



# 1200V SiC Schottky Diode

## GP3D010A120A

|                    |        |
|--------------------|--------|
| VDC                | 1200 V |
| Q <sub>C</sub>     | 56 nC  |
| I <sub>F</sub>     | 10 A   |
| T <sub>j,max</sub> | 175 °C |

### Amp+™ Features

- Unipolar rectifier with surge current
- Zero reverse recovery current
- Fast, temperature-independent switching
- Avalanche tested to 125mJ\*
- All parts tested to greater than 1,400V

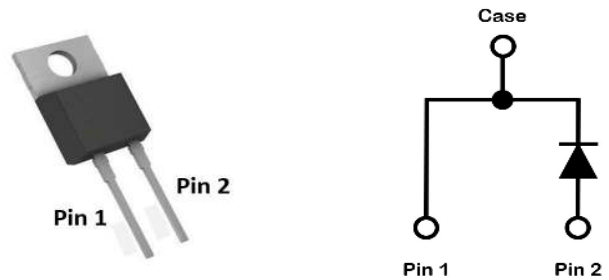
### Amp+™ Benefits

- Near zero switching loss
- Higher efficiency
- Reduced heat sink requirements
- Easy to parallel

### Amp+™ Applications

- Solar Inverters
- Switch mode power supplies, UPS
- Power factor correction
- EV charging stations

### Package



| Part #       | Package   | Marking   |
|--------------|-----------|-----------|
| GP3D010A120A | TO-220-2L | 3D010A120 |



Maximum Ratings, at T<sub>j</sub>=25 °C, unless otherwise specified

| Characteristics                                    | Symbol                                | Conditions                                     | Values    | Unit             |
|--|---------------------------------------|--|-----------|------------------|
| Continuous forward current                         | I <sub>F</sub> **                     | T <sub>C</sub> =25 °C, T <sub>J</sub> =175 °C  | 34        | A                |
|  |                                       | T <sub>C</sub> =125 °C, T <sub>J</sub> =175 °C | 19        |                  |
|  |                                       | T <sub>C</sub> =150 °C, T <sub>J</sub> =175 °C | 12        |                  |
| Surge non-repetitive forward current sine halfwave | I <sub>F,SM</sub>                     | T <sub>C</sub> =25 °C, t <sub>p</sub> =8.3 ms  | 100       | A                |
|  |                                       | T <sub>C</sub> =110 °C, t <sub>p</sub> =8.3 ms | 90        |                  |
| Non-repetitive peak forward current                | I <sub>F,max</sub>                    | T <sub>C</sub> =25 °C, t <sub>p</sub> =10 μs   | 700       | A                |
| i <sup>2</sup> t value                             | ∫i <sup>2</sup> dt                    | T <sub>C</sub> =25 °C, t <sub>p</sub> =8.3 ms  | 42        | A <sup>2</sup> s |
|  |                                       | T <sub>C</sub> =110 °C, t <sub>p</sub> =8.3 ms | 34        |                  |
| Repetitive peak reverse voltage                    | V <sub>RRM</sub>                      | T <sub>J</sub> =25 °C                          | 1200      | V                |
| Diode dv/dt ruggedness                             | dv/dt                                 | Turn-on slew rate, repetitive                  | 200       | V/ns             |
| Power dissipation                                  | P <sub>tot</sub> **                   | T <sub>C</sub> =25 °C                          | 183       | W                |
| Operating junction & storage temperature           | T <sub>J</sub> , T <sub>storage</sub> | Continuous                                     | -55...175 | °C               |
| Soldering temperature                              | T <sub>solder</sub>                   | Wave soldering leads                           | 260       | °C               |
| Mounting torque                                    |                                       | M3 Screw                                       | 1         | N-m              |

**Notes:**

\* EAS of 125 mJ is based on starting T<sub>j</sub> = 25°C, L = 1.0 mH, IAS = 15.81 A, V = 50 V.

