ms
Response time drop out Power output	≤10 ms

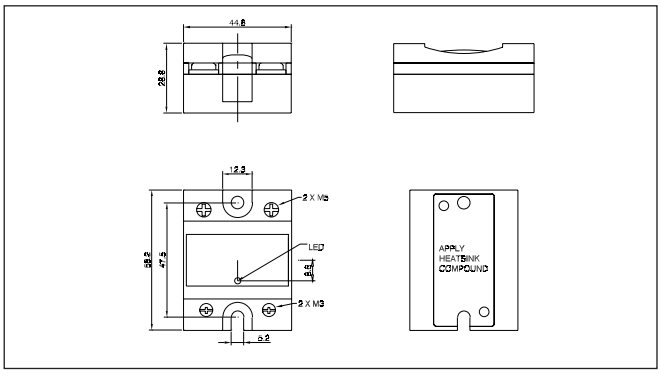
Functional Diagram



Output Specifications

	RM1C...25	RM1C...50	RM1C...75	RM1C...100
Rated operational current				
AC51 @ Ta=25°C	25 Arms	50 Arms	75 Arms	100 Arms
AC56a @ Ta=25°C	10 Arms	20 Arms	25 Arms	30 Arms
Min. operational current	150 mA	250 mA	400 mA	500 mA
Rep. overload current t=1 s	55 Arms	125 Arms	150 Arms	200 Arms
Non-rep. surge current t=10 ms	325 Ap	600 Ap	1150 Ap	1900 Ap
Off-state leakage current @ rated voltage and frequency	< 3 mA	< 3 mA	< 3 mA	< 3 mA
I^2t for fusing t=10 ms	< 525 A^2s	< 1800 A^2s	< 6600 A^2s	< 18000 A^2s
On-state voltage drop @ rated current	1.4 Vrms	1.4 Vrms	1.4 Vrms	1.4 Vrms
Critical dV/dt off-state min.	1000 V/µs	1000 V/µs	1000 V/µs	1000 V/µs

Dimensions



All dimensions in mm

Isolation

Rated isolation voltage	
Input to output	≥ 4000 VACrms
Output to case	≥ 4000 VACrms

Thermal Specifications

Operating temperature range	-30° to +80°C
Storage temperature range	-40° to +100°C
Junction temperature	< 125°C

Housing Specifications

Weight	
25A, 50A	Approx. 60g
75A, 100A	Approx. 100g
Housing material	Noryl GFN 1, black
Baseplate	
25A, 50A	Aluminium
75A, 100A	Copper, nickel-plated
Potting compound	None

Relay	
Mounting screws	M5
Mounting torque	1.5-2.0Nm
Control terminal	
Mounting screws	M3 x 9
Mounting torque	0.5Nm
Power terminal	
Mounting screws	M5 x 9
Mounting torque	2.4Nm

Specifications are subject to change without notice (04.09.2023)

Electromagnetic Compatibility

Immunity	EN60947-4-3
Electrostatic Discharge (ESD)	
Immunity	IEC/EN 61000-4-2
Air discharge, 8 kV	Performance Criteria 2
Contact, 4 kV	Performance Criteria 2
Electrical Fast Transient	
(Burst) Immunity	IEC/EN 61000-4-4
Output: 2 kV, 5 kHz	Performance Criteria 1
Input: 1 kV, 5 kHz	Performance Criteria 1
Electrical Surge Immunity	IEC/EN 61000-4-5
Output, line to line, 1 kV	Performance Criteria 2
Output, line to earth, 1 kV	Performance Criteria 2
Output, line to earth, 2 kV	Performance Criteria 2 with external varistor
Input, line to line, 1 kV	Performance Criteria 2
Input, line to earth, 2 kV	Performance Criteria 2

