

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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# BCR20KM-12L

## Triac

### Medium Power Use

(The product guaranteed maximum junction temperature of 150°C)

REJ03G0467-0200

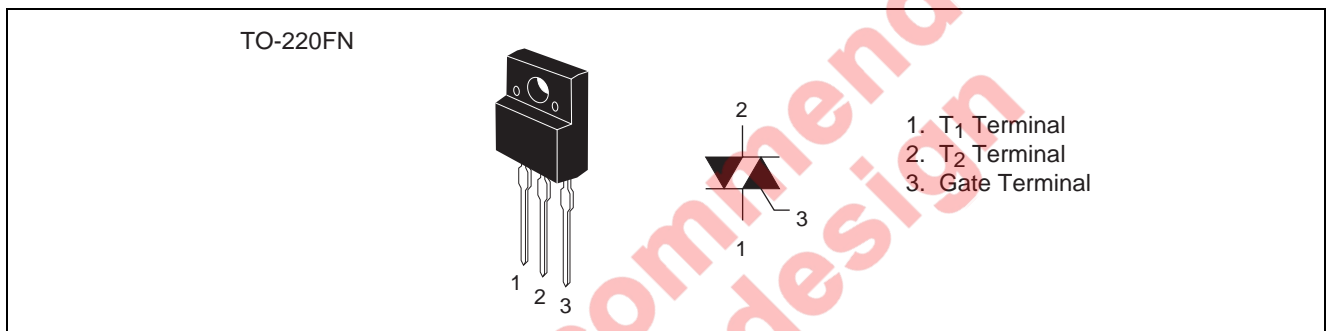
Rev.2.00

Nov.09.2004

## Features

- $I_{T(RMS)}$  : 20 A
- $V_{DRM}$  : 600 V
- $I_{FGTI}$ ,  $I_{RGTI}$ ,  $I_{RGT}$  : 30 mA (20 mA)<sup>Note5</sup>
- Viso : 2000 V
- Insulated Type
- Planar Passivation Type

## Outline



## Applications

Vacuum cleaner, electric heater, light dimmer, copying machine, and other general controlling devices

## Warning

1. Refer to the recommended circuit values around the triac before using.
2. Be sure to exchange the specification before using. Otherwise, general triacs with the maximum junction temperature of 125°C will be supplied.

## Maximum Ratings

Parameter	Symbol	Voltage class	Unit
		12	
Repetitive peak off-state voltage <sup>Note1</sup>	$V_{DRM}$	600	V
Non-repetitive peak off-state voltage <sup>Note1</sup>	$V_{DSM}$	720	V

**BCR20KM-12L (The product guaranteed maximum junction temperature of 150°C)**

Parameter	Symbol	Ratings	Unit	Conditions
RMS on-state current	$I_T$ (RMS)	20	A	Commercial frequency, sine full wave 360° conduction, $T_c = 110^\circ\text{C}$
Surge on-state current	$I_{TSM}$	200	A	60Hz sinewave 1 full cycle, peak value, non-repetitive
$I^2t$ for fusing	$I^2t$	167	$\text{A}^2\text{s}$	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current
Peak gate power dissipation	$P_{GM}$	5	W	
Average gate power dissipation	$P_{G(AV)}$	0.5	W	
Peak gate voltage	$V_{GM}$	10	V	
Peak gate current	$I_{GM}$	2	A	
Junction temperature	$T_j$	- 40 to +150	$^\circ\text{C}$	
Storage temperature	$T_{stg}$	- 40 to +150	$^\circ\text{C}$	
Mass	—	2.0	g	Typical value
Isolation voltage	Viso	2000	V	$T_a = 25^\circ\text{C}$ , AC 1 minute, $T_1 \cdot T_2 \cdot G$ terminal to case

Notes: 1. Gate open.

