

# CR05BM-12A

600V - 0.5A - Thyristor

Low Power Use

R07DS0992EJ0300


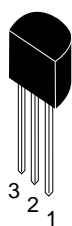
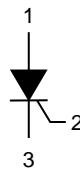
Rev.3.00

Feb. 22, 2022

## Features

- $I_T(AV)$ : 0.5 A
- $V_{DRM}$ : 600 V
- $I_{GT}$ : 100  $\mu$ A
- RoHS Compliant
- Center Gate pin assignment
- Planar Passivation Type
- Halogen-free (PRSS0003DJ-A)
- Completely Pb-free (PRSS0003DJ-A)

## Outline

RENESAS Package code: PRSS0003EA-A (Package name: TO-92*)	PRSS0003DJ-A (Package name: TO-92)	
Ordering code: #B00	#BD0	
		
		1. Anode 2. Gate 3. Cathode

## Application

Igniter, solid state relay, strobe flasher, circuit breaker, 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 <sup>Note1</sup>	$V_{DRM}$	600		V
DC off-state voltage <sup>Note1</sup>	$V_{D(DC)}$	480		V

Notes: 1. With gate to cathode resistance  $R_{GK}=1\text{ k}\Omega$

Parameter	Symbol	Ratings	Unit	Conditions	
RMS on-state current	$I_T(RMS)$	0.63	A		
Average on-state current	$I_T(AV)$	0.4	A	$T_a = 54^\circ\text{C}$	Commercial frequency, sine half wave 180°conduction
		0.5	A	$T_a = 30^\circ\text{C}$	
Surge on-state current	$I_{TSM}$	8	A	60 Hz sinewave 1 full cycle, peak value, non-repetitive	
$I^2t$ for fusing	$I^2t$	0.32	$\text{A}^2\text{s}$	Value corresponding to 1 cycle of half wave 60 Hz, surge on-state current	
Peak gate power dissipation	$P_{GM}$	0.5	W		
Average gate power dissipation	$P_{G(AV)}$	0.1	W		
Peak gate forward voltage	$V_{FGM}$	6	V		
Peak gate reverse voltage	$V_{RGM}$	6	V		
Peak gate forward current	$I_{FGM}$	0.3	A		
Junction temperature	$T_j$	-40 to +125	$^\circ\text{C}$		
Storage temperature	$T_{stg}$	-40 to +125	$^\circ\text{C}$		

**Electrical Characteristics**

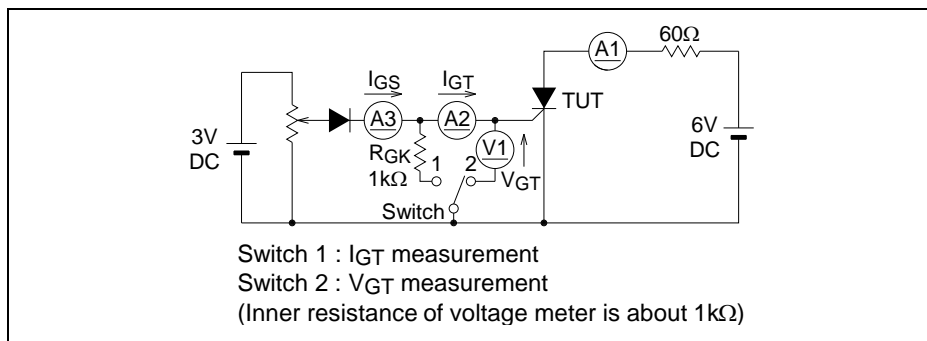
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test conditions
Repetitive peak reverse current	$I_{RRM}$	—	—	0.5	mA	$T_j = 125^\circ\text{C}$ , $V_{RRM}$ applied
Repetitive peak off-state current	$I_{DRM}$	—	—	0.5	mA	$T_j = 125^\circ\text{C}$ , $V_{DRM}$ applied $R_{GK}=1\text{ k}\Omega$
On-state voltage	$V_{TM}$	—	—	1.2	V	$T_c = 25^\circ\text{C}$ , $I_{TM} = 1.2\text{ A}$ , instantaneous value
Gate trigger voltage	$V_{GT}$	—	—	0.8	V	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $I_T = 0.1\text{ A}$ <small>Note3</small>
Gate non-trigger voltage	$V_{GD}$	0.2	—	—	V	$T_j = 125^\circ\text{C}$ , $V_D = 1/2 V_{DRM}$ $R_{GK}=1\text{ k}\Omega$
Gate trigger current	$I_{GT}$	1 <small>Note2</small>	—	100 <small>Note2</small>	$\mu\text{A}$	$T_j = 25^\circ\text{C}$ , $V_D = 6\text{ V}$ , $I_T = 0.1\text{ A}$ <small>Note3</small>
Holding current	$I_H$	—	—	5	mA	$T_j = 25^\circ\text{C}$ , $V_D = 12\text{ V}$ , $R_{GK}=1\text{ k}\Omega$
Thermal resistance	$R_{th(j-a)}$	—	—	150	$^\circ\text{C/W}$	Junction to ambient

