| **ABSOLUTE MAXIMUM RATINGS** ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | | |
|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **PART** | **SYMBOL** | **VALUE** | **UNIT** |
| **INPUT** | | | | | |
| Reverse voltage | | | $V_R$ | 6 | V |
| Forward current | | | $I_F$ | 20 | mA |
| Surge forward current | | | $I_{FSM}$ | 1.5 | A |
| Power dissipation | t ≤ 10 µs | | $P_{diss}$ | 30 | mW |
| **OUTPUT** | | | | | |
| Repetitive peak off-state voltage | | BRT11 | $V_{DRM}$ | 400 | V |
| | | BRT12 | $V_{DRM}$ | 600 | V |
| | | BRT13 | $V_{DRM}$ | 800 | V |
| RMS on-state current | | | $I_{TRMS}$ | 300 | mA |
| Single cycle surge current | 50 Hz | | $I_{TSM}$ | 3 | A |
| Power dissipation | | | $P_{diss}$ | 600 | mW |
| **COUPLER** | | | | | |
| Maximum power dissipation | | | $P_{tot}$ | 630 | mW |
| Isolation test voltage (between emitter and detector, climate per DIN 500414, part 2, Nov. 74) (1) | | | $V_{ISO}$ | 5300 | $V_{RMS}$ |
| Reference voltage in accordance with VDE 0110 b | | | $V_{ref}$ | 500 | $V_{RMS}$ |
| Reference voltage in accordance with VDE 0110 b (insulation group C) | | | $V_{ref}$ | 600 | $V_{DC}$ |
| Creepage distance | | | | ≥ 7.2 | mm |
| Clearance distance | | | | ≥ 7.2 | mm |
| Comparative tracking index per DIN IEC 112/VDE 0303 part 1 | group IIIa according to DIN VDE 0109 | | CTI | ≥ 175 | |
| Isolation resistance | $V_{IO}$ = 500 V, $T_{amb}$ = 25 °C | | $R_{IO}$ | ≥ $10^{12}$ | Ω |
| | $V_{IO}$ = 500 V, $T_{amb}$ = 100 °C | | $R_{IO}$ | ≥ $10^{11}$ | Ω |
| Storage temperature range | | | $T_{stg}$ | - 40 to + 150 | °C |
| Ambient temperature range | | | $T_{amb}$ | - 40 to + 100 | °C |

**Notes**

- Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of this document. Exposure to absolute maximum ratings for extended periods of the time can adversely affect reliability.

(1) Test AC voltage in accordance with DIN 57883, June 1980.

| **ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **PARAMETER** | **TEST CONDITION** | **PART** | **SYMBOL** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| **INPUT** | | | | | | | |
| Forward voltage | $I_F$ = 10 mA | | $V_F$ | | 1.1 | 1.35 | V |
| Reverse current | $V_R$ = 6 V | | $I_R$ | | | 10 | µA |
| Thermal resistance, junction to ambient (1) | | | $R_{thJA}$ | | | 750 | °C/W |
| **OUTPUT** | | | | | | | |
| Peak off-state voltage | $I_{D(RMS)}$ = 100 µA | BRT11 | $V_{DM}$ | | 400 | | µA |
| | | BRT12 | | | 600 | | µA |
| | | BRT13 | | | 800 | | µA |
| Off-state current | $T_C$ = 80 °C, $V_{DRM}$ | | $I_D$ | | 0.5 | 100 | µA |
| On-state voltage | $I_T$ = 300 mA | | $V_T$ | | | 2.3 | V |
| Pulse current | $t_p \le 5$ µs, f = 100 Hz, $dI_{tp}/dt \le 8$ A/µs | | $I_{tp}$ | | | 2 | A |
| Critical rate of rise of off-state voltage | $V_D$ = 0.67 $V_{DRM}$, $T_j$ = 25 °C | | $dV/dt_{cr}$ | 10 | | | kV/µs |
| | $V_D$ = 0.67 $V_{DRM}$, $T_j$ = 80 °C | | $dV/dt_{cr}$ | 5 | | | kV/µs |
| Critical rate of rise of voltage at current commutation | $V_D$ = 0.67 $V_{DRM}$, $T_j$ = 25 °C, $dI/dt_{crq} \le 15$ A/ms | | $dV/dt_{crq}$ | 10 | | | kV/µs |
| | $V_D$ = 0.67 $V_{DRM}$, $T_j$ = 80 °C, $dI/dt_{crq} \le 15$ A/ms | | $dV/dt_{crq}$ | 5 | | | kV/µs |
| Critical rate of rise of on-state at current | | | $dI/dt_{cr}$ | 8 | | | A/µs |
| Holding current | $V_D$ = 10 V | | $I_H$ | | 80 | 500 | µA |
| Thermal resistance, junction to ambient | | | $R_{thJA}$ | | | 125 | °C/W |
| **COUPLER** | | | | | | | |
| Trigger current | $V_D$ = 10 V, F - versions | | $I_{FT}$ | | | 1.2 | mA |
| | $V_D$ = 10 V, H - versions | | $I_{FT}$ | 0.4 | | 2 | mA |
| | $V_D$ = 10 V, M - versions | | $I_{FT}$ | 0.8 | | 3 | mA |
| Trigger current temperature gradient | | | $\Delta I_{FT}/\Delta T_j$ | | 7 | 14 | µA/°C |
| Capacitance (input to output) | f = 1 MHz, $V_R$ = 0 V | | $C_{IO}$ | | | 2 | pF |

