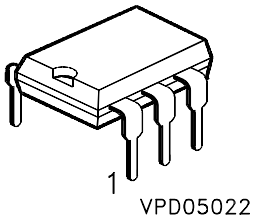
## SITAC® AC Switches
## With Zero Voltage Switch

- 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 sourface mounting




| Type | Opt. | $V_{DRM}$ | $I_{TRMS}$ | $I_{FT}$ | d$v$/d$t_{cr}$ | Marking | Ordering Code |
|---|---|---|---|---|---|---|---|
| BRT 21 H | - | 400 V | 300 mA | 2 mA | 10 kV/µs | BRT 21 H | C67079-A1020-A6 |
| BRT 21 H | 1 + 6 | 400 V | 300 mA | 2 mA | 10 kV/µs | BRT 21 H | C67079-A1050-A16 |
| BRT 22 H | - | 600 V | 300 mA | 2 mA | 10 kV/µs | BRT 22 H | C67079-A1021-A6 |
| BRT 22 H | 1 | 600 V | 300 mA | 2 mA | 10 kV/µs | BRT 22 H | C67079-A1051-A5 |
| BRT 22 H | 7 | 600 V | 300 mA | 2 mA | 10 kV/µs | BRT 22 H | C67079-A1051-A11 |
| BRT 22 H | 1 + 6 | 600 V | 300 mA | 2 mA | 10 kV/µs | BRT 22 H | C67079-A1051-A16 |
| BRT 22 H | 1 + 7 | 600 V | 300 mA | 2 mA | 10 kV/µs | BRT 22 H | C67079-A1051-A17 |
| BRT 22 M | - | 600 V | 300 mA | 3 mA | 10 kV/µs | BRT 22 M | C67079-A1021-A10 |
| BRT 22 M | 1 | 600 V | 300 mA | 3 mA | 10 kV/µs | BRT 22 M | C67079-A1051-A6 |
| BRT 23 H | - | 800 V | 300 mA | 2 mA | 10 kV/µs | BRT 23 H | C67079-A1022-A6 |
| BRT 23 H | 6 | 800 V | 300 mA | 2 mA | 10 kV/µs | BRT 23 H | C67079-A1052-A8 |
| BRT 23 H | 7 | 800 V | 300 mA | 2 mA | 10 kV/µs | BRT 23 H | C67079-A1052-A11 |
| BRT 23 H | 1 + 6 | 800 V | 300 mA | 2 mA | 10 kV/µs | BRT 23 H | C67079-A1052-A14 |
| BRT 23 M | - | 800 V | 300 mA | 3 mA | 10 kV/µs | 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 °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<br>600 | $V_{RMS}$<br>$V_{DC}$ |
| 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<br>$V_{IO}$ = 500 V, $T_A$ = 25 °C<br>$V_{IO}$ = 500 V, $T_A$ = 100 °C | $R_{is}$ | <br>$\geq 10^{12}$<br>$\geq 10^{11}$ | 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 | $I_{FSM(I)}$ | 1.5 | A |
| Max. power dissipation, $t \leq 10$ µs | $P_{tot}$ | 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) | $I_{TSM(I)}$ | 3 | | | A |
| Max. power dissipation | $P_{tot}$ | 600 | | | mW |

**Characteristics**

at $T_j$ = 25 °C, unless otherwise specified.

**Input Circuit**

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

**Output Circuit**

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

**Response Characteristics**

at $T_j$ = 25 °C, unless otherwise specified.

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| Trigger current 1<br>$V_D$ = 6 V | $I_{FT1}$ | | | | mA |
| type H | | 0.4 | - | 2 | |
| type M | | 0.4 | - | 3 | |
| Trigger current 2<br>$V_{op}$ = 220 V, $f$ = 50 Hz, $T_j$ = 100°C<br>$t_{pF}$ > 10 ms | $I_{FT2}$ | | | | |
| type H | | - | - | 6 | |
| type M | | - | - | 9 | |
| Trigger current temperature gradient | $\Delta I_{FT1}/\Delta T_j$<br>$\Delta I_{FT2}/\Delta T_j$ | - | 7 | 14 | µA/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<br>$I_F = I_{FT1}$ , $V_{DRM}$ | $I_{DINH}$ | 7 | 50 | 200 | µA |
| Capacitance between input and output circuit<br>$V_R$ = 0 V, $f$ = 1 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.

