

AXICOM

Telecom-, Signal and RF Relays

FT2/FU2 Relay

FT2/FU2 Relay

Disclaimer

While Tyco Electronics has made every reasonable effort to ensure the accuracy of the information in this datasheet, Tyco Electronics does not guarantee that it is error-free, nor does Tyco Electronics make any other representation, warranty or guarantee that the information is accurate, correct, reliable or current. Tyco Electronics reserves the right to make any adjustments to the information contained herein at any time without notice. Tyco Electronics expressly disclaims all implied warranties (and all express warranties, except as otherwise stated in this datasheet) regarding the information contained herein, including but not limited to any implied warranties or merchantability or fitness for a particular purpose. It is recommended that you test any new or replacement product before incorporating into a system.

The dimensions in this datasheet are for reference purpose only and are subject to change without notice. Specifications are subject to change without notice.



UL 508 File No. E 111441
UL 60950

IEC/EN60950

IEC Ref. Cert. No. 3268

Index

Dimensions	4
Coil Operating Range	5
Coil Data and Ordering Information	6
Contact Data	9
Insulation	10
General Data	10
Packing	12

FT2/FU2 Relay

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

ROHS compliant (Directive 2002/95/EC) as per product date code 0427.

Features

- Telecom/signal relay (dry circuit, test access, ringing)
- Slim line 15 x 7.5 mm, 0.59 x 0.295 inch
- Switching current 2 A
- 2 changeover contacts (2 form C / DPDT)
- Bifurcated contacts
- High sensitive 24 V and 48 V coil versions
- Meets Telcordia GR 1089, FCC Part 68 and ITU-T K20 ≥ 2500 V between coil and contacts

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

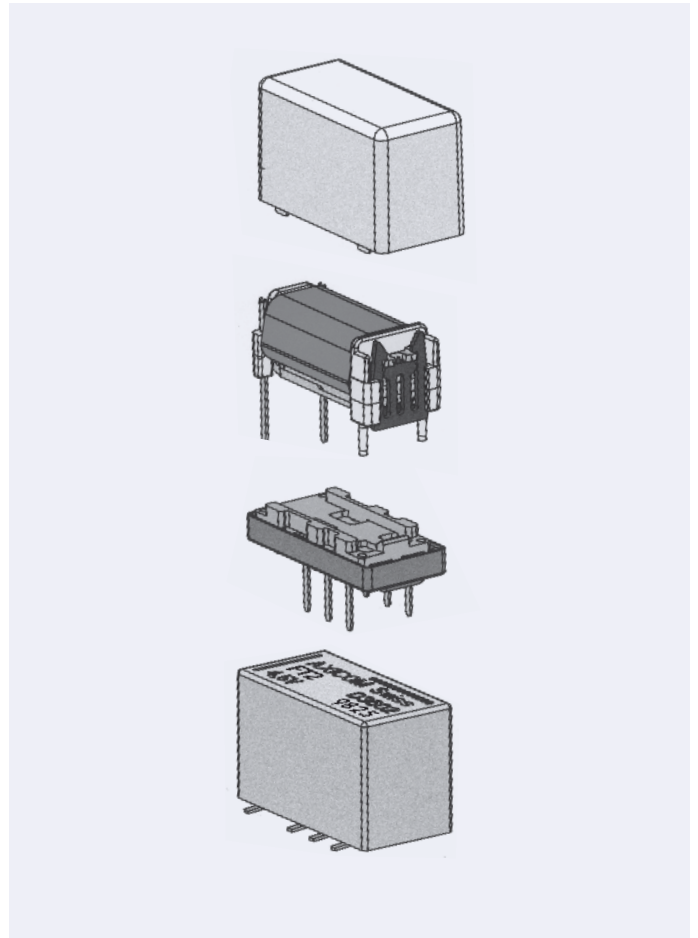
Options

- High Dielectric Version (HDV) with > 6000 V surge voltage between coil and contacts
- Suitable for 125 °C ambient temperature

Insulation category

Supplementary insulation according IEC / EN 60950 and UL 60950

Working voltage	≤ 300 Vrms
Mains supply voltage	≤ 250 Vrms
Repetitive peak voltage	1500 V
Pollution degree	Internal: 1 External: 2
Flammability classification	V-0
Maximum operating temperature	85 °C



