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May 2015

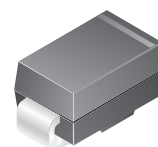
## S1A - S1M General-Purpose Rectifiers

### Features

- 1 A  $I_{F(AV)}$  Current Rating
- Glass Passivated
- Low Leakage:
  - 1  $\mu$ A Maximum at 25°C
  - 50  $\mu$ A Maximum at 125°C
- Fast Response: 1.8  $\mu$ s (Typical)
- 30 A Surge Rating
- 50 to 1000 V Reverse Voltage Ratings
- 6.6 pF Typical Capacitance
- RoHS Compliant
- UL Certified, UL #E258596

### Description

In the world of commodity rectifiers, Fairchild Semiconductor's S1 family of 1 A, P-I-N, SMA rectifiers stand out for their optimized low leakage, low capacitance, and fast response time. This was achieved while maintaining the industry standard  $V_F$  max of 1.1 V at 1 A and a 30 A surge rating. In today's world, where system power efficiency is a critical differentiating feature, these advantages can be leveraged to support those higher efficiency goals.



**SMA/DO-214AC**  
COLOR BAND DENOTES CATHODE

### Ordering Information

| Part Number | Marking | Package        | Packing Method |
|-------------|---------|----------------|----------------|
| S1A         | S1A     | DO-214AC (SMA) | Tape and Reel  |
| S1B         | S1B     | DO-214AC (SMA) | Tape and Reel  |
| S1D         | S1D     | DO-214AC (SMA) | Tape and Reel  |
| S1G         | S1G     | DO-214AC (SMA) | Tape and Reel  |
| S1J         | S1J     | DO-214AC (SMA) | Tape and Reel  |
| S1K         | S1K     | DO-214AC (SMA) | Tape and Reel  |
| S1M         | S1M     | DO-214AC (SMA) | Tape and Reel  |

## Absolute Maximum Ratings<sup>(1)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol      | Parameter   | Value       |     |     |     |     |     |      | Unit             |
|-------------|---|-------------|-----|-----|-----|-----|-----|------|------------------|
|             |   | S1A         | S1B | S1D | S1G | S1J | S1K | S1M  |                  |
| $V_{RRM}$   | Maximum Repetitive Reverse Voltage  | 50          | 100 | 200 | 400 | 600 | 800 | 1000 | V                |
| $I_{F(AV)}$ | Average Rectified Forward Current at $T_A = 100^\circ\text{C}$            | 1.0         |     |     |     |     |     |      | A                |
| $I_{FSM}$   | Non-Repetitive Peak Forward Surge Current<br>8.3 ms Single Half-Sine-Wave | 30          |     |     |     |     |     |      | A                |
| $T_{STG}$   | Storage Temperature Range   | -55 to +150 |     |     |     |     |     |      | $^\circ\text{C}$ |
| $T_J$       | Operating Junction Temperature  | -55 to +150 |     |     |     |     |     |      | $^\circ\text{C}$ |

### Note:

1. These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

## Thermal Characteristics

| Symbol          | Parameter  | Max. | Unit                      |
|-----------------|--|------|---------------------------|
| $P_D$           | Power Dissipation                                      | 1.4  | W                         |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient <sup>(2)</sup> | 85   | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient <sup>(3)</sup> | 170  | $^\circ\text{C}/\text{W}$ |
| $\Psi_{jl}$     | Junction-Lead thermal characteristics <sup>(3)</sup>   | 25   | $^\circ\text{C}/\text{W}$ |

### Notes:

2. Device mounted on FR-4 PCB, land pattern size: 25 mm<sup>2</sup> (5 x 5 mm).
3. Device mounted on FR-4 PCB, land pattern size: 4.6375 mm<sup>2</sup> (2.65 x 1.75 mm).

## Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

| Symbol   | Parameter                      | Conditions  | Min. | Typ. | Max. | Unit          |
|----------|--------------------------------|---|------|------|------|---------------|
| $V_F$    | Forward Voltage                | $I_F = 1.0\text{ A}$  |      |      | 1.1  | V             |
| $t_{rr}$ | Reverse Recovery Time          | $I_F = 0.5\text{ A}$ , $I_R = 1.0\text{ A}$ ,<br>$I_{rr} = 0.25\text{ A}$ |      | 1.8  |      | $\mu\text{s}$ |
| $I_R$    | Reverse Current at Rated $V_R$ | $T_A = 25^\circ\text{C}$  |      |      | 1.0  | $\mu\text{A}$ |
|          |                                | $T_A = 125^\circ\text{C}$   |      |      | 50   |               |
| $C_T$    | Junction Capacitance           | $V_R = 4.0\text{ V}$ , $f = 1.0\text{ MHz}$                               |      | 6.6  |      | pF            |

## Typical Performance Characteristics

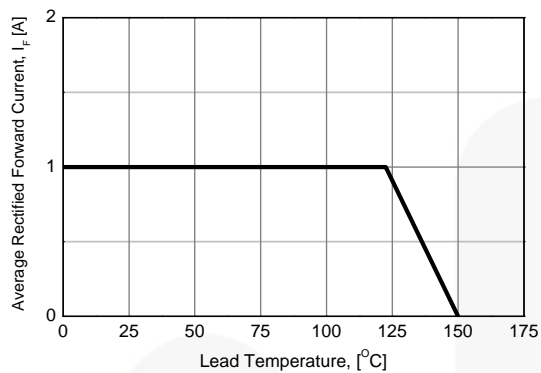


Figure 1. Forward Current Derating Curve

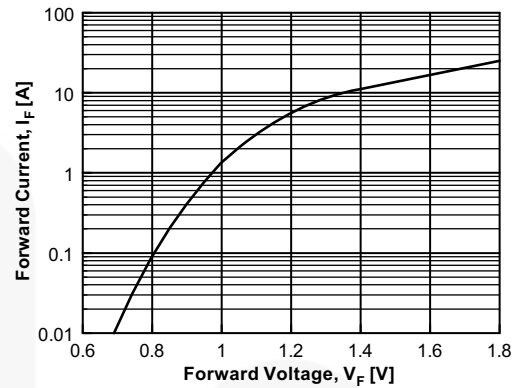


Figure 2. Forward Voltage Characteristics

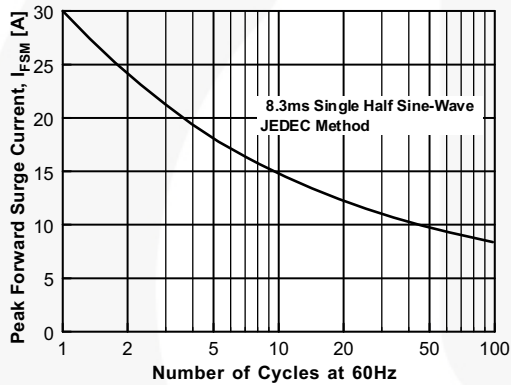


Figure 3. Non-Repetitive Surge Current

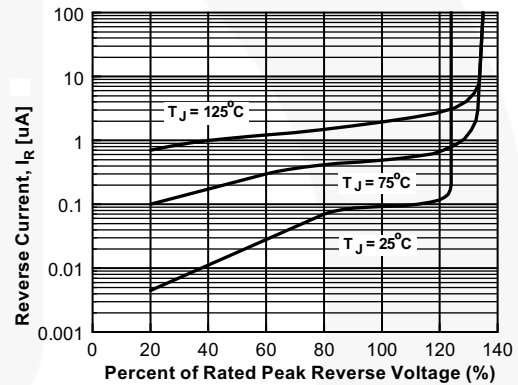


Figure 4. Reverse Current vs. Reverse Voltage

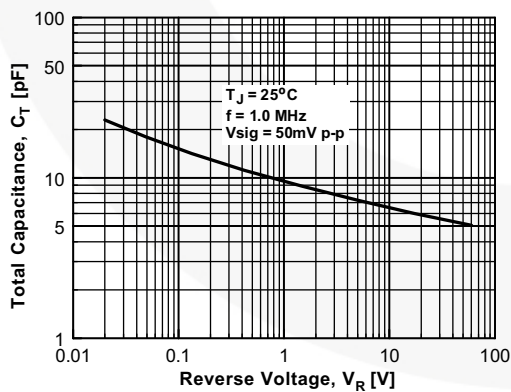


Figure 5. Total Capacitance

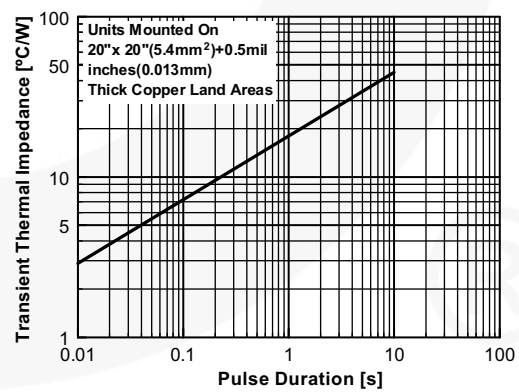


Figure 6. Thermal Impedance Characteristics

# Physical Dimensions

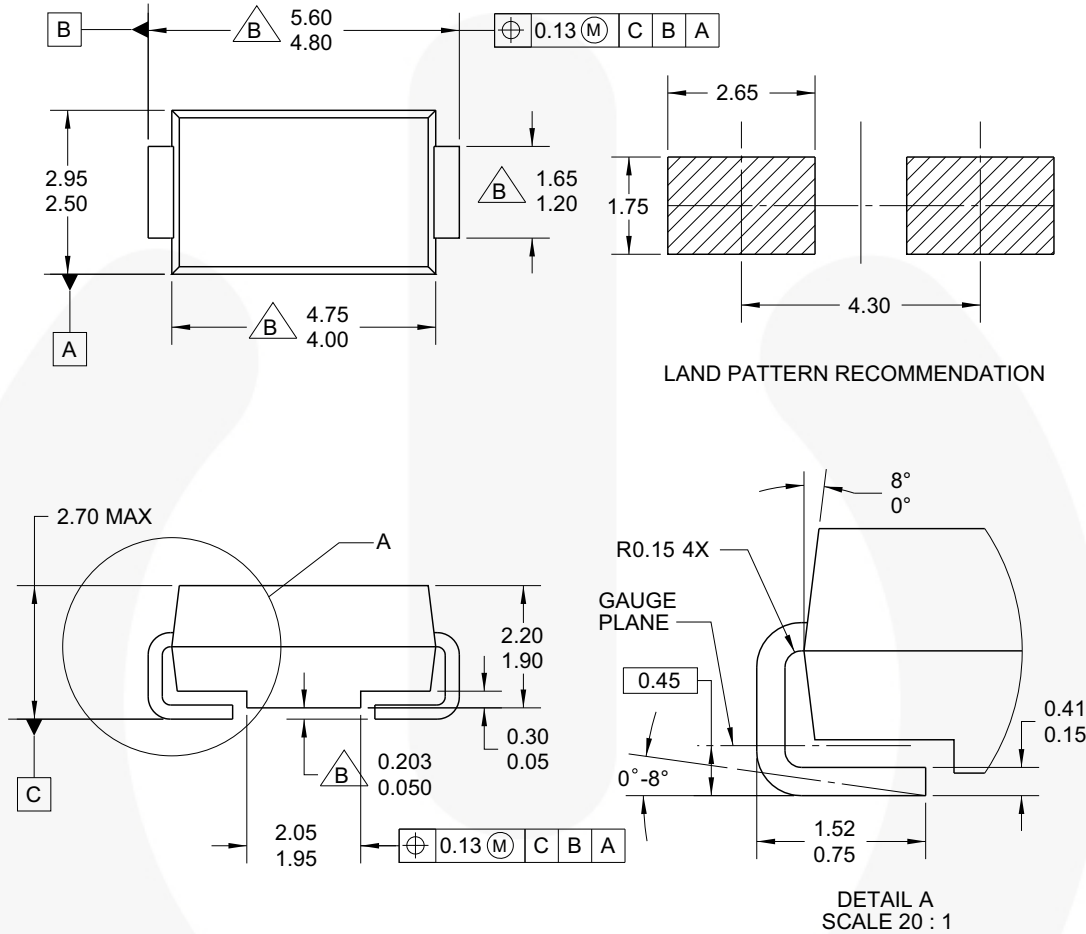


Figure 7. 2-LEAD, SMA, JEDEC DO-214, VARIATION AC





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