

## The Best Relay



## P1 Relay

ISO  
9001

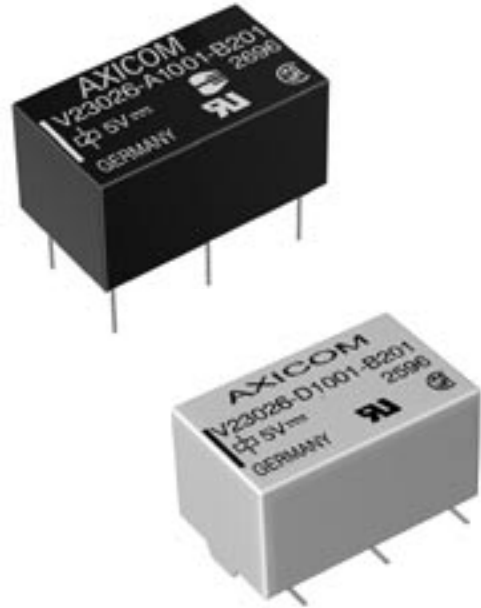


1 pole telecom and signal relay, polarized,  
Through Hole Type (THT) or  
Surface Mount Technology (SMT),

Relay types:     non-latching with 1 coil  
                      latching with 2 coils  
                      latching with 1 coil

**Features**

- Directly triggerable with TTL standard modules such as ALS, HCT and ACT
- Slim line 13.5 x 7.85 mm, 0.531 x 0.309 inch
- Switching current 1 A
- 1 changeover contact (1 form C / SPDT)
- Bifurcated contacts
- Immersion cleanable
- High sensitivity results in low nominal power consumption  
65 to 130 mW for non-latching  
30 to 150 mW for latching
- Surge voltage resistance between contact and coil:
  - 2.5 kV (2 / 10 µsec) meets the Bellcore Requirement GR-1089
  - 1.5 kV (10 / 160 µsec) meets FCC Part 68

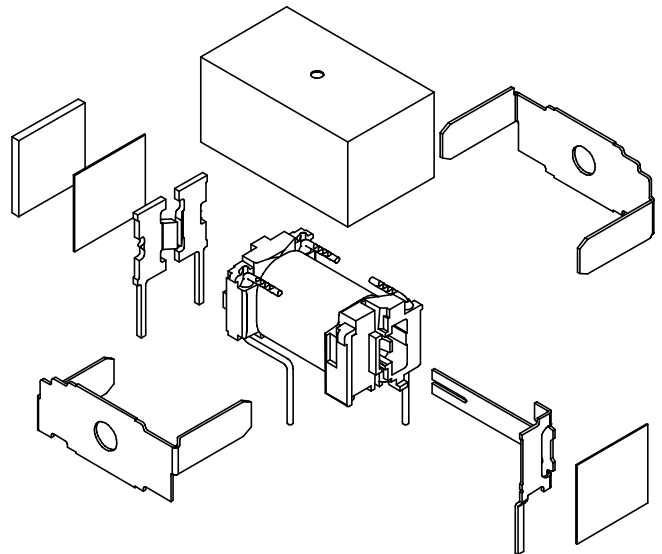


**Typical applications**

- Automotive equipment  
CAN bus, immobilizer
- Office equipment
- Measurement and control equipment
- Medical equipment
- Safety equipment

**Options**

- FCC version on request. Testing of open contacts with surge voltage in accordance with FCC 68.302 (1.5 kV, 10/160 µsec)

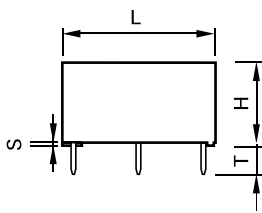


Basic insulation coil/contacts according to IEC/EN 60950  
Clearance > 0.75 mm  
Creepage distance > 0.75 mm

