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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 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 <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	$I_F = 0.5 \text{ A}$ , $I_R = 1.0 \text{ A}$ , $I_{rr} = 0.25 \text{ A}$		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

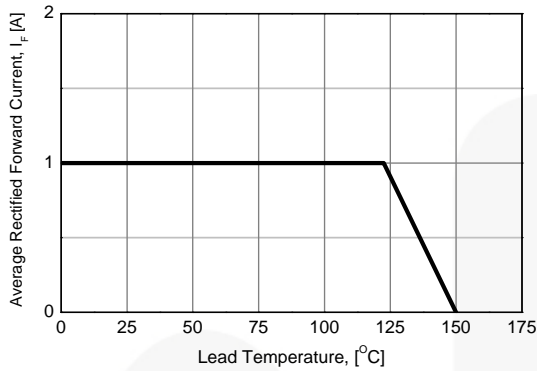


Figure 1. Forward Current Derating Curve



Figure 2. Forward Voltage Characteristics



Figure 3. Non-Repetitive Surge Current



Figure 4. Reverse Current vs. Reverse Voltage

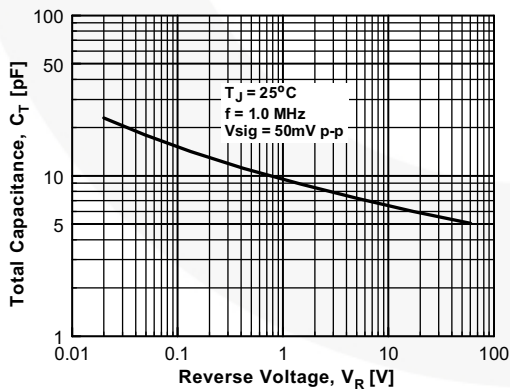


Figure 5. Total Capacitance

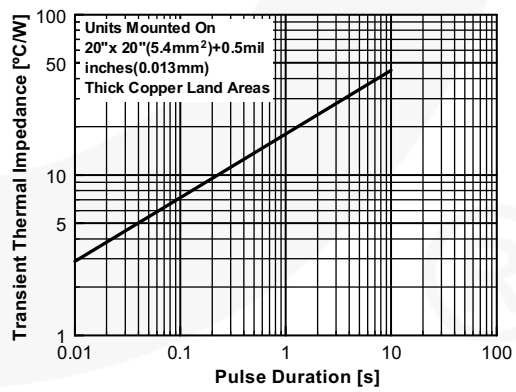
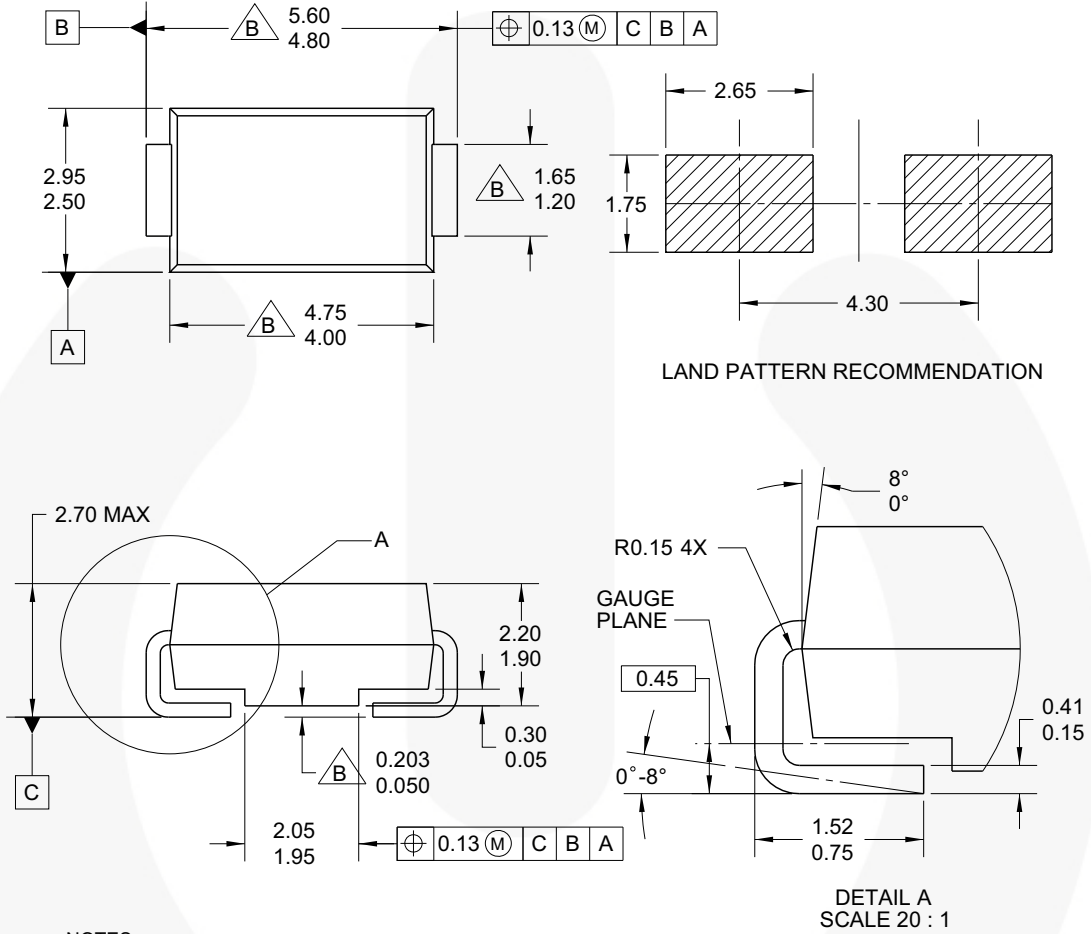


Figure 6. Thermal Impedance Characteristics

Physical Dimensions



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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