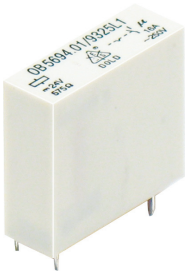
PCB Relays

Printed Circuit Board Relay
bistable
OB 5693, OB 5694

OB 5693



OB 5694

- According to DIN EN 61810-1, IEC/EN 60669-1
- OB 5693: horizontal model
  OB 5694: vertical model
- Bistable, mechanical latching of contact
- For impulse operation, at failure operation 100 % ED possible
- Same pulse (energy and direction) for both switching positions
- Safe separation according to IEC/EN 61140, IEC/EN 60335
- AC and DC - model
- Patent on function principle
- On request wash proof
- Switching reliability according to IEC/EN 60669-2-2

Application

- Remote switch
- Switching of sockets

Approvals and Marking

CE

Technical Data

Relay type			
1.0	**Coil**		
1.1	Nominal voltage	AC V DC V	12, 24, 42, 230 50/60 Hz 6, 12, 15, 24, 48, 60, 110
1.2	Nominal consumption	W / VA	1 / 1.4
2.0	**Contacts**		
2.1	Contact arrangement		1 changeover contact or 1 NO
2.2	Contact material		$AgSnO_2$; AgNi
2.3	Rated insulation voltage	AC V	250
	Switching voltage min./max.	V	10 / 400
2.4	Limiting continuous current I_{th}	A	16
	Switching current min./max.	A	10 mA[1] / 50 (20 ms)
2.5	Switching power min./max.	VA	3 / 4000
	Switching power min./max.	W	35 / 300
	Incandescent lamp load	W	1500
2.7	Electrical life	switching cycles	at 1 s On, 1 s Off (see contact service life)
	at AC 250 V 16 A cos φ = 1	switching cycles	≥ 5 x 10^4
2.8	max. switching frequency	switching cycles /s	5
2.10	Contact force	cN	≥ 8
2.14	Contact gap	mm	≥ 0.5
3.0	**Other**		
3.1	Mechanical life	switching cycles	DC ≥ 10 x 10^6 , AC ≥ 1 x 10^5
3.2	Temperature range	°C	- 40 ... + 75
3.3	Degree of protection		Solder line proof RT II
3.5	Vibration resistance		5 g, bis max. 100 Hz
3.6	Climate resistance		25 / 050 / 04 (climate category); A / B / D IEC/EN 60068-1

If no limit values stated the above values are typical values for the mean value.
All values are related to 20°C and for new products.

[1] Typical values [2] Only valid for the stated temperature range (≙ EN 61 810) different values (derating) see operating voltage limit curve

Technical Data

3.8	Insulation according to IEC 60664-1		
	Rated insulation voltage	AC V	250
	Contamination level		3
	Overvoltage category		III
	Test voltage contact-coil (1 min)	AC kV eff.	≥ 4
	Transient voltage contact-coil (1.2 - 50 µs)	kV	≥ 6
	Clearance and creepage distances contact-coil (1.2 - 50 µs)	mm	≥ 8
3.9	Weight	g	approx. 15

4.0	**Packing**			
4.1	on cardboard	Stück	OB 5693: 32;	OB 5694: 56
4.2	in case package	Stück	OB 5693: 320;	OB 5694: 280

5.0	**Solder method**		
5.1	Solder method /-temperature /-duration	°C / s	Wafe soldering / 260 / 5

Design Version OB 5693

Nominal voltage U_N		Voltage range [2] V	Resistance Ω (±10%)	$AgSnO_2$		Ag Ni + 0.2 µm Au	
DC V	AC V			.01/	.11/	.01/	.11/
6		4.8 ... 6.6	38	9031	9001	9141	9121
12		9.6 ... 13.2	150	9032	9002	9142	9122
15		12 ... 16.5	220	9033	9003	9143	9123
20		16 ... 22	410	9034	9004	9144	9124
24		19.2 ... 26.4	575	9035	9005	9145	9125
48		38.4 ... 52.8	2 500	9036	9006	9146	9126
60		48 ... 66	3 600	9037	9007	9147	9127
110		88 ... 121	12 100	9038	9008	9148	9128
	12	9.6 ... 13.2	65	9182	9152	9232	9222
	24	19.2 ... 26.4	250	9181	9151	9231	9221
	42	33.6 ... 46.2	830	9183	9153	9233	9223
	230	184 ... 253	25 000	9187	9157	9235	9225

