


BCR20AM

MEDIUM POWER USE

NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

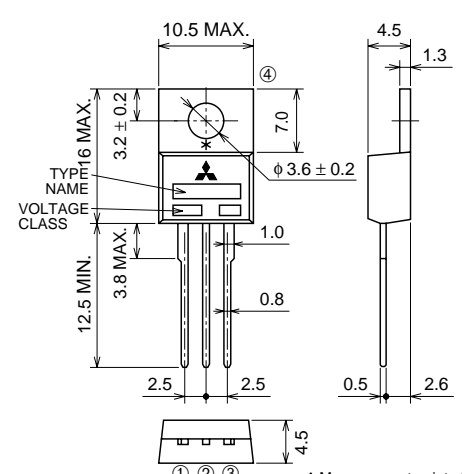
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

BCR20AM



- IT (RMS) 20A
- VDRM 600V
- IFGT I , IRGT I , IRGT III 20mA

OUTLINE DRAWING Dimensions in mm



① T1 TERMINAL
② T2 TERMINAL
③ GATE TERMINAL
④ T2 TERMINAL

TO-220

APPLICATION

Vacuum cleaner, light dimmer, copying machine, other control of motor and heater

MAXIMUM RATINGS

Symbol	Parameter	Voltage class	
		12	Unit
VDRM	Repetitive peak off-state voltage*1	600	V
VDSM	Non-repetitive peak off-state voltage*1	720	V

Symbol	Parameter	Conditions	Ratings	Unit
IT (RMS)	RMS on-state current	Commercial frequency, sine full wave 360° conduction, Tc=109°C*3	20	A
ITSM	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	200	A
I ² _t	I ² _t for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	167	A ² s
P _{GM}	Peak gate power dissipation		5	W
P _{G (AV)}	Average gate power dissipation		0.5	W
V _{GM}	Peak gate voltage		10	V
I _{GM}	Peak gate current		2	A
T _j	Junction temperature		-40 ~ +125	°C
T _{stg}	Storage temperature		-40 ~ +125	°C
—	Weight	Typical value	2.0	g

*1. Gate open.

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Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
IDRM	Repetitive peak off-state current	T _j =125°C, V _{DRM} applied	—	—	2.0	mA
V _{TM}	On-state voltage	T _c =25°C, I _{TM} =30A	—	—	1.5	V
V _{FGT I}	Gate trigger voltage*2	T _j =25°C, V _D =6V, R _L =6Ω, R _G =330Ω	I	—	1.5	V
V _{RGT I}			II	—	1.5	V
V _{RGT III}			III	—	1.5	V
I _{FGT I}	Gate trigger current*2	T _j =25°C, V _D =6V, R _L =6Ω, R _G =330Ω	I	—	20	mA
I _{RGT I}			II	—	20	mA
I _{RGT III}			III	—	20	mA
V _{GD}	Gate non-trigger voltage	T _j =125°C, V _D =1/2V _{DRM}	0.2	—	—	V
R _{th(j-c)}	Thermal resistance	Junction to case *3 *4	—	—	0.8	°C/W
(dv/dt) _c	Critical-rate of rise of off-state commutating voltage *5	T _j =125°C	10	—	—	V/μs

*2. Measurement using the gate trigger characteristics measurement circuit.

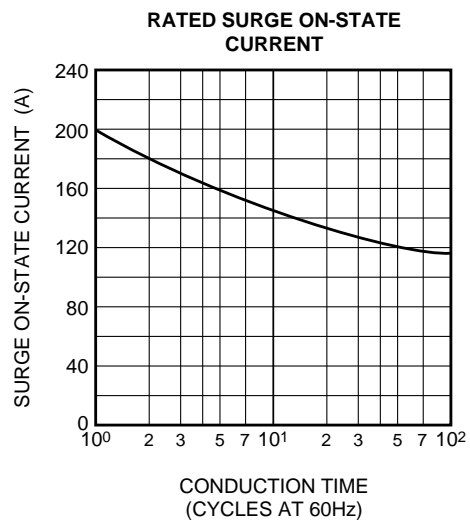
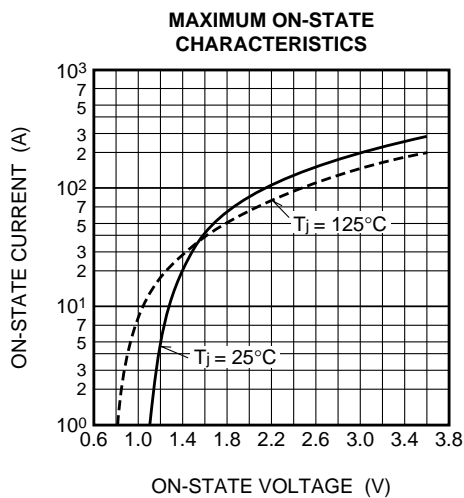
*3. Case temperature is measured at the T2 terminal 1.5mm away from the molded case.