**Notes**

- Minimum and maximum values are testing requirements. Typical values are characteristics of the device and are the result of engineering evaluation. Typical values are for information only and are not part of the testing requirements.

(1) Static air, SITAC soldered in PCB or base plate.

## TYPICAL CHARACTERISTICS ($T_{amb}$ = 25 °C, unless otherwise specified)

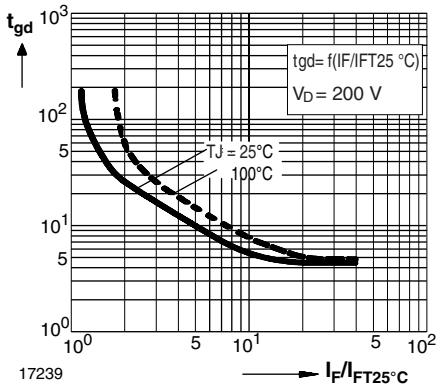



Fig. 1 - Typical Trigger Delay Time

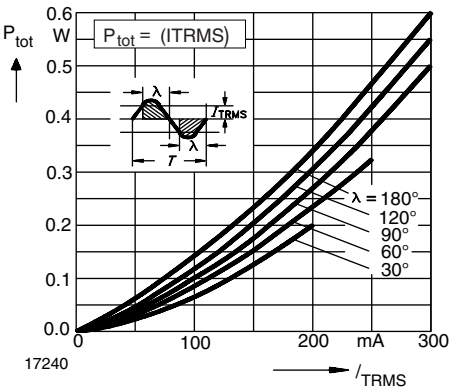



Fig. 2 - Power Dissipation 60 Hz to 60 Hz Line Operation

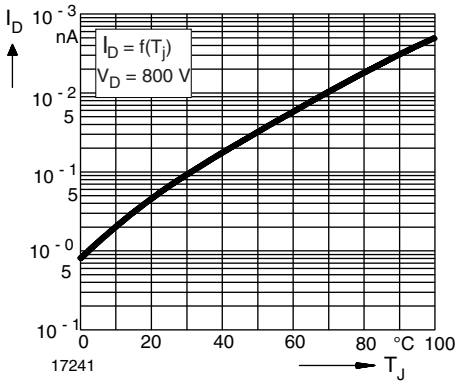



Fig. 3 - Typical Off-State Current

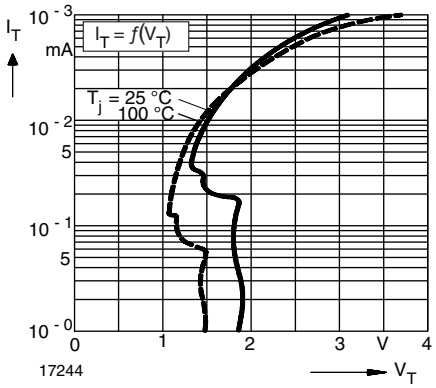



Fig. 6 - Typical Output Characteristics

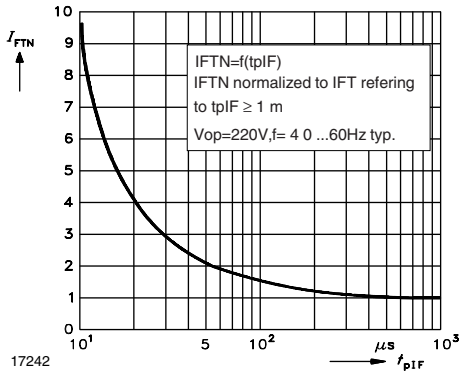



