NAiS

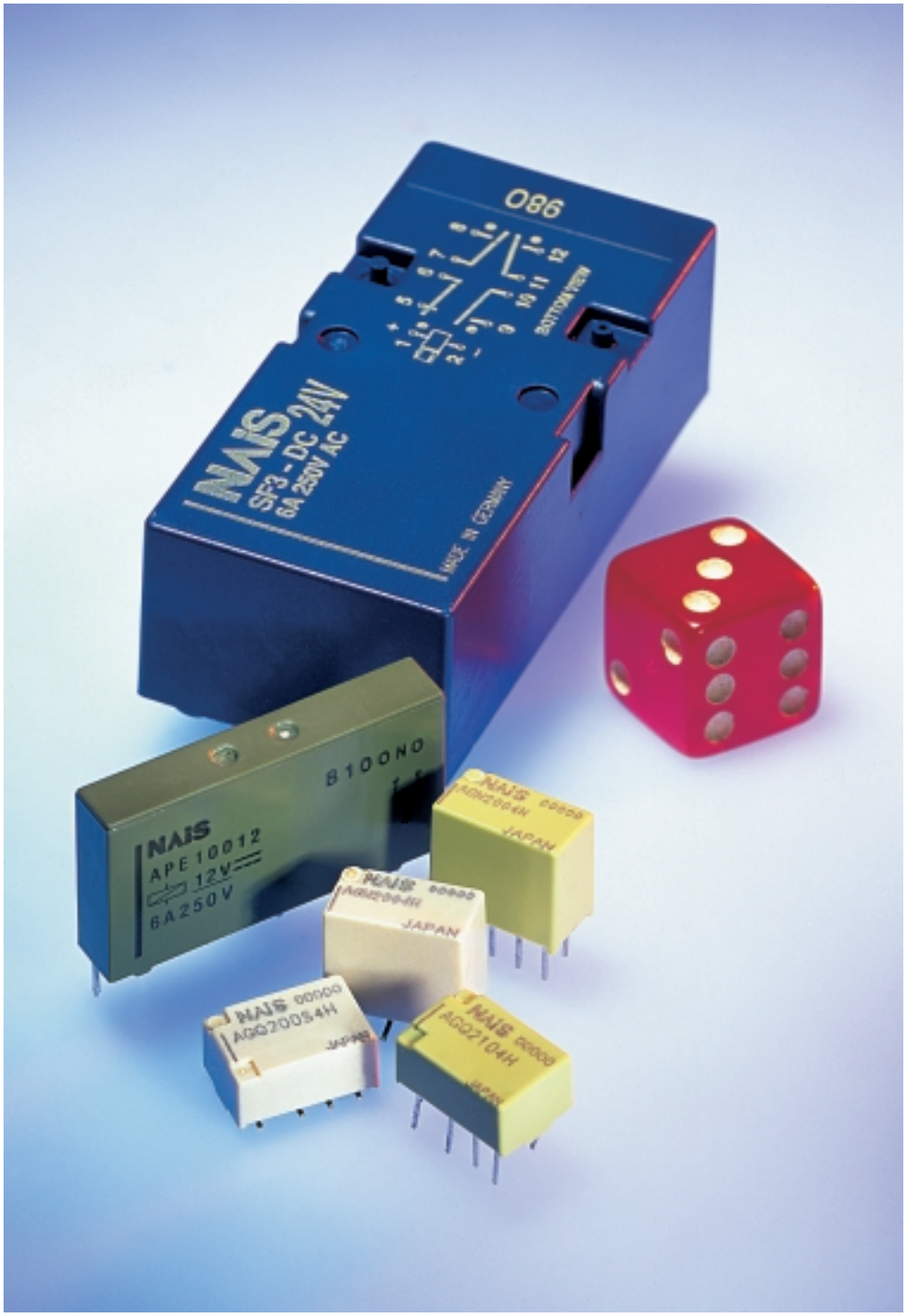
Matsushita

Relays

Shortform

Smart Solutions by NAiS

Matsushita Relay Technology.
Innovation across the board.



Telecommunications, machine construction, measurement and control systems, automotive electronics, building security and installation – today there is virtually no branch of human activity that can exist without using modern relays. Matsushita is able to meet both simple or complex demands from its vast range of sophisticated, economic switching technologies by offering the relay most appropriate to solving the specific application.

Economic and technical competence.

With over 30 years experience at the forefront of relay innovation and development, Matsushita today offers one of the world`s most comprehensive ranges of electro-mechanical and semi conductor types.
Currently the Matsushita product range extends from ultra-miniature SMD semi conductor types to robust, compact industrial devices. Load switching capability ranges from low-level signals to double digit ampères.

Application dependent, Matsushita relays are available for all common mounting configurations with screw, pcb, solder or surface mount terminals to meet most of the demands made by different operating environments or conditions.

A principal area of application for the modern relay is in the already booming market of telecommunications.
With its well established, comprehensive T-series relay ranges, and the new GN/GQ 4th generation telecom relays, Matsushita is making significant contributions within the field of global data transmission.

Matsushita power relays, particularly those of the J-series are not only used in mains isolation applications, but also in diverse ranges of consumer appliances, automotive electrics and diverse OEM manufacturing industries.
In the field of safety of man and machine, the introduction of SF2, SF3 and SF4 relays, with forced operated contacts has set a new standard of security.

Matsushita has developed a wide range of SMD miniature relays for the new-generation of surface mounting, automated assembly processes. In addition to electromechanical SMD types such as TQ, TX, GN and GQ series Matsushita has made significant developments in the rapidly expanding field of PhotoMOS semi conductor relays.

With the AQV212 SOP type, Matsushita is able to supply what is currently one of the smallest semi conductor relay. Measuring just 2,1 mm high this type reflects the extent to which electronics and communication systems are being miniaturised.

Quality to ISO9001 standards.

For Matsushita the supply of quality products is paramount. To achieve this the Company implement strict test and inspection procedures to comply with most international specifications. The award of ISO9001 certification has set the seal on our production capabilities.

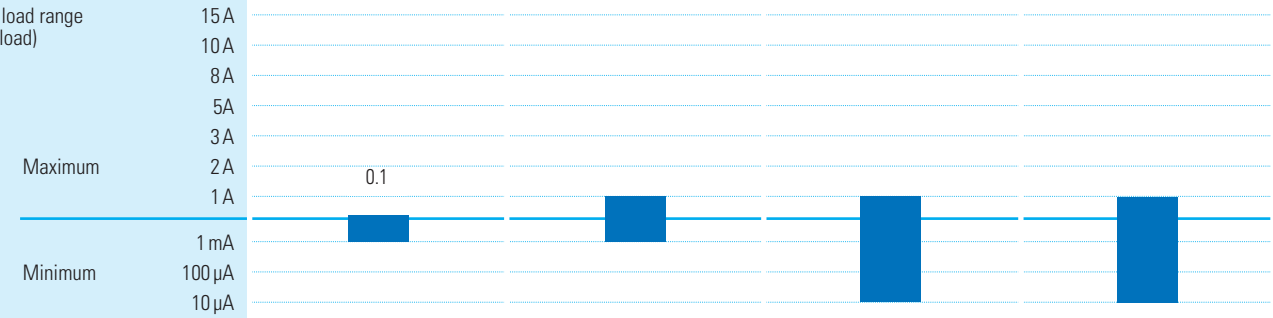
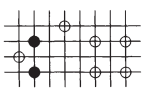
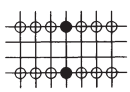
If you need more detailed information about Matsushita relays please ask us to send you a full relay catalogue.

Matsushita Relays.
Ideas for Tomorrow`s World.

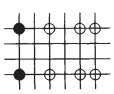
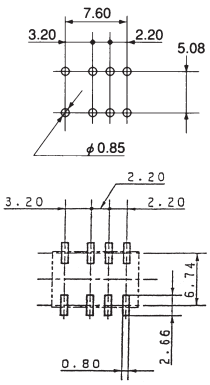
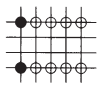
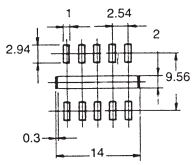
CONTENTS PAGE

1NO ≙ normally open
1NC ≙ normally closed

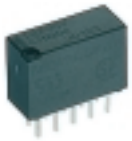
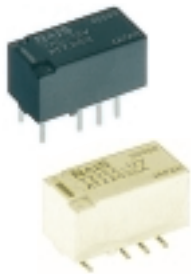
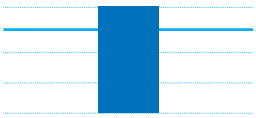
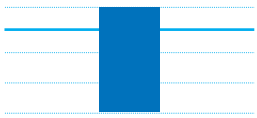
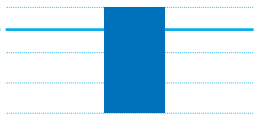
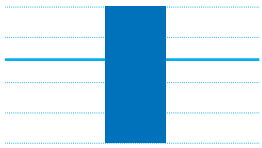
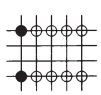
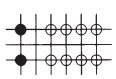
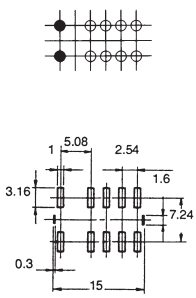
S I G N A L R E L A Y S