**Electrical Characteristics**

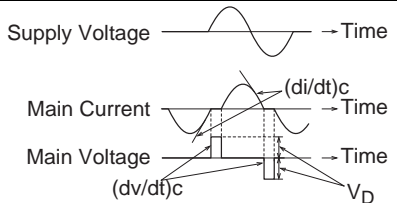
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Repetitive peak off-state current	$I_{DRM}$	—	—	2.0/3.0	mA	$T_j = 125^\circ\text{C}/150^\circ\text{C}$ , $V_{DRM}$ applied
On-state voltage	$V_{TM}$	—	—	1.5	V	$T_c = 25^\circ\text{C}$ , $I_{TM} = 30\text{ A}$ , Instantaneous measurement
Gate trigger voltage <sup>Note2</sup>	I $V_{FGTI}$	—	—	1.5	V	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$
	II $V_{RGTI}$	—	—	1.5	V	
	III $V_{RGTIII}$	—	—	1.5	V	
Gate trigger current <sup>Note2</sup>	I $I_{FGTI}$	—	—	30 <sup>Note5</sup>	mA	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $R_L = 6\ \Omega$ , $R_G = 330\ \Omega$
	II $I_{RGTI}$	—	—	30 <sup>Note5</sup>	mA	
	III $I_{RGTIII}$	—	—	30 <sup>Note5</sup>	mA	
Gate non-trigger voltage	$V_{GD}$	0.2/0.1	—	—	V	$T_j = 125^\circ\text{C}/150^\circ\text{C}$ , $V_D = 1/2\ V_{DRM}$
Thermal resistance	$R_{th(j-c)}$	—	—	2.0	$^\circ\text{C}/\text{W}$	Junction to case <sup>Note3</sup>
Critical-rate of rise of off-state commutating voltage <sup>Note4</sup>	$(dv/dt)_c$	10/1	—	—	$\text{V}/\mu\text{s}$	$T_j = 125^\circ\text{C}/150^\circ\text{C}$

Notes: 2. Measurement using the gate trigger characteristics measurement circuit.

3. The contact thermal resistance  $R_{th(c-f)}$  in case of greasing is  $0.5^\circ\text{C}/\text{W}$ .

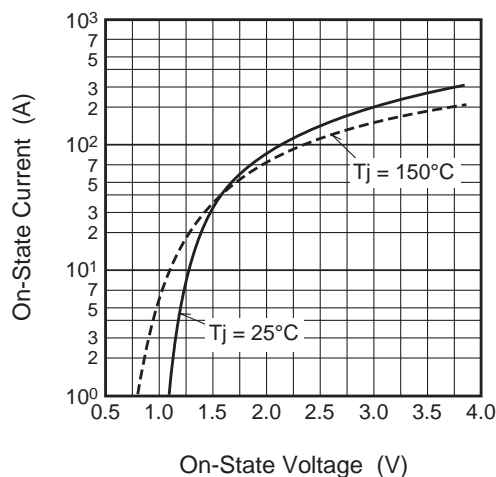
4. Test conditions of the critical-rate of rise of off-state commutating voltage is shown in the table below.

5. High sensitivity ( $I_{GT} \leq 20\text{ mA}$ ) is also available. ( $I_{GT}$  item: 1)

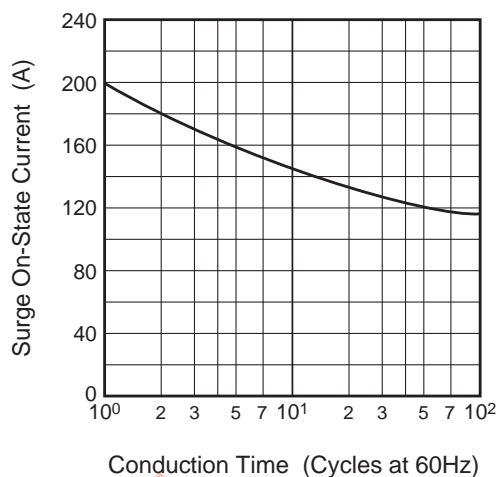
Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature $T_j = 125^\circ\text{C}/150^\circ\text{C}$ 2. Rate of decay of on-state commutating current $(di/dt)_c = -10\text{ A/ms}$ 3. Peak off-state voltage $V_D = 400\text{ V}$	

