

BCR12PM-14L

Triac

Medium Power Use

REJ03G0309-0100

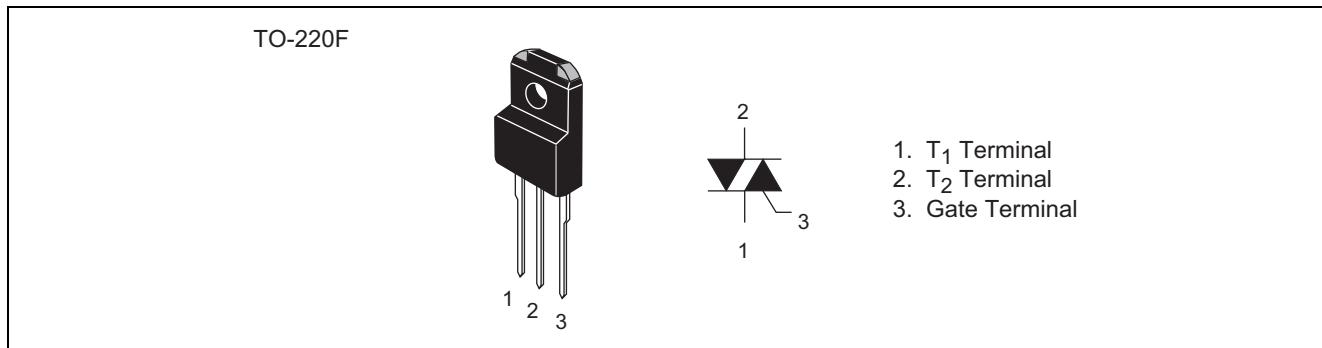
Rev.1.00

Aug.20.2004

Features

- $I_{T(RMS)}$: 12 A
- V_{DRM} : 700 V
- I_{FGTI} , I_{RGTI} , $I_{RGTI\text{III}}$: 30 mA
- Viso : 2000 V
- Insulated Type
- Planar Passivation Type
- UL Recognized : Yellow Card No. E223904
File No. E80271

Outline



Applications

Washing machine, inversion operation of capacitor motor, and other general controlling devices

Maximum Ratings

Parameter	Symbol	Voltage class		Unit
		14	700	
Repetitive peak off-state voltage ^{Note1}	V_{DRM}		700	V
Non-repetitive peak off-state voltage ^{Note1}	V_{DSM}		840	V

Parameter	Symbol	Ratings	Unit	Conditions
RMS on-state current	I_{TRMS}	12	A	Commercial frequency, sine full wave 360° conduction, $T_c = 74^\circ\text{C}$
Surge on-state current	I_{TSM}	120	A	60Hz sinewave 1 full cycle, peak value, non-repetitive
I^2t for fusing	I^2t	60	A^2s	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	$P_{\text{G(AV)}}$	0.5	W	
Peak gate voltage	V_{GM}	10	V	
Peak gate current	I_{GM}	2	A	
Junction temperature	T_j	– 40 to +125	$^\circ\text{C}$	
Storage temperature	T_{stg}	– 40 to +125	$^\circ\text{C}$	
Mass	—	2.0	g	Typical value
Isolation voltage	V_{iso}	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.

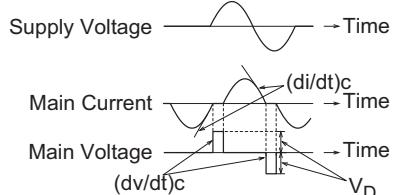
Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Repetitive peak off-state current	I_{DRM}	—	—	2.0	mA	$T_j = 125^\circ\text{C}$, V_{DRM} applied
On-state voltage	V_{TM}	—	—	1.6	V	$T_c = 25^\circ\text{C}$, $I_{\text{TM}} = 20$ A, Instantaneous measurement
Gate trigger voltage ^{Note2}	I	V_{FGTI}	—	1.5	V	$T_j = 25^\circ\text{C}$, $V_D = 6$ V, $R_L = 6$ Ω , $R_G = 330$ Ω
	II	V_{RGTI}	—	1.5	V	
	III	$V_{\text{RGTI}}_{\text{III}}$	—	1.5	V	
Gate trigger current ^{Note2}	I	I_{FGTI}	—	30	mA	$T_j = 25^\circ\text{C}$, $V_D = 6$ V, $R_L = 6$ Ω , $R_G = 330$ Ω
	II	I_{RGTI}	—	30	mA	
	III	$I_{\text{RGTI}}_{\text{III}}$	—	30	mA	
Gate non-trigger voltage	V_{GD}	0.2	—	—	V	$T_j = 125^\circ\text{C}$, $V_D = 1/2 V_{\text{DRM}}$
Thermal resistance	$R_{\text{th(j-c)}}$	—	—	3.5	$^\circ\text{C/W}$	Junction to case ^{Note3}
Critical-rate of rise of off-state commutating voltage ^{Note4}	$(dv/dt)c$	10	—	—	V/ μ s	$T_j = 125^\circ\text{C}$

