

## S4D10120A 1200V SIC POWER SCHOTTKY RECTIFIERS



### Description

This 1200V 10A diode is high voltage Schottky rectifier that has very low total conduction losses and very stable switching characteristics over temperature extremes. The S4D10120A is ideal for energy sensitive, high frequency applications in challenging environments.

### Circuit Diagram



### Features

- 175°C TJ operation
- Ultra-low switching loss
- Switching speeds independent of operating temperature
- Low total conduction losses
- High forward surge current capability
- High package isolation voltage
- Terminals finish: 100% Pure Tin
- "-A" is an AEC-Q101 qualified device
- Pb - Free Device
- All SMC parts are traceable to the wafer lot
- Additional electrical and life testing can be performed upon request

### Applications

- Alternative energy inverters
- Power Factor Correction (PFC)
- Free-Wheeling diodes
- Switching supply output rectification
- Reverse polarity protection

### Maximum Ratings:

| Characteristics  | Symbol                          | Condition   | Max. | Units |
|--|---------------------------------|---|------|-------|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | -   | 1200 | V     |
| Average Rectified Forward Current  | $I_{F(AV)1}$                    | $T_c = 25^\circ\text{C}$                            | 33   | A     |
|  | $I_{F(AV)2}$                    | $T_c = 153^\circ\text{C}$                           | 10   | A     |
| Repetitive Peak Forward Surge Current  | $I_{FRM1}$                      | 10 ms, Half Sine pulse, $T_c = 25^\circ\text{C}$    | 46   | A     |
|  | $I_{FRM2}$                      | 10 ms, Half Sine pulse, $T_c = 110^\circ\text{C}$   | 30   | A     |
| Peak One Cycle Non-Repetitive Surge Current  | $I_{FSM1}$                      | 10ms, Half Sine pulse, $T_c = 25^\circ\text{C}$     | 105  | A     |
|  | $I_{FSM2}$                      | 10ms, Half Sine pulse, $T_c = 110^\circ\text{C}$    | 80   | A     |
| Non-Repetitive Peak Forward Surge Current  | $I_{F,Max1}$                    | 10 $\mu\text{s}$ . Pulse, $T_c = 25^\circ\text{C}$  | 750  | A     |
|  | $I_{F,Max2}$                    | 10 $\mu\text{s}$ . Pulse, $T_c = 110^\circ\text{C}$ | 620  | A     |
| Power Dissipation  | $P_{tot1}$                      | $T_c = 25^\circ\text{C}$                            | 150  | W     |
|  | $P_{tot2}$                      | $T_c = 110^\circ\text{C}$                           | 65   | W     |

### Electrical Characteristics:

| Characteristics           | Symbol   | Condition  | Typ.  | Max. | Units         |
|---------------------------|----------|--|-------|------|---------------|
| Forward Voltage Drop*     | $V_{F1}$ | @ 10A, Pulse, $T_j = 25^\circ\text{C}$   | 1.5   | 1.8  | V             |
|                           | $V_{F2}$ | @ 10A, Pulse, $T_j = 175^\circ\text{C}$  | 2.2   | 3.0  | V             |
| Reverse Current*          | $I_{R1}$ | @ $V_R = \text{rated } V_R$<br>$T_j = 25^\circ\text{C}$  | 2     | 30   | $\mu\text{A}$ |
|                           | $I_{R2}$ | @ $V_R = \text{rated } V_R$<br>$T_j = 175^\circ\text{C}$   | 8     | 40   | $\mu\text{A}$ |
| Junction Capacitance      | $C_T$    | $V_R = 0\text{V}$ , $T_j = 25^\circ\text{C}$ , $f = 1\text{MHz}$   | 772   | -    | pF            |
| Reverse Recovery Charge   | $Q_c$    | $I_F = 10\text{A}$ , $di/dt = 200\text{A}/\mu\text{s}$<br>$V_R = 800\text{V}$ , $T_j = 25^\circ\text{C}$ | 56.46 | -    | nC            |
| Capacitance Stored Energy | $E_c$    | $V_R = 800\text{V}$  | 30.51 | -    | $\mu\text{J}$ |

\* Pulse width < 300  $\mu\text{s}$ , duty cycle < 2

### Thermal-Mechanical Specifications:

| Characteristics                             | Symbol          | Condition    | Specification | Units                     |
|---|-----------------|--------------|---------------|---------------------------|
| Junction Temperature                        | $T_j$           | -            | -55 to +175   | $^\circ\text{C}$          |
| Storage Temperature                         | $T_{stg}$       | -            | -55 to +175   | $^\circ\text{C}$          |
| Typical Thermal Resistance Junction to Case | $R_{\theta JC}$ | DC operation | 0.9           | $^\circ\text{C}/\text{W}$ |

