


BCR20KM

MEDIUM POWER USE

INSULATED TYPE, PLANAR PASSIVATION TYPE

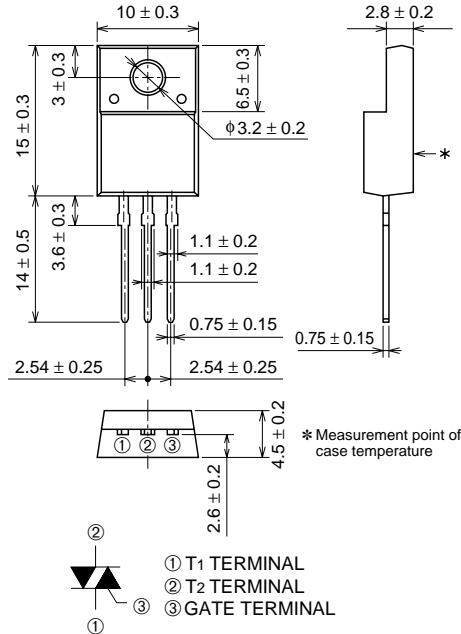
Refer to the page 6 as to the product guaranteed maximum junction temperature 150°C

BCR20KM



- IT (RMS) 20A
- VDRM 600V
- IFGT I, IRGT I, IRGT III 20mA
- V_{iso} 2000V
- UL Recognized: Yellow Card No.E80276(N)
File No. E80271

OUTLINE DRAWING Dimensions in mm



* Measurement point of case temperature

TO-220FN

① T1 TERMINAL
② T2 TERMINAL
③ GATE TERMINAL

APPLICATION

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

MAXIMUM RATINGS

Symbol	Parameter	Voltage class	
		12	Unit
V _{DRM}	Repetitive peak off-state voltage*1	600	V
V _{DSM}	Non-repetitive peak off-state voltage*1	720	V

Symbol	Parameter	Conditions	Ratings	Unit
I _T (RMS)	RMS on-state current	Commercial frequency, sine full wave 360° conduction, T _c =85°C	20	A
I _{TSM}	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	200	A
I _t ²	I _t ² 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
V _{iso}	Isolation voltage	T _a =25°C, AC 1 minute, T ₁ · T ₂ · G terminal to case	2000	V

*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
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
VTM	On-state voltage	T _c =25°C, I _{TM} =30A, Instantaneous measurement	—	—	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, V _D =1/2V _{DRM}	0.2	—	—	V
R _{th(j-c)}	Thermal resistance	Junction to case *3	—	—	2.0	°C/W
(dv/dt) _c	Critical-rate of rise off-state commutating voltage*4	T _j =125°C	10	—	—	V/μs

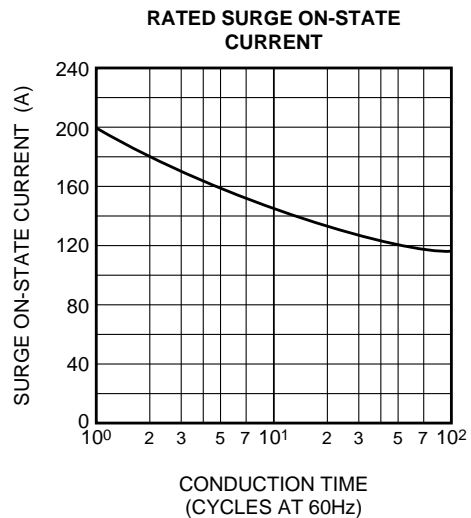
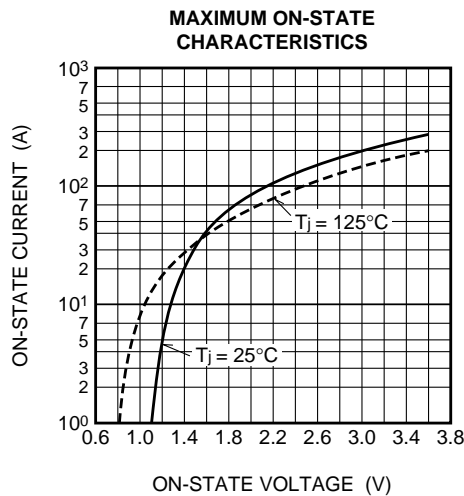
*2. Measurement using the gate trigger characteristics measurement circuit.

*3. The contact thermal resistance R_{th(c-f)} in case of greasing is 0.5°C/W.