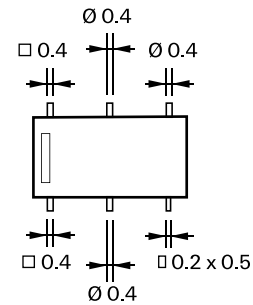
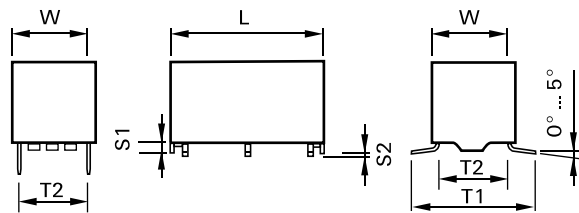
Dimensions

V23026-x1xxx-B201				
	THT		SMT	
	mm	inch	mm	inch
L	13.0±0.1	0.512±0.004	13.4±0.1	0.528±0.004
W	7.6±0.1	0.299±0.004	7.75±0.1	0.305±0.004
H	6.9-0.2	0.272-0.008	8.0-0.2	0.315-0.008
T	3.5-0.2	0.138-0.008	N/A	N/A
T1	N/A	N/A	10.9-0.5	0.429-0.020
T2	5.08±0.15	0.200±0.006	5.08±0.15	0.200±0.006
S	0.3±0.1	0.012±0.004	N/A	N/A
S1	N/A	N/A	0.85±0.1	0.033±0.004
S2	N/A	N/A	0.2-0.15	0.008±0.006

THT Version

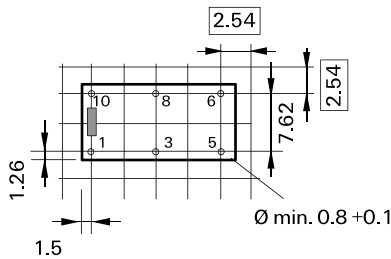


SMT Version



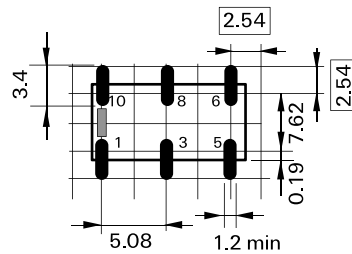
Mounting hole layout

View onto the component side of the PCB



Solder pad layout

View onto the component side of the PCB

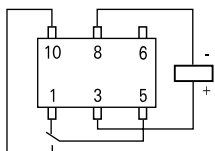


Terminal assignment

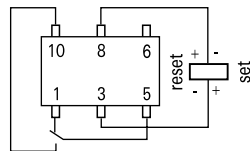
Relay - top view

Contact release or reset condition, coil polarity to set the relay

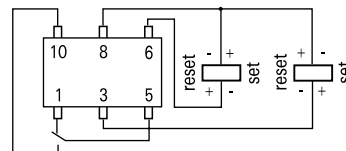
Non-latching type, not energized condition



Latching type, 1 coil reset condition



Latching type, 2 coils reset condition



**Coil Data (values at 23 °C)**

Nominal voltage $U_{nom}$	Operate/set voltage range		Release/ reset voltage	Nominal power consumption	Resistance	Coil number
	Minimum voltage $U_I$	Maximum voltage $U_{II}$	Minimum			
Vdc	Vdc	Vdc	Vdc	mW	$\Omega / \pm 10\%$	

THT, non-latching, 1 coil A1\*\*\*

3	2.25	8.80	0.30	66	137	006
5	3.75	14.50	0.50	68	370	001
12	9.00	35.00	1.20	64	2250	002
24	18.00	50.00	2.40	128	4500	004

THT, latching, 2 coils (coils I and II are identical) B1\*\*\*

3	2.25	8.55	2.25	69	130	106
5	3.75	14.75	3.75	64	390	101
12	9.00	29.00	9.00	96	1500	102
24	A nominal voltage of 24 V is feasible with a 12 V coil with a series resistor (1500 $\Omega$ )					

THT, latching, 1 coil C1\*\*\*

3	2.25	13.00	2.25	30	300	056
5	3.75	20.00	3.75	34	740	051
12	9.00	50.00	9.00	32	4500	052
24	18.00	50.00	18.00	128	4500	054