*4. The contact thermal resistance R_{th(c-f)} in case of greasing is 1°C/W.

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

Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature T _j =125°C 2. Rate of decay of on-state commutating current (di/dt) _c =-10A/ms 3. Peak off-state voltage V _D =400V	

PERFORMANCE CURVES

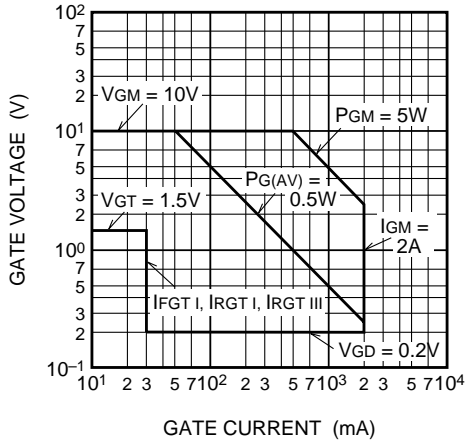


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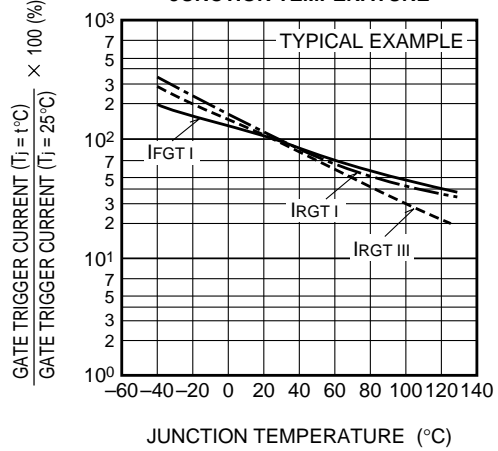
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

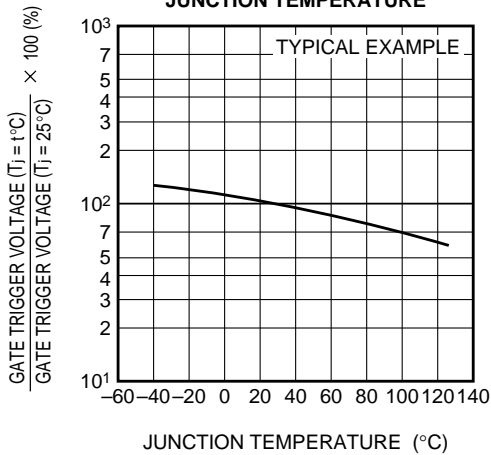
GATE CHARACTERISTICS (I, II AND III)



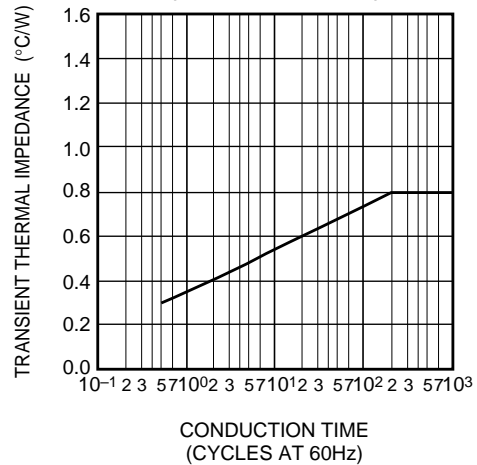
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE



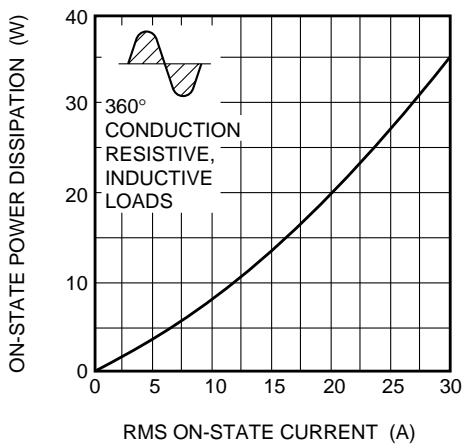
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE



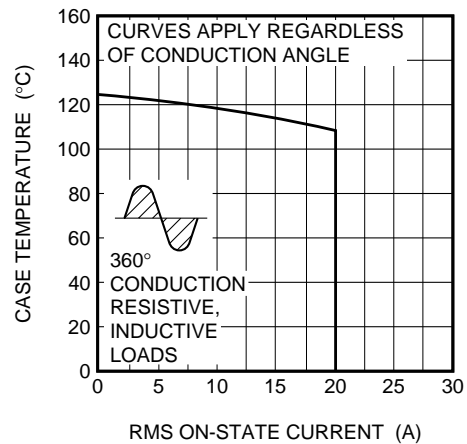
MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



