



**Modify Record:**

版次	新版本	旧版本	修改单位	修改内容
2019-06-01	1.0	NA	研发部	新文件制成（因工程产品，故 RD 开头）



## General Description (产品描述)

The SE86XX series is a high voltage , ultralow-power regulator. The device can allows an input voltage as high as 60V. The typical quiescent current is only 2μA. The device is available in fixed output voltages of 3.3V and 5.0V.

The device features integrated short-circuit and thermal shutdown protection.

Although designed primarily as fixed voltage regulators, the device can be used with external components to obtain variable voltages.

## Features(产品特性)

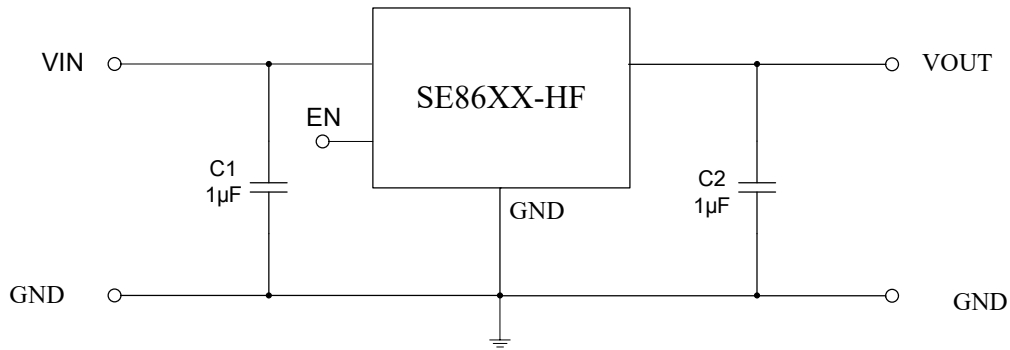
- Low Quiescent Current: 2μA
- High Input Voltage: Up to 80V
- High Output Current: 200mA
- Dropout Voltage:  
70mV@10mA  
700mV@100mA
- Fixed Output Voltages: 3.3V and 5.0V
- High-accuracy Output Voltage
- With EN pin
- Good Transient Response
- Integrated Short-Circuit Protection
- Integrated Thermal Protection
- Available Packages: SOT23-3, SOT89, SOT23-5

## Applications(产品应用)

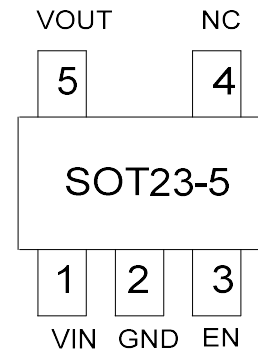
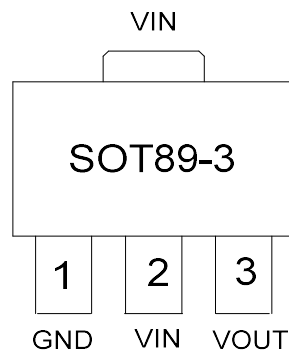
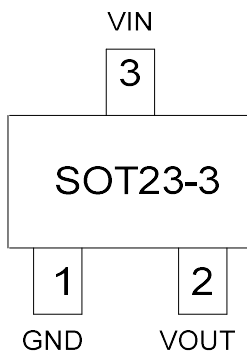
- Battery-powered equipment
- Smoke detector and sensor
- Microcontroller Applications
- Smart electric meter



