

## The Best Relaytion



## MT2 Relay



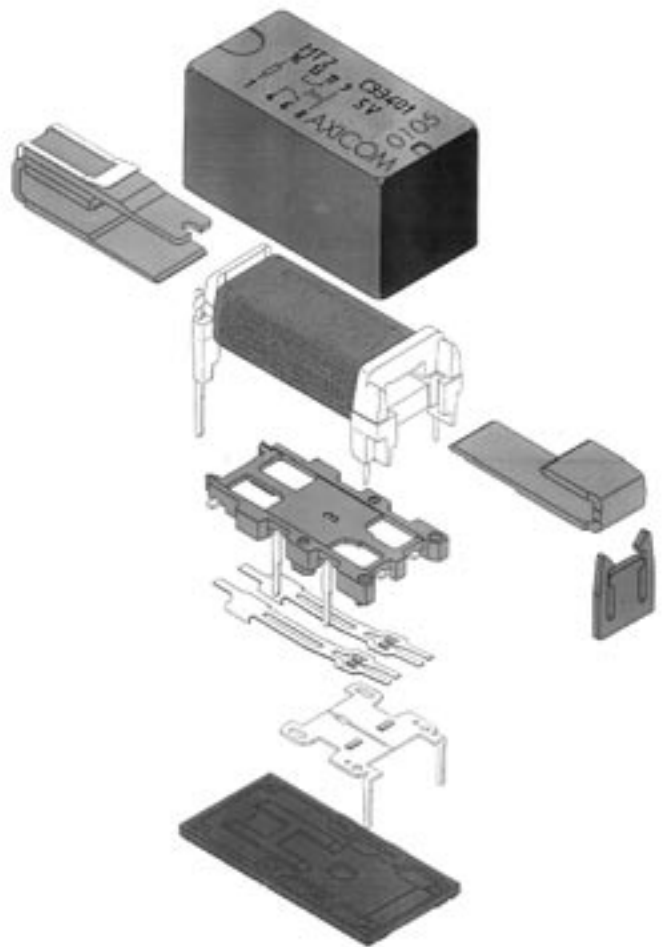
2 pole telecom/signal relay  
Through Hole Type (THT)  
Non-polarized, non-latching 1 coil

## Features

- Telecom/signal relay (dry circuit, test access, ringing)
- Slim line 20 x 10 mm, 0.795 x 0.393 inch
- Switching current 2 A
- 2 changeover contacts (2 form C / DPDT)
- Bifurcated contacts
- Meets FCC Part 68 and ITU-T K20

## Typical applications

- Communications equipment  
Linecard application – analog, ISDN, xDSL  
PABX  
Voice over IP
- Office and business equipment
- Measurement and control equipment
- Consumer electronics
- Set top boxes, HiFi
- Medical equipment
- Automotive Equipment



UL 508 File No. E 111441



IEC 61811-52:02  
(QC160504)

## European Directive conformance:

MT2 relay product conformance according to:

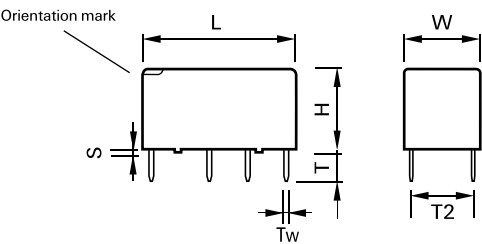
- Directive 2000/53/EC: ELV (End of Life of Vehicles)
- Directive 2002/95/EC: ROHS (Restrictions of the use of certain hazardous substances in electrical and electronic equipment)

Compliance is evidenced by written declaration from all raw material suppliers.

Tyco Electronics AXICOM only has responsibility for the proper processing of these materials.