SMT, non-latching, 1 coil D1\*\*\*

3	2.25	8.00	0.30	80	113	026
5	3.75	13.30	0.50	80	313	021
12	9.00	35.00	1.20	80	1800	022
24	18.00	50.00	2.40	128	4500	024

SMT, latching, 2 coils (coils I and II are identical) E1\*\*\*

3	2.25	8.55	2.25	69	130	106
5	3.75	14.75	3.75	64	390	101
12	9.00	29.00	9.00	96	1500	102
24	A nominal voltage of 24 V is feasible with a 12 V coil with a series resistor (1500 $\Omega$ )					

SMT, latching, 1coil F1\*\*\*

5	3.75	20.00	3.75	34	740	051
12	9.00	50.00	9.00	32	4500	052
24	A nominal voltage of 24 V is feasible with a 12 V coil with a series resistor (4500 $\Omega$ )					

Further coil versions e.g. 1.5 V, 9 V and 15 V are available on request.

$U_I$  = Minimum voltage at 23 °C after pre-energizing with nominal voltage without contact current

$U_{II}$  = Maximum continuous voltage at 23 °C

The operating voltage limits  $U_I$  and  $U_{II}$  depend on the temperature according to the formula:

$U_{I\ tamb} = K_I \cdot U_{I\ 23^\circ\ C}$   
and

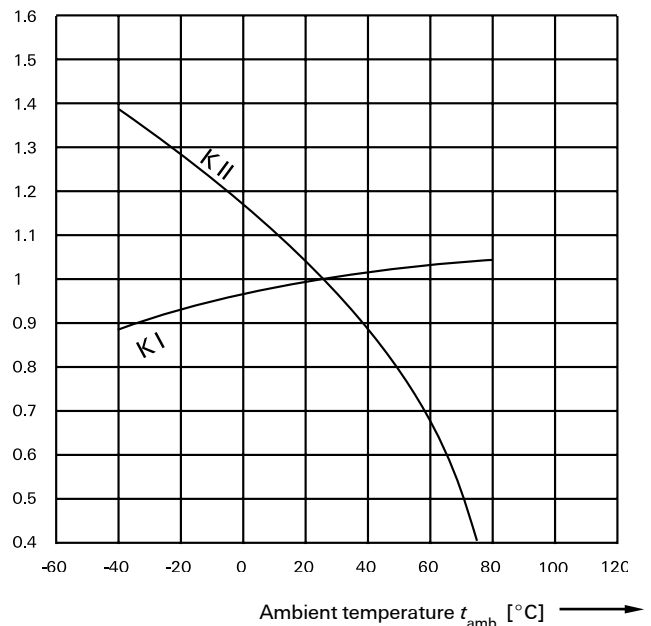
$U_{II\ tamb} = K_{II} \cdot U_{II\ 23^\circ\ C}$

$t_{amb}$  = Ambient temperature

$U_{I\ tamb}$  = Minimum voltage at ambient temperature,  $t_{amb}$

$U_{II\ tamb}$  = Maximum voltage at ambient temperature,  $t_{amb}$

$k_I, k_{II}$  = Factors (dependent on temperature), see diagram



**Contact Data**

Number of contacts and type	1 changeover contact
Contact assembly	Bifurcated contact
Contact material	Palladium nickel, gold-rhodium covered
Limiting continuous current at max. ambient temperature	1 A
Maximum switching current	1 A
Maximum switching voltage	125 Vdc 150 Vac
Maximum switching capacity	30 W, 60 VA
Thermoelectric potential	< 100 $\mu$ V
Initial contact resistance / measuring condition: 10 mA / 20 mV	< 50 m $\Omega$
Electrical endurance at 12 V / 10 mA at 6 V / 100 mA at 30 V / 1000 mA	typ. 5 x 10 <sup>7</sup> operations typ. 1 x 10 <sup>7</sup> operations typ. 1 x 10 <sup>5</sup> operations
Mechanical endurance	typ. 10 <sup>9</sup> operations
UL/CSA ratings	30 Vdc / 1 A 65 Vdc / 0.46 A 150 Vac / 0.46 A