Fig. 4 - Pulse Trigger Current

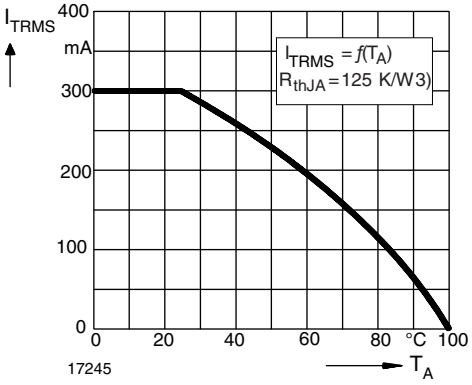



Fig. 7 - Current Reduction

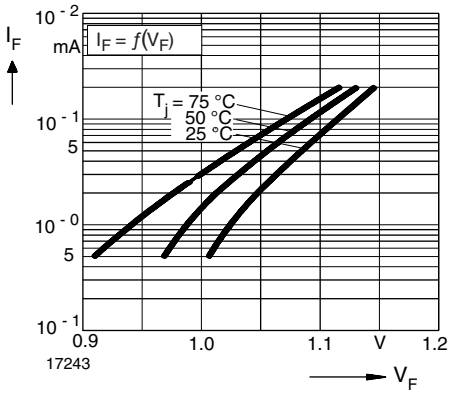



Fig. 5 - Typical Input Characteristics

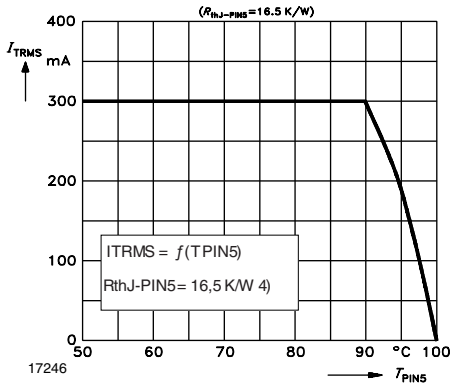
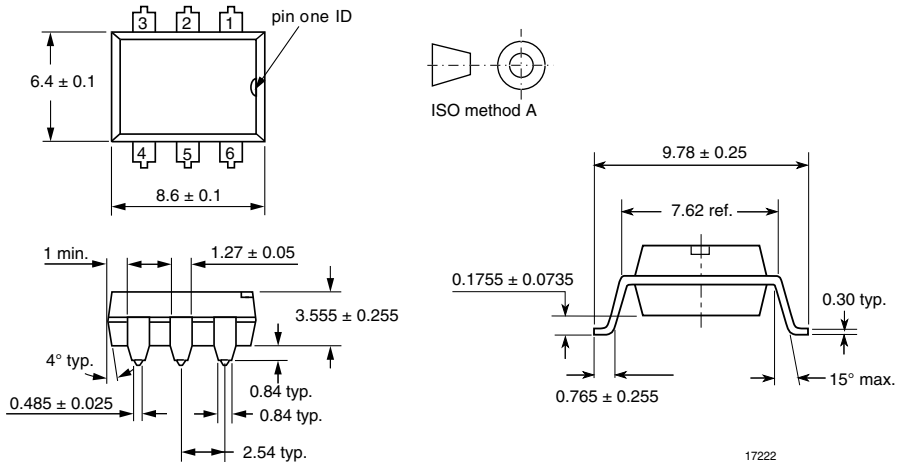
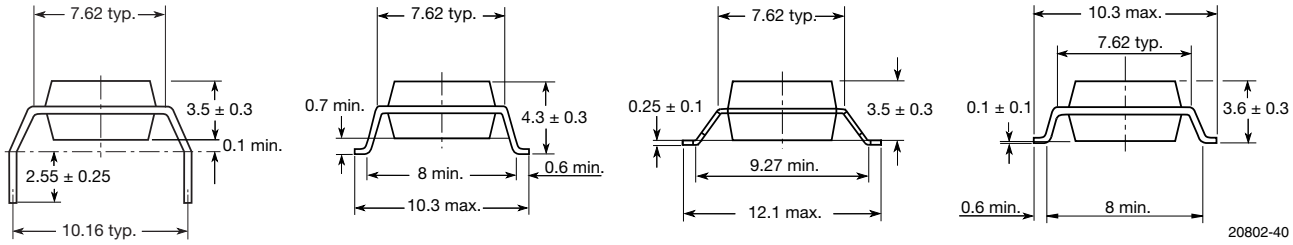



Fig. 8 - Current Reduction

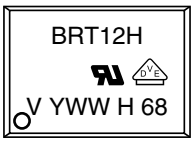
## PACKAGE DIMENSIONS in millimeters




**Option 6** **Option 7** **Option 8** **Option 9**




## PACKAGE MARKING (example)




**Notes**

- Only options 1, and 7 are reflected in the package marking.
- The VDE logo is only marked on option 1 parts.
- Tape and reel suffix (T) is not part of the package marking.

# Disclaimer

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