19-1613; Rev 3; 3/02

Low-Cost, Micropower, Low-Dropout, High-Output-Current, SOT23 Voltage References

General Description

The MAX6100–MAX6107 are low-cost, low-dropout (LDO), micropower voltage references. These three-terminal references are available with output voltage options of 1.25V, 1.8V, 2.048V, 2.5V, 3V, 4.096V, 4.5V, and 5V. They feature a proprietary curvature-correction circuit and laser-trimmed, thin-film resistors that result in a low temperature coefficient of 75ppm/°C (max) and an initial accuracy of ±0.4% (max). These devices are specified over the extended temperature range (-40°C to +85°C).

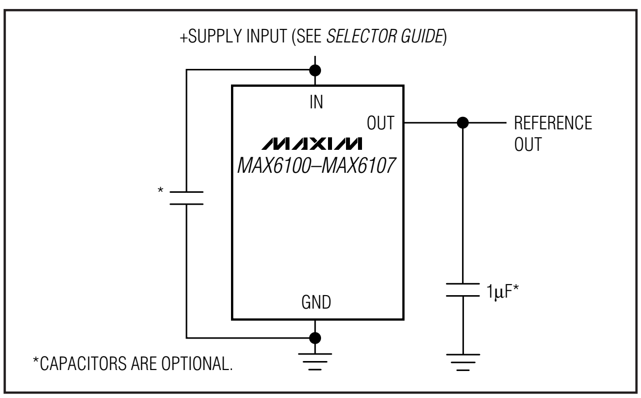
These series-mode voltage references draw only 90µA of supply current and can source 5mA and sink 2mA of load current. Unlike conventional shunt-mode (two-terminal) references that waste supply current and require an external resistor, these devices offer a supply current that is virtually independent of the supply voltage (with only a 4µA/V variation with supply voltage) and do not require an external resistor. Additionally, these internally compensated devices do not require an external compensation capacitor and are stable with load capacitance. Eliminating the external compensation capacitor saves valuable board area in space-critical applications. Low-dropout voltage and supply independent, ultra-low supply current make these devices ideal for battery-operated, high-performance, low-voltage systems.

The MAX6100–MAX6107 are available in tiny 3-pin SOT23 packages.

Applications

Portable Battery-Powered Systems
Notebook Computers
PDAs, GPSs, DMMs
Cellular Phones
Hard-Disk Drives

Typical Operating Circuit



Features

- ♦ **Ultra-Small 3-Pin SOT23 Package**
- ♦ **Low Cost**
- ♦ **No Output Capacitor Required**
- ♦ **Stable with Capacitive Loads**
- ♦ **Load Regulation (2mA Sink): 8mV/mA (max)**
  Load Regulation (5mA Source): 0.9mV/mA (max)
- ♦ **±0.4% (max) Initial Accuracy**
- ♦ **Low 75ppm/°C Temperature Coefficient**
- ♦ **125µA (max) Quiescent Supply Current**
- ♦ **50mV Dropout at 1mA Load Current**

Ordering Information

PART	TEMP RANGE	PIN-PACKAGE	TOP MARK
MAX6100EUR-T	-40°C to +85°C	3 SOT23-3	FZID
MAX6101EUR-T	-40°C to +85°C	3 SOT23-3	FZGT
MAX6102EUR-T	-40°C to +85°C	3 SOT23-3	FZGU
MAX6103EUR-T	-40°C to +85°C	3 SOT23-3	FZGV
MAX6104EUR-T	-40°C to +85°C	3 SOT23-3	FZGW
MAX6105EUR-T	-40°C to +85°C	3 SOT23-3	FZGX
MAX6106EUR-T	-40°C to +85°C	3 SOT23-3	FZJR
MAX6107EUR-T	-40°C to +85°C	3 SOT23-3	FZMV

Note: *There is a minimum order increment of 2500 pieces for SOT23 packages.*

Selector Guide

PART	OUTPUT VOLTAGE (V)	INPUT VOLTAGE RANGE (V)
MAX6100	1.800	2.5 to 12.6
MAX6101	1.250	2.5 to 12.6
MAX6102	2.500	(V_{OUT} + 200mV) to 12.6
MAX6103	3.000	(V_{OUT} + 200mV) to 12.6
MAX6104	4.096	(V_{OUT} + 200mV) to 12.6
MAX6105	5.000	(V_{OUT} + 200mV) to 12.6
MAX6106	2.048	2.5 to 12.6
MAX6107	4.5	(V_{OUT} + 200mV) to 12.6

Pin Configuration appears at end of data sheet.

Low-Cost, Micropower, Low-Dropout, High-Output-Current, SOT23 Voltage References

ABSOLUTE MAXIMUM RATINGS

(Voltages Referenced to GND)
IN ....-0.3V to +13.5V
OUT ....-0.3V to (V_{IN} + 0.3V)
Output Short-Circuit to GND or IN (V_{IN} < 6V) ....Continuous
Output Short-Circuit to GND or IN (V_{IN} ≥ 6V) 60s
Continuous Power Dissipation (T_A = +70°C)
3-Pin SOT23 (derate 4.0mW/°C above +70°C)............320mW
Operating Temperature Range ....-40°C to +85°C
Storage Temperature Range ....-65°C to +150°C
Lead Temperature (soldering, 10s) ....+300°C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS—MAX6101, V_{OUT} = 1.25V