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

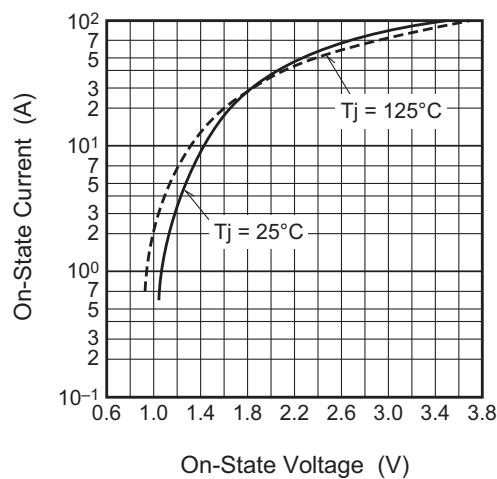
3. The contact thermal resistance $R_{\text{th(c-f)}}$ in case of greasing is 0.5°C/W .

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

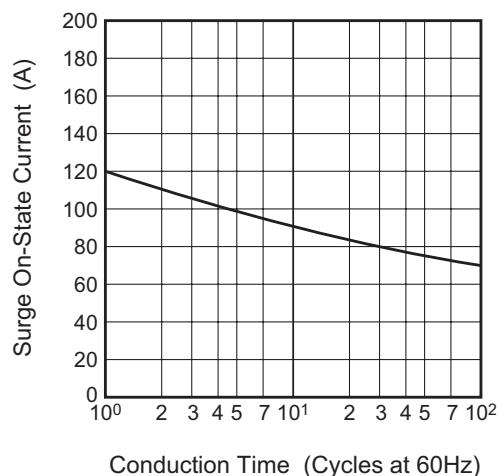
Test conditions	Commutating voltage and current waveforms (inductive load)
1. Junction temperature $T_j = 125^\circ\text{C}$ 2. Rate of decay of on-state commutating current $(di/dt)c = -6.0$ A/ms 3. Peak off-state voltage $V_D = 400$ V	