FT2/FU2 Relay

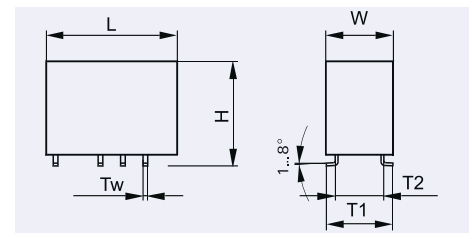
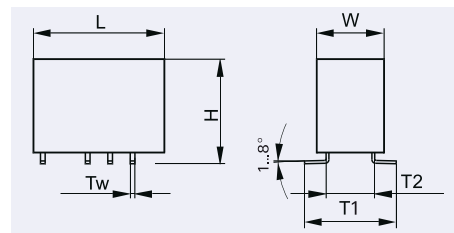
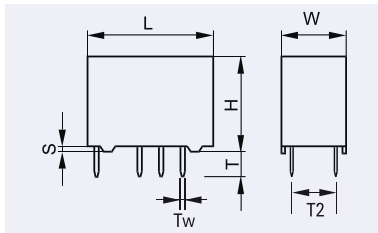
Dimensions

Dimensions in mm

	FT2 THT		FU2 SMT long terminals		FU2 SMT short terminals	
	mm	inch	mm	inch	mm	inch
L	15.0 ± 0.05	0.590 ± 0.002	15.0 ± 0.05	0.590 ± 0.002	15.0 ± 0.05	0.590 ± 0.002
W	7.5 ± 0.05	0.295 ± 0.002	7.5 ± 0.05	0.295 ± 0.002	7.6 ± 0.05	0.295 ± 0.002
H	9.6 ± 0.03	0.377 ± 0.001	10.0 ± 0.15	0.393 ± 0.006	10.0 ± 0.15	0.393 ± 0.006
T	3.30 ± 0.30	0.129 ± 0.011	N/A	N/A	N/A	N/A
T1	N/A	N/A	9.2 ± 0.2	0.362 ± 0.008	7.5 ± 0.2	0.295 ± 0.008
T2	5.08	0.200	5.08	0.200	5.08	0.200
Tw	0.50	0.020	0.50	0.020	0.50	0.020
S	0.35 ± 0.03	0.013 ± 0.001	N/A	N/A	N/A	N/A

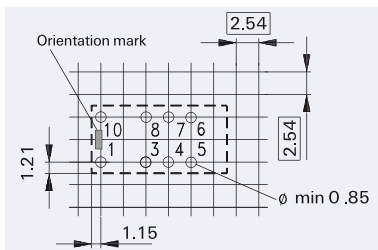
FT2: THT Version

FU2: SMT Version



Mounting hole layout

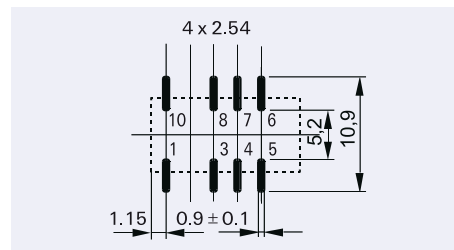
View onto the component side of the PCB (top view)



