CR12FM-12B

600V - 12A - Thyristor

Medium Power Use

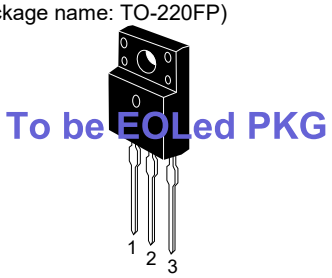
R07DS1100EJ0200
Rev.2.00
Sep. 11, 2018

Features

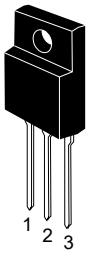
- $I_{T\,(AV)}$: 12 A
- V_{DRM} : 600 V
- I_{GT}: 30 mA
- Tj: 150°C
- Insulated Type (V_{iso} : 2000 V)
- Planar Passivation Type

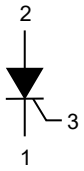
Outline

RENESAS Package code: PRSS0003AG-A
(Package name: TO-220FP)



RENESAS Package code: PRSS0003AP-A
(Package name: TO-220FPA)





1. Cathode
2. Anode
3. Gate

Application

Power supply, motor control, heater control and other general purpose 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	$I_{T\,(RMS)}$	18.8	A	
Average on-state current	$I_{T\,(AV)}$	12	A	Commercial frequency, sine half wave 180°conduction, Tc = 81°C
Surge on-state current	I_{TSM}	360	A	60 Hz sinewave 1 full cycle, peak value, non-repetitive
I^2t for fusing	I^2t	544	A^2s	Value corresponding to 1 cycle of half wave 60 Hz, 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	Tj	–40 to +150	°C	
Storage temperature	Tstg	–40 to +150	°C	
Isolation voltage Note2	V_{iso}	2000	V	Ta=25°C, AC 1 minute, each terminal to case

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Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Repetitive peak reverse current	I_{RRM}	—	—	2.0	mA	Tj = 125°C, V_{RRM} applied
		—	—	5.0	mA	Tj = 150°C, V_{RRM} applied
Repetitive peak off-state current	I_{DRM}	—	—	2.0	mA	Tj = 125°C, V_{DRM} applied
		—	—	5.0	mA	Tj = 150°C, V_{DRM} applied
On-state voltage	V_{TM}	—	—	1.6	V	Tc = 25°C, I_{TM} = 40 A, instantaneous value
Gate trigger voltage	V_{GT}	—	—	1.5	V	Tj = 25°C, V_D = 6 V, I_T = 1A
Gate non-trigger voltage	V_{GD}	0.2	—	—	V	Tj = 125°C, V_D = 1/2 V_{DRM}
		0.1	—	—	V	Tj = 150°C, V_D = 1/2 V_{DRM}
Gate trigger current	I_{GT}	—	—	30	mA	Tj = 25°C, V_D = 6 V, I_T = 1A
Holding current	I_H	—	30	—	mA	Tj = 25°C, V_D = 12 V
Thermal resistance	$R_{th\ (j-c)}$	—	—	3.2	°C/W	Junction to case[Note1 Note2]

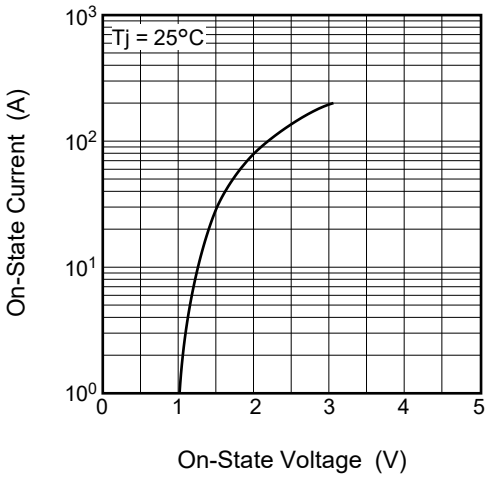
Notes: 1. The contact thermal resistance $R_{th(c-f)}$ in case of greasing is 0.5°C /W.

2. Make sure that your finished product containing this device meets your safe isolation requirements. For safety, it's advisable that heatsink is electrically floating.