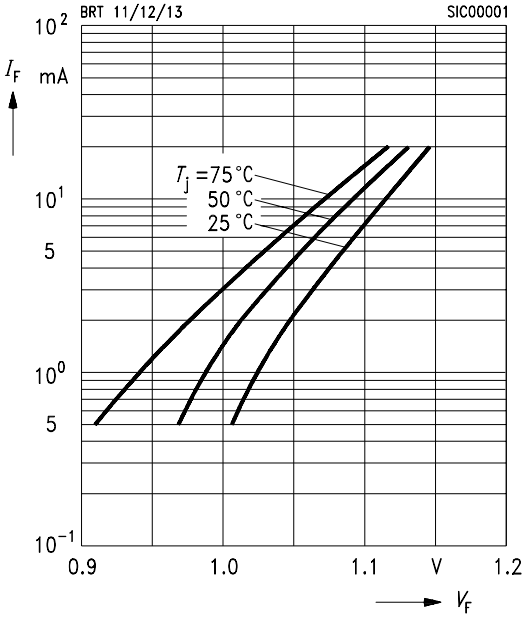
3) The SITAC switch is soldered in pcb or base plate.

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.

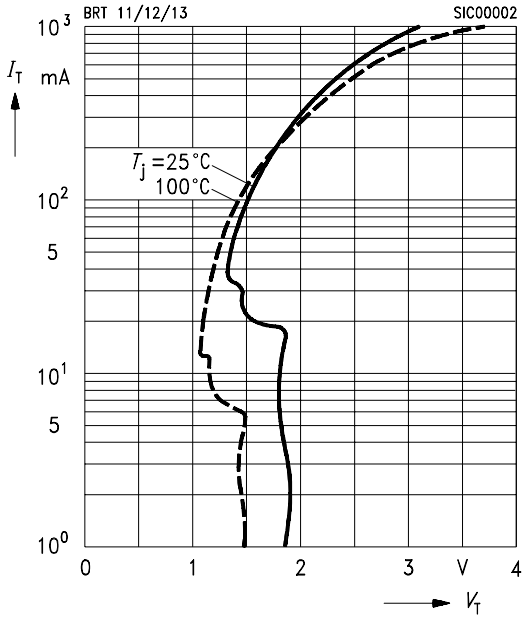
5) The SITAC zero voltage switch can be triggered only in the hatched area below the $T_j$ curves.

**Characteristics**
**at $T_j$ = 25 °C, unless otherwise specified.**

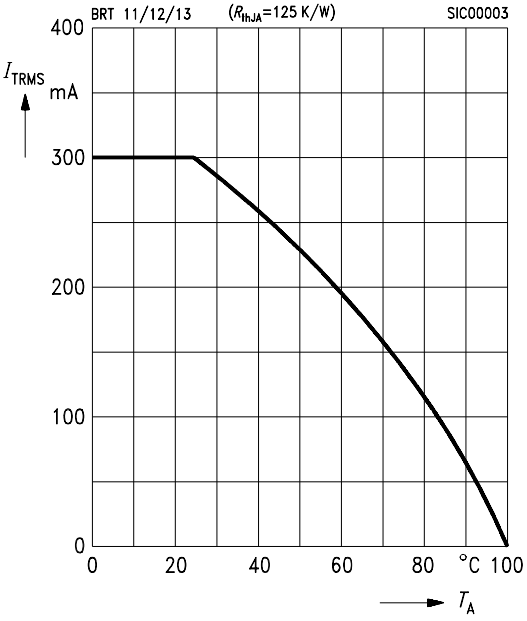
**Typical input characteristics**
$I_F = f(V_F)$