Radiated Radio Frequency Immunity	IEC/EN 61000-4-3
10 V/m, 80 - 1000 MHz	Performance Criteria 1
10 V/m, 1.4 - 2.0 GHz	Performance Criteria 1
3 V/m, 2.0 - 2.7 GHz	Performance Criteria 1
Conducted Radio Frequency Immunity	IEC/EN 61000-4-6
10 V/m, 0.15 - 80 MHz	Performance Criteria 1
Voltage Dips Immunity	IEC/EN 61000-4-11
0% for 0.5 , 1 cycle	Performance Criteria 2
40% for 10 cycles	Performance Criteria 2
70% for 25 cycles	Performance Criteria 2
80% for 250 cycles	Performance Criteria 2
Voltage Interruptions Immunity	IEC/EN 61000-4-11
0% for 5000 ms	Performance Criteria 2

EMC Emission	EN60947-4-3
Radio Interference Voltage Emission (Conducted)	IEC/EN 55011
0.15 - 30 MHz	Class A (industrial) with filters

Radio Interference Field Emission (Radiated)	IEC/EN 55011
30 - 1000 MHz	Class B

Notes:
- Use of AC solid state relays may, according to the application and the load current, cause conducted radio interferences. Use of mains filters may be necessary for cases where the user must meet E.M.C requirements. The capacitor values given inside the filtering specification tables should be taken only as indications, the filter attenuation will depend on the final application.
- The manufacturer has set the maximum allowable deviation under the influence of RFI to +/- 1.0% FSD or +/-1 step in distributed modes.
- Control input lines must be installed together to maintain products' susceptibility to Radio Frequency interference.

- Performance Criteria 1: No degradation of performance or loss of function is allowed when the product is operated as intended.
- Performance Criteria 2: During the test, degradation of performance or partial loss of function is allowed. However, when the test is complete the product should return operating as intended by itself.
- Performance Criteria 3: Temporary loss of function is allowed, provided the function can be restored by manual operation of the controls.

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Heatsink Dimensions (load current versus ambient temperature)

RM1C..25

Load current [A]	Thermal resistance [°C/W]					Power dissipation [W]
	20	30	40	50	60	70 (T_A)
25.0	2.70	2.34	1.98	1.61	1.25	0.89	28
22.5	3.10	2.69	2.28	1.86	1.45	1.04	24
20.0	3.61	3.13	2.65	2.18	1.70	1.23	21
17.5	4.26	3.70	3.14	2.59	2.03	1.47	18
15.0	5.14	4.47	3.80	3.14	2.47	1.80	15
12.5	6.38	5.56	4.73	3.91	3.09	2.27	12
10.0	8.25	7.19	6.14	5.08	4.02	2.97	9
7.5	11.4	9.94	8.49	7.04	5.59	4.14	7
5.0	17.7	15.4	13.2	11.0	8.74	6.51	4
2.5	-	-	-	-	18.2	13.6	2

Ambient temp. [°C]

Junction to ambient thermal resistance, $R_{th\ j\text{-}a}$	< 20.0	°C/W
Junction to case thermal resistance, $R_{th\ j\text{-}c}$	< 0.80	°C/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.20	°C/W
Maximum allowable case temperature	100	°C
Maximum allowable junction temperature	125	°C

RM1C..50

Load current [A]	Thermal resistance [°C/W]					Power dissipation [W]
	20	30	40	50	60	70 (T_A)
50.0	1.03	0.86	0.70	0.53	0.37	0.20	61
45.0	1.27	1.09	0.90	0.71	0.52	0.33	53
40.0	1.54	1.32	1.10	0.89	0.67	0.45	46
35.0	1.85	1.59	1.34	1.08	0.82	0.57	39
30.0	2.26	1.95	1.65	1.34	1.03	0.72	33
25.0	2.85	2.47	2.08	1.70	1.32	0.94	26
20.0	3.73	3.24	2.75	2.26	1.77	1.27	20
15.0	5.22	4.54	3.86	3.19	2.51	1.83	15
10.0	8.21	7.16	6.11	5.05	4.00	2.95	10
5.0	17.2	15.0	12.9	10.7	8.51	6.33	5

Ambient temp. [°C]

Junction to ambient thermal resistance, $R_{th\ j\text{-}a}$	< 20.0	°C/W
Junction to case thermal resistance, $R_{th\ j\text{-}c}$	< 0.50	°C/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.20	°C/W
Maximum allowable case temperature	100	°C
Maximum allowable junction temperature	125	°C

