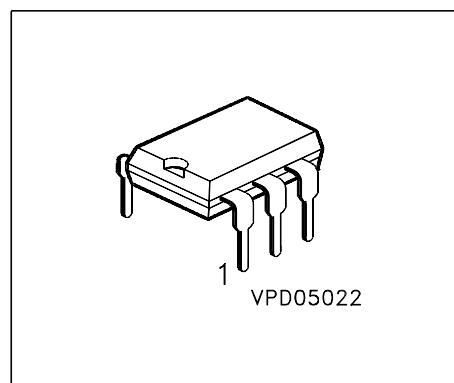


SITAC® AC Switches With Zero Voltage Switch

- AC switch with zero-voltage detector
- Electrically insulated between input and output circuit
- Microcomputer-compatible by very low trigger current
- UL-tested (file no. E 52744), code letter "J"
- Available with the following options:
Option 1: VDE 0884-approved
Option 6: Pins in 10.16 mm spacing
Option 7: Pins for surface mounting



Type	Opt.	V_{DRM}	I_{TRMS}	I_{FT}	dv/dt_{cr}	Marking	Ordering Code
BRT 21 H	-	400 V	300 mA	2 mA	10 kV/ μ s	BRT 21 H	C67079-A1020-A6
BRT 21 H	1 + 6	400 V	300 mA	2 mA	10 kV/ μ s	BRT 21 H	C67079-A1050-A16
BRT 22 H	-	600 V	300 mA	2 mA	10 kV/ μ s	BRT 22 H	C67079-A1021-A6
BRT 22 H	1	600 V	300 mA	2 mA	10 kV/ μ s	BRT 22 H	C67079-A1051-A5
BRT 22 H	7	600 V	300 mA	2 mA	10 kV/ μ s	BRT 22 H	C67079-A1051-A11
BRT 22 H	1 + 6	600 V	300 mA	2 mA	10 kV/ μ s	BRT 22 H	C67079-A1051-A16
BRT 22 H	1 + 7	600 V	300 mA	2 mA	10 kV/ μ s	BRT 22 H	C67079-A1051-A17
BRT 22 M	-	600 V	300 mA	3 mA	10 kV/ μ s	BRT 22 M	C67079-A1021-A10
BRT 22 M	1	600 V	300 mA	3 mA	10 kV/ μ s	BRT 22 M	C67079-A1051-A6
BRT 23 H	-	800 V	300 mA	2 mA	10 kV/ μ s	BRT 23 H	C67079-A1022-A6
BRT 23 H	6	800 V	300 mA	2 mA	10 kV/ μ s	BRT 23 H	C67079-A1052-A8
BRT 23 H	7	800 V	300 mA	2 mA	10 kV/ μ s	BRT 23 H	C67079-A1052-A11
BRT 23 H	1 + 6	800 V	300 mA	2 mA	10 kV/ μ s	BRT 23 H	C67079-A1052-A14
BRT 23 M	-	800 V	300 mA	3 mA	10 kV/ μ s	BRT 23 M	C67079-A1022-A10

Information	Package	Pin Configuration					
		1	2	3	4	5	6
50 pcs per tube	P-DIP-6	Anode	Cathode	not connected	A1	do not connect	A2

Maximum Ratings, at $T_j = 25\text{ °C}$, unless otherwise specified.

AC Switch

Parameter	Symbol	Value	Unit
Max. Power dissipation	P_{tot}	630	mW
Chip or operating temperature	T_j	-40 ...+ 100	°C
Storage temperature	T_{stg}	-40 ...+ 150	
Insulation test voltage ¹⁾ between input/output circuit (climate in acc. with DIN 40046, part2, Nov.74)	V_{IS}	5300	V_{RMS}
Reference voltage in acc. with VDE 0110 b (insulation group C)	V_{ref}	500 600	V_{RMS} V_{DC}
Creepage tracking resistance (in acc. with DIN IEC 112/VDE 0303, part 1)	C_{TI}	175	(group IIIa acc. to DIN VDE 0109)
Insulation resistance $V_{\text{IO}} = 500\text{ V}$, $T_A = 25\text{ °C}$ $V_{\text{IO}} = 500\text{ V}$, $T_A = 100\text{ °C}$	R_{is}	$\geq 10^{12}$ $\geq 10^{11}$	Ω
DIN humidity category, DIN 40 040	-	F	-
Creepage distance (input/output circuit)	-	≥ 7.2	mm
Clearance (input/output circuit)	-	≥ 7.2	