\*\* Typical R<sub>thjC</sub> used

Electrical Characteristics, at T<sub>j</sub>=25 °C, unless otherwise specified

| Characteristics         | Symbol          | Conditions                                     | Values |      |      | Unit |
|-------------------------|-----------------|--|--------|------|------|------|
|                         |                 |  | min.   | typ. | max. |      |
| DC blocking voltage     | V <sub>DC</sub> | T <sub>j</sub> =25 °C                          | 1200   | -    | -    | V    |
| Breakdown voltage       | V <sub>BR</sub> | I <sub>R</sub> =1,000µA, T <sub>j</sub> =25 °C | 1400   | -    | -    | V    |
| Diode forward voltage   | V <sub>F</sub>  | I <sub>F</sub> =10A, T <sub>j</sub> =25 °C     | -      | 1.49 | 1.65 | V    |
|                         |                 | I <sub>F</sub> =10A, T <sub>j</sub> =125 °C    | -      | 1.84 | -    |      |
|                         |                 | I <sub>F</sub> =10A, T <sub>j</sub> =175 °C    | -      | 2.12 | 2.70 |      |
| Reverse current         | I <sub>R</sub>  | V <sub>R</sub> =1,200V, T <sub>j</sub> =25 °C  | -      | 2    | 20   | µA   |
|                         |                 | V <sub>R</sub> =1,400V, T <sub>j</sub> =25 °C  | -      | 5    | -    |      |
|                         |                 | V <sub>R</sub> =1,200V, T <sub>j</sub> =125 °C | -      | 11   | -    |      |
|                         |                 | V <sub>R</sub> =1,200V, T <sub>j</sub> =175 °C | -      | 39   | 300  |      |
| Total capacitive charge | Q <sub>C</sub>  | V <sub>R</sub> =800V, T <sub>j</sub> =25 °C    | -      | 56   | -    | nC   |
| Total capacitance       | C               | V <sub>R</sub> =1V, f=1 MHz                    | -      | 608  | -    | pF   |
|                         |                 | V <sub>R</sub> =400V, f=1 MHz                  | -      | 53   | -    |      |
|                         |                 | V <sub>R</sub> =800V, f=1 MHz                  | -      | 39   | -    |      |

Thermal Characteristics

| Characteristics                   | Symbol            | Conditions | Values |      |      | Unit |
|-----------------------------------|-------------------|------------|--------|------|------|------|
|                                   |                   |            | min.   | typ. | max. |      |
| Thermal resistance, junction-case | R <sub>thJC</sub> | -          | -      | 0.82 | 1.10 | °C/W |

Typical Performance

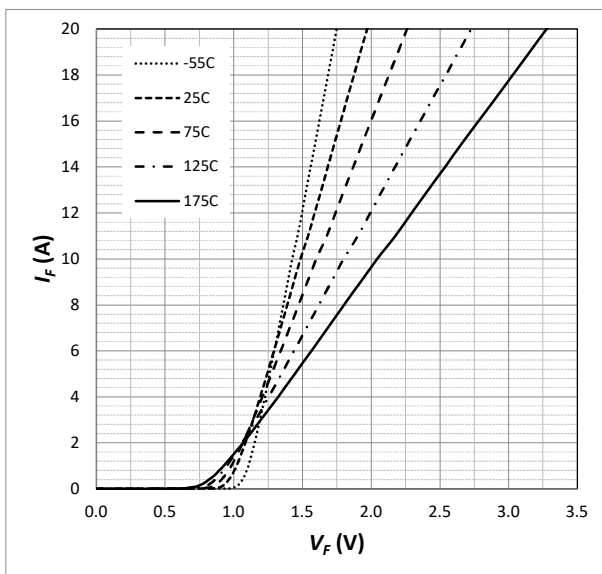


Fig. 1 Forward Characteristics (parameterized on T<sub>j</sub>)

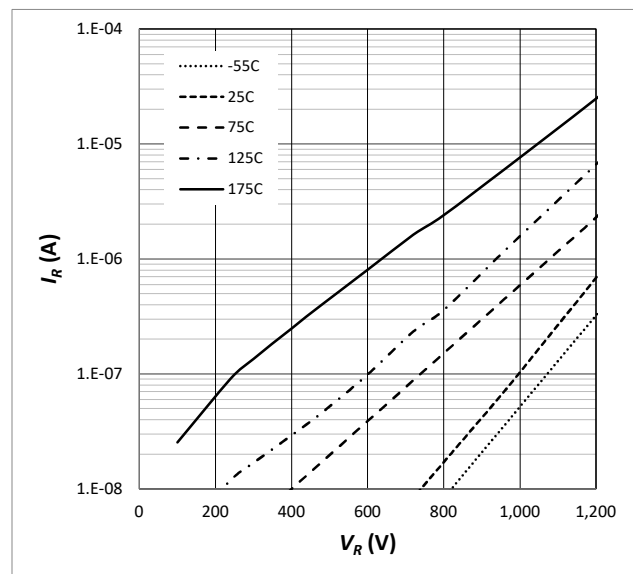


Fig. 2 Reverse Characteristics (parameterized on T<sub>j</sub>)