Design Version OB 5694

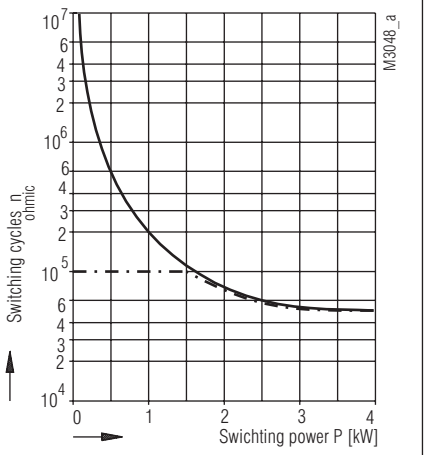
Nominal voltage U_N		Voltage range [2] V	Resistance Ω (±10%)	$AgSnO_2$		Ag Ni + 0.2 µm Au	
DC V	AC V			.01/	.11/	.01/	.11/
6		4.8 ... 6.6	38	9321	9301	9331	9311
12		9.6 ... 13.2	150	9322	9302	9332	9312
15		12 ... 16.5	220	9323	9303	9333	9313
20		16 ... 22	410	9324	9304	9334	9314
24		19.2 ... 26.4	575	9325	9305	9335	9315
	12	9.6 ... 13.2	65	9422	9402	9432	9412
	24	19.2 ... 26.4	250	9423	9403	9433	9413
	42	33.6 ... 46.2	830	9424	9404	9434	9414
	230	184 ... 253	25 000	9425	9405	9435	9415

Ordering Example

OB 569_. _ _ / _ _ _ _ _ _

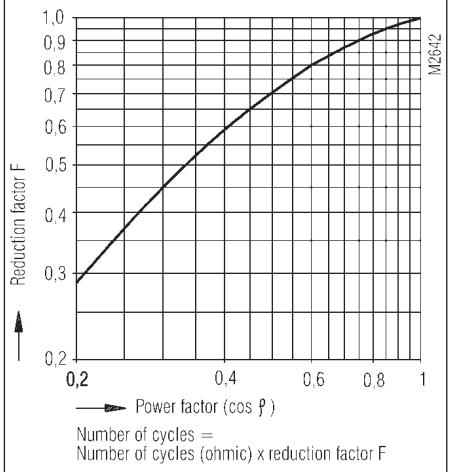
- Pin configuration
  - L = solder line proof RT II
  - W = wash proof RT III
- Design version
- 01 = NO
  11 = C/O
- 3 = horizontal model
  4 = vertical model

Characteristics



Comment
Graph is valid for:
- clear resistive load (cosφ=1)
- AC 230V

Contact service life



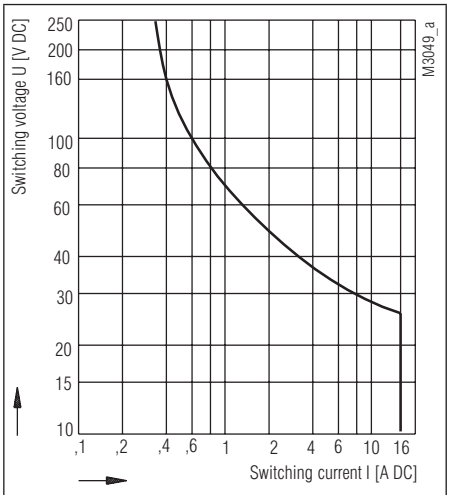
Number of cycles =
Number of cycles (ohmic) x reduction factor F

Graph is valid for:
- inductive load
- capacitive load

The actual number of reactive loads $n_{reactive}$ calculates:

$n_{reactive} = n_{ohmic} \times F$

Reduction factor for reactive loads

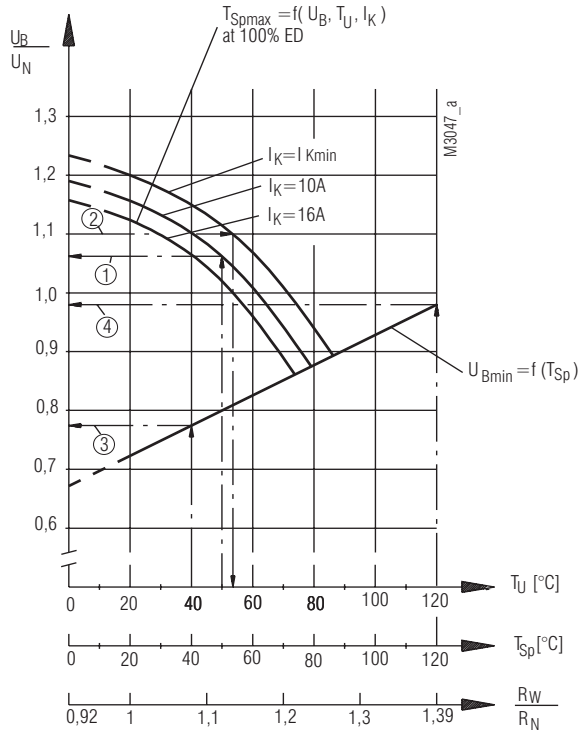


Contact distance ≥ 0,5 mm
Grapic only for resistive DC-loads

at max. 1 switching cycle / s
- safe switch-off
- no standing arc

At voltages < DC 25 V
max. 300 W can be switched.