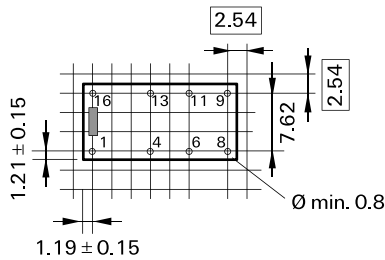
Confirmation is valid for date codes  $\geq$  0416

THT Version



Mounting hole layout

View onto the component side of the PCB  
(top view)

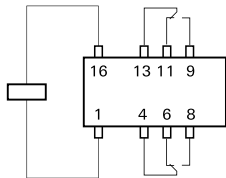


Basic grid 2.54 mm

Terminal assignment

Relay - top view

non-latching 1 coil  
release condition



Dimension

|    | THT               |                       |
|----|-------------------|-----------------------|
|    | mm                | inch                  |
| L  | 20.2 + 0.05/-0.02 | 0.795 + 0.002/-0.0008 |
| W  | 10 + 0.05/-0.02   | 0.393 + 0.002/-0.0008 |
| H  | 11+0.1/-0.2       | 0.433 + 0.004/-0.008  |
| T  | 3.1 ± 0.3         | 0.122 ± 0.011         |
| T1 | N/A               | N/A                   |
| T2 | 7.62 ± 0.15       | 0.3 ± 0.005           |
| S  | 0.55              | 0.021                 |
| Tw | 0.5               | 0.020                 |

## Coil Data (values at 23 °C)

## Ordering Information

| Nominal voltage $U_{nom}$ | Operate/set voltage range        |                                  | Release/reset voltage Minimum | Coil power | Coil Resistance      | Relay code | Tyco part number |
|---------------------------|----------------------------------|----------------------------------|-------------------------------|------------|----------------------|------------|------------------|
| Vdc                       | Minimum voltage $U_{min}$<br>Vdc | Maximum voltage $U_{max}$<br>Vdc | Vdc                           | mW         | $\Omega / \pm 10 \%$ |            |                  |

High sensitive version (150 mW)  
non-latching 1 coil

|     |      |       |      |     |       |         |             |
|-----|------|-------|------|-----|-------|---------|-------------|
| 3   | 2.1  | 8.1   | 0.30 | 150 | 60    | C 93400 | 1-1462001-2 |
| 4.5 | 3.2  | 12.2  | 0.45 | 150 | 136   | C 93406 | 2-1462000-2 |
| 5   | 3.6  | 13.5  | 0.50 | 150 | 168   | C 93401 | 0-1462000-1 |
| 6   | 4.3  | 16.2  | 0.60 | 150 | 240   | C 93427 | 5-1462000-6 |
| 9   | 6.4  | 24.3  | 0.90 | 150 | 544   | C 93405 | 2-1462000-0 |
| 12  | 8.6  | 32.4  | 1.20 | 150 | 968   | C 93402 | 0-1462000-7 |
| 24  | 17.1 | 64.8  | 2.40 | 150 | 3872  | C 93403 | 1-1462000-3 |
| 48  | 33.1 | 129.6 | 4.80 | 150 | 15468 | C 93404 | 1-1462000-8 |

Sensitive version (200 mW)  
non-latching 1 coil

|     |      |       |      |     |       |         |             |
|-----|------|-------|------|-----|-------|---------|-------------|
| 3   | 2.0  | 7.0   | 0.30 | 200 | 45    | C 93414 | 1-1462001-1 |
| 4.5 | 2.9  | 10.5  | 0.45 | 200 | 101   | C 93415 | 3-1462000-0 |
| 5   | 3.3  | 11.6  | 0.50 | 200 | 125   | C 93416 | 3-1462000-1 |
| 6   | 3.9  | 14.0  | 0.60 | 200 | 180   | C 93428 | 5-1462000-7 |
| 9   | 5.9  | 21.0  | 0.90 | 200 | 405   | C 93417 | 3-1462000-6 |
| 12  | 7.8  | 28.0  | 1.20 | 200 | 720   | C 93418 | 3-1462000-7 |
| 24  | 15.6 | 59.9  | 2.40 | 200 | 2880  | C 93419 | 4-1462000-1 |
| 48  | 31.2 | 112.0 | 4.80 | 200 | 11520 | C 93420 | 4-1462000-5 |

Sensitive version (300 mW)  
non-latching 1 coil

|     |      |      |      |     |      |         |             |
|-----|------|------|------|-----|------|---------|-------------|
| 4.5 | 3.1  | 8.9  | 0.45 | 300 | 73   | C 93433 | 6-1462000-6 |
| 5   | 3.4  | 9.9  | 0.50 | 300 | 90   | C 93434 | 6-1462000-8 |
| 12  | 8.25 | 23.6 | 1.20 | 300 | 515  | C 93412 | 2-1462000-6 |
| 24  | 16.5 | 47.3 | 2.40 | 300 | 2060 | C 93435 | 7-1462000-0 |
| 48  | 32.5 | 54.6 | 4.80 | 300 | 8240 | C 93436 | 7-1462000-2 |