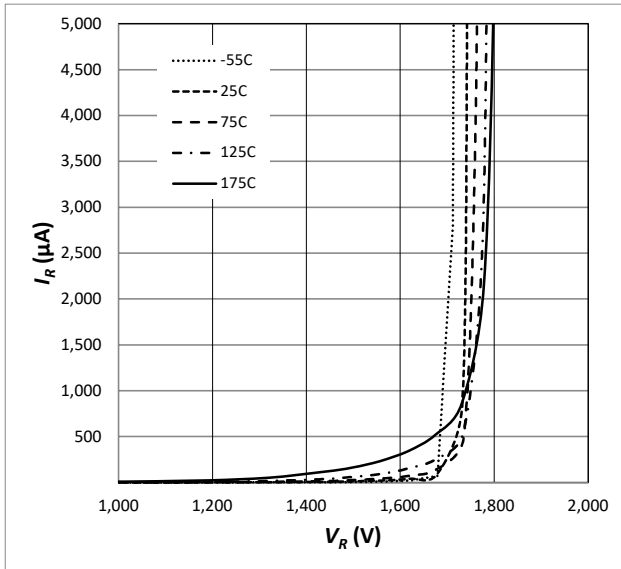


Fig. 3 Reverse Characteristics (parameterized on  $T_j$ )