**Insulation**

Insulation resistance at 500 VDC	> 10 <sup>9</sup> $\Omega$
Dielectric test voltage (1 min) between coil and contacts (Relay with 1 coil)  between open contacts	1500 Vrms  500 Vrms
Surge voltage resistance according to Bellcore TR-NWT-001089 (2 / 10 $\mu$ s) between coil and contacts (Relay with 1 coil) between open contacts  according to FCC 68 (10 / 160 $\mu$ s) between coil and contacts (Relay with 1 coil) between open contacts	2500 V on request 2000 V  1500 V on request 1500 V
Insulation according to IEC / EN 60950 Clearance Creepage distance	Basic insulation 0.75 mm 0.75 mm

**High Frequency Data**

Capacitance between coil and contacts between open contacts	max. 6 pF max. 5 pF
RF Characteristics Isolation at 100 / 900 MHz Insertion loss at 100 / 900 MHz V.S.W.R. at 100 / 900 MHz	-30.0 dB / -18.0 dB -0.12 dB / -1.9 dB 1.06 / 1.75

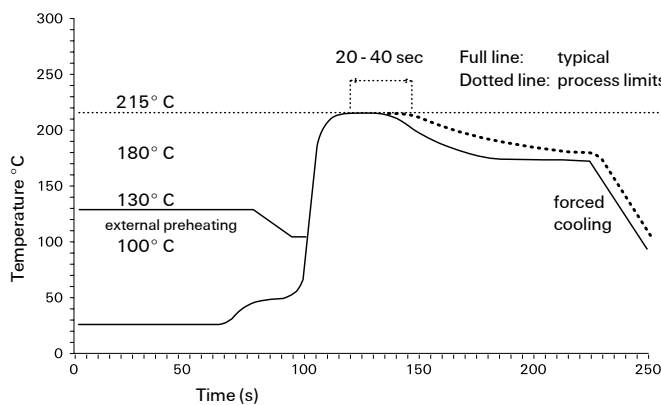
General data	
Operate time at $U_{nom}$ typ. / max.	1 ms / 2 ms
Reset time (latching) at $U_{nom}$ , typ. / max.	1 ms / 2 ms
Release time without diode in parallel (non-latching), typ. / max.	0.4 ms / 1 ms
Release time with diode in parallel (non-latching), typ. / max.	1.2 ms / 2 ms
Bounce time at closing contact, typ. / max.	1 ms / 3 ms
Maximum switching rate without load	200 operations/s
Ambient temperature	-40° C ... +70° C, +85° C on request
Thermal resistance	< 130 K/W
Maximum permissible coil temperature	85° C
Vibration resistance (function)	20 G, 200 to 2000 Hz 40 G, 10 to 200 Hz
Shock resistance, half sinus, 11 ms	50 G (function)
Degree of protection / Environmental protection	immersion cleanable, IP 67 / RT III
Needle flame test	application time 20 s, burning time < 15 s
Mounting position	any
Processing information	Ultrasonic cleaning possible
Weight (mass)	max. 2 g
Resistance to soldering heat	260° C / 10 s

All data refers to 23° C unless otherwise specified.

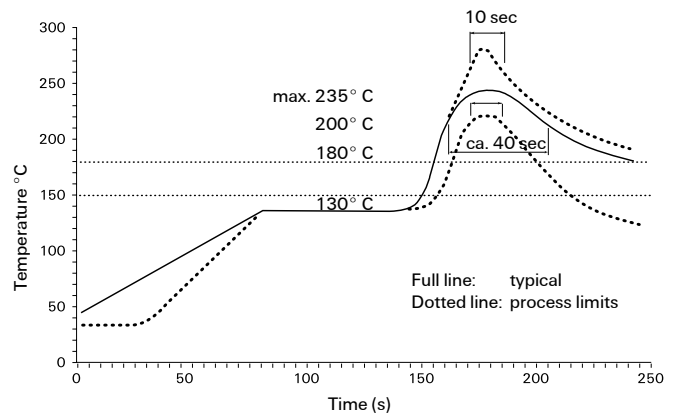
## Recommended soldering conditions

Soldering conditions according CECC 00802

Note: Internal relay temperature should not exceed 210° C



Vapor Phase Soldering: Temperature/Time Profile (Lead Temperature)

