

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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# CR6KM-12A

## Thyristor

Medium Power Use

REJ03G0387-0100

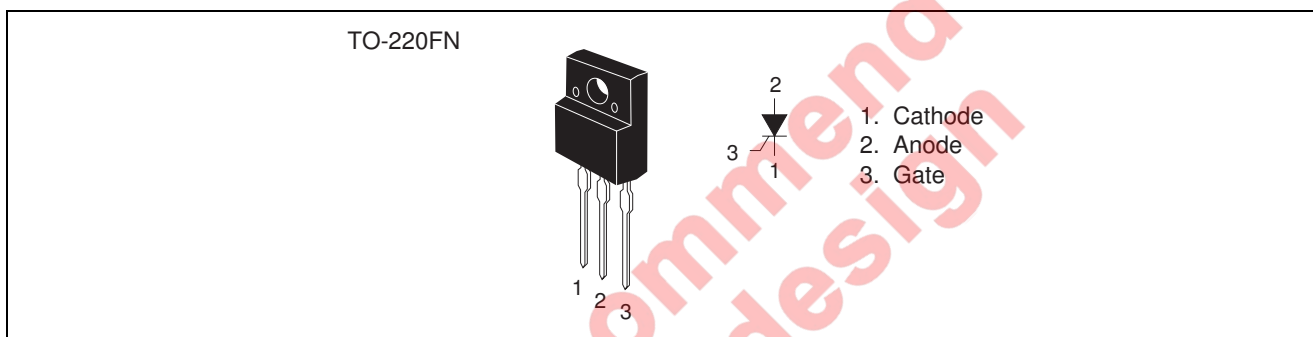
Rev.1.00

Aug.06.2004

### Features

- $I_{T(AV)}$  : 6 A
- $V_{DRM}$  : 600 V
- $I_{GT}$  : 10 mA
- $V_{ISO}$  : 2000 V
- Insulated Type
- Planar Passivation Type
- UL Recognized : Yellow Card No. E223904  
File No. E80271

### Outline



### Applications

Switching mode power supply, regulator for auticycle, motor control, heater control, and other general purpose control applications

### Maximum Ratings

Parameter	Symbol	Voltage class	Unit
		12	
Repetitive peak reverse voltage	$V_{RRM}$	600	V
Non-repetitive peak reverse voltage	$V_{RSM}$	720	V
DC reverse voltage	$V_{R(DC)}$	480	V
Repetitive peak off-state voltage	$V_{DRM}$	600	V
DC off-state voltage	$V_{D(DC)}$	480	V