### Typical Application (典型应用电路)



### Pin Configuration (管脚排列)

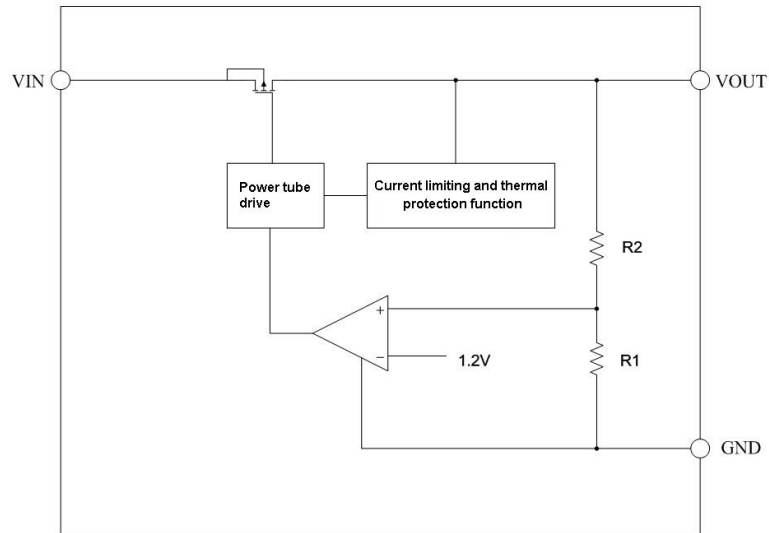


### Pin Description (管脚功能描述)

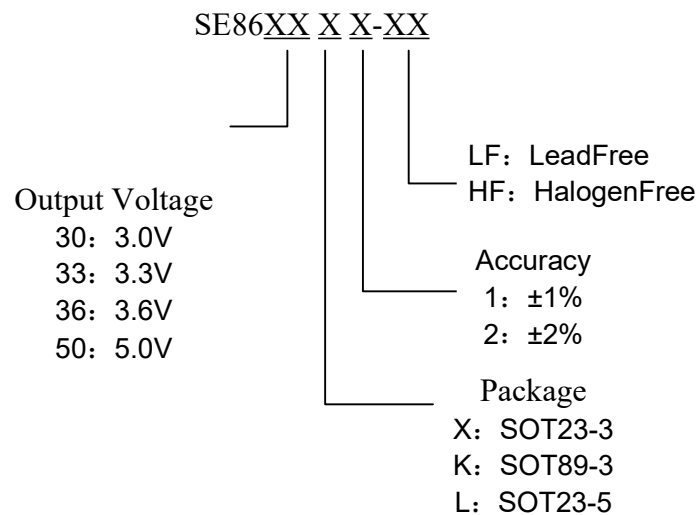
Pin Name	Pin Function Description
VIN	In put pin
VOUT	Out put pin
GND	Ground pin
EN	Enable pin
NC	No connection



### Functional Block Diagram (功能框图)



### Ordering Information (订货信息)





**Absolute Maximum Ratings(最大额定参数)**

Symbol	Parameter	Value	Units
V <sub>IN</sub>	Input Supply Voltage	80	V
V <sub>OUT</sub> ----GND	Output Voltage TO GND	6	
V <sub>out</sub> ----V <sub>IN</sub>	Output Voltage TO V <sub>IN</sub>	-35	
T <sub>A</sub>	Operating Temperature	-40----105	°C
T <sub>STG</sub>	Storage Temperature	-40---150	
T <sub>J</sub>	Maximum Junction Temperature	150	
T <sub>LEAD</sub>	Lead Temperature (Soldering) 10 seconds	260	
θ <sub>JA</sub>	Thermal Resistance, Junction-to-Ambient	165(SOT89)	°C/W
		280(SOT23-3)	
		270(SOT23-5)	
P <sub>D</sub>	Power Consumption	750(SOT89)	mW
		446(SOT23-3)	
		465(SOT23-5)	

Note : Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

**Recommended Operating Conditions(推荐工作条件)**

Symbol	Parameter	Maximum	Units
V <sub>IN</sub>	Input Supply Voltage	60	V
T <sub>A</sub>	Operating Temperature	-20----85	°C
T <sub>LEAD</sub>	Lead Temperature (Soldering) 10 seconds	230	°C



## Electrical Characteristics(电气参数)

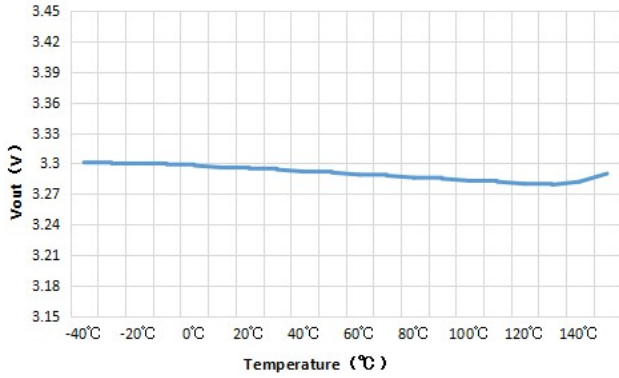
( TA=25° C, CIN=1uF, VIN=VOUT+1.0V, COUT=10uF, unless otherwise noted )