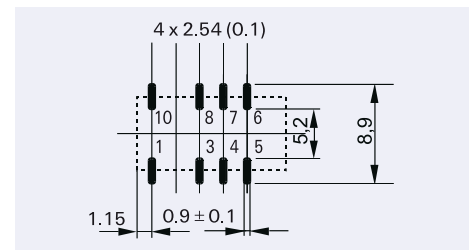
Solder pad layout

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

Long terminals



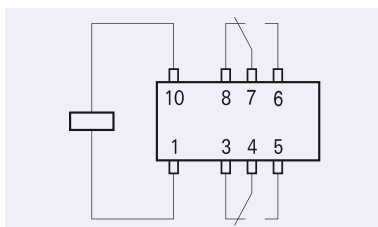
Short terminals



Terminal assignment

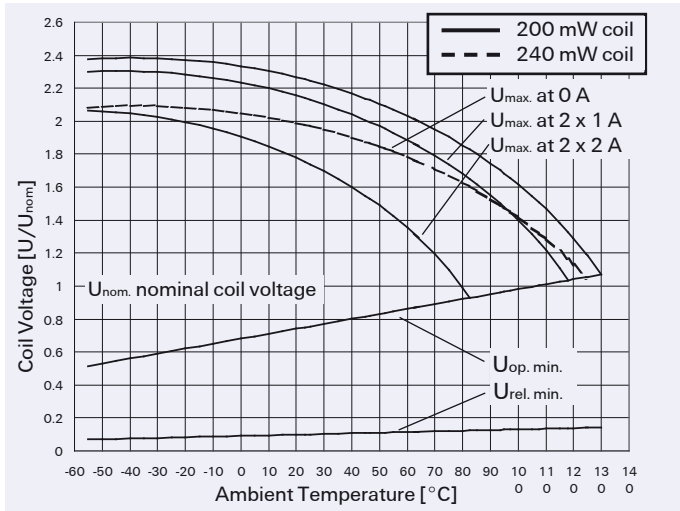
Relay – top view

Non-latching 1 coil
not energized condition



FT2/FU2 Relay

Coil Operating Range

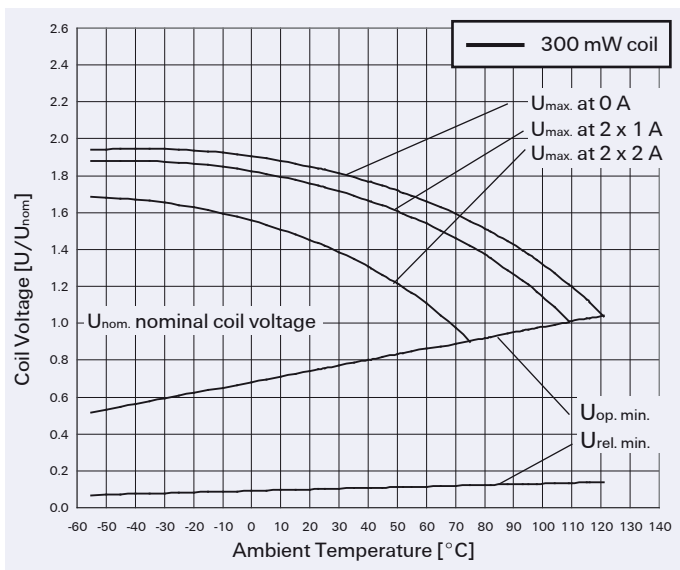


U_{nom} = Nominal coil voltage

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)



FT2/FU2 Relay

Coil Data (values at 23 °C)

Ordering Information

Nominal voltage Unom	Operate/set voltage range		Release/ reset voltage Minimum	Coil power	Coil Resistance	Relay code	Tyco part number
	Minimum voltage Umin	Maximum voltage Umax					
Vdc	Vdc	Vdc	Vdc	mW	Ω / ± 10 %		

Sensitive Version

THT non-latching

3	2.25	6.8	0.30	200	45	D3421	1462035-9
4	3.00	9.0	0.40	200	80	D3429	1-1462035-9
4.5	3.38	10.1	0.45	200	101	D3422	1-1462035-0
5	3.75	11.2	0.50	200	125	D3423	1-1462035-1
6	4.50	13.5	0.60	200	180	D3424	1-1462035-2
9	6.75	20.3	0.90	200	405	D3425	1-1462035-3
12	9.00	27.0	1.20	200	720	D3426	1-1462035-4
24	18.00	47.5	2.40	240	2400	D3427	1-1462035-7
48	36.00	95.0	4.80	240	9600	D3428	1-1462035-8

SMT Long Terminals, non-latching

3	2.25	6.8	0.30	200	45	D3521W	1-1462036-8
4	3.00	9.0	0.40	200	80	D3529W	3-1462036-1
4.5	3.38	10.1	0.45	200	101	D3522W	2-1462036-0
5	3.75	11.2	0.50	200	125	D3523W	2-1462036-2
6	4.50	13.5	0.60	200	180	D3524W	2-1462036-4
9	6.75	20.3	0.90	200	405	D3525W	2-1462036-6
12	9.00	27.0	1.20	200	720	D3526W	2-1462036-8
24	18.00	47.5	2.40	240	2400	D3527W	9-1462036-1
48	36.00	95.0	4.80	240	9600	D3528W	9-1462036-5

SMT Short Terminals, non-latching

3	2.25	6.8	0.30	200	45	D3521N	1-1462036-7
4	3.00	9.0	0.40	200	80	D3529N	3-1462036-0
4.5	3.38	10.1	0.45	200	101	D3522N	1-1462036-9
5	3.75	11.2	0.50	200	125	D3523N	2-1462036-1
6	4.50	13.5	0.60	200	180	D3524N	2-1462036-3
9	6.75	20.3	0.90	200	405	D3525N	2-1462036-5
12	9.00	27.0	1.20	200	720	D3526N	2-1462036-7
24	18.00	47.5	2.40	240	2400	D3527N	2-1462036-9
48	36.00	95.0	4.80	240	9600	D3528N	9-1462036-3

Further coil versions are available on request.

FT2/FU2 Relay

Coil Data (values at 23 °C)

Ordering Information

Nominal voltage Unom	Operate/set voltage range		Release/ reset voltage Minimum	Coil power	Coil Resistance	Relay code	Tyco part number
	Minimum voltage Umin	Maximum voltage Umax					
Vdc	Vdc	Vdc	Vdc	mW	Ω / ± 10 %		

High Dielectric Version

THT non-latching, Sensitive Version

3	2.25	6.80	0.30	200	45	D3491L	2-1462035-7
5	3.75	11.20	0.50	200	125	D3493L	2-1462035-8
12	9.00	27.00	1.20	200	720	D3496	2-1462035-4
24	18.00	47.50	2.40	240	2400	D3497	2-1462035-5

SMT Short Terminals, non-latching, Sensitive Version

3	2.25	6.80	0.30	200	45	D3591N	7-1462035-7
5	3.75	11.20	0.50	200	125	D3593N	7-1462035-8
12	9.00	27.00	1.20	200	720	D3596N	7-1462035-9