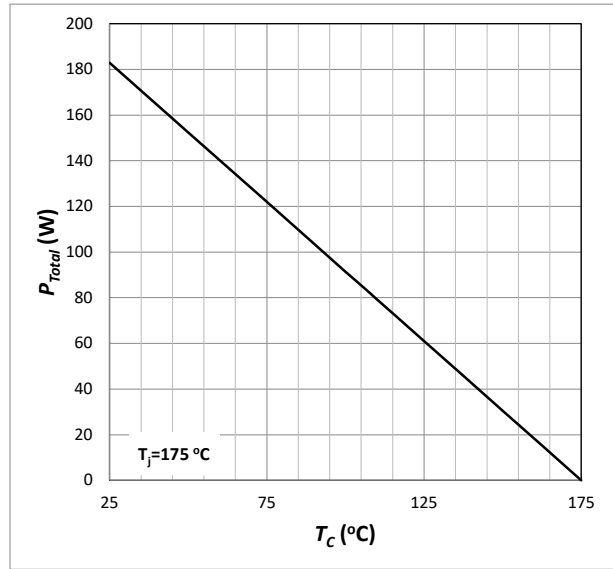


Fig. 4 Power Derating

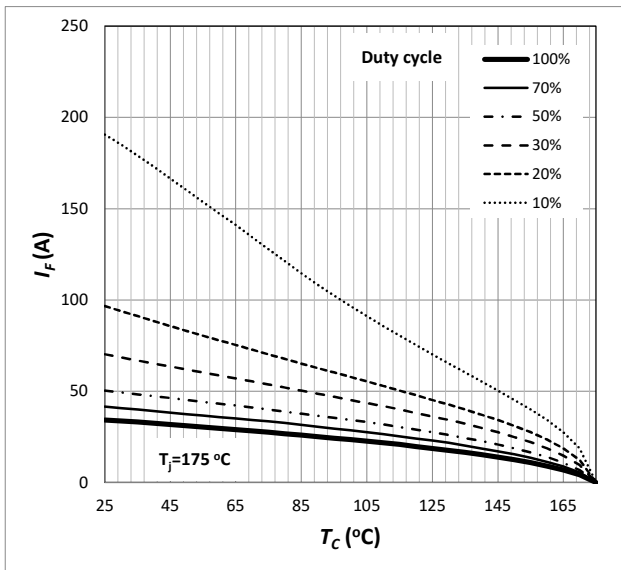


Fig. 5 Current Derating

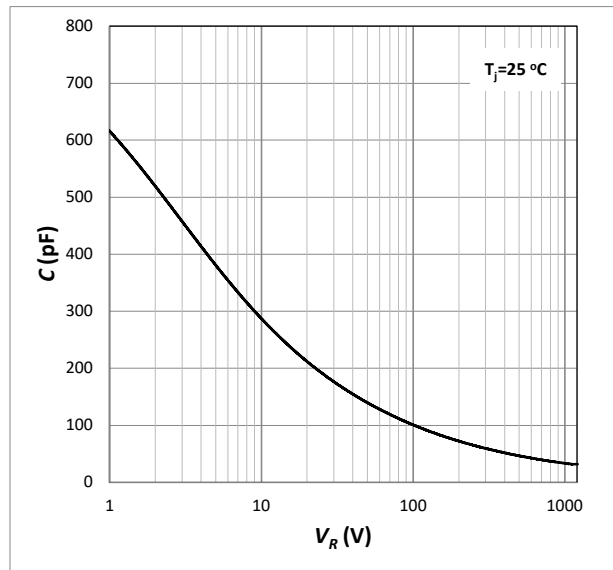


Fig. 6 Capacitance

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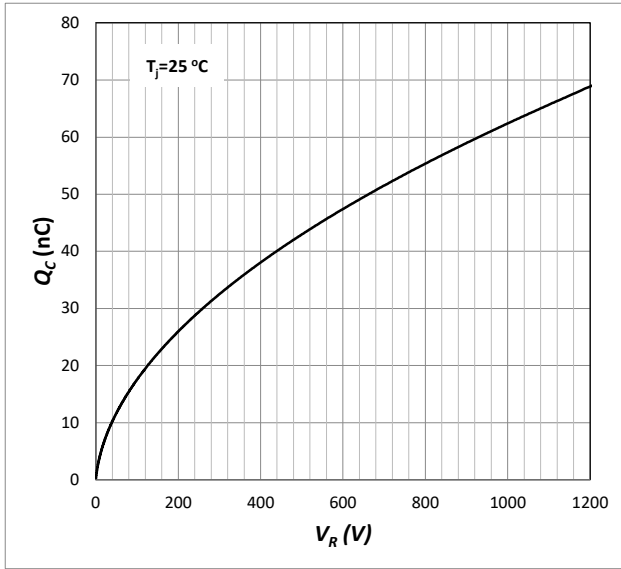