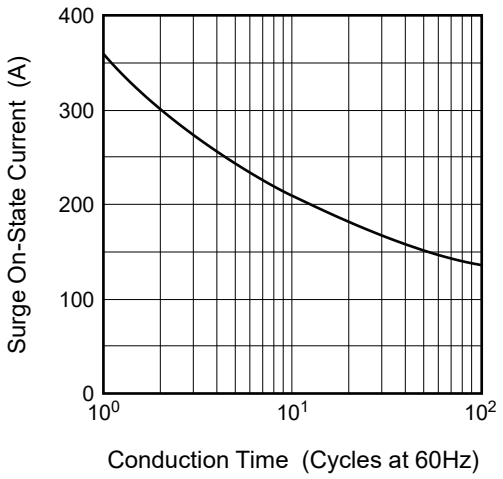
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Performance Curves

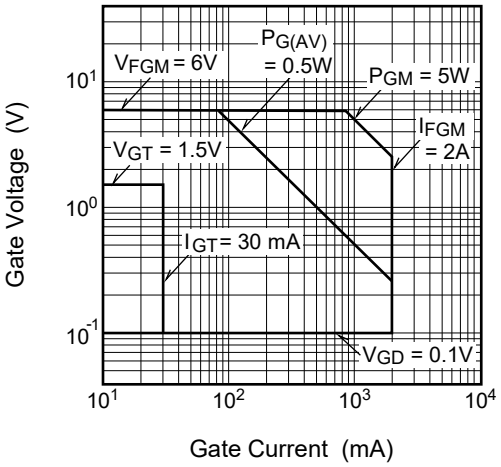
Maximum On-State Characteristics



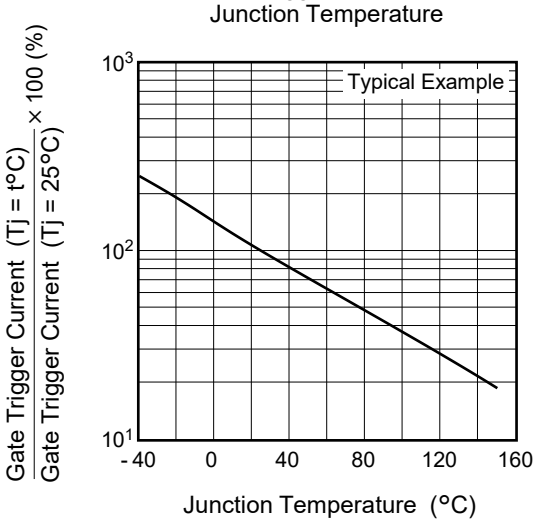
Rated Surge On-State Current



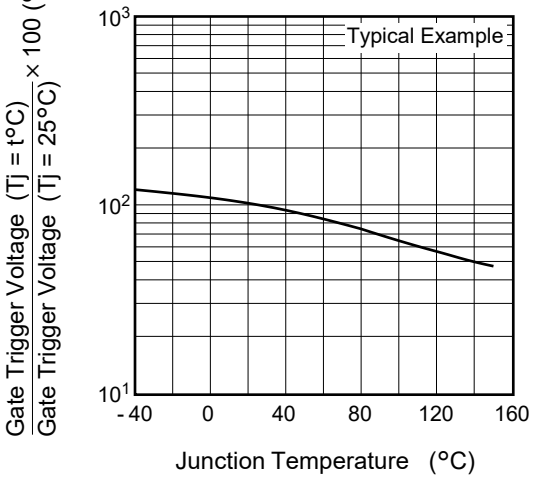
Gate Characteristics



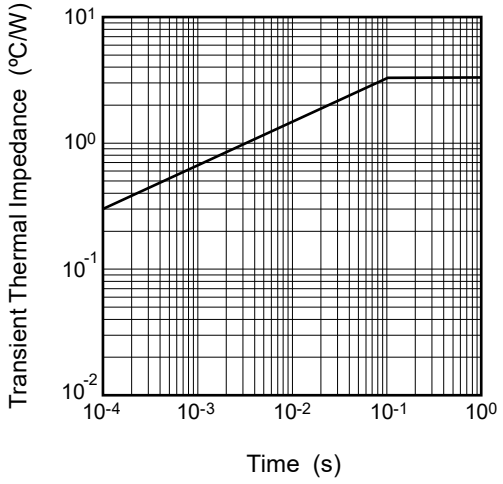
Gate Trigger Current vs. Junction Temperature



