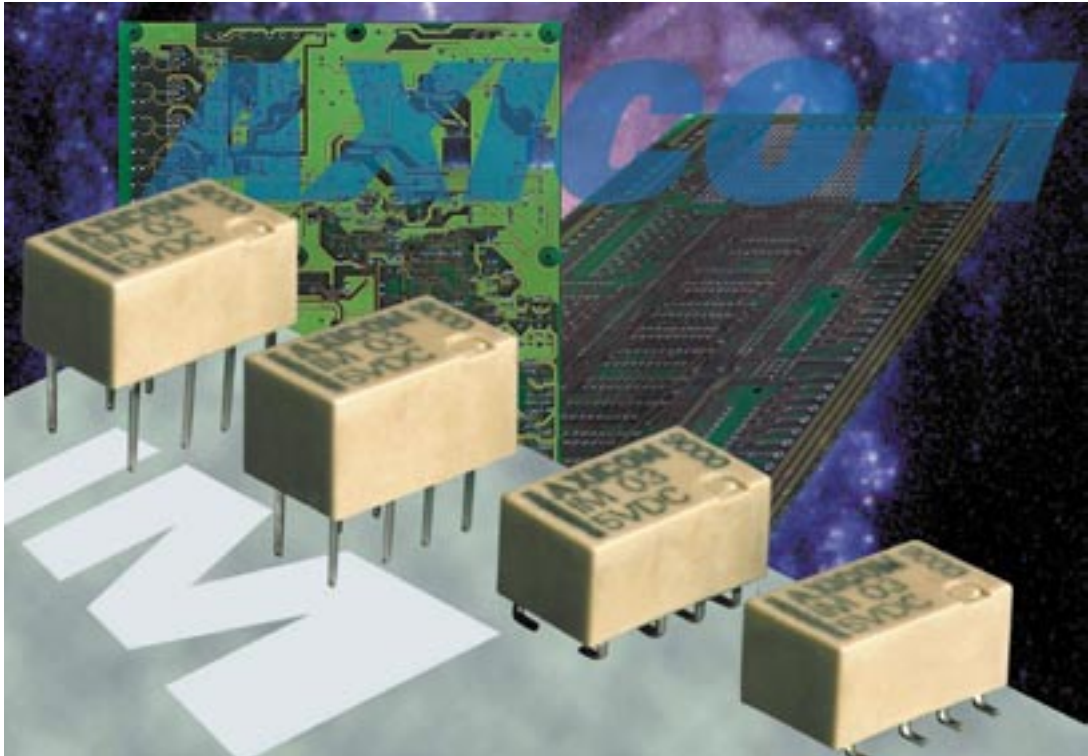


The Best Relaytion



IM Relay

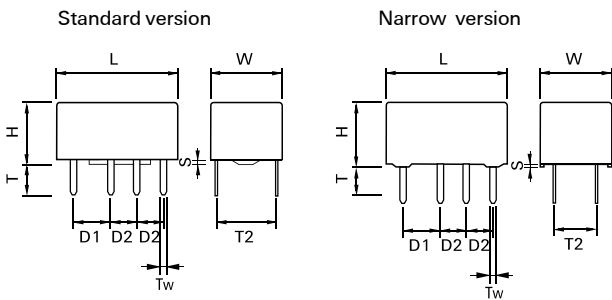


108-98001
Rev. D
EC-JM00-0009-03
ECOC: JM10
1. Apr. 04

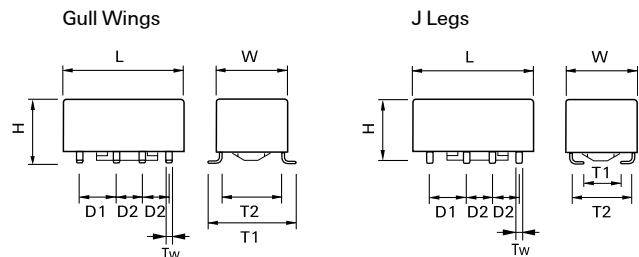
Dimensions

	IM THT Standard		IM THT Narrow		IM SMT Gull Wings		IM SMT J-Legs	
	mm	inch	mm	inch	mm	inch		
L	10 ±0.08	0.393 ±0.003	10 ±0.08	0.393 ±0.003	10 ±0.08	0.393 ±0.003	10 ±0.08	0.393 ±0.003
W	6 ±0.08	0.236 ±0.003	5.7 ±0.3	0.224 ±0.012	6 ±0.08	0.236 ±0.003	6 ±0.08	0.236 ±0.003
H	5.65 -0.2	0.222 -0.008	5.85 -0.15	0.230 -0.006	5.65 -0.2	0.222 -0.008	5.65 -0.2	0.222 -0.008
T	3.2	0.125	3.2	0.125	N/A	N/A	N/A	N/A
T1	N/A	N/A	N/A	N/A	7.5 ±0.3	0.295 ±0.011	2.8 ±0.2	0.110 ±0.007
T2	5.08 ±0.1	0.200 ±0.004	3.2 ±0.1	0.126 ±0.006	5.08 ±0.1	0.200 ±0.004	5.08 ±0.1	0.200 ±0.004
D1	3.2 ±0.15	0.126 ±0.006	3.2 ±0.15	0.126 ±0.006	3.2 ±0.15	0.126 ±0.006	3.2 ±0.15	0.126 ±0.006
D2	2.2 ±0.15	0.087 ±0.006	2.2 ±0.15	0.087 ±0.006	2.2 ±0.15	0.087 ±0.006	2.2 ±0.15	0.087 ±0.006
Tw	0.4	0.015	0.4	0.015	0.4	0.015	0.4	0.015