MAXIMUM ON-STATE POWER DISSIPATION



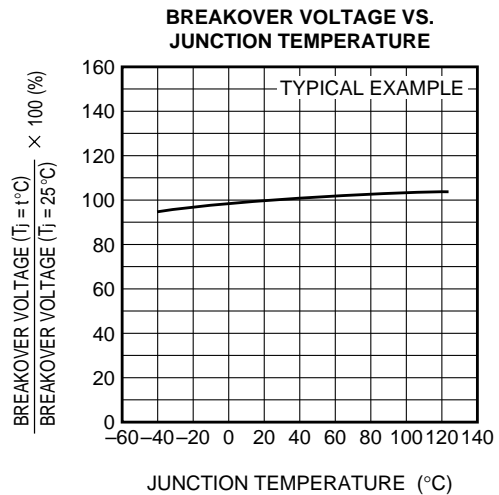
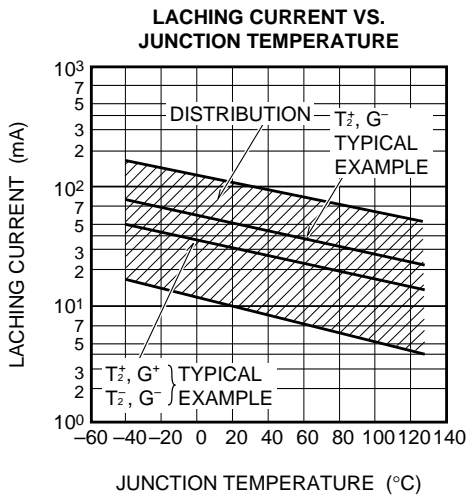
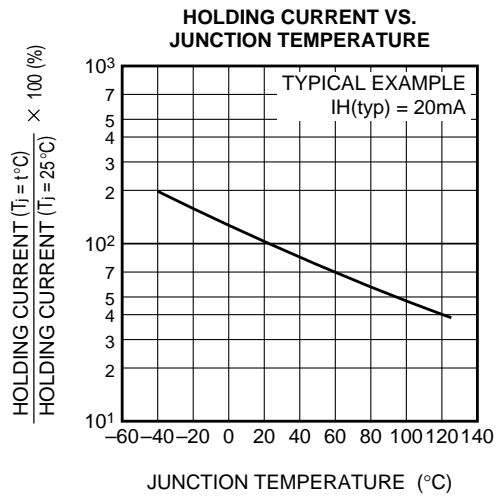
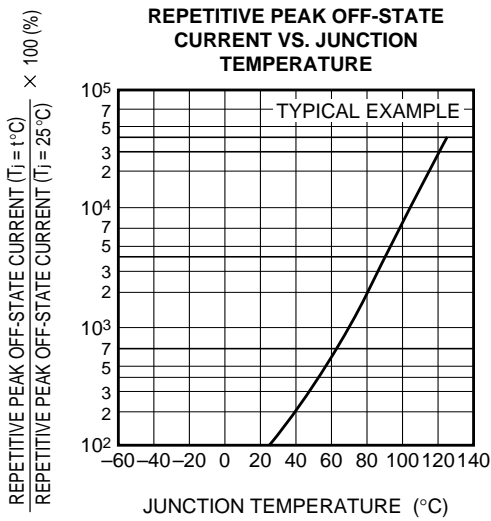
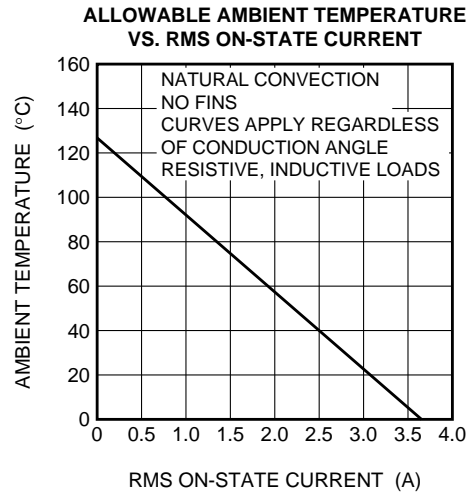
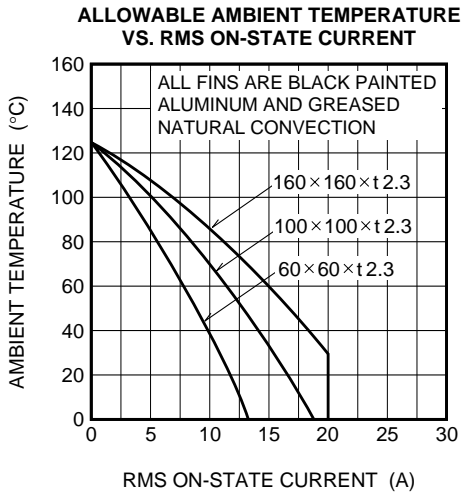
ALLOWABLE CASE TEMPERATURE VS. RMS ON-STATE CURRENT