(V_{IN} = 5V, I_{OUT} = 0, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	T_A = +25°C	1.245	1.250	1.255	V
Output Voltage Temperature Coefficient (Notes 2, 3)	TCV_{OUT}	0°C to +70°C			65	ppm/°C
		-40°C to +85°C			75	
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	2.5V ≤ V_{IN} ≤ 12.6V			90	µV/V
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	Sourcing: 0 ≤ I_{OUT} ≤ 5mA			0.9	mV/mA
		Sinking: -2mA ≤ I_{OUT} ≤ 0			3.0	
OUT Short-Circuit Current	I_{SC}	Short to GND		110		mA
		Short to IN		12		
Long-Term Stability	ΔV_{OUT}/time	1000hr at +25°C		50		ppm/1000hr
Output Voltage Hysteresis (Note 4)	ΔV_{OUT}/cycle			130		ppm
DYNAMIC CHARACTERISTICS						
Noise Voltage	e_{OUT}	f = 0.1Hz to 10Hz		13		$µV_{P-P}$
		f = 10Hz to 10kHz		15		$µV_{RMS}$
Ripple Rejection	$\Delta V_{OUT}/\Delta V_{IN}$	V_{IN} = 5V ±100mV, f = 120Hz		86		dB
Turn-On Settling Time	t_R	To V_{OUT} = 0.1% of final value, C_{OUT} = 50pF		50		µs
INPUT CHARACTERISTICS						
Supply Voltage Range	V_{IN}	Guaranteed by line-regulation test	2.5		12.6	V
Quiescent Supply Current	I_{IN}			90	125	µA
Change in Supply Current	I_{IN}/V_{IN}	2.5V ≤ V_{IN} ≤ 12.6V		4	8	µA/V

ELECTRICAL CHARACTERISTICS—MAX6100, V_{OUT} = 1.8V

(V_{IN} = 5V, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	T_A = +25°C	1.793	1.800	1.807	V
Output Voltage Temperature Coefficient (Notes 2, 3)	TCV_{OUT}	0°C to +70°C			65	ppm/°C
		-40°C to +85°C			75	
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	2.5V ≤ V_{IN} ≥ 12.6V			200	µV/V
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	Sourcing: 0 ≤ I_{OUT} ≤ 5mA			0.9	mV/mA
		Sinking: -2mA ≤ I_{OUT} ≤ 0			4.0	
OUT Short-Circuit Current	I_{SC}	Short to GND		110		mA
		Short to IN		12		
Long-Term Stability	ΔV_{OUT}/time	1000hr at +25°C		50		ppm/1000hr
Output Voltage Hysteresis (Note 4)	ΔV_{OUT}/cycle			130		ppm
DYNAMIC CHARACTERISTICS						
Noise Voltage	e_{OUT}	f = 0.1Hz to 10Hz		22		μV_{P-P}
		f = 10Hz to 10kHz		25		μV_{RMS}
Ripple Rejection	$\Delta V_{OUT}/\Delta V_{IN}$	V_{IN} = 5V, ±100mV, f = 120Hz		86		dB
Turn-On Settling Time	t_R	To V_{OUT} = 0.1% of final value, C_{OUT} = 50pF		100		µs
INPUT CHARACTERISTICS						
Supply Voltage Range	V_{IN}	Guaranteed by line-regulation test	2.5		12.6	V
Quiescent Supply Current	I_{IN}			90	125	µA
Change in Supply Current	I_{IN}/V_{IN}	2.5V ≤ V_{IN} ≤ 12.6V		4	8	µA/V

Low-Cost, Micropower, Low-Dropout, High-Output-Current, SOT23 Voltage References

ELECTRICAL CHARACTERISTICS—MAX6106, V_{OUT} = 2.048V

(V_{IN} = 5V, I_{OUT} = 0, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	T_A = +25°C	2.040	2.048	2.056	V
Output Voltage Temperature Coefficient (Notes 2, 3)	TCV_{OUT}	0°C to +70°C			65	ppm/°C
		-40°C to +85°C			75	
Line Regulation	ΔV_{OUT} / ΔV_{IN}	2.5V ≤ V_{IN} ≥ 12.6V			200	µV/V
Load Regulation	ΔV_{OUT}/ ΔI_{OUT}	Sourcing : 0 ≤ I_{OUT} ≤ 5mA			0.9	mV/mA
		Sinking: -2mA ≤ I_{OUT} ≤ 0			4.0	
OUT Short-Circuit Current	I_{SC}	Short to GND		110		mA
		Short to IN		12		
Long-Term Stability	ΔV_{OUT}/ time	1000hr at +25°C		50		ppm/ 1000hr
Output Voltage Hysteresis (Note 4)	ΔV_{OUT}/ cycle			130		ppm
DYNAMIC CHARACTERISTICS						
Noise Voltage	e_{OUT}	f= 0.1Hz to 10Hz		22		$µV_{P-P}$
		f= 10Hz to 10kHz		25		$µV_{RMS}$
Ripple Rejection	ΔV_{OUT}/ ΔV_{IN}	V_{IN} = 5V ±100mV, f = 120Hz		86		dB
Turn-On Settling Time	t_R	To V_{OUT} = 0.1% of final value, C_{OUT} = 50pF		100		µs
INPUT CHARACTERISTICS						
Supply Voltage Range	V_{IN}	Guaranteed by line-regulation test	2.5		12.6	V
Quiescent Supply Current	I_{IN}			90	125	µA
Change in Supply Current	I_{IN} / V_{IN}	2.5 ≤ V_{IN} ≤ 12.6V		4	8	µA/V