*4. 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



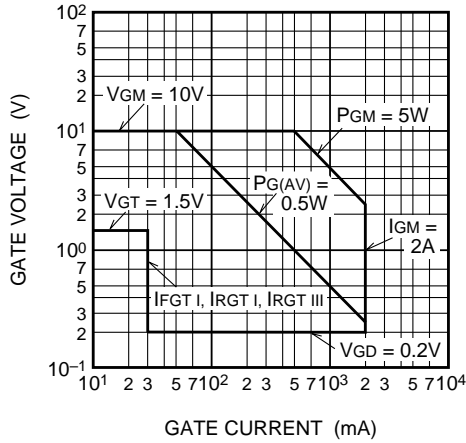
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MEDIUM POWER USE

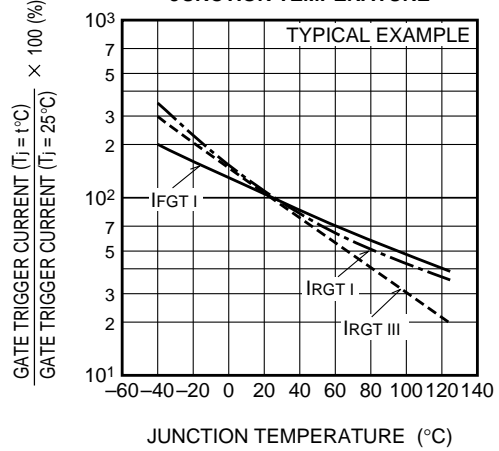
INSULATED TYPE, PLANAR PASSIVATION TYPE

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

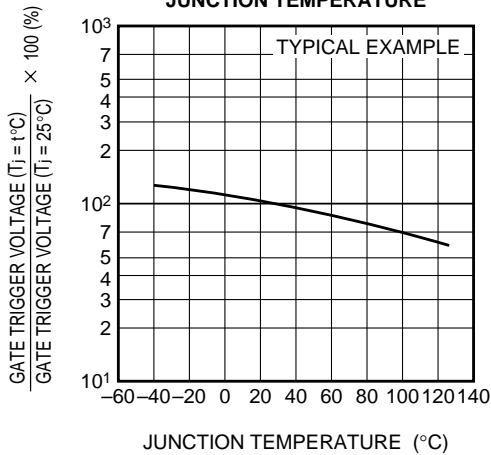
GATE CHARACTERISTICS (I, II AND III)



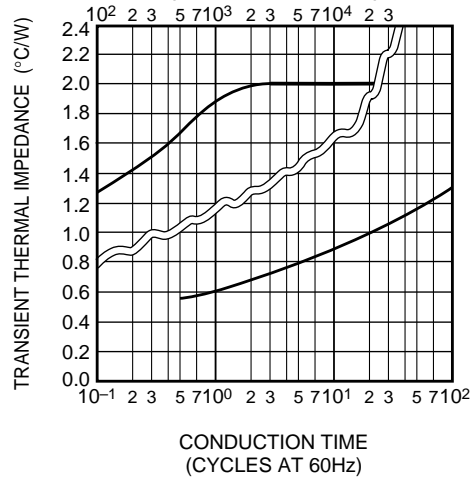
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE



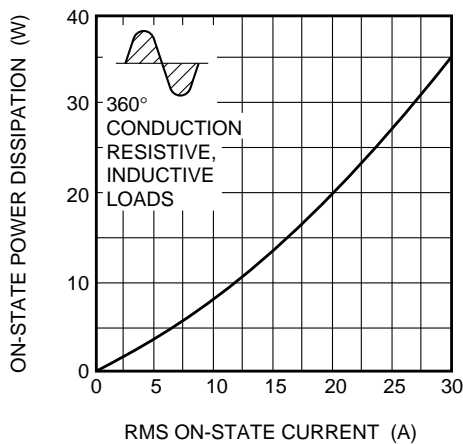
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE



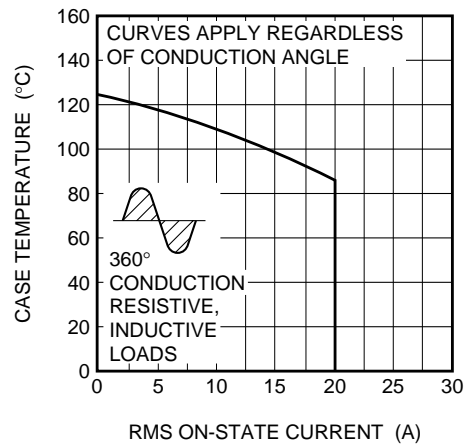
MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