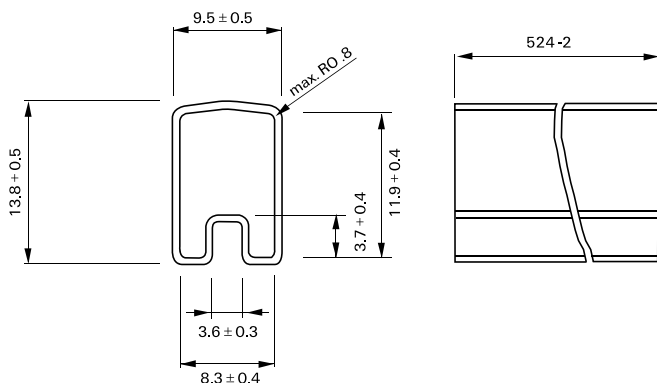


Infrared Soldering: Temperature/Time Profile (Lead Temperature)

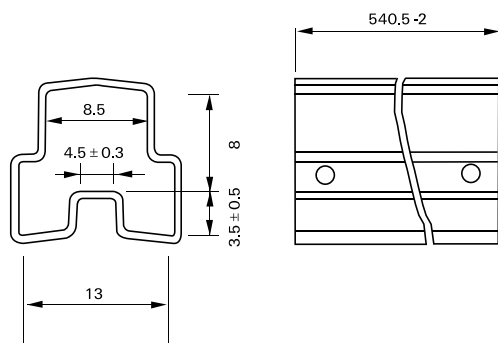
Packing

Dimensions in mm

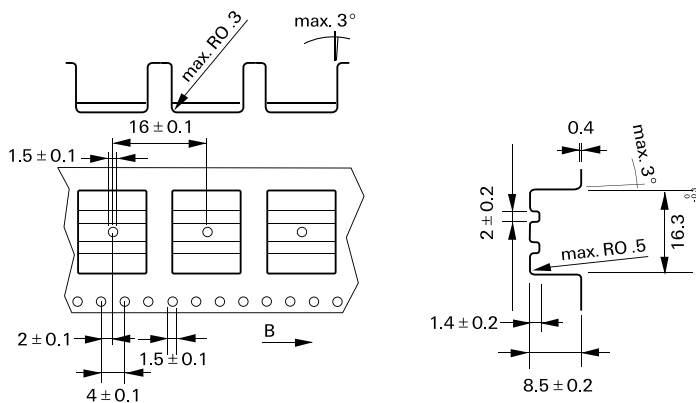
Tube for THT version - 40 relays per tube, 2000 relays per box



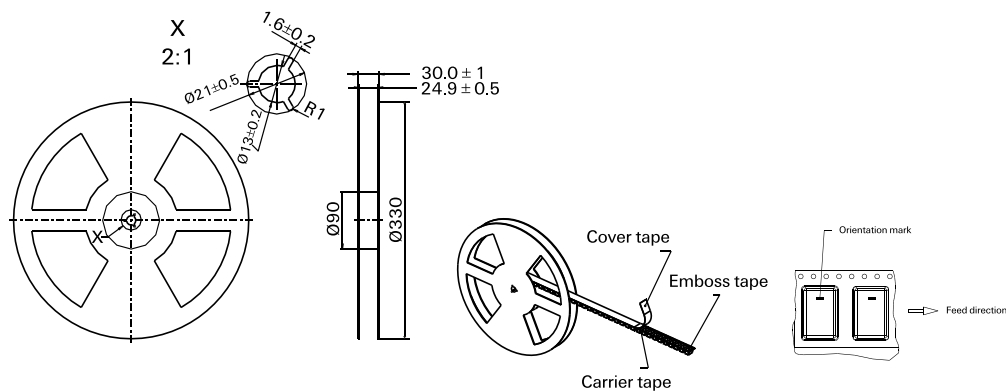
Tube for SMT version - 40 relays per tube 2000 relays per box