ELECTRICAL CHARACTERISTICS—MAX6102, V_{OUT} = 2.50V

(V_{IN} = 5V, I_{OUT} = 0, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	T_A = +25°C	2.490	2.50	2.510	V
Output Voltage Temperature Coefficient (Notes 2, 3)	TCV_{OUT}	0°C to +70°C			65	ppm/°C
		-40°C to +85°C			75	
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	(V_{OUT} + 0.2V) ≤ V_{IN} ≤ 12.6V			300	µV/V
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	Sourcing: 0 ≤ I_{OUT} ≤ 5mA			0.9	mV/mA
		Sinking: -2mA ≤ I_{OUT} ≤ 0			5.0	
Dropout Voltage (Note 5)	V_{IN} - V_{OUT}	I_{OUT} = 1mA		50	200	mV
OUT Short-Circuit Current	I_{SC}	Short to GND		110		mA
		Short to IN		12		
Long-Term Stability	ΔV_{OUT}/time	1000hr at +25°C		50		ppm/1000hr
Output Voltage Hysteresis (Note 4)	ΔV_{OUT}/cycle			130		ppm
DYNAMIC CHARACTERISTICS						
Noise Voltage	e_{OUT}	f = 0.1Hz to 10Hz		27		$µV_{P-P}$
		f = 10Hz to 10kHz		30		$µV_{RMS}$
Ripple Rejection	$\Delta V_{OUT}/\Delta V_{IN}$	V_{IN} = 5V ±100mV, f = 120Hz		86		dB
Turn-On Settling Time	t_R	To V_{OUT} = 0.1% of final value, C_{OUT} = 50pF		115		µs
INPUT CHARACTERISTICS						
Supply Voltage Range	V_{IN}	Guaranteed by line-regulation test	V_{OUT} + 0.2		12.6	V
Quiescent Supply Current	I_{IN}			90	125	µA
Change in Supply Current	I_{IN}/V_{IN}	(V_{OUT} + 0.2V) ≤ V_{IN} ≤ 12.6V		4	8	µA/V

Low-Cost, Micropower, Low-Dropout, High-Output-Current, SOT23 Voltage References

ELECTRICAL CHARACTERISTICS—MAX6103, V_{OUT} = 3.0V

(V_{IN} = 5V, I_{OUT} = 0, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	T_A = +25°C	2.988	3.000	3.012	V
Output Voltage Temperature Coefficient (Notes 2, 3)	TCV_{OUT}	0°C to +70°C			65	ppm/°C
		-40°C to +85°C			75	
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	(V_{OUT} + 0.2V) ≤ V_{IN} ≤ 12.6V			400	µV/V
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	Sourcing: 0 ≤ I_{OUT} ≤ 5mA			0.9	mV/mA
		Sinking: -2mA ≤ I_{OUT} ≤ 0			6.0	
Dropout Voltage (Note 5)	V_{IN} - V_{OUT}	I_{OUT} = 1mA		50	200	mV
OUT Short-Circuit Current	I_{SC}	Short to GND		110		mA
		Short to IN		12		
Long-Term Stability	ΔV_{OUT}/time	1000hr at +25°C		50		ppm/1000hr
Output Voltage Hysteresis (Note 4)	ΔV_{OUT}/cycle			130		ppm
DYNAMIC CHARACTERISTICS						
Noise Voltage	e_{OUT}	f = 0.1Hz to 10Hz		35		$µV_{P-P}$
		f = 10Hz to 10kHz		40		$µV_{RMS}$
Ripple Rejection	$\Delta V_{OUT}/\Delta V_{IN}$	V_{IN} = 5V ±100mV, f = 120Hz		76		dB
Turn-On Settling Time	t_R	To V_{OUT} = 0.1% of final value, C_{OUT} = 50pF		115		µs
INPUT CHARACTERISTICS						
Supply Voltage Range	V_{IN}	Guaranteed by line-regulation test	V_{OUT} + 0.2		12.6	V
Quiescent Supply Current	I_{IN}			90	125	µA
Change in Supply Current	I_{IN}/V_{IN}	(V_{OUT} + 0.2V) ≤ V_{IN} ≤ 12.6V		4	8	µA/V

ELECTRICAL CHARACTERISTICS—MAX6104, V_{OUT} = 4.096V

(V_{IN} = 5V, I_{OUT} = 0, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	T_A = +25°C	4.080	4.096	4.112	V
Output Voltage Temperature Coefficient (Notes 2, 3)	TCV_{OUT}	0°C to +70°C			65	ppm/°C
		-40°C to +85°C			75	
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	(V_{OUT} + 0.2V) ≤ V_{IN} ≤ 12.6V			430	µV/V
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	Sourcing: 0 ≤ I_{OUT} ≤ 5mA			0.9	mV/mA
		Sinking: -2mA ≤ I_{OUT} ≤ 0			8.0	
Dropout Voltage (Note 5)	V_{IN} - V_{OUT}	I_{OUT} = 1mA		50	200	mV
OUT Short-Circuit Current	I_{SC}	Short to GND		110		mA
		Short to IN		12		
Long-Term Stability	ΔV_{OUT}/time	1000hr at +25°C		50		ppm/1000hr
Output Voltage Hysteresis (Note 4)	ΔV_{OUT}/cycle			130		ppm
DYNAMIC CHARACTERISTICS						
Noise Voltage	e_{OUT}	f = 0.1Hz to 10Hz		50		$µV_{P-P}$
		f = 10Hz to 10kHz		50		$µV_{RMS}$
Ripple Rejection	$\Delta V_{OUT}/\Delta V_{IN}$	V_{IN} = 5V ±100mV, f = 120Hz		72		dB
Turn-On Settling Time	t_R	To V_{OUT} = 0.1% of final value, C_{OUT} = 50pF		190		µs
INPUT CHARACTERISTICS						
Supply Voltage Range	V_{IN}	Guaranteed by line-regulation test	V_{OUT} + 0.2		12.6	V
Quiescent Supply Current	I_{IN}			90	125	µA
Change in Supply Current	I_{IN}/V_{IN}	(V_{OUT} + 0.2V) ≤ V_{IN} ≤ 12.6V		4	8	µA/V

