

RUG6KB060



# Fast Recovery Bridge Rectifiers

**Voltage:** 600 Volts

**Current:** 6 A

**Package:** D3K

## Features

- NH'S Fast Recovery Rectifiers Chip Technology
- Low Switching Loss For High Efficiency
- Low Leakage Current For High Reliability
- Fast Switching Speed

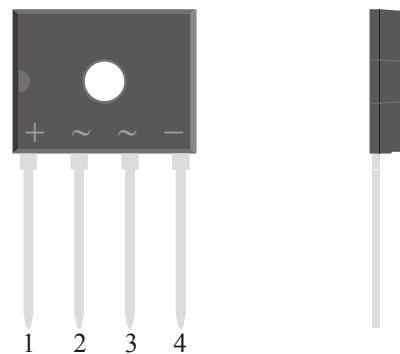
## Mechanical Data

- **Case:** Molded With UL-94 ClassV-0 Recognized, RoHS-Compliant
- **Polarity:** Look At The Diagram And Polarity On The Right
- **Terminals:** Tin Plated Leads,Solderable Per J-STD-002 And JESD22-B102

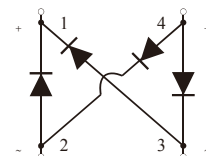
## Typical Applications

- Switch Mode Power Supplies (SMPS)
- Fast Chargers
- LED Driver And Monitor Lighting
- Automotive Electronics And Charging Posts

## Diagram:



## Polarity:



Single Phase,Half Wave,60Hz,Resistive Or Inductive Load.For Capacitive Load,Derate Current By 20%

## Maximum Ratings (Ta=25°C Unless Otherwise Specified)

| Parameter                                        | Test Conditions                                          | Symbol      | Ratings  | Unit               |
|--------------------------------------------------|----------------------------------------------------------|-------------|----------|--------------------|
| Maximum Repetitive Peak Reverse Voltage          |                                                          | $V_{RRM}$   | 600      | V                  |
| Maximum RMS Voltag                               |                                                          | $V_{RMS}$   | 420      | V                  |
| Maximum DC Blocking Voltage                      |                                                          | $V_{DC}$    | 600      | V                  |
| Maximum Average Forward Rectified Current(Note2) | With Heatsink 100 °C<br>Without Heatsink 100 °C          | $I_{F(AV)}$ | 6<br>1.6 | A                  |
| Peak Forward Surge Current Per Diode             | 8.3ms Single Half Sine-wave<br>Superimposed On Rate Load | $I_{FSM}$   | 200      | A                  |
| Current Squared Time Per Diode                   | $t < 8.3ms$                                              | $I^2t$      | 166.0    | A <sup>2</sup> sec |
| Maximum Mounting Torque                          | M3 screw                                                 | $T_{MM}$    | 1.1      | N.m                |

## Electrical Characteristics (Ta=25°C Unless Otherwise Specified )

| Parameter                                               | Test Conditions                   | Symbol    | Ratings |      |      | Unit |
|---------------------------------------------------------|-----------------------------------|-----------|---------|------|------|------|
|                                                         |                                   |           | Min.    | Typ. | Max. |      |
| Instaneous Forward Voltage Per Diode                    | $I_F = 3.0 A$                     | $V_F$     | --      | 0.86 | 0.92 | V    |
| Maximum DC Reverse Current at Rated DC Blocking Voltage | Ta=25°C , $V_R = V_{RRM}$         | $I_{RRM}$ | --      | 1    | 5    | uA   |
|                                                         | Ta=125°C , $V_R = V_{RRM} * 80\%$ |           | --      | 25   | 200  | uA   |
| Typical Junction Capacitance Per Diode                  | 4 V,1MHz                          | $C_J$     | --      | 65   | --   | pF   |
| Maximum Reverse Recovery Time                           | IF=0.5A, IR=1.0A, IRR=0.25A       | $T_{rr}$  | --      | 300  | 500  | nS   |

## Thermal Characteristics (Ta=25°C Unless Otherwise Specified )

| Parameter                                                   | Test Conditions                                     | Symbol          | Ratings    | Unit |
|-------------------------------------------------------------|-----------------------------------------------------|-----------------|------------|------|
| Operating Junction Temperature Range                        |                                                     | $T_J$           | -55 to 150 | °C   |
| Storage Temperature Range                                   |                                                     | $T_{STD}$       | -55 to 150 |      |
| Thermal Resistance Junction To Ambient<br>With Steady-State | Still Air Environment<br>With Ta=25°C               | $R_{\theta JA}$ | 31.0       | °C/W |
| Thermal Resistance Junction-Case<br>With Steady-State       | Device Mounted On<br>75mm x 45mm x 2.5mm Alu. Heat. | $R_{\theta JC}$ | 7.6        |      |

Notes: 1.Pulse Test: 300 Us Pulse Width,1% Duty Cycle

2.Device mounted on 250mm x 250mm x 2.0mm Aluminum Plate Heatsink.