Tape and reel for SMT version - 480 relays per reel



Reel dimension



## Ordering Information

Relay Code Tube packing	Tyco Part Number	Relay Code Tube packing	Tyco Part Number
V23026A1001B201	0-1393774-1	V23026D1021B201	3-1393774-7
V23026A1002B201	0-1393774-8	V23026D1022B201	3-1393774-8
V23026A1004B201	1-1393774-2	V23026D1024B201	3-1393774-9
V23026A1006B201	1-1393774-7	V23026D1026B201	2-1393774-9
V23026B1101B201	3-1393774-4	V23026E1101B201	4-1393774-1
V23026B1102B201	3-1393774-5	V23026E1102B201	4-1393774-2
V23026B1106B201	0-1393775-3	V23026E1106B201	0-1393777-3
V23026C1051B201	2-1393774-0	V23026F1051B201	1-1393776-0
V23026C1052B201	2-1393774-1	V23026F1052B201	4-1393774-3
V23026C1054B201	2-1393774-4		
V23026C1056B201	2-1393774-6		

## Tape &amp; reel packing

V23026D1021B201	0-1393776-3
V23026D1022B201	0-1393776-4
V23026D1024B201	0-1393776-7
V23026D1026B201	0-1393776-8
V23026E1101B201	0-1422015-6
V23026E1102B201	0-1393776-9

## Middle block of relay code

V23026-xyyy-B301

xx: See table below

yyy: See coil table on page 4

xx	Description
A1	THT, non latching
B1	THT, latching, 2 coils
C1	THT, latching, 1 coil
D1	SMT, non latching
E1	SMT, latching, 2 coils
F1	SMT, latching, 1 coil

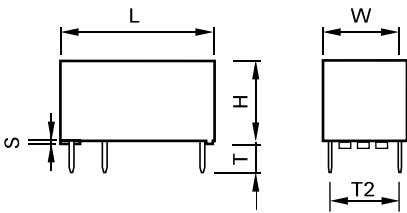


Option: asymmetrical coil pinning

This supplementary data sheet refers to the basic data sheet of the P1 relay series (V23026) with following additions:

- Coil terminals are placed asymmetrically between contact terminals
- Only non latching, through hole types available
- All technical data are equivalent to the standard versions

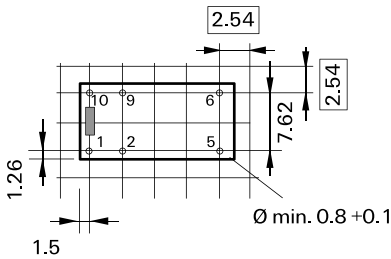
Dimensions



V23026-A2xxx-B201		
	mm	inch
L	13.0 ± 0.1	0.512 ± 0.004
W	7.6 ± 0.1	0.299 ± 0.004
H	6.9 - 0.2	0.272 - 0.008
T	3.5 - 0.2	0.138 - 0.008
T2	5.08 ± 0.15	0.200 ± 0.006
S	0.3 ± 0.1	0.012 ± 0.004

Mounting hole layout

View onto the component side of the PCB

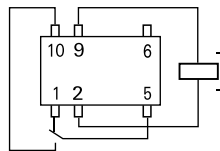


Terminal assignment

Relay - top view

Contact release condition, coil polarity to set the relay

Non-latching type, not energized condition



Coil Data (values at 23°C)

Nominal voltage $U_{nom}$	Operate/set voltage range		Release/ reset voltage Minimum	Nominal power consumption	Resistance	Coil number
	Minimum voltage $U_I$	Maximum voltage $U_{II}$				
Vdc	Vdc	Vdc	Vdc	mW	$\Omega / \pm 10\%$	

non-latching, 1 coil

V23026-  
A2xxx-B201

1.5	1.13	4.5	0.15	65	36	007
3	2.25	8.80	0.30	65	137	006
5	3.75	14.50	0.50	65	370	001
9	6.75	25.5	0.90	65	1165	005
12	9.00	35.00	1.20	65	2250	002
15	11.25	42.00	1.50	65	3100	003
24	18.00	50.00	2.40	130	4500	004