SMT Long Terminals, non-latching, Sensitive Version

3	2.25	6.80	0.30	200	45	D3591W	9-1462036-7
5	3.75	11.20	0.50	200	125	D3593W	9-1462036-8
12	9.00	27.00	1.20	200	720	D3596W	9-1462036-9

High Dielectric Version - IEC 60950 (Australia)

SMT Short Terminals, non-latching, Standard Version

3	2.25	5.50	0.30	300	30	D3571N	7-1462035-5
5	3.75	9.20	0.50	300	83	D3573N	7-1462035-6
12	9.00	22.10	1.20	300	480	D3576N	7-1462035-3

SMT Long Terminals, non-latching, Standard Version

3	2.25	5.50	0.30	300	30	D3571W	7-1462035-1
5	3.75	9.20	0.50	300	83	D3573W	7-1462035-2
12	9.00	22.10	1.20	300	480	D3576W	7-1462035-4

Further coil versions are available on request.

FT2/FU2 Relay

Coil Data (values at 23 °C)

Ordering Information

Nominal voltage Unom	Operate/set voltage range		Release/ reset voltage Minimum	Coil power	Coil Resistance	Relay code	Tyco part number
	Minimum voltage Umin	Maximum voltage Umax					
Vdc	Vdc	Vdc	Vdc	mW	Ω / ± 10 %		

Standard Version

THT non-latching

3	2.25	5.5	0.30	300	30	D3401	1462035-1
4.5	3.38	8.3	0.45	300	68	D3402	1462035-2
5	3.75	9.2	0.50	300	83	D3403	1462035-3
6	4.50	11.0	0.60	300	120	D3404	1462035-4
9	6.75	16.6	0.90	300	270	D3405	1462035-5
12	9.00	22.1	1.20	300	480	D3406	1462035-6
24	18.00	44.2	2.40	300	1920	D3407	1462035-7
48	36.00	88.3	4.80	300	7680	D3408	1462035-8

SMT Long Terminals non-latching

3	2.25	5.5	0.30	300	30	D3401W	1462036-2
4.5	3.38	8.3	0.45	300	68	D3402W	1462036-4
5	3.75	9.2	0.50	300	83	D3403W	1462036-6
6	4.50	11.0	0.60	300	120	D3404W	1462036-8
9	6.75	16.6	0.90	300	270	D3405W	1-1462036-0
12	9.00	22.1	1.20	300	480	D3406W	1-1462036-2
24	18.00	44.2	2.40	300	1920	D3407W	1-1462036-4
48	36.00	88.3	4.80	300	7680	D3408W	1-1462036-6

SMT Short Terminals non-latching

3	2.25	5.5	0.30	300	30	D3401N	1462036-1
4.5	3.38	8.3	0.45	300	68	D3402N	1462036-3
5	3.75	9.2	0.50	300	83	D3403N	1462036-5
6	4.50	11.0	0.60	300	120	D3404N	1462036-7
9	6.75	16.6	0.90	300	270	D3405N	1462036-9
12	9.00	22.1	1.20	300	480	D3406N	1-1462036-1
24	18.00	44.2	2.40	300	1920	D3407N	1-1462036-3
48	36.00	88.3	4.80	300	7680	D3408N	1-1462036-5

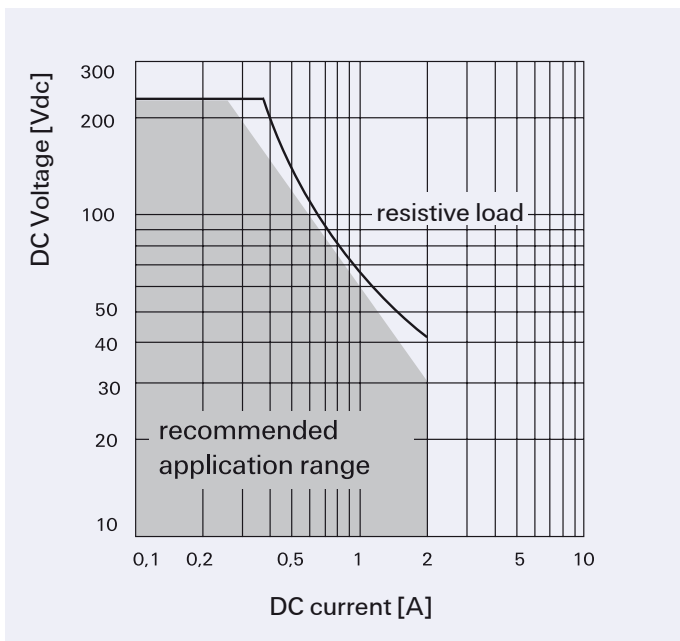
Further coil versions are available on request.