S	0.3 ±0.05	0.011 ±0.002	0.3 ±0.05	0.011 ±0.002	N/A	N/A	N/A	N/A

THT Version

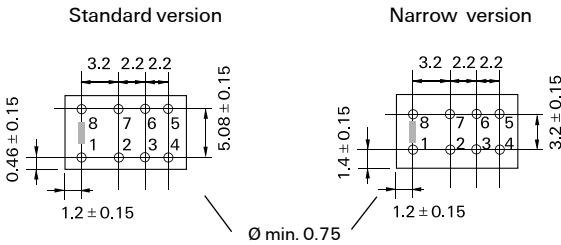


SMT Version



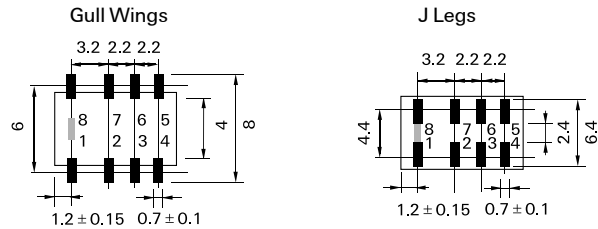
Mounting hole layout

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



Solder pad layout

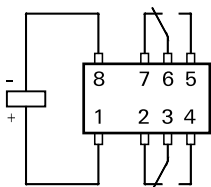
View onto the component side of the PCB (top view)



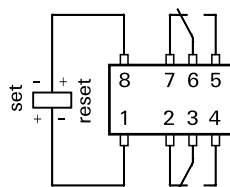
Terminal assignment

Relay - top view

Non-latching type, not energized condition



Latching type, 1 coil reset condition



Relay Code

- IM
- Packaging: S Tube, R Reel
- Terminal shape: T = THT - Standard, N = THT - Narrow, J = SMT J-Legs, G = SMT Gull Wing
- Dielectric type: Nil = Standard Type, C = High Dielectric Version, D = High Current Version (see coil data on page 4)
- Coil Version: (see coil data on page 4)

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
	Minimum voltage U_{min}	Maximum voltage U_{max}					
Vdc	Vdc	Vdc	Vdc	mW	$\Omega / \pm 10 \%$		

