

## Low Temperature Drift, Low Power Dissipation Voltage Reference

### PRODUCT DESCRIPTION

The MSR015/MSR025 is a low temperature drift, low power dissipation and high-precision CMOS voltage reference, which is featured by initial precision of  $\pm 0.05\%$  and low power dissipation.

The features, low output voltage hysteresis and low long-term output voltage drift, could further improve stability and system reliability. In addition, it is characterized by small-outline and low operating current, which is suitable for portable and battery-powered applications.

The MSR015/MSR025 is available in SOT23-5 package. The operating temperature ranges from  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ .



SOT23-5

### FEATURES

- MSR015: Output Voltage 1.5V; MSR025: Output Voltage 2.5V
- Initial Precision:  $\pm 0.05\%$  (Max)
- Operating Temperature Range:  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Output Current:  $\pm 0.3\text{mA}$
- Quiescent Current:  $800\mu\text{A}@5\text{V}$
- MSR015 Power Supply: 2.5V to 5.5V
- MSR025 Power Supply: 2.65V to 5.5V
- SOT23-5 Package

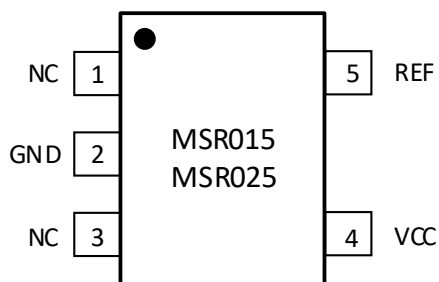
### APPLICATIONS

- Precision Data Acquisition System
- Portable and Battery-powered Devices
- Industry Instrument
- Test Device and Power Monitor

### PRODUCT SPECIFICATION

Part Number	Package	Marking	Grade	Maximum Temperature Drift (ppm/ $^{\circ}\text{C}$ )
MSR015	SOT23-5	R015	A	5
			B	10
			C	30
			D	60
MSR025	SOT23-5	R025	A	5
			B	10
			C	30
			D	60

## PIN CONFIGURATION



## PIN DESCRIPTION

Pin	Name	Type	Description
1	NC	-	Not Connection
2	GND	-	Ground
3	NC	-	Not Connection
4	VCC	-	Power Supply
5	REF	O	Reference Output. MSR015: Output 1.5V; MSR025: Output 2.5V

**ABSOLUTE MAXIMUM RATINGS**

Any exceeding absolute maximum rating application causes permanent damage to device. Because long-time absolute operation state affects device reliability. Absolute ratings just conclude from a series of extreme tests. It doesn't represent chip can operate normally in these extreme conditions.

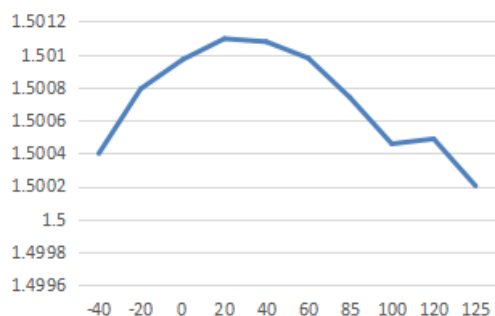
Parameter	Symbol	Ratings	Unit
Power Supply	V <sub>CC</sub>	-0.3 ~ +6.5	V
Power Supply Difference	V <sub>CC-GND</sub>	-0.3 ~ +6.5	V
Operating Temperature	T <sub>A</sub>	-40 ~ +125	°C
Storage Temperature	T <sub>STG</sub>	-65 ~ +150	°C
Maximum Junction Temperature	T <sub>JMAX</sub>	150	°C
Lead Temperature(10s)	T <sub>SOLDER</sub>	260	°C
ESD (HBM)	V <sub>ESD</sub>	4000	V

