

## SPD10120D1 1200V Silicon Carbide Diode

### Features

- 1200-Volt Schottky Rectifier
- Shorter recovery time
- High-speed switching possible
- High-Frequency Operation
- Temperature-Independent Switching Behavior
- Extremely Fast Switching
- Positive Temperature Coefficient on VF

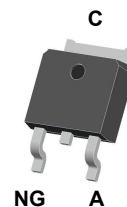
### Benefits

- Higher safety margin against overvoltage
- Improved efficiency all load conditions
- Increased efficiency compared to Silicon Diode alternatives
- Reduction of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway
- Essentially No Switching Losses

### Applications

- Switch Mode Power Supplies
- Power Factor Correction
- Motor Drives
- HID Lighting

### Package



Type : TO-252(DPAK)

Anode  Cathode

### Absolute Maximum Ratings $T_c = 25^\circ\text{C}$ unless otherwise noted

| Symbol   | Parameter  | SPD10120D1     | Units            |
|----------|--|----------------|------------------|
| VRRM     | Repetitive Peak Reverse Voltage  | 1200           | V                |
| VRSM     | Surge Peak Reverse Voltage   | 1200           | V                |
| VDC      | DC Blocking Voltage  | 1200           | V                |
| IF       | Continuous Forward Current<br>@ $T_c=25^\circ\text{C}$<br>@ $T_c=125^\circ\text{C}$<br>@ $T_c=145^\circ\text{C}$ | 33<br>16<br>10 | A                |
| IFRM     | Repetitive Peak Forward Surge Current<br>@ $T_c=25^\circ\text{C}$ , $t_P = 10$ ms, Half Sine Wave                | 50             | A                |
| IFSM     | Non-Repetitive Peak Forward Surge Current<br>@ $T_c=25^\circ\text{C}$ , $t_P = 10$ ms, Half Sine Wave            | 70             | A                |
| Ptot     | Power Dissipation<br>@ $T_c=25^\circ\text{C}$<br>@ $T_c=110^\circ\text{C}$                                       | 190<br>81      | W                |
| TJ, Tstg | Operating Junction and Storage Temperature   | -55 to +175    | $^\circ\text{C}$ |

## Electrical Characteristics

$T_C = 25^\circ \text{C}$  unless otherwise noted

| Symbol | Test Conditions           | Test Conditions  | Min | Typ             | Max        | Unit |
|--------|---------------------------|--|-----|-----------------|------------|------|
| VF     | Forward Voltage           | IF=10A, TC=25° C<br>IF=10A, TC=175° C  | -   | 1.5<br>2.2      | 1.8<br>3.0 | V    |
| IR     | Reverse Current           | VR=1200V, TC=25° C<br>VR=1200V, TC=175° C  | -   | 10<br>50        | 100<br>400 | μA   |
| QC     | Total Capacitive Charge   | VR =600V, IF =10A<br>TJ = 25° C<br>$Qc = \int_0^{Vr} C (V) dv$                             | -   | 50              | -          | nC   |
| C      | Total Capacitance         | VR =0V, TJ = 25° C, f=1MHz<br>VR =400V, TJ = 25° C, f=1MHz<br>VR =600V, TJ = 25° C, f=1MHz | -   | 610<br>46<br>40 | -          | pF   |
| EC     | Capacitance Stored Energy | VR=600V  | -   | 15              | -          | μJ   |

## Thermal Characteristics

| Symbol | Parameter                                | Typ  | Unit |
|--------|--|------|------|
| RθJC   | Thermal Resistance from Junction to Case | 0.79 | °C/W |

