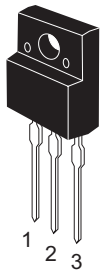
BCR3KM-12

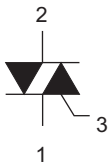
Features

- $I_{T(RMS)}$: 3 A
- V_{DRM} : 600 V
- $I_{FGT\ I}$, $I_{RGT\ I}$, $I_{RGT\ III}$: 15 mA (10 mA)[Note3]
- Insulated Type
- Planar Passivation Type
- UL Recognized : Yellow Card No. E223904
  File No. E80271

Outline

TO-220FN





1. T_1 Terminal
2. T_2 Terminal
3. Gate Terminal

Applications

Electric rice cooker, electric pot, and controller for other heater

Maximum Ratings

Parameter	Symbol	Voltage class	Unit
		12	
Repetitive peak off-state voltage[Note1]	V_{DRM}	600	V
Non-repetitive peak off-state voltage[Note1]	V_{DSM}	720	V

Parameter	Symbol	Ratings	Unit	Conditions
RMS on-state current	$I_{T(RMS)}$	3.0	A	Commercial frequency, sine full wave 360° conduction, Tc = 111°C
Surge on-state current	I_{TSM}	30	A	60Hz sinewave 1 full cycle, peak value, non-repetitive
I^2t for fusing	I^2t	3.7	A^2s	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current
Peak gate power dissipation	P_{GM}	3	W	
Average gate power dissipation	$P_{G(AV)}$	0.3	W	
Peak gate voltage	V_{GM}	6	V	
Peak gate current	I_{GM}	0.5	A	
Junction temperature	Tj	– 40 to +125	°C	
Storage temperature	Tstg	– 40 to +125	°C	
Mass	—	2.0	g	
Isolation voltage	V_{iso}	2000	V	Ta = 25°C, AC 1 minute, $T_1 \cdot T_2 \cdot G$ terminal to case

Notes: 1. Gate open.

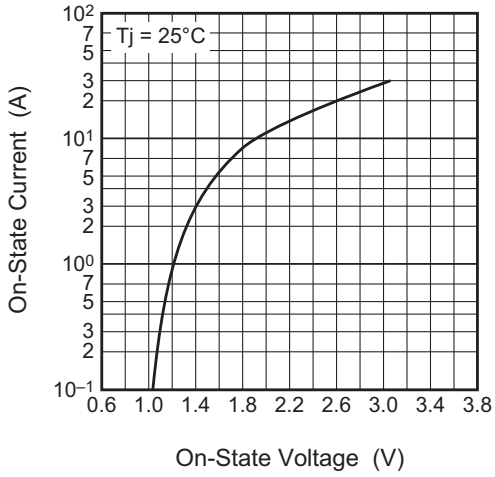
Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Test conditions
Repetitive peak off-state current		I_{DRM}	—	—	2.0	mA	Tj = 125°C, V_{DRM} applied
On-state voltage		V_{TM}	—	—	1.5	V	Tc = 25°C, I_{TM} = 4.5 A, Instantaneous measurement
Gate trigger voltage[Note2]	I	$V_{FGT\ I}$	—	—	1.5	V	Tj = 25°C, V_D = 6 V, R_L = 6 Ω, R_G = 330 Ω
	II	$V_{RGT\ I}$	—	—	1.5	V	
	III	$V_{RGT\ III}$	—	—	1.5	V	
Gate trigger current[Note2]	I	$I_{FGT\ I}$	—	—	15[Note3]	mA	Tj = 25°C, V_D = 6 V, R_L = 6 Ω, R_G = 330 Ω
	II	$I_{RGT\ I}$	—	—	15[Note3]	mA	
	III	$I_{RGT\ III}$	—	—	15[Note3]	mA	
Gate non-trigger voltage		V_{GD}	0.2	—	—	V	Tj = 125°C, V_D = 1/2V_{DRM}
Thermal resistance		$R_{th(j-c)}$	—	—	4.0	°C/W	Junction to case[Note4]
Thermal resistance		$R_{th(j-a)}$	—	—	50	°C/W	Junction to ambient

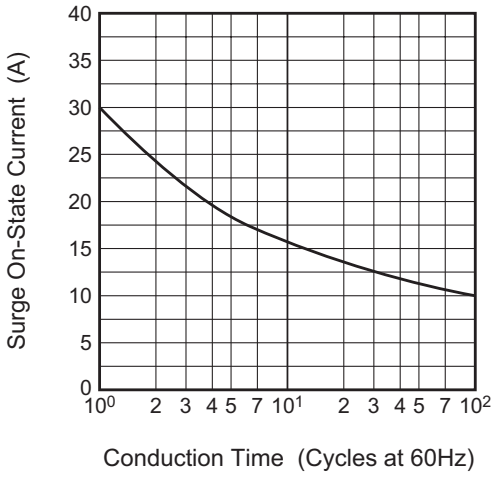
Notes: 2. Measurement using the gate trigger characteristics measurement circuit.
3. High sensitivity ($I_{GT} \leq 10$ mA) is also available. (I_{GT} item: 1)
4. The contact thermal resistance $R_{th\ (c-f)}$ in case of greasing is 0.5°C/W.

