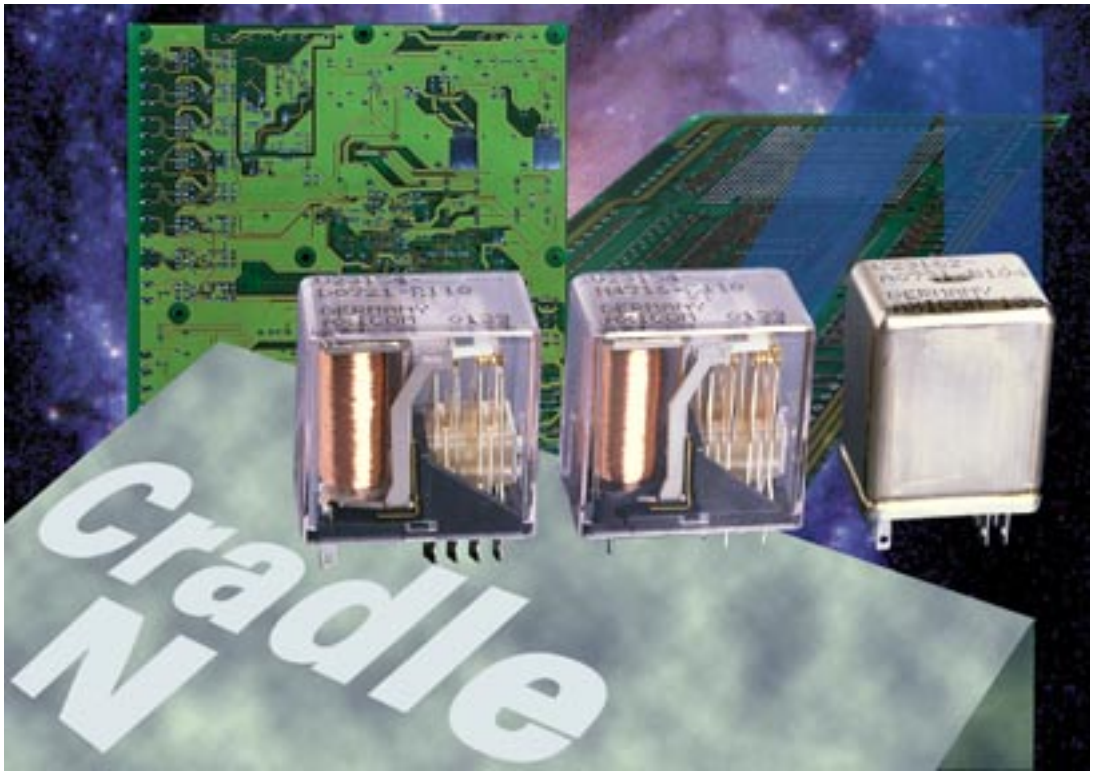
tyco Electronics

AXICOM

The Best Relaytion



Cradle Relay N

108-98012
Rev. B
EC-JM00-0009-03
ECOC: JM10
1. Aug. 04

PCB, hand solder or plug-in relays,
for DC operation,
non-polarized, non-latching

Features

- Multi purpose relay
- highly reliable
- great variety of contact arrangements and materials to meet specific applications
- Contacts for signal loads and currents up to 5 A
- AC and DC, latching and non-latching, coils operating voltage 1.5 V ... 125 V
- Sockets for easy and quick mounting of relays (see data sheet Accessories)

Typical applications

- Measurement and control equipment
- Press controls with high safety requirements (forcibly guided springs)
- Telecommunications

Versions

- Size I or II, depending on contact set
- Standard contact sets with max. 4 changeover, 2 break or 6 make contacts, special configurations on request
- Single or bifurcated contacts
- Hand solder terminals also for plug-in connection with screw fixing or PCB terminals
- Dust-protected with plastic cover, hermetically sealed with metal enclosure

European Directive conformance:

