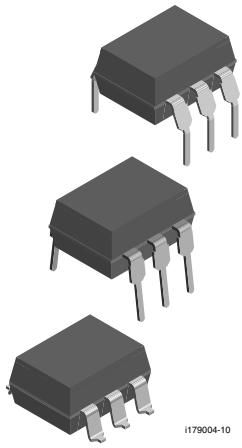
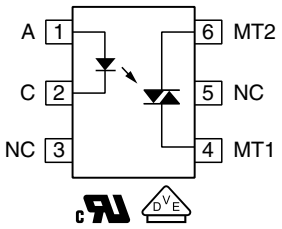
Optocoupler, Phototriac Output, Non-Zero Crossing





FEATURES

- I_{TRMS} = 300 mA
- High static dV/dt < 10 000 V/µs
- Electrically insulated between input and output circuit
- Microcomputer compatible - very low trigger current
- Trigger current
  - (I_{FT} < 1.2 mA) BRT12**F**
  - (I_{FT} < 2 mA) BRT11**H**, BRT12**H**, BRT13**H**
  - (I_{FT} < 3 mA) BRT11**M**, BRT12**M**, BRT13**M**
- Non-zero voltage detectors high input sensitivity
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free

e3

RoHS COMPLIANT

DESCRIPTION

The BRT11, BRT12, and BRT13 product family consists of AC optocouplers non-zero voltage detectors consisting of two electrically insulated lateral power ICs which integrate a thyristor system, a photo detector and noise suppression at the output and an IR GaAs diode input.

APPLICATIONS

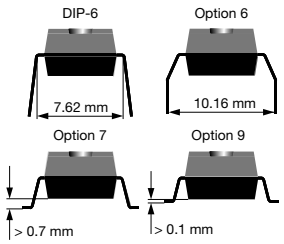
- Industrial controls
- Office equipment
- Consumer appliances

AGENCY APPROVALS

- UL 1577, file no. E52744 system code H
- DIN EN 60747-5-2 (VDE 0844)/DIN EN 60747-5-5 (pending) available with option 1
- CQC

ORDERING INFORMATION

B	R	T	1	#	x	-	X	0	#	#	T
PART NUMBER							PACKAGE OPTION				TAPE AND REEL



AGENCY CERTIFIED/PACKAGE	V_{DRM} (V)						
	≤ 400		≤ 600			≤ 800	
UL	**I_{FT} = 2 mA**	**I_{FT} = 3 mA**	**I_{FT} = 1.2 mA**	**I_{FT} = 2 mA**	**I_{FT} = 3 mA**	**I_{FT} = 2 mA**	**I_{FT} = 3 mA**
DIP-6	BRT11H	BRT11M	BRT12F	BRT12H	BRT12M	BRT13H	BRT13M
DIP-6, 400 mil, option 6	-	-	BRT12F-X006	BRT12H-X006	-	BRT13H-X006	-
SMD-6, option 7	-	-	BRT12F-X007T (1)	BRT12H-X007T (1)	-	BRT13H-X007T (1)	-
SMD-6, option 9	-	-	-	BRT12H-X009T	-	BRT13H-X009T	-
UL, VDE	**I_{FT} = 2 mA**	**I_{FT} = 3 mA**	**I_{FT} = 1.2 mA**	**I_{FT} = 2 mA**	**I_{FT} = 3 mA**	**I_{FT} = 2 mA**	**I_{FT} = 3 mA**
DIP-6	-	-	-	BRT12H-X001	BRT12M-X001	-	-
DIP-6, option 6	-	-	BRT12F-X016	BRT12H-X016	BRT12M-X016	BRT13H-X016	-
SMD-6, option 7	-	-	-	-	-	BRT13H-X017T (1)	-

Note

(1) Also available in tube, do not put T on the end.