## Performance Curves

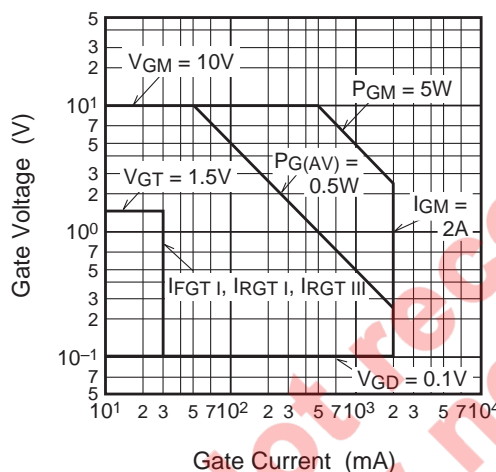
Maximum On-State Characteristics



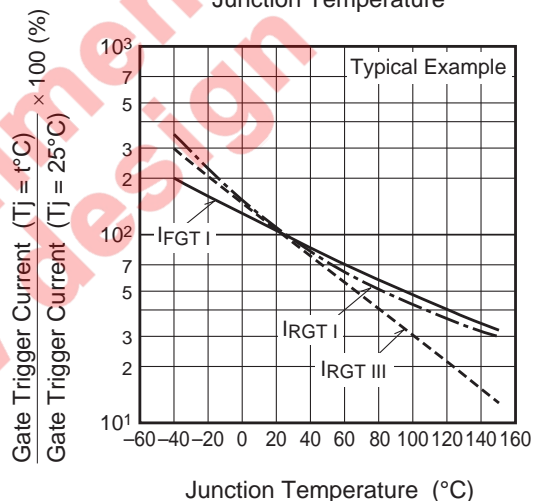
Rated Surge On-State Current



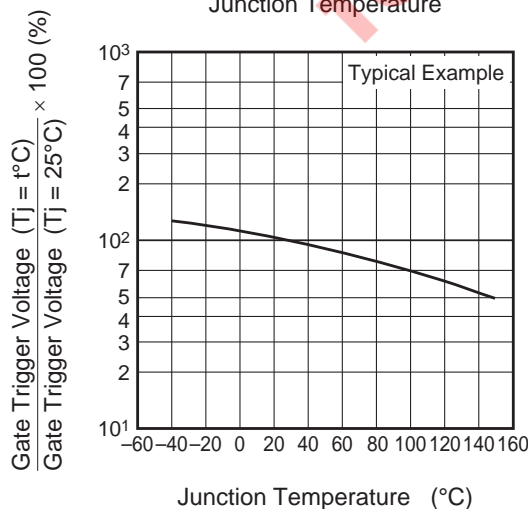
Gate Characteristics (I, II and III)



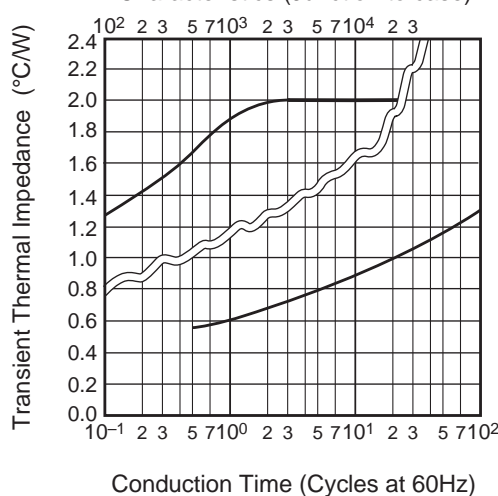
Gate Trigger Current vs. Junction Temperature