Low-Cost, Micropower, Low-Dropout, High-Output-Current, SOT23 Voltage References

ELECTRICAL CHARACTERISTICS—MAX6107, V_{OUT} = 4.5V

(V_{IN} = 5V, I_{OUT} = 0, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	T_A = +25°C	4.482	4.500	4.518	V
Output Voltage Temperature Coefficient (Notes 2, 3)	TCV_{OUT}	0°C to +70°C			65	ppm/°C
		-40°C to +85°C			75	
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	(V_{OUT} + 0.2V) ≤ V_{IN} ≤ 12.6V			550	µV/V
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	Sourcing: 0 ≤ I_{OUT} ≤ 5mA			0.9	mV/mA
		Sinking: -2mA ≤ I_{OUT} ≤ 0			8.0	
Dropout Voltage (Note 5)	V_{IN} - V_{OUT}	I_{OUT} = 1mA		50	200	mV
OUT Short-Circuit Current	I_{SC}	Short to GND		110		mA
		Short to IN		12		
Long-Term Stability	ΔV_{OUT}/time	1000hr at +25°C		50		ppm/1000hr
Output Voltage Hysteresis (Note 4)	ΔV_{OUT}/cycle			130		ppm
DYNAMIC CHARACTERISTICS						
Noise Voltage	e_{OUT}	f = 0.1Hz to 10Hz		55		$µV_{P-P}$
		f = 10Hz to 10kHz		55		$µV_{RMS}$
Ripple Rejection	$\Delta V_{OUT}/\Delta V_{IN}$	V_{IN} = 5V ±100mV, f = 120Hz		70		dB
Turn-On Settling Time	t_R	To V_{OUT} = 0.1% of final value, C_{OUT} = 50pF		230		µs
INPUT CHARACTERISTICS						
Supply Voltage Range	V_{IN}	Guaranteed by line-regulation test	V_{OUT} + 0.2		12.6	V
Quiescent Supply Current	I_{IN}			90	125	µA
Change in Supply Current	I_{IN}/V_{IN}	(V_{OUT} + 0.2V) ≤ V_{IN} ≤ 12.6V		4	8	µA/V

ELECTRICAL CHARACTERISTICS—MAX6105, V_{OUT} = 5.000V

(V_{IN} = 5.5V, I_{OUT} = 0, T_A = T_{MIN} to T_{MAX}, unless otherwise noted. Typical values are at T_A = +25°C.) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	V_{OUT}	T_A = +25°C	4.980	5.000	5.020	V
Output Voltage Temperature Coefficient (Notes 2, 3)	TCV_{OUT}	0°C to +70°C			65	ppm/°C
		-40°C to +85°C			75	
Line Regulation	$\Delta V_{OUT}/\Delta V_{IN}$	(V_{OUT} + 0.2V) ≤ V_{IN} ≤ 12.6V			550	µV/V
Load Regulation	$\Delta V_{OUT}/\Delta I_{OUT}$	Sourcing: 0 ≤ I_{OUT} ≤ 5mA			0.9	mV/mA
		Sinking: -2mA ≤ I_{OUT} ≤ 0			10	
Dropout Voltage (Note 5)	V_{IN} - V_{OUT}	I_{OUT} = 1mA		50	200	mV
OUT Short-Circuit Current	I_{SC}	Short to GND		110		mA
		Short to IN		12		
Long-Term Stability	ΔV_{OUT}/time	1000hr at +25°C		50		ppm/1000hr
Output Voltage Hysteresis (Note 4)	ΔV_{OUT}/cycle			130		ppm
DYNAMIC CHARACTERISTICS						
Noise Voltage	e_{OUT}	f = 0.1Hz to 10Hz		60		$µV_{P-P}$
		f = 10Hz to 10kHz		60		$µV_{RMS}$
Ripple Rejection	$\Delta V_{OUT}/\Delta V_{IN}$	V_{IN} = 6V ±100mV, f = 120Hz		65		dB
Turn-On Settling Time	t_R	To V_{OUT} = 0.1% of final value, C_{OUT} = 50pF		300		µs
INPUT CHARACTERISTICS						
Supply Voltage Range	V_{IN}	Guaranteed by line-regulation test	V_{OUT} + 0.2		12.6	V
Quiescent Supply Current	I_{IN}			90	125	µA
Change in Supply Current	I_{IN}/V_{IN}	(V_{OUT} + 0.2V) ≤ V_{IN} ≤ 12.6V		4	8	µA/V

Note 1: Devices are 100% production tested at T_A = +25°C and are guaranteed by design from T_A = T_{MIN} to T_{MAX} by correlation to sample units characterized over temperature.

Note 2: Temperature coefficient is specified by the “box” method, i.e., the maximum ΔV_{OUT} is divided by the maximum Δt.

Note 3: Not production tested. Guaranteed by design.

Note 4: Thermal hysteresis is defined as the change in +25°C output voltage before and after temperature cycling of the device from T_A = T_{MIN} to T_{MAX}.

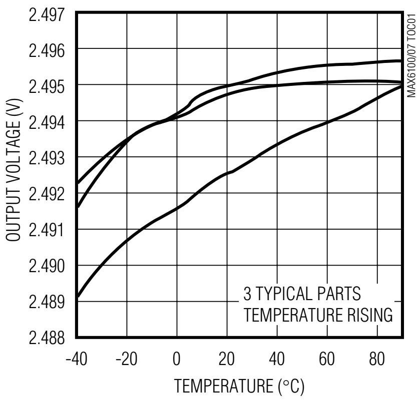
Note 5: Dropout voltage is the minimum input voltage at which V_{OUT} changes ≤ 0.2% from V_{OUT} at V_{IN} = 5.0V (V_{IN} = 5.5V for MAX6105).