Notes: 2. If special values of  $I_{GT}$  are required, choose item D or E from those listed in the table below if possible.

Item	D	E
$I_{GT} (\mu\text{A})$	1 to 50	20 to 100

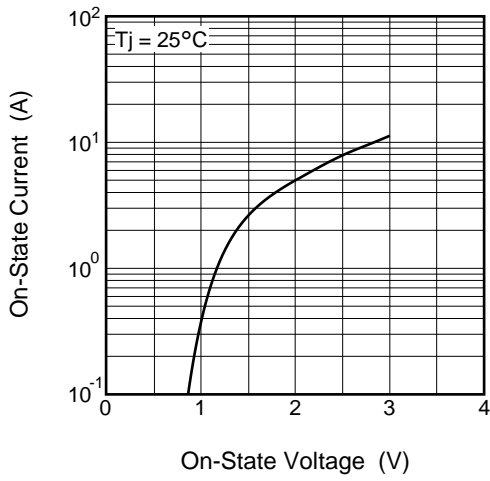
The above values do not include the current flowing through the 1 k $\Omega$  resistance between the gate and cathode.

3.  $I_{GT}$ ,  $V_{GT}$  measurement circuit.

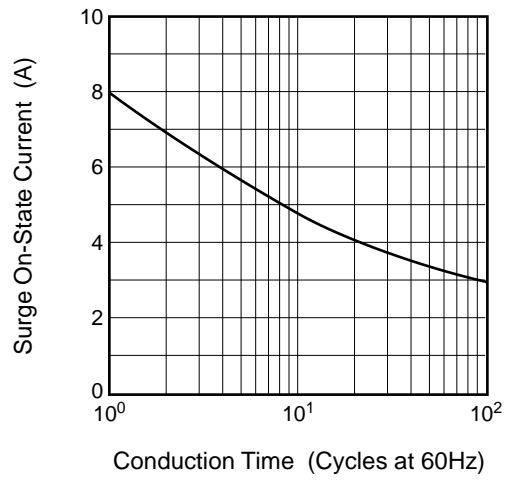


Performance Curves

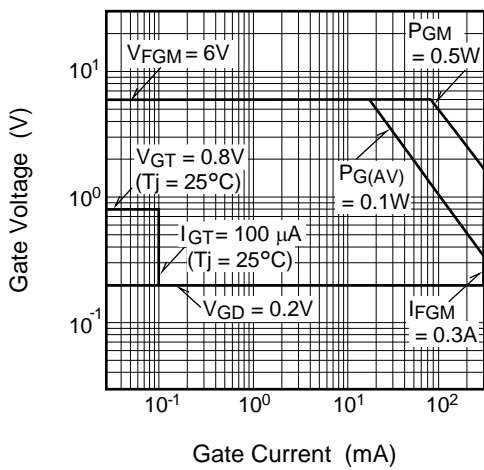
Maximum On-State Characteristics



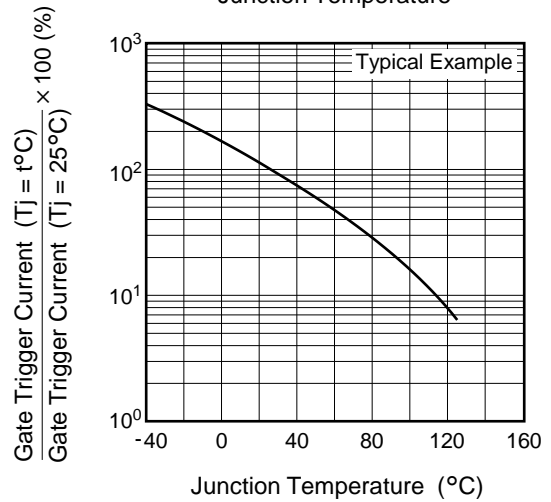
Rated Surge On-State Current



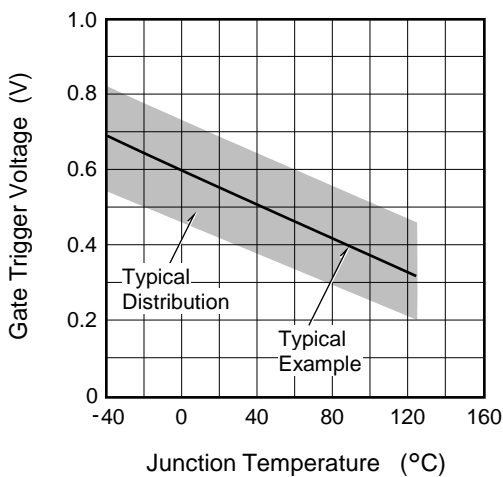
Gate Characteristics



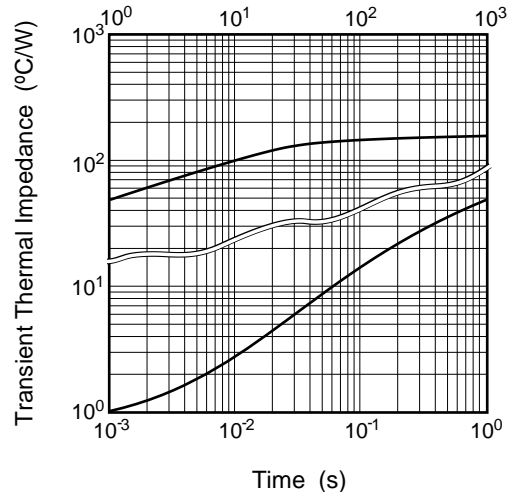
Gate Trigger Current vs. Junction Temperature