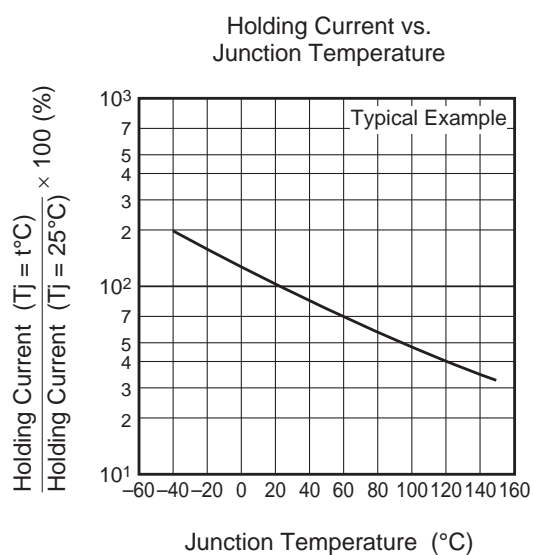
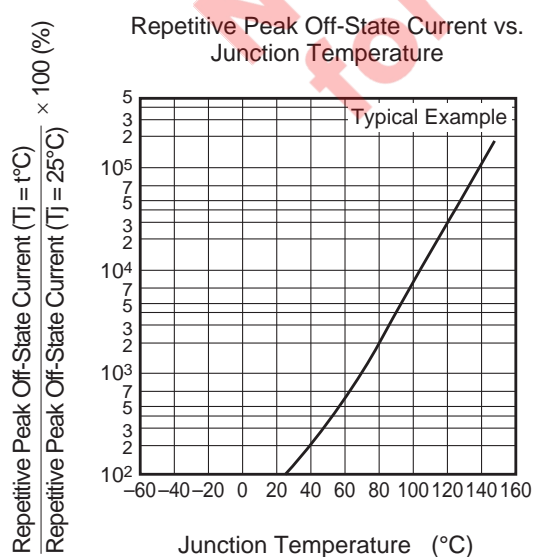
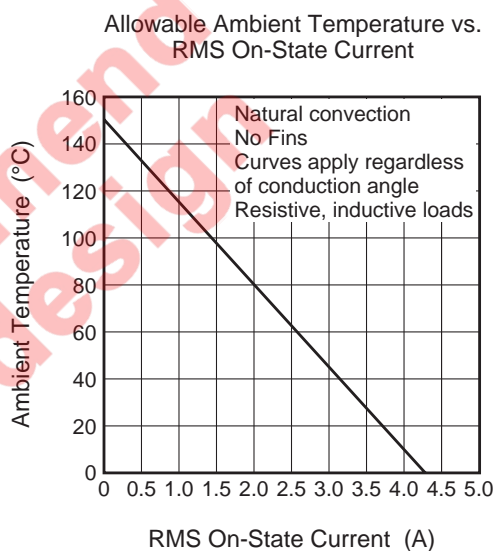
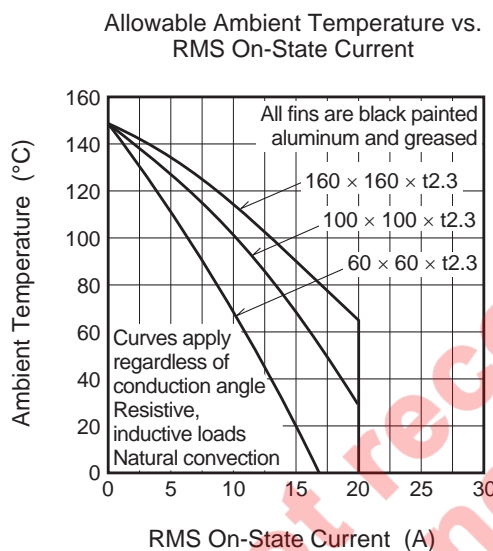
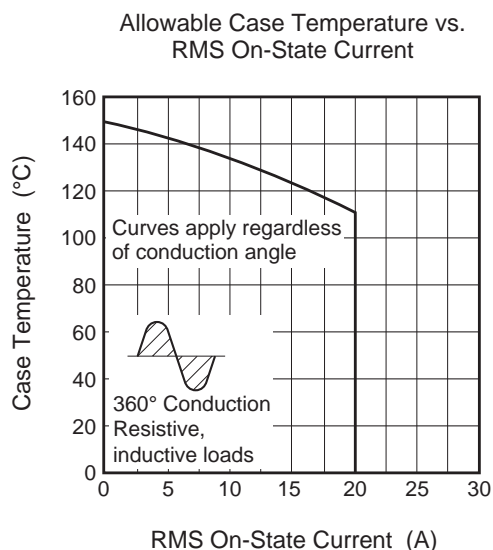
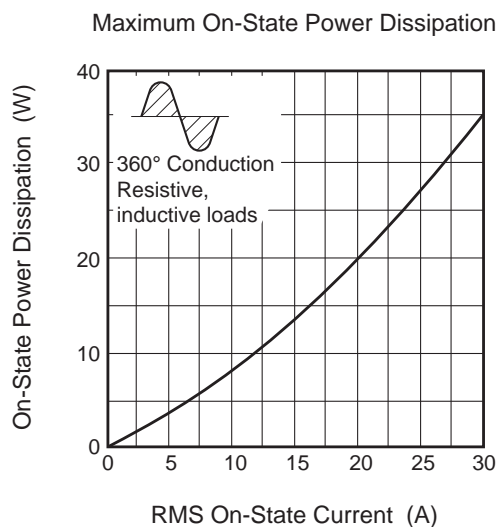


