

### Features

- New Thin Wafer Technology
- Low Forward Voltage Drop ( $V_F$ )
- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- Positive Temperature Coefficient on  $V_F$
- Temperature-independent Switching

|                                    |   |      |      |
|------------------------------------|---|------|------|
| $V_{RRM}$                          | = | 1200 | V    |
| $I_F (T_C \leq 148^\circ\text{C})$ | = | 20   | A**  |
| $Q_C$                              | = | 50   | nC** |

\*Per Leg, \*\*Per Device

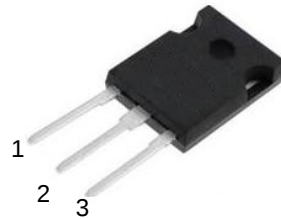
### Benefits

- Replace Bipolar with Unipolar Device
- Reduction of Heat Sink Size
- Parallel Devices Without Thermal Runaway
- Essentially No Switching Losses

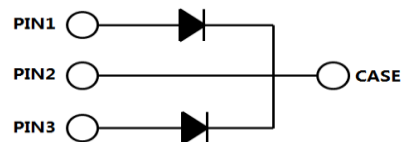
### Applications

- Switch Mode Power Supplies
- Uninterruptible Power Supplies
- Motor drive, PV Inverter, Wind Power Station

### Package



TO-247-3



| Part Number  | Package  | Marking      |
|--------------|----------|--------------|
| AS4D020120P2 | TO-247-3 | AS4D020120P2 |

### Maximum Ratings( $T_c = 25^\circ\text{C}$ , unless otherwise specified)

| Symbol         | Parameter                                  | Value                   | Unit             | Test Conditions                                                                             | Note  |
|----------------|--------------------------------------------|-------------------------|------------------|---------------------------------------------------------------------------------------------|-------|
| $V_{RRM}$      | Repetitive Peak Reverse Voltage            | 1200                    | V                |                                                                                             |       |
| $V_{RSM}$      | Surge Peak Reverse Voltage                 | 1200                    | V                |                                                                                             |       |
| $V_R$          | DC Blocking Voltage                        | 1200                    | V                |                                                                                             |       |
| $I_F$          | Forward Current<br>(Per leg/Device)        | 25/50<br>13/26<br>10/20 | A                | $T_c \leq 25^\circ\text{C}$<br>$T_c \leq 135^\circ\text{C}$<br>$T_c \leq 148^\circ\text{C}$ |       |
| $I_{FSM}$      | Non-Repetitive Forward Surge Current       | 90*                     | A                | $t_p = 8.3\text{ms}$ , Half Sine Wave                                                       |       |
| $P_{tot}$      | Power Dissipation(Per leg/Device)          | 125/250                 | W                |                                                                                             | Fig.3 |
| $T_J, T_{STG}$ | Operating Junction and Storage Temperature | -55 to 175              | $^\circ\text{C}$ |                                                                                             |       |
|                | TO-247-3 Mounting Torque                   | 1                       | Nm               | M3 Screw                                                                                    |       |

\*Per Leg, \*\*Per Device

### Electrical Characteristics (Per leg)

| Symbol | Parameter               | Typ.            | Max.       | Unit          | Test Conditions                                                                                                                                                                              | Note  |
|--------|-------------------------|-----------------|------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| $V_F$  | Forward Voltage         | 1.45<br>2.0     | 1.8<br>/   | V             | $I_F = 10\text{A}, T_J = 25^\circ\text{C}$<br>$I_F = 10\text{A}, T_J = 175^\circ\text{C}$                                                                                                    | Fig.1 |
| $I_R$  | Reverse Current         | 6<br>30         | 100<br>500 | $\mu\text{A}$ | $V_R = 1200\text{V}, T_J = 25^\circ\text{C}$<br>$V_R = 1200\text{V}, T_J = 175^\circ\text{C}$                                                                                                | Fig.2 |
| $C$    | Total Capacitance       | 600<br>45<br>34 | /          | pF            | $V_R = 0.1\text{V}, T_J = 25^\circ\text{C}, f = 1\text{MHz}$<br>$V_R = 400\text{V}, T_J = 25^\circ\text{C}, f = 1\text{MHz}$<br>$V_R = 800\text{V}, T_J = 25^\circ\text{C}, f = 1\text{MHz}$ | Fig.5 |
| $Q_C$  | Total Capacitive Charge | 25              | /          | nC            | $V_R = 800\text{V}, I_F = 10\text{A}$<br>$di/dt = 200\text{A}/\mu\text{s}, T_J = 25^\circ\text{C}$                                                                                           | Fig.4 |