## IM Relays

4<sup>th</sup> generation slim line – low profile polarized 2 c/o telecom relay with bifurcated contacts, available as non latching or latching relay with 1 coil. Nominal voltage range from 1.5... 24 V, coil power consumption of 140... 200 mW, latching relays with 1 coil 100 mW. The IM relay is available as through hole and surface mount type (J-Legs and Gull Wings) and capable to switch loads up to 60 W/62,5 VA. Dielectric strength fulfills the Bellcore requirements according GR 1089 (2,5 kV – 2 / 10  $\mu$ s) and FCC part 68 (1,5 kV – 10 / 160  $\mu$ s). The IM relay is CECC/IECQ approved and certified in accordance with IEC/EN 60950 and UL1950. Dimensions approx. 10 x 6 mm board space and 5,65 mm height.

## P2 Relays

3<sup>rd</sup> generation polarized 2 c/o telecom relay with bifurcated contacts, available as non latching or latching relay with 1 or 2 coils. Nominal voltage range from 3 ... 24 V, coil power consumption 140 mW, latching relays with 1 coil 70 mW. The P2 Relay is available as through hole or surface mount type and capable to switch currents up to 5 A. Dielectric strength fulfills the Bellcore requirements according GR 1089 (2,5 kV – 2 / 10  $\mu$ s) and FCC part 68 (1,5 kV – 10 / 160  $\mu$ s). Dimensions approx. 15 x 7,5 mm board space and 10 mm height.

## FX Relays

3<sup>rd</sup> generation polarized 2 c/o telecom relay with bifurcated contacts, available as non latching or latching relay with 1 coil. Nominal voltage range from 3 ... 48 V, coil power consumption of 80 ... 260 mW for the high sensitive version, 140... 300 mW for the standard version, latching relays with 1 coil 100 mW. The FX2 relay is available as through hole type and capable to switch loads up to 60 W/62,5 VA. Dielectric strength fulfills the Bellcore requirements according GR 1089 (2,5 kV – 2 / 10  $\mu$ s) and FCC part 68 (1,5 kV – 10 / 160  $\mu$ s). The FX2 is CECC/IECQ approved and certified in accordance with IEC/EN 60950 and UL1950. Dimensions approx. 15 x 7,5 mm board space and 10,7 mm height.

## FT2 / FU2 Relays

3<sup>rd</sup> generation non polarized, non latching 2 c/o telecom relay with bifurcated contacts. Nominal voltage range from 3 ... 48 V, coil power consumption 200 ... 300 mW. Most sensitive 48 V relay. Available as through hole and surface mount type. Dielectric strength fulfills the Bellcore requirements according GR 1089 (2,5 kV – 2 / 10  $\mu$ s) and FCC part 68 (1,5 kV – 10 / 160  $\mu$ s). The FT2/FU2 is CECC/IECQ approved and certified in accordance with IEC/EN 60950 and UL1950. Dimensions approx. 15 x 7,5 mm board space and 10 mm height.

## FP1 Relays

3<sup>rd</sup> generation polarized 2 c/o telecom relay with bifurcated contacts, available as non latching or latching relay with 1 or 2 coils. Nominal voltage range from 3 ... 48 V, coil power consumption of 80 ... 260 mW for the high sensitive version, 140... 300 mW for the standard version, latching relays with 1 coil 100 mW. The FP1 Relay is available as through hole type and capable to switch loads up to 30 W/62,5 VA. Dielectric strength fulfills FCC part 68 (1,5 kV – 10 / 160  $\mu$ s). The FP2 is CECC/IECQ approved. Dimensions approx. 14 x 9 mm board space and 5 mm height.