**Ratings and Characteristics Curves**

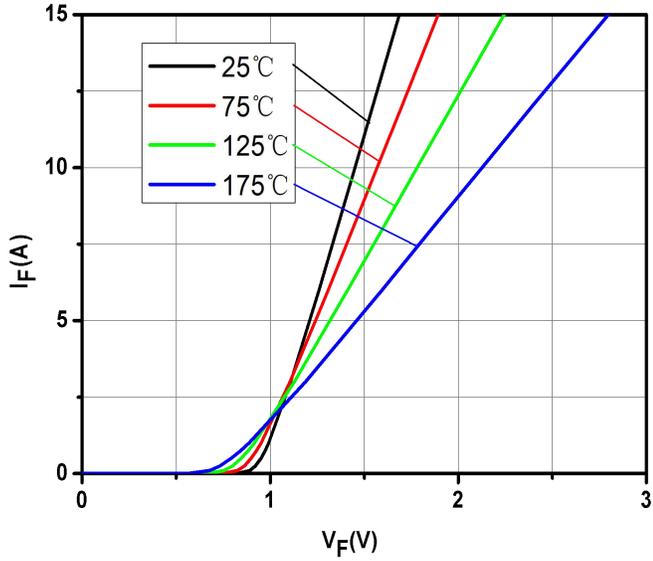


Fig.1-Typical Forward Voltage Characteristics

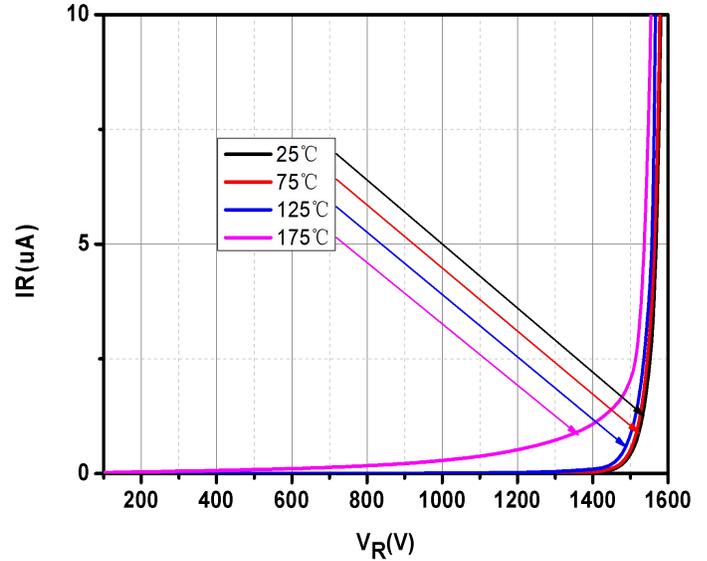


Fig.2-Typical Reverse Characteristics

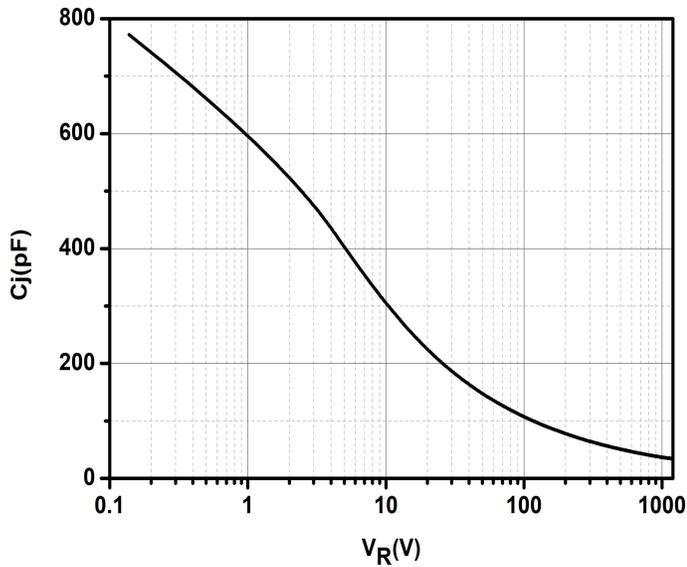


Fig.3-Capacitance vs. Reverse Voltage

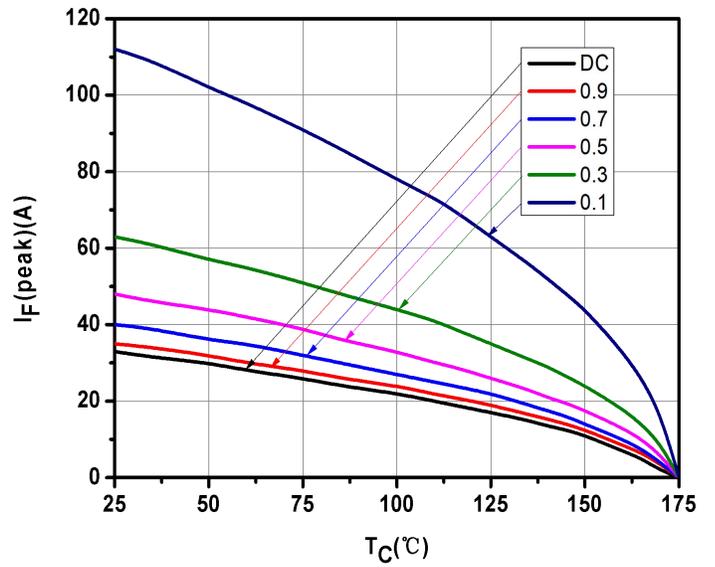


Fig.4-Current Derating

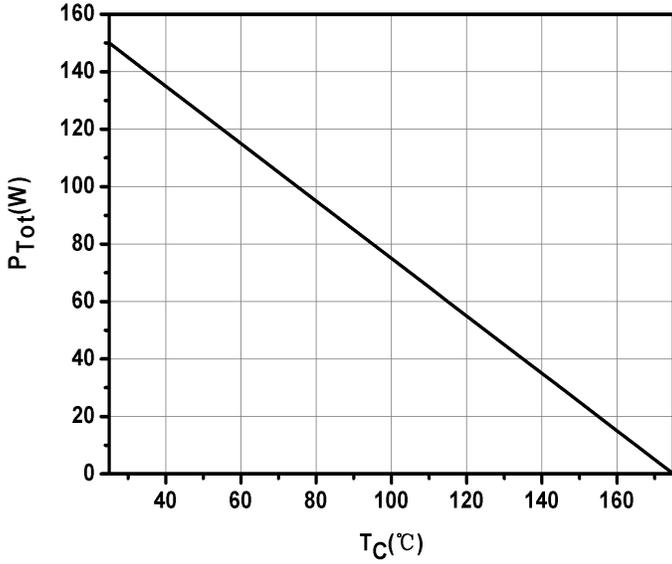


Fig.5-Power Derating

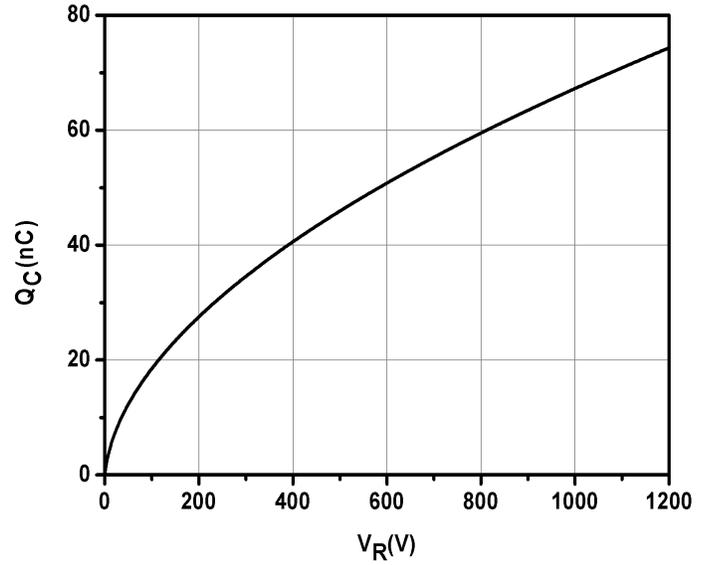


Fig.6-Total Capacitance Charge vs. Reverse Voltage

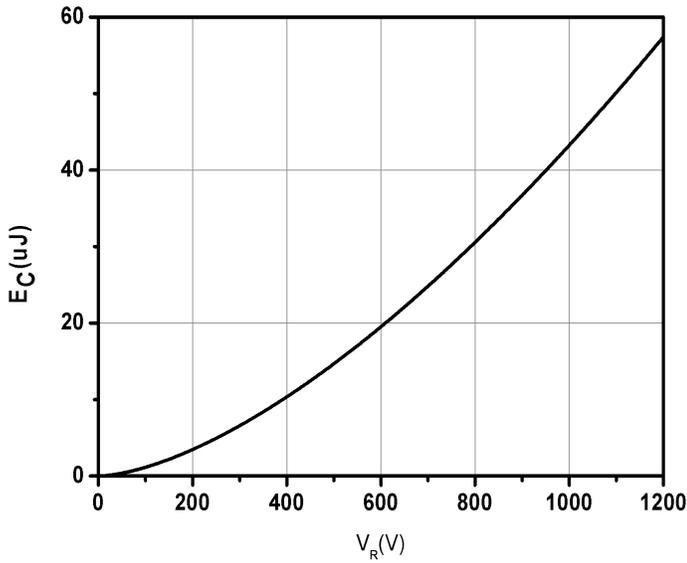


Fig.7-Capacitance Stored Energy

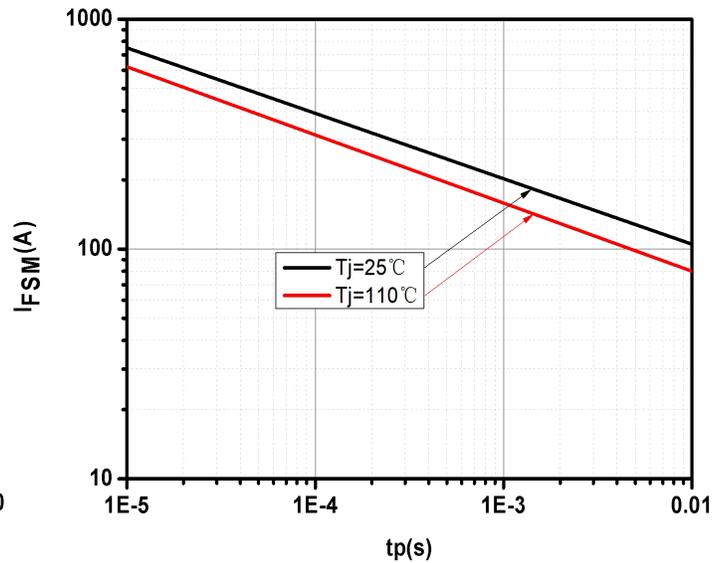
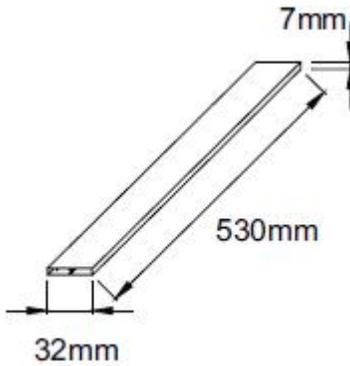


Fig.8-Non-repetitive peak forward surge current versus pulse duration (sinusoidal waveform)