THT Standard non-latching 1 coil

1.5	1.13	3.6	0.15	140	16	IM00TS	3-1462037-5
3	2.25	7.2	0.30	140	64	IM01TS	0-1462037-4
4.5	3.38	10.8	0.45	140	145	IM02TS	1-1462037-3
5	3.75	12.1	0.50	140	178	IM03TS	1-1462037-8
6	4.50	14.5	0.60	140	257	IM04TS	4-1462037-1
9	6.75	21.7	0.90	140	574	IM05TS	2-1462037-2
12	9.00	28.9	1.20	140	1028	IM06TS	2-1462037-7
24	18.00	48.5	2.40	200	2880	IM07TS	3-1462037-0

THT Narrow non-latching 1 coil

1.5	1.13	3.6	0.15	140	16	IM00NS	1-1462038-0
3	2.25	7.2	0.30	140	64	IM01NS	1-1462038-1
4.5	3.38	10.8	0.45	140	145	IM02NS	1-1462038-2
5	3.75	12.1	0.50	140	178	IM03NS	1-1462038-3
6	4.50	14.5	0.60	140	257	IM04NS	1-1462038-4
9	6.75	21.7	0.90	140	574	IM05NS	1-1462038-5
12	9.00	28.9	1.20	140	1028	IM06NS	1-1462038-6
24	18.00	48.5	2.40	200	2880	IM07NS	1-1462038-7

SMT J-Legs non-latching 1 coil

1.5	1.13	3.6	0.15	140	16	IM00JR	3-1462037-9
3	2.25	7.2	0.30	140	64	IM01JR	4-1462037-0
4.5	3.38	10.8	0.45	140	145	IM02JR	1-1462037-1
5	3.75	12.1	0.50	140	178	IM03JR	1-1462037-6
6	4.50	14.5	0.60	140	257	IM04JR	4-1462037-4
9	6.75	21.7	0.90	140	574	IM05JR	4-1462037-5
12	9.00	28.9	1.20	140	1028	IM06JR	4-1462037-6
24	18.00	48.5	2.40	200	2880	IM07JR	4-1462037-8

SMT Gull Wings non-latching 1 coil

1.5	1.13	3.6	0.15	140	16	IM00GR	3-1462037-7
3	2.25	7.2	0.30	140	64	IM01GR	0-1462037-1
4.5	3.38	10.8	0.45	140	145	IM02GR	0-1462037-9
5	3.75	12.1	0.50	140	178	IM03GR	1-1462037-4
6	4.50	14.5	0.60	140	257	IM04GR	4-1462037-2
9	6.75	21.7	0.90	140	574	IM05GR	3-1462037-4
12	9.00	28.9	1.20	140	1028	IM06GR	2-1462037-3
24	18.00	48.5	2.40	200	2880	IM07GR	4-1462037-7

High Dielectric Version

SMT Gull Wings non-latching 1 coil

3	2.25	7.2	0.30	140	64	IM01CGR	0-1462038-4
4.5	3.38	10.8	0.45	140	145	IM02CGR	0-1462038-1
5	3.75	12.1	0.50	140	178	IM03CGR	0-1462038-2
9	6.75	21.7	0.90	140	574	IM05CGR	0-1462038-3
12	9.00	28.9	1.20	140	1028	IM06CGR	9-1462037-9
24	18.00	48.5	2.40	200	2880	IM07CGR	0-1462039-2

High Current Version

SMT Gull Wings non-latching 1 coil

4.5	3.38	10.8	0.45	140	145	IM02DGR	9-1462038-8
5	3.75	12.1	0.50	140	178	IM03DGR	9-1462038-9

Further coil versions are available on request.