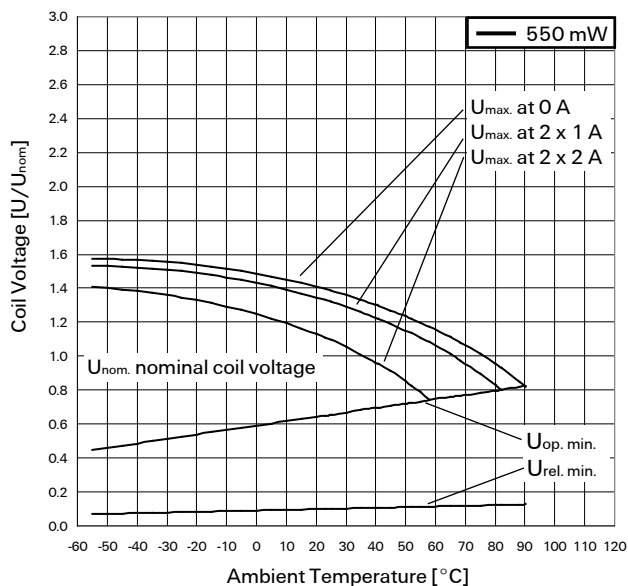
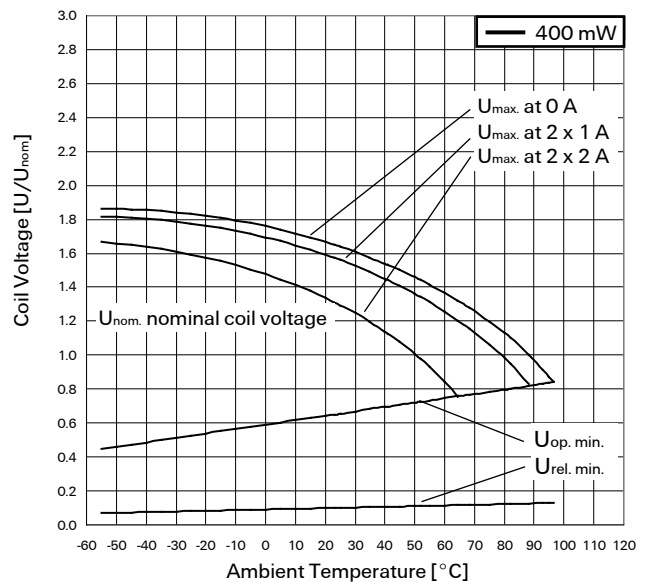
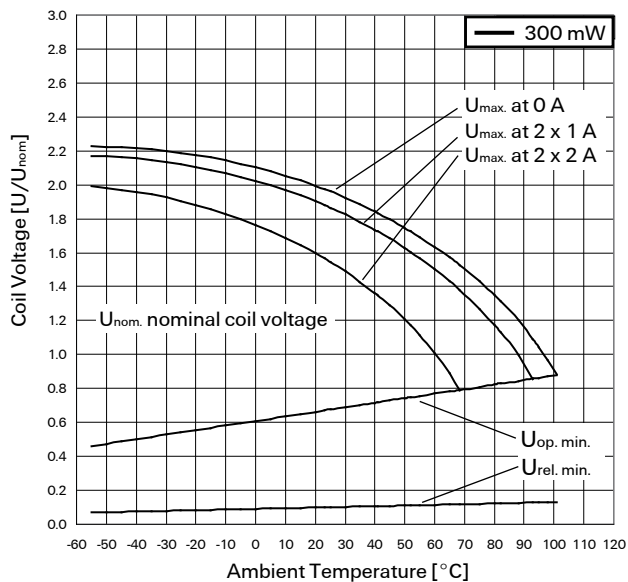
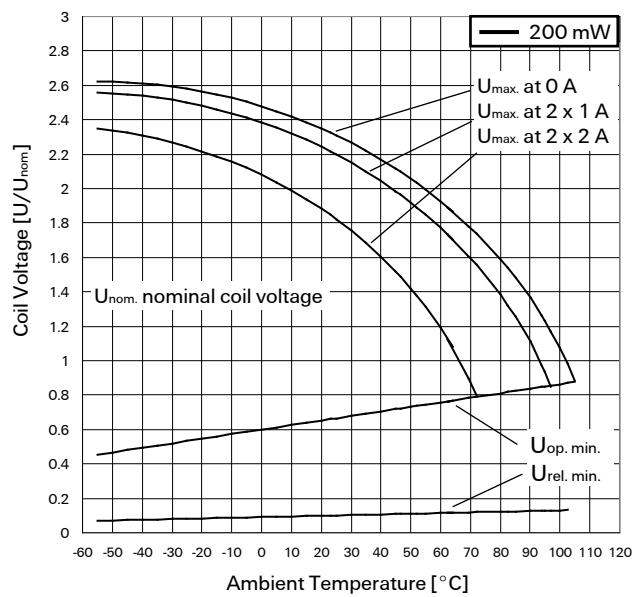
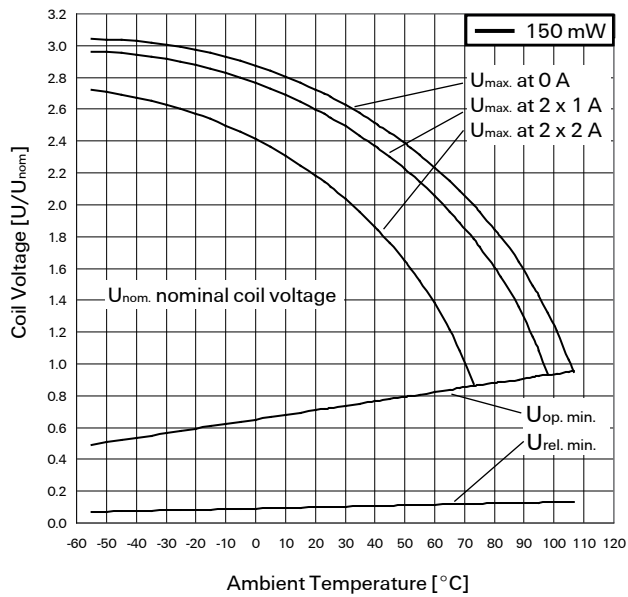
Standard version (400 mW)  
non-latching 1 coil