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>IN</sub>	Input Supply Voltage		2.8		60	V
V <sub>OUT</sub>	Output Voltage Accuracy	I <sub>OUT</sub> =10mA	-1%		1%	V
			-2%		2%	V
I <sub>Q</sub>	Quiescent Current	V <sub>IN</sub> =6V~60V		1.8	4	μA
I <sub>OUT</sub>	Output Current			200		mA
V <sub>DROP</sub>	Dropout Voltage	I <sub>OUT</sub> =10mA ΔV <sub>OUT</sub> = - V <sub>OUT</sub> *2%		70		mV
		I <sub>OUT</sub> =100mA ΔV <sub>OUT</sub> = - V <sub>OUT</sub> *2%		700		mV
V <sub>LR</sub>	Load Regulation	1mA ≤ I <sub>OUT</sub> ≤ 100mA		20		mV
V <sub>SR</sub>	Line Regulation	I <sub>OUT</sub> =1mA, V <sub>IN</sub> =(V <sub>OUT</sub> +1V) to 30V		0.2		%/V
I <sub>LIMIT</sub>	Current Limit	V <sub>IN</sub> =(V <sub>OUT</sub> +1V) to 60V		400		mA
T <sub>SHDN</sub>	Thermal Protection			125		°C
TC <sub>VOUT</sub>	Output Voltage Temperature Coefficient	I <sub>OUT</sub> =10mA -40°C ≤ T <sub>AMB</sub> ≤ 100°C		-17		ppm/°C

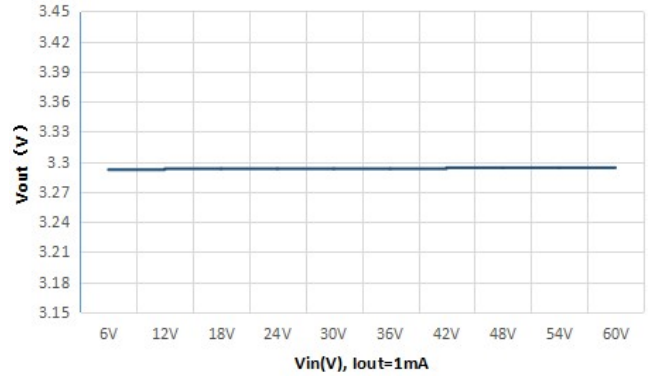


### Typical Performance Characteristics(典型性能特性)

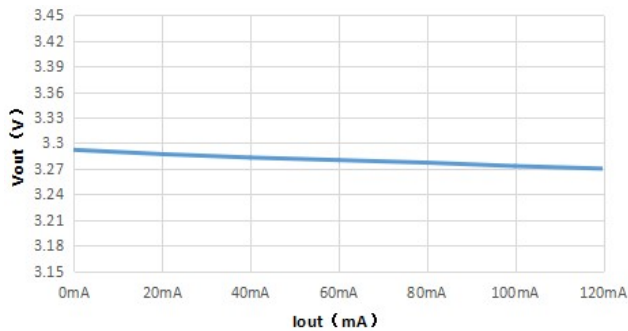
( TA=25° C, CIN=1uF, VIN=VOUT (3.3V) +1.0V, COUT=10uF, unless otherwise noted )