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
	Minimum voltage U_{min}	Maximum voltage U_{max}	Vdc				
Vdc	Vdc	Vdc	Vdc	mW	$\Omega / \pm 10\%$		

High Sensitive Version

SMT Gull Wings non-latching 1 coil

3	2.40	8.7	0.30	100	91	IM11GR	9-1462038-5
4.5	3.60	13.1	0.45	100	194	IM12GR	0-1462039-3
5	4.00	14.6	0.50	100	238	IM13GR	0-1462039-4
12	9.60	35.0	1.20	110	1315	IM16GR	0-1462039-5
24	19.20	57.8	2.40	140	4120	IM17GR	0-1462039-6

THT Standard latching 1 coil

1.5	1.13	4.3	-1.13	100	23	IM40TS	5-1462037-0
3	2.25	8.6	-2.25	100	90	IM41TS	5-1462037-3
4.5	3.38	12.9	-3.38	100	203	IM42TS	5-1462037-6
5	3.75	14.3	-3.75	100	250	IM43TS	5-1462037-8
6	4.50	17.1	-4.50	100	380	IM44TS	6-1462037-1
9	6.75	25.7	-6.75	100	810	IM45TS	3-1462037-2
12	9.00	34.3	-9.00	100	1440	IM46TS	6-1462037-6
24	18.00	48.5	-18.00	200	2880	IM47TS	6-1462037-9

THT Narrow latching 1 coil

1.5	1.13	4.3	-1.13	100	23	IM40NS	1-1462038-8
3	2.25	8.6	-2.25	100	90	IM41NS	1-1462038-9
4.5	3.38	12.9	-3.38	100	203	IM42NS	2-1462038-0
5	3.75	14.3	-3.75	100	250	IM43NS	2-1462038-1
6	4.50	17.1	-4.50	100	380	IM44NS	2-1462038-2
9	6.75	25.7	-6.75	100	810	IM45NS	2-1462038-3
12	9.00	34.3	-9.00	100	1440	IM46NS	2-1462038-4
24	18.00	48.5	-18.00	200	2880	IM47NS	2-1462038-5

SMT J-Legs latching 1 coil

1.5	1.13	4.3	-1.13	100	23	IM40JR	5-1462037-2
3	2.25	8.6	-2.25	100	90	IM41JR	5-1462037-5
4.5	3.38	12.9	-3.38	100	203	IM42JR	5-1462037-7
5	3.75	14.3	-3.75	100	250	IM43JR	6-1462037-0
6	4.50	17.1	-4.50	100	380	IM44JR	6-1462037-3
9	6.75	25.7	-6.75	100	810	IM45JR	6-1462037-5
12	9.00	34.3	-9.00	100	1440	IM46JR	6-1462037-8
24	18.00	48.5	-18.00	200	2880	IM47JR	7-1462037-1