Cradle N 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 ≥ 0501

Version V23154-Mxxxx Size I and
V23154-Nxxxx Size II

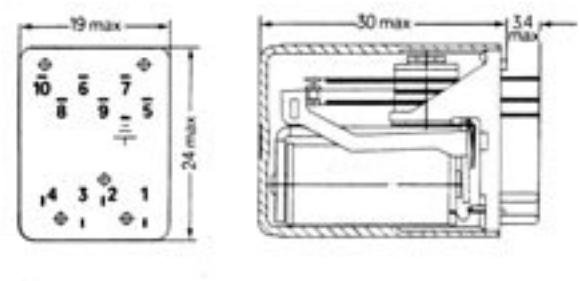
For printed circuit mounting

With or without earth terminal

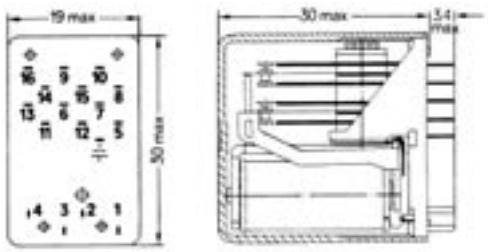
Dust-protected

Dimension drawing (in mm)

Size I

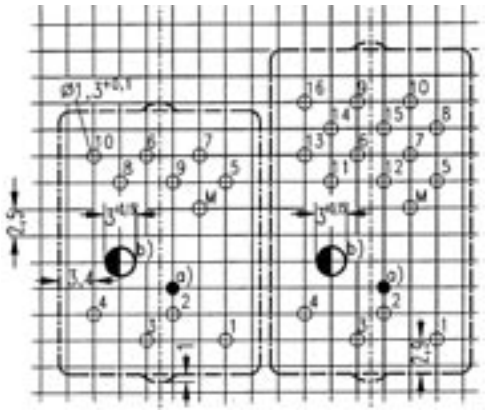


Size II



Mounting hole layout

View onto the component side of the PCB



M = Earth terminal

a) Hole for mechanical armature actuation, if required
b) Hole for socket mounting with screw M1.6,

Version V23154-C0xxx Size I and
V23154-D0xxx Size II

Hand solder terminals, silver-plated

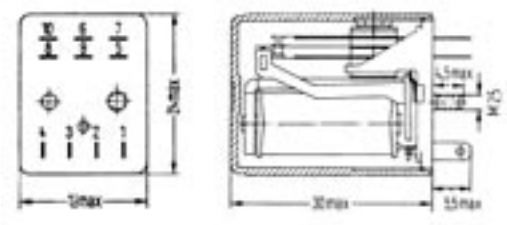
Also for plug-in connection
ans screw fixing

With earth terminal

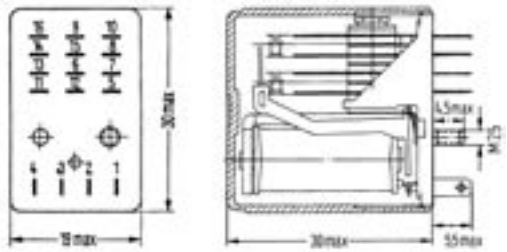
Dust-protected

Dimension drawing (in mm)

Size I



Size II



For sockets and hold-down springs see data sheet Accessories

Version V23162-A0xxx Size I and
V23162-B0xxx Size II

With hand solder terminals, silver-plated

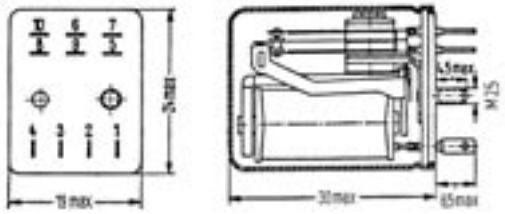
Also for plug-in connection
and screw fixing

With earth terminal

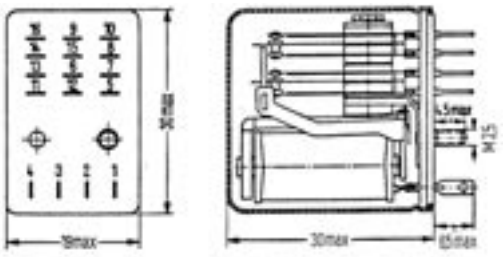
Hermetically sealed

Dimension drawing (in mm)

Size I



Size II



For sockets and hold-down springs see data sheet Accessories

Contact Data

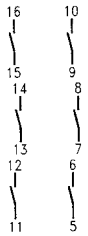
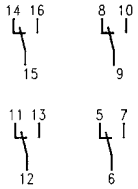
Ordering code block 3	B104/B110/ B112	B604/B610/ B612	C104/C110/ C112	C404/C410	F104 ... F107
Type of contact	max. 4 changeover contacts, 2 break contacts or 6 make contacts				
Contact assembly	single contacts		bifurcated contacts		single contacts
Contact material	silver, gold-flashed	gold F	silver, gold-flashed	gold F	silver, gold-flashed
Max. switching voltage	150 Vdc	36 Vdc	150 Vdc	36 Vdc	250 Vdc
	125 Vac	30 Vac	125 Vac	30 Vac	250 Vac
Max. switching current	2 A	0.2 A	2 A	0.2 A	5 A
Max. switching capacity	35 to 70 W see load limit curve page 7 50 VA	5 W 5 VA	35 to 70 W see load limit curve page 7 50 VA	5 W 5 VA	50 to 140 W see load limit curve page 7 500 VA
Max. continuous current at max. ambient temperature	2 A				5 A

