

# Switch-mode Power Rectifier

## BYW51-200

ULTRAFAST RECTIFIER  
16 AMPERES, 200 VOLTS  
 $t_{rr} = 35 \text{ ns}$

### Features and Benefits

- Low Forward Voltage
- Low Power Loss/High Efficiency
- High Surge Capacity
- 175°C Operating Junction Temperature
- 16 A Total (8 A Per Diode Leg)
- These Devices are Pb-Free and are RoHS Compliant\*

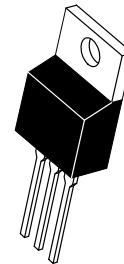
### Applications

- Power Supply – Output Rectification
- Power Management
- Instrumentation

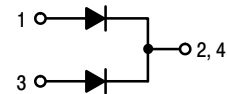
### Mechanical Characteristics

- Case: Epoxy, Molded
- Epoxy Meets UL 94 V-0 @ 0.125 in
- Weight: 1.9 Grams (Approximately)
- Finish: All External Surfaces Corrosion Resistant and Terminal Leads are Readily Solderable
- Lead Temperature for Soldering Purposes: 260°C Max. for 10 Seconds
- ESD Rating: Human Body Model 3B  
Machine Model C

\*For additional information on our Pb-Free strategy and soldering details, please download the [onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D](#).



TO-220  
CASE 221A  
PLASTIC



### MARKING DIAGRAM



A = Assembly Location  
Y = Year  
WW = Work Week  
BYW51-200 = Device Code  
G = Pb-Free Package  
AKA = Diode Polarity

### ORDERING INFORMATION

| Device     | Package             | Shipping      |
|------------|---------------------|---------------|
| BYW51-200G | TO-220<br>(Pb-Free) | 50 Units/Rail |

## MAXIMUM RATINGS

| Symbol                          | Rating                                                                                                     | Value       | Unit             |
|---------------------------------|------------------------------------------------------------------------------------------------------------|-------------|------------------|
| $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage                     | 200         | V                |
| $I_{F(AV)}$                     | Average Rectified Forward Current<br>$T_C = 156^\circ\text{C}$<br>Per Leg<br>Total Device                  | 8.0<br>16   | A                |
| $I_{FM}$                        | Peak Rectified Forward Current (Square Wave, 20 kHz),<br>$T_C = 153^\circ\text{C}$ – Per Diode Leg         | 16          | A                |
| $I_{FSM}$                       | Nonrepetitive Peak Surge Current<br>(Surge applied at rated load conditions halfwave, single phase, 60 Hz) | 100         | A                |
| $T_J, T_{stg}$                  | Operating Junction Temperature and Storage Temperature                                                     | –65 to +175 | $^\circ\text{C}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## THERMAL CHARACTERISTICS

| Symbol          | Characteristic                                  | Conditions | Value | Unit                      |
|-----------------|-------------------------------------------------|------------|-------|---------------------------|
| $R_{\theta JC}$ | Maximum Thermal Resistance, Junction-to-Case    | Min. Pad   | 3.0   | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Maximum Thermal Resistance, Junction-to-Ambient | Min. Pad   | 60.0  |                           |

## ELECTRICAL CHARACTERISTICS

| Symbol   | Characteristic                                                                                                                                                     | Min    | Typical     | Max          | Unit          |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------|--------------|---------------|
| $V_F$    | Instantaneous Forward Voltage (Note 1)<br>( $I_F = 8.0\text{ A}$ , $T_J = 100^\circ\text{C}$ )<br>( $I_F = 8.0\text{ A}$ , $T_J = 25^\circ\text{C}$ )              | –<br>– | 0.8<br>0.89 | 0.89<br>0.97 | V             |
| $I_R$    | Maximum Instantaneous Reverse Current (Note 1)<br>(Rated dc Voltage, $T_J = 100^\circ\text{C}$ )<br>(Rated dc Voltage, $T_J = 25^\circ\text{C}$ )                  | –<br>– | 21<br>3.8   | 1000<br>10   | $\mu\text{A}$ |
| $t_{rr}$ | Maximum Reverse Recovery Time<br>( $I_F = 1.0\text{ A}$ , $di/dt = 50\text{ A/s}$ )<br>( $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ , $I_{REC} = 0.25\text{ A}$ ) | –      | –           | 35<br>25     | ns            |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. Pulse Test: Pulse Width = 300 s, Duty Cycle  $\leq 2.0\%$ .