Type	A	HY	R	DX
				
Dimensions (mm) LxWxH	∅ 9.5 x 20	12 x 7.4 x 10.1	20 x 10 x 10.2	20 x 12 x 6.3
Features	● Reed relay with single-in-line pcb pins ● Can also be mounted flat ● Not for a new design-in	● Small sensitive relay	● Polarised monostable or bistable (latching) reed changeover relay ● Outstanding reliability ● VS-compatible ● IC-compatible ● Not for a new design-in	● Metal encapsulated miniature relay ● For dry load or HF circuits ● Sealed to IP68 ● IC-compatible ● VS-compatible
Contact arrangement	1NO	1CO	1CO	2CO
Switched load range (resistive load)				
Switched voltage range VDC	0.1 … 50	0.1 … 60	0.001 … 30	0.001 … 30
VAC	… 50	… 125	… 110	… 110
Switching configuration	monostable	monostable	monostable, bistable	monostable, bistable
Voltage withstand – Open contact V_{rms}	250	500	350	500
Voltage withstand – Between contact sets V_{rms}	—	—	—	500
Voltage withstand – Coil / contact V_{rms}	500	1000	1000	500
Impulse voltage withstand (1.25 / 50 µs) V	—	—	1000	—
Nominal coil voltage VDC	5/12/24	1.5 – 24	1.5 – 60	3 – 24
VAC	—	—	—	—
Power consumption (mW) – Monostable	180	sensitive: 150; standard: 200	150 – 280	125 – 144
Power consumption (mW) – Bistable 1 coil	—	—	70 – 100	125 – 144
Power consumption (mW) – Bistable 2 coils	—	—	150 – 230	250 – 288
Degree of protection	IP67	IP67	IP67	IP68
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection				
Connection type	PCB	PCB	PCB	PCB
Approvals		UL (E 43149), CSA (LR 26550)	VDE, UL (E 43149), CSA (LR 26550)	

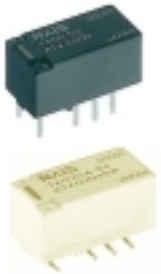
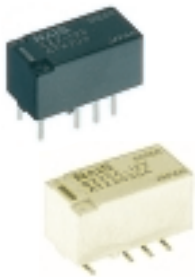
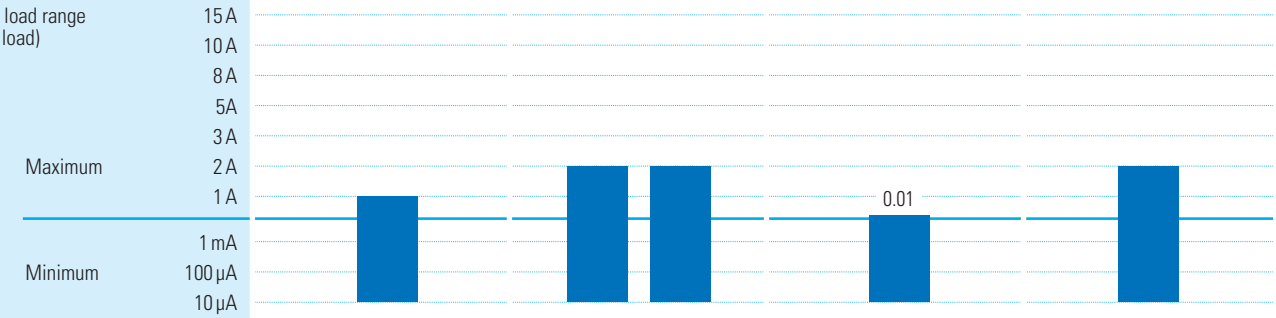
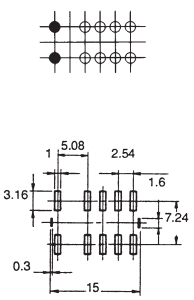
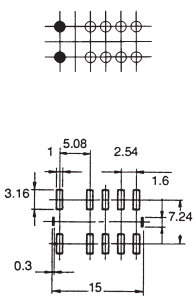
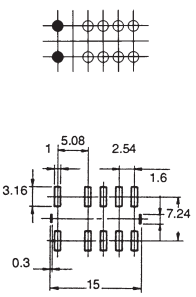
S I G N A L R E L A Y S

Type	DF	GN/GQ	TQ2	TQ2-SA
				
Dimensions (mm) LxWxH	16 x 9.9 x 7	GN 10.6 x 5.7 x 9.0/GQ 10.6 x 7.2 x 5.2	14 x 9 x 5	14 x 9 x 5.6
Features	● Polarised DIL relay ● 8 cN dual contact force ● 1 – 2 µV thermovoltage for dry load or power switching ● BT type 53 version available ● IC-compatible ● VS-compatible ● Not for a new design-in	● Extremely compact ultraminiature relay ● 2 changeover contacts ● Very high impulse voltage withstand 2.5 kV complying Bellcore standard ● High density mounting due to decreased relay size. ● IC-compatible	● Ultra-miniature relay ● Universal performance capability for use in telecommunications, measurement and instrumentation ● IC-compatible ● VS-compatible	● New, very low profile SM version ● 2 changeover contacts ● 2 A switched current ● Very high impulse voltage withstand 2,5 kV complying with Bellcore standard ● IC-compatible, VS-compatible
Contact arrangement	2CO	2 CO	2CO	2CO
Switched load range (resistive load) Maximum Minimum	15 A 10 A 8 A 5A 3 A 2 A 1 A 1 mA 100 µA 10 µA			
Switched voltage range VDC	0.1 … 60	0,01 … 110	0.01 … 110	0.01 … 220
VAC	… 125	… 125	… 125	… 125
Switching configuration	monostable, bistable	monostable, bistable	monostable, bistable	monostable, bistable
Voltage withstand – Open contact V_{rms}	500	750	750	1000
Voltage withstand – Between contact sets V_{rms}	500	1000	1000	1000
Voltage withstand – Coil / contact V_{rms}	1000	1500	1000	1500
Impulse voltage withstand (1.25 / 50 µs) V	1500	2500 Bellcore	1500	2500 Bellcore
Nominal coil voltage VDC	1.5 – 24	1.5 – 24	1.5 – 48	1.5 – 48
VAC	—	—	—	—
Power consumption (mW) – Monostable	200	140 – 230	140 – 300	140 – 300
Power consumption (mW) – Bistable 1 coil	100	100 – 120	100 – 150	70 – 100
Power consumption (mW) – Bistable 2 coils	200	—	200 – 300	140 – 200
Degree of protection	IP67	IP67	IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection				
Connection type	PCB	PCB, SM technology	PCB	SM technology
Approvals	UL (E 43149) CSA (LR 26550)	UL, CSA, BSI, EN 60950	UL (E 43149), BSI, CSA (LR 26550)	UL (E 43149), CSA (LR 26550)

S I G N A L R E L A Y S

Type			TN2	TF2	HX2	TX2 / TX2-SA
						
Dimensions (mm) LxWxH			14 x 5.6 x 9.8	14 x 9 x 7.8	15 x 7.4 x 9.4	15 x 7.4 x 8.2
Features			● Ultra-miniature relay ● Upright version of TQ ● High packing density due to very small footprint ● IC-compatible ● VS-compatible	● Ultra-miniature relay ● High control sensitivity ● IC-compatible ● VS-compatible	● Surge withstand of 1.500 V FCC ● Pin compatible to TX relay	● High efficiency ultra-miniature relay ● SM version ● Very high impulse voltage withstand 2.5 kV complying with Bellcore standard ● IC-compatible ● VS-compatible
Contact arrangement			2CO	2CO	2CO	2CO
Switched load range (resistive load)		15 A 10 A 8 A 5A 3 A 2 A 1 A				
	Maximum					
	Minimum	1 mA 100 µA 10 µA				
Switched voltage range		VDC	0.01 … 110	0.01 … 110	0.01 … 110	0.01 … 220
		VAC	… 125	… 125	… 125	… 220
Switching configuration			monostable, bistable	monostable, bistable	monostable	monostable, bistable
Voltage withstand	Open contact	V_{rms}	750	750	750	1000
	Between contact sets	V_{rms}	1000	1000	1000	1000
	Coil / contact	V_{rms}	1000	1000	1000	2000
Impulse voltage withstand (1.25 / 50 µs)		V	1500	1500	1500	2500 Bellcore
Nominal coil voltage		VDC	3 – 48	3 – 48	1.5 – 24	1.5 – 48
		VAC	—	—	—	—
Power consumption (mW)	Monostable		140 – 300	80 – 260	320	140 – 270
	Bistable 1 coil		100 – 150	55 – 100	—	100
	Bistable 2 coils		200 – 300	110 – 200	—	200
Degree of protection			IP67	IP67	IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection						
Connection type			PCB	PCB	PCB	PCB, SM technology
Approvals			UL (E 43149), CSA (LR 26550)	UL (E 43149), BSI, CSA (LR 26550)	UL (E 43149), CSA (LR 26550)	UL (E 43149), BSI, CSA (LR 26550)

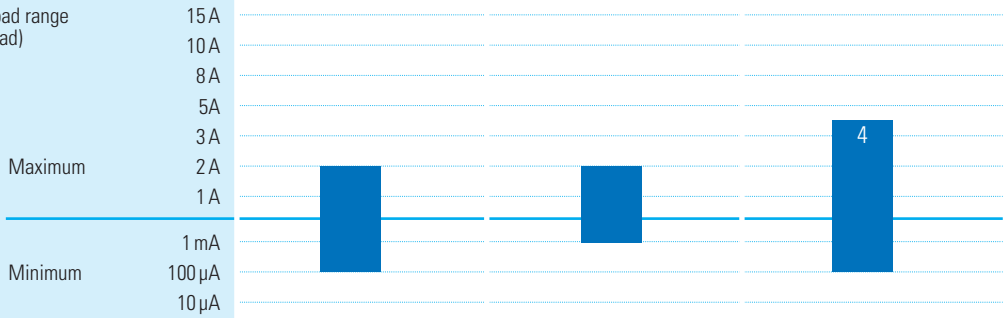
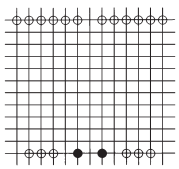
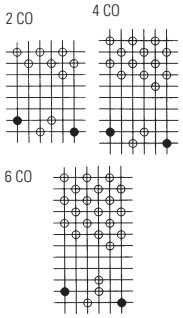
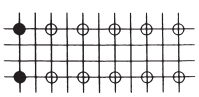
S I G N A L R E L A Y S