MAXIMUM ON-STATE POWER DISSIPATION



ALLOWABLE CASE TEMPERATURE VS. RMS ON-STATE CURRENT

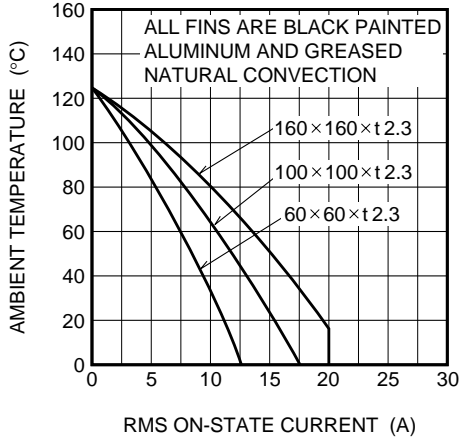


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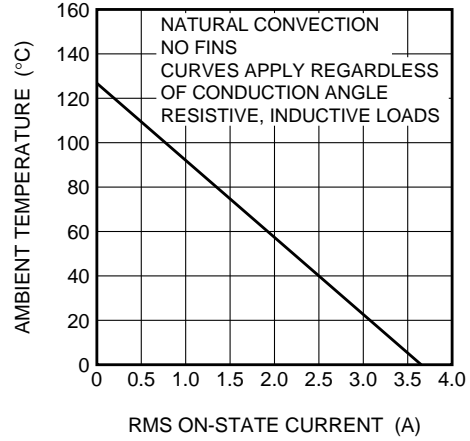
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MEDIUM POWER USE
INSULATED TYPE, PLANAR PASSIVATION TYPE

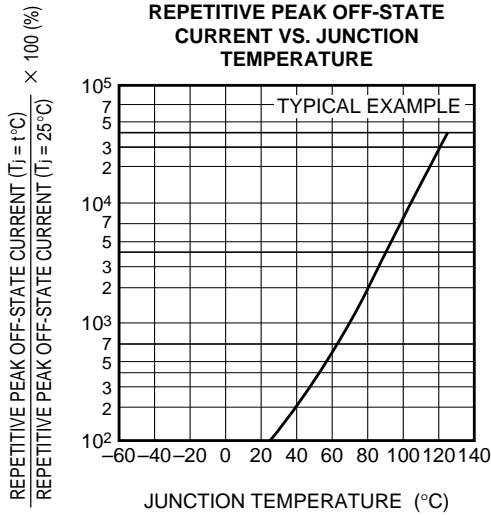
ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT



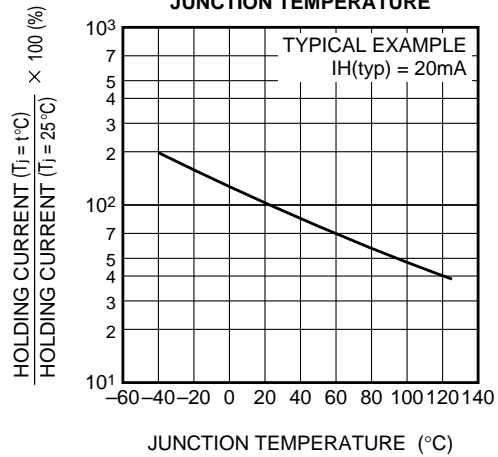
ALLOWABLE AMBIENT TEMPERATURE VS. RMS ON-STATE CURRENT



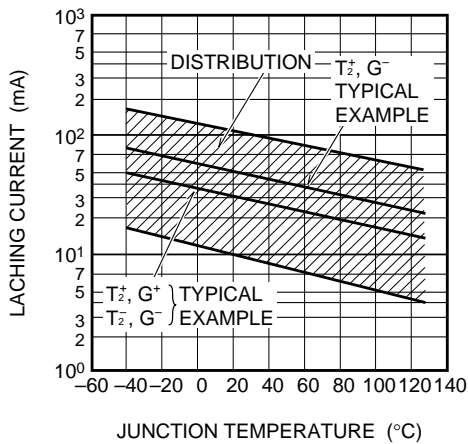
REPETITIVE PEAK OFF-STATE CURRENT VS. JUNCTION TEMPERATURE



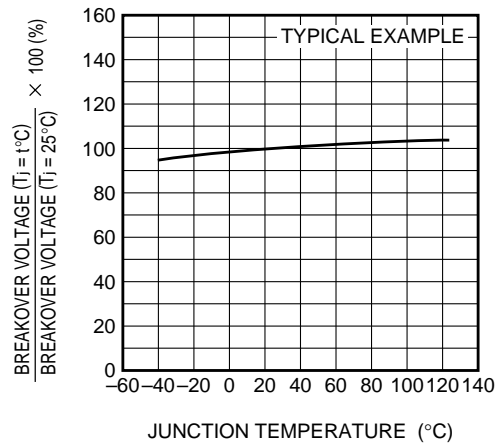
HOLDING CURRENT VS. JUNCTION TEMPERATURE