|     |      |      |      |     |      |         |             |
|-----|------|------|------|-----|------|---------|-------------|
| 4.5 | 2.9  | 8.9  | 0.45 | 400 | 50   | C 93421 | 4-1462000-7 |
| 5   | 3.3  | 9.9  | 0.50 | 400 | 63   | C 93422 | 4-1462000-8 |
| 6   | 3.9  | 11.8 | 0.60 | 400 | 90   | C 93429 | 5-1462000-8 |
| 9   | 5.9  | 17.7 | 0.90 | 400 | 203  | C 93423 | 5-1462000-0 |
| 12  | 7.8  | 23.6 | 1.20 | 400 | 360  | C 93424 | 5-1462000-1 |
| 24  | 15.6 | 47.3 | 2.40 | 400 | 1440 | C 93425 | 5-1462000-3 |
| 48  | 31.2 | 94.6 | 4.80 | 400 | 5760 | C 93426 | 5-1462000-5 |

Standard version (550 mW)  
non-latching 1 coil

|     |      |      |      |     |      |         |             |
|-----|------|------|------|-----|------|---------|-------------|
| 4.5 | 2.9  | 6.3  | 0.45 | 550 | 36   | C 93438 | 7-1462000-7 |
| 5   | 3.3  | 7.0  | 0.5  | 550 | 45   | C 93450 | 8-1462000-5 |
| 6   | 3.9  | 8.4  | 0.60 | 550 | 66   | C 93437 | 7-1462000-6 |
| 12  | 7.8  | 16.8 | 1.20 | 550 | 280  | C 93432 | 6-1462000-2 |
| 24  | 15.6 | 33.6 | 2.40 | 550 | 1050 | C 93431 | 6-1462000-1 |
| 48  | 31.2 | 67.2 | 4.80 | 550 | 4100 | C 93430 | 5-1462000-9 |