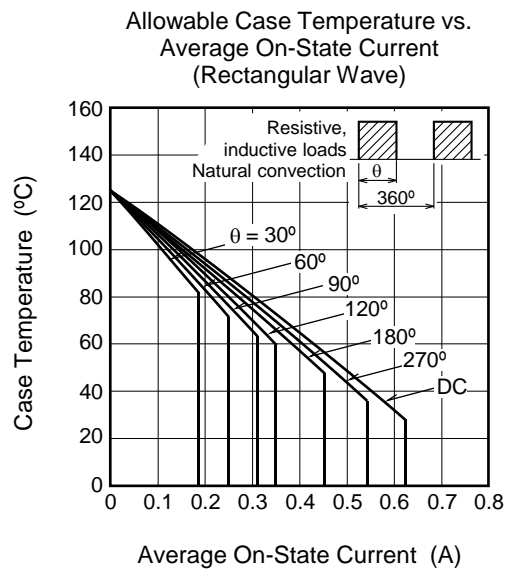
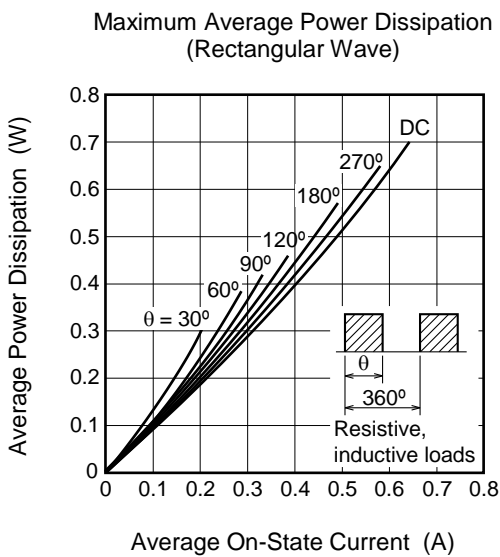
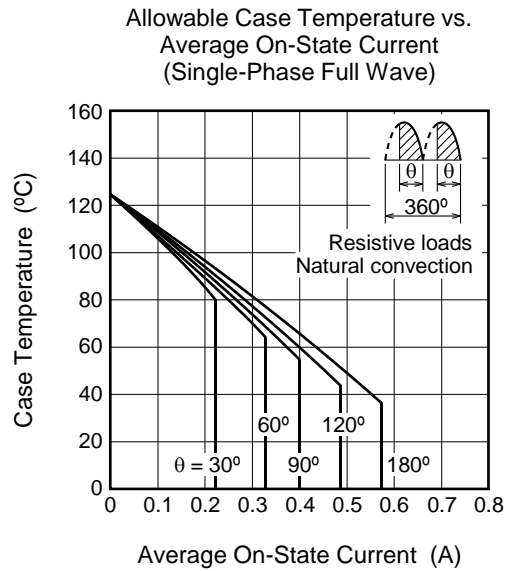
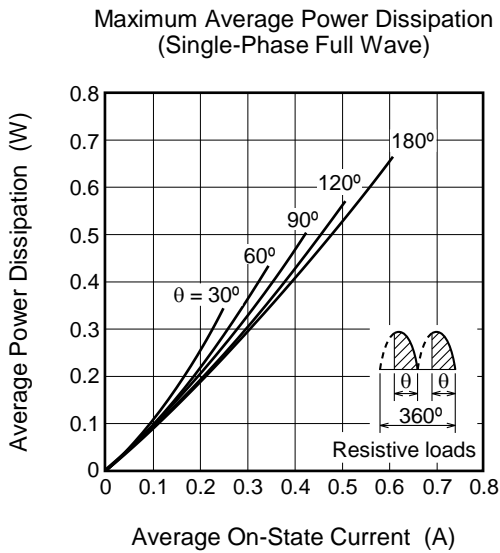
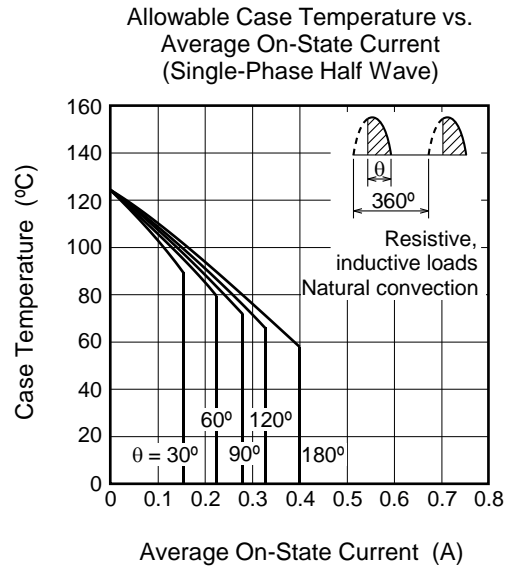
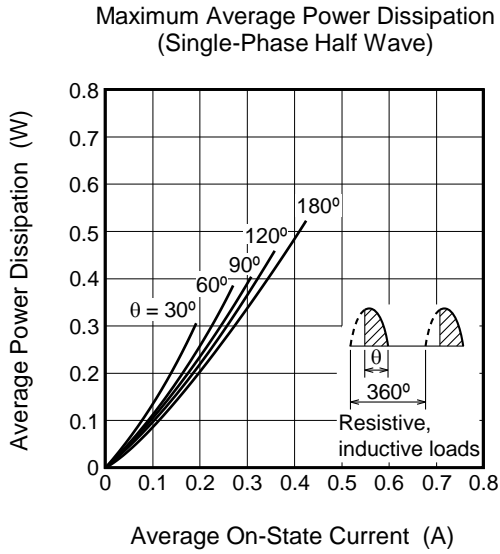