LATCHING CURRENT VS. JUNCTION TEMPERATURE



BREAKOVER VOLTAGE VS. JUNCTION TEMPERATURE



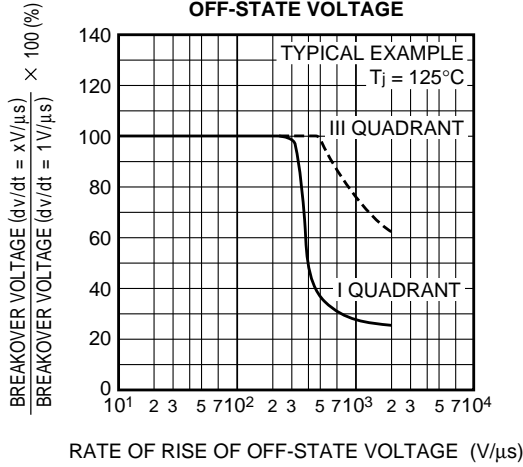
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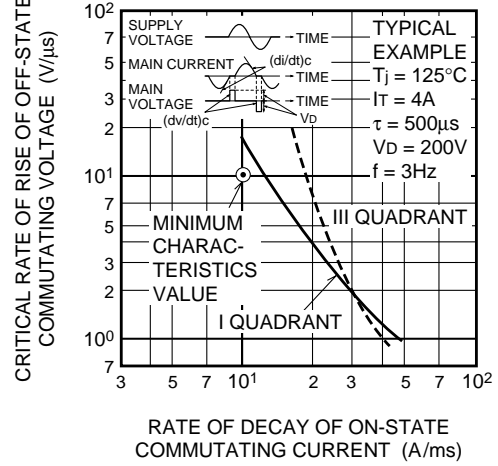
INSULATED TYPE, PLANAR PASSIVATION TYPE

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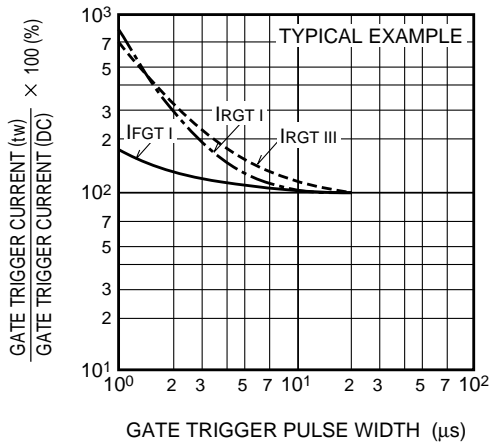
BREAKOVER VOLTAGE VS. RATE OF RISE OF OFF-STATE VOLTAGE



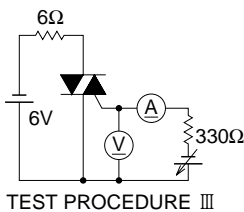
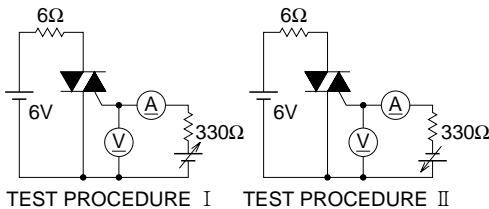
COMMUTATION CHARACTERISTICS



GATE TRIGGER CURRENT VS. GATE CURRENT PULSE WIDTH



GATE TRIGGER CHARACTERISTICS TEST CIRCUITS




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MEDIUM POWER USE

INSULATED TYPE, PLANAR PASSIVATION TYPE

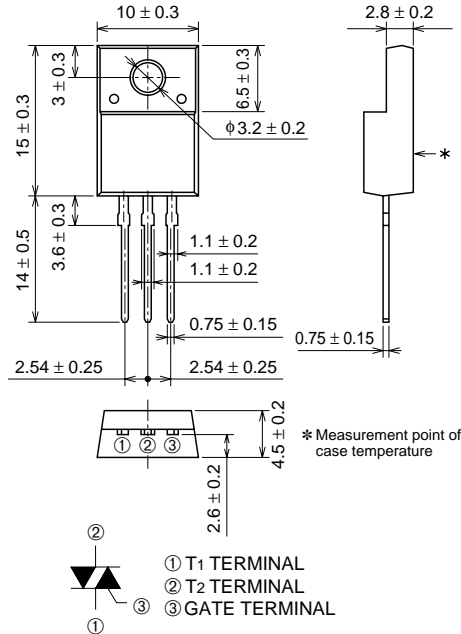
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- IFGT I , IRGT I , IRGT III 20mA
- V_{iso} 2000V
- UL Recognized: Yellow Card No.E80276(N)
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OUTLINE DRAWING Dimensions in mm