Type	TXS2 / TXS2-SA	TX-D2 / TX-D2-SA	SX2/SX2-SA	TK1
				
Dimensions (mm) LxWxH	15 x 7.4 x 8.2 (8.4)	15 x 7.4 x 8.2	15 x 7.4 x 8.2	10.6 x 9 x 4
Features	● High sensitive relay (50mW) ● Low thermal electromotive force (approx. 0.3 µV) ● Surge voltage withstand of 1500 V FCC	● Approved to EN41003 supplementary isolation ● Very high surge resistance 1500 V 10 x 160 µs (FCC part 68) 2500 V 2 x 10 µs (Bellcore) ● 2000 V breakdown voltage ● Also available for MBB	● Low level switching capability (10 µA 1m V DC) ● High sensitivity (50 mW)	● Smallest relay with 2 A capability ● Very high impulse voltage withstand 2.5 kV complying with Bellcore standard ● IC-compatible
Contact arrangement	2CO	2CO (BBM) 2CO (MBB)	2CO	1CO
Switched load range (resistive load)				
Switched voltage range VDC	0.01 … 110	… 220 … 125	0.01 … 10	0.01 … 220
VAC	… 125	… 250 … 125	—	… 220
Switching configuration	monostable, bistable	monostable, bistable	monostable, bistable	monostable, bistable
Voltage withstand: Open contact V_{rms}	750	1000 500	750	750
Voltage withstand: Between contact sets V_{rms}	1000	1000	1000	1000
Voltage withstand: Coil / contact V_{rms}	1800	2000	1000	1500
Impulse voltage withstand (1.25 / 50 µs) V	1500	2500 Bellcore	—	2500 Bellcore
Nominal coil voltage VDC	1.5 – 24	1.5 – 24	1.5 – 24	1.5 – 24
VAC	—	—	—	—
Power consumption (mW): Monostable	50 – 70	200 – 230 250 – 270	50 – 70	140 – 270
Power consumption (mW): Bistable 1 coil	35 – 50	150 – 170 —	35 – 50	100 – 150
Power consumption (mW): Bistable 2 coils	70 – 150	—	70 – 150	200 – 400
Degree of protection	IP67	IP67	IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection				
Connection type	PCB, SM technology	PCB, SM technology		PCB
Approvals	UL (E 43149), BSI, CSA (LR 26550)	UL (E 43149), BSI, CSA (LR 26550), EN 60950	UL (E 43149), BSI, CSA (LR 26550)	UL (E 43149), CSA (LR 26550)

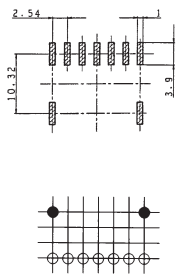
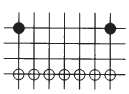
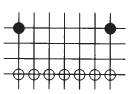
Type	DSE-M(S)/DS2Y-S	DS2E(F)/DSBT2	NF
			
Dimensions (mm) LxWxH	15/ 20/ 35.2 x 9.9 x 9.8	20 x 9.9 x 9.8	2CO: 29.6 x 19.4 x 10.8 4CO: 29.6 x 24 x 10.8
Features	● Dimensions of 1CO / 2CO / 4CO x 9.9 x 9.8 ● Universal pcb relay with large switching range ● M = 400 mW (S) = 200 mW version ● IC-compatible ● VS-compatible	● FLOC version [DS2E(F)] ● 12 cN contact force ● (F) = high sensitivity version ● BT = 4000 Vrms breakdown voltage ● DSBT also available for MBB* ● BABT approvals ● IC/ VS-compatible	● Proven pcb relay ● High reliability due to bifurcated linear Au/ Ag contacts ● Not for a new design-in
Contact arrangement	1CO/2CO/4CO	2CO	2CO / 4CO
Switched load range (resistive load)	15 A 10 A 8 A 5 A 3 A Maximum 2 A 1 A 1 mA Minimum 100 µA 10 µA		
Switched voltage range VDC	0.01 … 220	0.01 … 220	0.1 … 220
VAC	… 250	… 250	… 220
Switching configuration	monostable, bistable	monostable, bistable	monostable
Voltage withstand: Open contact V_{rms}	1000, DS1E-S: –500, DS2Y: –750	1000, Type BT: 750	750
Voltage withstand: Between contact sets V_{rms}	1000	1000	1000
Voltage withstand: Coil / contact V_{rms}	1500, DS1E-S / DS2Y: 1000	1500, Type BT: 4000	1000
Impulse voltage withstand (1.25 / 50 µs) V	1500	1500	1500
Nominal coil voltage VDC	1.5 – 48	1.5 – 48	5 – 60
VAC	—	—	—
Power consumption (mW): Monostable	400, Type S: 200	200, Type F: 140, Type BT: 360	2CO: 300; 4CO: 480
Power consumption (mW): Bistable 1 coil	180, Type S: 100	100, Type F: 70	—
Power consumption (mW): Bistable 2 coils	360, Type S: 180	200, Type F: 140	—
Degree of protection	IP67	IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection	DS1 DS2, DS2Y DS4		2 CO 4 CO
Connection type	PCB	PCB	PCB
Approvals	UL (E 43149), CSA (LR 26550)	UL (E 43149), CSA (LR 26550), BABT CR No.: 0104	VDE, UL (E 43149), CSA (LR 26550)

*) MBB = make before break

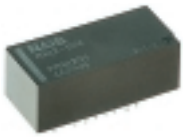
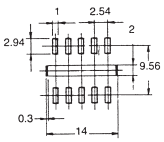
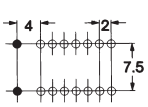
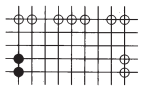
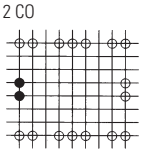
S I G N A L R E L A Y S

Type	NL	K	S
			
Dimensions (mm) LxWxH	25.4 x 32.4 x 10.9	24/ 29/ 35 x 19 x 30	28 x 12 x 10.4
Features	● Flat pcb relay ● 6 changeover contacts ● Not for a new design-in	● Dimensions for 2CO/ 4CO/ 6CO x 19 x 30 ● Relay with proven cam operated Au / Ag contacts ● Plug-in or pcb connection ● Not for a new design-in	● Wide switching range due to 5-layer contacts ● Good HF switching characteristics ● Low thermo voltage ● IC-compatible ● VS-compatible
Contact arrangement	6CO	2CO / 4CO / 6CO	2NO 2NC/3NO 1NC/4NO
Switched load range (resistive load)			
Switched voltage range VDC	0.01 … 110	0.1 … 220	0.01 … 200
VAC	… 110	… 250	… 250
Switching configuration	monostable, bistable	monostable	monostable, bistable
Voltage withstand – Open contact V_{rms}	1000	750	750
Voltage withstand – Between contact sets V_{rms}	1000	750	1000
Voltage withstand – Coil / contact V_{rms}	2000	750	1500
Impulse voltage withstand (1.25 / 50 µs) V	—	—	—
Nominal coil voltage VDC	5 – 110	3 – 110	1.5 – 48
VAC	—	—	—
Power consumption (mW) – Monostable	– 60 V: 720; 110 V: 900	2CO: 400; 4CO: 700; 6CO: 1300	200 – 271
Power consumption (mW) – Bistable 1 coil	—	—	83 – 144
Power consumption (mW) – Bistable 2 coils	1600	—	200 – 355
Degree of protection	IP67	IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection			
Connection type	PCB	PCB, solder, plug-in	PCB
Approvals	UL (E 43149), CSA (LR 26550)	VDE, UL (E 43149), CSA (LR 26550)	UL (E 43028), CSA (LR 26550)

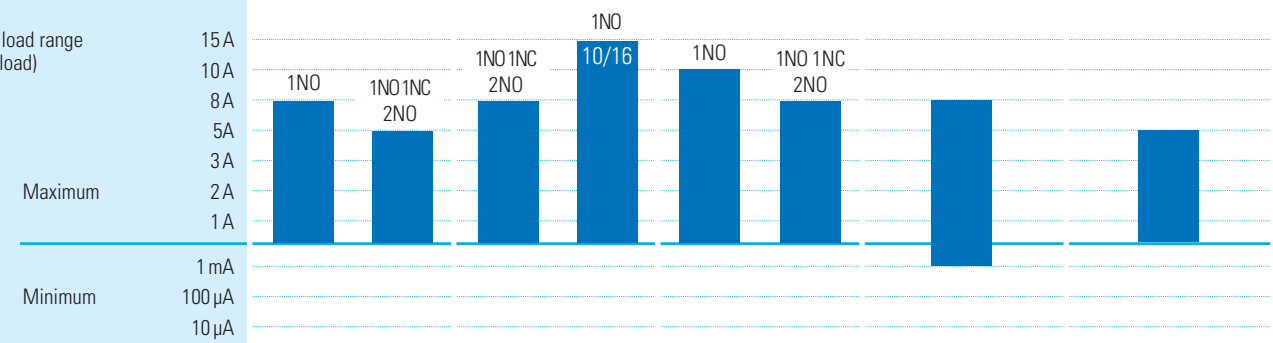
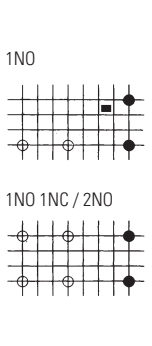
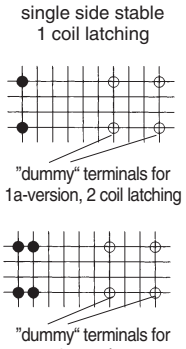
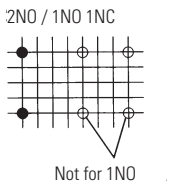
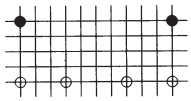
H I G H - F R E Q U E N C Y R E L A Y S