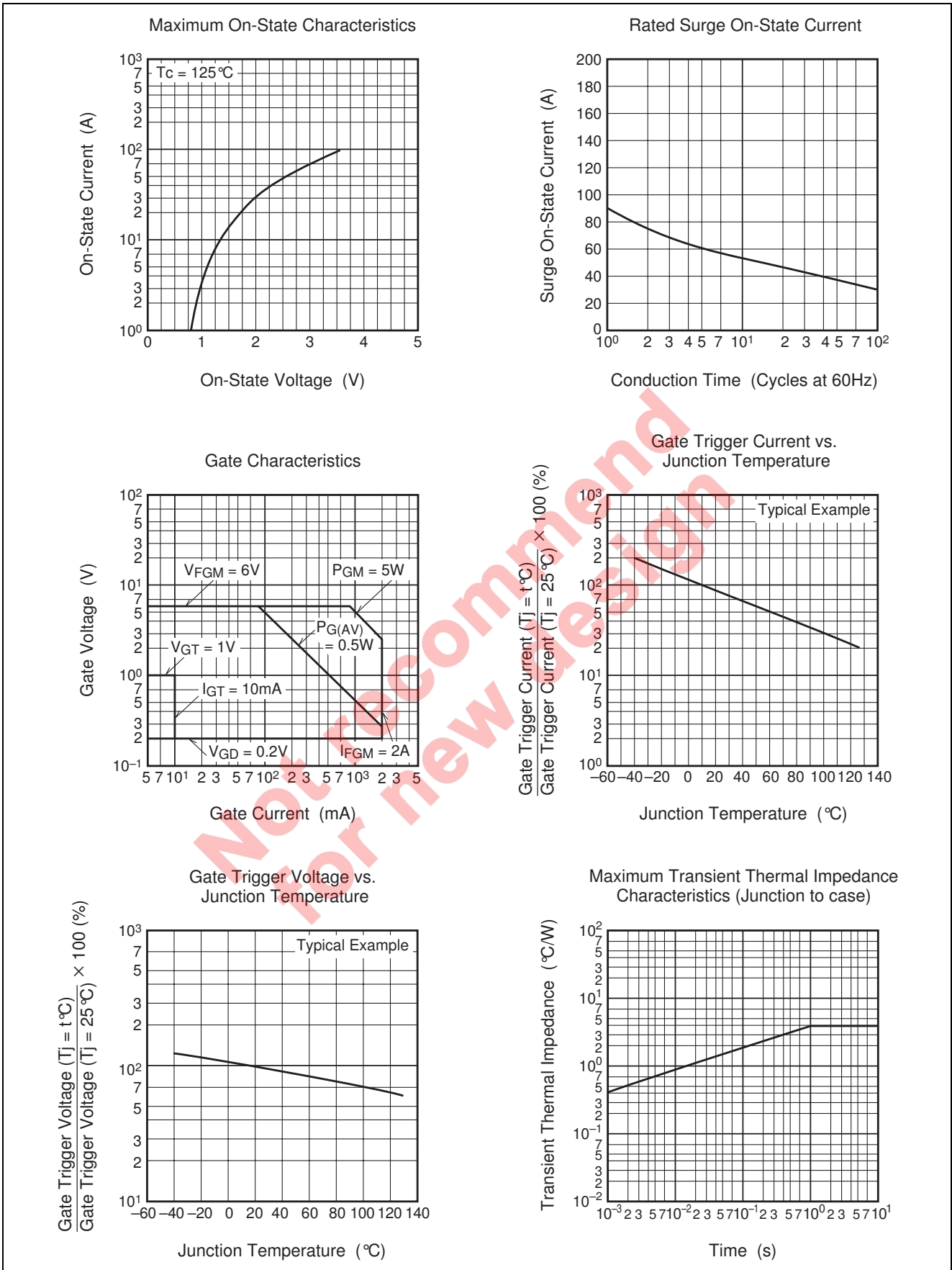
Parameter	Symbol	Ratings	Unit	Conditions
RMS on-state current	$I_{T(RMS)}$	9.4	A	
Average on-state current	$I_{T(AV)}$	6	A	Commercial frequency, sine half wave 180° conduction, $T_c = 85^\circ\text{C}$
Surge on-state current	$I_{TSM}$	90	A	60Hz sine half wave 1 full cycle, peak value, non-repetitive
$I^2t$ for fusing	$I^2t$	34	$\text{A}^2\text{s}$	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 forward voltage	$V_{FGM}$	6	V	
Peak gate reverse voltage	$V_{RGM}$	10	V	
Peak gate forward current	$I_{FGM}$	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	Viso	2000	V	$T_a = 25^\circ\text{C}$ , AC 1 minute, each terminal to case