**Ordering Information**

| Device    | Package            | Shipping     |
|-----------|--------------------|--------------|
| S4D10120A | TO-220AC(TO-220-2) | 50pcs / tube |

**Tube Specification**



**Marking Diagram**

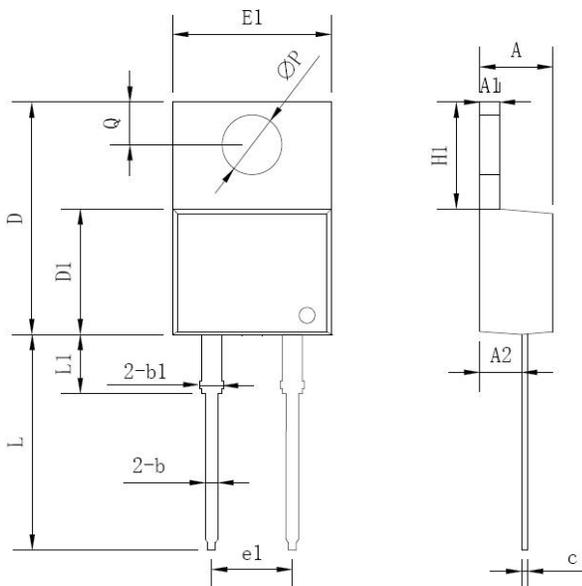


Where XXXXX is YYWWL

- S4D = Device Type
- A = Package type
- 10 = Forward Current (10A)
- 120 = Reverse Voltage (1200V)
- SSG = SSG
- YY = Year
- WW = Week
- L = Lot Number

**Cautions :** Molding resin  
Epoxy resin UL : 94V-0

**Mechanical Dimensions**



| Symbol | Dimensions in millimeters |         |       |
|--------|---------------------------|---------|-------|
|        | Min.                      | Typical | Max.  |
| A      | 3.56                      | -       | 4.83  |
| A1     | 0.51                      | -       | 1.40  |
| A2     | 2.03                      | -       | 2.92  |
| b      | 0.38                      | -       | 1.02  |
| b1     | 1.14                      | -       | 1.78  |
| c      | 0.31                      | -       | 0.61  |
| D      | 14.22                     | -       | 16.51 |
| D1     | 8.38                      | -       | 9.42  |
| E1     | 9.65                      | 10.16   | 10.67 |
| e1     | -                         | 5.08    | -     |
| H1     | 5.84                      | -       | 6.86  |
| L      | 12.70                     | -       | 14.73 |
| L1     | -                         | -       | 6.35  |
| φP     | -                         | 3.56    | -     |
| Q      | 2.54                      | -       | 3.43  |

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