Type			RE *new*	RK	RX	RP
						
Dimensions (mm) LxWxH			20.2x11.2x8.9/9.6	20.2 x 11.2 x 9.7	20.5 x 12.4 x 9.4	10.6 x 9 x 4
Features	Insertion loss (max) Isolation (min) V.S.W.R. (max)		● Up to 2.6 GHz ● SMD-type available ● Isolation 30 dB / 2.6 GHz ● Impedance 75 Ω	● Polarised HF relay for for pcb up to 1.3 GHz ● High sensitivity ● Small size ● Insertion loss: 0.3 dB ● Isolation 60 dB ● V.S.W.R. 1.5 ● Impedance 50 Ω	● Polarised small micro wave relay for up to 2.5 GHz ● High sensitivity 200 mW ● Isol.: 60 dB or more ● Insertion loss: 0.2 dB ● V.S.W.R. 1.2 ● Impedance 50 Ω	● Extremely small HF relay ● Use up to 1.8 GHz ● High sensitivity ● Insertion loss: 1 dB ● Isolation 10 dB ● V.S.W.R. 1.3 ● Impedance 50 Ω
Contact arrangement			1CO/2CO	1CO	1CO	1CO
Switched load range (resistive load)	Maximum	15 A 10 A 8 A 5A 3 A 2 A 1 A	0.01	0.5	0.5	0.1
	Minimum	1 mA 100 µA 10 µA				
Switched voltage range		VDC	… 30	…30	… 30	… 30
		VAC	—	30	—	—
Switching configuration			mono-, bistable	mono-, bistable	mono-, bistable	monostable
Voltage withstand	Open contact	V_{rms}	500	500	500	750
	Between contact sets	V_{rms}	—	—	—	—
	Coil / contact	V_{rms}	1000	1000	1000	1500
Impulse voltage withstand (1.25 / 50 µs)		V	—	—	—	—
Nominal coil voltage		VDC	3 – 24	3 – 24	3 – 24	1.5 – 24
		VAC	—	—	—	—
Power consumption (mW)	Monostable		200	200	200	12 V: – 140 / 24 V: – 270
	Bistable 1 coil		—	200	200	—
	Bistable 2 coils		—	400	400	—
Degree of protection			IP40	IP67	IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection						
Connection type			PCB	PCB	PCB	PCB
Approvals						

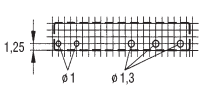
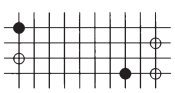
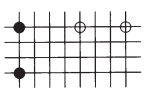
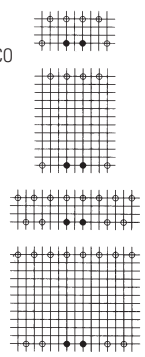
H I G H - F R E Q U E N C Y R E L A Y S

Type			RA *new*	RM	RG	RD
						
Dimensions (mm) LxWxH			14.7 x 9.7 x 5.9	28 x 12.4 x 10.5	25 x 19 x 10.4	34 x 38 x 13.2
Features	Insertion loss (max) Isolation (min) V.S.W.R. (max)		● 300 kHz – 1.0 GHz ● Insertion loss max: 0.3 dB ● Isolation min: 20 dB ● V.S.W.R. max.: 1.2 ● Impedance 50 Ω	● Polarised miniature relay for up to 4 GHz ● High sensitivity ● Isolation: 40 dB or more (at 4 GHz) ● Insertion loss: 1 dB ● Isolation 40 dB ● Impedance 50 Ω	● Polarised miniature HF relay for up to 1 GHz ● Monostable or bistable (latching) ● Insertion loss: 1 dB ● Isolation 65 dB ● V.S.W.R. 1.2 – 2.0 ● Impedance 50 Ω or 75 Ω	● 1 GHz – 18 GHz ● Insertion loss 0.2 – 0.5 dB ● Isolation min. dB 60 – 85 ● V.S.W.R. max.: 1.1 – 1.5
Contact arrangement			2CO	2CO	1CO/2CO	1CO–4/1
Switched load range (resistive load)	Maximum	15 A				
		10 A				
		8 A				
		5 A				
		3 A				
		2 A	1	0.01	1	100 mA
		1 A				
	Minimum	1 mA				
		100 µA				
		10 µA				
Switched voltage range		VDC	… 30	… 24	… 24	… 30
		VAC	24	—	24	—
Switching configuration			mono-, bistable	mono-, bistable	mono-, bistable	mono-, bistable
Voltage withstand	Open contact	V_{rms}	750	500	1000	500
	Between contact sets	V_{rms}	1000	—	—	500
	Coil / contact	V_{rms}	1000	1000	2000	500
Impulse voltage withstand (1.25 / 50 µs)		V	—	—	—	—
Nominal coil voltage		VDC	1.5 – 48	3 – 24	3 – 48	12, 24
		VAC	—	—	—	—
Power consumption (mW)	Monostable		140 – 300	360	350 – 400	700
	Bistable 1 coil		70 – 100	250	180 – 200	500
	Bistable 2 coils		140 – 200	500	350 – 400	—
Degree of protection			IP67	IP67	IP67	IP54
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection					1 CO  2 CO 	
Connection type			SM technology	PCB	PCB	SMA
Approvals						

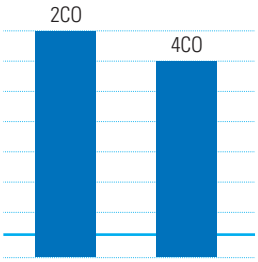
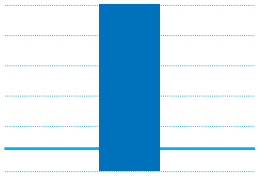
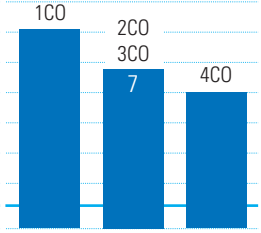
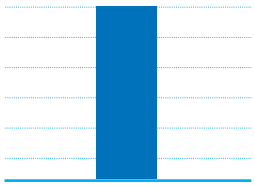
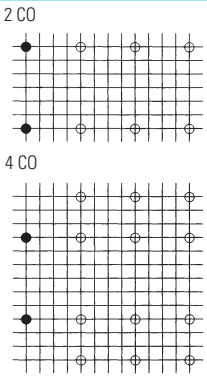
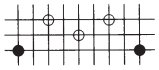
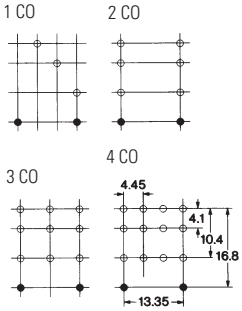
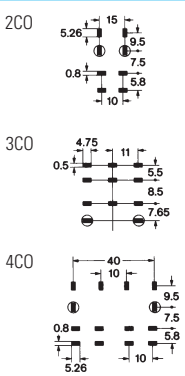
P O W E R R E L A Y S

Type	DSP	DE	DK	ST	PA/PAD
					
Dimensions (mm) LxWxH	20.2 x 11 x 10.5	25 x 12.5 x 12.5	20 x 12.5 x 10 / 20 x 15 x 10	31 x 14 x 11.3	20 x 5 x 12.5
Features	● Miniature power relay ● DIL construction ● IC-compatible ● VS-compatible	● Small dimensions ● High switching capacity ● 16 A = 25.000, 10 A = 100.000 operations ● 8 mm air gaps and creepage distances	● Width for 1NO: 12.5 mm / 2NO and 1NO 1NC:15 mm ● Polarised miniature power relay ● PCB mounting ● 8 mm airgaps and creepage distances ● Test voltage: 4 kV	● Friction-free rotating armature ● Air gaps and creepage distances > 4 mm ● High voltage withstand ● IC-compatible ● VS-compatible	● Extremely small and narrow power relay ● Au plated Ag contacts ● High packing density ● Pin compatible to PhotoMOS AQZ relay
Contact arrangement	1NO / 1NO 1NC / 2NO	1NO / 2NO / 1NO 1NC	1NO / 1NO 1NC / 2NO	1NO 1NC / 2NO	1NO
Switched load range (resistive load)					
Switched voltage range VDC	0.1 … 220	… 230	… 125	0,1 … 250	0.1 … 110
VAC	… 400	… 440	… 400	… 400	… 250
Switching configuration	monostable, bistable	monostable, bistable	monostable, bistable	monostable, bistable	monostable
Voltage withstand – Open contact V_{rms}	1000	1000	1000	1200	1000
Voltage withstand – Between contact sets V_{rms}	2000	4000	4000	2000	—
Voltage withstand – Coil / contact V_{rms}	3000	5000	4000	3750	2000
Impulse voltage withstand (1.25 / 50 µs) V	5000	12000	10000	6000	4000
Nominal coil voltage VDC	1.5 – 24	1.5 – 48	1.5 – 48	3 – 48	5 – 24
VAC	—	—	—	—	—
Power consumption (mW) – Monostable	300	200	200	240	120 – 180
Power consumption (mW) – Bistable 1 coil	150	100	100	110	—
Power consumption (mW) – Bistable 2 coils	300	200	200	225	—
Degree of protection	IP67	IP67	IP67	IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection					
Connection type	PCB	PCB	PCB	PCB	PCB
Approvals	TÜV, UL (E 43028), CSA (LR 26550), SEV	TÜV, UL, CSA, VDE	VDE, TÜV, UL (E 43028), CSA (LR 48525), SEV	UL (E 43028), CSA (LR 26550), SEV, VDE, TV rating	UL (E 43149), CSA (LR 26550), TÜV