Contact sets

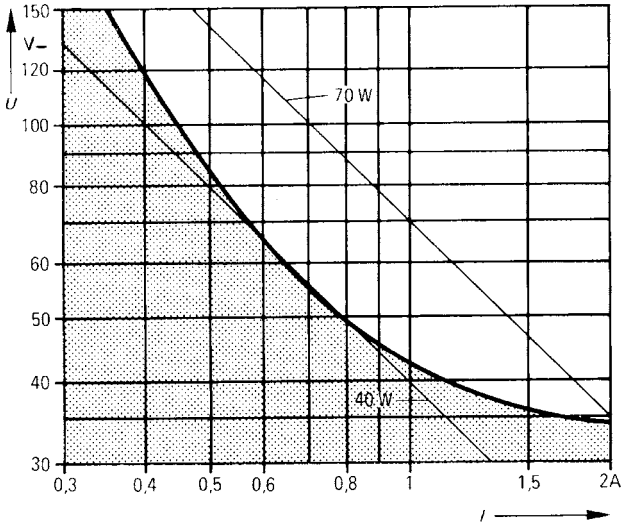
Size I

Number of contacts and type	2 changeover contacts		2 make contacts	2 break contacts	1 break 1 make contact
Symbols with base conncections coil I - + 3 — 2 coil II - + 4 — 1 Contacts in release condition, coil polarity to set the relay					
Contact assembly	single contacts	bifurcated contacts	single contacts		
Contact material silver, gold-flashed Ordering code block 3	B104	C104	F105	F107	F106
Contact material gold F Ordering code block 3	B604	C404			

Size II

Number of contacts and type	6 make contacts	4 changeover	2 changeover
Symbols with base conncections coil I - + 3 — 2 coil II - + 4 — 1 Contacts in release condition, coil polarity to set the relay			
Contact assembly	single contacts	bifurcated contacts	single contacts	bifurcated contacts	single contacts
Contact material silver, gold-flashed Ordering code block 3	B112	C112	B110	C 110	F 104
Contact material gold F Ordering code block 3	B612		B610	C 410	

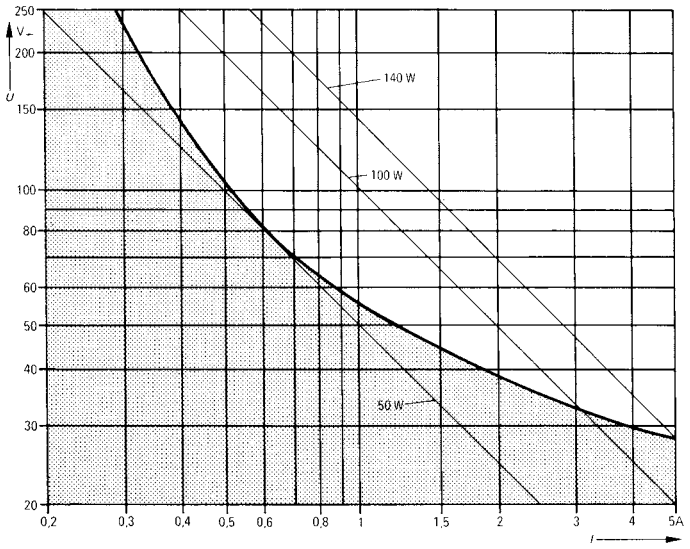
Load limit curve for contact sets B1xx and C1 xx



I = switching current
U = switching voltage

Safe breaking, no stationary arc
Contact material silver, gold-flashed

Load limit curve for contact sets F1xx



Safe breaking, no stationary arc
Contact material silver, gold-flashed

Coil Data

Nominal voltage	from 5 VDC to 125 VDC
Typical nominal power consumption, at 20"C	0.8 W
Class of the operative range acc to EN 61810-1 / IEC 61810-1 and VDE 0435 Part 201	2
Operating voltage (according to the coil type)	max. 98% of the nominal voltage