Gate Trigger Voltage vs. Junction Temperature

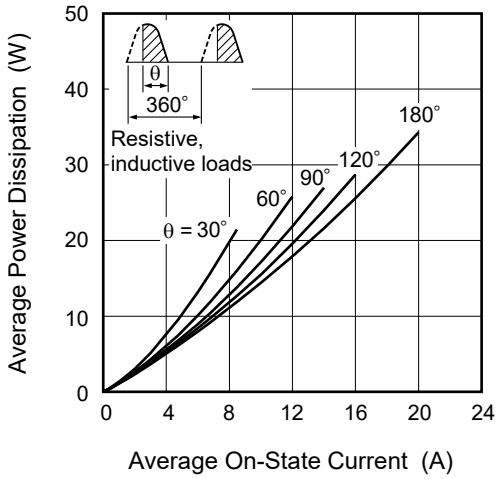


Maximum Transient Thermal Impedance Characteristics (Junction to case)

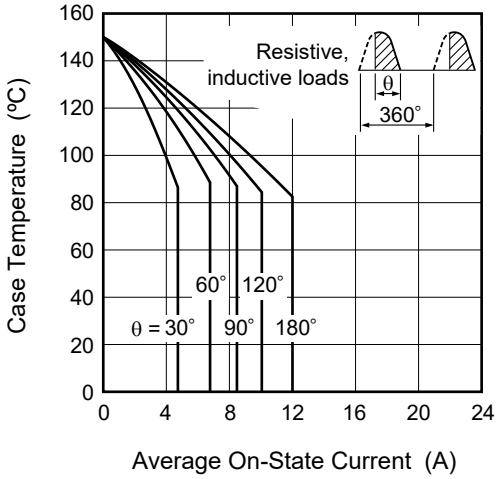


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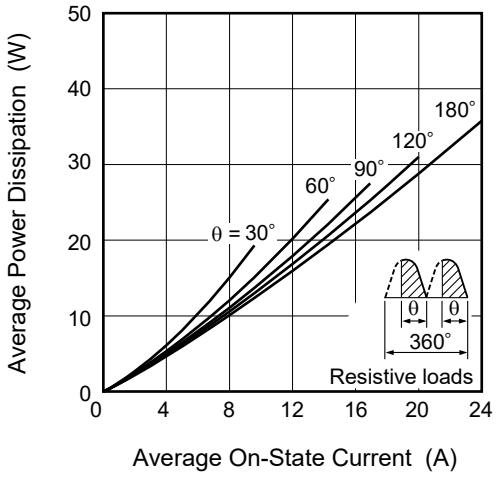
Maximum Average Power Dissipation
(Single-Phase Half Wave)



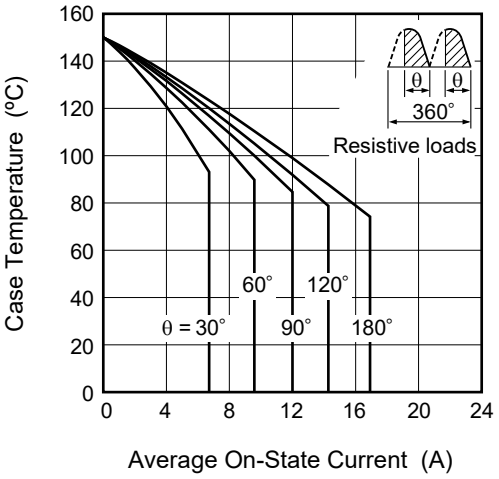
Allowable Case Temperature vs.
Average On-State Current
(Single-Phase Half Wave)



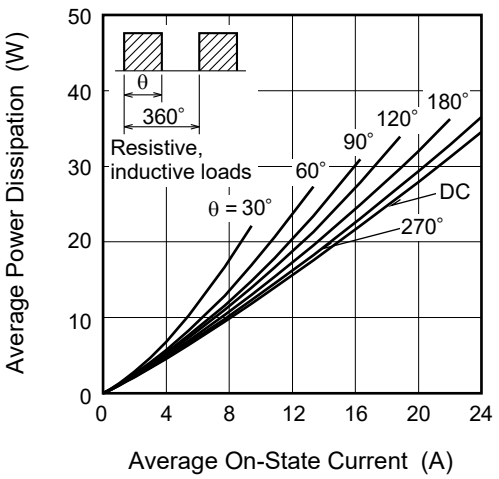
Maximum Average Power Dissipation
(Single-Phase Full Wave)