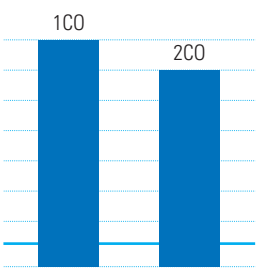
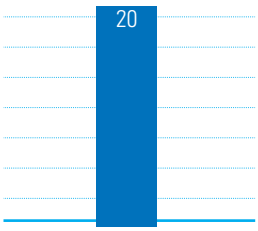
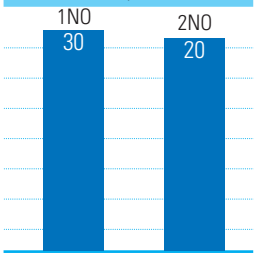
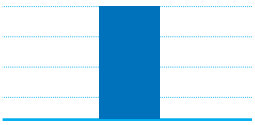
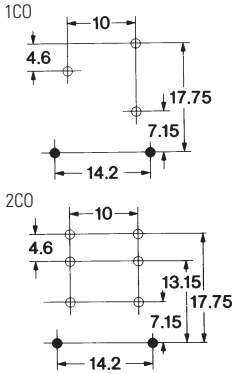
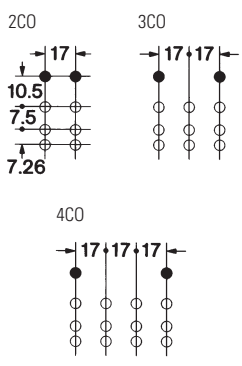
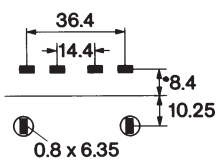
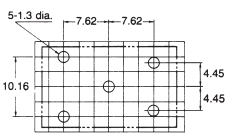
P O W E R R E L A Y S

Type	RT-3 module	PE	HA	PQ	NC
					
Dimensions (mm) LxWxH	67 x 33 x 32	28 x 5 x 15	26.3 x 14 x 16.9	20 x 10 x 15.6	25.4 / 38.1 x 25.4 x 10.9
Features	● Space saving relay module for DIN rail mounting ● Four PA relays per module ● Separate indicator LED for each relay ● Also available with PhotoMOS relays AQZ type	● Compact and small foot print area ● High insulation resistance meeting VDE0700 ● 8 mm creapage and clearance distances	● Dust tight / sealed pcb relay ● AC or DC coil ● Also available sealed with gold contacts	● Power relay with high switching capability ● High impulse voltage withstand ● High sensitivity	● Dimensions of 2CO/4CO x 25.4 x 10.9 ● High efficiency power relay ● Flat or upright versions ● Bifurcated contacts
Contact arrangement	4 x 1NO	1NO/1CO/1NC	1CO	1NO	2CO / 4CO
Switched load range (resistive load) Maximum	15 A 10 A 8 A 5A 3 A 2 A 1 A	6			
Minimum	1 mA 100 µA 10 µA				
Switched voltage range VDC	0.1 … 110	1 … 300	1 … 30	… 110	0.01 … 250
VAC	… 250	… 400	… 250	… 250	… 250
Switching configuration	monostable	monostable	monostable	monostable	monostable, bistable
Voltage withstand — Open contact V_{rms}	1000	1000	750	1000	1000
Voltage withstand — Between contact sets V_{rms}	—	—	—	—	1000
Voltage withstand — Coil / contact V_{rms}	2000	4000	1500	4000	2000
Impulse voltage withstand (1.25 / 50 µs) V	—	6000	—	8000	—
Nominal coil voltage VDC	12, 24	5 – 48	5 – 48	3 – 24	5 – 110
VAC	—	—	6 – 115	—	—
Power consumption (mW) Monostable	180	170	DC: - 360; AC: - 900	200	2CO: 360; 4CO: 720
Power consumption (mW) Bistable 1 coil	—	—	—	—	—
Power consumption (mW) Bistable 2 coils	—	—	—	—	2CO: 800; 4CO: 1600
Degree of protection	—	IP67	IP50 / IP67	IP67	IP50 / IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection					
Connection type	Screw terminal	Print	PCB	PCB	PCB, solder, plug-in
Approvals		UL (E 43149), VDE (122402), CSA (LR 26550)	TÜV, UL (E 43149), CSA (LR 26550), SEV	TÜV, UL (E 43028), CSA (LR 26550), SEV, VDE, SEMKO	VDE, UL (E 43025), CSA (LR 26550)

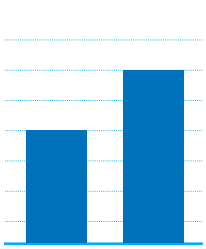
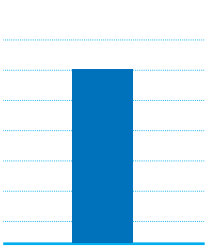
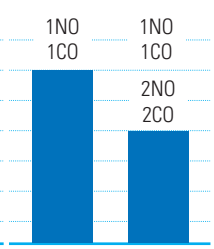
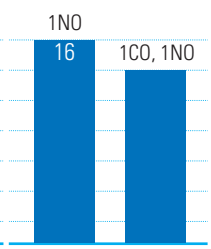
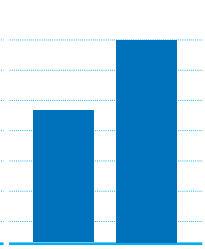
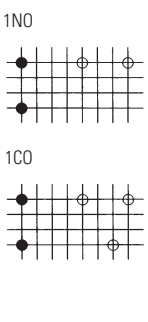
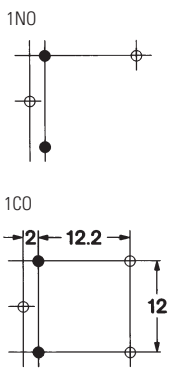
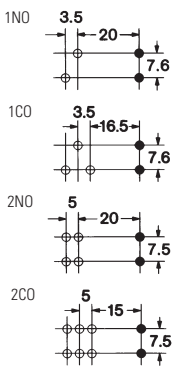
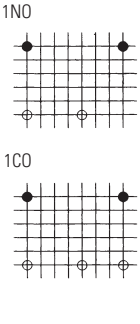
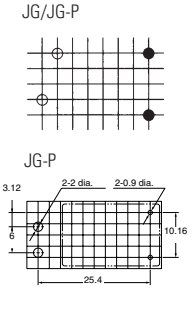
P O W E R R E L A Y S

Type	SP	NT	HC/HJ *new*	HP
				
Dimensions (mm) LxWxH	2CO: 50 x 25.6 x 22 4CO: 50 x 36.8 x 22	25.4 x 10.6 x 25.7	27.2 x 20.8 x 35.2	25/ 38/ 50 x 36 x 44.5
Features	● Polarised power relay ● Rotating armature	● Au plated Ag/Ni contacts ● 12 cN contact force	● Compact power relay ● DC and AC-types available	● Dimensions for 2CO/ 3CO/ 4CO x 36 x 44 ● Power relay with long operational life
Contact arrangement	2CO/4CO	1CO	1CO/2CO/3CO/4CO	2CO/3CO/4CO
Switched load range (resistive load) Maximum 15 A, 10 A, 8 A, 5 A, 3 A, 2 A, 1 A; Minimum 1 mA, 100 µA, 10 µA				
Switched voltage range VDC	10 … 110	0.1 … 30	0.1 … 30	1 … 125
VAC	… 250	… 250	… 250	… 250
Switching configuration	monostable, bistable	monostable	monostable	monostable
Voltage withstand: Open contact V_{rms}	1500	1000	700	2CO/4CO: 1000; 3CO: 2000
Voltage withstand: Between contact sets V_{rms}	3000	—	700	2CO/4CO: 1500; 3CO: 2600
Voltage withstand: Coil / contact V_{rms}	3000	2000	2000	2CO/4CO: 1500; 3CO: 2000
Impulse voltage withstand (1.25/50 µs) V	—	—	—	—
Nominal coil voltage VDC	3 – 48	5 – 48	6 – 110	6 – 110
VAC	—	—	6 – 240	6 – 240
Power consumption (mW): Monostable	300	290	900, AC: 1200	1500, AC: 1900 – 4900
Power consumption (mW): Bistable 1 coil	100	—	—	—
Power consumption (mW): Bistable 2 coils	300	—	—	—
Degree of protection	IP40	IP54	IP50 / IP67	IP50
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection				
Connection type	PCB, Plug-in	PCB	PCB, solder, screw	Plug-in
Approvals	UL (E 43028), TÜV, CSA (LR 26550)	VDE, UL (E 43028), CSA (LR 48525), SEV	VDE, UL (E 43028), CSA (LR 26550), SEV (1CO, 2CO, 3CO), TV rating	VDE, UL (E 43028), CSA (LR 26550), SEV