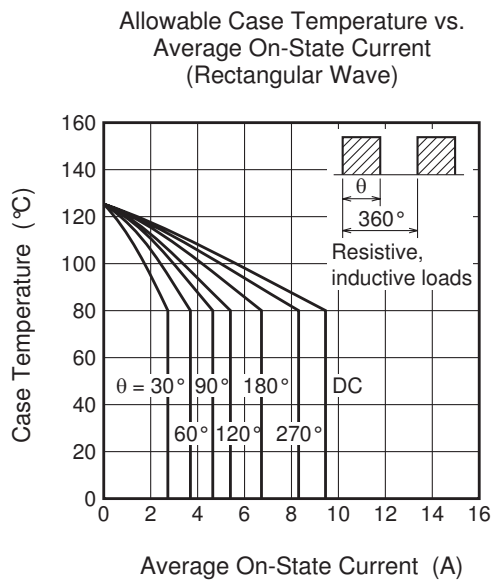
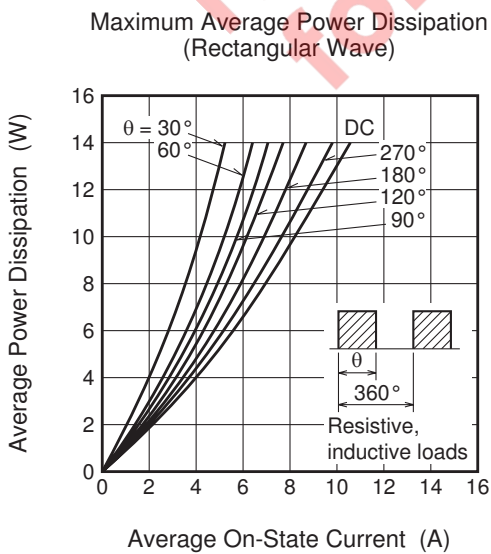
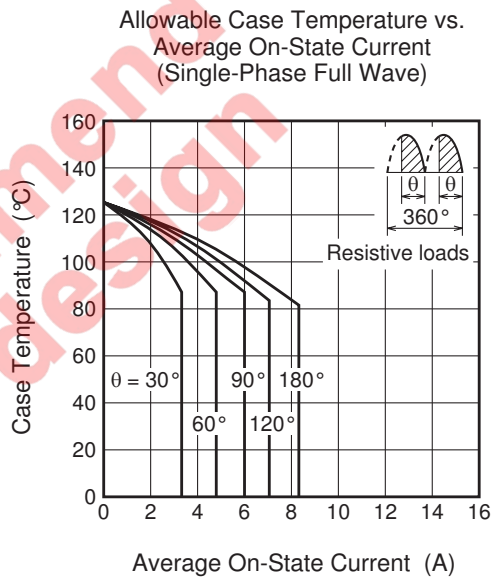
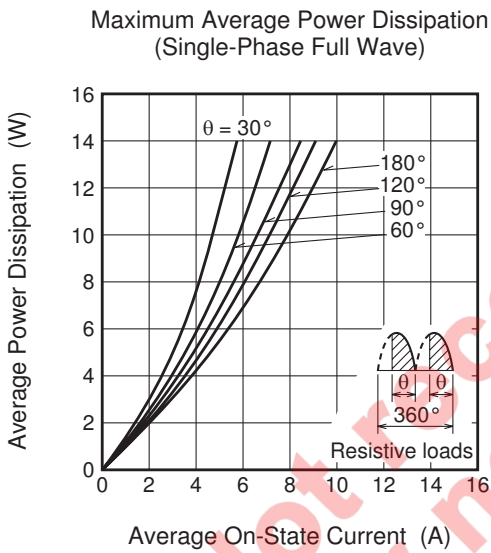
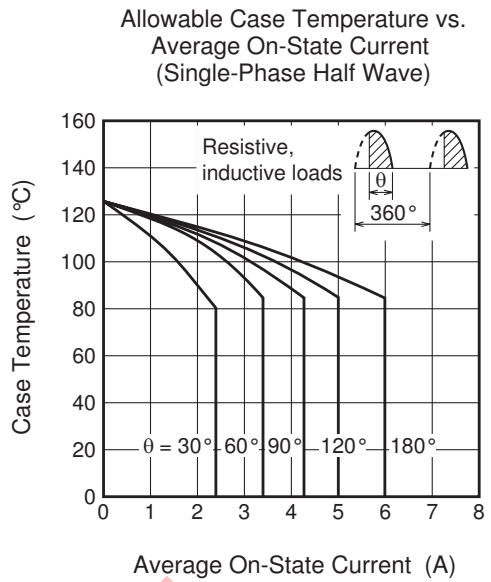
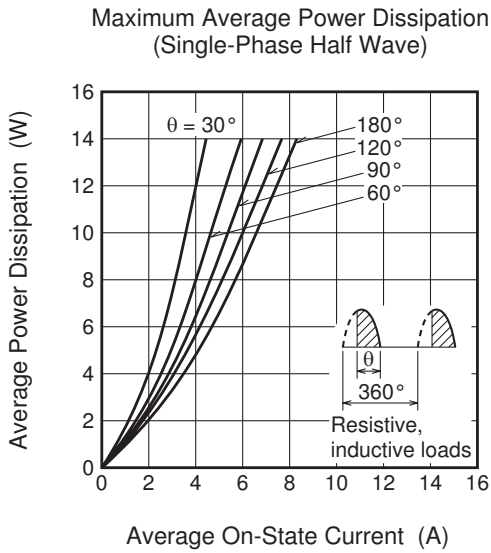
## Electrical Characteristics