Low-Cost, Micropower, Low-Dropout, High-Output-Current, SOT23 Voltage References

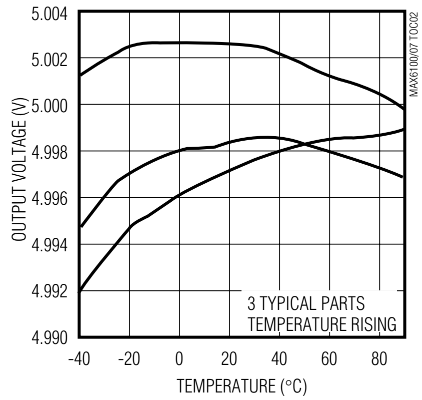
Typical Operating Characteristics

(T_A = +25°C, unless otherwise noted.)

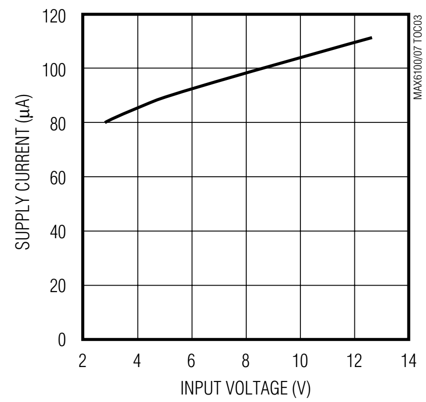
MAX6102
OUTPUT VOLTAGE TEMPERATURE DRIFT



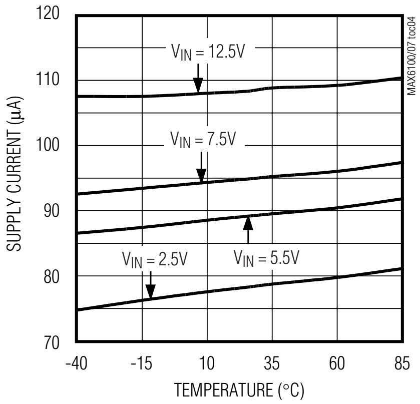
MAX6105
OUTPUT VOLTAGE TEMPERATURE DRIFT



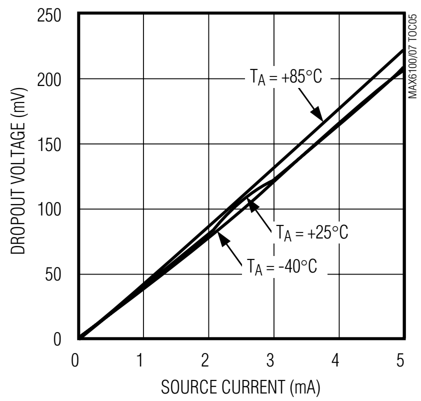
SUPPLY CURRENT
vs. INPUT VOLTAGE



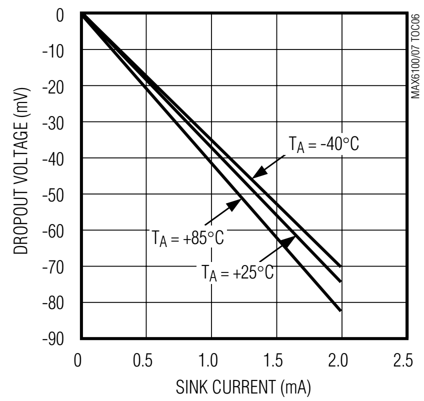
MAX6101
SUPPLY CURRENT vs. TEMPERATURE



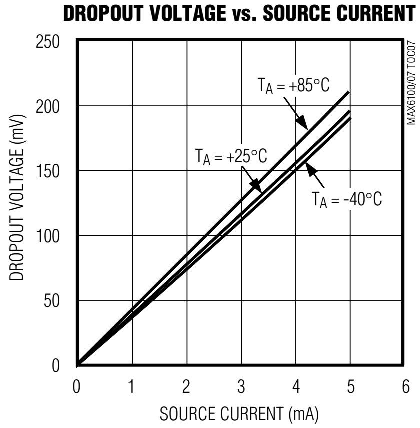
MAX6102
DROPOUT VOLTAGE vs. SOURCE CURRENT



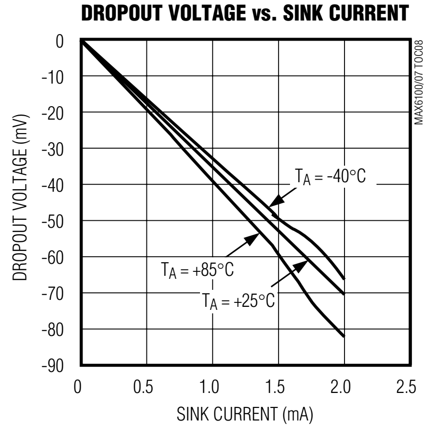
MAX6102
DROPOUT VOLTAGE vs. SINK CURRENT



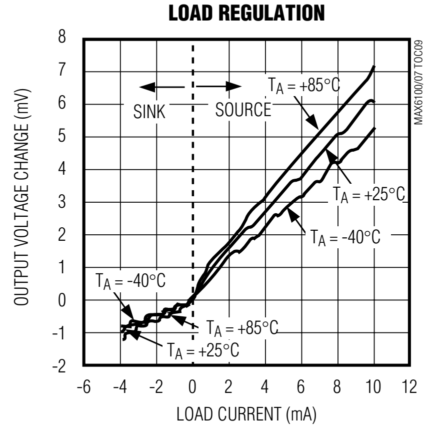
MAX6105
DROPOUT VOLTAGE vs. SOURCE CURRENT



