Solid State Relays
Low Voltage AC/DC Control: 5 to 24 V
Types RM 23M, RM 40M, RM 48M, RM 60M



- **Zero switching AC Solid State Relay**
- **Low voltage AC/DC control: 5 to 24 V**
- **Direct copper bonding (DCB) technology**
- **LED indication**
- **Built-in varistor**
- **Clip-on IP 20 protection cover**
- **Self-lifting terminals**
- **Housing free of moulding mass**
- **Operational ratings: Up to 100AACrms and 600VACrms**
- **Opto-isolation: > 4000VACrms**

Product Description

The industrial, 1-phase relay with antiparallel thyristor output is the most widely used SSR due to its multiple application possibilities. This relay has been designed to interface low voltage AC or DC control systems with high voltage resistive, inductive and capacitive loads. The zero switching relay switches ON when the sinusoidal curve crosses zero and switches OFF when the current crosses zero. The built-in varistor secures transient protection for the heavy industrial applications, and the LED indicates the status of the control input. The clip-on cover is securing touch safety to IP 20. Protected output terminals can take cables up to 16 mm^2.

Ordering Key

RM 1 A 23 M 25

- **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
A: Zero Switching	23: 230VACrms 40: 400VACrms 48: 480VACrms 60: 600VACrms	M: 5 to 24VDC/AC	25: 25AACrms 50: 50AACrms 75: 75AACrms 100: 100AACrms

Selection Guide

Rated operational voltage	Blocking voltage	Control voltage	Rated operational current 25 AACrms	50 AACrms	75 AACrms	100 AACrms
230VACrms	650V_p	5 to 24VDC/AC	**RM1A23M25**	**RM1A23M50**	**RM1A23M75**	**RM1A23M100**
400VACrms	850V_p	5 to 24VDC/AC	**RM1A40M25**	**RM1A40M50**	**RM1A40M75**	**RM1A40M100**
480VACrms	1200V_p	5 to 24VDC/AC	**RM1A48M25**	**RM1A48M50**	**RM1A48M75**	**RM1A48M100**
600VACrms	1400V_p	5 to 24VDC/AC	**RM1A60M25**	**RM1A60M50**	**RM1A60M75**	**RM1A60M100**

General Specifications

	RM1A23M	RM1A40M	RM1A48M	RM1A60M
Operational voltage range	24 to 265VACrms	42 to 440VACrms	42 to 530VACrms	42 to 660VACrms
Blocking voltage	≥ 650V_p	≥ 850V_p	≥ 1200V_p	≥ 1400V_p
Zero voltage turn-on	≤ 15V	≤ 15V	≤ 15V	≤ 15V
Operational frequency range	45 to 65Hz	45 to 65Hz	45 to 65Hz	45 to 65Hz
Power factor	> 0.5 @ 230VACrms	> 0.5 @ 400VACrms	> 0.5 @ 480VACrms	> 0.5 @ 600VACrms
Approvals	UL, CSA, EAC	UL, CSA, EAC	UL, CSA, EAC	UL, CSA, EAC
CE-marking	Yes	Yes	Yes	Yes *

* Heatsink must be connected to ground.

Input Specifications

Absolute max. input voltage	37VDC 28VAC
Pick-up voltage	4.0VDC 4.0VAC
Drop out voltage	2.0VDC 2.0VAC
Input current	
@ 5 VAC	≤ 10mA
@ 24 VAC	≤ 18mA
@ 5 VDC	≤ 9mA
@ 24 VDC	≤ 12mA
Response time pick-up	≤ 1 cycle
Response time drop-out	≤ 2.5 cycles

Isolation

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

Housing Specifications

Weight	
25 A, 50 A	Approx. 60g
75 A, 100 A	Approx. 100g
Housing material	Noryl GFN 1, black
Baseplate	
25 A, 50 A	Aluminium
75 A, 100 A	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

Thermal Specifications

	RM1...M25	RM1...M50	RM1.60M50	RM1...M75	RM1...M100
Operating temperature range	-20° to 70°C	-20° to 70°C	-20° to 70°C	-20° to 70°C	-20° to 70°C
Storage temperature range	-40° to 100°C	-40° to 100°C	-40° to 100°C	-40° to 100°C	-40° to 100°C
Junction temperature	≤ 125°C	≤ 125°C	≤ 125°C	≤ 125°C	≤ 125°C
R_{th} junction to case	≤ 0.80K/W	≤ 0.50K/W	≤ 0.72K/W	≤ 0.35K/W	≤ 0.30K/W
R_{th} junction to ambient	≤ 20.0K/W	≤ 20.0K/W	≤ 20.0K/W	≤ 20.0K/W	≤ 20.0K/W

Output Specifications

	RM1A..M25	RM1A..M50	RM1A..M75	RM1A..M100
Rated operational current				
AC51 @ Ta=25°C	25Arms	50Arms	75Arms	100Arms
AC53a @ Ta=25°C	5Arms	15Arms	20Arms	30Arms
Min. operational current	150mA	250mA	400mA	500mA
Rep. overload current t=1 s	< 55AACrms	< 125AACrms	< 150AACrms	< 200AACrms
Non-rep. surge current t=10ms	325Ap	600Ap	1150Ap	1900Ap
Off-state leakage current @ rated voltage and frequency	< 3mArms	< 3mArms	< 3mArms	< 3mArms
I^2t for fusing t=10ms	< 525A^2s	< 1800A^2s	< 6600A^2s	< 18000A^2s
On-state voltage drop @ rated current	1.6Vrms	1.6Vrms	1.6Vrms	1.6Vrms
Critical dV/dt off-state min.	500V/µs	500V/µs	500V/µs	500V/µs
Zero crossing detection	Yes	Yes	Yes	Yes

