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May 2015

S1A - S1M General-Purpose Rectifiers

Features

- 1 A $I_{F(AV)}$ Current Rating
- Glass Passivated
- Low Leakage:
 - 1 μ A Maximum at 25°C
 - 50 μ A Maximum at 125°C
- Fast Response: 1.8 μ 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⁽¹⁾

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 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 maybe impaired.

Thermal Characteristics

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

Notes:

2. Device mounted on FR-4 PCB, land pattern size: 25 mm² (5 x 5 mm).
3. Device mounted on FR-4 PCB, land pattern size: 4.6375 mm² (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 | $I_F = 0.5 \text{ A}$, $I_R = 1.0 \text{ A}$, $I_{rr} = 0.25 \text{ A}$ | | 1.8 | | μs |
| I_R | Reverse Current at Rated V_R | $T_A = 25^\circ\text{C}$ | | | 1.0 | μA |
| | | $T_A = 125^\circ\text{C}$ | | | 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

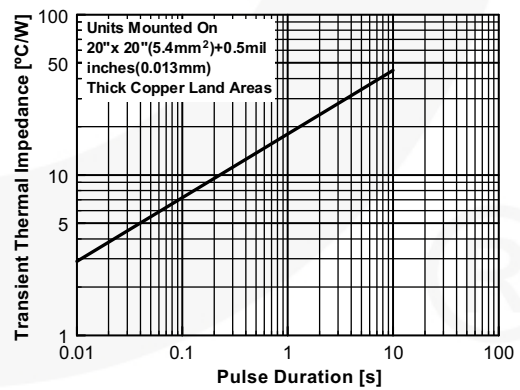
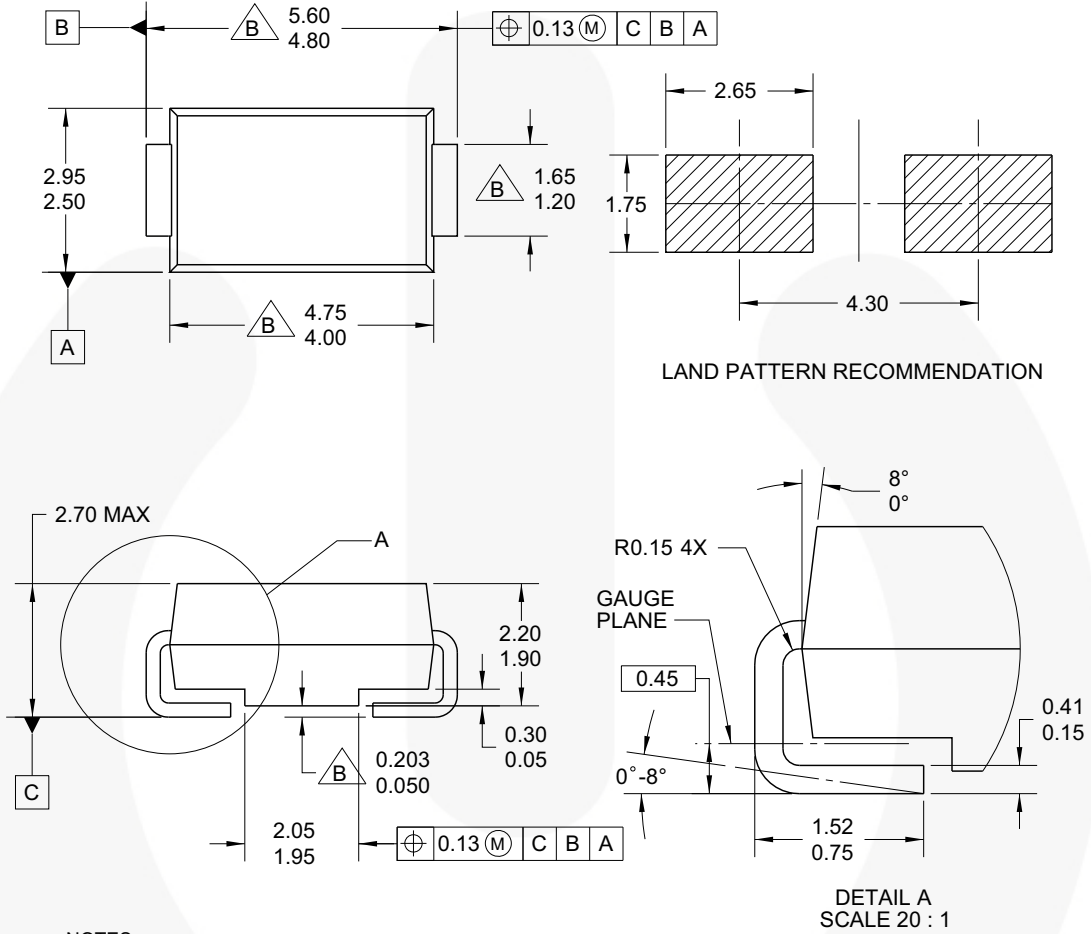


Figure 6. Thermal Impedance Characteristics

Physical Dimensions



NOTES:

- A. EXCEPT WHERE NOTED CONFORMS TO JEDEC DO214 VARIATION AC.
- B. DOES NOT COMPLY JEDEC STD. VALUE.
- C. ALL DIMENSIONS ARE IN MILLIMETERS.
- D. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- E. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
- F. LAND PATTERN STD. DIOM5025X231M.
- G. DRAWING FILE NAME: DO214ACREV1

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



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|--------------------------|-----------------------|---|
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