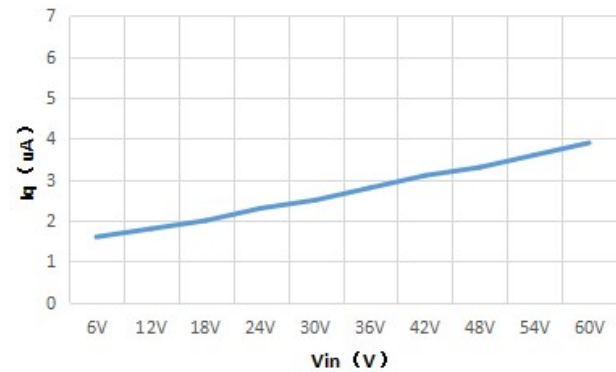
Output Voltage Temperature Coefficient



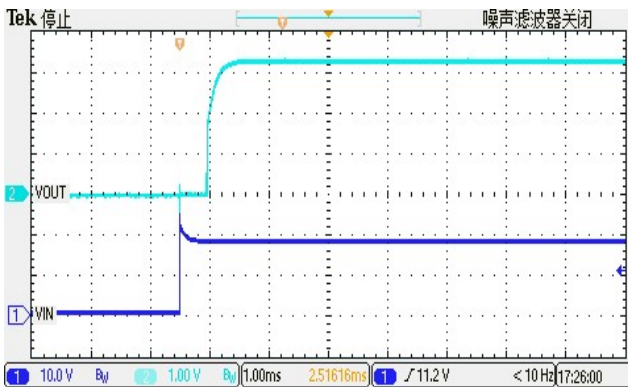
Line Regulation



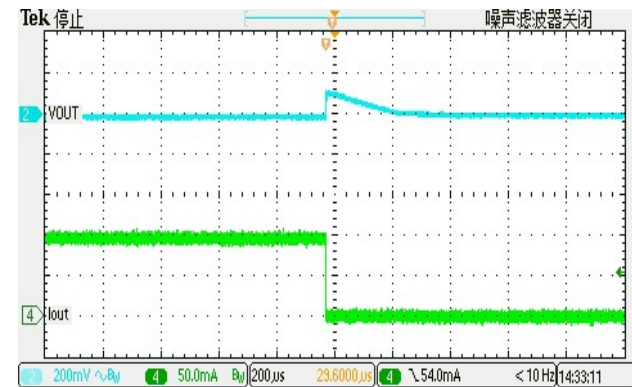
Load Regulation(Vin=12V)



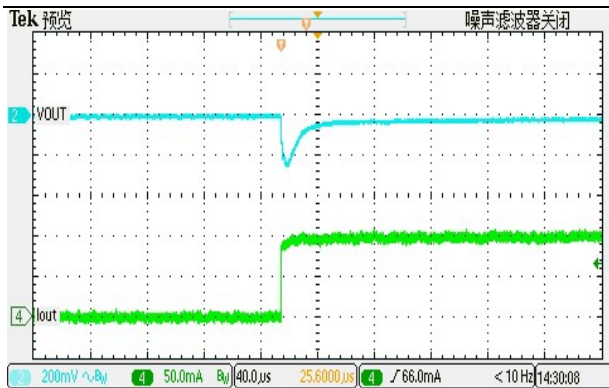
Quiescent Current(Iout=0mA,EN=VIN)