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Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

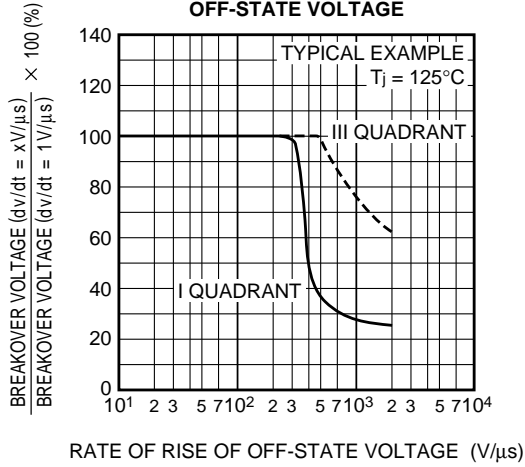


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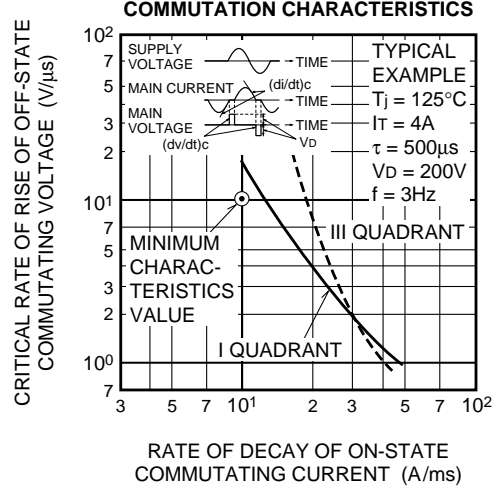
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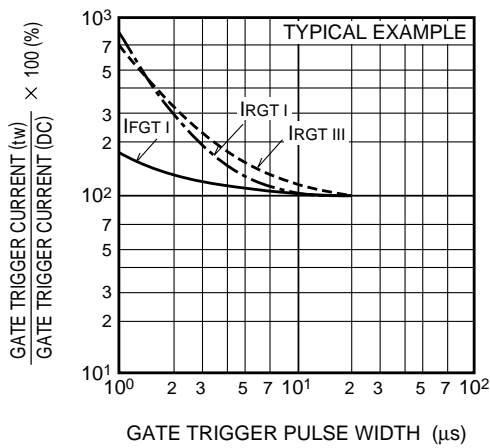
BREAKOVER VOLTAGE VS. RATE OF RISE OF OFF-STATE VOLTAGE



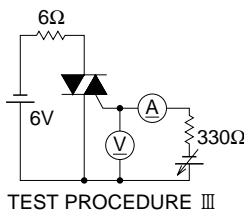
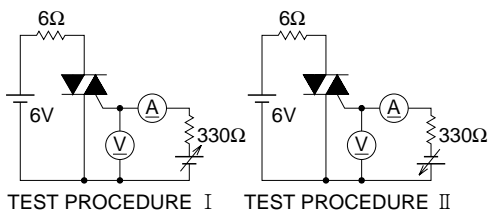
COMMUTATION CHARACTERISTICS



GATE TRIGGER CURRENT VS. GATE CURRENT PULSE WIDTH



GATE TRIGGER CHARACTERISTICS TEST CIRCUITS




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MEDIUM POWER USE

NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

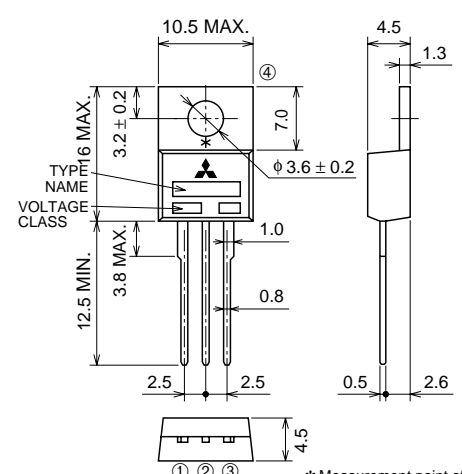
The product guaranteed maximum junction temperature 150°C (See warning.)

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- IT (RMS) 20A
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- IFGT I , IRGT I , IRGT III 20mA

OUTLINE DRAWING Dimensions in mm



① T1 TERMINAL
② T2 TERMINAL
③ GATE TERMINAL
④ T2 TERMINAL

TO-220

APPLICATION

Vacuum cleaner, light dimmer, copying machine, other control of motor and heater

(Warning)

1. Refer to the recommended circuit values around the triac before using.
2. Be sure to exchange the specification before using. If not exchanged, general triacs will be supplied.