Limit curve for arc-free operation



I_K = continuous current
R_W = resistance in hot state
R_N = nominal coil resistance
T_U = ambient temperature
T_{Sp} = actual coil temperature
U_B = opertating voltage applied
U_N = nominal voltage

Example:
* for max. voltage or max. coil resistance (at t_e >10s ... 100% ED)

① known: T_U = 50°C, I_K =10A
requested: U_{Bmax} ?
solution: U_{Bmax} = 1,06 x U_N

② known: $I_K = I_{Kmin}$, $U_B = 1{,}1U_N$
requested: T_U zul ?
solution: T_U zul = 53°C

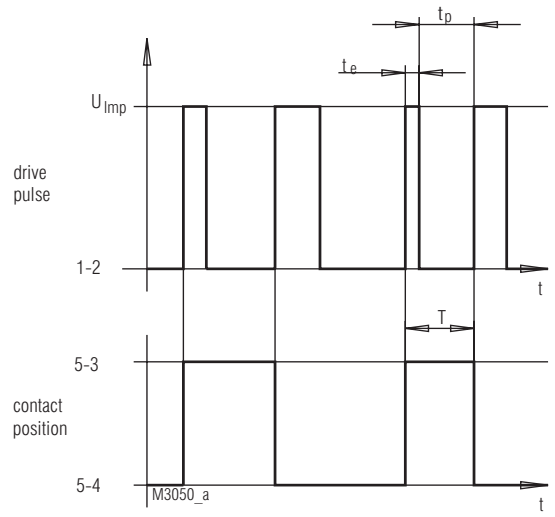
* for operating behaviour of the relay

③ known: relay "cold", i.e. $T_{Sp}=T_U$ [with T_U =40°C]
requested: U_{Bmin} ?
solution: U_{Bmin} = 0,77 x U_N

④ known: Relais "hot", i.e. $T_{Sp} > T_U$
[with T_{Sp} -> 120°C but according to ① or ② T_U ca. 50°C)
requested: U_{Bmin} ?
solution: U_{Bmin} = 0,98 x U_N

Operating voltage limit curve

Function Diagram



Notes:

1.) Safe function for pulse operation
at $0{,}8 \times U_N < U_{Imp} < 1{,}1 \times U_N$

t_e min = 20 ms
t_p min = 180 ms

2.) Safe thermal operation
at $1{,}1 \times U_N < U_{Imp}$
(voltage increase at pulse operation)

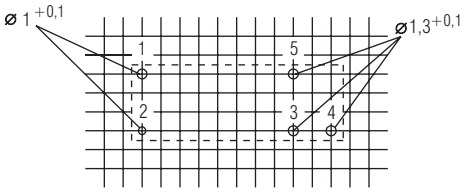
$$U_{Imp} = U_{Bmax} \times \sqrt{\frac{T}{t_e}}$$

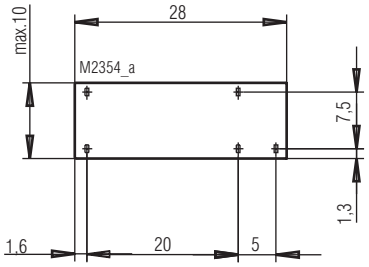
with: $t_e \leq 10s$

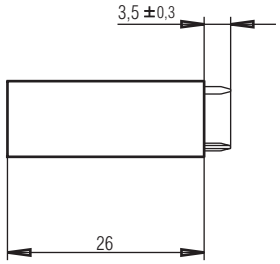
for: $t_e > 10s$ ... 100% ED
see operating voltage limit curve

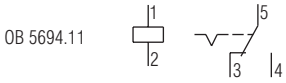
Dimensions, Pin Configuration, Connection Diagrams

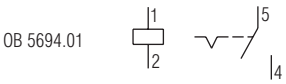
Drilling plan (solder side)

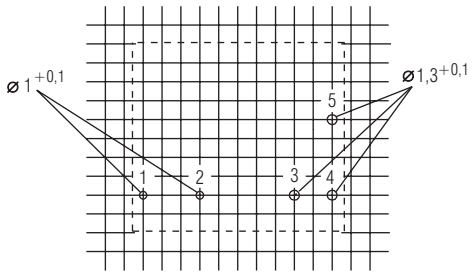


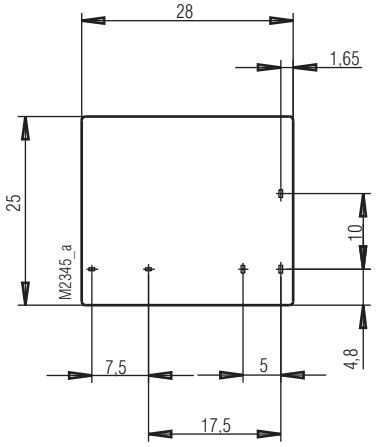


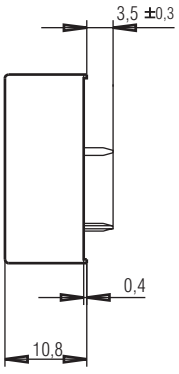


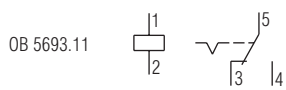


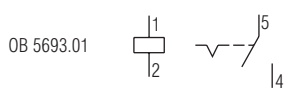












Connection for basic grid divensions 2.5 mm as well as 2.54 mm according to IEC/EN 60097 and IEC 60326 average