MAX6105
DROPOUT VOLTAGE vs. SINK CURRENT



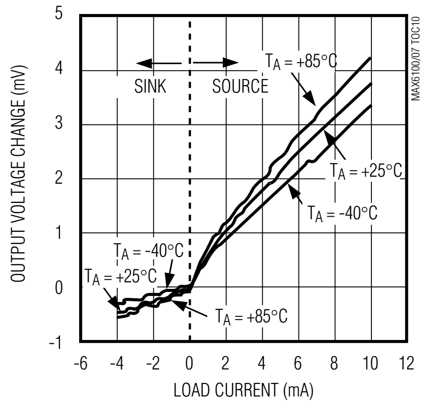
MAX6102
LOAD REGULATION



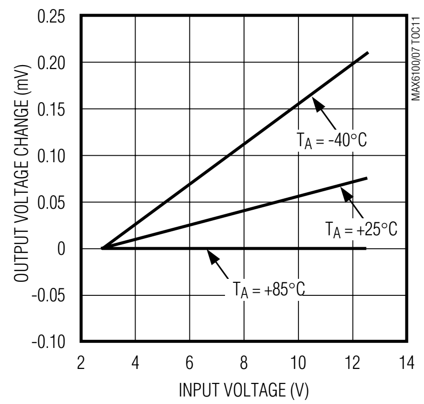
Typical Operating Characteristics (continued)

(T_A = +25°C, unless otherwise noted.)

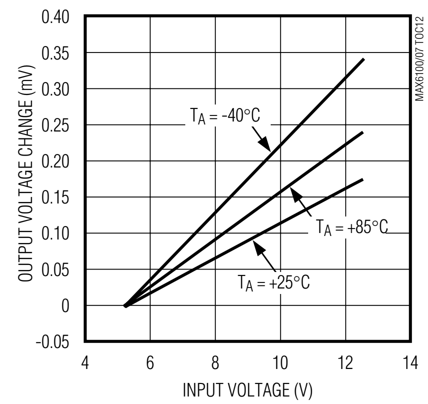
MAX6105 LOAD REGULATION



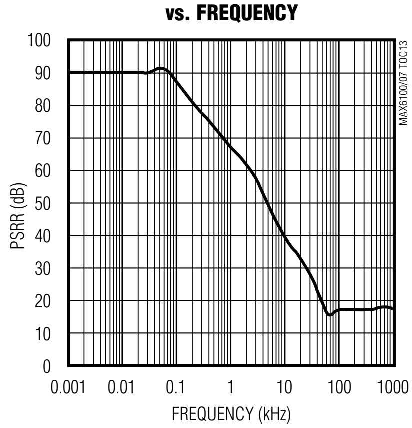
MAX6102 LINE REGULATION



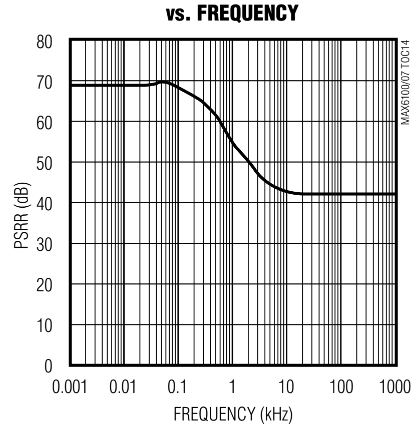
MAX6105 LINE REGULATION



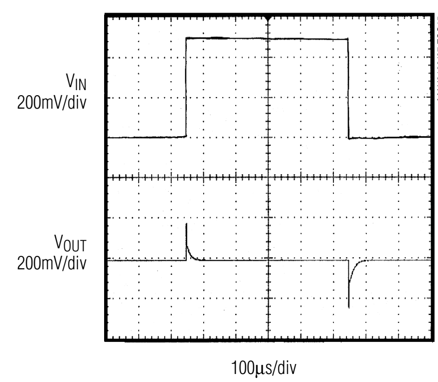
MAX6102 POWER-SUPPLY REJECTION RATIO vs. FREQUENCY



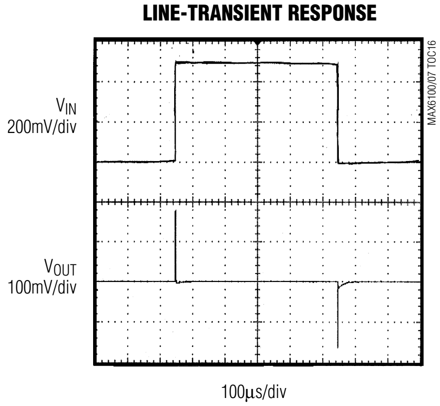
MAX6105 POWER-SUPPLY REJECTION RATIO vs. FREQUENCY