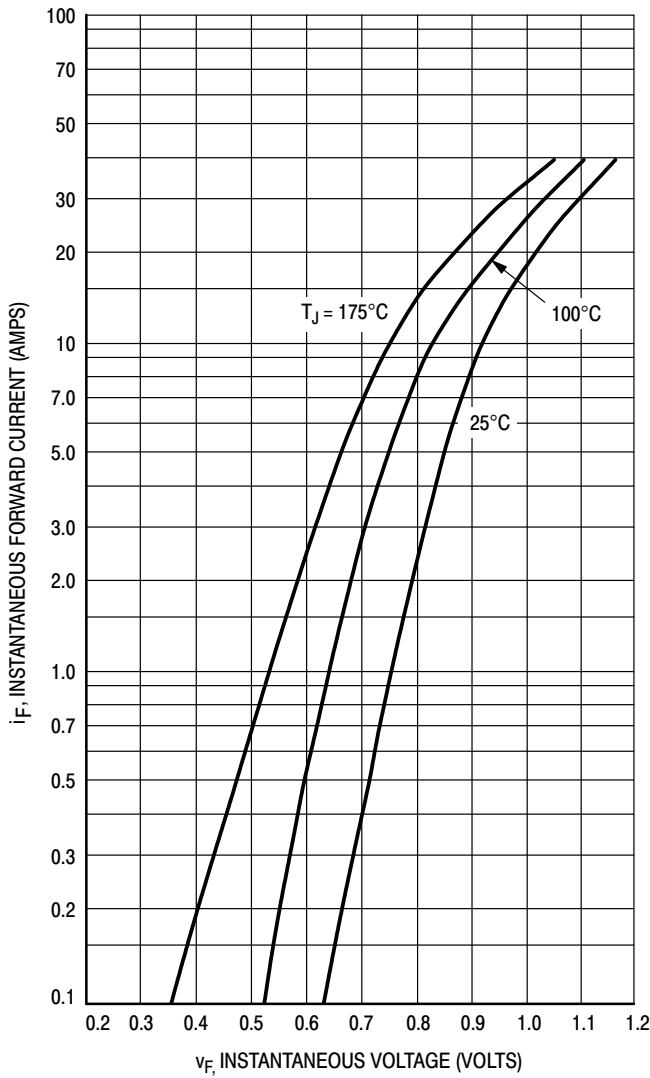


Figure 1. Typical Forward Voltage, Per Leg

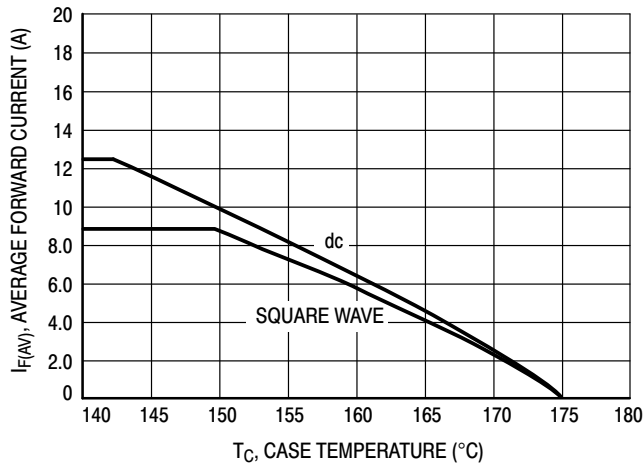


Figure 4. Current Derating, Case, Per Leg

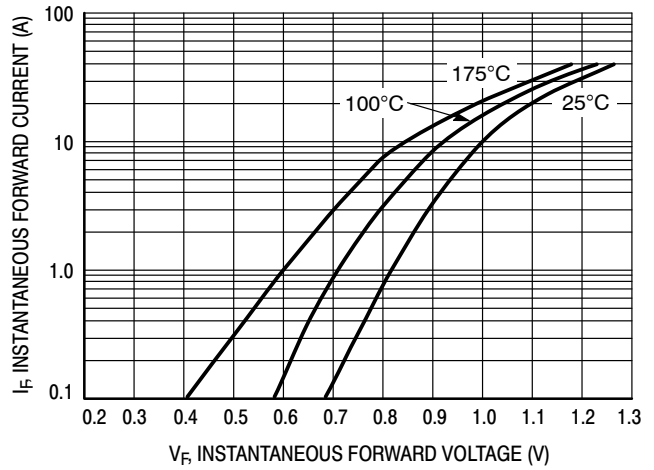


Figure 2. Maximum Forward Voltage

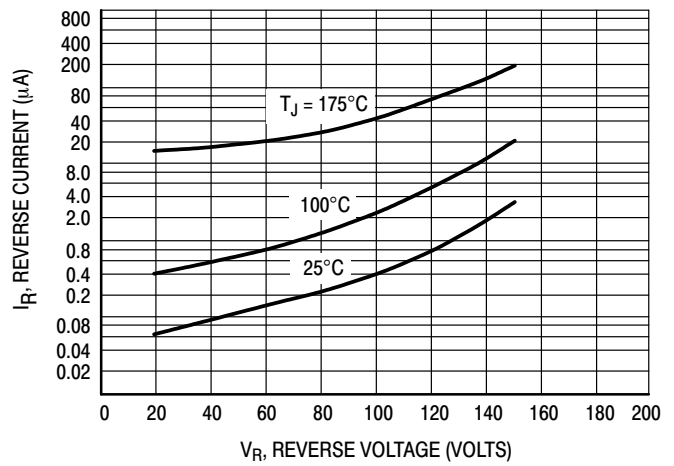


Figure 3. Typical Reverse Current, Per Leg\*

