

### Features

- Zero Reverse Recovery Current
- Zero Forward Recovery Voltage
- Positive Temperature Coefficient on  $V_F$
- Temperature-independent Switching
- 175°C Operating Junction Temperature

|                                    |   |      |    |
|------------------------------------|---|------|----|
| $V_{RRM}$                          | = | 1200 | V  |
| $I_F (T_C \leq 175^\circ\text{C})$ | = | 17.5 | A  |
| $Q_C$                              | = | 43   | nC |

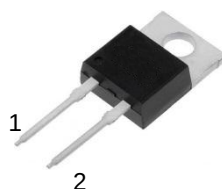
### Benefits

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

### Applications

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

### Package



TO-220-2



| Part Number | Package  | Marking   |
|-------------|----------|-----------|
| AS3D015120A | TO-220-2 | ASD15120A |

### Maximum Ratings

| Symbol         | Parameter                                  | Value            | Unit               | Test Conditions                                                                                   | Note  |
|----------------|--------------------------------------------|------------------|--------------------|---------------------------------------------------------------------------------------------------|-------|
| $V_{RRM}$      | Repetitive Peak Reverse Voltage            | 1200             | V                  | $T_C = 25^{\circ}\text{C}$                                                                        |       |
| $V_{RSM}$      | Surge Peak Reverse Voltage                 | 1200             | V                  | $T_C = 25^{\circ}\text{C}$                                                                        |       |
| $V_R$          | DC Blocking Voltage                        | 1200             | V                  | $T_C = 25^{\circ}\text{C}$                                                                        |       |
| $I_F$          | Forward Current                            | 37<br>17.5<br>15 | A                  | $T_C \leq 25^{\circ}\text{C}$<br>$T_C \leq 135^{\circ}\text{C}$<br>$T_C \leq 144^{\circ}\text{C}$ |       |
| $I_{FSM}$      | Non-Repetitive Forward Surge Current       | 135              | A                  | $T_C = 25^{\circ}\text{C}$ , $t_p = 8.3\text{ms}$ , Half Sine Wave                                |       |
| $P_{tot}$      | Power Dissipation                          | 183              | W                  | $T_C = 25^{\circ}\text{C}$                                                                        | Fig.3 |
| $T_C$          | Maximum Case Temperature                   | 144              | $^{\circ}\text{C}$ |                                                                                                   |       |
| $T_J, T_{STG}$ | Operating Junction and Storage Temperature | -55 to 175       | $^{\circ}\text{C}$ |                                                                                                   |       |
|                | TO-220-2 Mounting Torque                   | 1                | Nm                 | M3 Screw                                                                                          |       |

### Electrical Characteristics

| Symbol | Parameter               | Typ.            | Max.       | Unit          | Test Conditions                                                                                                                                                                                                    | Note  |
|--------|-------------------------|-----------------|------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| $V_F$  | Forward Voltage         | 1.55<br>2.2     | 1.8<br>2.5 | V             | $I_F = 15\text{A}$ , $T_J = 25^{\circ}\text{C}$<br>$I_F = 15\text{A}$ , $T_J = 175^{\circ}\text{C}$                                                                                                                | Fig.1 |
| $I_R$  | Reverse Current         | 5<br>20         | 20<br>200  | $\mu\text{A}$ | $V_R = 1200\text{V}$ , $T_J = 25^{\circ}\text{C}$<br>$V_R = 1200\text{V}$ , $T_J = 175^{\circ}\text{C}$                                                                                                            | Fig.2 |
| $C$    | Total Capacitance       | 940<br>70<br>57 | /          | pF            | $V_R = 0\text{V}$ , $T_J = 25^{\circ}\text{C}$ , $f = 1\text{MHz}$<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 | 43              | /          | nC            | $V_R = 800\text{V}$ , $I_F = 15\text{A}$<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    | 0.86 | $^{\circ}\text{C}/\text{W}$ | Fig.6 |
| $R_{\theta JA}$ | Thermal Resistance from Junction to Ambient | 80   | $^{\circ}\text{C}/\text{W}$ |       |
| $T_{sold}$      | Soldering Temperature                       | 260  | $^{\circ}\text{C}$          |       |