Performance Curves

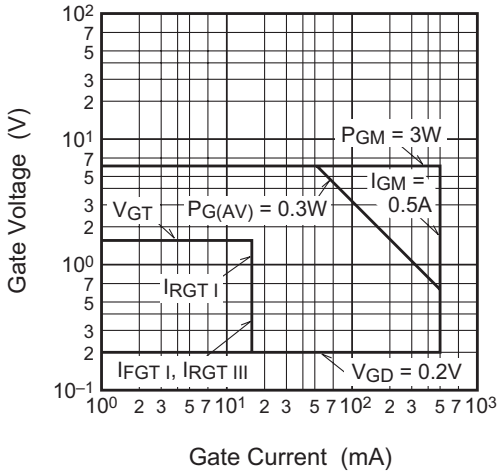
Maximum On-State Characteristics



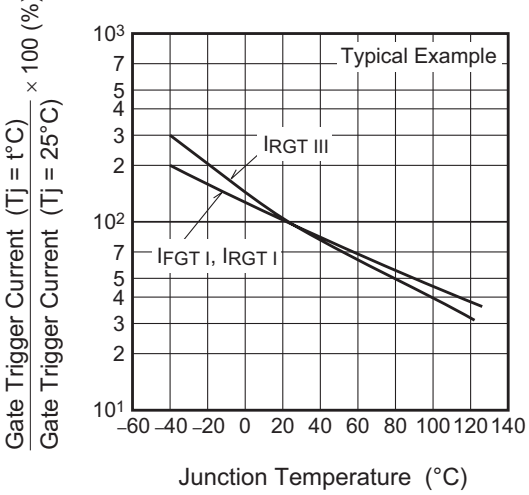
Rated Surge On-State Current



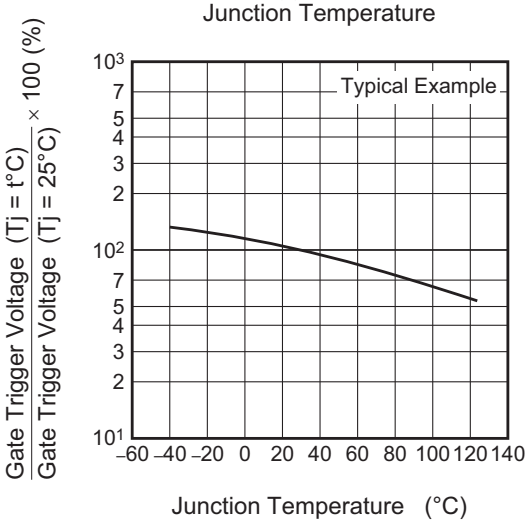
Gate Characteristics (I, II and III)



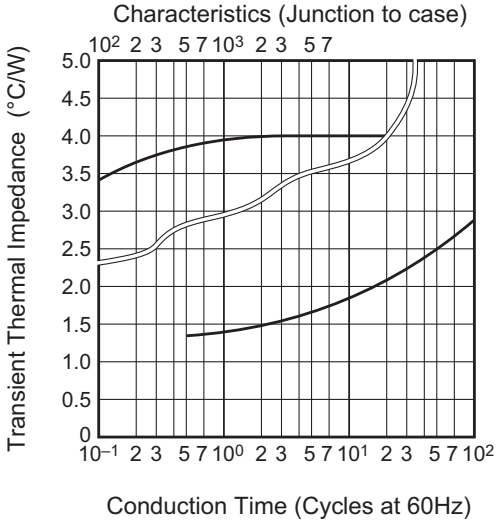
Gate Trigger Current vs. Junction Temperature



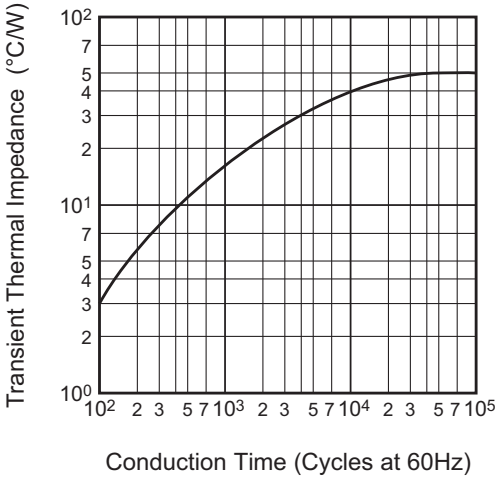
Gate Trigger Voltage vs. Junction Temperature



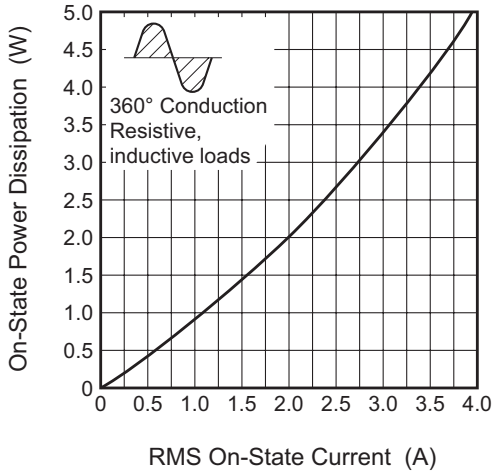
Maximum Transient Thermal Impedance Characteristics (Junction to case)