* Measurement point of case temperature

TO-220FN

① T1 TERMINAL
② T2 TERMINAL
③ GATE TERMINAL

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
V _{DRM}	Repetitive peak off-state voltage*1	600	V
V _{DSM}	Non-repetitive peak off-state voltage*1	720	V

Symbol	Parameter	Conditions	Ratings	Unit
I _{T (RMS)}	RMS on-state current	Commercial frequency, sine full wave 360° conduction, T _c =110°C	20	A
I _{TSM}	Surge on-state current	60Hz sinewave 1 full cycle, peak value, non-repetitive	200	A
I _t ²	I _t ² 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
V _{iso}	Isolation voltage	T _a =25°C, AC 1 minute, T ₁ · T ₂ · G terminal to case	2000	V

*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, Instantaneous measurement	—	—	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	—	—	2.0	°C/W	
(dv/dt) _c	Critical-rate of rise off-state commutating voltage*4	T _j =125°C/150°C	10/1	—	—	V/μs	

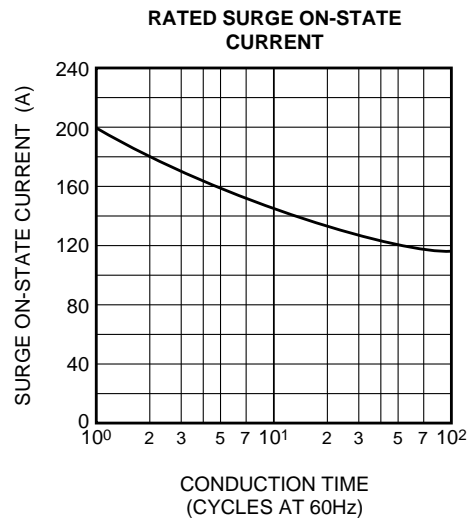
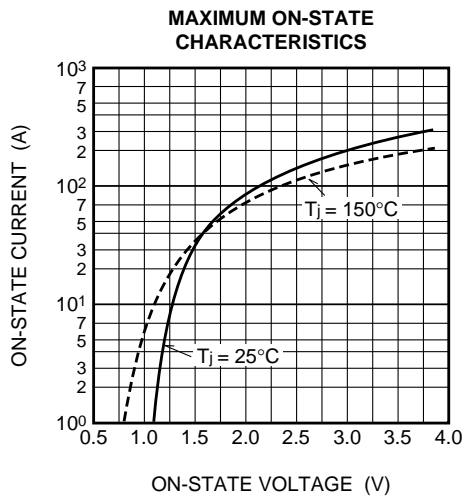
*2. Measurement using the gate trigger characteristics measurement circuit.

*3. The contact thermal resistance R_{th(c-f)} in case of greasing is 0.5°C/W.

*4. 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



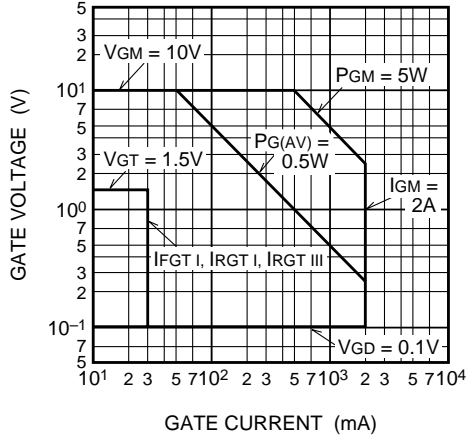
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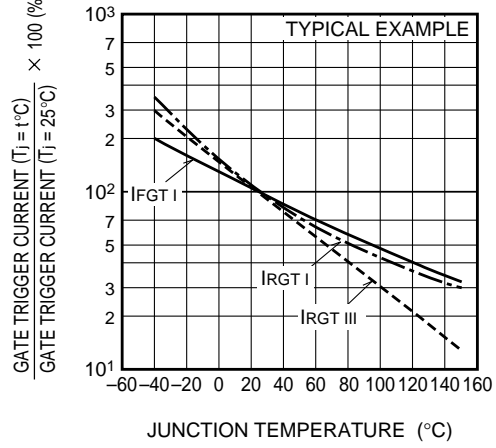
INSULATED TYPE, PLANAR PASSIVATION TYPE