Input Circuit

Parameter	Symbol	Value	Unit
Param VR	V_R	6	V
Continuous forward current	I_F	20	mA
Surge forward current	$I_{\text{FSM(I)}}$	1.5	A
Max. power dissipation, $t \leq 10\text{ }\mu\text{s}$	P_{tot}	30	mW

Output Circuit

Parameter	Symbol	BRT 21	BRT 22	BRT 23	Unit
Repetitive peak off-state voltage	V_{DRM}	400	600	800	V
RMS on-state current	I_{TRMS}	300			mA
Single cycle surge current (50 Hz)	$I_{\text{TSM(I)}}$	3			A
Max. power dissipation	P_{tot}	600			mW

Characteristics

at $T_j = 25\text{ °C}$, unless otherwise specified.

Input Circuit

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Forward Voltage, $I_F = 10\text{ mA}$	V_F	-	1.1	1.35	V
Reverse current, $V_R = 6\text{ V}$	I_R	-	-	10	μA
Thermal resistance 2) junction - ambient	R_{thJA}	-	-	750	K/W

Output Circuit

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Critical rate of rise of off-state voltage $V_D = 0.67\text{ }V_{DRM}$, $T_j = 25\text{ °C}$ $V_D = 0.67\text{ }V_{DRM}$, $T_j = 80\text{ °C}$	dv/dt_{cr}	10 5	- -	- -	$\text{kV}/\mu\text{s}$
Critical rate of rise of voltage at current commutation $V_D = 0.67\text{ }V_{DRM}$, $T_j = 25\text{ °C}$, $di/dt_{crq} \leq 15\text{ A/ms}$ $V_D = 0.67\text{ }V_{DRM}$, $T_j = 80\text{ °C}$, $di/dt_{crq} \leq 15\text{ A/ms}$	dv/dt_{crq}	10 5	- -	- -	
Critical rate of rise of on-state current	di/dt_{cr}	8	-	-	$\text{A}/\mu\text{s}$
Pulse current $t_p \leq 5\text{ }\mu\text{s}$, $f = 100\text{ Hz}$, $di_{tp}/dt \leq 8\text{ A/ms}$	I_{tp}	-	-	2	A
On-state voltage, $I_T = 300\text{ mA}$	V_T	-	-	2.3	V
Off-state current $T_C = 25\text{ °C}$, V_{DRM} $T_C = 80\text{ °C}$, V_{DRM}	I_D	- -	7 12	30 100	μA
Holding current, $V_D = 10\text{ V}$	I_H	-	80	500	
Thermal resistance 2) junction - ambient	R_{thJA}	-	-	125	K/W

Response Characteristics

at $T_j = 25\text{ °C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Trigger current 1 $V_D = 6\text{ V}$ type H type M	I_{FT1}	0.4 0.4	- -	2 3	mA
Trigger current 2 $V_{op} = 220\text{ V}$, $f = 50\text{ Hz}$, $T_j = 100\text{ °C}$ $t_{pF} > 10\text{ ms}$ type H type M	I_{FT2}	- -	- -	6 9	
Trigger current temperature gradient	$\Delta I_{FT1}/\Delta T_j$ $\Delta I_{FT2}/\Delta T_j$	-	7	14	$\mu\text{A/K}$
Inhibit voltage, $I_F = I_{FT1}$	V_{DINH}	-	8	12	V
Inhibit voltage temperature gradient	$\Delta V_{DINH}/\Delta T_j$	-	-20	-	mV/K
Off-state current in inhibit state $I_F = I_{FT1}$, V_{DRM}	I_{DINH}	7	50	200	μA
Capacitance between input and output circuit $V_R = 0\text{ V}$, $f = 1\text{ kHz}$	C_{IO}	-	-	2	pF