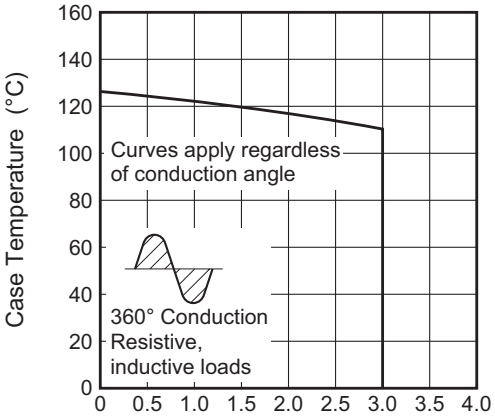
Maximum Transient Thermal Impedance Characteristics (Junction to ambient)



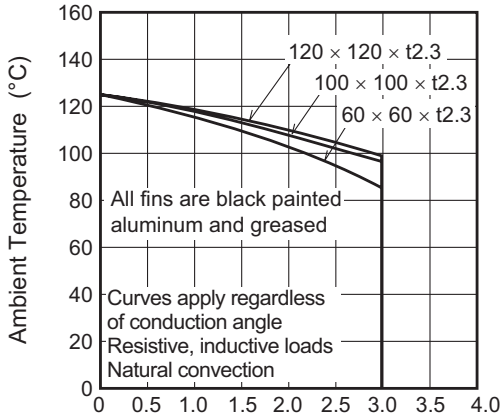
Maximum On-State Power Dissipation



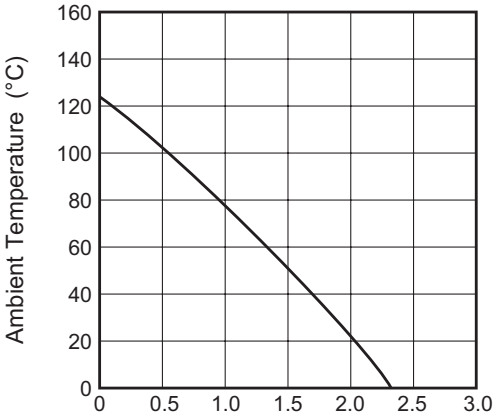
Allowable Case Temperature vs. RMS On-State Current



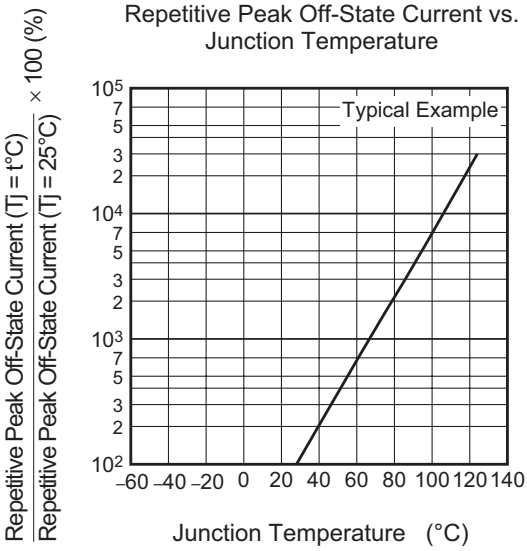
Allowable Ambient Temperature vs. RMS On-State Current



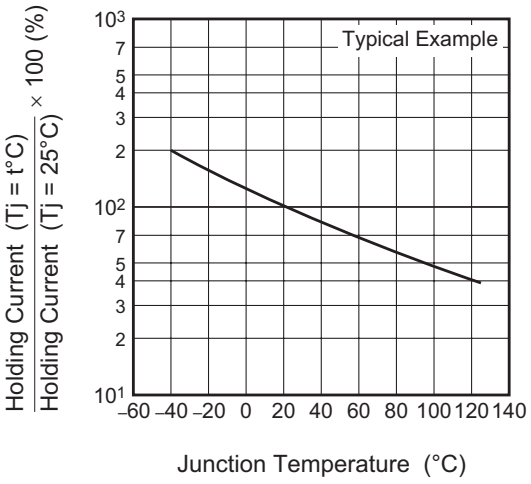
Allowable Ambient Temperature vs. RMS On-State Current



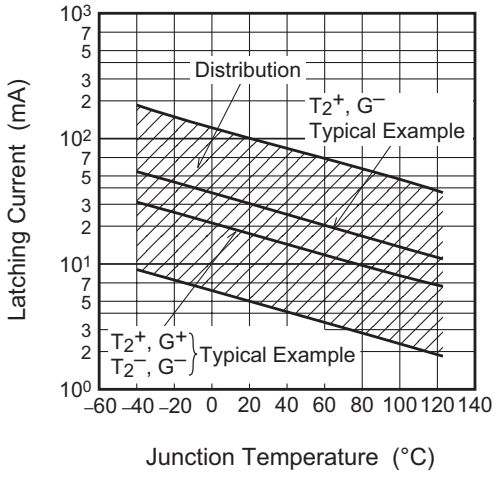
Repetitive Peak Off-State Current vs. Junction Temperature