\* The curves shown are typical for the highest voltage device in the voltage grouping. Typical reverse current for lower voltage selections can be estimated from these same curves if  $V_R$  is sufficiently below rated  $V_R$ .

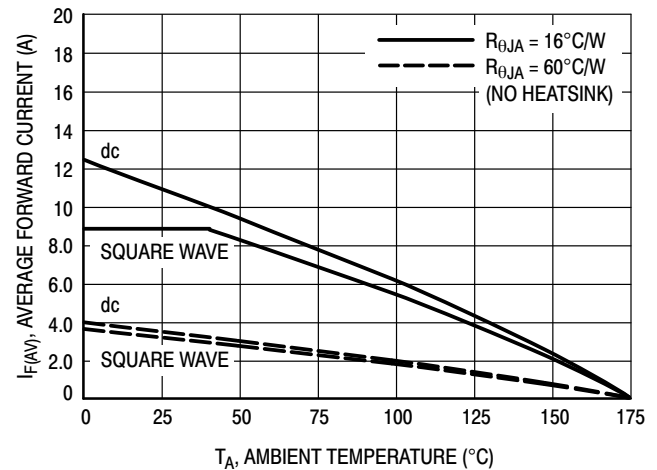
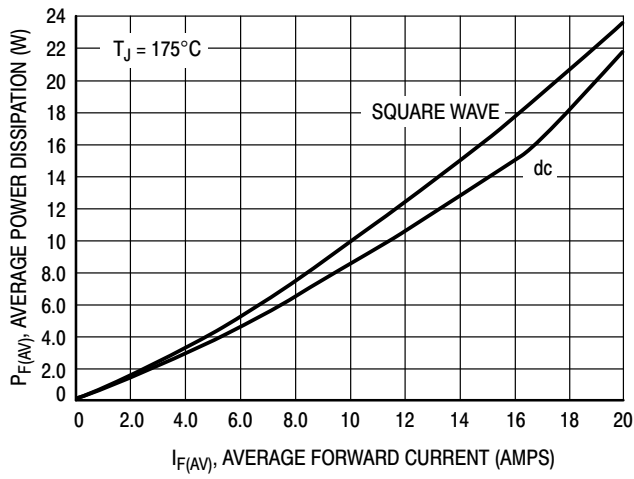
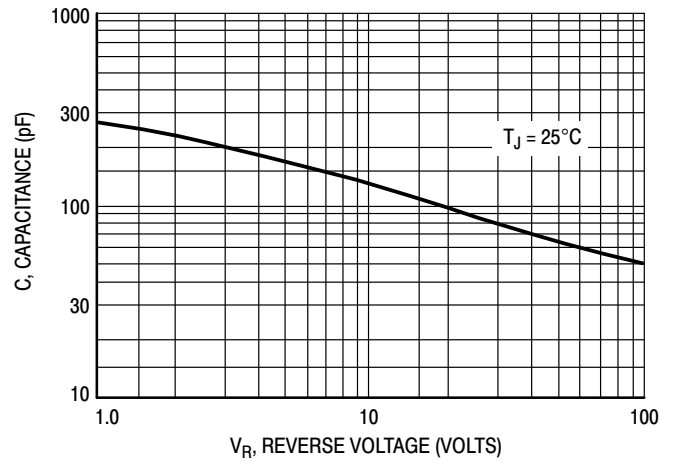