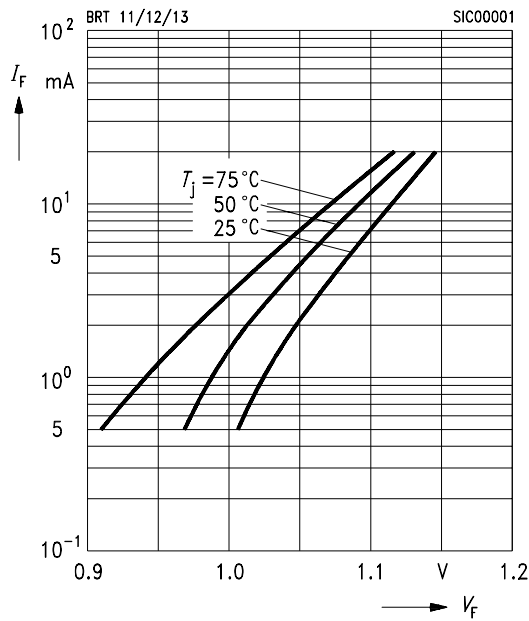
- 1) Static air, SITAC soldered in pcb or base plate.
- 2) Test AC voltage in acc. with DIN 57883, June 1980.
- 3) The SITAC switch is soldered in pcb or base plate.
- 4) Termocouple measurement has to be performed potentially separated to A1 and A2. The measuring junction should be as near as possible at the case.
- 5) The SITAC zero voltage switch can be triggered only in the hatched area below the T_j curves.

Characteristics

at $T_j = 25^\circ\text{C}$, unless otherwise specified.

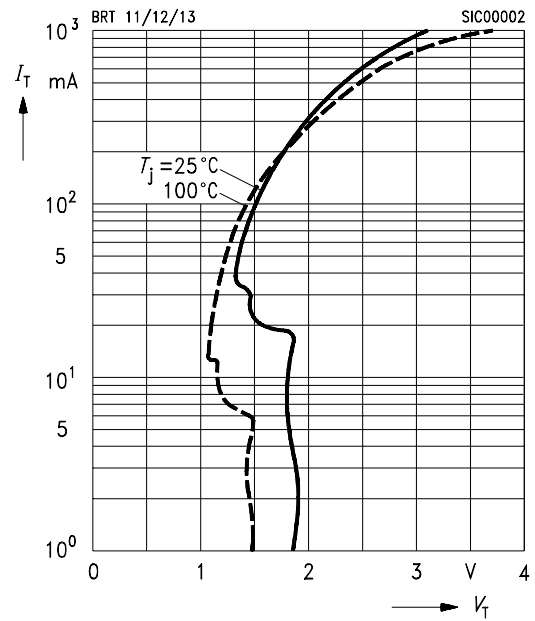
Typical input characteristics

$$I_F = f(V_F)$$



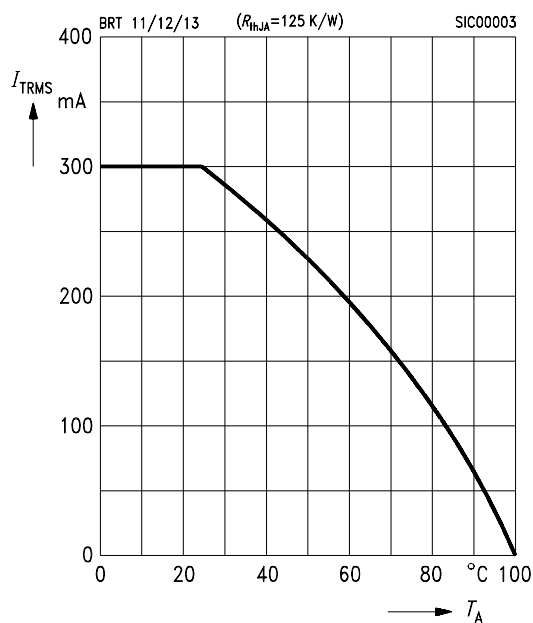
Typical output characteristics

$$I_T = f(V_T)$$



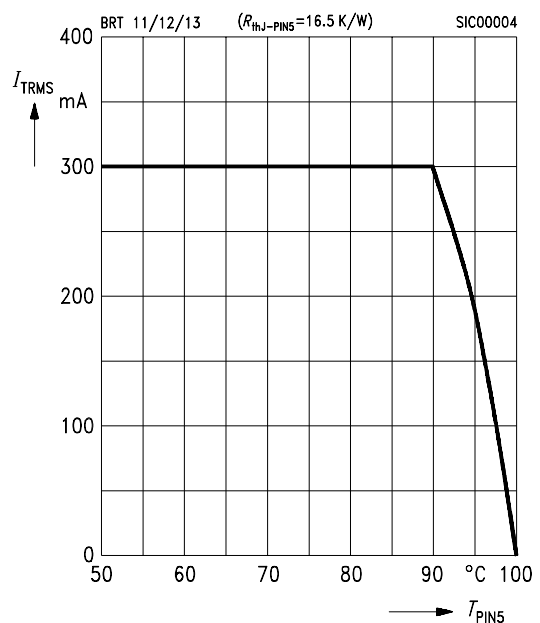
Current reduction $I_{\text{TRMS}} = f(T_A)$