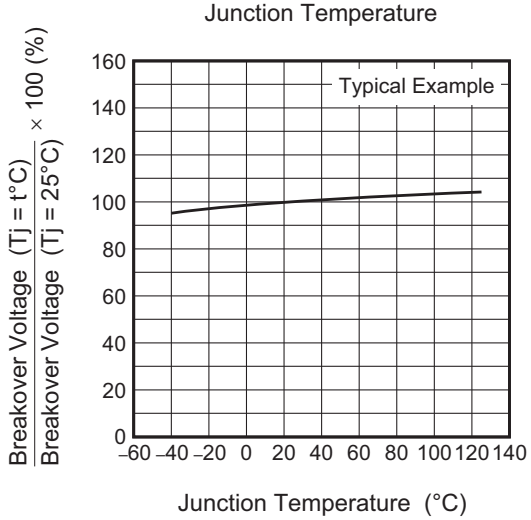
Holding Current vs.
Junction Temperature



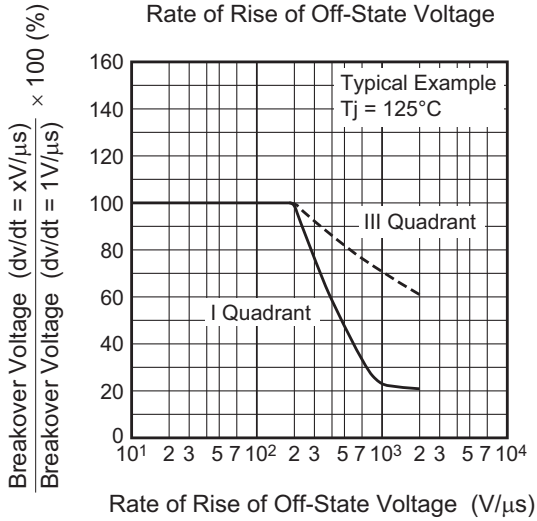
Latching Current vs.
Junction Temperature



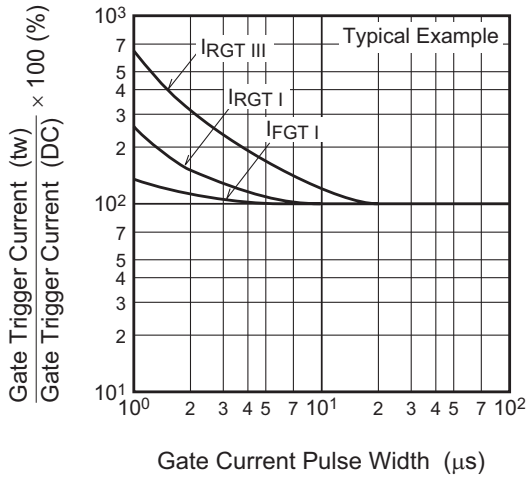
Breakover Voltage vs.
Junction Temperature



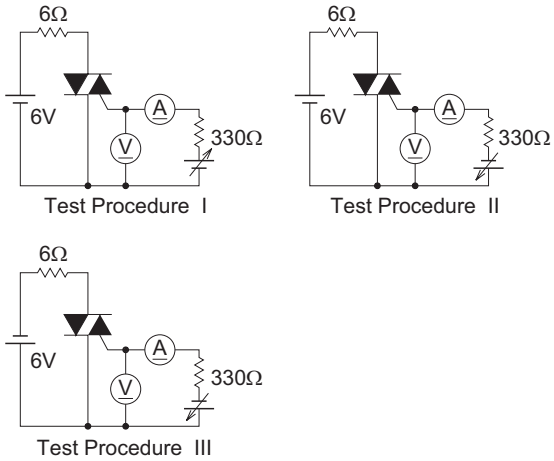
Breakover Voltage vs.
Rate of Rise of Off-State Voltage



Gate Trigger Current vs.
Gate Current Pulse Width



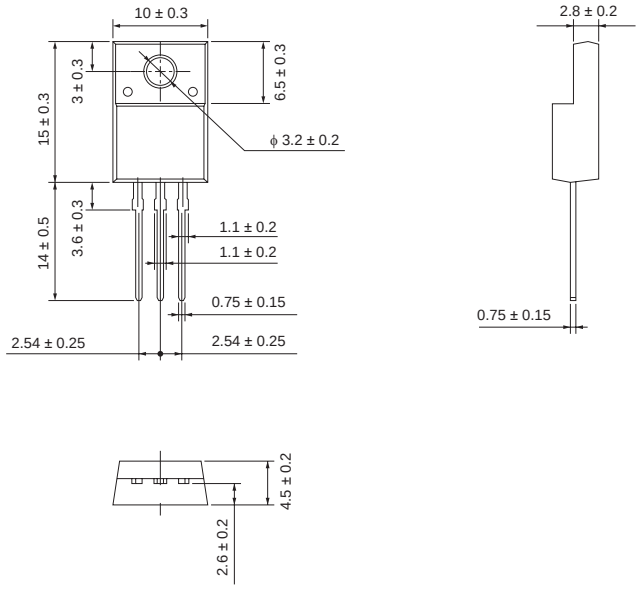
Gate Trigger Characteristics Test Circuits

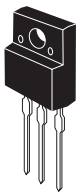


Package Dimensions

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_1	———	———	———
A_2	———	———	———
b	———	———	———
D	———	———	———
E	———	———	———
e	———	———	———
x	———	———	———
y	———	———	———
y_1	———	———	———
ZD	———	———	———
ZE	———	———	———

Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Straight type	Plastic Magazine (Tube)	50	Type name +RA	BCR3KM-12RA
Lead form	Plastic Magazine (Tube)	50	Type name +RA – Lead forming code	BCR3KM-12RA-A8

Note : Please confirm the specification about the shipping in detail.