## Coil operating range



$U_{nom}$  = Nominal coil voltage

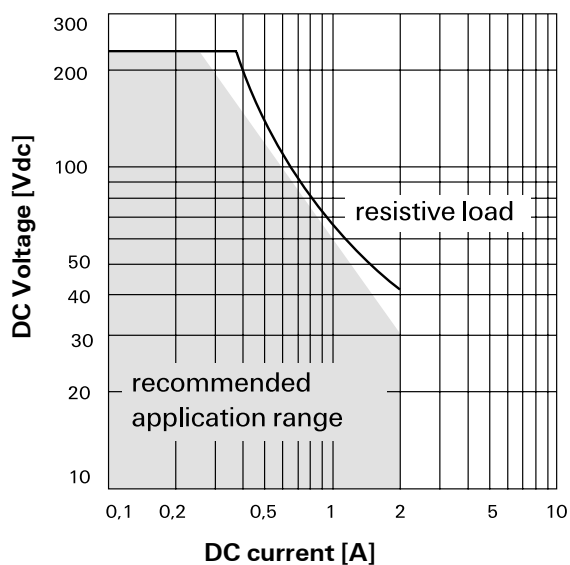
$U_{max}$  = Upper limit of the operative range of the coil voltage (limiting voltage) when coils are continuously energized

$U_{op. min.}$  = Lower limit of the operative range of the coil voltage (reliable operate voltage)

$U_{rel. min.}$  = Lower limit of the operative range of the coil voltage (reliable release voltage)

**Contact Data**

|                                                                 |                                                                                                                                      |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Number of contacts and type                                     | 2 changeover contacts                                                                                                                |
| Contact assembly                                                | Bifurcated contacts                                                                                                                  |
| Contact material                                                | Silver-nickel, gold-covered                                                                                                          |
| Limiting continuous current at max. ambient temperature         | 2 A                                                                                                                                  |
| Maximum switching current                                       | 2 A                                                                                                                                  |
| Maximum switching voltage                                       | 220 Vdc<br>250 Vac                                                                                                                   |
| Maximum switching capacity                                      | 60 W, 62.5 VA                                                                                                                        |
| Thermoelectric potential                                        | < 10 $\mu$ V                                                                                                                         |
| Minimum switching voltage                                       | 100 $\mu$ V                                                                                                                          |
| Initial contact resistance / measuring condition: 10 mA / 20 mV | < 70 m $\Omega$                                                                                                                      |
| Electrical endurance                                            | Contact application 0 (30 mV/ 10 mA)<br>Cable load open end<br>Resistive load    150 V / 0.2 A - 30 W<br>24 V / 1.25 A - 30 W        |
| Mechanical endurance                                            | typ. 10 <sup>8</sup> operations                                                                                                      |
| UL contact ratings                                              | 220 Vdc / 0.24 A - 60 W<br>125 Vdc / 0.24 A - 30 W<br>250 Vac / 0.25 A - 62.5 VA<br>125 Vac / 0.5 A - 62.5 VA<br>30 Vdc / 2 A - 60 W |

**Max. DC load breaking capacity****Insulation**

|                                                                   |                            |
|-------------------------------------------------------------------|----------------------------|
| Insulation resistance at 500 Vdc                                  | > 10 <sup>9</sup> $\Omega$ |
| Dielectric test voltage (1 min)                                   |                            |
| between coil and contacts                                         | 1050 Vrms                  |
| between adjacent contact sets                                     | 750 Vrms                   |
| between open contacts                                             | 750 Vrms                   |
| Surge voltage resistance                                          |                            |
| according to FCC 68 (10 / 160 $\mu$ s) and IEC (10 / 700 $\mu$ s) |                            |
| between coil and contacts                                         | 1500 V                     |
| between adjacent contact sets                                     | 1500 V                     |
| between open contacts                                             | 1500 V                     |

| High Frequency Data             |                       |
|---------------------------------|-----------------------|
| Capacitance                     |                       |
| between coil and contacts       | max. 4 pF             |
| between adjacent contact sets   | max. 2 pF             |
| between open contacts           | max. 2 pF             |
| RF Characteristics              |                       |
| Isolation at 100 / 900 MHz      | - 31.8 dB / - 14.2 dB |
| Insertion loss at 100 / 900 MHz | - 0.02 dB / - 0.97 dB |
| V.S.W.R. at 100 / 900 MHz       | 1.03 / 1.31           |