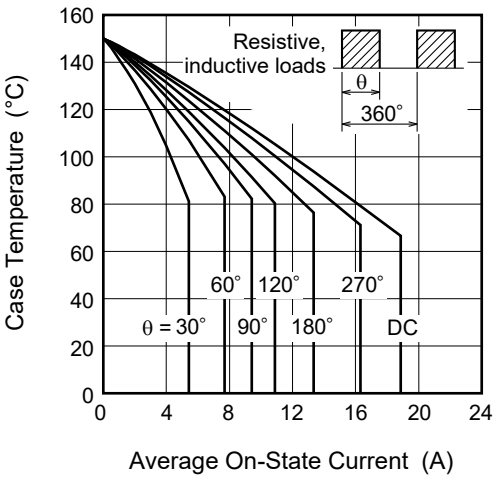
Allowable Case Temperature vs.
Average On-State Current
(Single-Phase Full Wave)



Maximum Average Power Dissipation
(Rectangular Wave)

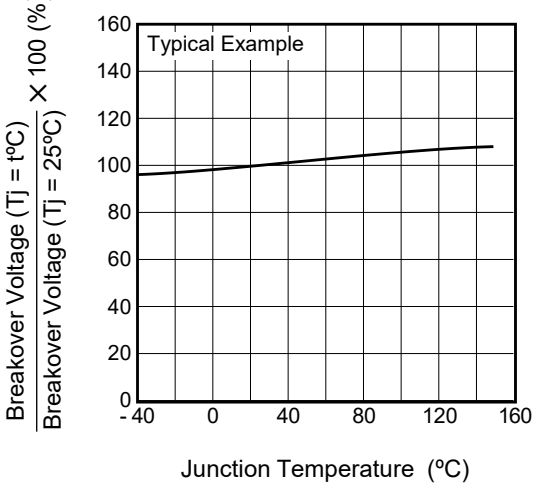


Allowable Case Temperature vs.
Average On-State Current
(Rectangular Wave)

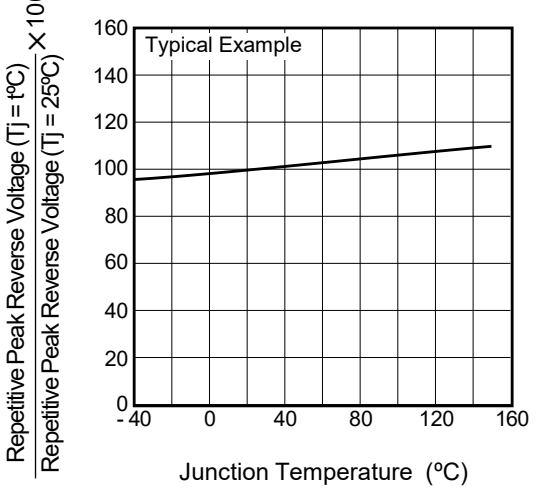


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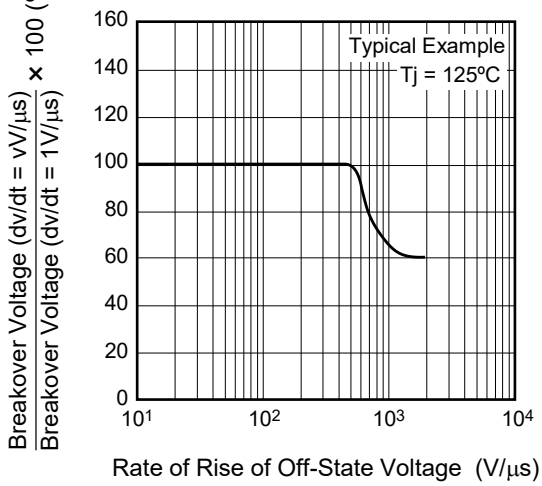
Breakover Voltage vs. Junction Temperature