MAXIMUM RATINGS

Symbol	Parameter	Voltage class	
		12	Unit
VDRM	Repetitive peak off-state voltage*1	600	V
VDSM	Non-repetitive peak off-state voltage*1	720	V

Symbol	Parameter	Conditions	Ratings	Unit
IT (RMS)	RMS on-state current	Commercial frequency, sine full wave 360° conduction, Tc=134°C*3	20	A
ITSM	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	200	A
I ² _t	I ² _t for fusing	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current	167	A ² s
P _{GM}	Peak gate power dissipation		5	W
P _{G (AV)}	Average gate power dissipation		0.5	W
V _{GM}	Peak gate voltage		10	V
I _{GM}	Peak gate current		2	A
T _j	Junction temperature		-40 ~ +150	°C
T _{stg}	Storage temperature		-40 ~ +150	°C
—	Weight	Typical value	2.0	g

*1. Gate open.

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ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions	Limits			Unit	
			Min.	Typ.	Max.		
IDRM	Repetitive peak off-state current	T _j =125°C/150°C, V _{DRM} applied	—	—	2.0/3.0	mA	
VTM	On-state voltage	T _c =25°C, I _{TM} =30A	—	—	1.5	V	
VFGT I	Gate trigger voltage*2	T _j =25°C, V _D =6V, R _L =6Ω, R _G =330Ω	I	—	—	1.5	V
VRGT I			II	—	—	1.5	V
VRGT III			III	—	—	1.5	V
IFGT I	Gate trigger current*2	T _j =25°C, V _D =6V, R _L =6Ω, R _G =330Ω	I	—	—	20	mA
IRGT I			II	—	—	20	mA
IRGT III			III	—	—	20	mA
VGD	Gate non-trigger voltage	T _j =125°C/150°C, V _D =1/2V _{DRM}	0.2/0.1	—	—	V	
R _{th(j-c)}	Thermal resistance	Junction to case *3 *4	—	—	0.8	°C/W	
(dv/dt) _c	Critical-rate of rise of off-state commutating voltage *5	T _j =125°C/150°C	10/1	—	—	V/μs	

*2. Measurement using the gate trigger characteristics measurement circuit.

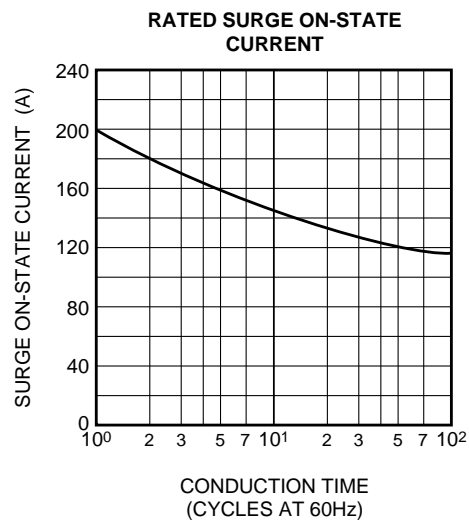
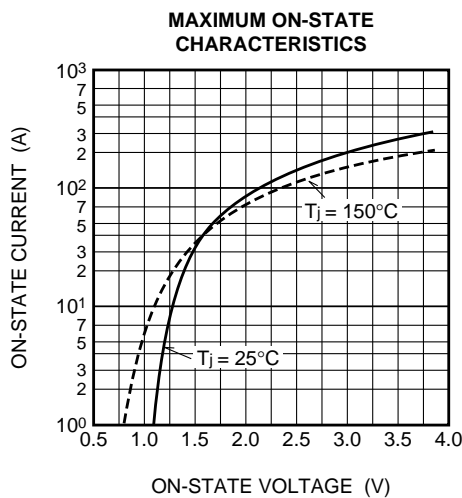
*3. Case temperature is measured at the T2 terminal 1.5mm away from the molded case.

*4. The contact thermal resistance R_{th(c-f)} in case of greasing is 1°C/W.

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

Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature T _j =125°C/150°C 2. Rate of decay of on-state commutating current (di/dt) _c =-10A/ms 3. Peak off-state voltage V _D =400V	