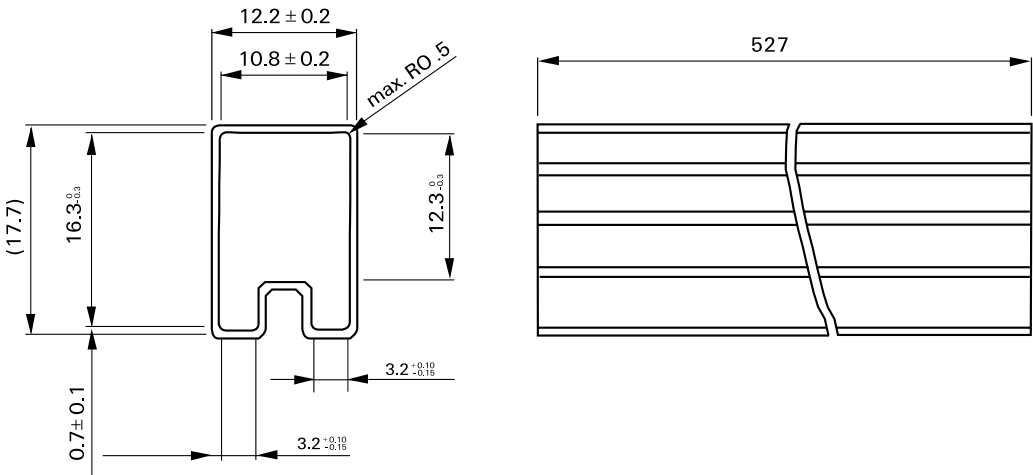
| General data                                                       |                                        |
|--------------------------------------------------------------------|----------------------------------------|
| Operate time at $U_{nom}$ typ. / max.                              | 4 ms / 5 ms                            |
| Release time without diode in parallel (non-latching), typ. / max. | 1 ms / 3 ms                            |
| Release time with diode in parallel (non-latching), typ. / max.    | 4 ms / 6 ms                            |
| Bounce time at closing contact, typ. / max.                        | 1 ms / 5 ms                            |
| Maximum switching rate without load                                | 50 operations/s                        |
| Ambient temperature                                                | -55° C ... +85° C                      |
| Thermal resistance                                                 | < 85 K/W                               |
| Maximum permissible coil temperature                               | 115° C                                 |
| Vibration resistance (function)                                    | 10 G                                   |
|                                                                    | 10 to 500 Hz                           |
| Shock resistance, half sinus, 11 ms                                | 10 G / 30 G (function)                 |
|                                                                    | 30 G (damage)                          |
| Degree of protection                                               | immersion cleanable, IP 67             |
| Needle flame test                                                  | application time 10 s,                 |
| Mounting position                                                  | any                                    |
| Processing information                                             | Ultrasonic cleaning is not recommended |
| Weight (mass)                                                      | max. 5 g                               |
| Terminal surface                                                   | SnCu 0.7                               |
| Resistance to soldering heat                                       | 260° C / 10 s                          |

All data refers to 23° C unless otherwise specified.

# Packing

Dimensions in mm

Tube for THT version - 25 relays per stick, 1'000 relays per box



## 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 µs) and FCC part 68 (1,5 kV – 10 / 160 µs). The IM relay is CECC/IECQ approved and certified in accordance with IEC/EN 60950 and UL 1950. 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 µs) and FCC part 68 (1,5 kV – 10 / 160 µs). 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 µs) and FCC part 68 (1,5 kV – 10 / 160 µs). 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 µs) and FCC part 68 (1,5 kV – 10 / 160 µs). The FT2/FU2 is CECC/IECQ approved and certified in accordance with IEC/EN 60950 and UL 1950. 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 µs). 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 µs) for both and the Bellcore requirements according GR 1089 (2,5 kV – 2 / 10 µs) 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 µs). 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 µs). 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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