Performance Curves

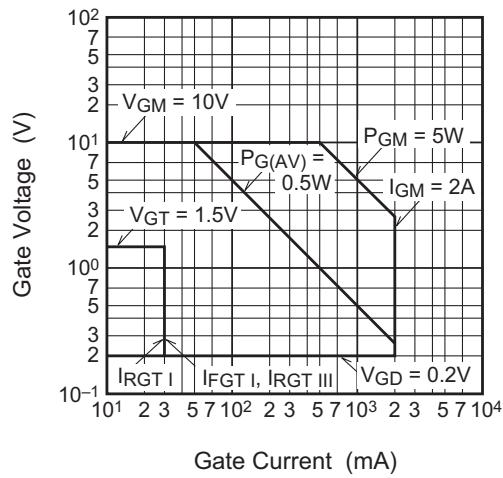
Maximum On-State Characteristics



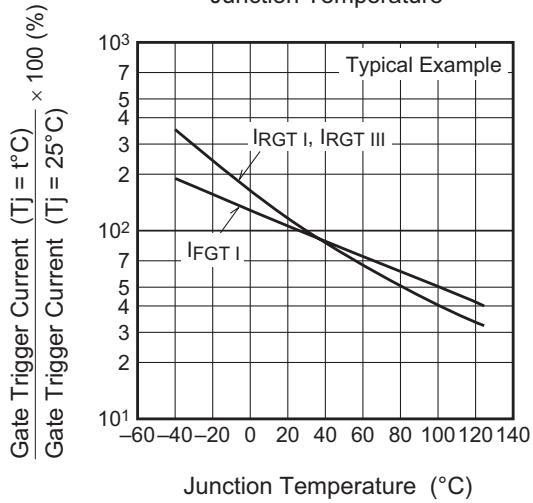
Rated Surge On-State Current



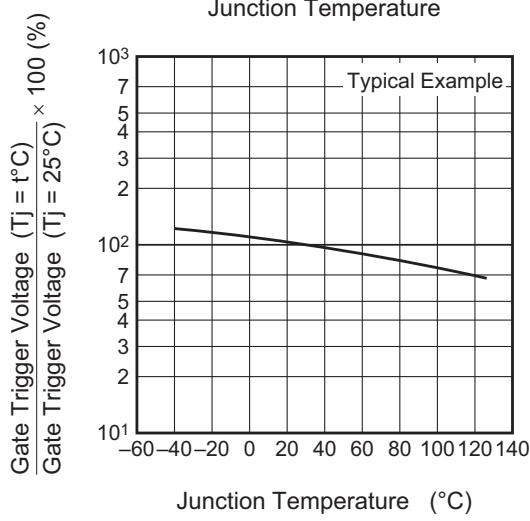
Gate Characteristics (I, II and III)



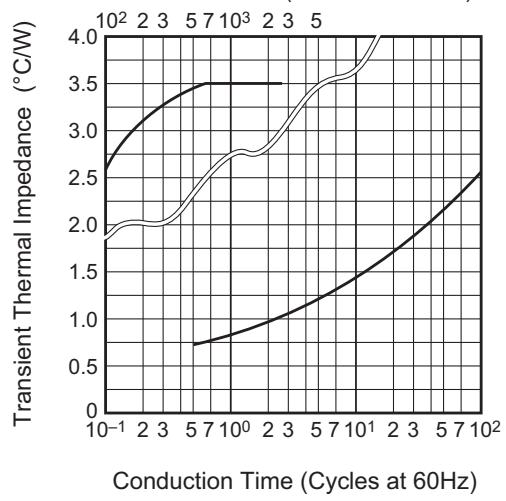
Gate Trigger Current vs. Junction Temperature



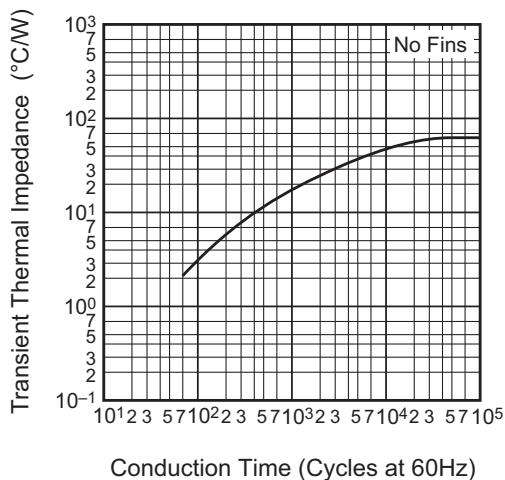
Gate Trigger Voltage vs. Junction Temperature



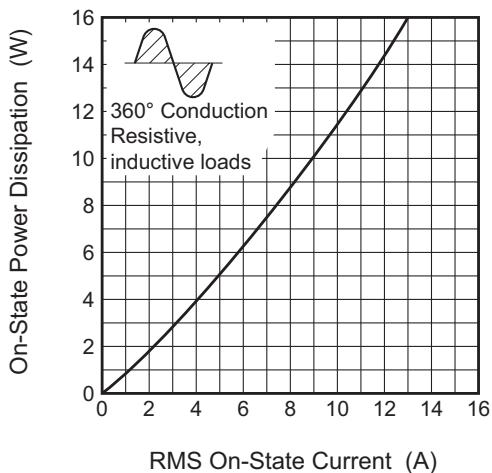
Maximum Transient Thermal Impedance Characteristics (Junction to case)