FT2/FU2 Relay

Contact Data

	Standard Version / Sensitive Version / High Dielectric Version
Number of contacts and type	2 changeover contacts
Contact assembly	Bifurcated contacts
Contact material	Palladium-ruthenium, gold covered
Limiting continuous current at max. ambient temperature	2 A
Maximum switching current	2 A
Maximum switching voltage	220 Vdc 250 Vac
Maximum switching capacity	60 W, 62.5 VA
Thermoelectric potential	< 10 μ V
Minimum switching voltage	100 μ V
Initial contact resistance / measuring condition: 10 mA / 20 mV	< 50 m Ω
Electrical endurance at contact application 0 (\leq 30 mV / \leq 10 mA) at cable load open end Resistive load at 125 Vdc / 0.24 A - 30 W at 250 Vac / 0.25 A - 62.5 VA at 24 V / 1.25 A - 30 W	min. 2.5 x 10 ⁶ operations min. 2.0 x 10 ⁶ operations min. 1.0 x 10 ⁵ operations min. 1.0 x 10 ⁵ operations min. 1.0 x 10 ⁵ operations
Mechanical endurance	typ. 10 ⁸ operations
UL contact ratings	220 Vdc / 0.24 A - 60 W 125 Vdc / 0.24 A - 30 W 250 Vac / 0.25 A - 62.5 VA 125 Vac / 0.5 A - 62.5 VA 30 Vdc / 2 A - 60 W

Max. DC Load Breaking Capacity



FT2/FU2 Relay

Insulation

	Standard Version	High Dielectric Version
Insulation resistance at 500 Vdc	> 10 ⁹ Ω	> 10 ⁹ Ω
Dielectric test voltage (1 min) between coil and contacts between adjacent contact sets between open contacts	1500 Vrms 1500 Vrms 1000 Vrms	4000 Vrms 1800 Vrms 1500 Vrms
Surge voltage resistance according IEC (10 / 700 μs) between coil and contacts between adjacent contact sets between open contacts according to FCC 68 (10 / 160 μs) between coil and contacts between adjacent contact sets between open contacts	2500 V 1500 V 1500 V 2500 V 1500 V 1500 V	6000 V 2500 V 2500 V 6000 V 2500 V 2500 V

High Frequency Data

Capacitance between coil and contacts between adjacent contact sets between open contacts	max. 4 pF max. 1 pF max. 1 pF
RF Characteristics Isolation at 100 MHz / 900 MHz Insertion loss at 100 MHz / 900 MHz V.S.W.R. at 100 MHz / 900 MHz	- 30.6 dB / - 13.7 dB - 0.02 dB / - 0.50 dB 1.02 / 1.27

General Data

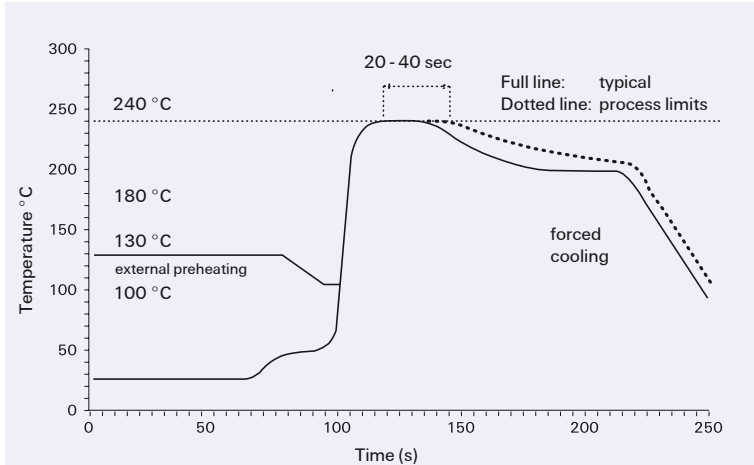
Operate time at U _{nom} typ. / max.	3 ms / 5 ms
Release time without diode in parallel (non-latching), typ. / max.	2 ms / 5 ms
Release time with diode in parallel (non-latching), typ. / max.	4 ms / 5 ms
Bounce time at closing contact, typ. / max.	1 ms / 5 ms
Maximum switching rate without load	50 operations/s
Ambient temperature	-55 °C ... +85 °C
Thermal resistance	< 125 K/W
Maximum permissible coil temperature	150 °C
Vibration resistance (function)	10 G 10 to 500 Hz
Shock resistance, half sinus, 11 ms	15 G (function) 500 G (damage)
Degree of protection / Environmental protection	immersion cleanable, IP 67 / RT III / RT V
Needle flame test	application time 20 s, no burning or glowing
Mounting position	any
Processing information	Ultrasonic cleaning is not recommended
Weight (mass)	max. 3 g
Terminal surface	SnCu 0.7
Moisture sensitive level (JDEC J-STD-020B) - SMD types	MSL 3
Resistance to soldering heat	265 °C / 10 s

All data refers to 23 °C unless otherwise specified.