Coil version

Nominal voltage U_{nom} Vdc	Operating voltage range at 20° C Minimum voltage U_I Vdc				Maximum voltage U_{II} Vdc	Resistance at 20° C Ω	Coil number Ordering code block 2
	Conctact sets -B104/-B604/ -F105	-B110/-B112/-B610/ -612/-C104/-C404/ -F104/-F106/-F107	-C112	-C110 -C410			
5	1.8	2.5	3	3.7	7.2	28 ± 3	711
12	5.3	7.1	8.7	10.5	20	220 ± 22	717
24	11	14.5	18	22	40	890 ± 89	721
48	23	30	37	45	75	3200 ± 480	726
60	27	36	43	53	92	4700 ± 705	734
110	49	65	79	98	164	15000 ± 1500	735
125	61	81	99	122	190	20900 ± 3140	703

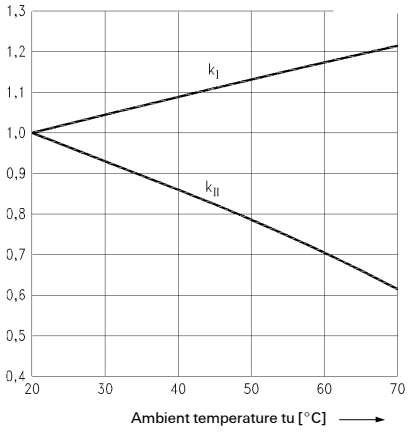
Terminals:
Coil with 1 winding
Start 4 End 1

Coil with 2 windings (upon request)
Start 3 End 2 for winding I
Start 4 End 1 for winding II

The minimum voltage U_I depends on the contact set and the ambient temperature, the maximum voltage U_{II} only depends on the ambient temperature.

Between minimum voltage $U_{I\,tamb}$ and operating voltage U a safety margin of approx. 20% is recommended.

$U_{I\,tamb}$ (1.2) $< U_I \leq U_{II\,tamb}$
$U_{I\,tamb} = U_I \cdot U_{20°C} \cdot k_{I\,tamb}$
$U_{II\,tamb} = U_{II\ 20°C} \cdot k_{II\,tamb}$
t_{amb} = Ambient temperature
U = Operating voltage
$U_{I\,tamb}$ = Minimum voltage at ambient temperature, t_{amb}
$U_{II\,tamb}$ = Maximum voltage at ambient temperature, t_{amb}
k_I and k_{II} = Factors



Instructions for impulse operation

The maximum voltage stated in the table (page 8) can be increased for impulse operation as follows:

$U_{II\ Impuls}$ = $U_{II\ tamb}$. q
$U_{II\ tamb}$ = Maximum continuous voltage at ambient temperature t_{amb}
q = Factor

The impulse voltage must not exceed 80% of the test voltage (winding/frame or winding/winding) or 2.5 times the value of the maximum voltage listed in the table (page 8).

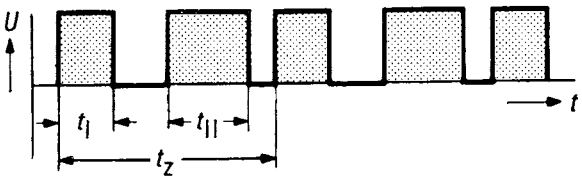
If $t_{ED} \leq 3$ s then $q = \sqrt{\frac{t_z}{t_{ED}}}$

If t_{ED} = Pulse width
t_2 = Cycle time
If t_{ED} = > 3 s the value of q must be obtained from the nomograph (next page).

Examples of various periodic pulse trains (energizing side)