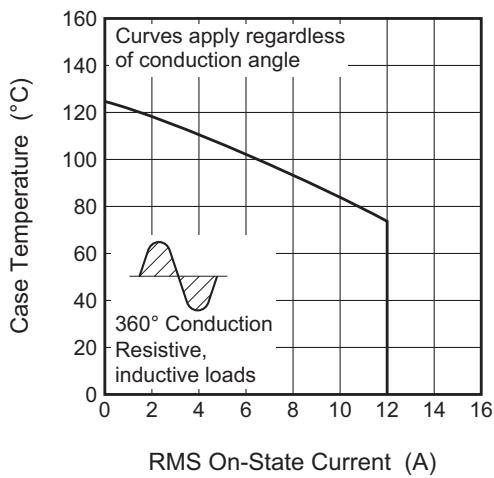
Maximum Transient Thermal Impedance Characteristics (Junction to ambient)



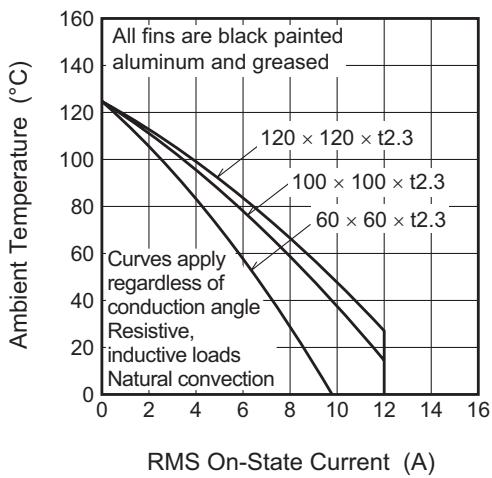
Maximum On-State Power Dissipation



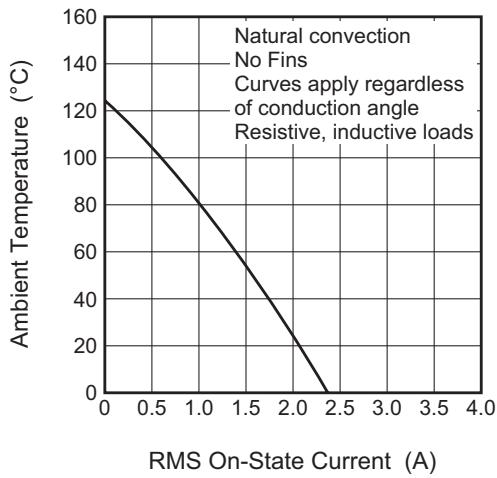
Allowable Case Temperature vs. RMS On-State Current



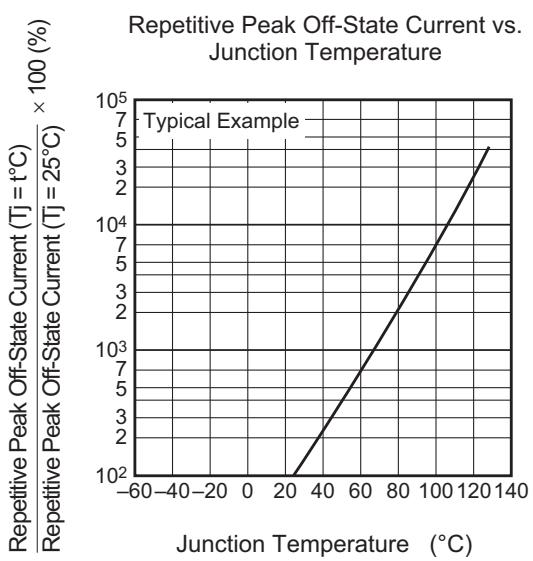
Allowable Ambient Temperature vs. RMS On-State Current