Parameter	Symbol	Ratings	Unit	Conditions
RMS on-state current	$I_{T(RMS)}$	3.0	A	Commercial frequency, sine full wave 360° conduction, Tc = 136°C
Surge on-state current	I_{TSM}	30	A	60Hz sinewave 1 full cycle, peak value, non-repetitive
I^2t for fusing	I^2t	3.7	A^2s	Value corresponding to 1 cycle of half wave 60Hz, surge on-state current
Peak gate power dissipation	P_{GM}	3	W	
Average gate power dissipation	$P_{G(AV)}$	0.3	W	
Peak gate voltage	V_{GM}	6	V	
Peak gate current	I_{GM}	0.5	A	
Junction temperature	Tj	– 40 to +150	°C	
Storage temperature	Tstg	– 40 to +150	°C	
Mass	—	2.0	g	
Isolation voltage	V_{iso}	2000	V	Ta = 25°C, AC 1 minute, $T_1 \cdot T_2 \cdot G$ terminal to case

Notes: 1. Gate open.

Electrical Characteristics

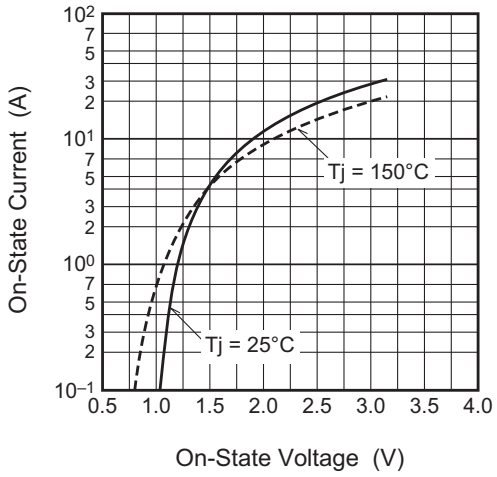
Parameter		Symbol	Min.	Typ.	Max.	Unit	Test conditions
Repetitive peak off-state current		I_{DRM}	—	—	2.0	mA	Tj = 150°C, V_{DRM} applied
On-state voltage		V_{TM}	—	—	1.5	V	Tc = 25°C, I_{TM} = 4.5 A, Instantaneous measurement
Gate trigger voltage[Note2]	I	$V_{FGT\ I}$	—	—	1.5	V	Tj = 25°C, V_D = 6 V, R_L = 6 Ω, R_G = 330 Ω
	II	$V_{RGT\ I}$	—	—	1.5	V	
	III	$V_{RGT\ III}$	—	—	1.5	V	
Gate trigger current[Note2]	I	$I_{FGT\ I}$	—	—	15[Note3]	mA	Tj = 25°C, V_D = 6 V, R_L = 6 Ω, R_G = 330 Ω
	II	$I_{RGT\ I}$	—	—	15[Note3]	mA	
	III	$I_{RGT\ III}$	—	—	15[Note3]	mA	
Gate non-trigger voltage		V_{GD}	0.2/0.1	—	—	V	Tj = 125°C/150°C, $V_D = 1/2V_{DRM}$
Thermal resistance		$R_{th(j-c)}$	—	—	4.0	°C/W	Junction to case[Note4]
Thermal resistance		$R_{th(j-a)}$	—	—	50	°C/W	Junction to ambient

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

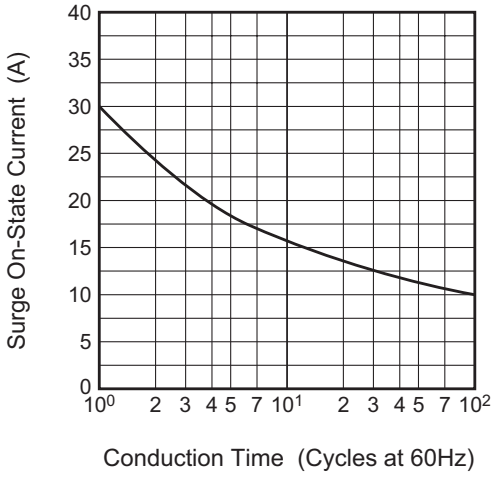
3. High sensitivity ($I_{GT} \leq 10$ mA) is also available. (I_{GT} item: 1)