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### Typical Characteristics Curves

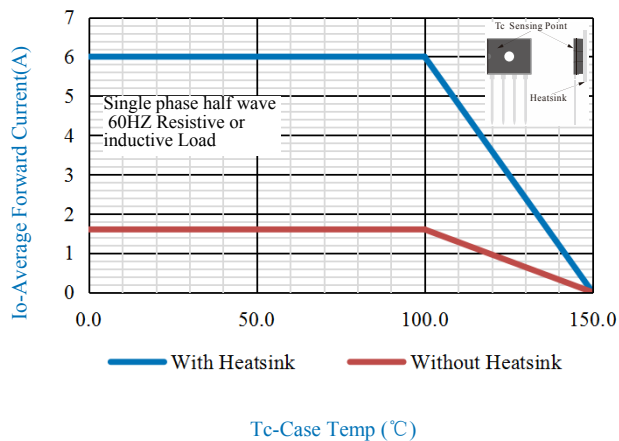


Fig.1-Forward Current Derating Curve

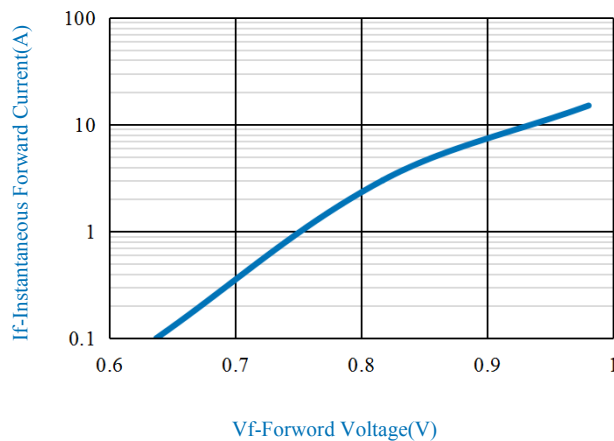


Fig.2-Typical Instantaneous Forward

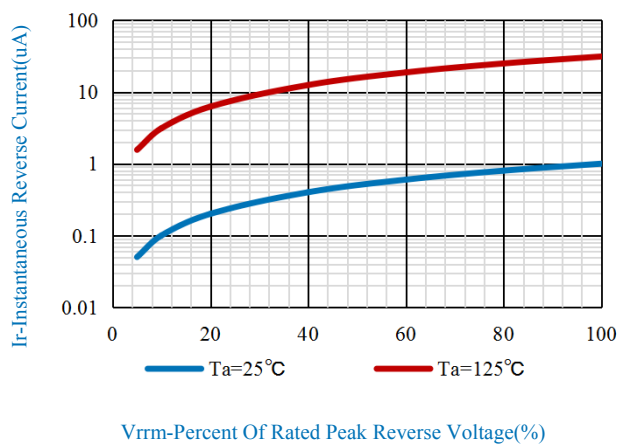


Fig.3-Typical Reverse Characteristics

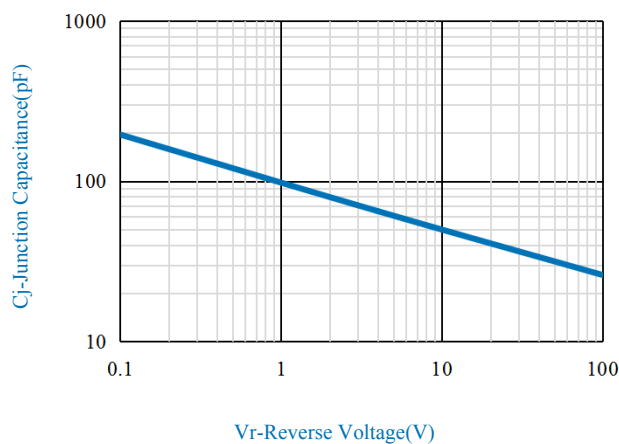


Fig.4-Typical Junction Capacitance

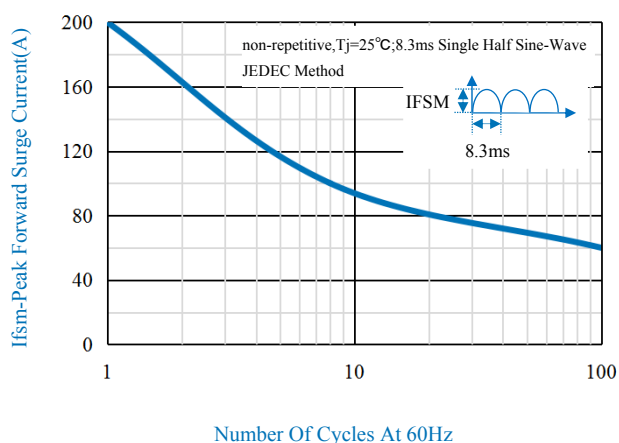


Fig.5-Max. Non-Repetitive Surge Current

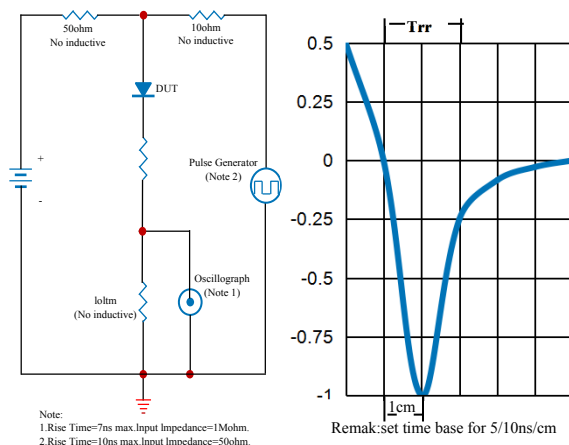


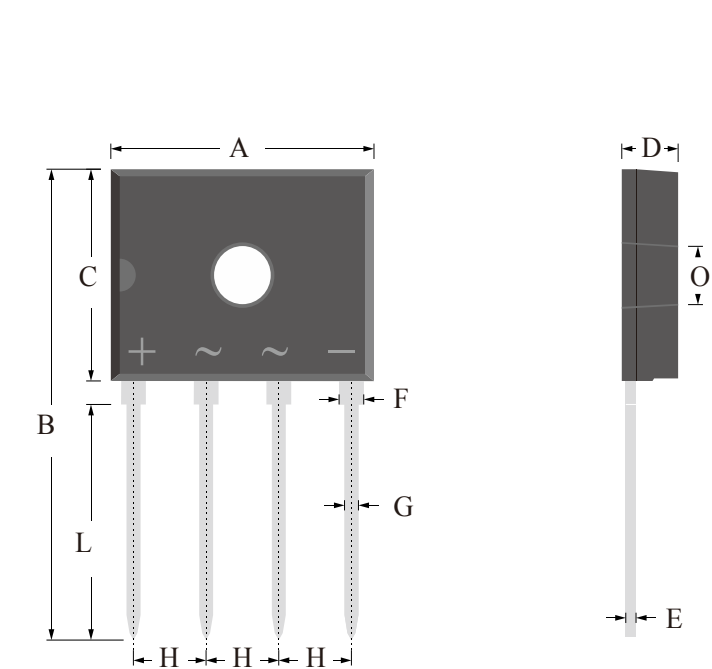
Fig.6-Reverse Recovery Time Characteristic And Test Circuit

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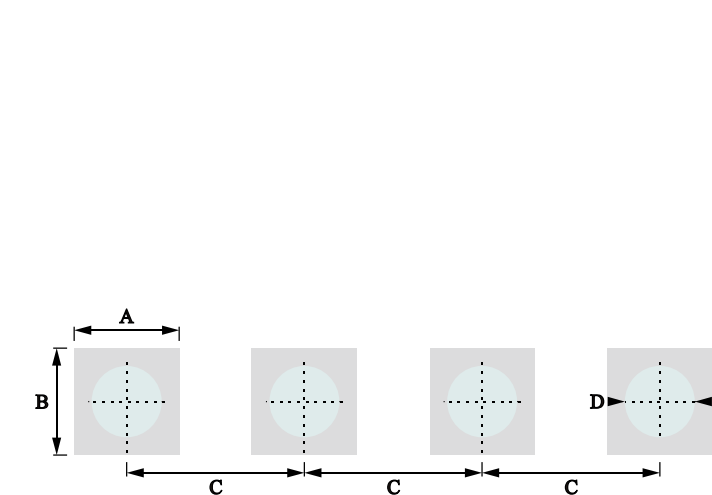
OUTLINE DRAWINGS



D3K

| OUTLINE DIMENSIONS |            |      |       |        |      |        |
|--------------------|------------|------|-------|--------|------|--------|
| Dim.               | Milimeters |      |       | Inches |      |        |
|                    | Min.       | Typ. | Max.  | Min.   | Typ. | Max.   |
| A                  | 13.50      | -    | 14.10 | 0.5315 | -    | 0.5551 |
| B                  | 23.50      | -    | 24.50 | 0.9252 | -    | 0.9646 |
| C                  | 10.50      | -    | 11.10 | 0.4134 | -    | 0.4370 |
| D                  | 2.90       | -    | 3.30  | 0.1142 | -    | 0.1299 |
| E                  | 0.45       | -    | 0.55  | 0.0177 | -    | 0.0217 |
| F                  | 1.10       | -    | 1.50  | 0.0433 | -    | 0.0591 |
| G                  | 0.66       | -    | 0.86  | 0.0260 | -    | 0.0339 |
| H                  | 3.51       | -    | 4.11  | 0.1382 | -    | 0.1618 |
| L                  | 11.70      | -    | 12.30 | 0.4606 | -    | 0.4843 |
| O                  | 3.10       | -    | 3.40  | 0.1220 | -    | 0.1339 |