# ELECTRICAL CHARACTERISTICS

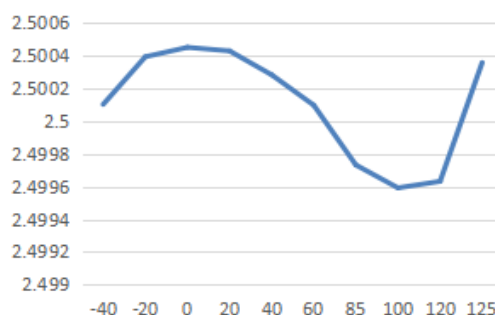
$V_{CC}=5V$ ,  $T_A=25^{\circ}C$

Parameter	Condition	Min	Typ	Max	Unit
Output Voltage	MSR015, $C_L=1\mu F$		1.5		V
	MSR025, $C_L=1\mu F$	2.49875	2.5	2.50125	V
Precision		-0.05%		+0.05%	%
Output Voltage Temperature Drift	Grade A, $-40^{\circ}C$ to $85^{\circ}C$			5	ppm/ $^{\circ}C$
	Grade B, $-40^{\circ}C$ to $85^{\circ}C$			10	
	Grade C, $-40^{\circ}C$ to $85^{\circ}C$			30	
	Grade D, $-40^{\circ}C$ to $85^{\circ}C$			60	
Output Voltage Noise	$f=0.1Hz$ 到 $10Hz$		20		$\mu V_{pp}$
Output Voltage Noise Density	$f=1kHz$		0.3		ppm/ $\sqrt{Hz}$
Power Supply Rejection Ratio	$V_{CC}=5V\pm0.5V$		-70		dB
Output Short-circuit Current			1		mA
Start-up Time	MSR015, External $10\mu F$ Capacitor		15		ms
	MSR025, External $10\mu F$ Capacitor		20		ms
Power Supply	MSR015	2.5		5.5	V
	MSR025	2.65		5.5	
Power Supply Current	MSR015		750		$\mu A$
	MSR025		800	1000	$\mu A$

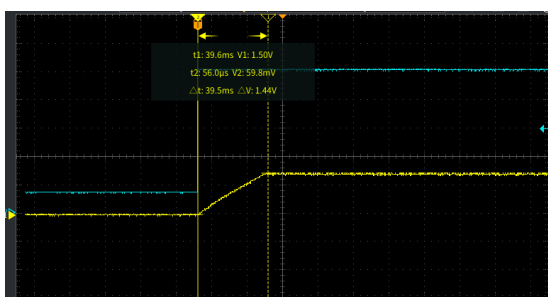
# TYPICAL CHARACTERISTICS DIAGRAM



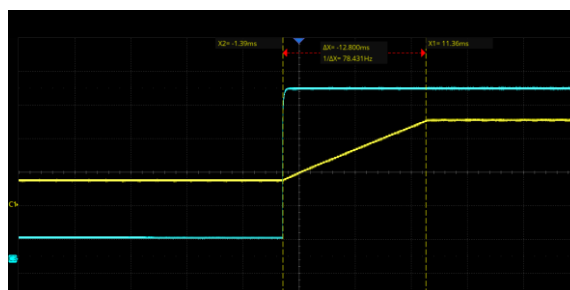
MSR015: Output Voltage Temperature Drift (VCC=5V)



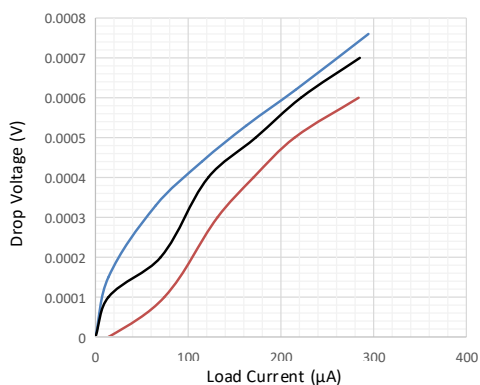
MSR025: Output Voltage Temperature Drift (VCC=5V)



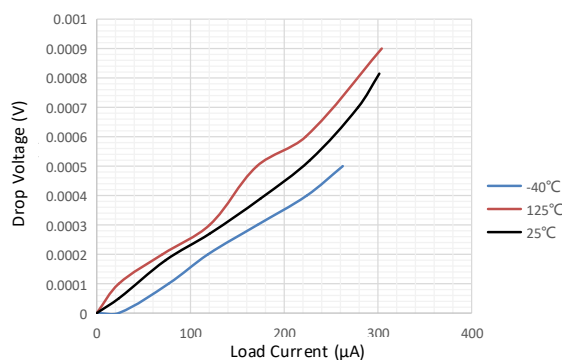
MSR015: Start-up Time with 10μF Load Capacitor