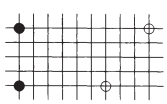
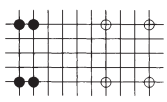
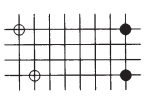
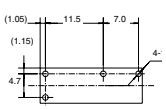
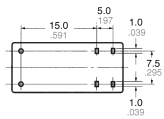
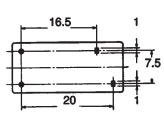
P O W E R R E L A Y S

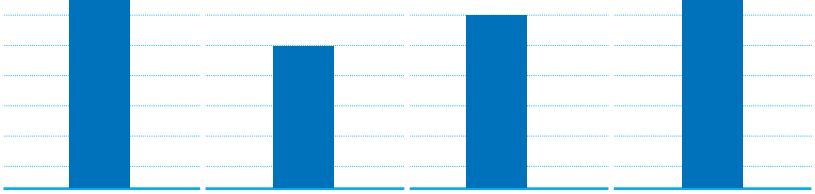
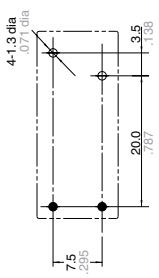
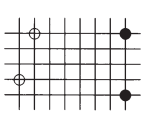
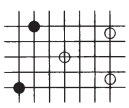
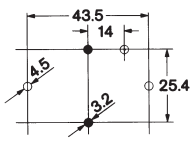
Type	HL	HG	HE	JE–X
				
Dimensions (mm) LxWxH	27.2 x 20.8 x 35.4	34 / 50 / 68 x 36 x 56	50 x 33 x 35.8	22 x 14 x 18.7
Features	● Compact power relay ● High operational life ● Wide switching range	● Dimensions for 2CO / 3CO / 4CO x 36 x 56 mm ● Compact power relay with up to 4 switching contacts	● Compact power relay for DC or AC ● 8 mm air gaps and creepage distances ● 3 mm contact gap	● Very low cost power relay ● Compact size
Contact arrangement	1CO / 2CO	2CO / 3CO / 4CO	1NO / 2NO	1NO / 1CO
Switched load range (resistive load) Maximum 15 A / 10 A / 8 A / 5 A / 3 A / 2 A / 1 A; Minimum 1 mA / 100 µA / 10 µA				
Switched voltage range VDC	1 … 30	10 … 125	… 100	… 30
VAC	… 250	… 250	… 277	… 277
Switching configuration	monostable	monostable	monostable	monostable
Voltage withstand – Open contact V_{rms}	1000	2000	2000	750
Voltage withstand – Between contact sets V_{rms}	1500	2000	4000	—
Voltage withstand – Coil / contact V_{rms}	2000	2000	5000	1500
Impulse voltage withstand (1.25 / 50 µs) V	—	—	10000	5000
Nominal coil voltage VDC	6 – 110	6 – 110	6 – 110	5 – 48
VAC	6 – 240	6 – 240	6 – 240	—
Power consumption mW [VA] – Monostable	900 – 1000 [1.2 – 1.3]	2CO: 1400 [3.6] / 3CO: 1600 [5.2] / 4CO: 2100 [7.6]	1920 [1.65 – 2.65]	400
Power consumption mW [VA] – Bistable 1 coil	—	—	—	—
Power consumption mW [VA] – Bistable 2 coils	—	—	—	—
Degree of protection	IP40	IP40	—	IP50 / IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection				
Connection type	PCB, plug-in, top mount	—	Plug-in, screw, flange	PCB
Approvals	UL (E 43028), CSA (LR 26550), TV5	UL (E 43028), CSA (LR 26550)	TÜV, UL (E 43028), CSA (LR 26550), VDE, TV rating	TÜV, UL (E 43028), CSA (LR 48525), VDE

P O W E R R E L A Y S

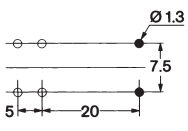
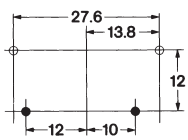
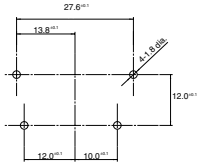
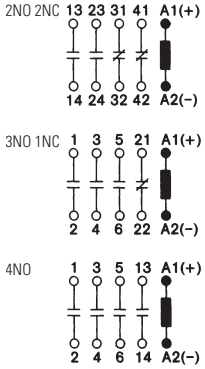
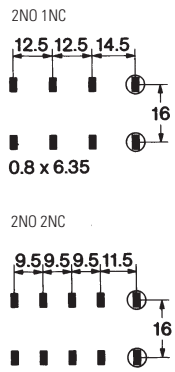
Type	JQ	JS	JW	JV	JG / JG-P
					
Dimensions (mm) LxWxH	20 x 10 x 15.6	22 x 16 x 16.4	28.6 x 12.8 x 20.4	22 x 16 x 10.9	22 x 14 x 11.6
Features	● Low power consumption ● Very low cost ● High impulse voltage withstand	● Universal miniature power relay ● High switching capability ● Very suitable for automotive applications ● Special type for high ambient temperatures ● Very low cost	● Compact mains isolation relay ● Air gaps and creepage distances > 7.5 mm between contacts and coil ● Test voltage 5000 V_{rms} between contacts and coil	● High switching capability within low profile small package ● High sensitivity ● Suitable for automotive applications ● Flat construction	● Compact pcb relay ● High impulse voltage withstand
Contact arrangement	1NO/1CO	1NO/1CO	1NO/1CO/2NO/2CO	1NO/1CO	1NO
Switched load range (resistive load) Maximum 15 A / 10 A / 8 A / 5 A / 3 A / 2 A / 1 A					
Minimum 1 mA / 100 µA / 10 µA	Standard version / Power version			Power version / Standard version	
Switched voltage range VDC	… 110	… 100	… 100	… 110	… 100
VAC	… 250	… 277	… 250	… 250	… 250
Switching configuration	monostable	monostable	monostable	monostable	monostable
Voltage withstand – Open contact V_{rms}	1NO: 1000, 1CO: 750	750	1000	1000	750
Voltage withstand – Between contact sets V_{rms}	—	—	—	—	—
Voltage withstand – Coil / contact V_{rms}	4000	1500	5000	1500	2000
Impulse voltage withstand (1.25 / 50 µs) V	8000	—	10000	—	10000
Nominal coil voltage VDC	3 – 48	5 – 48	5 – 48	5 – 100	5 – 24
VAC	—	—	—	—	—
Power consumption (mW) Monostable	1NO: 200, 1CO: 400	360	530	200 – 450	200 / 400
Power consumption (mW) Bistable 1 coil	—	—	—	—	—
Power consumption (mW) Bistable 2 coils	—	—	—	—	—
Degree of protection	IP67	IP67	IP67	IP50 / IP67	IP54
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection					
Connection type	PCB	PCB	PCB	PCB	PCB
Approvals	TÜV, VDE, UL (E 43028), CSA (LR 26550), SEV, SEMKO	VDE, TÜV, UL (E 43028), CSA (LR 26550), TV5	VDE, TÜV, UL (E 43028), CSA (LR 26550), SEV, TV5	UL (E 43028), CSA (LR 26550)	TÜV, UL (E 43028), VDE, SEMKO, CSA (LR 26550)

P O W E R R E L A Y S

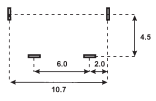
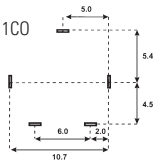
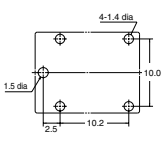
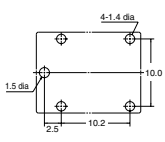
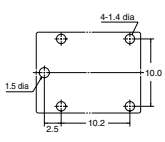
Type	JC	JK	LD	LA	LK/LK-S/LK-P
					
Dimensions (mm) LxWxH	30 x 19 x 30.4	21.4 x 11 x 15.7	20.5 x 7.2 x 15.3	24 x 12 x 25	24 x 11 x 25
Features	● 8 mm air gaps and creepage distances ● High make current capability ● 2 NO spezial type with blow magnet for 250 V DC / 5 A	● Small, narrow pcb relay ● JK-Q quiet (30 dB) switching noise	● Slim 7 mm width ● 200 mW operating power ● 6 mm creapage distance and clearances	● Low-cost power relay ● Surge withstand voltage 10 kV ● 6 mm creapage distance and clearances ● 3 A type best suited for switching speakers	● High switching capacity 20 A 277 V AC ● 111A inrush current capacity ● Surge withstand at 10000V
Contact arrangement	1NO / 2NO / 1NO 1NC	1NO	1NO	2NO	1NO
Switched load range (resistive load) Maximum 15 A / 10 A / 8 A / 5 A / 3 A / 2 A / 1 A	1NO, 2NO, 1NO 1NC	1NO	1NO	2NO	1NO
Minimum 1 mA / 100 µA / 10 µA					LK, LK-S, LK-P
Switched voltage range VDC	… 125/250 with blow magne	… 110	… 30	… 30	… 30
VAC	… 250	… 250	… 277	… 277	… 277
Switching configuration	monostable	monostable	monostable	monostable	monostable
Voltage withstand – Open contact V_{rms}	2000	750	750	1000	1000
Voltage withstand – Between contact sets V_{rms}	2000	—	—	1000	—
Voltage withstand – Coil / contact V_{rms}	4000	2000	4000	4000	4000
Impulse voltage withstand (1.25 / 50 µs) V	10000	8000	10000	10000	10000
Nominal coil voltage VDC	6 – 48	3 – 48	4.5 – 24	12, 24	5 – 24
VAC	—	—	—	—	—
Power consumption (mW) Monostable	1NO: 900, 2NO / 1NO 1NC: 1000	200	200	530	530 / 250
Power consumption (mW) Bistable 1 coil	—	—	—	—	—
Power consumption (mW) Bistable 2 coils	—	—	—	—	—
Degree of protection	IP40	IP54 / IP67	IP40	IP40	IP40
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection	1a  2a/1a1r 				
Connection type	PCB, Plug-in	PCB	PCB	PCB	PCB
Approvals	UL (E 43028), VDE, SEV, SEMKO, CSA (LR 26550), TV5	TÜV, UL (E 43028), CSA (LR 26550)	TÜV, UL (E 43149), CSA (LR 26550)	TÜV, UL (E 43149) CSA, (LR 26550), SEMKO, SEV	UL (E43028), CSA (LR26550), TÜV, VDE, SEMKO, SEV, TV rating