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

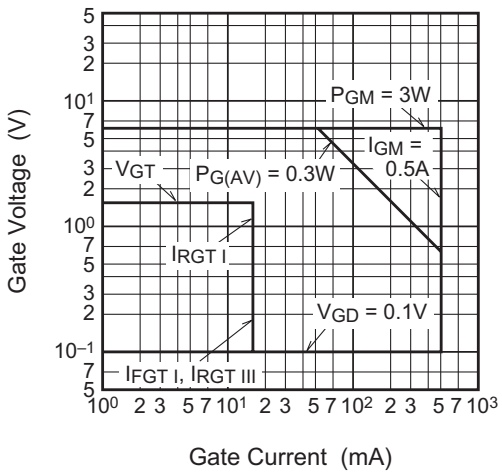
Maximum On-State Characteristics



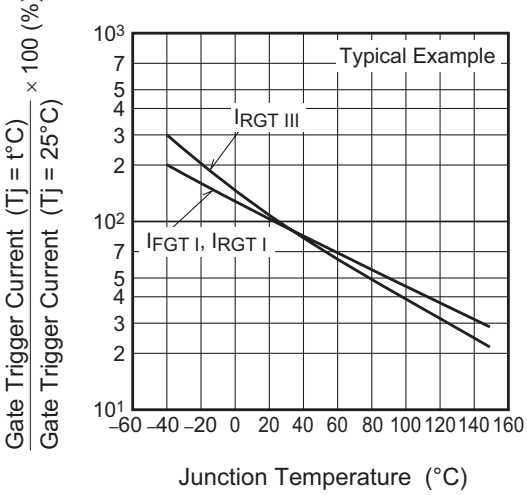
Rated Surge On-State Current



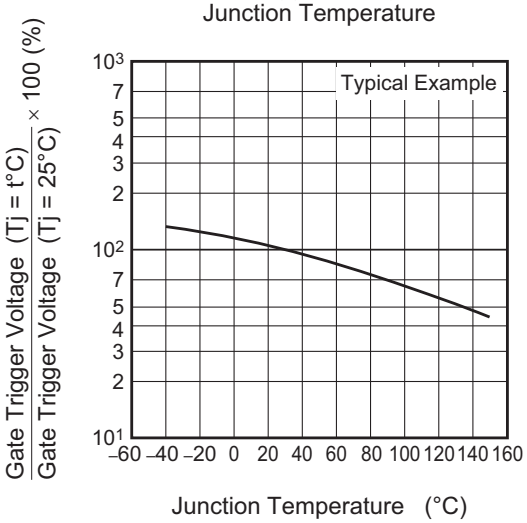
Gate Characteristics (I, II and III)



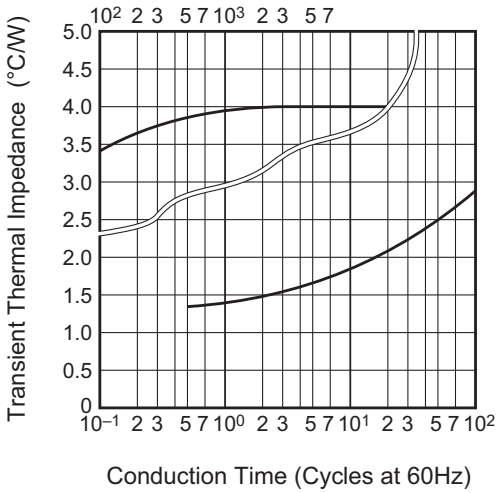
Gate Trigger Current vs. Junction Temperature



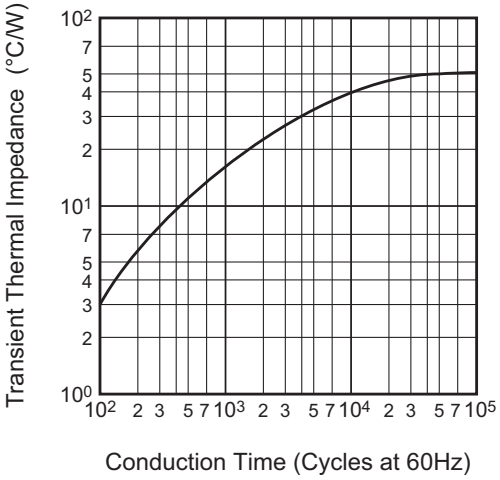
Gate Trigger Voltage vs. Junction Temperature



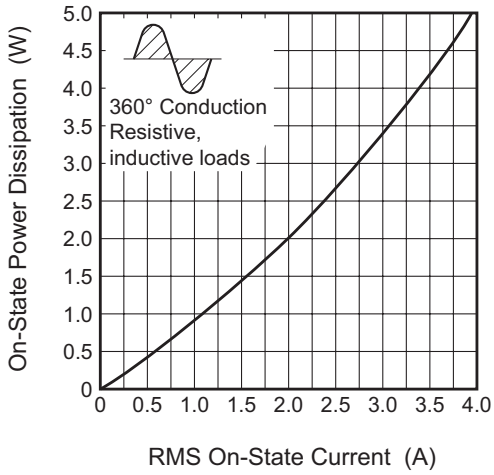
Maximum Transient Thermal Impedance Characteristics (Junction to case)



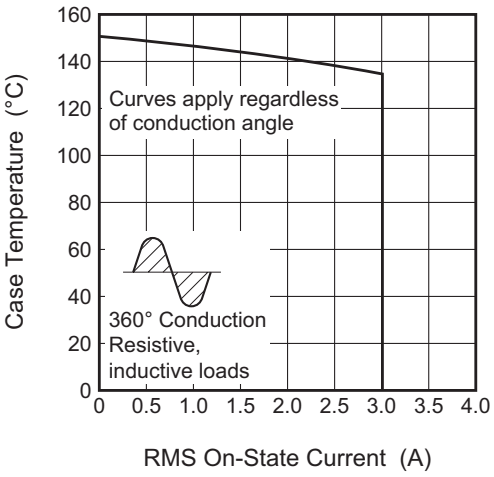
Maximum Transient Thermal Impedance Characteristics (Junction to ambient)



