

FEATURES

- $V_{DRM}=400$ to 800 V
- $I_{TRMS}=300$ mA
- $dv/dt_{cr} \geq 10,000$ V/ μ s
- Electrically Insulated Between Input and Output Circuit
- Microcomputer Compatible—Very Low Trigger Current
- Trigger Current:
 - BRT11/12/13 H, <2 mA
 - BRT11/12/13 M, <3 mA
- Options Available:
 - Option 1—Per VDE 0884
 - Option 6—Leads with $0.4"$ (10.16 mm) Spacing
 - Option 7—Lead Bends for Surface Mounting
- DIP-6 Package
- Underwriters Lab File #E52744, Code Letter "J"

Maximum Ratings ($T_J=25^\circ\text{C}$ unless otherwise specified)

Input Circuit

Reverse Voltage	6 V
Continuous Forward Current	20 mA
Surge Forward Current, $t \leq 10 \mu\text{s}$	1.5 A
Maximum Power Dissipation	30 mW

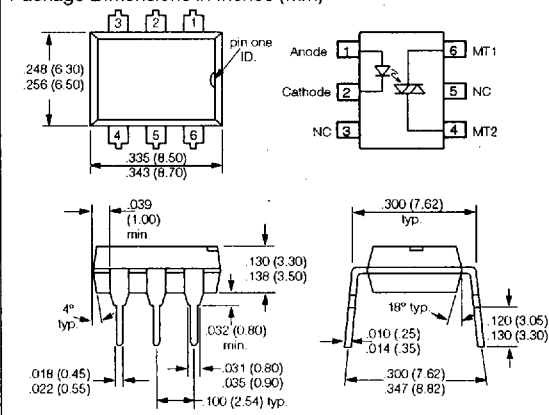
Output Circuit

Repetitive Peak Off-State Voltage	
BRT11	400 V
BRT12	600 V
BRT13	800 V
RMS On-State Current	300 mA
Single Cycle Surge Current (50 Hz)	3 A
Maximum Power Dissipation	600 mW

AC Switch

Insulation Test Voltage	
Between Input/Output Circuit	
(Climax per DIN 40 046, Part 2, Nov. 74)	5300 VDC
Reference Voltage per VDE 0110b	
(Insulation Group C)	500VAC _{eff} /600 VDC
Creepage Distance (input/output circuit)	≥ 8.2 mm
Clearance (input/output circuit)	7.2 mm
Creepage Tracking Resistance per DIN IEC 112/VDE 0303, part 1	175 Group IIIa per DIN VDE 0109
Insulation Resistance	
$V_{IO}=500$ V, $T_A=25^\circ\text{C}$	$10^{12} \Omega$
$V_{IO}=500$ V, $T_A=100^\circ\text{C}$	$10^{11} \Omega$
Humidity Category (DIN 40 040)	F
Maximum Power Dissipation	630 mW
Operating Temperature Range	-40°C to $+100^\circ\text{C}$
Storage Temperature Range	-40°C to $+150^\circ\text{C}$

Package Dimensions in Inches (mm)



DESCRIPTION

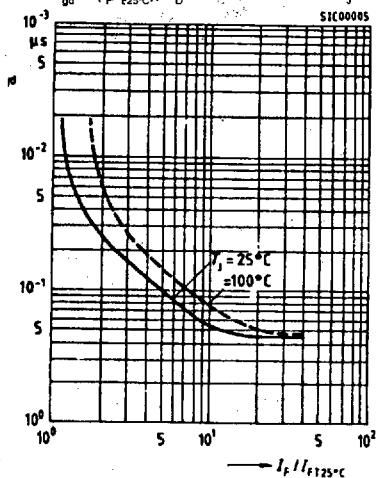
The BRT11/12/13 are AC switch optocouplers without zero voltage detectors consisting of two electrically insulated lateral power ICs which integrate a thyristor system, a photo detector and noise suppression at the output and an IR GaAs diode at the input.

Characteristics ($T_J=25^\circ\text{C}$, unless otherwise specified)

	Symbol	Min.	Typ.	Max.	Unit	Condition
Input Circuit						
Forward Voltage	V_F		1.1		V	$I_F=10$ mA
Reverse Current	I_R		10		μ A	$V_R=6$ V
Thermal Resistance ⁽¹⁾			750		K/W	
Junction to Ambient R_{thJA}						
Output Circuit						
On-State Voltage	V_T		2.3		V	$I_T=300$ mA
Off-State Current	I_D	0.5	100		μ A	$T_J=100^\circ\text{C}$, V_{DRM}
Holding Current	I_H	80	500		μ A	$V_D=10$ V
Critical Rate of Rise:						
Off-Stage Voltage	dv/dt_{cr}	1000			V/ μ s	$T_J=25^\circ\text{C}$, $V_D=0.67 V_{DRM}$
	dv/dt_{cr}	5000			V/ μ s	$T_J=80^\circ\text{C}$, $V_D=0.67 V_{DRM}$
						$V_D=0.67 V_{DRM}$, $di/dt_{cr} \leq 15$ A/ms
Voltage at Current Commutation						$T_J=25^\circ\text{C}$
	dv/dt_{crq}	10000			V/ μ s	$T_J=80^\circ\text{C}$
	dv/dt_{crq}	5000			V/ μ s	
On-State Current	I_T		8		A/ μ s	
Thermal Resistance						
Junction to Ambient R_{thJA}			125		K/W	
Package						
Trigger Current	I_{FT}					
Type H			2.0		mA	$V_D=10$ V
Type M			3.0		mA	$V_D=10$ V
Input-Output Capacitance	C_{IO}		2		pF	$V_{IO}=0$, $f=1$ MHz

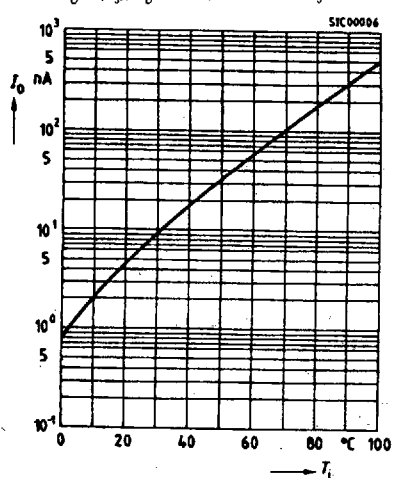
Typical trigger delay time

$t_{gd} = f(I_F/I_{F125^\circ C})$, $V_D = 200$ V, Parameter: T_J



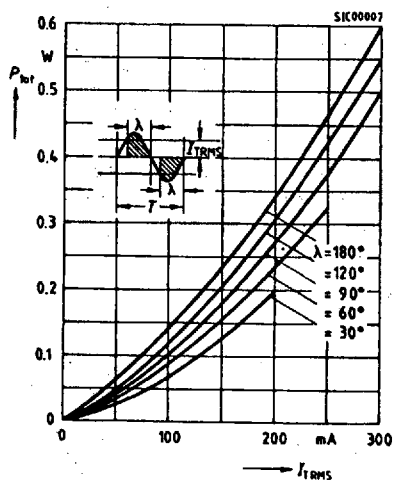
Typical off-state current

$I_o = f(T_J)$, $V_D = 800$ V, Parameter: T_J



Power dissipation—for 40 to 60 Hz line operation

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



Pulse trigger current

$I_{FTN} = f(t_{DIF})$, I_{FTN} normalized to I_{FT} referring to $t_{DIF} \leq 1$ ms, $V_{OP} = 220$ V, $f = 40$ to 60 Hz typical