$$R_{\text{thJA}} = 125 \text{ K/W } ^3)$$



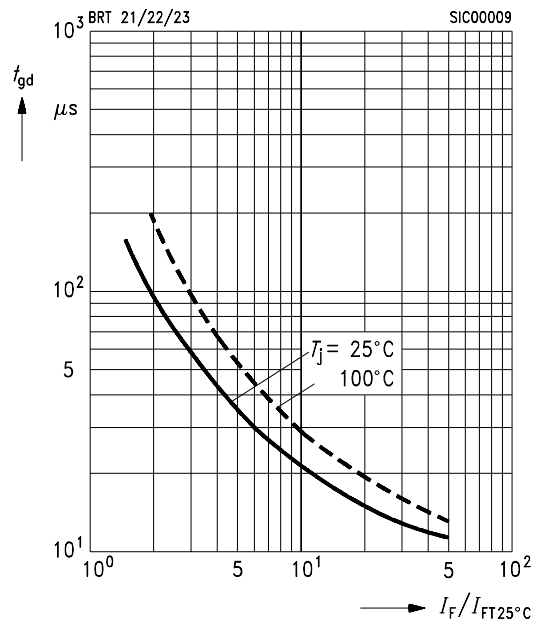
Current reduction $I_{\text{TRMS}} = f(T_{\text{PIN5}})$

$$R_{\text{thJ-PIN5}} = 16,5 \text{ K/W } ^4)$$



Typical trigger delay time $t_{gd} = f(I_F/I_{FT25^\circ C})$

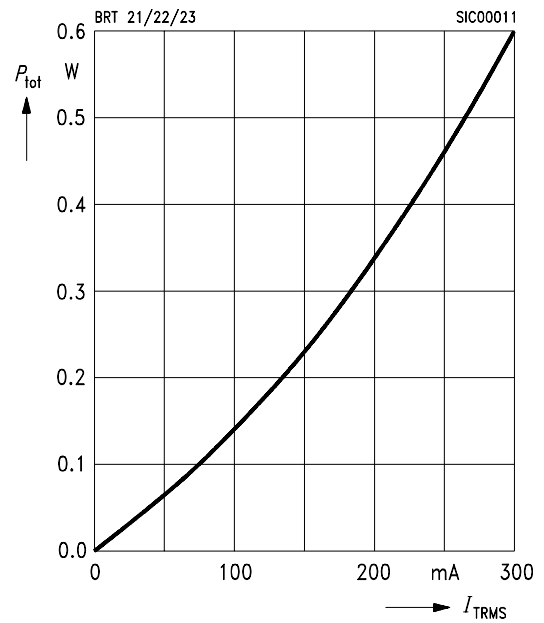
$V_D = 200V$



Power dissipation for 40 ... 60 Hz

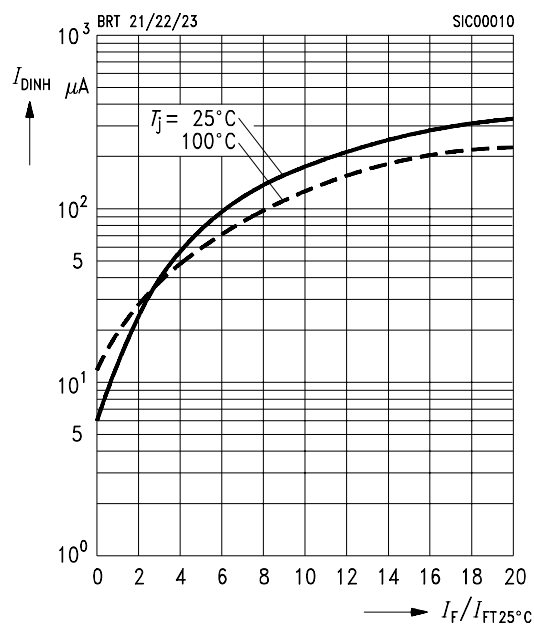
line operation

$P_{tot} = f(I_{TRMS})$



Typ. inhibit current $I_{DINH} = f(I_F/I_{FT25^\circ C})$

$V_D = 800V$



Typ. static inhibit voltage limit 5)

$V_{DINHmin} = f(I_F/I_{FT25^\circ C})$, parameter: T_j