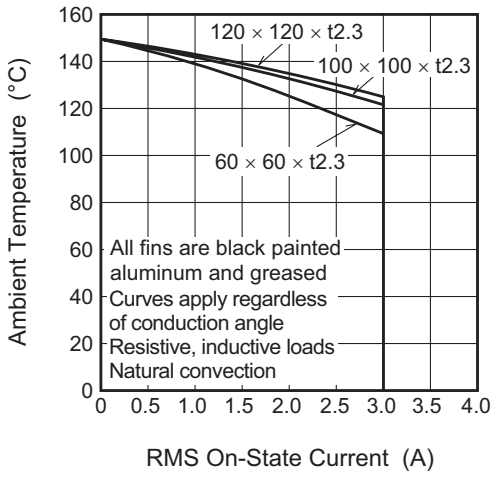
Maximum On-State Power Dissipation



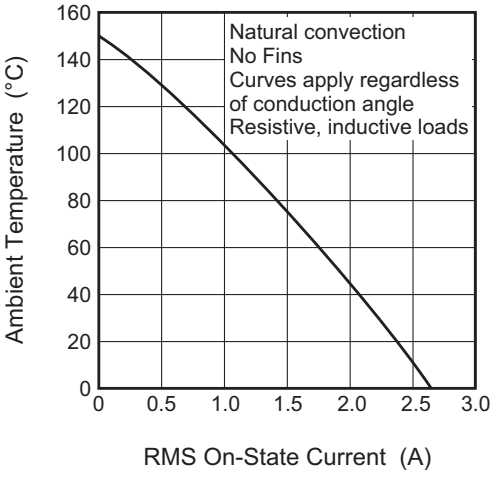
Allowable Case Temperature vs. RMS On-State Current



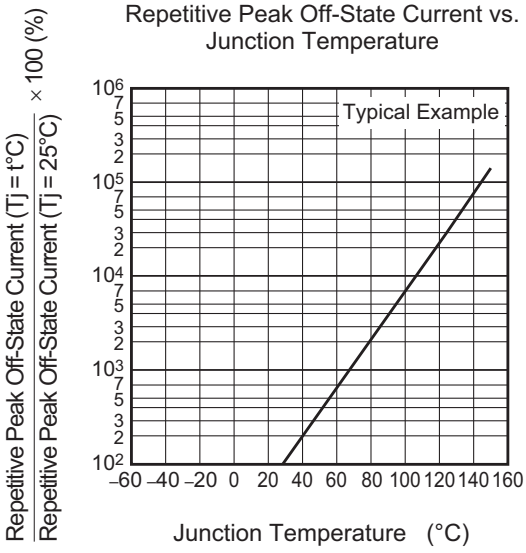
Allowable Ambient Temperature vs. RMS On-State Current



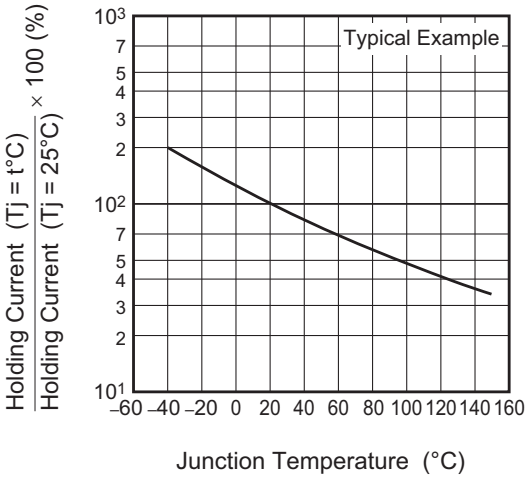
Allowable Ambient Temperature vs. RMS On-State Current



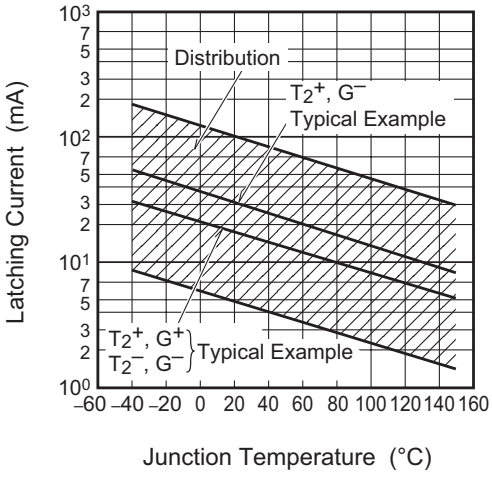
Repetitive Peak Off-State Current vs. Junction Temperature



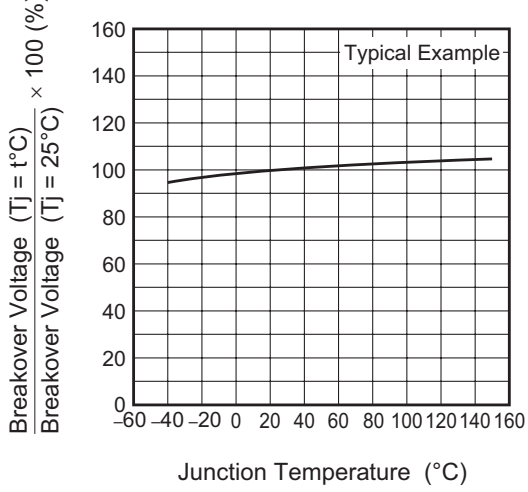
Holding Current vs.
Junction Temperature