RECOMMEDND LAYOUT DRAWINGS



D3K

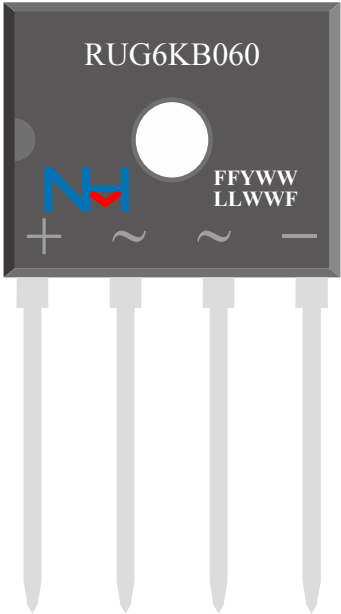
| OUTLINE DIMENSIONS |            |      |      |        |        |      |
|--------------------|------------|------|------|--------|--------|------|
| Dim.               | Milimeters |      |      | Inches |        |      |
|                    | Min.       | Typ. | Max. | Min.   | Typ.   | Max. |
| A                  | -          | 1.60 | -    | -      | 0.0630 | -    |
| B                  | -          | 1.60 | -    | -      | 0.0630 | -    |
| C                  | -          | 3.80 | -    | -      | 0.1496 | -    |
| D                  | -          | 0.86 | -    | -      | 0.0339 | -    |

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MARKING



MARKING INSTRUCTION

NH=Niuhan Trademark  
FF=Product Line Code,According To Actual Changes  
YWW=Date Code,According To Actual Changes  
LLWWF=Inernal Code,According To Actual Changes  
RUG6KB060=Model  
+ ~ ~ -=Polarity Mark

PACKING INFORMATION

| Package Type | Package Code | Product Weight<br>Approx(g/Pcs) | Package Method | Quantity<br>(Pcs/Min. Pack.) | Quantity<br>(Pcs/Inner Box) | Quantity<br>(Pcs/Carton) |
|--------------|--------------|---------------------------------|----------------|------------------------------|-----------------------------|--------------------------|
| D3K          | P1           | 1.3                             | Box            | 500                          | 500                         | 9000                     |
| D3K          | P2           | 1.3                             | Tube           | 25                           | 1500                        | 6000                     |

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# Fast Recovery Bridge Rectifiers

## Recommended wave soldering condition

| Product         | Peak Temperature | Soldering Time  |
|-----------------|------------------|-----------------|
| Pb-free devices | 260 +0/-5 °C     | 5 +1/-1 seconds |

## Recommended temperature profile for IR reflow

|  | Profile feature                                                                                                                          | Sn-Pb eutectic Assembly          | Pb-free Assembly                 |
|--|------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|
|  | Average ramp-up rate (T <sub>smax</sub> to T <sub>p</sub> )                                                                              | 3°C/second max.                  | 3°C/second max.                  |
|  | Preheat-Temperature Min (T <sub>S</sub> min)<br>-Temperature Max (T <sub>S</sub> max)<br>-Time(t <sub>s</sub> min to t <sub>s</sub> max) | 100°C<br>150°C<br>60-120 seconds | 150°C<br>200°C<br>60-180 seconds |
|  | Time maintained above:<br>-Temperature (T <sub>L</sub> )<br>- Time (t <sub>L</sub> )                                                     | 183°C<br>60-150 seconds          | 217°C<br>60-150 seconds          |
|  | Peak Temperature(T <sub>P</sub> )                                                                                                        | 240 +0/-5 °C                     | 260 +0/-5 °C                     |
|  | Time within 5°C of actual peak temperature (t <sub>p</sub> )                                                                             | 10-30 seconds                    | 20-40 seconds                    |
|  | Ramp down rate                                                                                                                           | 6°C/second max.                  | 6°C/second max.                  |
|  | Time 25 °C to peak temperature                                                                                                           | 6 minutes max.                   | 8 minutes max.                   |

Note : All temperatures refer to topside of the package, measured on the package body surface.

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Specification Revision History

| Rev.        | Date       | Changed Items | Pre-Changed Content | Changed Content |
|-------------|------------|---------------|---------------------|-----------------|
| A/1         | 2014-10-20 | First Issue   |                     |                 |
| Blank Below |            |               |                     |                 |