### Thermal Characteristics

| Symbol          | Parameter                                   | Typ.          | Unit                      | Note  |
|-----------------|---------------------------------------------|---------------|---------------------------|-------|
| $R_{\theta JC}$ | Thermal Resistance from Junction to Case    | 1.2*<br>0.6** | $^\circ\text{C}/\text{W}$ | Fig.6 |
| $R_{\theta JA}$ | Thermal Resistance from Junction to Ambient | 80            | $^\circ\text{C}/\text{W}$ |       |
| $T_{sld}$       | Soldering Temperature                       | 260           | $^\circ\text{C}$          |       |

\*Per Leg, \*\*Per Device

## Typical Performance (Per Leg)

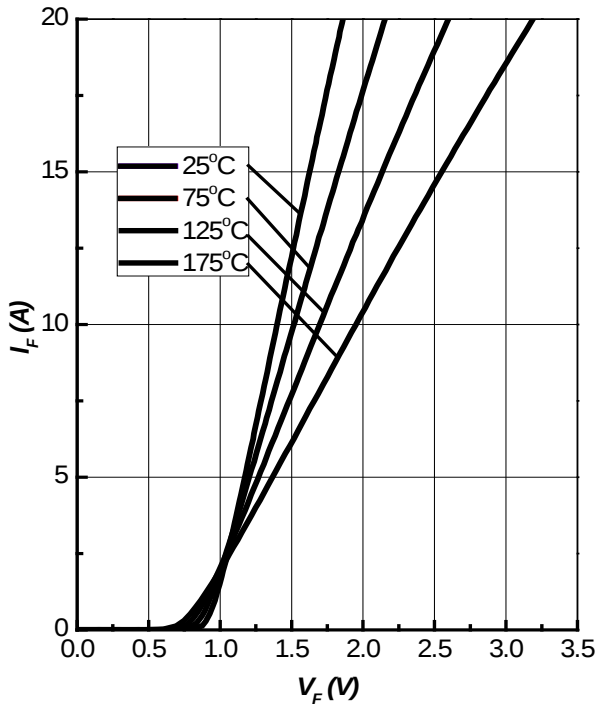


Figure 1. Forward Characteristics

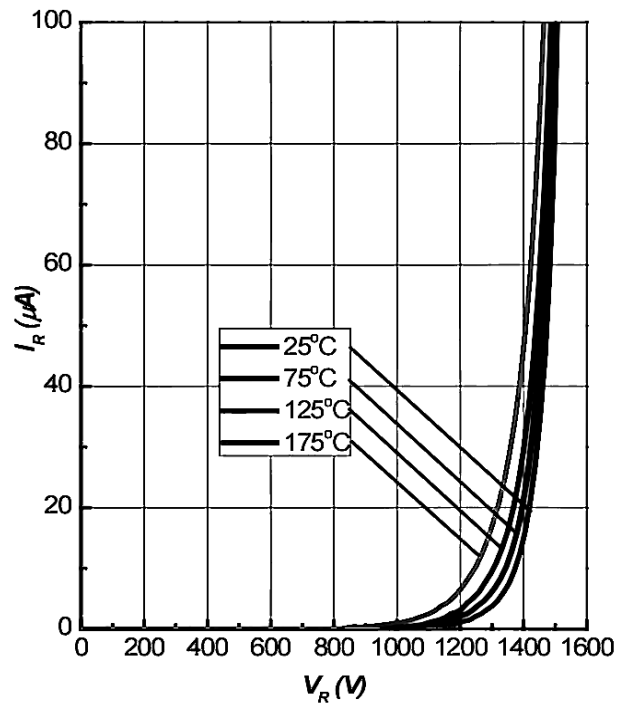


Figure 2. Reverse Characteristics

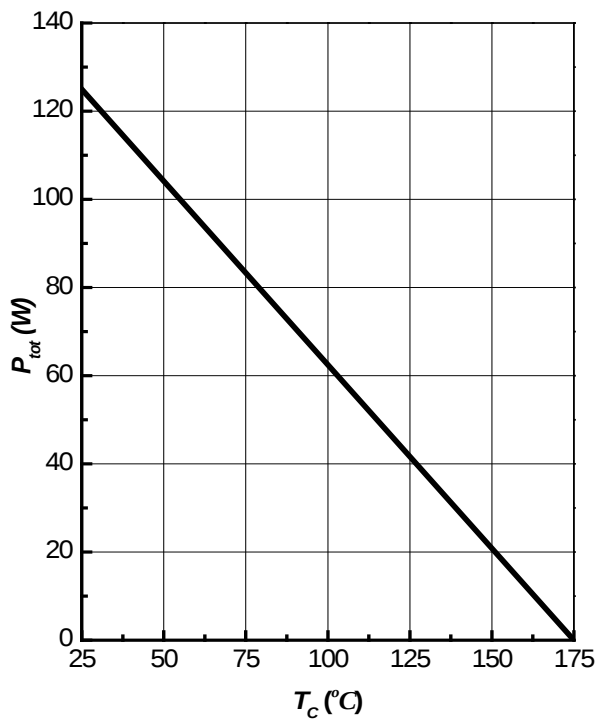


Figure 3. Power Derating

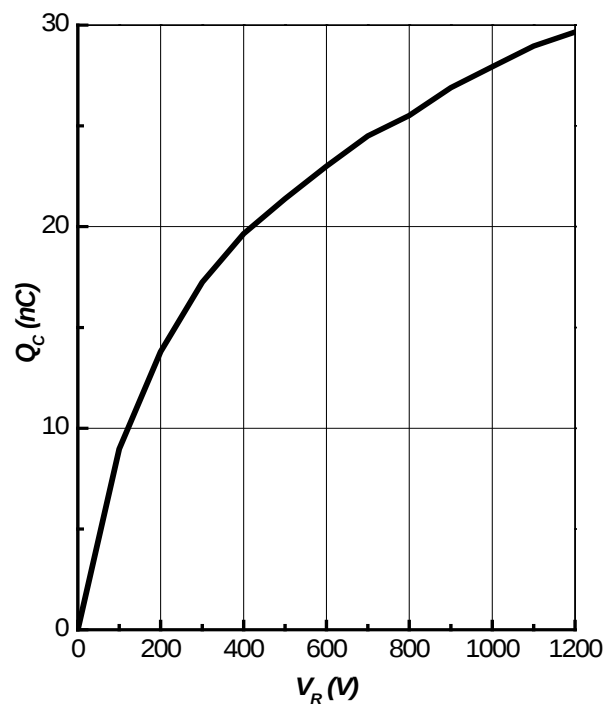


Figure 4. Total Capacitive Charge vs. Reverse Voltage

## Typical Performance (Per Leg)

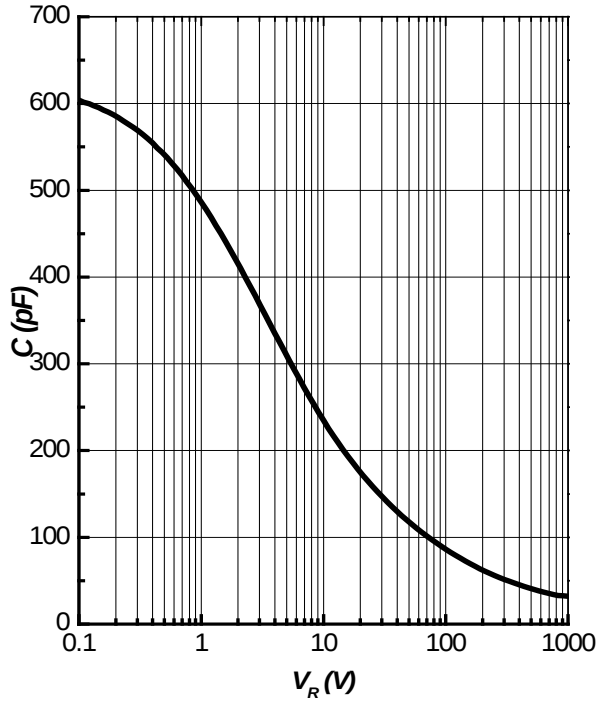


Figure 5. Total Capacitance vs. Reverse Voltage

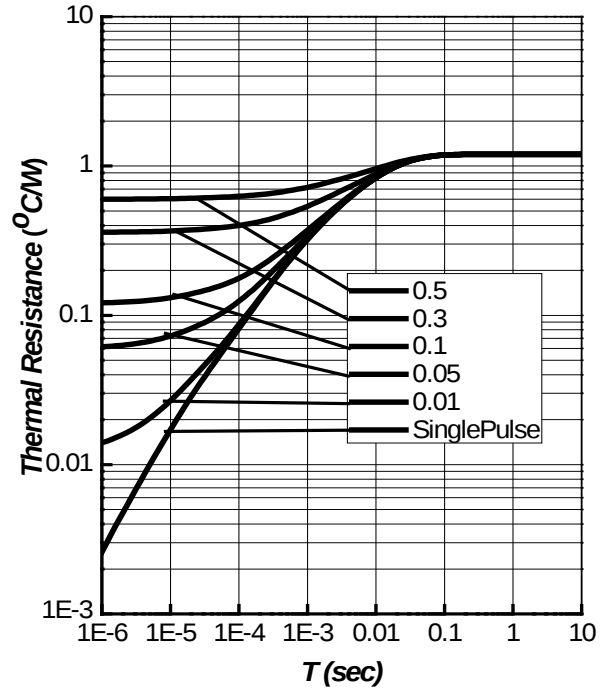