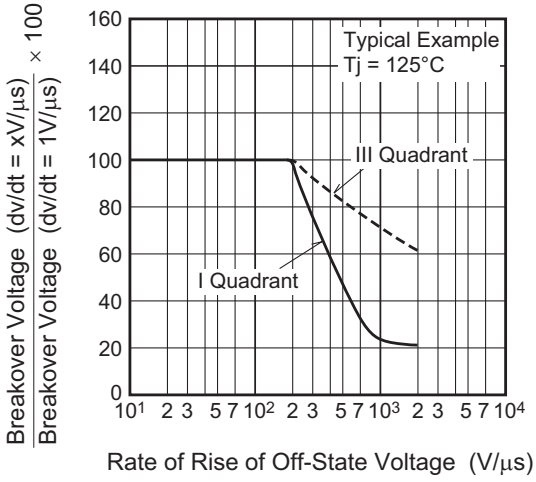
Latching Current vs.
Junction Temperature



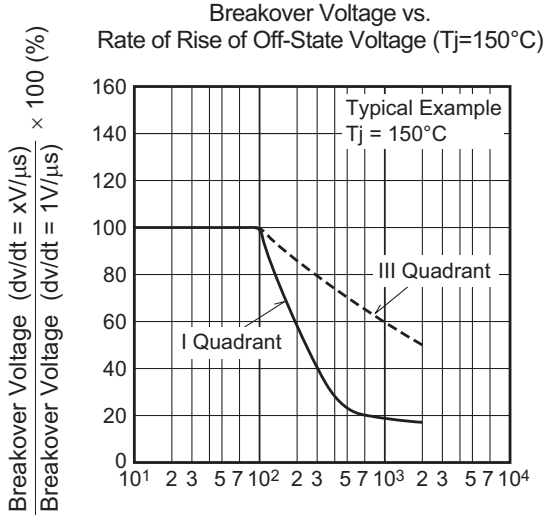
Breakover Voltage vs.
Junction Temperature



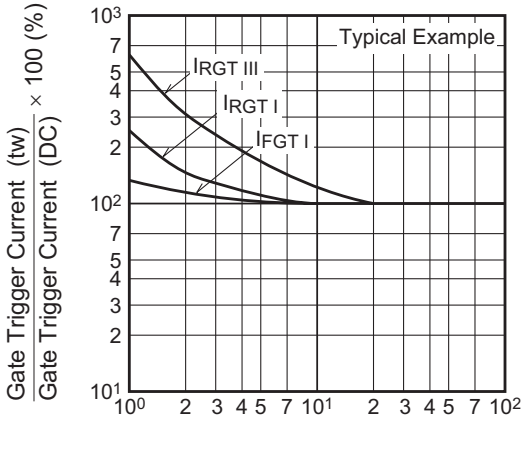
Breakover Voltage vs.
Rate of Rise of Off-State Voltage (Tj=125°C)



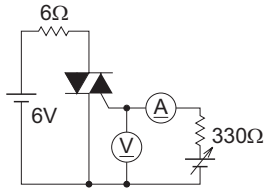
Breakover Voltage vs.
Rate of Rise of Off-State Voltage (Tj=150°C)



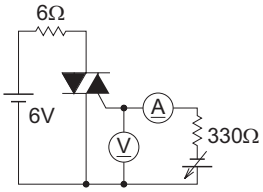
Gate Trigger Current vs.
Gate Current Pulse Width



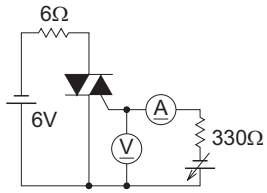
Gate Trigger Characteristics Test Circuits



Test Procedure I

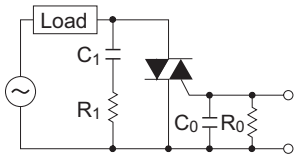


Test Procedure II



Test Procedure III

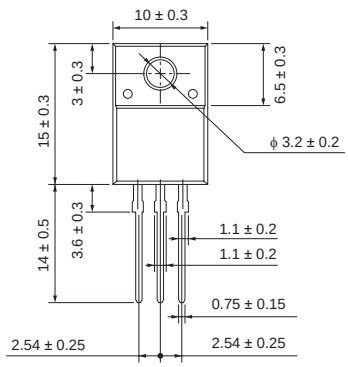
Recommended Circuit Values Around The Triac

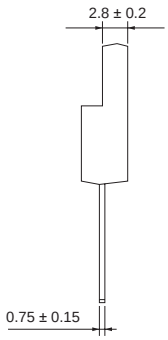


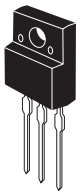
C_1 = 0.1 to 0.47μF C_0 = 0.1μF
R_1 = 47 to 100Ω R_0 = 100Ω

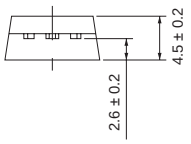
TO-220FN

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_1	———	———	———
A_2	———	———	———
b	———	———	———
D	———	———	———
E	———	———	———
e	———	———	———
x	———	———	———
y	———	———	———
y_1	———	———	———
ZD	———	———	———
ZE	———	———	———

Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Straight type	Plastic Magazine (Tube)	50	Type name +RB	BCR3KM-12RB
Lead form	Plastic Magazine (Tube)	50	Type name +RB – Lead forming code	BCR3KM-12RB-A8

Note : Please confirm the specification about the shipping in detail.