MSR025: Start-up Time with 10μF Load Capacitor



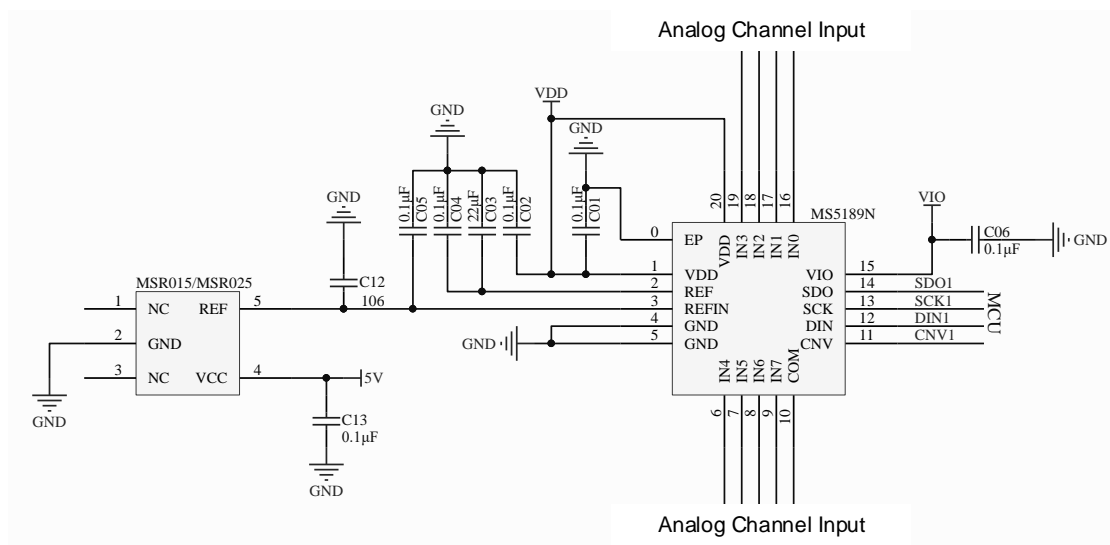
MSR015: Drop Voltage VS. Load Current



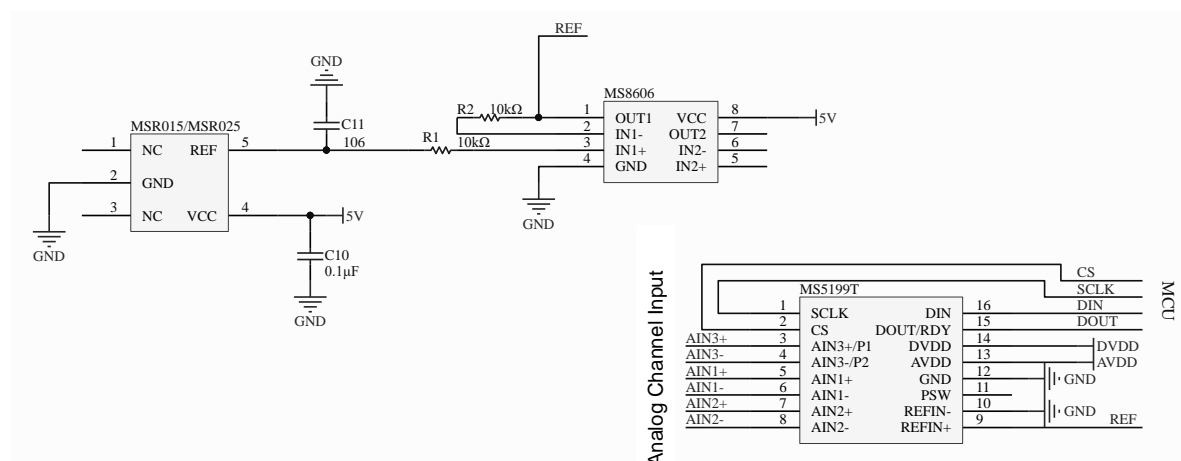
MSR025: Drop Voltage VS. Load Current

## TYPICAL APPLICATION DIAGRAM

1. Provide high-precision, low temperature drift external reference for the MS518X, SAR ADC.

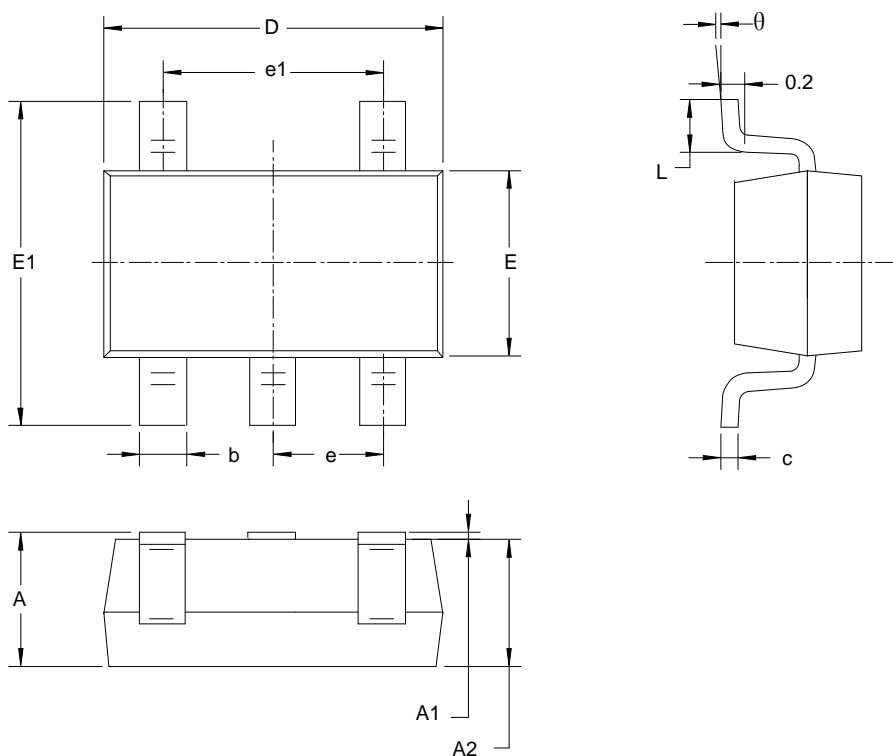


2. Provide high-precision, low temperature drift external reference for the MS519X,  $\Sigma$ - $\Delta$  ADC.



# PACKAGE OUTLINE DIMENSIONS

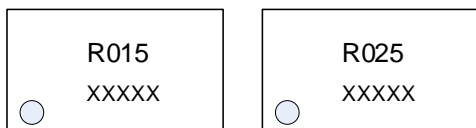
SOT23-5



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950 BSC		0.037 BSC	
e1	1.900 BSC		0.075 BSC	
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

## MARKING and PACKAGING SPECIFICATION

### 1. Marking Drawing Description



Product Name: R015, R025

Product Code: XXXXX

### 2. Marking Drawing Demand

Laser printing, contents in the middle, font type Arial.

### 3. Packaging Specification

Device	Package	Piece/Reel	Reel/Box	Piece/Box	Box/Carton	Piece/Carton
MSR015	SOT23-5	3000	10	30000	4	120000
MSR025	SOT23-5	3000	10	30000	4	120000



**STATEMENT**

- All Revision Rights of Datasheets Reserved for Ruimeng. Don't release additional notice.  
Customer should get latest version information and verify the integrity before placing order.
- When using Ruimeng products to design and produce, purchaser has the responsibility to observe safety standard and adopt corresponding precautions, in order to avoid personal injury and property loss caused by potential failure risk.
- The process of improving product is endless. And our company would sincerely provide more excellent product for customer.

**MOS CIRCUIT OPERATION PRECAUTIONS**

Static electricity can be generated in many places. The following precautions can be taken to effectively prevent the damage of MOS circuit caused by electrostatic discharge:

1. The operator shall ground through the anti-static wristband.
2. The equipment shell must be grounded.
3. The tools used in the assembly process must be grounded.
4. Must use conductor packaging or anti-static materials packaging or transportation.



+86-571-89966911



Rm701, No.9 Building, No. 1 WeiYe Road, Puyan Street, Binjiang District, Hangzhou, Zhejiang



[http:// www.relmon.com](http://www.relmon.com)