PERFORMANCE CURVES



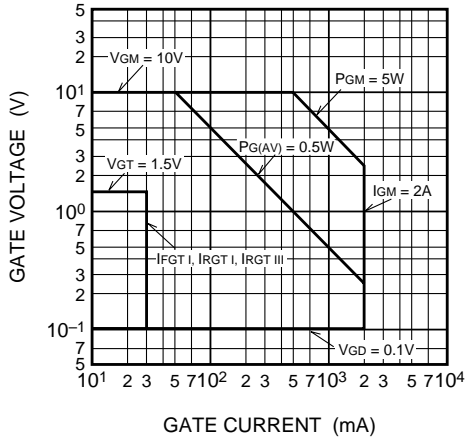
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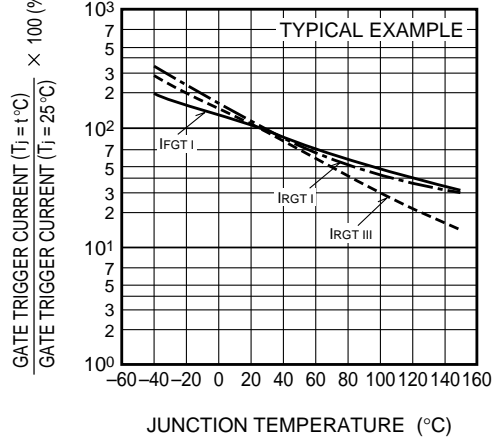
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

The product guaranteed maximum junction temperature 150°C (See warning.)

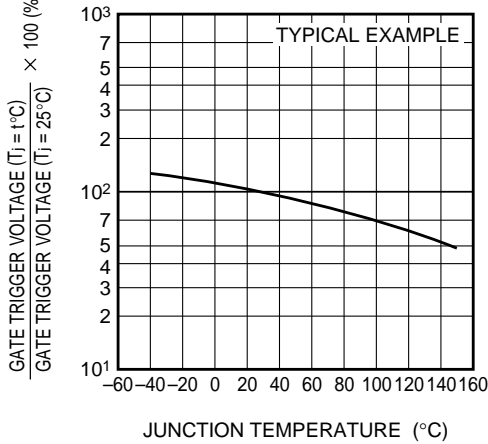
GATE CHARACTERISTICS (I, II AND III)



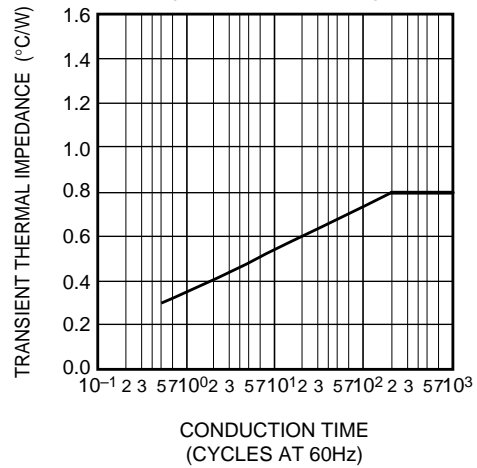
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE



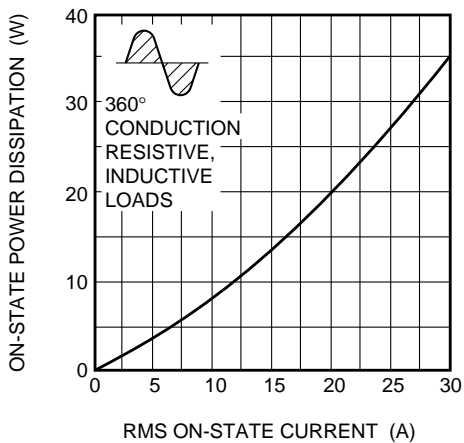
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE



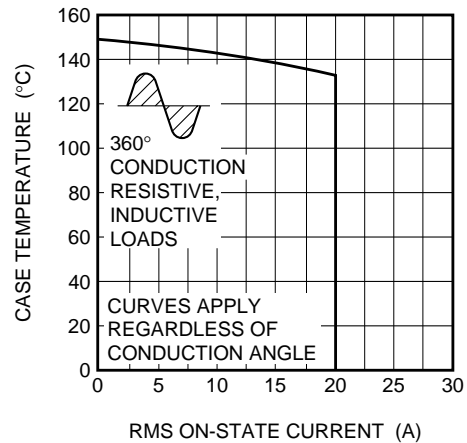
MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