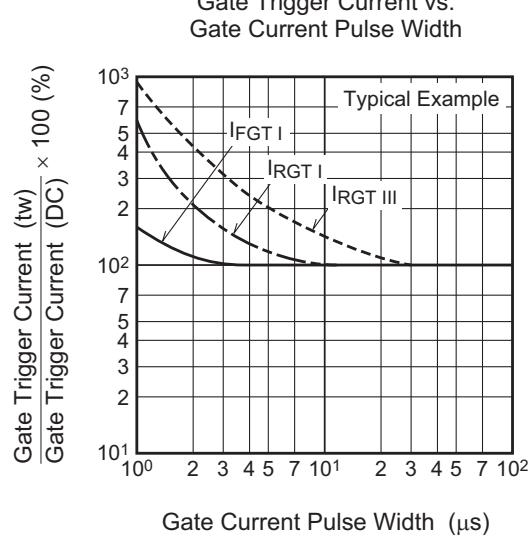
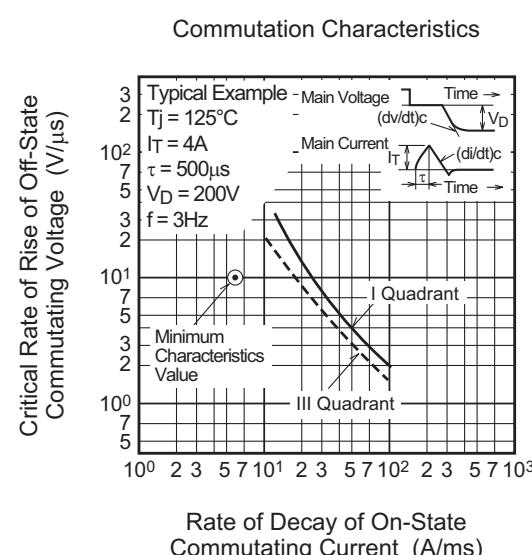
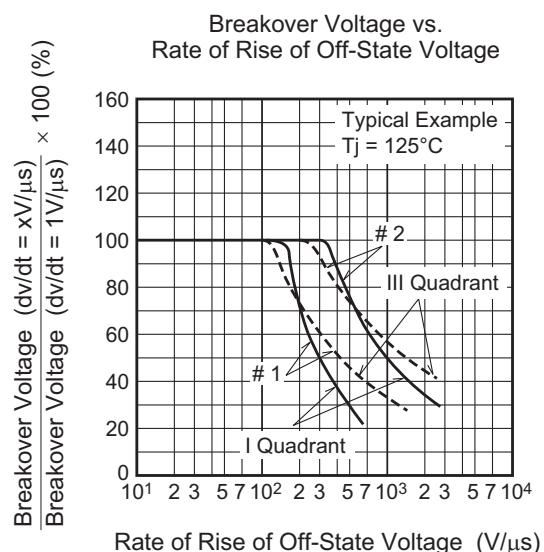
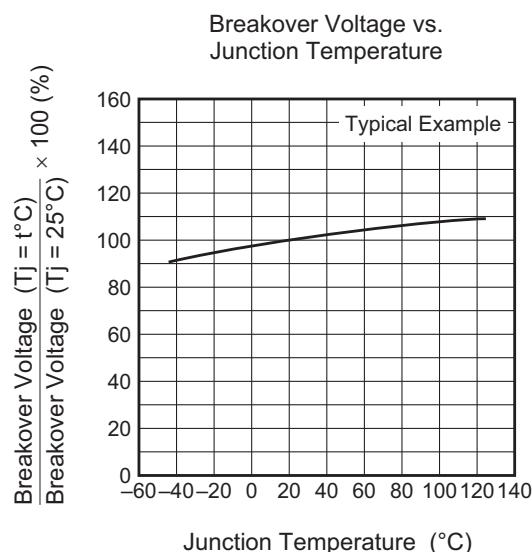
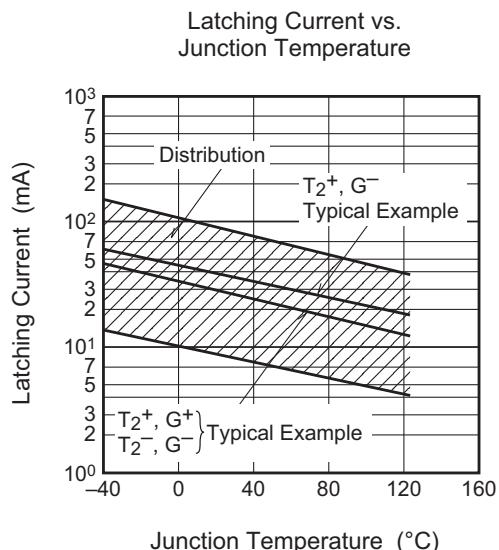
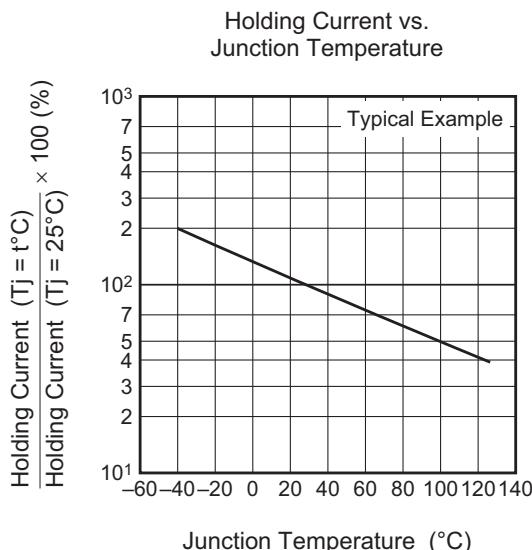