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

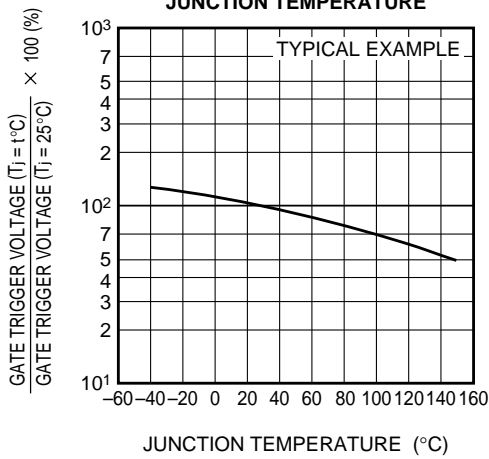
GATE CHARACTERISTICS (I, II AND III)



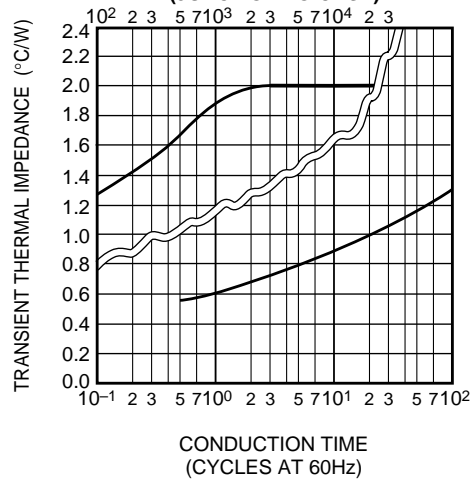
GATE TRIGGER CURRENT VS. JUNCTION TEMPERATURE



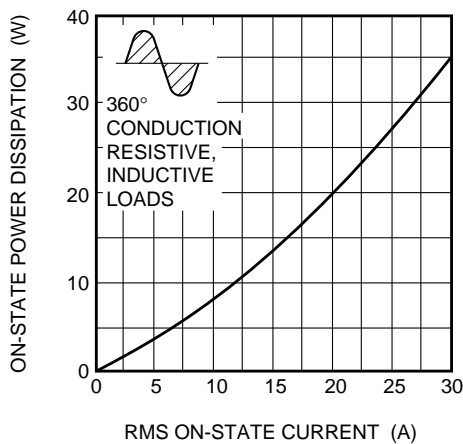
GATE TRIGGER VOLTAGE VS. JUNCTION TEMPERATURE



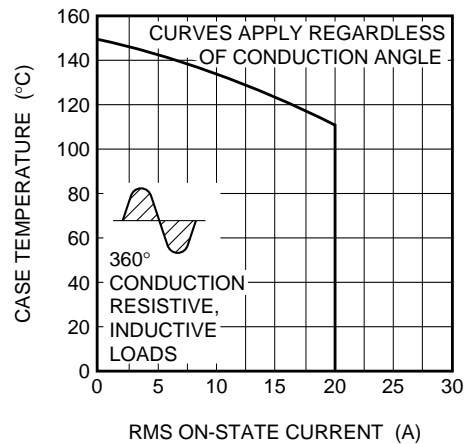
MAXIMUM TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