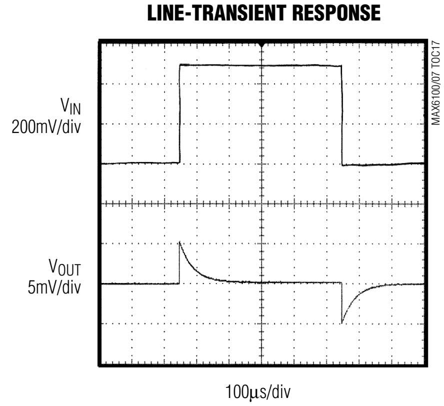
MAX6101 LINE-TRANSIENT RESPONSE



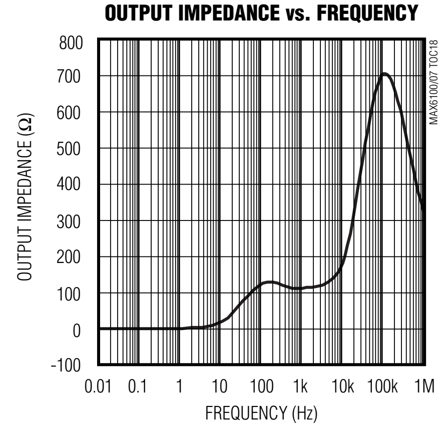
MAX6102 LINE-TRANSIENT RESPONSE



MAX6105 LINE-TRANSIENT RESPONSE



OUTPUT IMPEDANCE vs. FREQUENCY

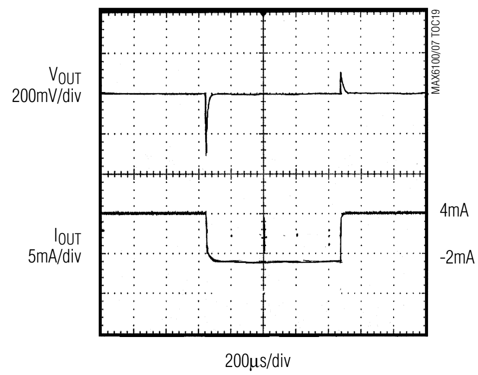


Low-Cost, Micropower, Low-Dropout, High-Output-Current, SOT23 Voltage References

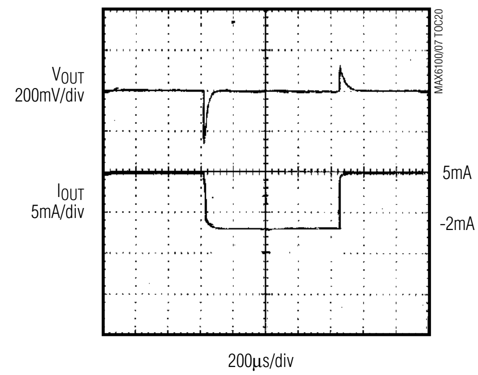
Typical Operating Characteristics (continued)

(T_A = +25°C, unless otherwise noted.)

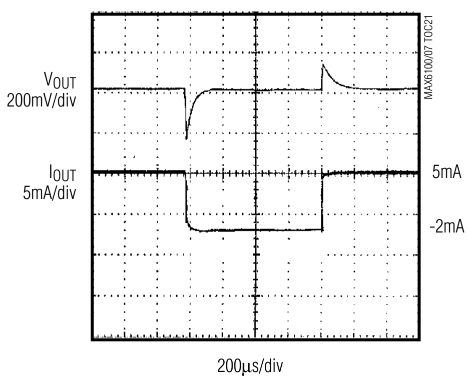
MAX6101
LOAD-TRANSIENT RESPONSE (C_{LOAD} = 0)



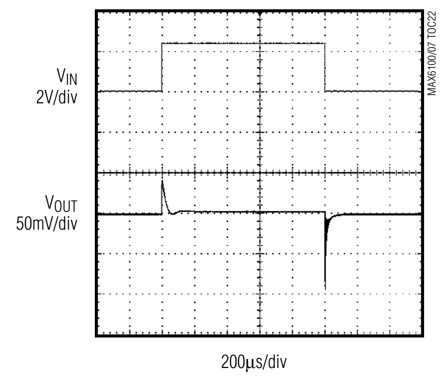
MAX6102
LOAD-TRANSIENT RESPONSE (C_{LOAD} = 0)



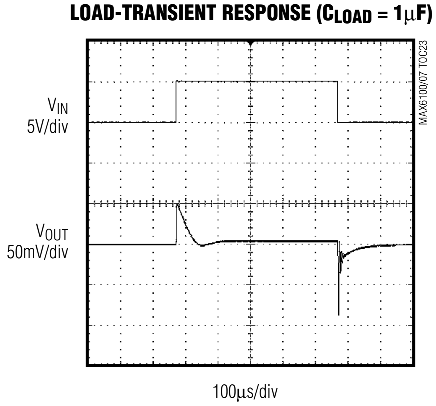
MAX6105
LOAD-TRANSIENT RESPONSE (C_{LOAD} = 0)



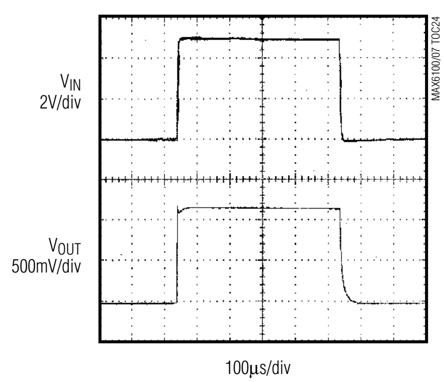
MAX6102
LOAD-TRANSIENT RESPONSE (C_{LOAD} = 1µF)



MAX6105
LOAD-TRANSIENT RESPONSE (C_{LOAD} = 1µF)

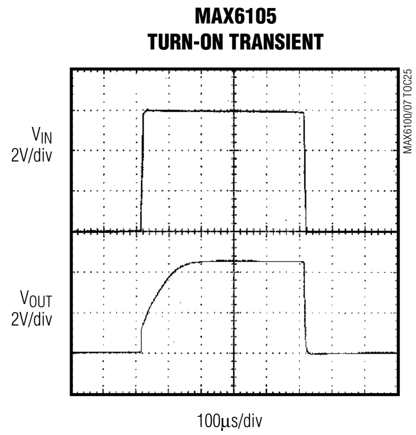


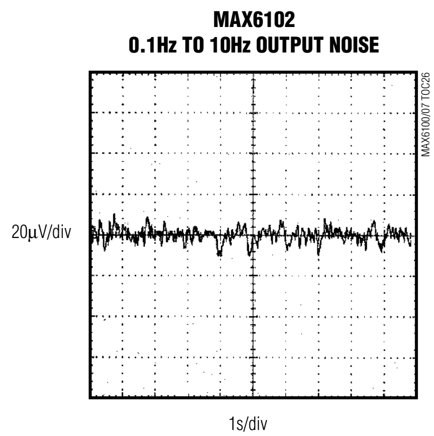
MAX6101
TURN-ON TRANSIENT

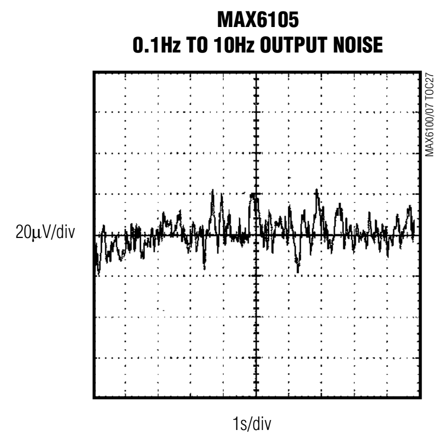


Typical Operating Characteristics (continued)

(T_A = +25°C, unless otherwise noted.)