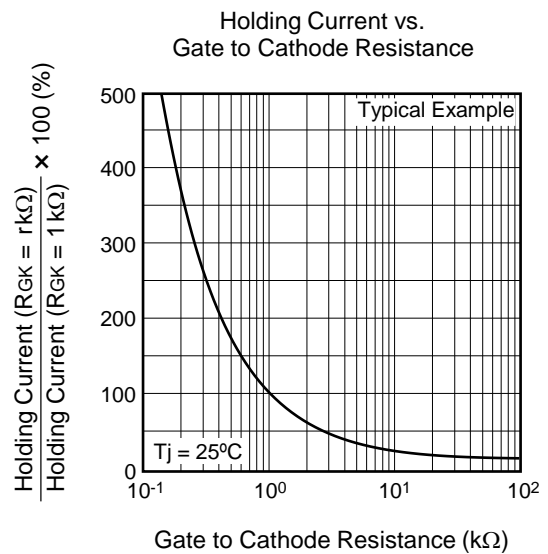
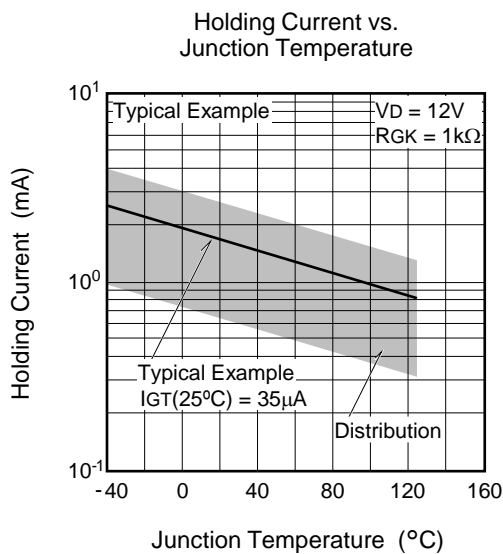
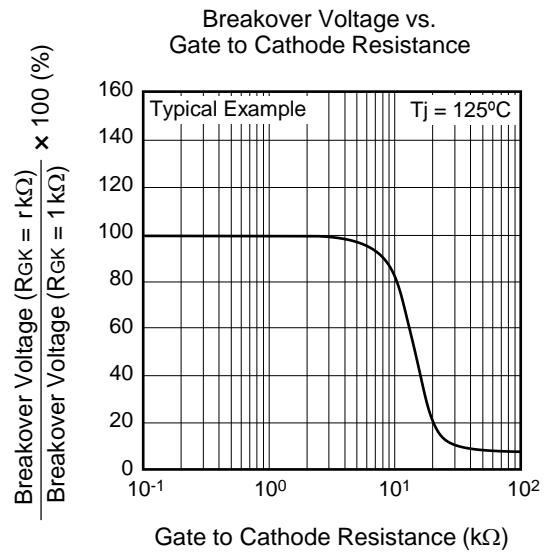
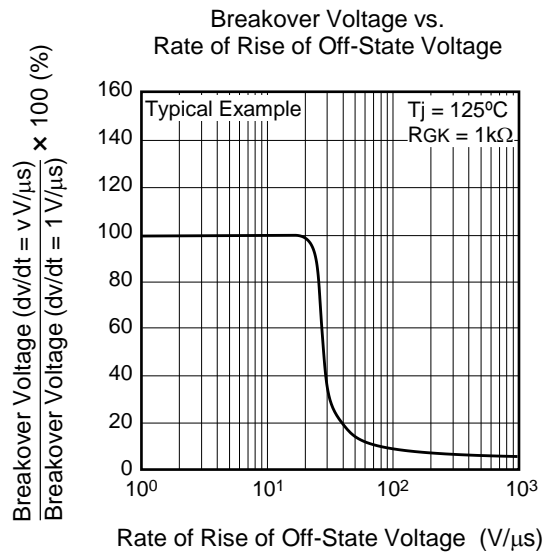