RM1.60..50

Load current [A]	Thermal resistance [°C/W]					Power dissipation [W]
	20	30	40	50	60	70 (T_A)
50.0	0.99	0.81	0.63	0.44	0.26	0.08	55
45.0	1.28	1.07	0.86	0.65	0.44	0.23	48
40.0	1.64	1.40	1.15	0.91	0.67	0.42	41
35.0	2.11	1.82	1.54	1.25	0.96	0.67	35
30.0	2.60	2.25	1.90	1.55	1.20	0.85	29
25.0	3.30	2.86	2.43	1.99	1.55	1.11	23
20.0	4.36	3.79	3.22	2.65	2.08	1.51	18
15.0	6.1	5.4	4.6	3.77	2.97	2.18	13
10.0	9.76	8.52	7.3	6.0	4.8	3.54	8
5.0	--	--	15.47	12.85	10.24	7.6	4

Ambient temp. [°C]

Junction to ambient thermal resistance, $R_{th\ j\text{-}a}$	< 20.0	°C/W
Junction to case thermal resistance, $R_{th\ j\text{-}c}$	< 0.72	°C/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.20	°C/W
Maximum allowable case temperature	100	°C
Maximum allowable junction temperature	125	°C

RM1C..75

Load current [A]	Thermal resistance [°C/W]					Power dissipation [W]
	20	30	40	50	60	70 (T_A)
75.0	0.91	0.78	0.65	0.52	0.39	0.26	77
67.5	1.10	0.96	0.81	0.66	0.51	0.36	68
60.0	1.34	1.17	1.00	0.83	0.66	0.49	59
52.5	1.60	1.40	1.20	1.00	0.80	0.60	50
45.0	1.93	1.68	1.44	1.20	0.96	0.72	42
37.5	2.38	2.08	1.78	1.49	1.19	0.89	34
30.0	3.06	2.68	2.30	1.91	1.53	1.15	26
22.5	4.21	3.68	3.16	2.63	2.10	1.58	19
15.0	6.51	5.70	4.88	4.07	3.26	2.44	12
7.5	13.5	11.77	10.09	8.41	6.73	5.04	6

Ambient temp. [°C]

Junction to ambient thermal resistance, $R_{th\ j\text{-}a}$	< 20.0	°C/W
Junction to case thermal resistance, $R_{th\ j\text{-}c}$	< 0.35	°C/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.10	°C/W
Maximum allowable case temperature	100	°C
Maximum allowable junction temperature	125	°C

Specifications are subject to change without notice (04.09.2023)

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Heatsink Dimensions

(load current versus ambient temperature) cont.

RM1C...100

Load current [A]	Thermal resistance [°C/W]					Power dissipation [W]
100.0	0.54	0.45	0.36	0.27	0.18	0.09	**111**
90.0	0.68	0.58	0.47	0.37	0.27	0.17	**97**
80.0	0.86	0.74	0.62	0.50	0.38	0.26	**84**
70.0	1.08	0.94	0.80	0.66	0.52	0.38	**71**
60.0	1.37	1.20	1.03	0.85	0.68	0.51	**59**
50.0	1.70	1.49	1.28	1.06	0.85	0.64	**47**
40.0	2.21	1.93	1.66	1.38	1.10	0.83	**36**
30.0	3.06	2.68	2.30	1.91	1.53	1.15	**26**
20.0	4.78	4.18	3.59	2.99	2.39	1.79	**17**
10.0	9.98	8.73	7.49	6.24	4.99	3.74	**8**
	20	**30**	**40**	**50**	**60**	**70**	T_A

Ambient temp. [°C]

Junction to ambient thermal resistance, $R_{th\ j\text{-}a}$	< 20.0	K/W
Junction to case thermal resistance, $R_{th\ j\text{-}c}$	< 0.30	K/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.10	K/W
Maximum allowable case temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