Pin Description

PIN	NAME	FUNCTION
1	IN	Input Voltage
2	OUT	Reference Output
3	GND	Ground

Applications Information

Input Bypassing

For the best line-transient performance, decouple the input with a 0.1µF ceramic capacitor as shown in the *Typical Operating Circuit*. Locate the capacitor as close to IN as possible. Where transient performance is less important, no capacitor is necessary.

Output/Load Capacitance

Devices in the MAX6100 family do not require an output capacitance for frequency stability. They are stable for any capacitive load when sourcing less than 200µA. When sourcing greater than 200µA, the output may become unstable with capacitive loads between 0.5nF and 50nF. In applications where the load or the supply can experience step changes, an output capacitor reduces the amount of overshoot (undershoot) and improves the circuit's transient response. Many applications do not require an external capacitor, and the MAX6100 family can offer a significant advantage in these applications when board space is critical.

Supply Current

The quiescent supply current of the series-mode MAX6100 family is typically 90µA and is virtually independent of the supply voltage, with only an 8µA/V (max) variation with supply voltage. Unlike series references, shunt-mode references operate with a series resistor connected to the power supply. The quiescent current of a shunt-mode reference is thus a function of the input voltage. Additionally, shunt-mode references have to be biased at the maximum-expected load current, even if the load current is not present at the time. In the MAX6100 family, the load current is drawn from the input voltage only when required, so supply current is not wasted and efficiency is maximized at all input voltages. This improved efficiency reduces power dissipation and extends battery life. When the supply voltage is below the minimum specified input voltage (as during turn-on), the devices can draw up to 400µA beyond the nominal supply current. The input voltage source must be capable of providing this current to ensure reliable turn-on.

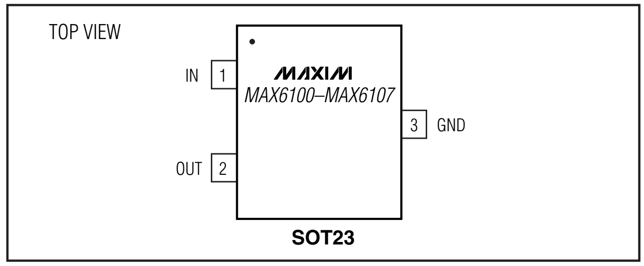
Output Voltage Hysteresis

Output voltage hysteresis is the change of output voltage at T_A = +25°C before and after the device is cycled over its entire operating temperature range. Hysteresis is caused by differential package stress appearing across the bandgap core transistors. The typical temperature hysteresis value is 130ppm.

Turn-On Time

These devices typically turn on and settle to within 0.1% of their final value in 50µs to 300µs. The turn-on time can increase up to 1.5ms with the device operating at the minimum dropout voltage and the maximum load.

Pin Configuration



Chip Information

TRANSISTOR COUNT: 117

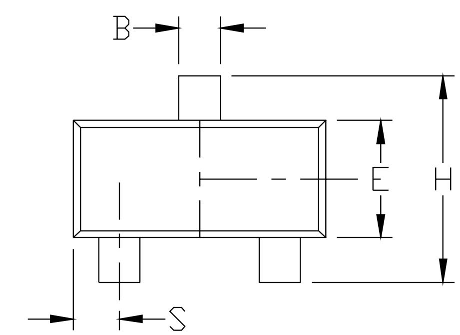
Package Information

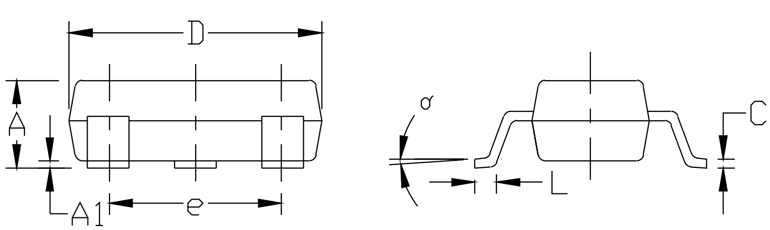
(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information, go to **www.maxim-ic.com/packages**.)

SOTPO3L.EPS

NOTES:
1. D&E DO NOT INCLUDE MOLD FLASH.
2. MOLD FLASH OR PROTRUSIONS NOT TO EXCEED .15mm (.006")
3. CONTROLLING DIMENSION: MILLIMETER

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.031	0.047	0.787	1.194
A1	0.001	0.005	0.025	0.127
B	0.014	0.022	0.356	0.559
C	0.0034	0.006	0.086	0.152
D	0.105	0.120	2.667	3.048
E	0.047	0.055	1.194	1.397
e	0.070	0.080	1.778	2.032
H	0.082	0.098	2.083	2.489
L	0.004	0.012	0.102	0.305
S	0.017	0.022	0.432	0.559
α	0°	8°	0°	8°





MAXIM
PROPRIETARY INFORMATION
TITLE:
PACKAGE OUTLINE,SOT-23, 3L
APPROVAL | DOCUMENT CONTROL NO. 21-0051 | REV C | 1/1