FT2/FU2 Relay

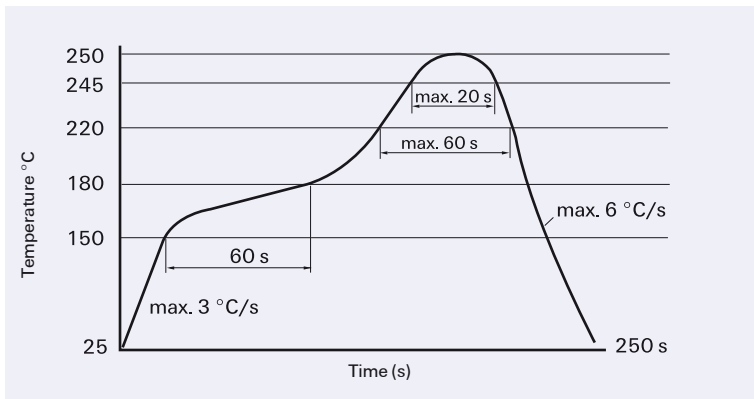
Recommended Soldering Conditions

Soldering conditions according IEC 60058-2-58 and IPC/JEDEC J-STD-020B



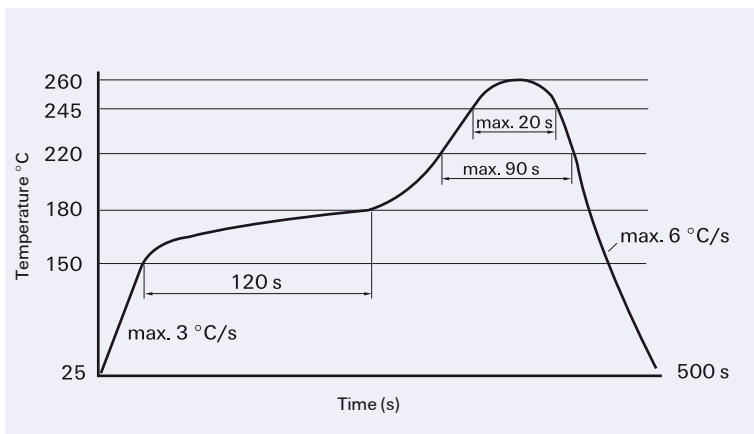
Vapor Phase Soldering: Temperature/Time Profile (Lead and Housing Peak Temperature)

Recommended reflow soldering profile



Infrared Soldering: Temperature/Time Profile (Lead and Housing Peak Temperature)