Allowable Ambient Temperature vs. RMS On-State Current

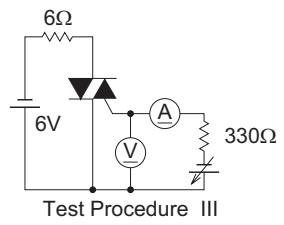
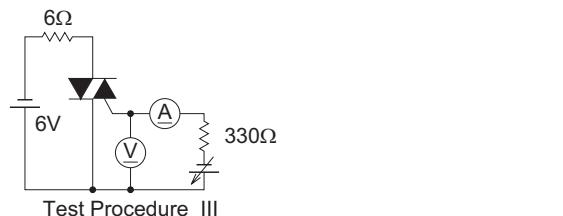
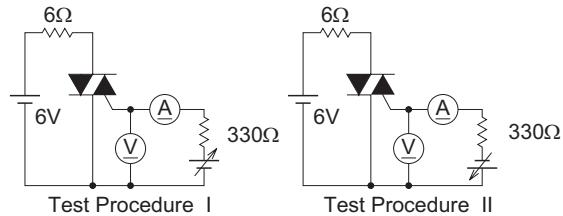


Repetitive Peak Off-State Current vs. Junction Temperature



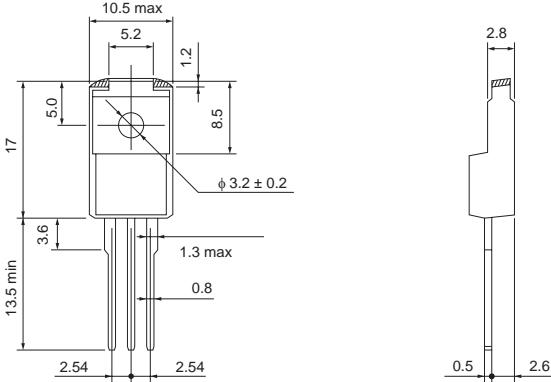


Gate Trigger Characteristics Test Circuits

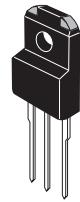


Package Dimensions

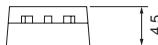
TO-220F			
EIAJ Package Code	JEDEC Code	Mass (g) (reference value)	Lead Material
Conforms	—	2.0	Cu alloy



Technical drawing of the TO-220F package showing top and side views with dimensions: 17 (height), 13.5 min (body height), 5.0 (width), 10.5 max (width), 5.2 (width), 1.2 (width), 8.5 (width), 3.6 (width), 1.3 max (width), 0.8 (width), 2.54 (lead spacing), 2.54 (lead spacing), 2.8 (lead height), 0.5 (lead spacing), and 2.6 (lead spacing). A note indicates $\phi 3.2 \pm 0.2$.



3D perspective view of the TO-220F package.



Bottom view of the TO-220F package showing lead spacing of 4.5 mm.

Symbol	Dimension in Millimeters		
	Min	Typ	Max
A			
A ₁			
A ₂			
b			
D			
E			
e			
x			
y			
y ₁			
ZD			
ZE			

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

Order Code

Lead form	Standard packing	Quantity	Standard order code	Standard order code example
Straight type	Vinyl sack	100	Type name +A	BCR12PM-14LA
Lead form	Plastic Magazine (Tube)	50	Type name +A – Lead forming code	BCR12PM-14LA-A8

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

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