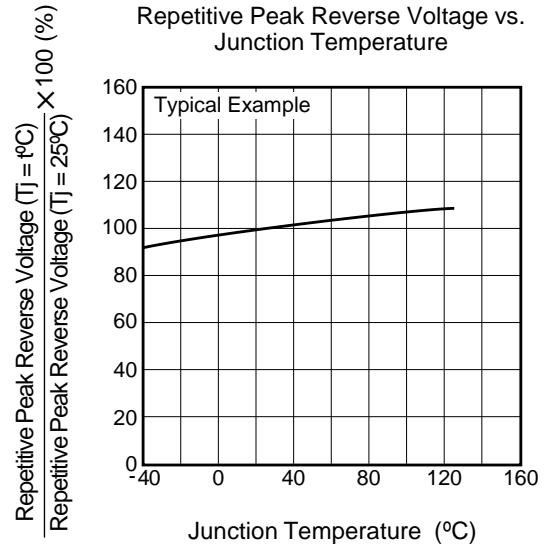
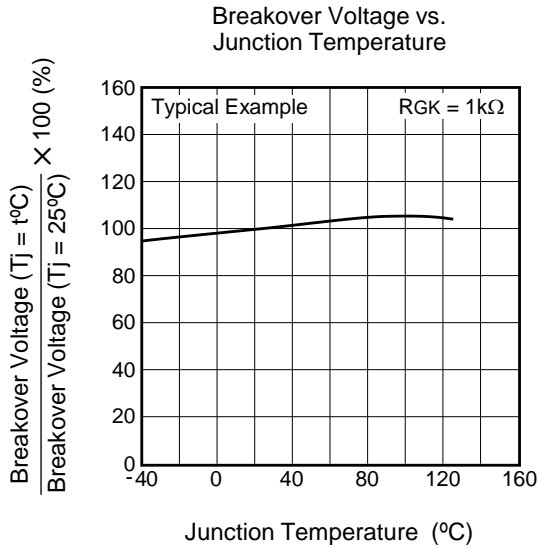
Gate Trigger Voltage vs. Junction Temperature