Type	LE *new*	JZ	JY	JA
				
Dimensions (mm) LxWxH	28.6 x 12.4 x 24.9	22 x 14 x 11.6	22 x 12 x 22.5	34.7 x 30.1 x 28.5
Features	● Relay for home appliances ● Excellent heat resistance (+85°C ambient) ● Low operating power ● #187 terminals	● Small pcb relay ● High impulse voltage withstand ● Special type for low switching noise (30dB)	● Compact pcb relay ● High switching capability ● Special type for high ambient temperatures	● High switching capability ● FAST-ON connections for contacts ● Plug-in or pcb (TMP) connections for coil ● Max. make current 55 A
Contact arrangement	1NO	1NO	1NO/1CO	1NO/1NC/1CO
Switched load range (resistive load) Maximum	15 A 10 A 8 A 5A 3 A 2 A 1 A			
Minimum	1 mA 100 µA 10 µA			
Switched voltage range VDC	—	… 110	… 100	… 100
VAC	277	… 250	… 250	… 250
Switching configuration	monostable	monostable	monostable	monostable
Voltage withstand – Open contact V_{rms}	1000	750	800	1000
Voltage withstand – Between contact sets V_{rms}	—	—	—	—
Voltage withstand – Coil / contact V_{rms}	4000	2000	2000	2000
Impulse voltage withstand (1.25 / 50 µs) V	10000	10000	5000	5000
Nominal coil voltage VDC	5 – 48	5 – 24	5 – 48	6 – 24
VAC	—	—	—	6 – 115
Power consumption (mW) – Monostable	400	200 – 400	400	1200, AC: 1300
Power consumption (mW) – Bistable 1 coil	—	—	—	—
Power consumption (mW) – Bistable 2 coils	—	—	—	—
Degree of protection	IP40	IP50/ IP67	IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection	 PCB and TMP/PCB-type (Layout of TMP/PCB type with 3 terminals is different)			
Connection type	PCB	PCB	PCB	PCB, Chassis
Approvals	TÜV, UL (E43028), CSA (LR48525),	TÜV, UL (E 43028), SEMKO, VDE, CSA (LR 26550), TV5	TÜV, UL (E 43028), CSA (LR 26550)	TÜV, UL (E 43028), CSA (LR 26550), SEV, TV5

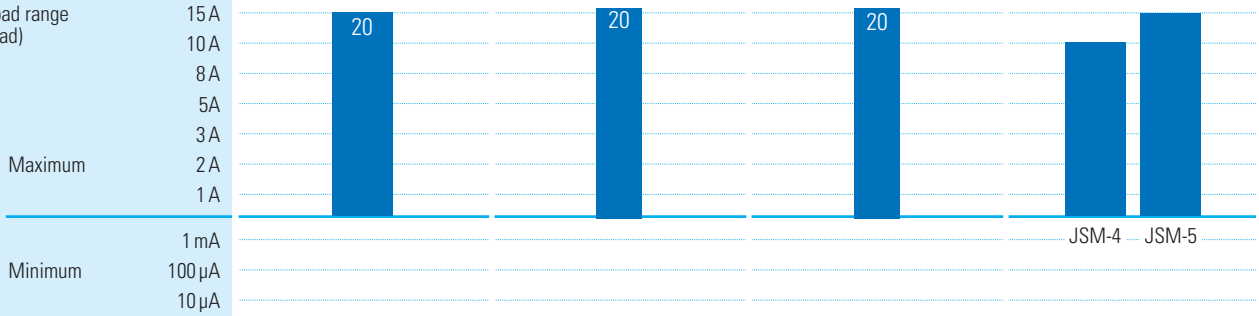
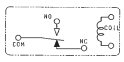
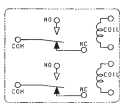
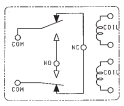
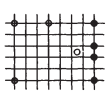
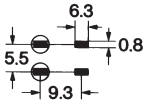
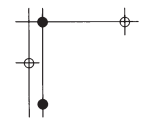
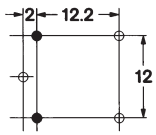
P O W E R R E L A Y S

Type	JR1aF	JM	LF new	MC	VC
					
Dimensions (mm) LxWxH	28.6 x 12.8 x 28.5	30.4 x 16 x 26.5	30.1 x 15.7 x 23.3	45 x 45.2 x 40	60 x 40 x 49.5
Features	● According Isolation VDE0660 with 8 mm air gaps and creepage distances ● Test voltage 5 kV	● Relay for large motor loads ● High impulse voltage withstand ● Make current up to 70 A	● For compressor or motor loads ● Air and creepage distance > 8 mm ● 102 A inrush current / 200 V AC	● Minicontactor for controlling motor, airconditioning and heating loads ● Energy saving ● Also available in PCB version ● 3 mm contact opening	● High switching capability due to bridge contacts
Contact arrangement	1NO	1NO	1a	4NO/3NO 1NC/2NO 2NC	1,2,3 or 4 NO/1NO 1NC/2NO 1NC/3NO 1NC
Switched load range (resistive load) Maximum 15 A / 10 A / 8 A / 5 A / 3 A / 2 A / 1 A	16	20	25	16	20
Minimum 1 mA / 100 µA / 10 µA					
Switched voltage range VDC	… 110	… 100	—	440	—
VAC	… 277	… 250	… 250	400	400
Switching configuration	monostable	monostable	monostable	monostable, bistable	monostable
Voltage withstand – Open contact V_{rms}	1000	1000	1000	2500	2500
Voltage withstand – Between contact sets V_{rms}	3000	—	—	2500	2500
Voltage withstand – Coil / contact V_{rms}	5000	5000	5000	2500	2500
Impulse voltage withstand (1.25 / 50 µs) V	10000	—	10000	—	—
Nominal coil voltage VDC	6 – 48	5 – 48	5 – 24	3 – 48	12, 24, 48
VAC	115	—	—	24 – 380	24 – 240
Power consumption mW [VA] – Monostable	530	900	900	500	—
Power consumption mW [VA] – Bistable 1 coil	—	—	—	—	—
Power consumption mW [VA] – Bistable 2 coils	—	—	—	—	—
Degree of protection	IP50	IP40	IP40	IP40	IP40
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection					
Connection type	PCB	Top mount contact, coil to pcb	Print	PCB, screw, plug-in, DIN rail	Flat plug-in, screw
Approvals	UL (E 43028), TÜV, CSA (LR 26550), TV5	UL (E 43028), CSA (LR 26550), TÜV 88121645536, VDE 3584	UL, CSA, TÜV, VDE, SEMKO	UL (E 43028), CSA (LR 26550)	VDE, TÜV, UL (E 43028), CSA (LR 26550)

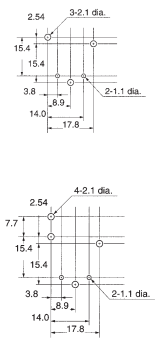
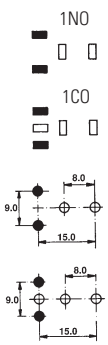
A U T O M O T I V E R E L A Y S

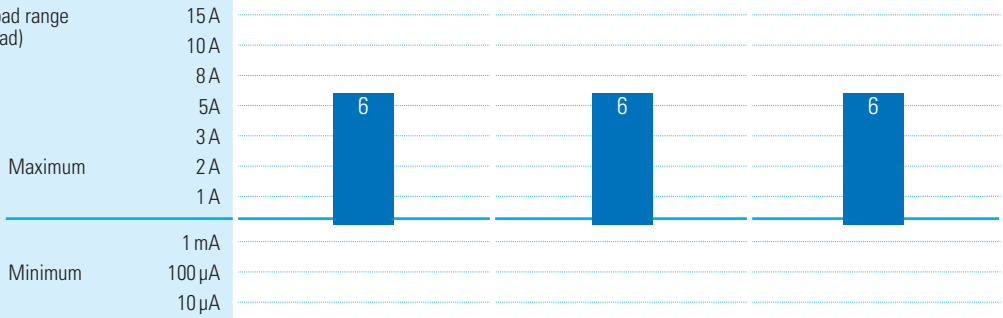
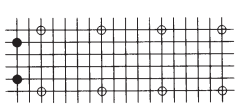
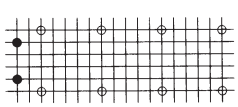
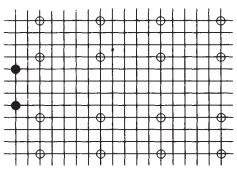
Type			CP	CQ	JJM	JJM2W
						