Figure 5. Current Derating, Ambient, Per Leg

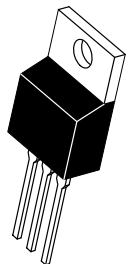
# BYW51-200



**Figure 6. Power Dissipation, Per Leg**



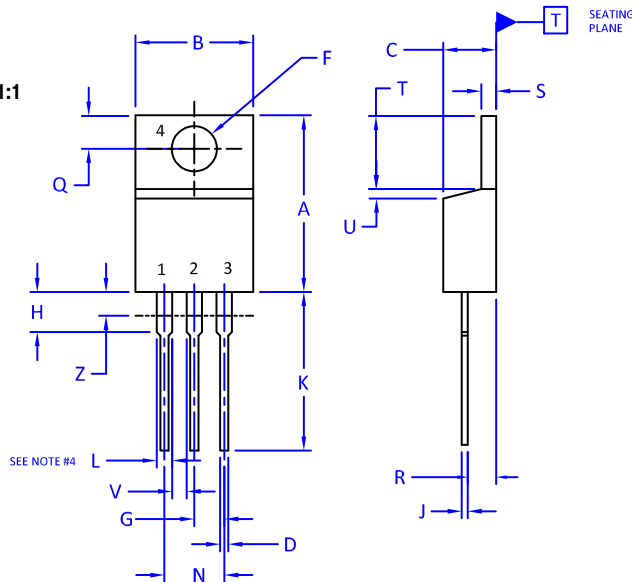
**Figure 7. Typical Capacitance, Per Leg**



SCALE 1:1

**TO-220**  
**CASE 221A**  
**ISSUE AK**

DATE 13 JAN 2022



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 2009.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.
4. MAX WIDTH FOR F102 DEVICE = 1.35MM

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN.   | MAX.  | MIN.        | MAX.  |
| A   | 0.570  | 0.620 | 14.48       | 15.75 |
| B   | 0.380  | 0.415 | 9.66        | 10.53 |
| C   | 0.160  | 0.190 | 4.07        | 4.83  |
| D   | 0.025  | 0.038 | 0.64        | 0.96  |
| F   | 0.142  | 0.161 | 3.60        | 4.09  |
| G   | 0.095  | 0.105 | 2.42        | 2.66  |
| H   | 0.110  | 0.161 | 2.80        | 4.10  |
| J   | 0.014  | 0.024 | 0.36        | 0.61  |
| K   | 0.500  | 0.562 | 12.70       | 14.27 |
| L   | 0.045  | 0.060 | 1.15        | 1.52  |
| N   | 0.190  | 0.210 | 4.83        | 5.33  |
| Q   | 0.100  | 0.120 | 2.54        | 3.04  |
| R   | 0.080  | 0.110 | 2.04        | 2.79  |
| S   | 0.045  | 0.055 | 1.15        | 1.41  |
| T   | 0.235  | 0.255 | 5.97        | 6.47  |
| U   | 0.000  | 0.050 | 0.00        | 1.27  |
| V   | 0.045  | ----  | 1.15        | ---   |
| Z   | ----   | 0.080 | ---         | 2.04  |

STYLE 1:  
PIN 1. BASE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

STYLE 2:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR  
4. EMITTER

STYLE 3:  
PIN 1. CATHODE  
2. ANODE  
3. GATE  
4. ANODE

STYLE 4:  
PIN 1. MAIN TERMINAL 1  
2. MAIN TERMINAL 2  
3. GATE  
4. MAIN TERMINAL 2

STYLE 5:  
PIN 1. GATE  
2. DRAIN  
3. SOURCE  
4. DRAIN

STYLE 6:  
PIN 1. ANODE  
2. CATHODE  
3. ANODE  
4. CATHODE

STYLE 7:  
PIN 1. CATHODE  
2. ANODE  
3. CATHODE  
4. ANODE

STYLE 8:  
PIN 1. CATHODE  
2. ANODE  
3. EXTERNAL TRIP/DELAY  
4. ANODE

STYLE 9:  
PIN 1. GATE  
2. COLLECTOR  
3. EMITTER  
4. COLLECTOR

STYLE 10:  
PIN 1. GATE  
2. SOURCE  
3. DRAIN  
4. SOURCE

STYLE 11:  
PIN 1. DRAIN  
2. SOURCE  
3. GATE  
4. SOURCE

STYLE 12:  
PIN 1. MAIN TERMINAL 1  
2. MAIN TERMINAL 2  
3. GATE  
4. NOT CONNECTED

|                         |                    |                                                                                                                                                                                     |
|-------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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