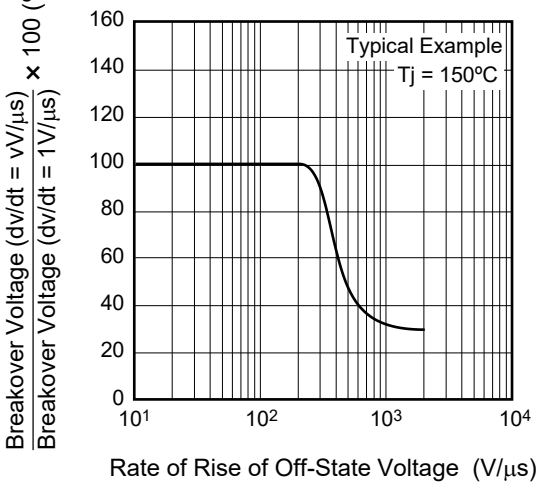
Repetitive Peak Reverse Voltage vs. Junction Temperature



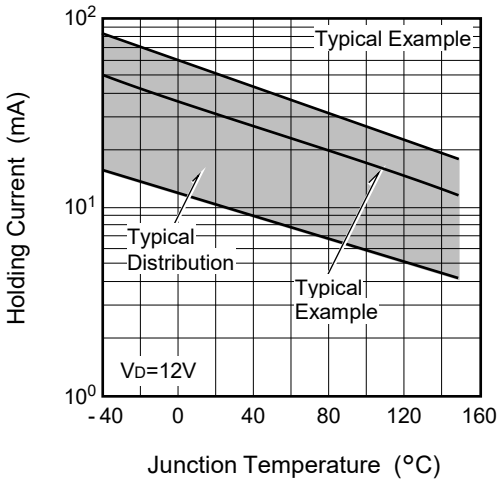
Breakover Voltage vs. Rate of Rise of Off-State Voltage



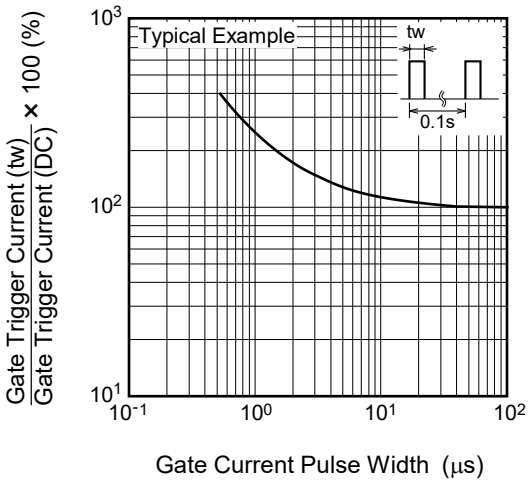
Breakover Voltage vs. Rate of Rise of Off-State Voltage



