

# MAXIM

## MAX889S Evaluation Kit

**Evaluates: MAX889**

### General Description

The MAX889 IC is an inverting charge pump that delivers a regulated negative output voltage at loads up to 200mA. The device operates from an input of +2.7V to +5.5V to produce a user-adjustable, regulated output of -2.5V to  $-V_{IN}$ .

The MAX889S evaluation kit (EV kit) is a fully assembled and tested surface-mount board. The board is set up to provide a -3.3V output from a +5.0V input supply. The EV kit is shipped with a MAX889S (1MHz switching frequency) installed. The board may also be used to evaluate the MAX889R (500kHz) or the MAX889T (2MHz). To do so, request a free sample of the MAX889RESA or MAX889TESA, and refer to the MAX889 data sheet for the appropriate capacitor values.

### Component List

DESIGNATION	QTY	DESCRIPTION
C1, C3	2	10 $\mu$ F, 6.3V X5R ceramic capacitors Taiyo Yuden JMK316BJ106ML Murata GRM42-6X5R106K6.3
C2	1	2.2 $\mu$ F, 10V X5R ceramic capacitor Taiyo Yuden LMK212BJ225MG
JU1	1	3-pin jumper
JU2, JU3	2	2-pin jumpers
R1	1	49.9k $\Omega$ $\pm$ 1% resistor
R2	1	33.2k $\Omega$ $\pm$ 1% resistor
U1	1	MAX889SESA
None	1	MAX889S EV kit data sheet
None	1	MAX889 IC data sheet
None	3	Shunts

### Component Suppliers

SUPPLIER	PHONE	FAX
Murata	814-237-1431	814-238-0490
Taiyo Yuden	408-573-4150	408-573-4159

**Note:** Please indicate that you are using the MAX889S when contacting these suppliers.

### Features

- ◆ +2.7V to +5.5V Input Range
- ◆ Uses One 2.2 $\mu$ F and Two 10 $\mu$ F Ceramic Capacitors
- ◆ Output Adjustable from -2.5V to  $-V_{IN}$
- ◆ 200mA Output Current
- ◆ 1MHz Switching Frequency
- ◆ Fully Assembled and Tested Surface-Mount Board

### Ordering Information

PART	TEMP. RANGE	IC PACKAGE
MAX889SEVKIT	0°C to +70°C	8 SO

### Quick Start

The MAX889S EV kit is fully assembled and tested. Follow the steps below to verify board operation. **Do not turn on the power supply until all connections are completed:**

- 1) Connect a voltmeter and the load to the VOUT pad.
- 2) Place the shunts in the following positions: JU1 1-2, JU2 closed, JU3 closed.
- 3) Connect a +5.0V supply to the pad labeled VIN. Connect the ground lead to the pad labeled GND.
- 4) Turn on the power and verify that the output is 3.3V.



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## Detailed Description

### Jumper Selection

The MAX889 can be placed in shutdown mode, using jumper JU1. See Table 1 for jumper settings.

Jumper JU2 connects VIN to the voltage-divider that sets the output voltage. To use a voltage source other than VIN as the reference, open JU2, and connect the reference source to the pad labeled VREF.

The MAX889 can be placed into free-run mode (unregulated,  $V_{OUT} = -V_{IN}$ ) by removing the shunt on JU3 and installing a shunt on JU2.

### Output Voltage Adjustment

The MAX889S EV kit is shipped with the resistor-divider selected for an output of -3.3V and an input of +5.0V. Output voltages other than -3.3V can be set one of two ways:

- 1) Change the resistor-divider formed by R1 and R2. Use the following equation to determine the resistor values:

$$R2 = -(V_{OUT} / V_{REF}) R1$$

(The current through R1 and R2 should be at least 30µA.)

- 2) Remove the shunt from JU2 and apply a voltage to the VREF pad. Use the following equation to determine the voltage for VREF:

$$V_{REF} = -(R1 / R2) V_{OUT}$$

### Capacitor Selection

Use capacitors with a low effective series resistance (ESR), such as ceramic or surface-mount chip tantalum types. Refer to the MAX889 data sheet for more information.

**Table 1. Jumper Functions**

JUMPER	JUMPER POSITION	FUNCTION
JU1	1-2*	$\overline{\text{SHDN}}$ = High, MAX889 enabled
	2-3	$\overline{\text{SHDN}}$ = Low, MAX889 disabled
	Open	Drive $\overline{\text{SHDN}}$ pad with an external signal
JU2	Open	Drive VREF pad with an external voltage to set the output voltage
	Closed*	VIN is used to set the output voltage
JU3	Open	Used to place the MAX889 into free-run mode (JU2 must be closed)
	Closed*	Output voltage is set by resistor-divider and VIN or VREF

\*Default position

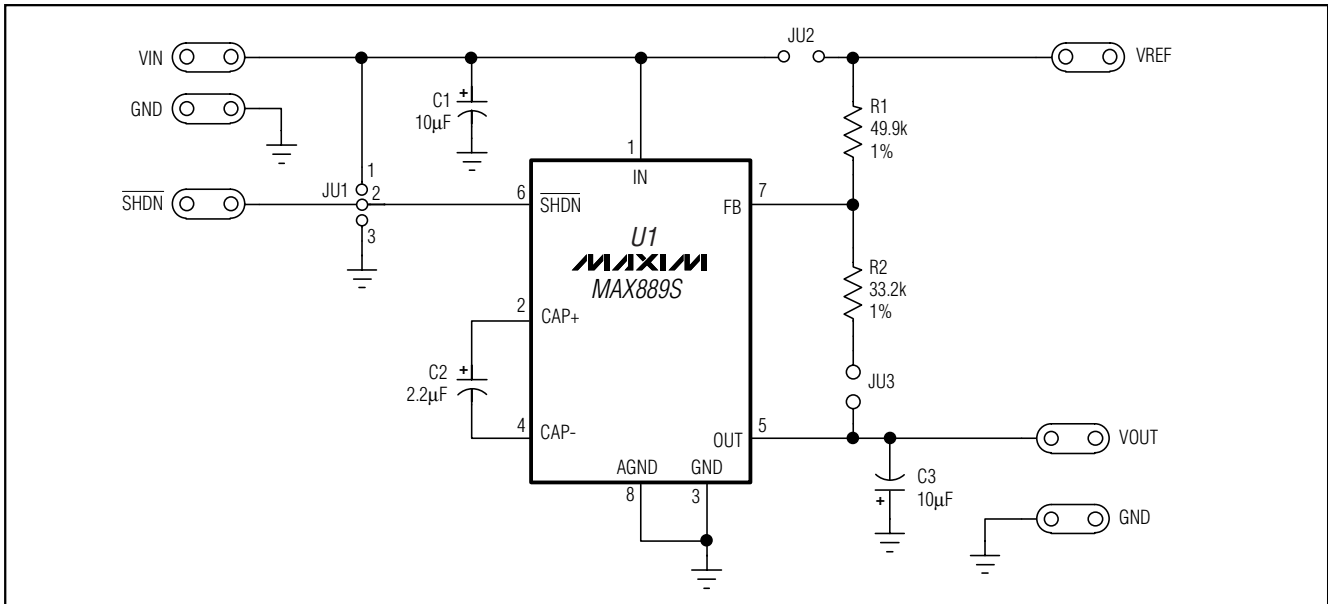


Figure 1. MAX889S EV Kit Schematic Diagram