Heatsink Dimensions (load current versus ambient temperature)

RM1...M25

Load current [A]	Thermal resistance [K/W]					Power dissipation [W]	
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**
	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, $R_{th\ j\text{-}c}$	< 0.80	K/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.20	K/W
Maximum allowable case temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

RM1...M50

Load current [A]	Thermal resistance [K/W]					Power dissipation [W]	
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	0.96	**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**
	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, $R_{th\ j\text{-}c}$	< 0.50	K/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.20	K/W
Maximum allowable case temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

RM1.60..50

Load current [A]	Thermal resistance [K/W]					Power dissipation [W]	
50.0		0.81	0.63	0.44	0.26	0.08	**5**
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**
	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 baseplate case thermal resistance, $R_{th\ j\text{-}c}$	< 0.72	K/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.20	K/W
Maximum allowable heatsink temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

RM1...M75

Load current [A]	Thermal resistance [K/W]					Power dissipation [W]	
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**
	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, $R_{th\ j\text{-}c}$	< 0.35	K/W
Case to heatsink thermal resistance, $R_{th\ c\text{-}s}$	< 0.10	K/W
Maximum allowable heatsink temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

Heatsink Dimensions

(load current versus ambient temperature) cont.d

RM1...M100

Load current [A]	Thermal resistance [K/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

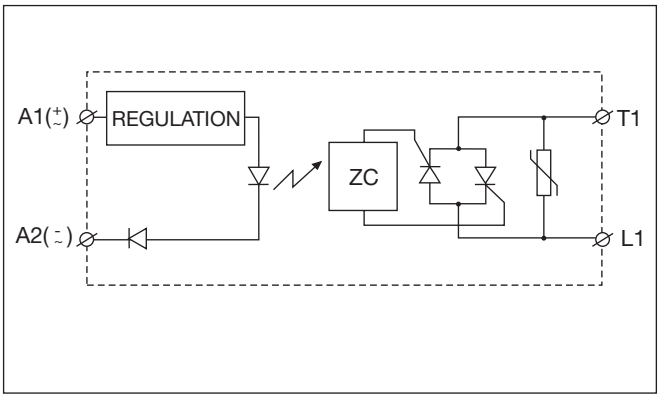
Ambient temp. [∝C]

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 heatsink temperature	100	deg.C
Maximum allowable junction temperature	125	deg.C

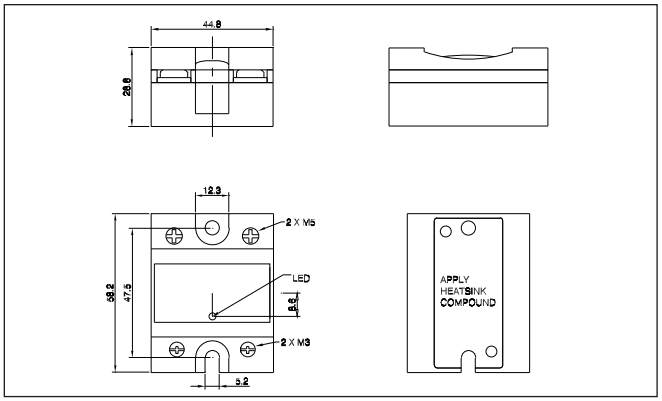
Heatsink Selection

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

Functional Diagram



Dimensions



All dimensions in mm.

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。						



Faston terminals



- Faston tabs
- Tab dimension according to DIN 46342 part 1
- Pure tin-plated brass

Ordering Key

Screw mounted Faston terminals **RM1A48M25 | F 4***

RS, RM Solid State Relay
Faston terminals
Tab orientation

Input Tab width: 4.8mm
Output Tab width: 6.3mm

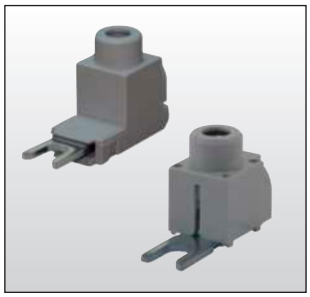
Faston terminals in packs of 20 **RM48** ** | **F4** *

RS, RM Solid State Relay
Tab orientation

* **0: Flat (0º)**
4: Angled (45º)

** **48: 4.8mm faston for input**
63: 6.3mm faston for output

Fork Terminals



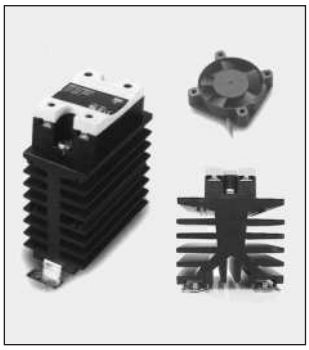
- Terminal adaptors for 35mm² cable
- Type RM635FK
- Pack size: 10 pieces

Ordering Key

RM635FK | P

RM terminal adaptor
Touch protected (optional)

Other Accessories



- Heatsinks and fans
- Type RHS....
- 0.25 to 5.00 k/W
- Single and dual relay types



- Touch safety cover
- Type RMIP20
- IP20 protection degree
- Pack size: 20 pieces

All accessories can be ordered pre-assembled with Solid State Relays.
Other accessories include DIN rail adaptors, fuses, varistors and spacers.
For futher information refer to Accessories datasheets.