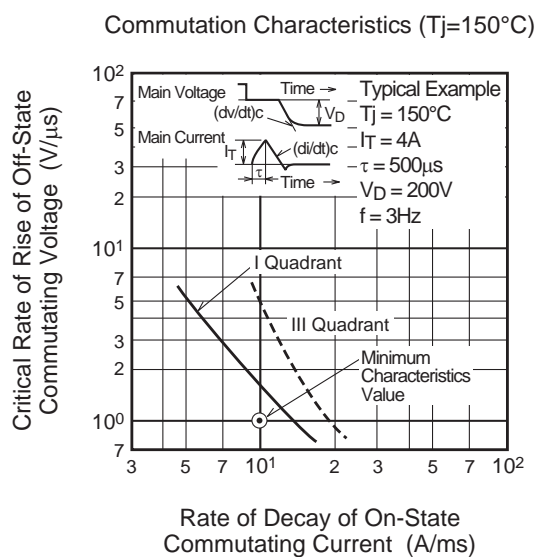
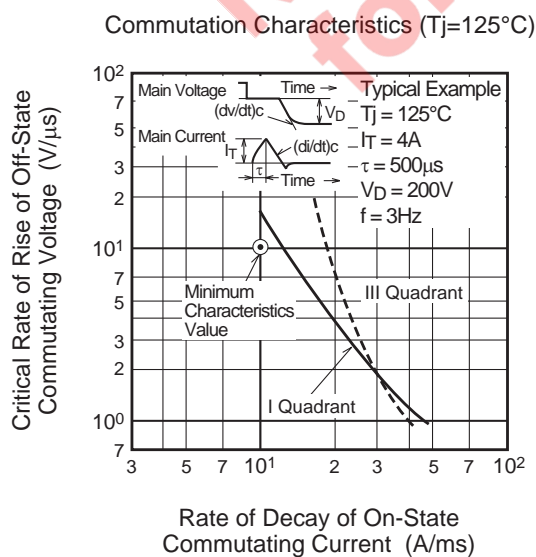
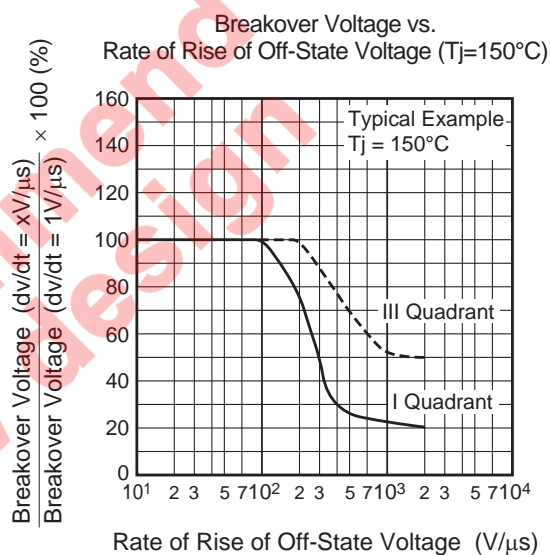
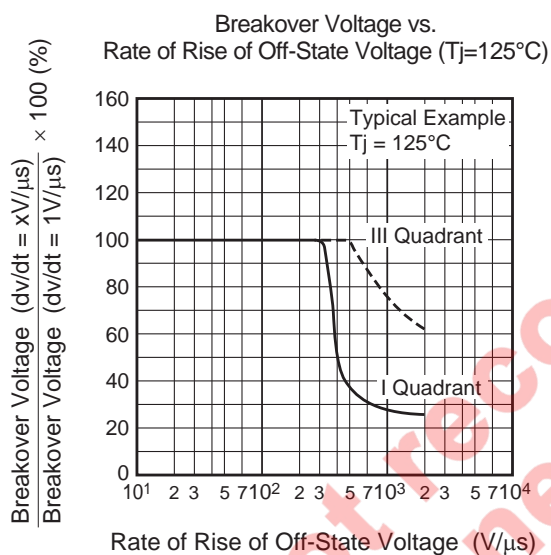