MAXIMUM ON-STATE POWER DISSIPATION



ALLOWABLE CASE TEMPERATURE VS. RMS ON-STATE CURRENT

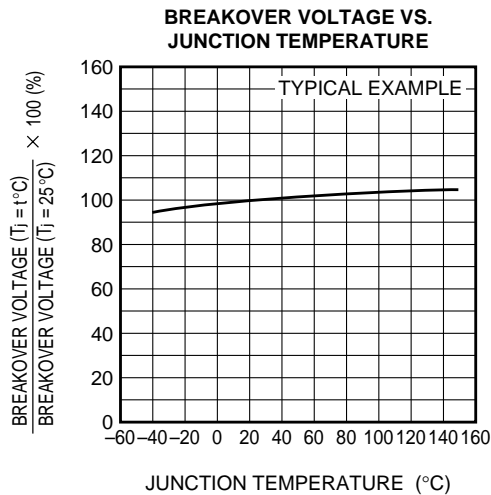
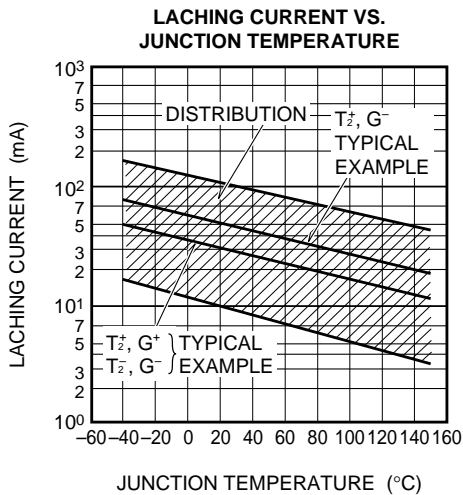
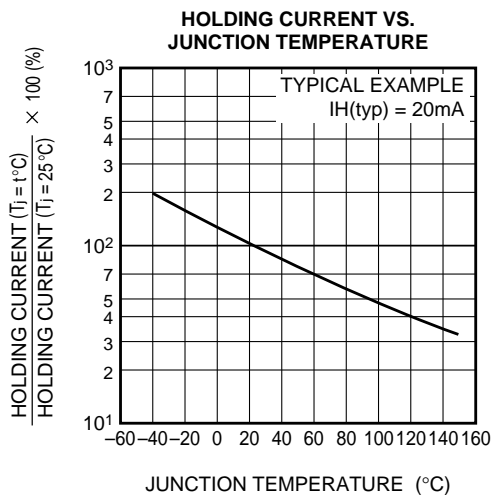
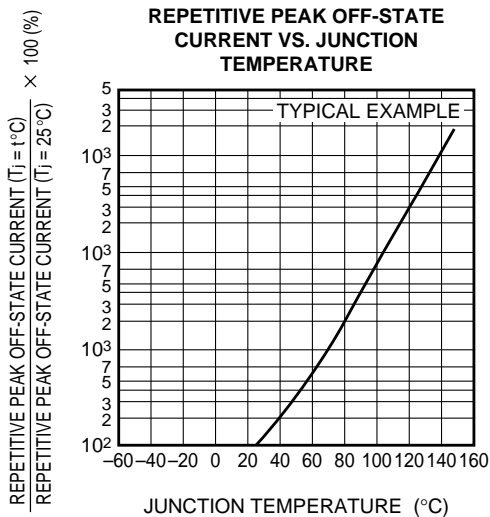
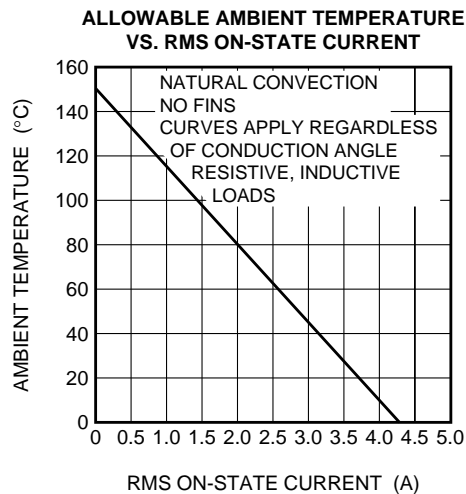
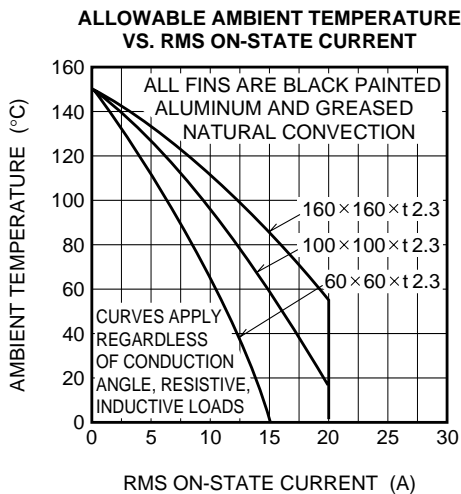


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MEDIUM POWER USE

NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

The product guaranteed maximum junction temperature 150°C (See warning.)