## MT2 / MT4

2<sup>nd</sup> generation non polarized, non latching 2 c/o and 4 c/o telecom and signal relay with bifurcated contacts. Nominal voltage range from 4.5 ... 48 V, coil power consumption 150/200/300/400 and 550 mW, and 300 mW (MT4). Dielectric strength fulfills the requirements according FCC part 68 (1,5 kV – 10 / 160  $\mu$ s) for both and the Bellcore requirements according GR 1089 (2,5 kV – 2 / 10  $\mu$ s) the MT4 only. Dimensions MT2 approx. 20 x 10 mm board space and 11 mm height, MT4 approx. 20 x 15 mm board space and 11 mm height.

## D2n Relays

2<sup>nd</sup> generation non polarized 2 c/o relay for telecom and various other applications. Nominal voltage range from 3 ... 48 V, coil power consumption from 150 ... 500 mW. The D2n relay is capable to switch currents up to 3 A. Dielectric strength fulfills the requirements according FCC part 68 (1,5 kV – 10 / 160  $\mu$ s). Dimensions approx. 20 x 10 mm board space and 11,5 mm height.

## P1 Relays

Extremely sensitive, polarized 1 c/o relay with bifurcated contacts for a wide range of applications, available as non latching or latching relay with 1 or 2 coils. Nominal voltage range from 3 ... 24 V, coil power consumption 65 mW, latching relays with 1 coil 30 mW. The P1 relay is available as through hole or surface mount type and capable to switch currents up to 1 A. Dielectric strength fulfills the requirements according FCC part 68 (1,5 kV – 10 / 160  $\mu$ s). Dimensions approx. 13 x 7,6 mm board space and 7 mm height for THT or 8 mm height for SMT version.

## W11 Relays

Low cost, non polarized 1 c/o relay for various applications. Nominal voltage range from 3 ... 24 V, coil power consumption 450 mW, sensitive versions 200 mW. The W11 relay is capable to switch currents up to 3 A. Dielectric strength 1000 Vrms. Dimensions approx. 15,6 x 10,6 mm board space and 11,5 mm height.

## Reed Relays

High sensitive, non polarized relay for telecom and various other applications, available with 1 n/o, 2 n/o or 1 c/o contacts. Nominal voltage range from 5 ... 24 V, coil power consumption 50...280 mW for 1 n/o and 125 ... 280 mW for 2 n/o or 1 c/o versions. Reedrelays are available in DIP or SIL housing and capable to switch currents up to 0,5 A. Integrated diode and/or electrostatic shield optional. Dielectric strength 1500 Vdc. Dimensions approx. 19,3 x 7 mm board space and 5 ... 7,5 mm height for DIP or 19,8 x 5 mm board space and 7,8 mm height for SIL version.

## Cradle Relays

Extremely reliable and mature relay family of 1<sup>st</sup> generation for various signal switching applications. Available as non polarized, polarized / latching and relay with AC coil. The benefit is the possibility of combining various contact sets from 1 up to 6 poles, single and bifurcated contacts, different contact materials with a coil voltage range from 1,5 Vdc to 220 Vac. Cradle relays are available as dust protected and hermetically sealed versions, with plug in or solder terminals and are capable to switch currents up to 5 A. Forcibly guided (linked) contact sets optional. Dielectric strength 500 Vrms. Dimensions from approx. 19 x 24 to 19x35 mm board space and 30 mm height.

## Other Relays

We offer a variety of different relay families for maintenance and replacement purposes. These relays are up to 60 years old now, such as Card Relay SN (V23030 / V23031 series), Small General Purpose Relay (V23006 series), Small Polarized Relay (V23063 ... V23067 and V23163 ... V23167 series). Accessories like sockets, hold down springs, etc. optional.

## HF3 Relay

High performance low cost RF relay with excellent RF characteristics. Available with an impedance of 50 and 75 Ohm. Suitable for frequencies up to 3 GHz. Actually smallest RF relay available combining small size, excellent RF performance and SMD solderability. Available as non latching or latching relay with 1 or 2 coils and a nominal coil voltage range from 3 ... 24 V, coil power consumption 140 mW, latching relays with 1 coil 70 mW. Dimensions 14,6 x 7,3 x 10 mm.



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