## Typical Characteristics

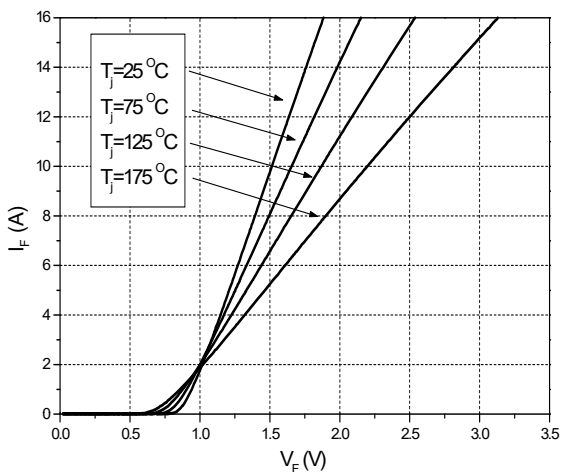


Figure 1. Forward Characteristics

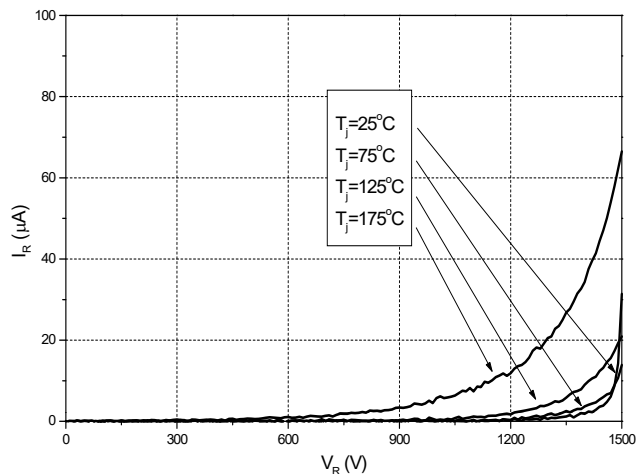


Figure 2. Reverse Characteristics

# Typical Characteristics

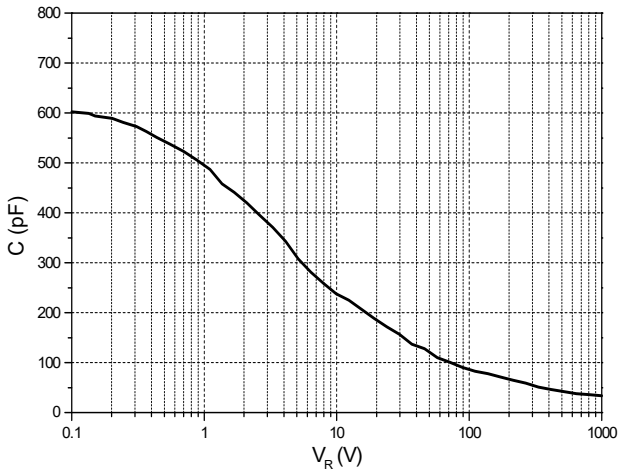


Figure 3. Capacitance vs. Reverse Voltage

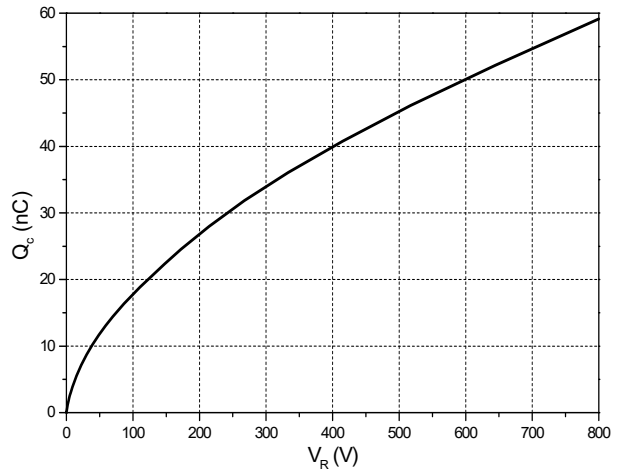


Figure 4. Total Capacitance Charge vs. Reverse Voltage

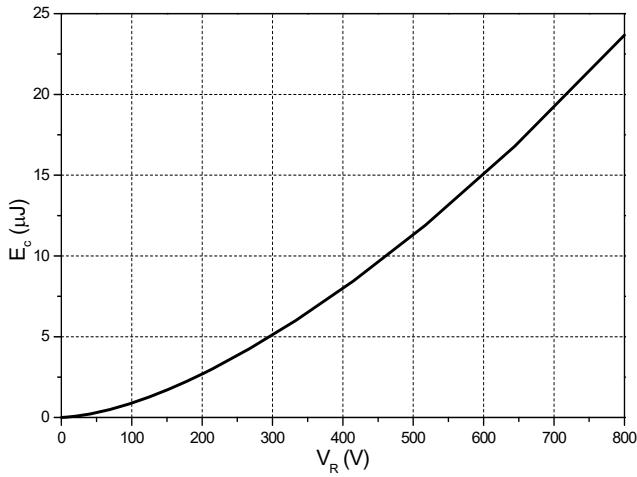


Figure 5. Capacitance Stored Energy

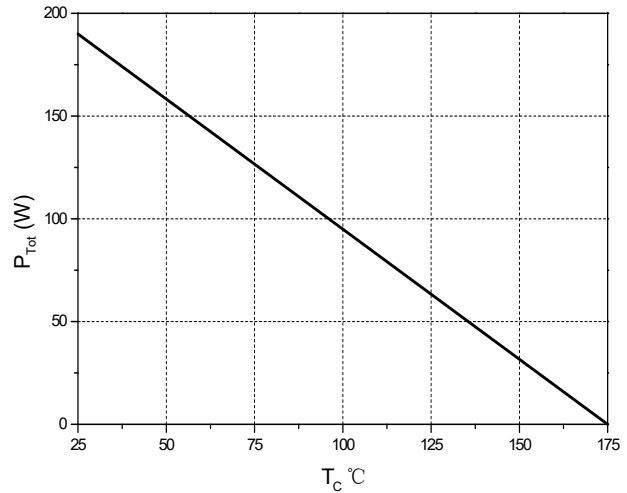


Figure 6. Power Derating

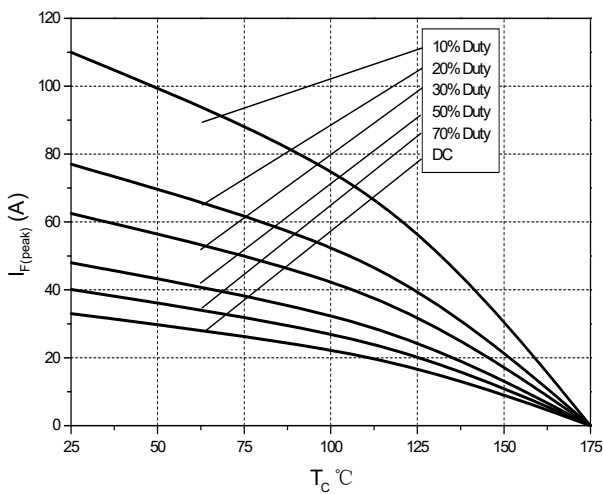


Figure 7. Current Derating

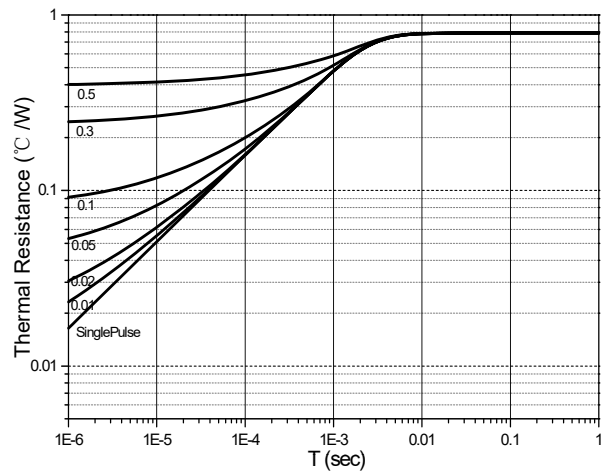
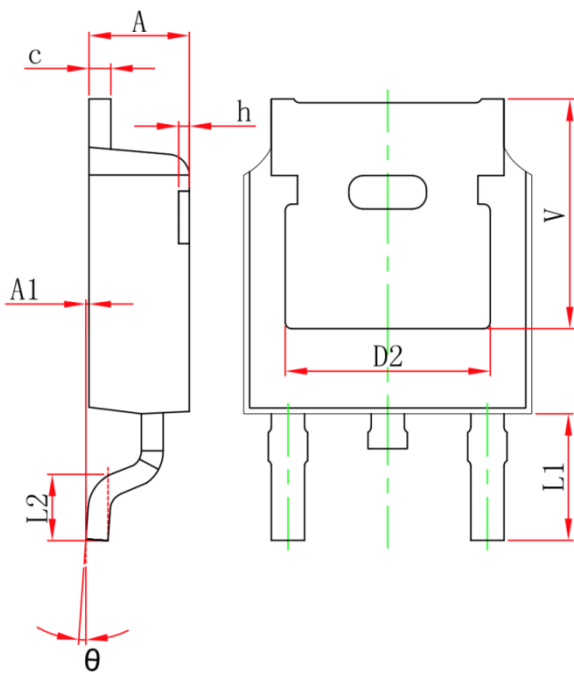
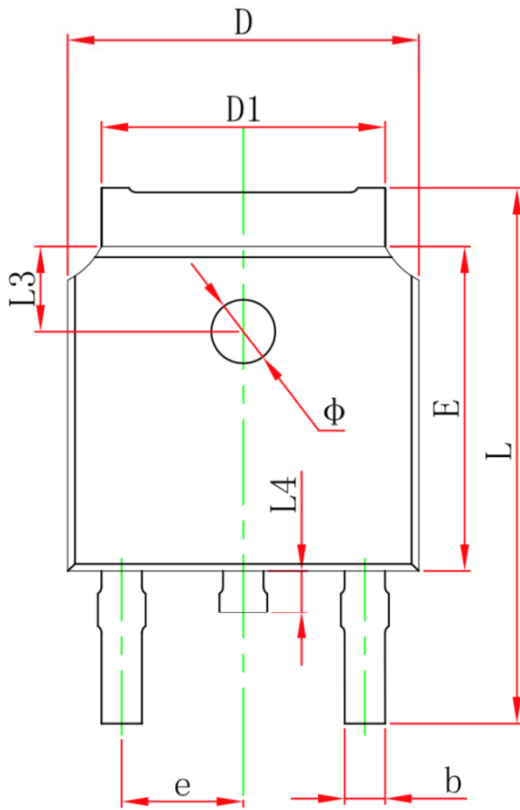


Figure 8. Transient Thermal Impedance

# Package Dimensions



| Symbol   | Dimensions In Millimeters |        | Dimensions In Inches |       |