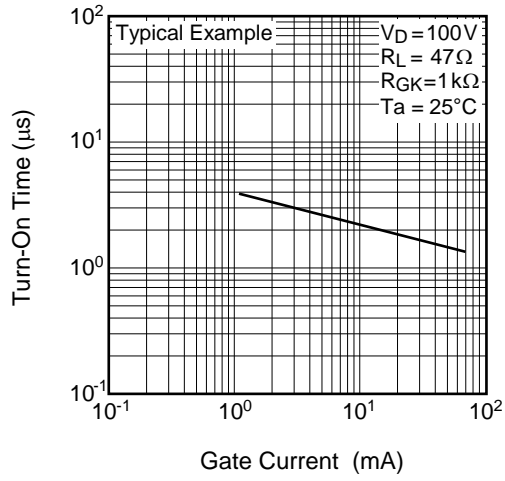
Maximum Transient Thermal Impedance Characteristics (Junction to ambient)



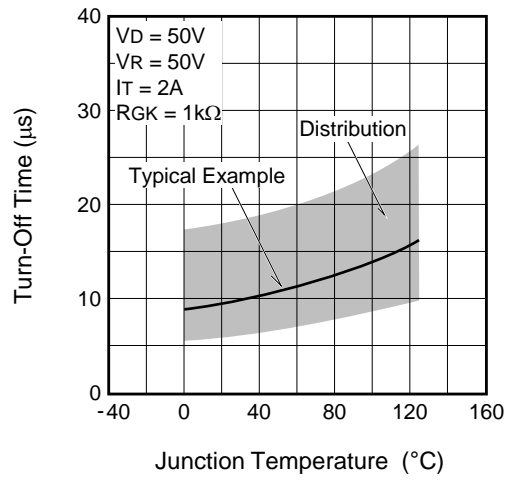




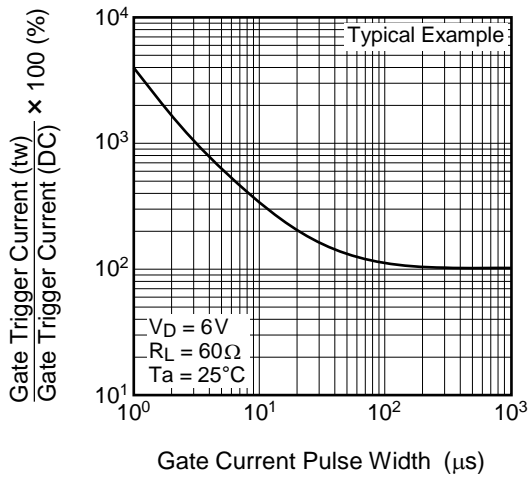
Turn-On Time vs. Gate Current



Turn-Off Time vs. Junction Temperature

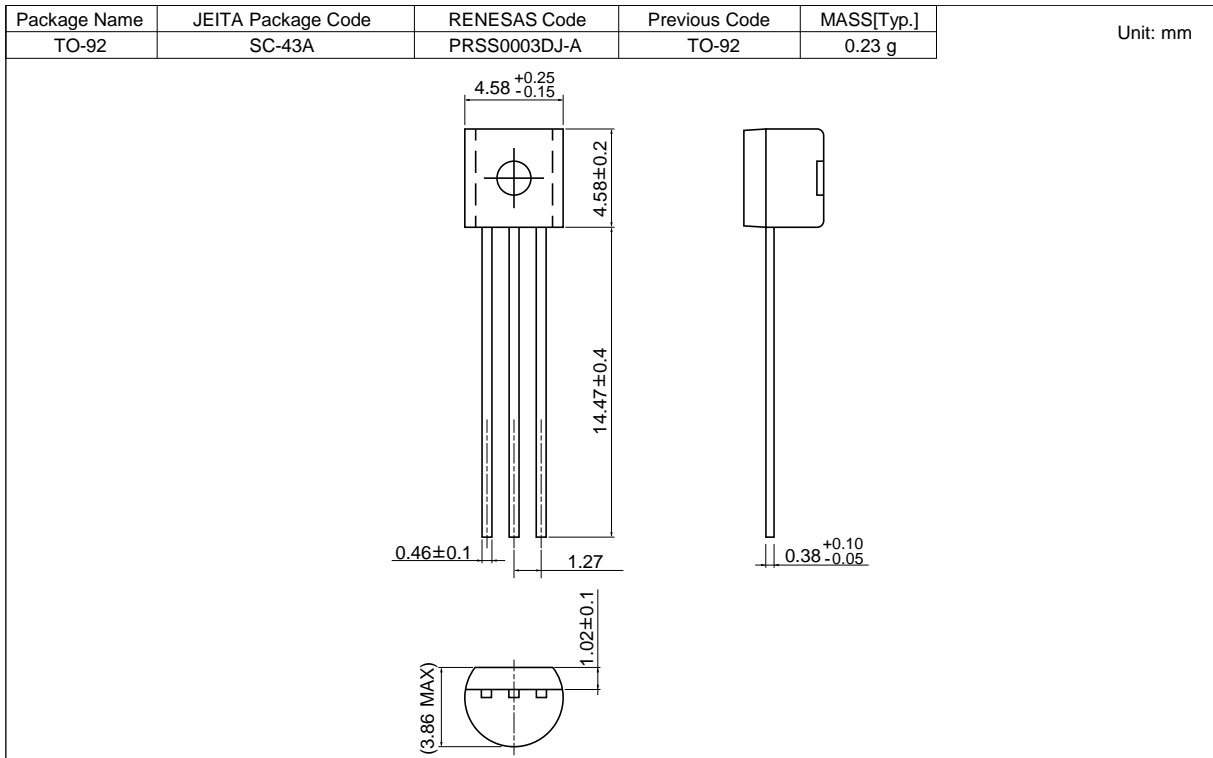


Gate Trigger Current vs. Gate Current Pulse Width

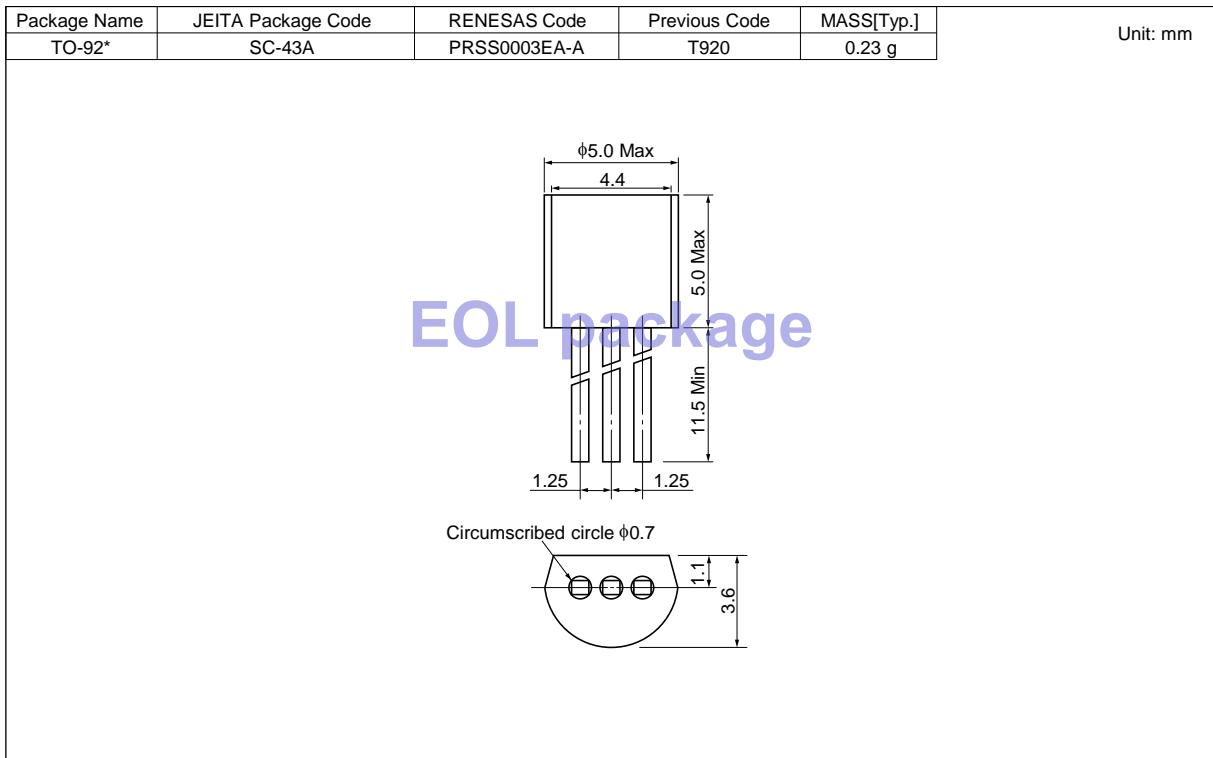


### Package Dimensions

Ordering code: #BD0 <Active>



Ordering code: #B00 <Obsolete>



## Ordering Information

Orderable Part Number	Package	Packing <sup>Note4</sup>	Quantity	Remark	Status