Fig. 7 Capacitive Charge

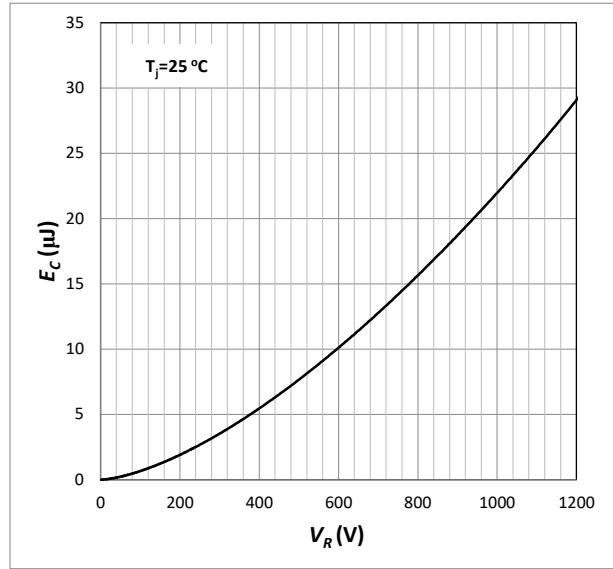


Fig. 8 Typical Capacitance Stored Energy

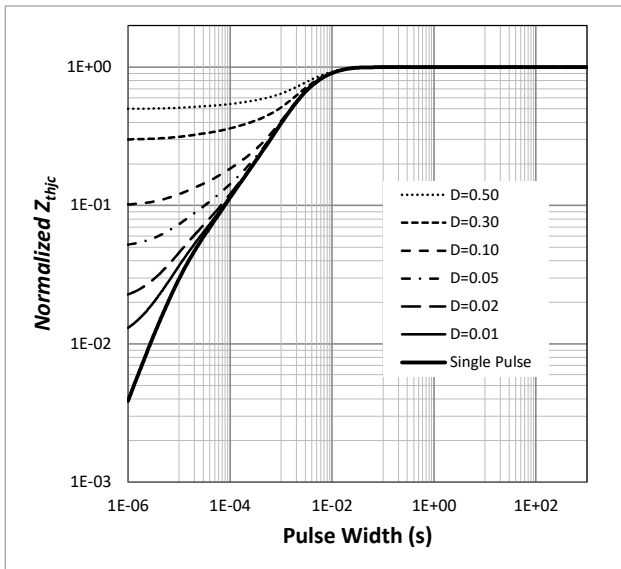


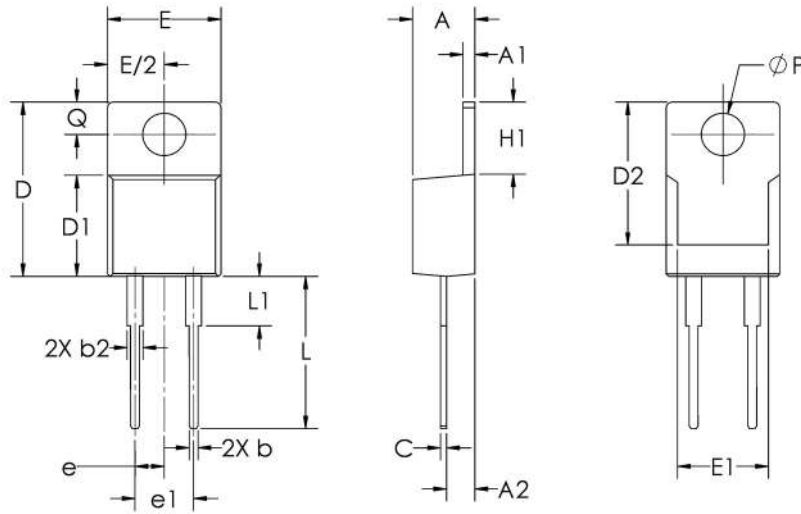
Fig. 9 Transient Thermal Impedance

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## Package Dimensions TO-220-2L



| Sym   | Millimeters |       | Inches   |       |
|-------|-------------|-------|----------|-------|
|       | Min         | Max   | Min      | Max   |
| A     | 4.20        | 4.70  | 0.165    | 0.185 |
| A1    | 1.14        | 1.40  | 0.045    | 0.055 |
| A2    | 2.03        | 2.92  | 0.080    | 0.115 |
| b     | 0.38        | 1.02  | 0.015    | 0.040 |
| b2    | 1.02        | 1.78  | 0.040    | 0.070 |
| c     | 0.36        | 0.76  | 0.014    | 0.030 |
| D     | 14.22       | 16.51 | 0.560    | 0.650 |
| D1    | 8.38        | 9.40  | 0.330    | 0.370 |
| D2    | 12.19       | 13.13 | 0.480    | 0.517 |
| E     | 9.65        | 10.67 | 0.380    | 0.420 |
| E1    | 6.86        | 8.89  | 0.270    | 0.350 |
| e     | 2.54 BSC    |       | .100 BSC |       |
| e1    | 5.08 BSC    |       | .200 BSC |       |
| H1    | 5.84        | 6.86  | 0.230    | 0.270 |
| L     | 12.57       | 14.73 | 0.495    | 0.580 |
| L1    | 3.60        | 6.35  | 0.142    | 0.250 |
| phi P | 3.53        | 4.09  | 0.139    | 0.161 |
| Q     | 2.54        | 3.43  | 0.100    | 0.135 |

**Revision History**

| Date       | Revision | Notes   |
|------------|----------|---|
| 12/19/2019 | 1.0      | Initial release of datasheet                                |
| 4/17/2020  | 1.1      | Using Rthjc typical for I <sub>F</sub> and P <sub>tot</sub> |
| 11/16/2020 | 1.2      | Updated package dimensions                                  |
| 8/6/2021   | 1.3      | Updated surge, Rthjc  |

**Notes****RoHS Compliance**

The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU Directive 2011/65/EC (RoHS2), as implemented March, 2013. RoHS Declarations for this product can be obtained from the Product Documentation sections of [www.SemiQ.com](http://www.SemiQ.com).

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