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)

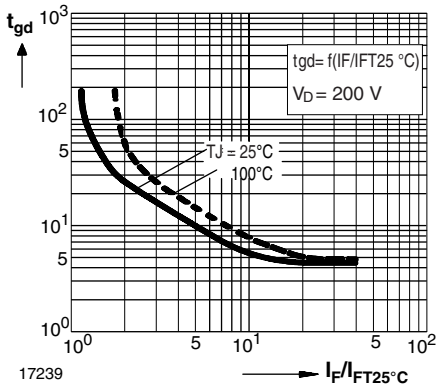


Fig. 1 - Typical Trigger Delay Time

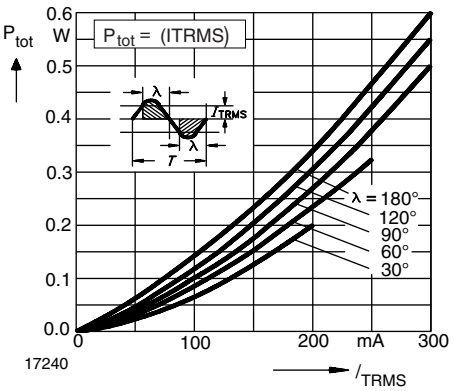


Fig. 2 - Power Dissipation 60 Hz to 60 Hz Line Operation

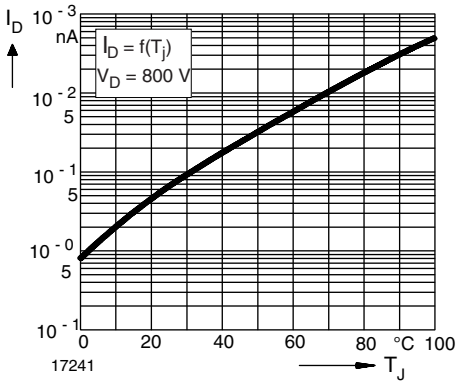


Fig. 3 - Typical Off-State Current

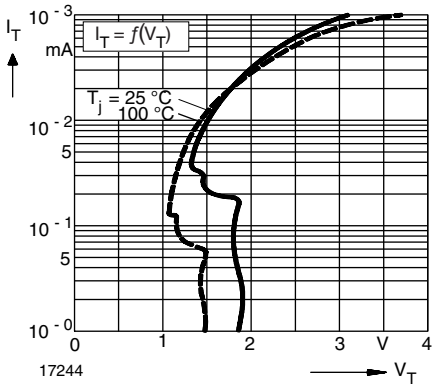


Fig. 6 - Typical Output Characteristics

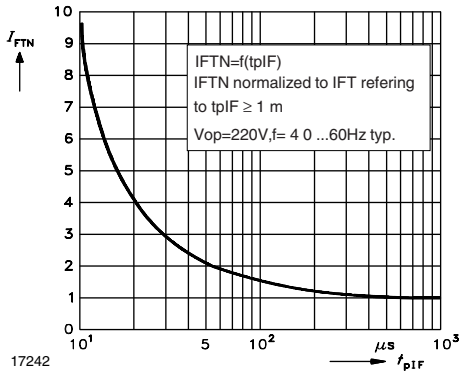


Fig. 4 - Pulse Trigger Current