Holding Current vs. Junction Temperature



Gate Trigger Current vs. Gate Current Pulse Width



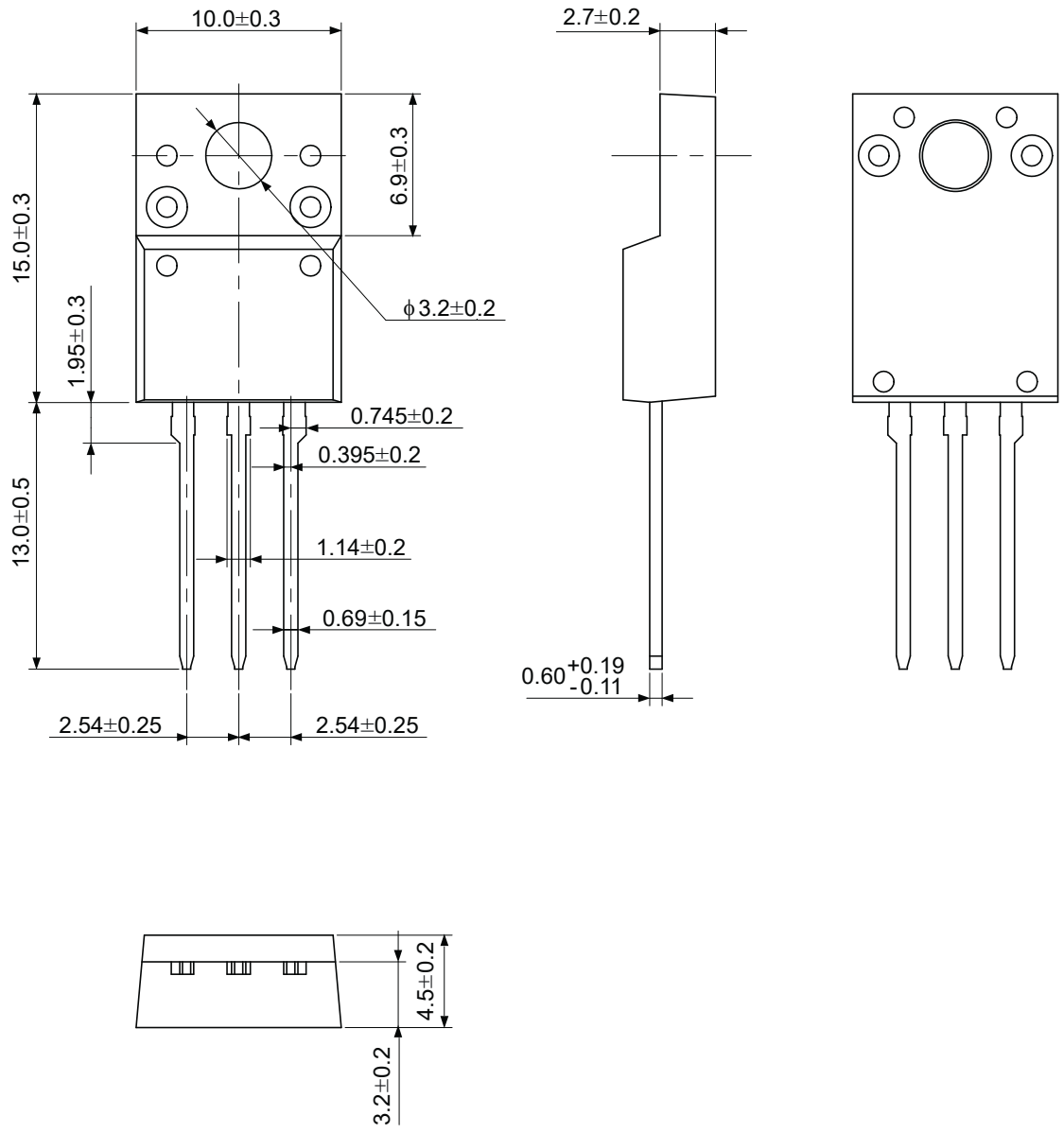
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Package Dimensions

Ordering code: #BG0, #BH0

JEITA Package Code	RENESAS Code	Previous Code	MASS (Typ) [g]
-	PRSS0003AP-A	TO-220FPA	1.65

Unit: mm



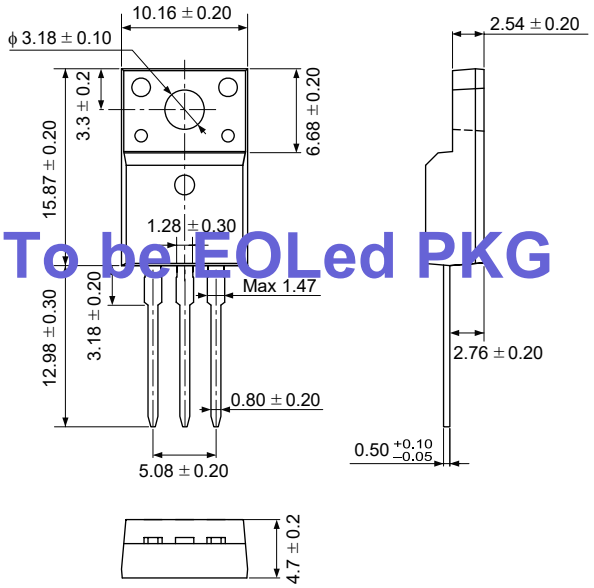
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Package Dimensions

Ordering code: #BB0 <To be EOLed>

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-220FP		PRSS0003AG-A		1.9g

Unit: mm



Ordering Information

Orderable Part Number	Package	Quantity Note3	Remark	Status
CR12FM-12B#BG0	TO-220FPA	50 pcs./ tube	Straight type	Mass Production
CR12FM-12B-☐☐#BG0	TO-220FPA	50 pcs./ tube	☐☐:Lead form type	
CR12FM-12B#BH0	TO-220FPA	50 pcs./ tube	Straight type	Mass Production
CR12FM-12B-☐☐#BH0	TO-220FPA	50 pcs./ tube	☐☐:Lead form type	
CR12FM-12B#BB0	TO-220FP	50 pcs./ tube	Straight type	EOL Candidate

Notes: 3. Please confirm the specification about the shipping in detail.

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(Rev.3.0-1 November 2016)

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