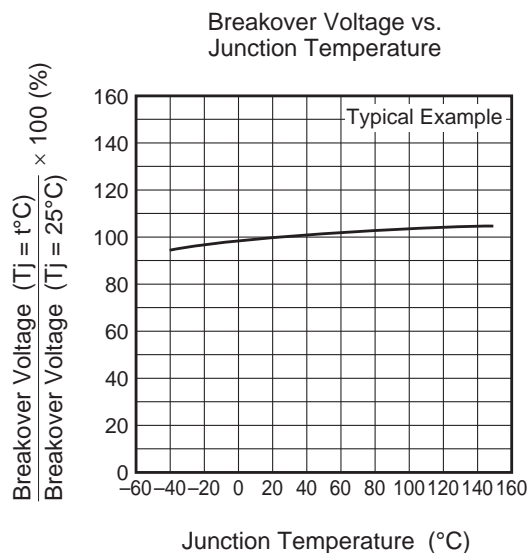
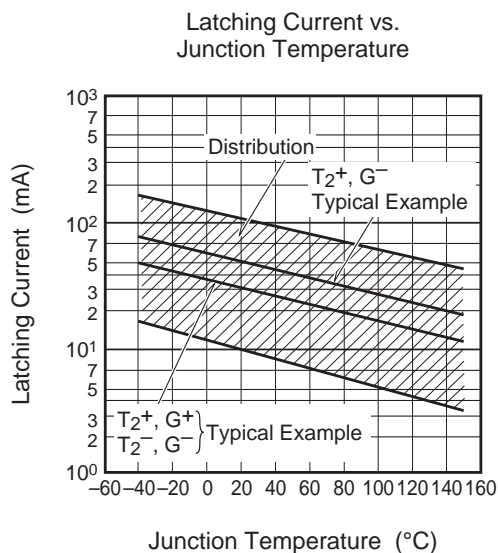
Gate Trigger Voltage vs. Junction Temperature