Heatsink Selection

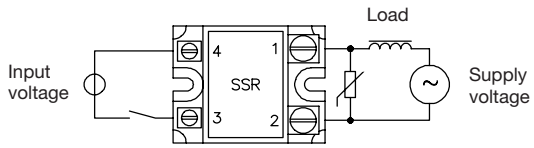
Carlo Gavazzi Heatsink (see Accessories)	Thermal resistance...	...for power dissipation
No heatsink required	---	N/A
RHS 300	5.00 K/W	> 0 W
RHS 100	3.00 K/W	> 25 W
RHS 45C	2.70 K/W	> 60 W
RHS 45B	2.00 K/W	> 60 W
RHS 90A	1.35 K/W	> 60 W
RHS 45C plus fan	1.25 K/W	> 0 W
RHS 45B plus fan	1.20 K/W	> 0 W
RHS 112A	1.10 K/W	> 100 W
RHS 301	0.80 K/W	> 70 W
RHS 90A plus fan	0.45 K/W	> 0 W
RHS 112A plus fan	0.40 K/W	> 0 W
RHS 301 plus fan	0.25 K/W	> 0 W
Consult your distribution	> 0.25 K/W	N/A
Infinite heatsink - No solution	---	N/A

Applications

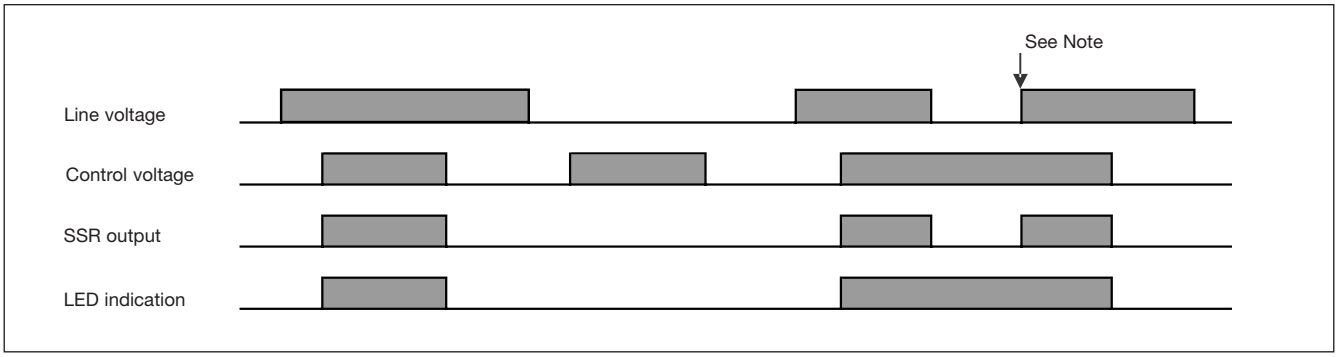
Overvoltage protection

As transformers can have va-rying stray inductances and stray capacitances, it is always advisable to use external overvoltage protection.

Varistor diameter: ≤ 20 mm
Varistor voltage for 400 V SSR: 460 VAC (RV 02)
Varistor voltage for 600V SSR: 680 VAC (RV 05)



Operational Diagram



Note: At this point (i.e., when switching of the mains is done rather than the control lines) no peak switching occurs but only Instantaneous switching.

Environmental Information

The declaration in this section is prepared in compliance with People's Republic of China Electronic Industry Standard SJ/T11364-2014: Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products.

Part Name	Toxic or Harardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Power Unit Assembly	x	O	O	O	O	O
O: Indicates that said hazardous substance contained in homogeneous materials fot this part are below the limit requirement of GB/T 26572. X: Indicates that said hazardous substance contained in one of the homogeneous materials used for this part is above the limit requirement of GB/T 26572.						

环境特性

这份申明根据中华人民共和国电子工业标准
SJ/T11364-2014：标注在电子电气产品中限定使用的有害物质

零件名称	有毒或有害物质与元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴化联苯 (PBB)	多溴联苯醚 (PBDE)
功率单元	x	O	O	O	O	O
O:此零件所有材料中含有的该有害物低于GB/T 26572的限定。 X: 此零件某种材料中含有的该有害物高于GB/T 26572的限定。						