Parameter	Symbol	Minimum Characteristics Value			Unit	Test conditions
		Min.	Typ.	Max.		
Repetitive peak reverse current	$I_{RRM}$	—	—	2.0	mA	$T_j = 125^\circ\text{C}$ , $V_{RRM}$ applied
Repetitive peak off-state current	$I_{DRM}$	—	—	2.0	mA	$T_j = 125^\circ\text{C}$ , $V_{DRM}$ applied
On-state voltage	$V_{TM}$	—	—	1.7	V	$T_c = 25^\circ\text{C}$ , $I_{TM} = 20\text{ A}$ , instantaneous value
Gate trigger voltage	$V_{GT}$	—	—	1.0	V	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $I_T = 1\text{ A}$
Gate non-trigger voltage	$V_{GD}$	0.2	—	—	V	$T_j = 125^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$
Gate trigger current	$I_{GT}$	—	—	10	mA	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $I_T = 1\text{ A}$
Holding current	$I_H$	—	15	—	mA	$T_j = 25^\circ\text{C}$ , $V_D = 12\text{ V}$
Thermal resistance	$R_{th(j-c)}$	—	—	4.0	$^\circ\text{C/W}$	Junction to case <sup>Note1</sup>

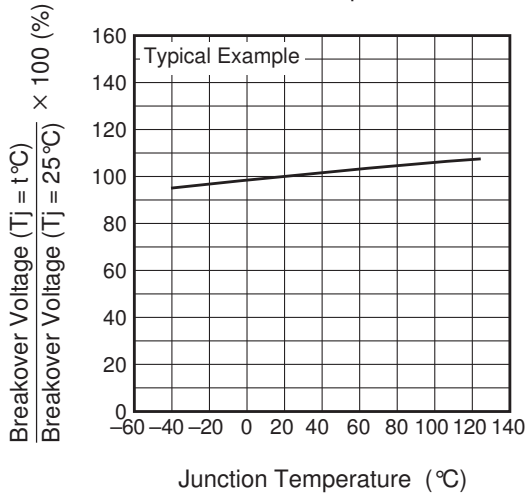
Notes: 1. The contact thermal resistance  $R_{th(c-f)}$  in case of greasing is  $0.5^\circ\text{C/W}$ .

Performance Curves

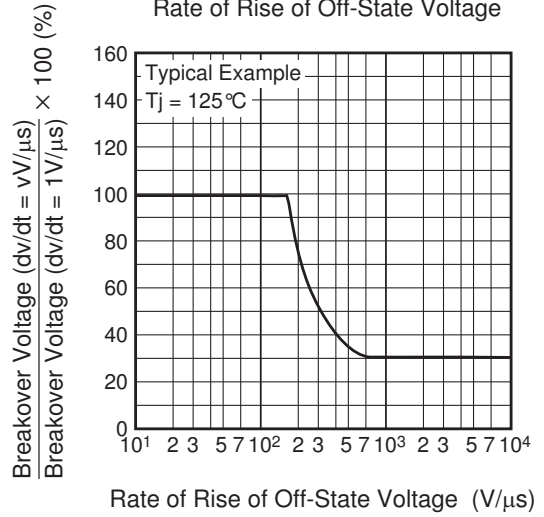




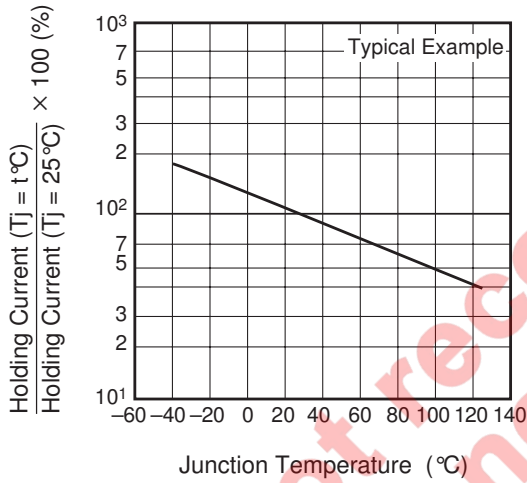
Breakover Voltage vs. Junction Temperature