SMT Gull Wings latching 1 coil

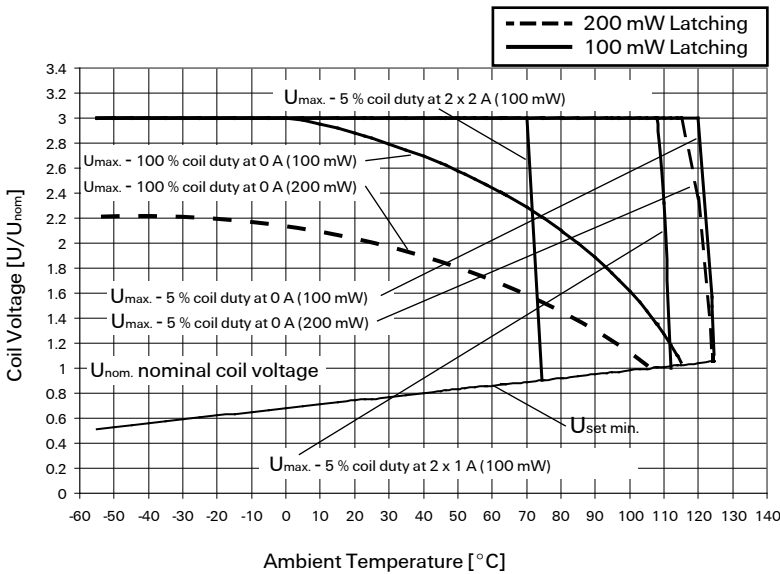
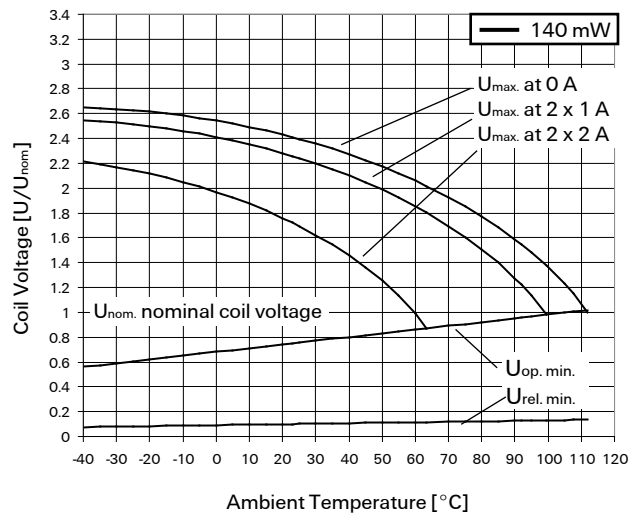
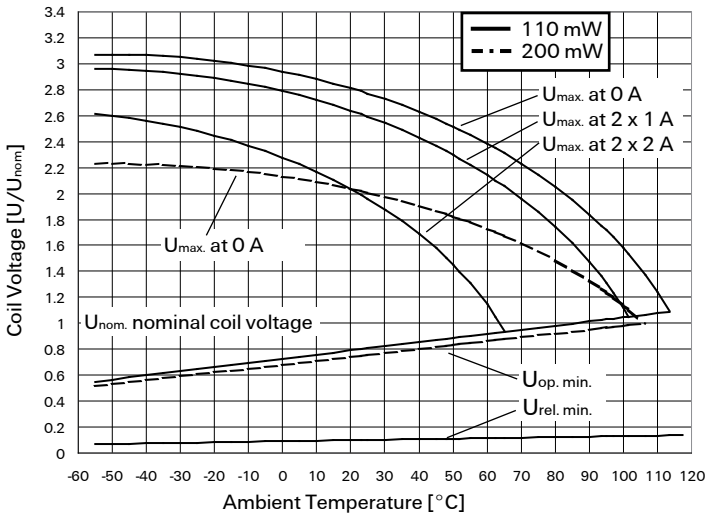
1.5	1.13	4.3	-1.13	100	23	IM40GR	5-1462037-1
3	2.25	8.6	-2.25	100	90	IM41GR	5-1462037-4
4.5	3.38	12.9	-3.38	100	203	IM42GR	3-1462037-1
5	3.75	14.3	-3.75	100	250	IM43GR	5-1462037-9
6	4.50	17.1	-4.50	100	380	IM44GR	6-1462037-2
9	6.75	25.7	-6.75	100	810	IM45GR	6-1462037-4
12	9.00	34.3	-9.00	100	1440	IM46GR	6-1462037-7
24	18.00	48.5	-18.00	200	2880	IM47GR	7-1462037-0

High Dielectric Version

SMT Gull Wings latching 1 coil

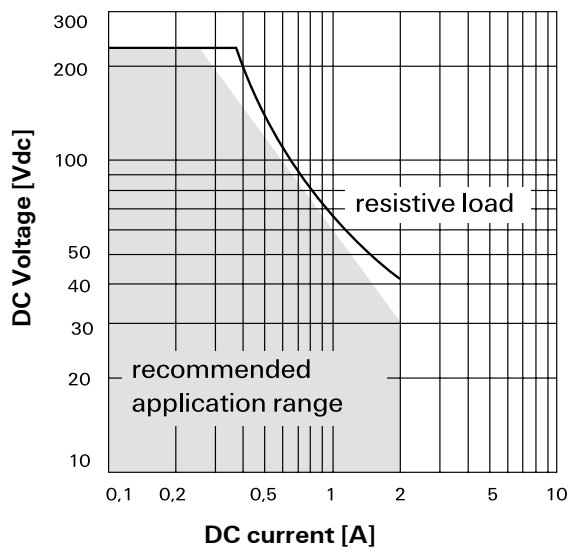
5	3.75	14.3	-3.75	100	250	IM43CGR	9-1462038-7
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Coil operating range