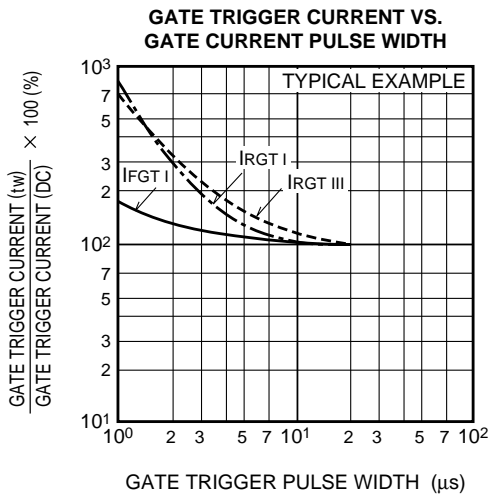
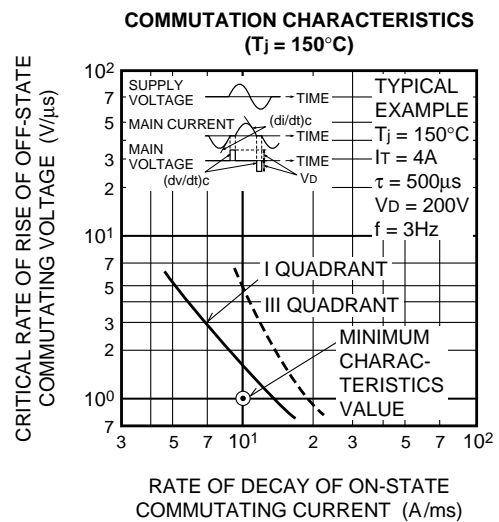
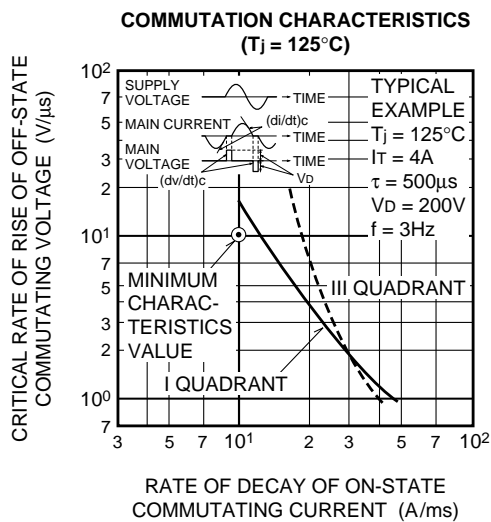
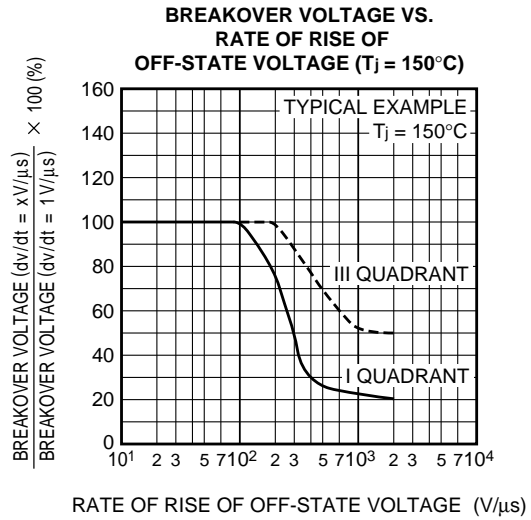
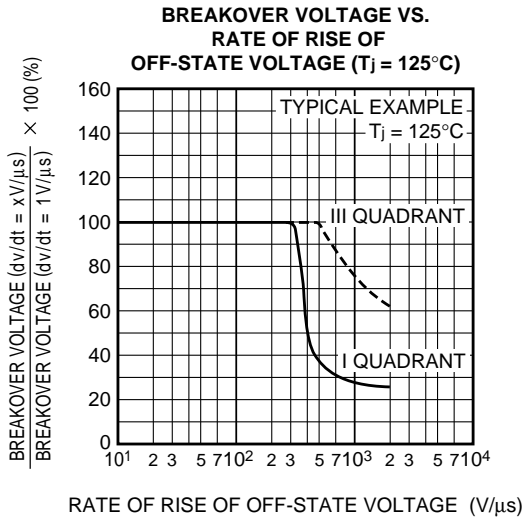


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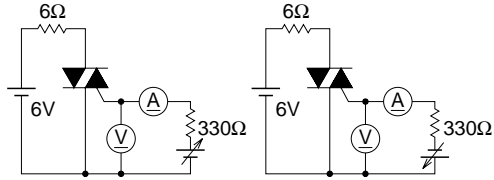


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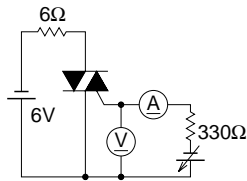
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MEDIUM POWER USE
NON-INSULATED TYPE, PLANAR PASSIVATION TYPE

GATE TRIGGER CHARACTERISTICS TEST CIRCUITS

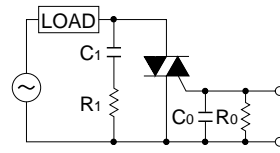


TEST PROCEDURE I TEST PROCEDURE II



TEST PROCEDURE III

RECOMMENDED CIRCUIT VALUES AROUND THE TRIAC



$C_1 = 0.1 \sim 0.47 \mu\text{F}$ $C_0 = 0.1 \mu\text{F}$
 $R_1 = 47 \sim 100 \Omega$ $R_0 = 100 \Omega$



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