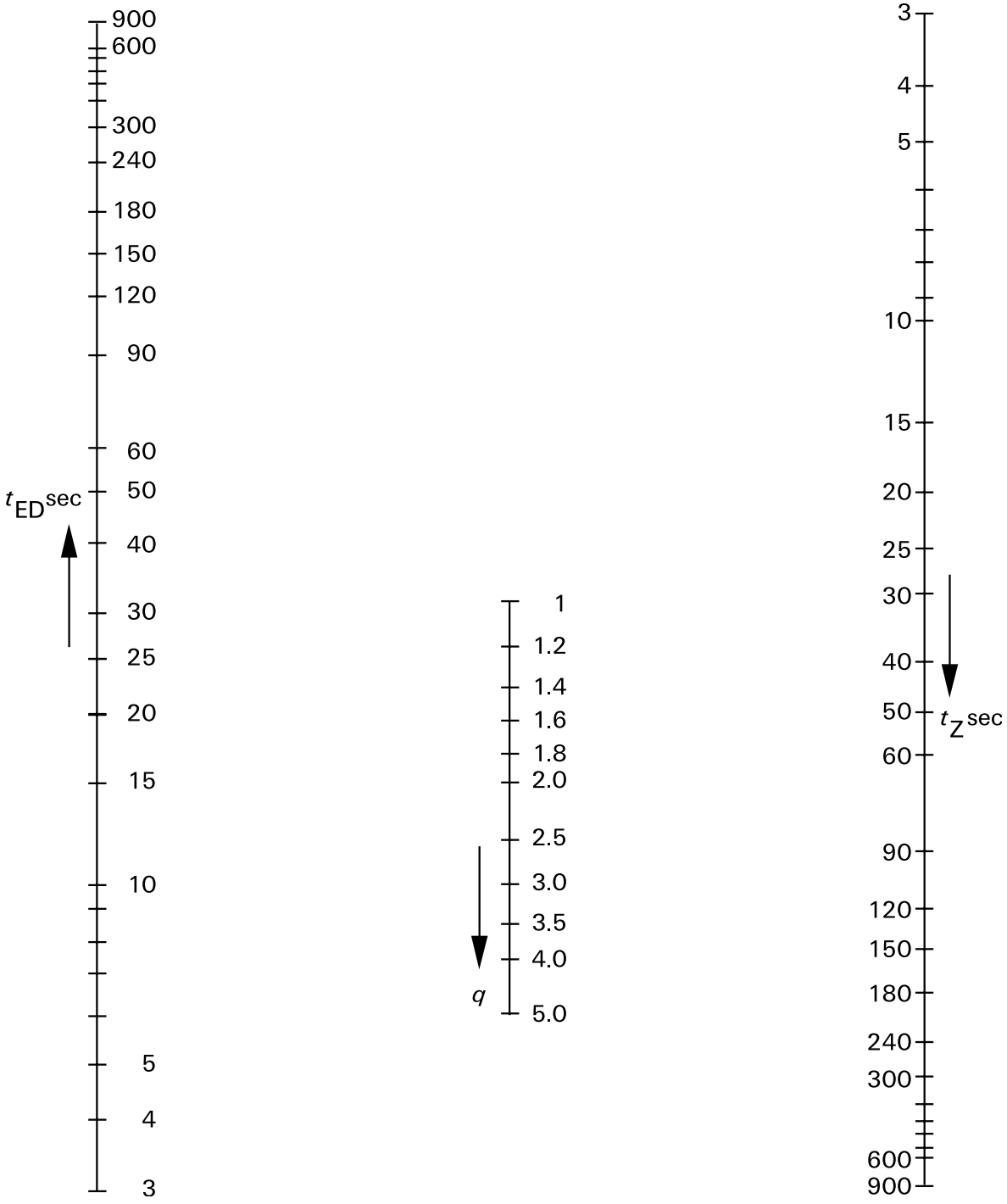
1. Periodic recurrence of one energizing pulse

2. Periodic recurrence of two unequal energizing pulses



t_{ED} = $t_I + t_{II}$
$t_I + t_{II}$ = Pulse widths within one cycle

Nomograph for determining factor *q*



General data

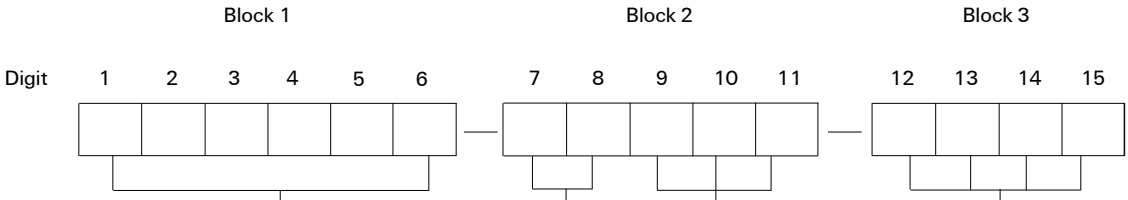
Ordering code block 3	B1xx	B6xx	C1xx	C4xx	F1xx
Operate time at U_{nom} and 20° C, typical	7.5 ms				
Reset time typical	3 ms				
Maximum switching rate without load	50 operations/s				10 operations/s
Ambient temperature range acc. to EN 61810-1 / IEC 61810-1 and VDE 0435 part 201	-40° C ... +70° C				
Thermal resistance	50 K/W				
Maximum temperature	100° C				
Continious thermal load	1.6 W				
Degree of protection acc. to EN 60529 / IEC 60529 / VDE 0470 part 1	dust-protected IP 30 or hermetically sealed IP 67				
Mechanical endurance	approx. 10^8 operations				approx. 10^7 operations
Mounting position	any				
Processing information	Ultrasonic cleaning should be avoided if possible or carried out only after consulting the manufacturer				