- 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)

Max. DC load breaking capacity



Contact Data	
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) cable load open end	min. 2.5 x 10 ⁶ operations min. 2.0 x 10 ⁶ operations
Resistive load at 125Vdc / 0.24 A - 30 W at 220 Vdc / 0.27 A - 60 W at 250 Vac / 0.25 A - 62.5 VA at 30 Vdc / 1 A - 30 W at 30 Vdc / 2 A - 60 W	min. 5 x 10 ⁵ operations min. 1 x 10 ⁵ operations min. 1 x 10 ⁵ operations min. 5 x 10 ⁵ operations min. 1 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

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	1800 Vrms	1800 Vrms
between adjacent contact sets	1000 Vrms	1800 Vrms
between open contacts	1000 Vrms	1500 Vrms
Surge voltage resistance		
according to Bellcore TR-NWT-001089 (2 / 10 μ s)		
between coil and contacts	2500 V	2500 V
between adjacent contact sets	1500 V	2500 V
between open contacts	1500 V	2500 V
according to FCC 68 (10 / 160 μ s)		
between coil and contacts	2500 V	2500 V
between adjacent contact sets	1500 V	2500 V
between open contacts	1500 V	2500 V

High Frequency Data	
Capacitance	
between coil and contacts	max. 2 pF
between adjacent contact sets	max. 2 pF
between open contacts	max. 1 pF
RF Characteristics	
Isolation at 100 / 900 MHz	- 37.0 dB / - 18.8 dB
Insertion loss at 100 / 900 MHz	- 0.03 dB / - 0.33 dB
V.S.W.R. at 100 / 900 MHz	1.06 / 1.49

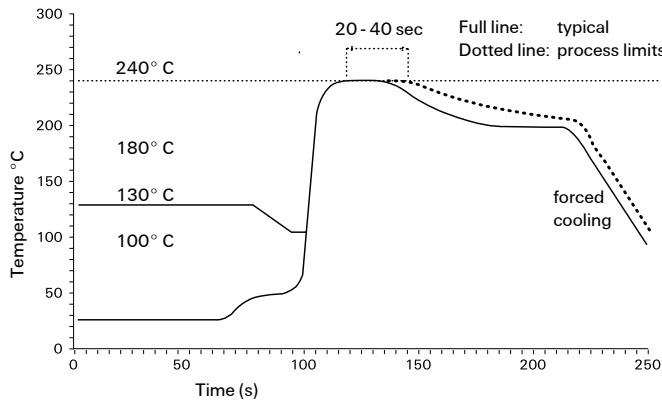
* High Dielectric Version „C“

General data	
Operate time at U_{nom} typ. / max.	1 ms / 3 ms
Reset time (latching) at U_{nom} , typ. / max.	1 ms / 3 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.	3 ms / 5 ms
Bounce time at closing contact, typ. / max.	1 ms / 5 ms
Maximum switching rate without load	50 operations/s
Ambient temperature	-40° C ... +85° C
Thermal resistance	< 150 K/W
Maximum permissible coil temperature	125° C
Vibration resistance (function)	20 G
	10 to 1000 Hz
Shock resistance, half sinus, 11 ms half sinus, 0.5 ms	50 G (function) 500 G (damage)
Degree of protection / Environmental protection	immersion cleanable, IP 67 / RT V
Needle flame test	application time 20 s, no burning and glowing
Mounting position	any
Processing information	Ultrasonic cleaning is not recommended
Weight (mass)	max. 0.75 g
Terminal surface	NiPdAu
Moisture sensitive level (JEDEC J-STD-020B)	MSL 3
Resistance to soldering heat	260° C / 10 s

All data refers to 23° C unless otherwise specified.