CR05BM-12A#BD0	TO-92	Plastic Bag	1000 pcs.	Straight type	Active
CR05BM-12A-D#BD0	TO-92	Plastic Bag	1000 pcs.	Straight type, I <sub>GT</sub> item: D	
CR05BM-12A-E#BD0	TO-92	Plastic Bag	1000 pcs.	Straight type, I <sub>GT</sub> item: E	
CR05BM-12A-A6#BD0	TO-92	Plastic Bag	1000 pcs.	A6 Lead form	
CR05BM-12A-TB#BD0	TO-92	Adhesive Tape	2000 pcs.	A8 Lead form	
CR05BM-12A-DTB#BD0	TO-92	Adhesive Tape	2000 pcs.	A8 Lead form, I <sub>GT</sub> item: D	
CR05BM-12A-ETB#BD0	TO-92	Adhesive Tape	2000 pcs.	A8 Lead form, I <sub>GT</sub> item: E	
CR05BM-12A#B00	TO-92*	Plastic Bag	500 pcs.	Straight type	Obsolete
CR05BM-12A-D#B00	TO-92*	Plastic Bag	500 pcs.	Straight type, I <sub>GT</sub> item: D	
CR05BM-12A-E#B00	TO-92*	Plastic Bag	500 pcs.	Straight type, I <sub>GT</sub> item: E	
CR05BM-12A-A6#B00	TO-92*	Plastic Bag	500 pcs.	A6 Lead form	
CR05BM-12A-TB#B00	TO-92*	Adhesive Tape	2000 pcs.	A8 Lead form	
CR05BM-12A-DTB#B00	TO-92*	Adhesive Tape	2000 pcs.	A8 Lead form, I <sub>GT</sub> item: D	
CR05BM-12A-ETB#B00	TO-92*	Adhesive Tape	2000 pcs.	A8 Lead form, I <sub>GT</sub> item: E	

Note: 4. Please confirm the specification about the shipping in detail.



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