Weight		
V23154-C0/-MO	Size I	approx. 20 g
V23154-D0/-NO	Size II	approx. 25 g
V23162-A0	Size I	approx. 30 g
V23162-B0	Size II	approx. 35 g

Insulation

Test voltage (1 min)		
winding / frame	500 Vac_{rms}	500 Vac_{rms}
contact / contact	500 Vac_{rms}	1000 Vac_{rms}
contact / frame	500 Vac_{rms}	1000 Vac_{rms}
contact / coil	1000 Vac_{rms}	1500 Vac_{rms}

Ordering Code



Basic type number of cradle relay N
V23154 = dust-protected
V23162 = hermetically sealed

Relay type
A0 = Size I,
for plug-in and screw fixing, hand solder terminals tinned,
with earth terminal, hermetically sealed
B0 = Size II,
for plug-in and screw fixing, hand solder terminals tinned,
with earth terminal, hermetically sealed
C0 = Size I,
for plug-in and screw fixing, hand solder terminals silver-plated,
with earth terminal, dust-protected
D0 = Size II,
for plug-in and screw fixing, hand solder terminals silver-plated,
with earth terminal, dust-protected
M0 = Size I,
for printed circuit mounting, with earth terminal, dust-protected
N0 = Size II,
for printed circuit mounting, with earth terminal, dust-protected
M4 = Size I,
for printed circuit mounting, without earth terminal, dust-protected
N4 = Size II,
for printed circuit mounting, without earth terminal, dust-protected

Coil number
Versions see page 8

Contact set / type of contact
see page 6

Ordering example:
V23154-D0721-B110
Cradle relay N, size II, plug-in, dust-protected, with solder terminals, silver-plated, coil 24 Vdc,
4 changeover contact set, single contacts, contact material silver, gold-flashed, with earth terminal,

Note:
The ordering scheme enables a multitude of variations. However, not all variations are defined as construction specifications (ordering code) and thus in the current delivery program.

Ordering Information

Relay Code	Tyco Part Number	Relay Code	Tyco Part Number
V23154C 702F101	3-1393806-3	V23154D 719B110	5-1393808-6
V23154C 704B104	4-1393806-3	V23154D 719F104	6-1393808-2
V23154C 716B104	6-1393806-4	V23154D 720B110	6-1393808-5
V23154C 717B104	6-1393806-7	V23154D 720C110	7-1393808-0
V23154C 719B104	7-1393806-1	V23154D 720C410	7-1393808-3
V23154C 720B104	7-1393806-8	V23154D 720F104	7-1393808-6
V23154C 720C104	8-1393806-1	V23154D 720W 56	7-1393808-8
V23154C 720F106	8-1393806-3	V23154D 721B110	8-1393808-3
V23154C 721B104	8-1393806-6	V23154D 721B112	8-1393808-4
V23154C 721B604	8-1393806-7	V23154D 721B610	9-1393808-2
V23154C 721C104	8-1393806-8	V23154D 721C110	9-1393808-5
V23154C 721F105	9-1393806-1	V23154D 721F104	0-1393809-1
V23154C 722B104	9-1393806-4	V23154D 722B110	1-1393809-4
V23154C 726B104	0-1393807-6	V23154D 722F104	2-1393809-4
V23154D 421B110	3-1393807-7	V23154D 726B110	3-1393809-2
V23154D 421F104	4-1393807-4	V23154D 726F104	4-1393809-4
V23154D 703F104	0-1393808-4	V23154M 721B104	2-1393810-7
V23154D 704B110	0-1393808-6	V23154N 719B110	6-1393810-3

IM Relays

4th 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 UL1950. Dimensions approx. 10 x 6 mm board space and 5.65 mm height.

P2 Relays

3rd 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

3rd 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

3rd 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 UL1950. Dimensions approx. 15 x 7,5 mm board space and 10 mm height.

FP2 Relays

3rd 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 FP2 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

2nd 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 x15 mm board space and 11 mm height.

D2n Relays

2nd 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 x10 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 1c/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 1st 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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