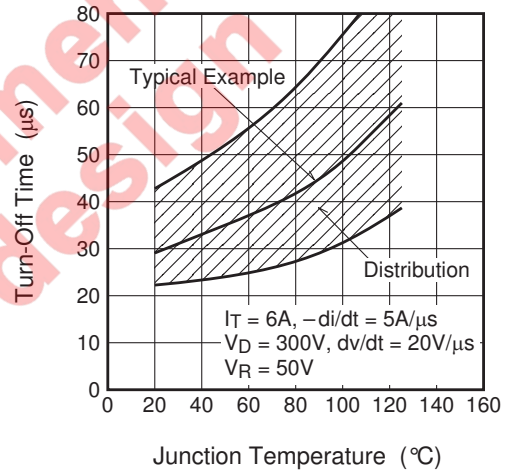
Breakover Voltage vs. Rate of Rise of Off-State Voltage



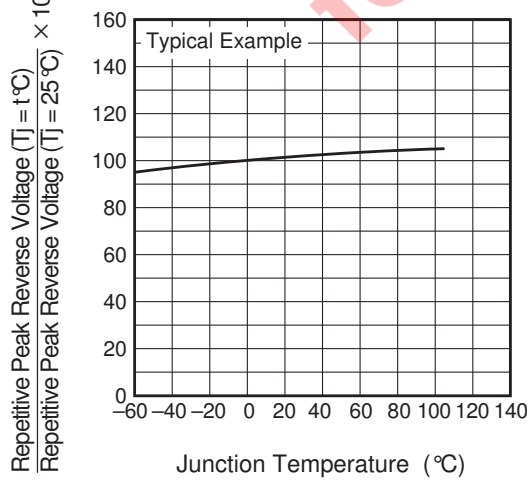
Holding Current vs. Junction Temperature



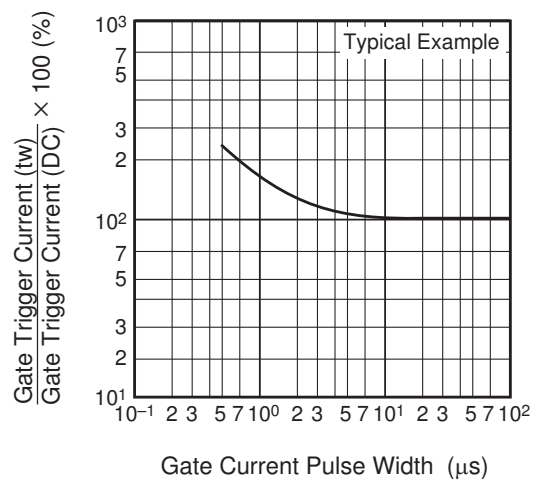
Turn-Off Time vs. Junction Temperature



Repetitive Peak Reverse Voltage vs. Junction Temperature



Gate Trigger Current vs. Gate Current Pulse Width



Package Dimensions

**TO-220FN**

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

Technical drawings showing dimensions for TO-220FN package:

- Top view: Overall width 10 ± 0.3 mm, height 15 ± 0.3 mm. Mounting holes are 3 ± 0.3 mm apart. Lead spacing is 2.54 ± 0.25 mm. Lead diameter is φ 3.2 ± 0.2 mm.
- Side view: Lead length 14 ± 0.5 mm, lead thickness 0.75 ± 0.15 mm. Lead diameter is φ 3.2 ± 0.2 mm.
- Lead view: Lead length 1.1 ± 0.2 mm, lead thickness 0.75 ± 0.15 mm.
- Lead detail: Lead thickness 2.6 ± 0.2 mm, lead diameter 4.5 ± 0.2 mm.

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	CR6KM-12A
Lead form	Plastic Magazine (Tube)	50	Type name – Lead forming code	CR6KM-12A-A8

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



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