Dimensions (mm) LxWxH			14 x 13 x 9.5	17 x 13 x 16.6	15.5 x 12 x 13.9	15.5 x 12 x 13.9
Features			● Ultra miniature automotive relay ● High carrying current and high temperature capabilities ● High inrush current capability (40A, lamp load) ● Available in SMD version	● Quiet type Noise reduced by approx. 20 dB	● Miniature power relay ● Typical application: air conditioning systems, power window door lock ● New: double make 1a contact arrangement	● Double make contact for car alarm systems
Contact arrangement			1NO / 1CO	1CO	1NO / 1CO	2W
Switched load range (resistive load)	Maximum	15 A 10 A 8 A 5 A 3 A 2 A 1 A	20	NO 20 / NC	1NO 20 / 1CO (NO) / 1CO (NC)	(2 x 6 A) lamploads
	Minimum	1 mA 100 µA 10 µA				
Switched voltage range		VDC	… 16	… 16	… 16	… 16
		VAC	—	—	—	—
Switching configuration			monostable	monostable	monostable	monostable
Voltage withstand	Open contact	V_{rms}	500	500	500	500
	Between contact sets	V_{rms}	—	—	—	—
	Coil / contact	V_{rms}	500	500	500	500
Impulse voltage withstand (1.25 / 50 µs)		V	—	—	—	—
Nominal coil voltage		VDC	12	12	12	12
		VAC	—	—	—	—
Power consumption (mW)	Monostable		640	640	640	1000
	Bistable 1 coil		—	—	—	—
	Bistable 2 coils		—	—	—	—
Degree of protection			IP67	IP67	IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection			1NO  1CO 	 Tolerance : ±0.1	 Tolerance : ±0.1	 Tolerance : ±0.1
Connection type			PCB, SM technology	PCB	PCB	PCB
Approvals						

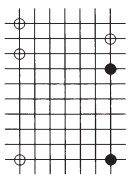
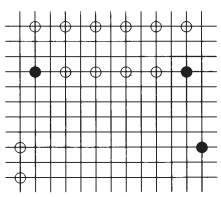
AUTOMOTIVE RELAYS

Type	CT1/2/5	CF	CA	JSM
				
Dimensions (mm) LxWxH	17.4 x 7.2 (14) x 13.5	22.5 x 16.5 x 16.5	26.2 x 19.4 x 40	22 x 16 x 16.4
Features	● Narrow automotive relay ● Available in single/ twin/dual coil packages ● All types are footprint compatible	● Power relay for automotive applications ● 2 separate coils in a single housing ● For high DC current ● Low noise < 50 dB type available	● Small, low weight automotive relay ● Plug-in terminals	● Miniature power relay for automotive applications ● Standard version JSM-4 for max. make current 25 A ● High power version JSM-5 for max. make current 50 A
Contact arrangement	1CO / 2CO(H-bridge) / 2 x 1CO	2 CO (H-bridge)	1NO	1NO / 1CO
Switched load range (resistive load)				
Switched voltage range VDC	… 16	… 16	… 30	… 16
VAC	—	—	—	—
Switching configuration	monostable	monostable	monostable	monostable
Voltage withstand – Open contact V_{rms}	500	1000	500	750
Voltage withstand – Between contact sets V_{rms}	500	—	—	—
Voltage withstand – Coil / contact V_{rms}	500	1000	500	1000
Impulse voltage withstand (1.25 / 50 µs) V	—	—	—	—
Nominal coil voltage VDC	12	12	5 – 24	9, 12
VAC	—	—	—	—
Power consumption (mW) – Monostable	800	640	1800	640
Power consumption (mW) – Bistable 1 coil	—	—	—	—
Power consumption (mW) – Bistable 2 coils	—	—	—	—
Degree of protection	IP67	IP67	IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection	CT1  CT5  CT2 			1NO  1CO 
Connection type	PCB	PCB	Flat plug-in	PCB
Approvals				

AUTOMOTIVE RELAYS

Type	JTN	CM	CB	EV
				
Dimensions (mm) LxWxH	30.5 x 24.2 x 16.9	20 x 15 x 22	26 x 22 x 25	88 x 87 x 87 80 x 38 x 71
Features	● High switching capability ● Up to 30 A lamp load ● Sealed and TMP types available	● 35 A contact rating ● High temperature range -40°C to +85°C ● High shock resistance for drop test requirements ● Quick connect and PCB type	● 40 A automotive relay ● High shock withstand ● Low contact losses ● 1 NO power type for 70 A available	● Power capsule contact relay for electric vehicle, hybrid electric vehicle ● Safety, small construction ● DC power cutt-off with compact body
Contact arrangement	1NO / 1CO	1NO / 1CO	1NO / 1CO	1NO/2NO 1NO
Switched load range (resistive load) Maximum	1NO 30, 1CO (NO) 20, 1CO (NC)	35, 20	40, 30	150, 60, 30
Minimum		1NO: 35A, 1NC: 20A	1NO: 40A, 1NC: 30A	1NO/2NO: 150A, 1NO: 60A/30A
Switched voltage range VDC	… 30	… 16 /… 28	… 75	… 400
VAC	… 277	—	—	—
Switching configuration	monostable	monostable	monostable	monostable
Voltage withstand — Open contact V_{rms}	1500	500	500	2500
Voltage withstand — Between contact sets V_{rms}	—	—	—	—
Voltage withstand — Coil / contact V_{rms}	1500	500	500	2500
Impulse voltage withstand (1.25 / 50 µs) V	—	—	—	—
Nominal coil voltage VDC	5 – 24	12, 24	12, 24	12 / 24
VAC	—	—	—	—
Power consumption (mW) — Monostable	890	1500	12 V: 1400; 24 V: 1800	5000 stable
Power consumption (mW) — Bistable 1 coil	—	—	—	—
Power consumption (mW) — Bistable 2 coils	—	—	—	—
Degree of protection	IP40 / IP67	IP50 / IP67	IP50 / IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection				
Connection type	PCB, Plug-in	Flat plug-in, PCB	Flat plug-in, PCB	Screw for wiring
Approvals	UL (E 43028) CSA (LR 26550)			

Type	SF2/SF2D	SF3	SF4/SF4D
	new with double contacts 		new with double contacts 
Dimensions (mm) LxWxH	53.3 x 25 x 16.5	53.3 x 25 x 16.5	53.3 x 33.4 x 16.5
Features	● Polarised relay with forced operated contacts according to EN 50205 ● min. 10 V / 10 mA ● D = Double contacts	● Polarised relay with forced operated contacts according to EN 50205 ● min. 10 V / 10 mA	● Polarised relay with forced operated contacts according to EN 50205 ● min. 10 V / 10 mA ● D = Double contacts
Contact arrangement	2NO 2NC	3NO 1NC	4NO 4NC
Switched load range (resistive load)			
Switched voltage range VDC	5 … 400	5 … 400	5 … 400
VAC	… 400	… 400	… 400
Switching configuration	monostable	monostable	monostable
Voltage withstand – Open contact V_{rms}	2500	2500	2500
Voltage withstand – Between contact sets V_{rms}	2500	2500	2500
Voltage withstand – Coil / contact V_{rms}	2500	2500	2500
Impulse voltage withstand (1.25 / 50 µs) V	—	—	—
Nominal coil voltage VDC	5 – 60	5 – 60	5 – 60
VAC	—	—	—
Power consumption (mW) – Monostable	500	500	500
Power consumption (mW) – Bistable 1 coil	—	—	—
Power consumption (mW) – Bistable 2 coils	—	—	—
Degree of protection	IP67	IP67	IP67
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection			
Connection type	PCB	PCB	PCB, DIN rail
Approvals	UL, CSA, SEV, TÜV, SUVA	UL, CSA, SEV, SUVA, TÜV	UL, CSA, SEV, SUVA, TÜV

Type			TR	TS
				
Dimensions (mm) LxWxH			30.4 x 22.1 x 10.7	34 x 34 x 10.8
Features			● Universal adjustable pcb time delay relay for ON or OFF delay, pulse or wiper action ● Also available for external remote adjustment	● Universal adjustable pcb time delay relay for ON or OFF delay, pulse or wiper action ● Also available for external remote adjustment
			Pull-in delay: 0,1 – 10 s; 1 – 100 s; 8 – 800 s; 1–1000 s for external Potentiometer Release delay: 0,1 – 10 s or 0,3 – 100 s with external Potentiometer	Pull-in delay: 0,1 – 10 s; 1 – 100 s; 8 – 800 s; 1–1000 s for external Potentiometer Release delay: 0,1 – 10 s or 0,3 – 100 s with external Potentiometer
Contact arrangement			1CO	2NO 2NC/3NO 1NC/4NO
Switched load range (resistive load)	Maximum	15 A		
		10 A		
		8 A		
		5A		
		3 A		
		2 A		
		1 A		
	Minimum	1 mA		
		100 µA		
		10 µA		
Switched voltage range		VDC	0.1 … 30	0.1 … 200
		VAC	… 110	… 250
Switching configuration			—	—
Voltage withstand	Open contact	V_{rms}	350	750
	Between contact sets	V_{rms}	—	1000
	Coil / contact	V_{rms}	1000	1500
Impulse voltage withstand (1.25 / 50 µs)		V	1000	—
Nominal coil voltage		VDC	5, 12, 24	5, 12, 24
		VAC	—	—
Power consumption (mW)	Monostable		—	—
	Bistable 1 coil		—	—
	Bistable 2 coils		—	—
Degree of protection			IP50	IP50
Connection diagram (Bottom view) Pin grid 2.54 mm unless stated otherwise ● Coil connection				
Connection type			PCB	PCB
Approvals			CE	CE

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