MAXIMUM ON-STATE POWER DISSIPATION



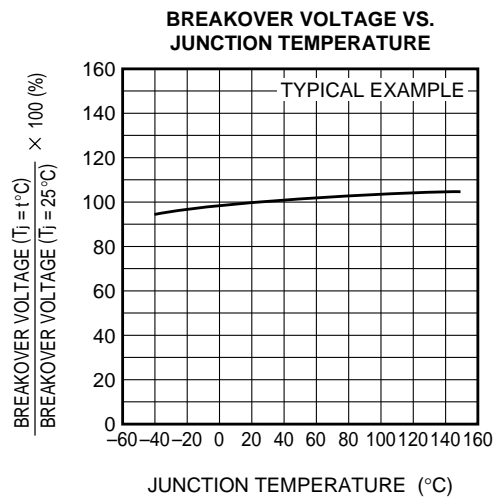
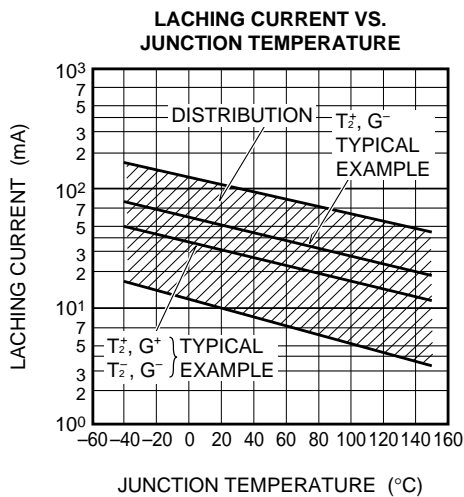
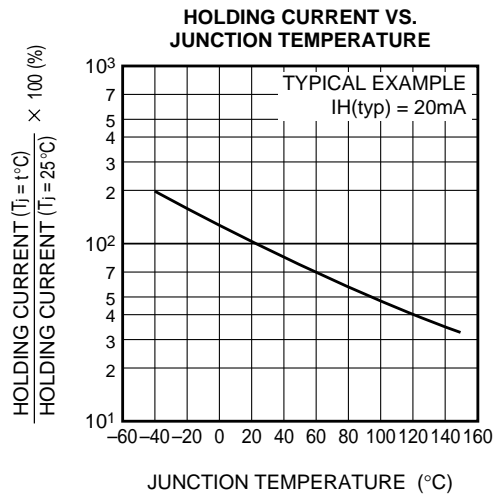
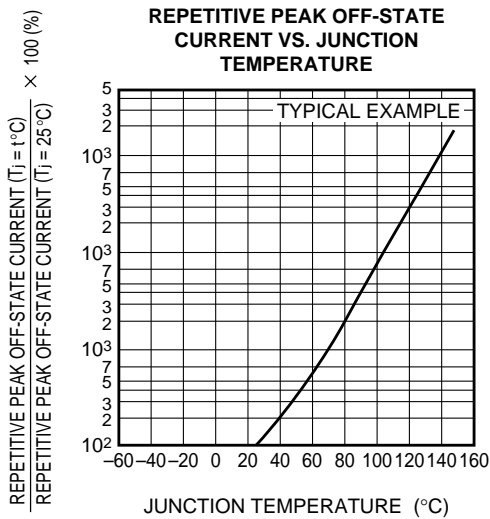
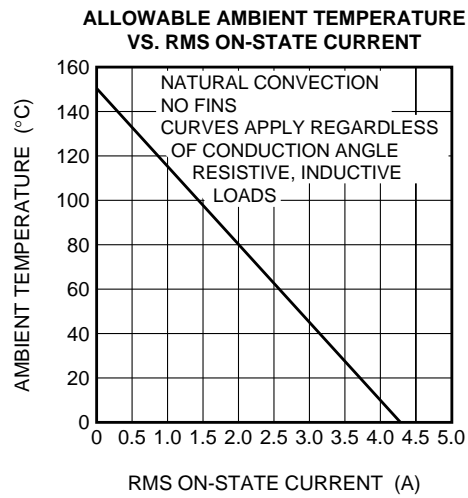
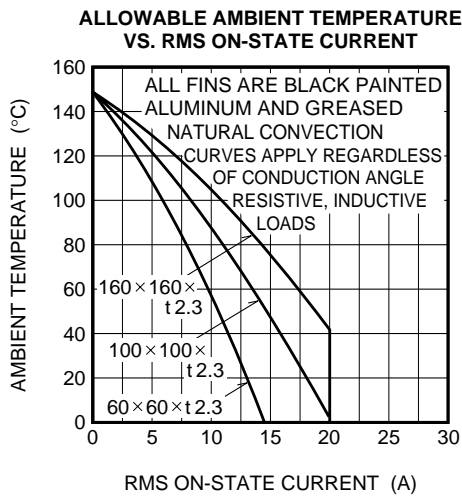
ALLOWABLE CASE TEMPERATURE VS. RMS ON-STATE CURRENT



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

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INSULATED TYPE, PLANAR PASSIVATION TYPE