### Typical Performance

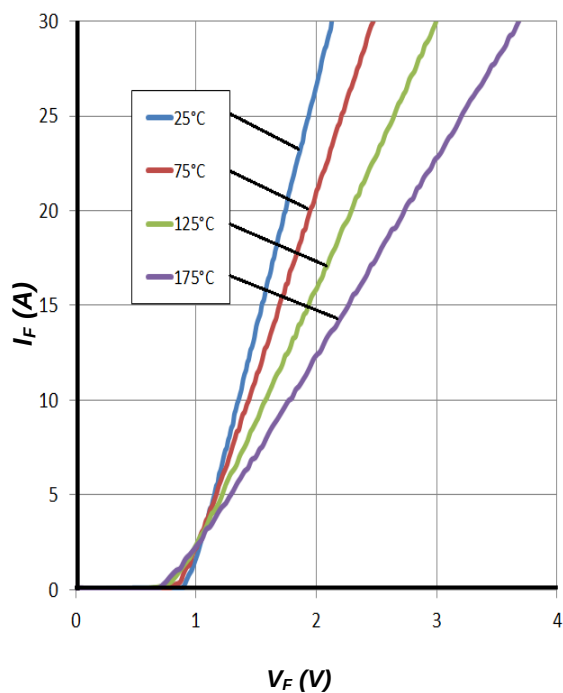


Figure 1. Forward Characteristics

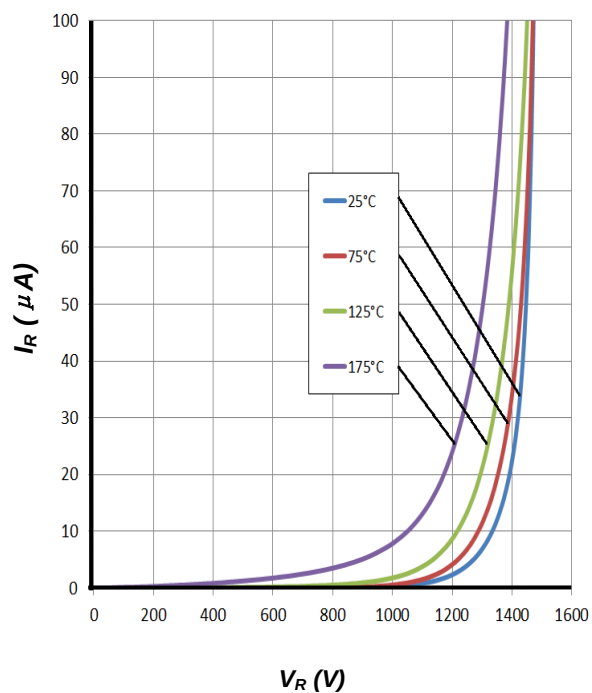


Figure 2. Reverse Characteristics

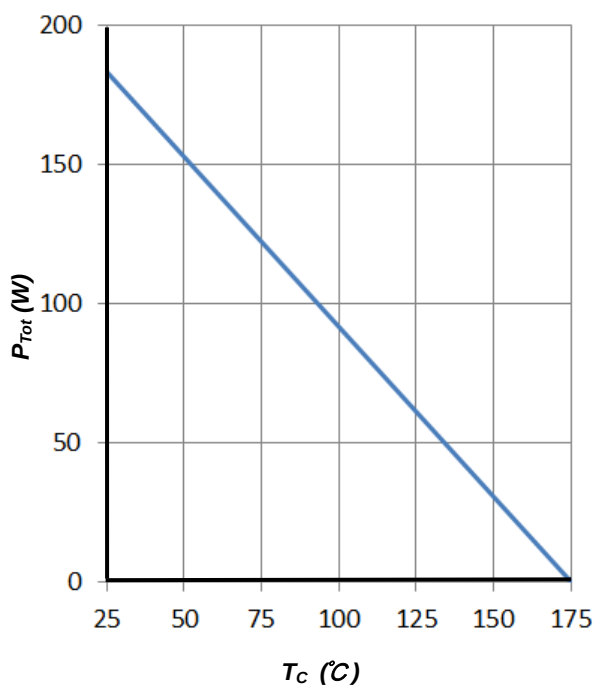


Figure 3. Power Derating

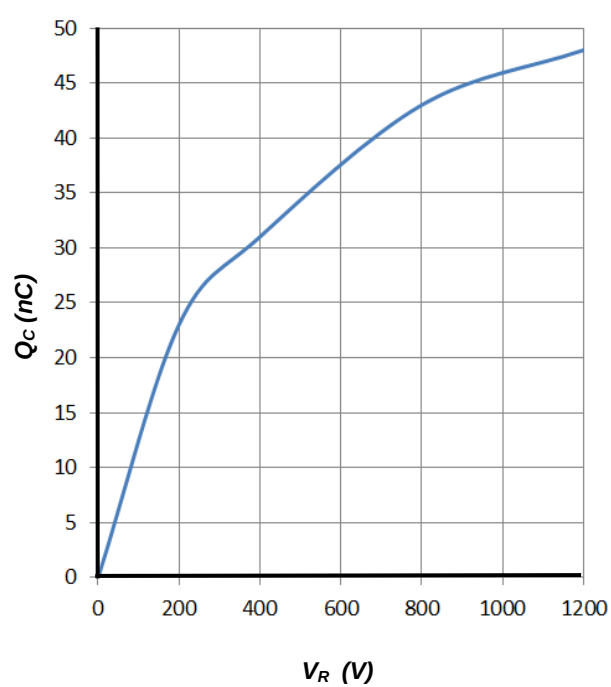


Figure 4. Total Capacitive Charge vs. Reverse Voltage

## Typical Performance

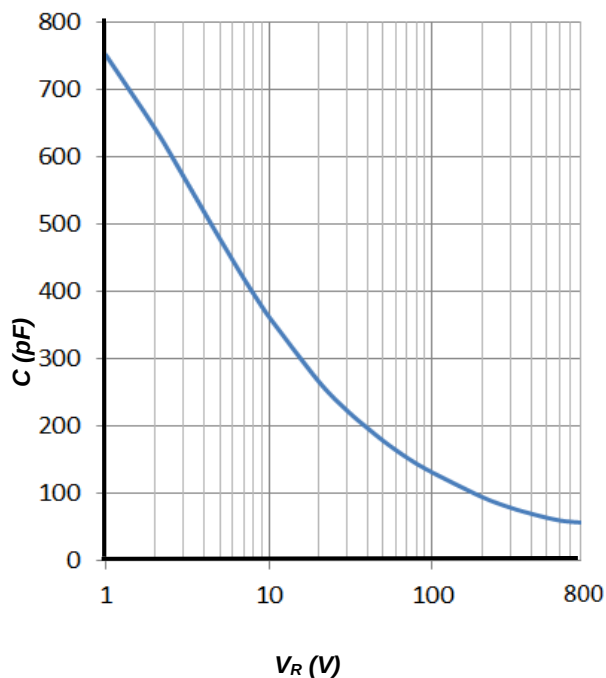


Figure 5. Total Capacitance vs. Reverse Voltage

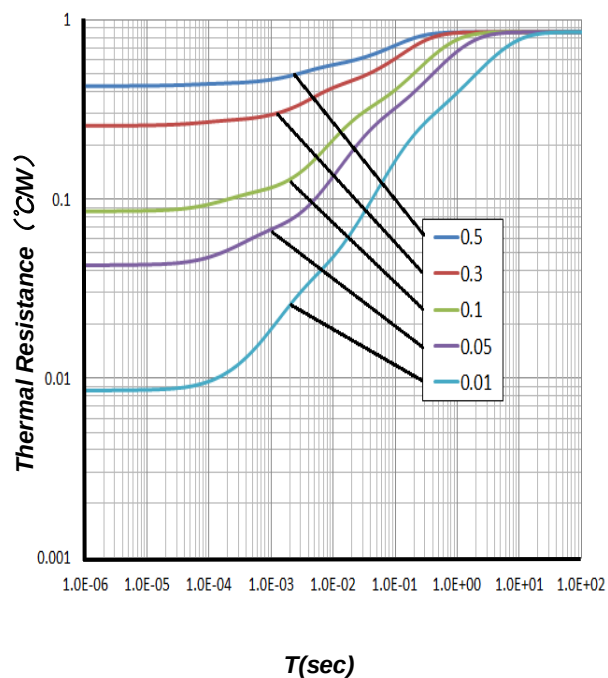
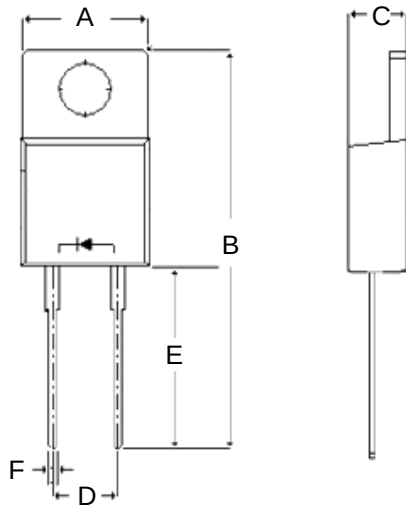


Figure 6. Transient Thermal Impedance



## Package Dimensions

Package TO-220-2



| Symbol | Min. (mm) | Typ. (mm) | Max. (mm) |
|--------|-----------|-----------|-----------|
| A      | 9.17      | 10.08     | 10.91     |
| B      | 27.00     | 28.58     | 30.00     |
| C      | 3.89      | 4.50      | 5.00      |
| D      | 4.20      | 5.10      | 5.80      |
| E      | 11.70     | 13.30     | 14.97     |
| F      | 0.50      | 0.80      | 1.21      |