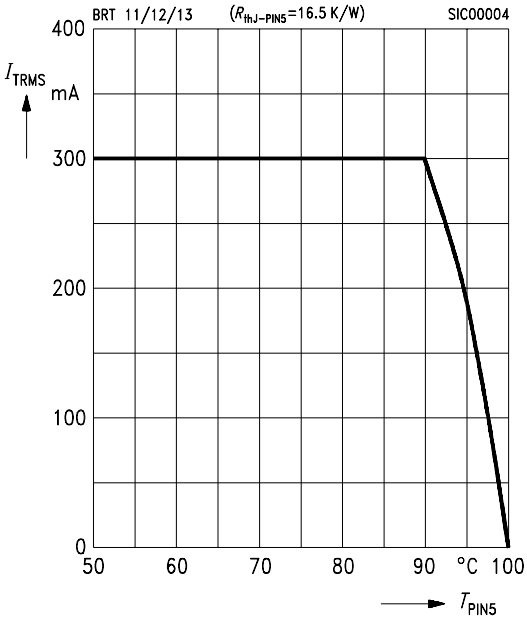

**Typical output characteristics**
$I_T = f(V_T)$



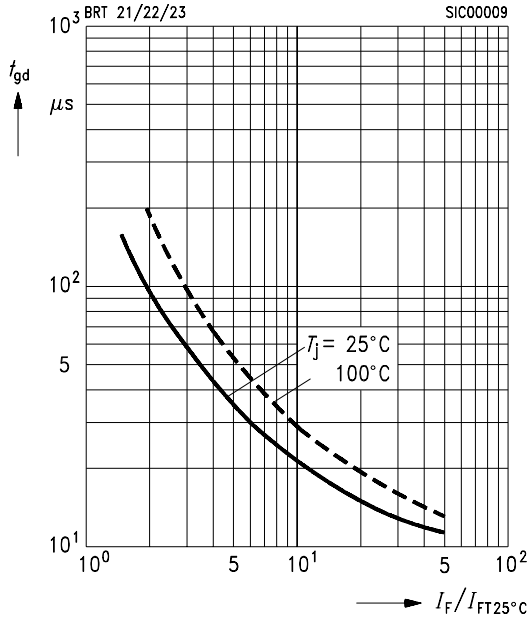

**Current reduction** $I_{TRMS} = f(T_A)$
$R_{thJA}$ = 125 K/W 3)



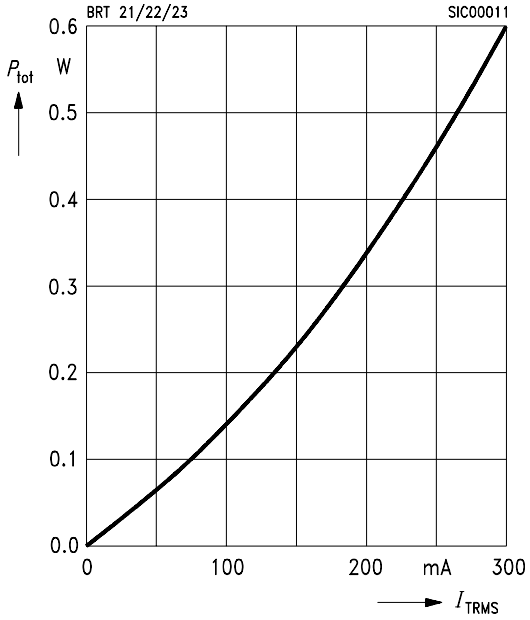

**Current reduction** $I_{TRMS} = f(T_{PIN5})$
$R_{thJ\text{-}PIN5}$ = 16,5 K/W 4)



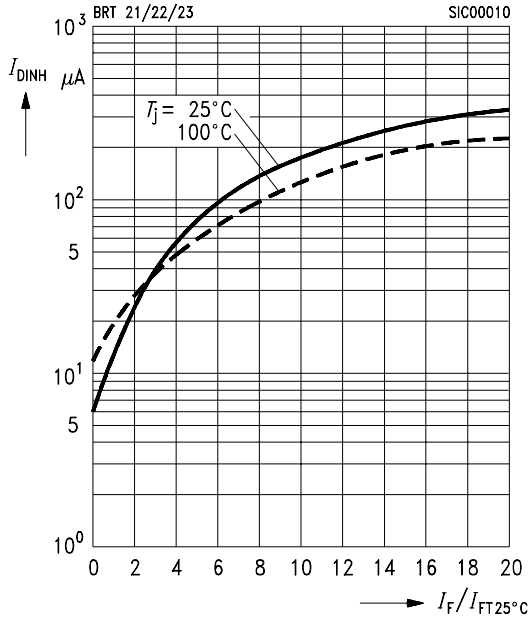
**Typical trigger delay time** $t_{gd} = f(I_F/I_{FT25°C})$
$V_D$ = 200V



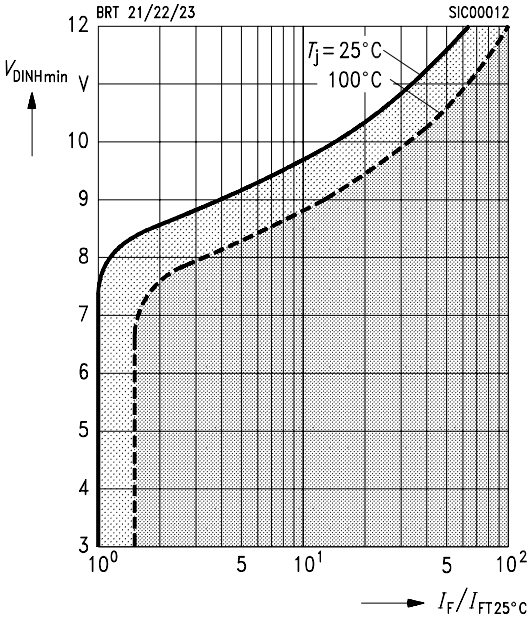

**Power dissipation** for 40 ... 60 Hz line operation
$P_{tot} = f(I_{TRMS})$




**Typ. inhibit current** $I_{DINH} = f(I_F/I_{FT\ 25°C})$
$V_D$ = 800 V




**Typ.static inhibit voltage limit** 5)
$V_{DINHmin} = f(I_F/I_{FT\ 25°C})$,parameter: $T_j$



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