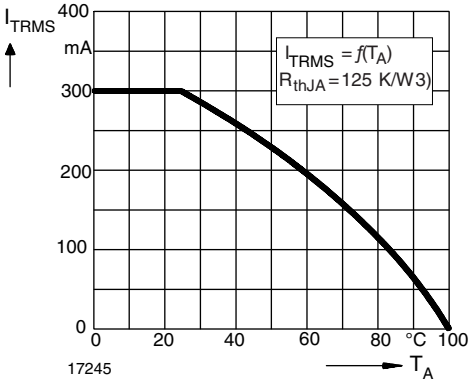


Fig. 7 - Current Reduction

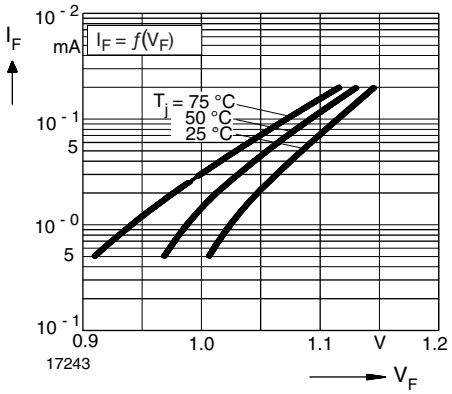


Fig. 5 - Typical Input Characteristics

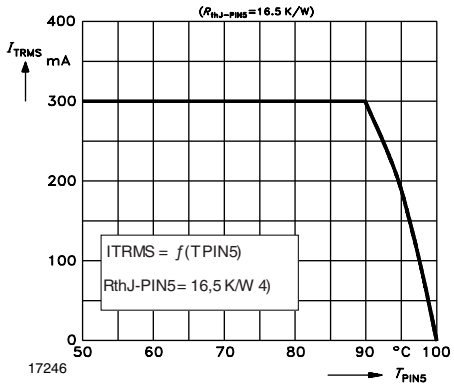
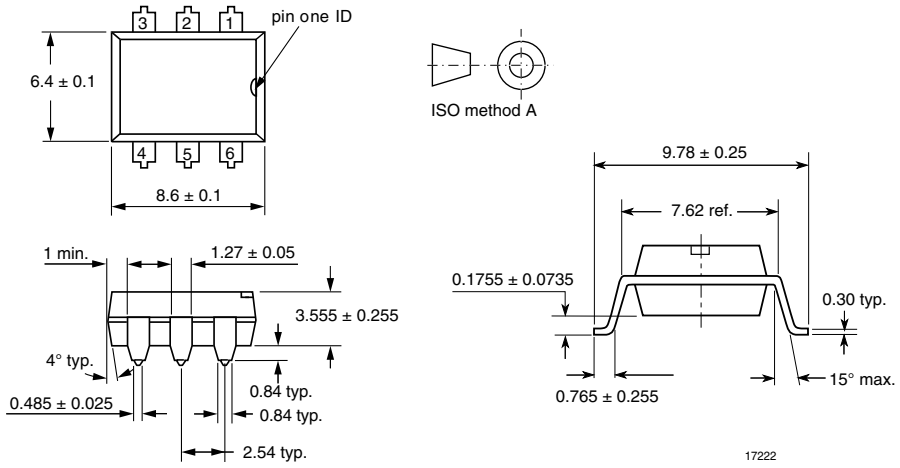
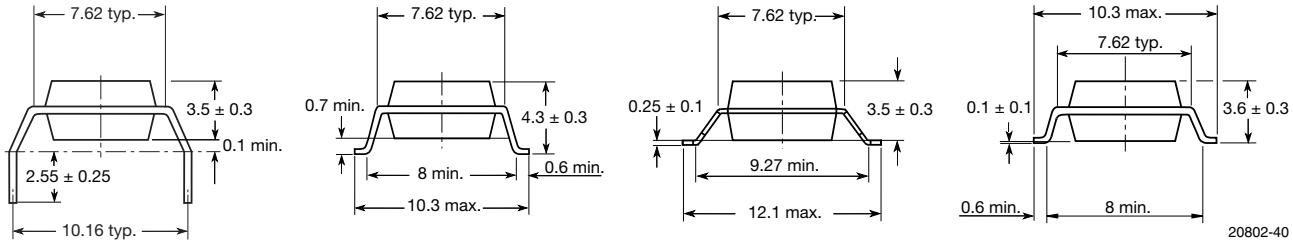


Fig. 8 - Current Reduction

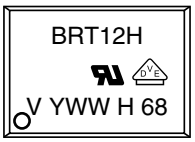
PACKAGE DIMENSIONS in millimeters



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.

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