Resistance to soldering heat - Reflow profile

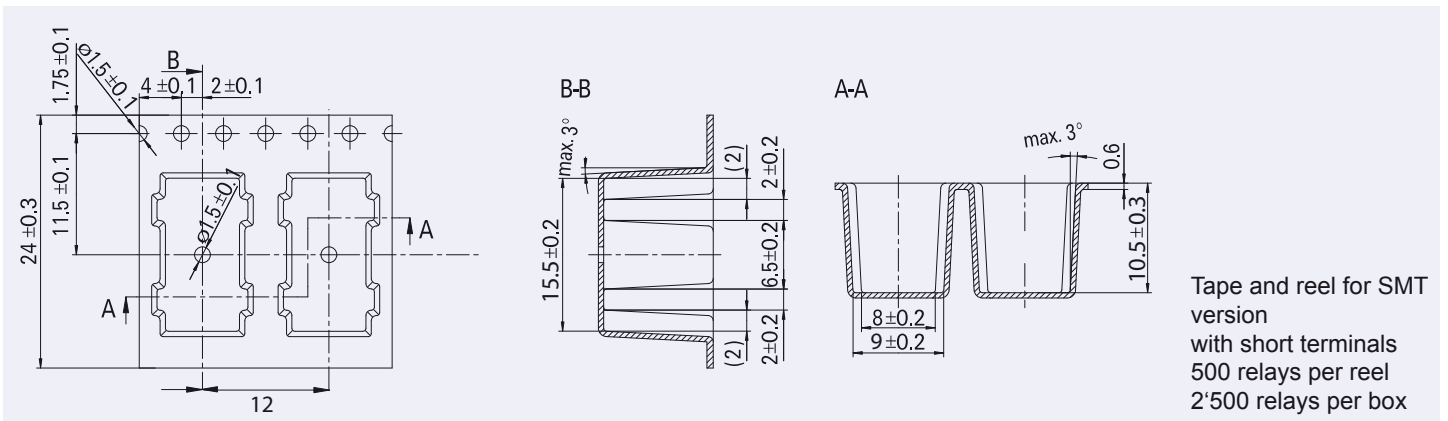
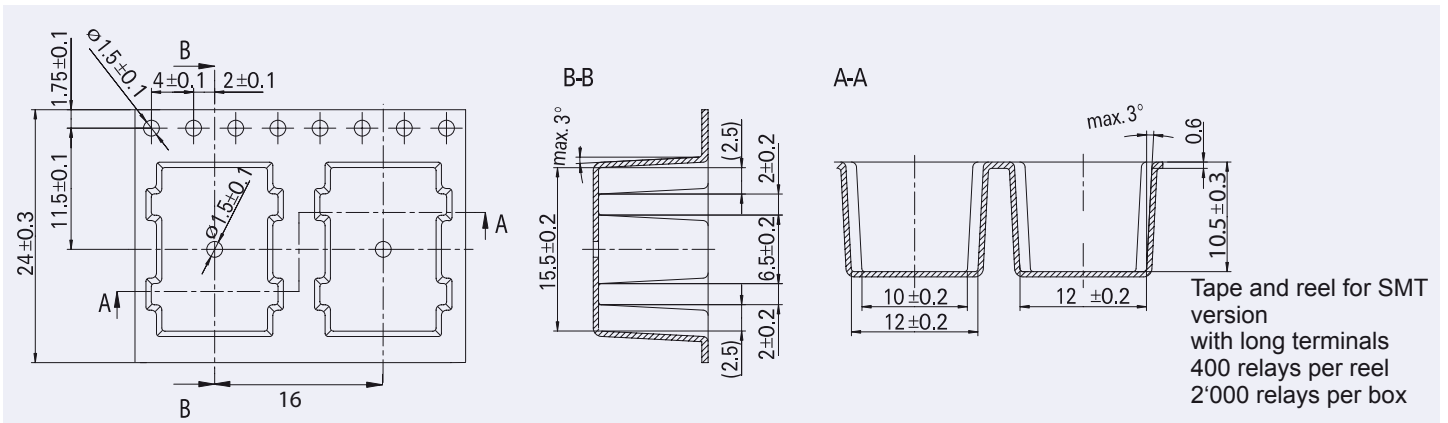
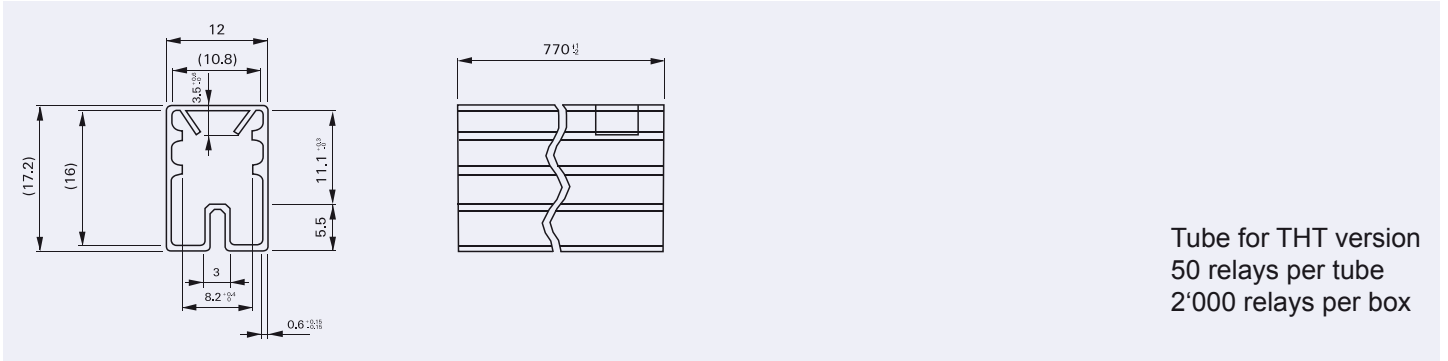


Infrared Soldering: Temperature/Time Profile (Lead and Housing Peak Temperature)