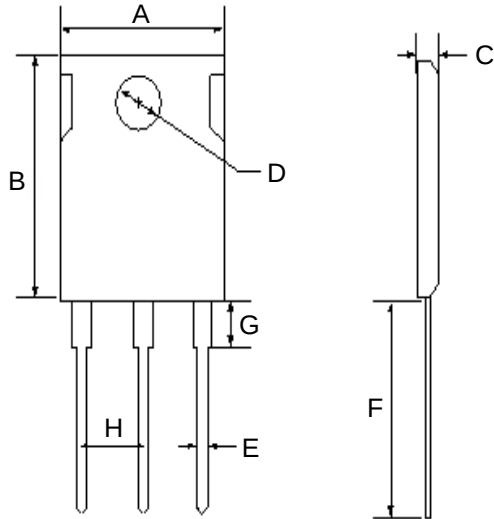


Figure 6. Transient Thermal Impedance

## TO-247-3 Package Dimensions



| Symbol | Min. (mm) | Typ. (mm) | Max. (mm) |
|--------|-----------|-----------|-----------|
| A      | 14.18     | 15.75     | 17.33     |
| B      | 18.45     | 20.5      | 22.55     |
| C      | 4.50      | 5.00      | 5.50      |
| D      | 3.15      | 3.50      | 3.85      |
| E      | 1.08      | 1.20      | 1.32      |
| F      | 18.27     | 20.30     | 22.33     |
| G      | 4.21      | 4.68      | 5.15      |
| H      | 4.91      | 5.46      | 6.01      |