|----------|---------------------------|--------|----------------------|-------|
|          | Min                       | Max    | Min                  | Max   |
| A        | 2.200                     | 2.400  | 0.087                | 0.094 |
| A1       | 0.000                     | 0.127  | 0.000                | 0.005 |
| b        | 0.660                     | 0.860  | 0.026                | 0.034 |
| c        | 0.460                     | 0.580  | 0.018                | 0.023 |
| D        | 6.500                     | 6.700  | 0.256                | 0.264 |
| D1       | 5.100                     | 5.460  | 0.201                | 0.215 |
| D2       | 4.830 REF.                |        | 0.190 REF.           |       |
| E        | 6.000                     | 6.200  | 0.236                | 0.244 |
| e        | 2.186                     | 2.386  | 0.086                | 0.094 |
| L        | 9.800                     | 10.400 | 0.386                | 0.409 |
| L1       | 2.900 REF.                |        | 0.114 REF.           |       |
| L2       | 1.400                     | 1.700  | 0.055                | 0.067 |
| L3       | 1.600 REF.                |        | 0.063 REF.           |       |
| L4       | 0.600                     | 1.000  | 0.024                | 0.039 |
| $\Phi$   | 1.100                     | 1.300  | 0.043                | 0.051 |
| $\theta$ | 0°                        | 8°     | 0°                   | 8°    |
| h        | 0.000                     | 0.300  | 0.000                | 0.012 |
| V        | 5.350 REF.                |        | 0.211 REF.           |       |