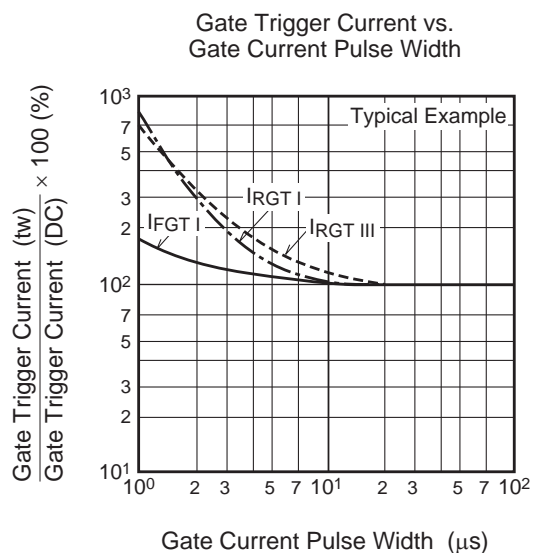


Maximum Transient Thermal Impedance Characteristics (Junction to case)

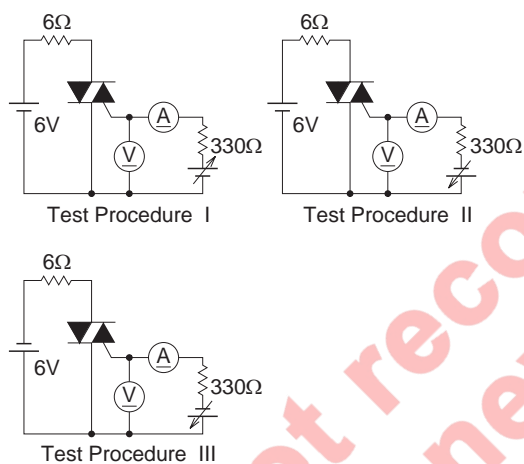




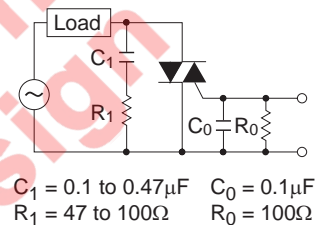




Gate Trigger Characteristics Test Circuits



Recommended Circuit Values Around The Triac

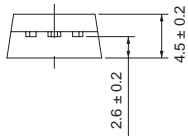
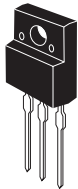
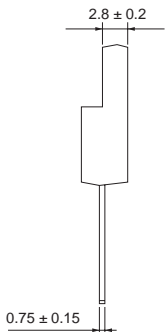
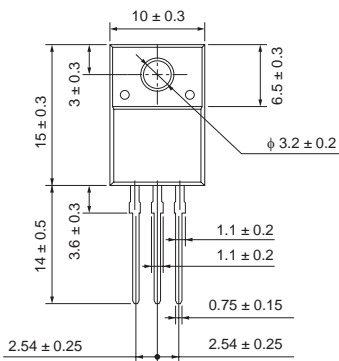




Package Dimensions

TO-220FN

EIAJ Package Code	JEDEC Code	Mass (g) (reference value)	Lead Material
—	—	2.0	Cu alloy



Note 1) The dimensional figures indicate representative values unless otherwise the tolerance is specified.

Symbol	Dimension in Millimeters		
	Min	Typ	Max
A	—	—	—
A <sub>1</sub>	—	—	—
A <sub>2</sub>	—	—	—
b	—	—	—
D	—	—	—
E	—	—	—
e	—	—	—
x	—	—	—
y	—	—	—
y <sub>1</sub>	—	—	—
ZD	—	—	—
ZE	—	—	—

Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Straight type	Plastic Magazine (Tube)	50	Type name +B	BCR20KM-12LB
Lead form	Plastic Magazine (Tube)	50	Type name +B – Lead forming code	BCR20KM-12LB-A8

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