VIN=24V, No Load, COUT=10uF

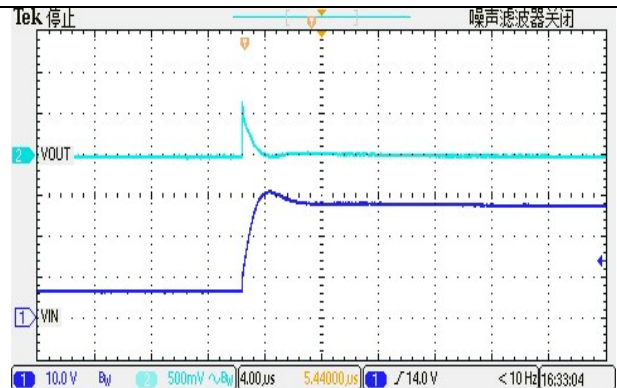


VIN=12.0V, COUT=10uF, IOUT=100mA to 10mA



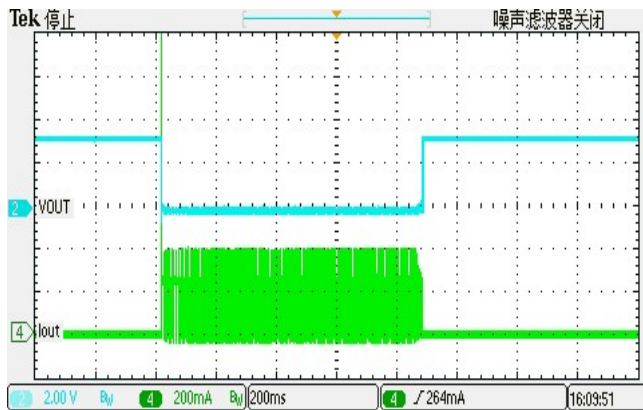
Load Transient

V<sub>IN</sub>=12.0V, C<sub>OUT</sub>=10uF, I<sub>OUT</sub>=10mA to 100mA

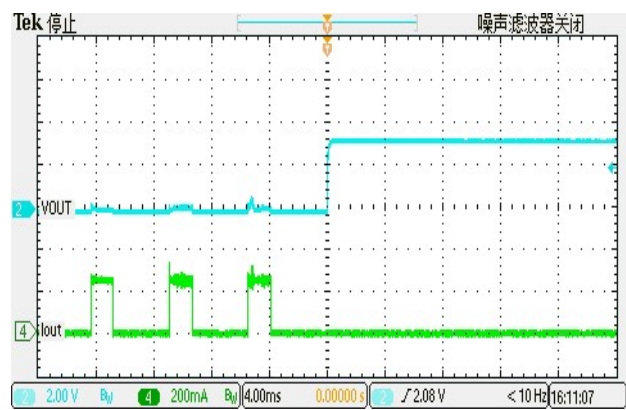


Line Transient

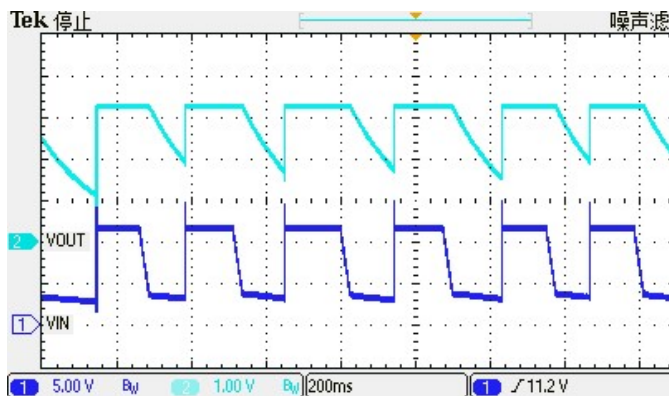
V<sub>IN</sub>=6.3V to 30V, C<sub>OUT</sub>=10uF, I<sub>OUT</sub>=1mA