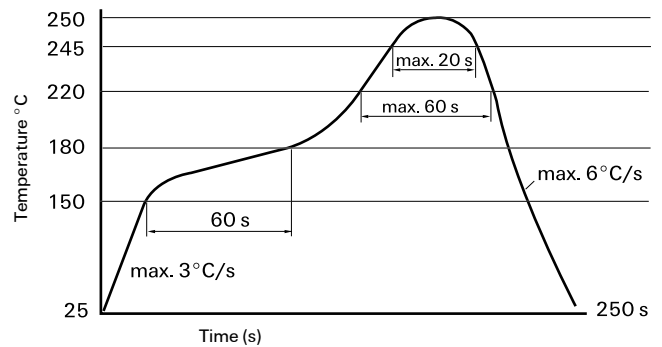
Recommended soldering conditions

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



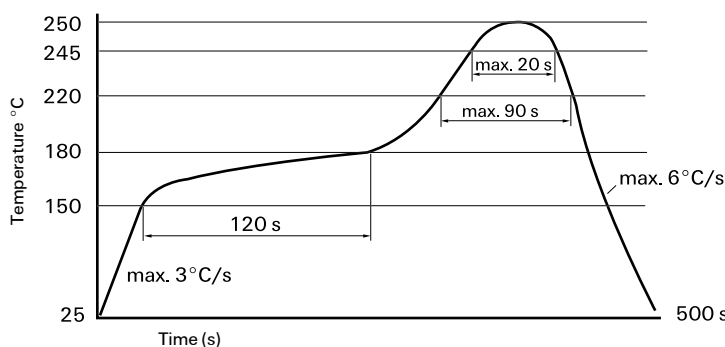
Vapor Phase Soldering: Temperature/Time Profile (Lead and Housing Peak Temperature)

Recommended reflow soldering profile



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

Resistance to soldering heat - Reflow profile

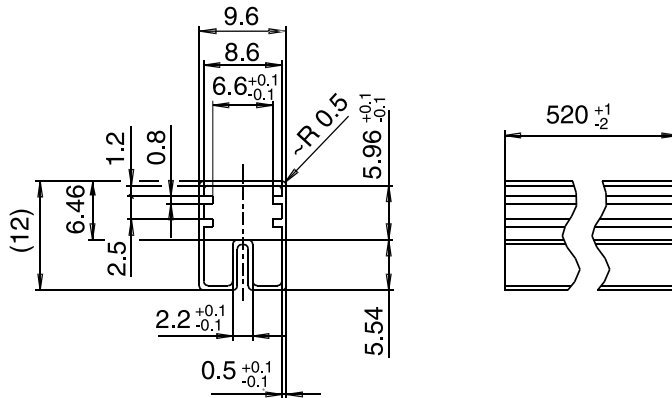


Infrared Soldering: Temperature/Time Profile (Lead and Housing Peak Temperature)