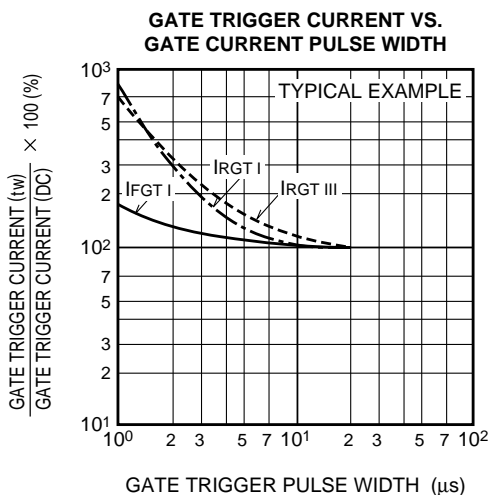
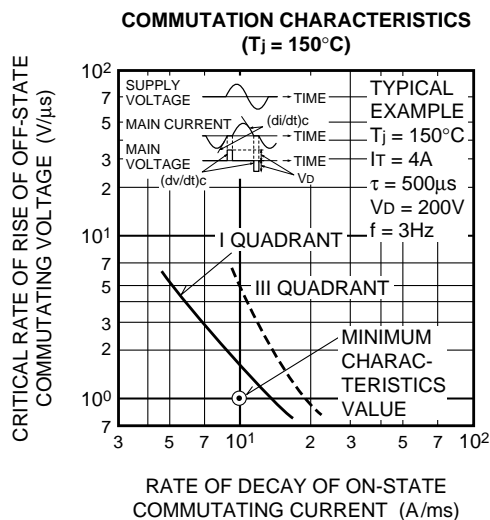
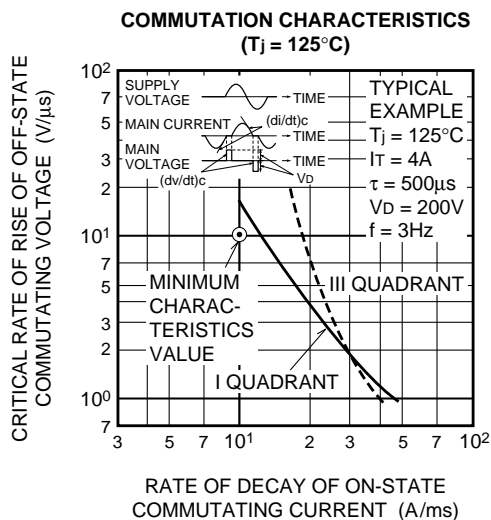
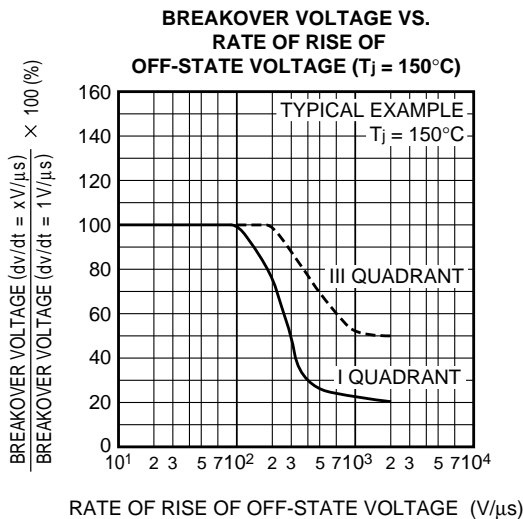
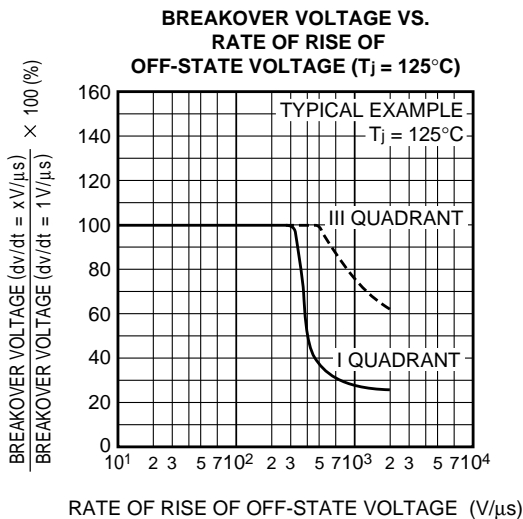


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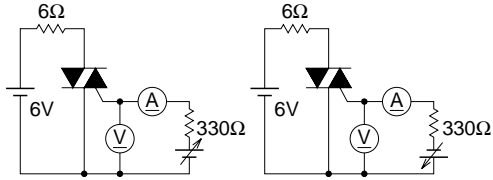


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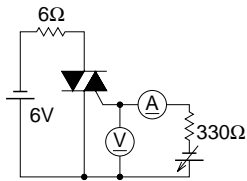
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GATE TRIGGER CHARACTERISTICS TEST CIRCUITS

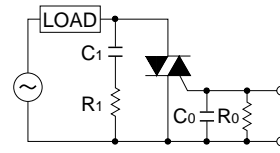


TEST PROCEDURE I TEST PROCEDURE II



TEST PROCEDURE III

RECOMMENDED CIRCUIT VALUES AROUND THE TRIAC



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