V<sub>IN</sub>=25.0V, Short Protection Occurred



V<sub>IN</sub>=25.0V, Short Protection Removed

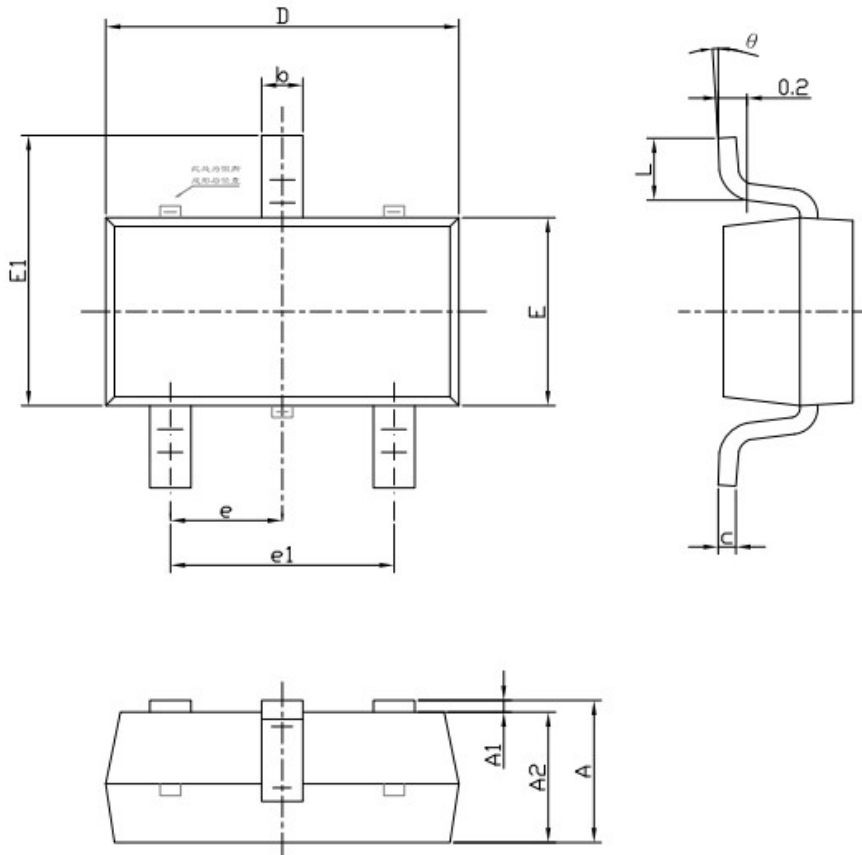


V<sub>IN</sub>=12.0V, Fast open Vin





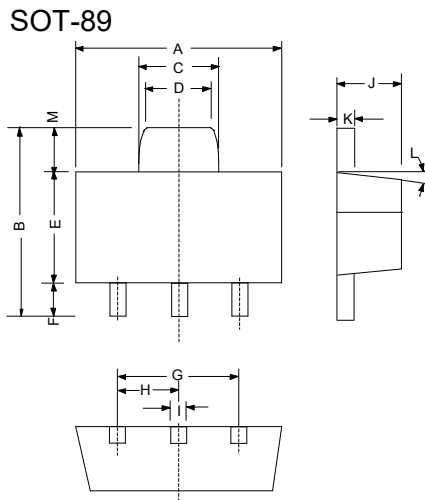
**Outline Drawing for SOT-23-3**



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	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

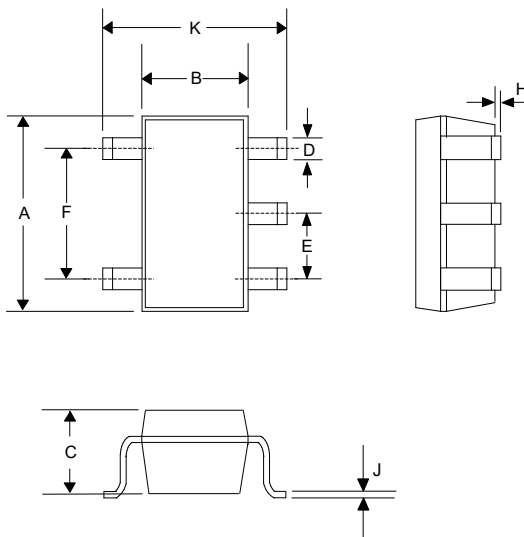


**Outline Drawing for SOT-89**



DIM <sup>N</sup>	DIMENSIONS			
	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.173	0.181	4.400	4.600
B	0.159	0.167	4.050	4.250
C	0.067	0.075	1.700	1.900
D	0.051	0.059	1.300	1.500
E	0.094	0.102	2.400	2.600
F	0.035	0.047	0.890	1.200
G	0.118REF		3.00REF	
H	0.059REF		1.50REF	
I	0.016	0.020	0.400	0.520
J	0.055	0.063	1.400	1.600
K	0.014	0.016	0.350	0.410
L	10°TYP		10°TYP	
M	0.028REF		0.70REF	

**Outline Drawing for SOT-23-5**



DIM <sup>N</sup>	DIMENSIONS			
	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.110	0.120	2.80	3.05
B	0.059	0.070	1.50	1.75
C	0.036	0.051	0.90	1.30
D	0.014	0.020	0.35	0.50
E	-	0.037	-	0.95
F	-	0.075	-	1.90
H	-	0.006	-	0.15
J	0.0035	0.008	0.090	0.20
K	0.102	0.118	2.60	3.00



**SEAWARD**  
**ELECTRONICS**

**SE86XX**

80V/2uA,Ultra Low High PSRR Quiescent Current LDO

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