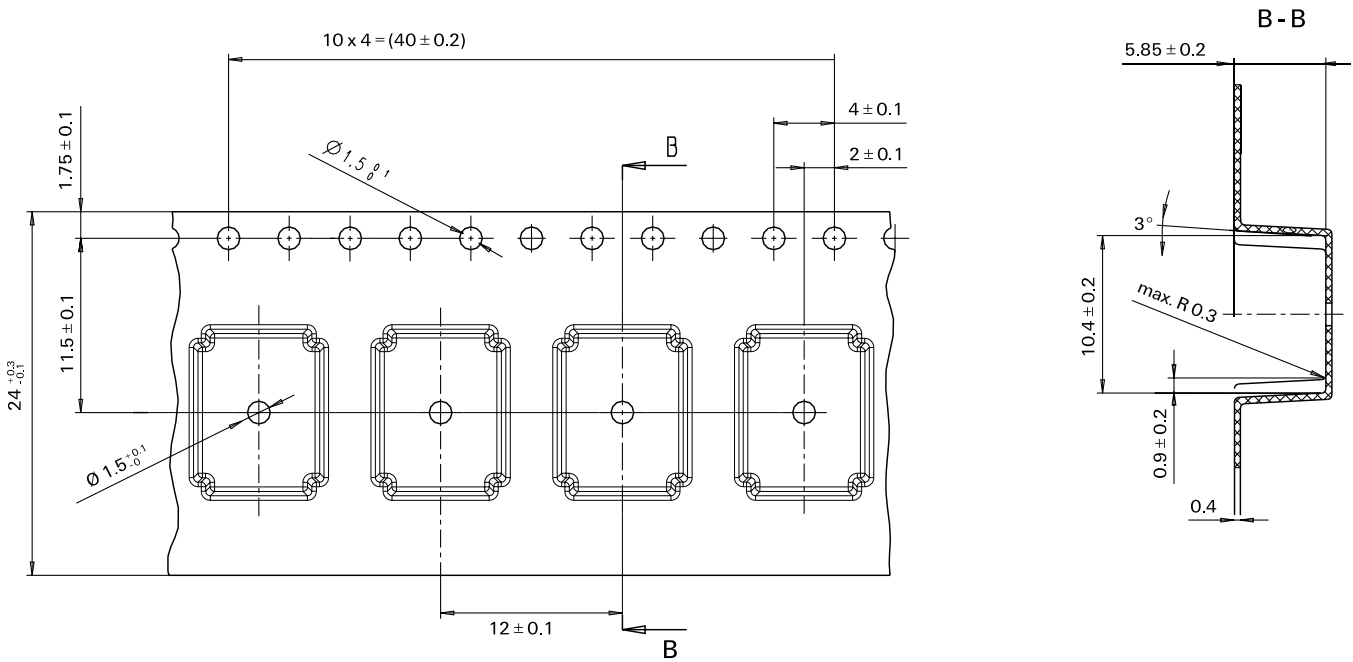
Packing

Dimensions in mm

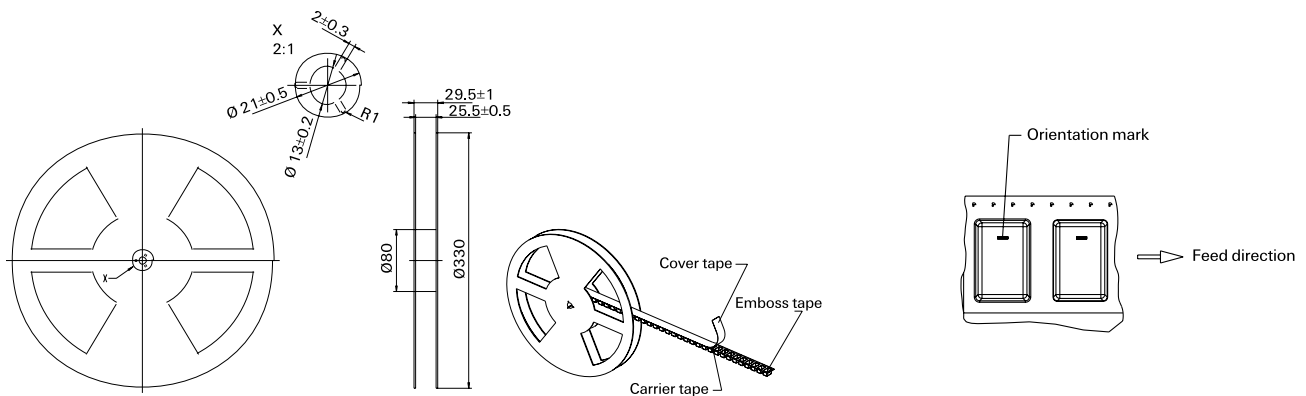
Tube for THT version - 50 relays per tube, 1000 relays per box



Tape and reel for SMT version - 1'000 relays / reel, 1'000 or 5'000 relays / box



Reel dimension



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 μ s) and FCC part 68 (1,5 kV – 10 / 160 μ s). 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

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 μ s) and FCC part 68 (1,5 kV – 10 / 160 μ s). 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 μ s) and FCC part 68 (1,5 kV – 10 / 160 μ s). The FX2 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 10,7 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 μ s) and FCC part 68 (1,5 kV – 10 / 160 μ s). 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.

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 μ s). 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 μ s) for both and the Bellcore requirements according GR 1089 (2,5 kV – 2 / 10 μ 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

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 μ 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 μ 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 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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