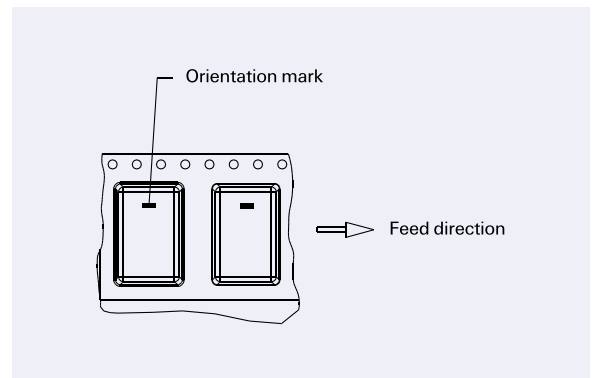
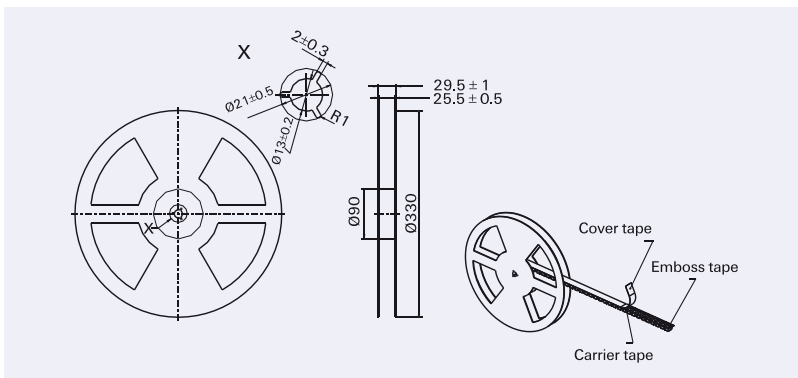
FT2/FU2 Relay

Packing

Dimensions in mm



Reel dimension



FT2/FU2 Relay

IM Relays

4th generation slim line – low profile polarized 2 c/o telecom signal 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 50 ... 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. It is currently the only 2 A rated 4G relay on the market. Dielectric strength fulfills the Telcordia requirements according GR 1089 (2,5 kV – 2 / 10 µs) and FCC part 68 (1,5 kV – 10 / 160 µs). The IM relay is tested according CECC/IECQ and certified in accordance with IEC/EN 60950 and UL 60950.

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 Telcordia requirements according GR 1089 (2,5 kV – 2 / 10 µs) and FCC part 68 (1,5 kV – 10 / 160 µs). The P2 relay is tested according CECC/IECQ and certified in accordance with IEC/EN 60950 and UL 60950. Dimensions approx. 15 x 7,5 mm board space and 10 mm height.

FX2 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 Telcordia requirements according GR 1089 (2,5 kV – 2 / 10 µs) and FCC part 68 (1,5 kV – 10 / 160 µs). The FX2 relay is tested according CECC/IECQ and certified in accordance with IEC/EN 60950 and UL 60950. 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 Telcordia requirements according GR 1089 (2,5 kV – 2 / 10 µs) and FCC part 68 (1,5 kV – 10 / 160 µs). The FT2/FU2 relay is tested according CECC/IECQ and certified in accordance with IEC/EN 60950 and UL 60950. 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 60 W/62,5 VA. Dielectric strength fulfills FCC part 68 (1,5 kV – 10 / 160 µs). The FP2 is tested according CECC/IECQ approved.

Dimensions approx. 14 x 9 mm board space and 5 mm height.

MT2

2nd generation non polarized, non latching 2 c/o telecom and signal relay with bifurcated contacts. Nominal voltage range from 3 ... 48 V, coil power consumption 150/200/300/400 and 550 mW. 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 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 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 series), Small General Purpose Relay (V23006 series), Small Polarized Relay (V23063 ... V23067 and V23163 ... V23167 series). Accessories like sockets, hold down springs, etc. optional.

High Frequency Relays

HF3 / HF3S / HF6 series RF relays offering excellent RF characteristics in a small package. All HF series relays are suitable for SMD soldering processes. Available as non latching or latching versions with 1 or 2 coils and a nominal coil voltage range from 3 ... 24 V, a coil power consumption of 140 mW or 70 mW (single coil latching types).

HF3: Low cost RF relay suitable up to 3 GHz. Impedance 50 and 75 Ohm. 50 W hot switching and 50 W RF power carry capability. Dimensions 14.6 x 7.3 x 10.3 mm.

HF3S: High performance, high power RF relay suitable up to 3 GHz, 50 W hot switching and 150 W RF power carry capability. Dimensions 15 x 7.6 x 10.6 mm.

HF6: High performance, high power RF relay suitable up to 6 GHz, 50 W hot switching and 50 W RF power carry capability. Dimensions 15 x 7.6 x 10.6 mm.



Tyco Electronics Logistics AG
Werk Axicom Au
Seestrasse 295
CH-8804 Au-Wädenswil / Switzerland
Phone +41 44 782 91 11
Fax +41 44 782 90 00
E-mail: axicom@tycoelectronics.com



Tyco Electronics
Paulsternstrasse 26
D-13629 Berlin / Germany
Phone +49 30 386 38573
Fax +49 30 386 38575
E-mail: axicom@tycoelectronics.com



Tyco Electronics EC Trutnov s.r.o.
Komenského 821
CZ-541 01 Trutnov / Czech Republic
E-mail: axicom@tycoelectronics.com

AXICOM

Telecom-, Signal and RF Relays

Tyco Electronics Corporation
POB 3608,
Harrisburg, PA 17105, USA
Phone +1 800-522-6752

 **Tyco Electronics**

Our commitment. Your advantage.