

FEATURES

- Supply voltage operating range: 3.6 to 20V
- Fixed oscillator frequency: Typ. 360KHz
- Precision reference voltage: 0.5V (2%)
- Low current consumption: 3mA
- Programmable Soft-Start function (SS)
- Short Circuit Shutdown and Auto Re-start function(ARSCP)
- Built-in P-MOSFET for 3A loading capability
- Package: SOP8

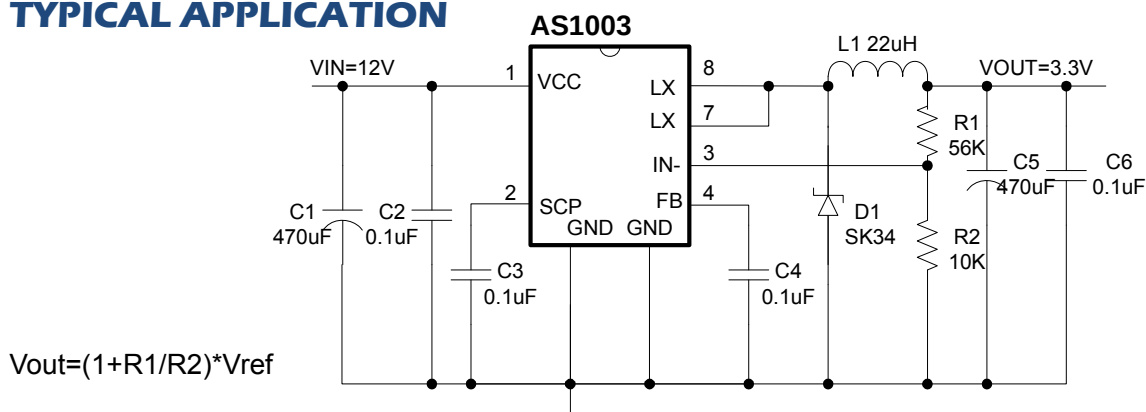
GENERAL DESCRIPTION

The AS1003 is a buck topology of switching regulator for wide operating voltage applications field. The AS1003 includes a high current P-MOSFET, high precision reference (0.5V) for comparing output voltage with feedback amplifier, an internal dead-time control and oscillator for controlling the maximum duty cycle and PWM frequency, and has power-on programmable soft start time and short circuit PMOS turn-off and auto re-start protection functions.

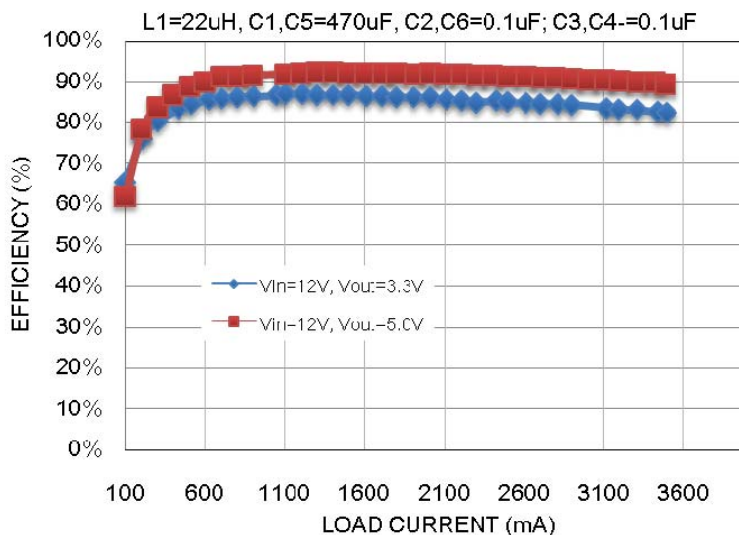
APPLICATIONS

- PC Monitors
- Distributed Power Systems
- Battery Charger
- Pre-Regulator for Linear Regulators

TYPICAL APPLICATION



EFFICIENCY vs. LOAD CURRENT



ABSOLUTE MAXIMUM RATINGS

(Note1)

V _{IN} Voltage Range.....	3.6V to 20V
I _{OUT} Output Current	3A
Error Amplifier IN-.....	-0.3V to 1.2V
P _D Power Dissipation (T _A =25°C).....	650mW
Operating Temperature Range	-40°C to 85°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature(Soldering, 10sec.)	260°C

PACKAGE/ORDER INFORMATION

Top View SOP-8 Plastic Package T_{JMAX}=125°C (Note2)	ORDER PART NUMBER
	AS1003EBT
	PART MARKING
	AS1003

Note 1: Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

Note 2: T_J is calculated from the ambient temperature T_A and power dissipation P_D according to the following formula:

$$T_J = T_A + P_D \times \Theta_{JA}$$

ELECTRICAL CHARACTERISTICS

V_{IN} =6V, T_A = -40°C to +85°C, unless otherwise noted. Typical values are T_A = 25°C

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
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Reference

V _{REF} Voltage	COMP connected to FB	0.490	0.5	0.510	V
V _{REF} Regulation	V _{CC} =3.0V to 20V		2	12.5	mV
V _{REF} Change with Temp.	T _A =-25°C to 25°C		1	2	%
	T _A =25°C to 85°C		1	2	

Soft Start (SS)

S.S. Source Current	V _{SS} = 0V	-7	-12	-17	μA
Soft Start Threshold Voltage	-	0.9	1.0	1.1	V

Short Circuit Protection(SCP)

S.C.P Source Current	V _{SCP} =0V	-7	-12	-17	μA
SCP Re-start/Hold time	V _{COMP} >0.8V		1/20		-
S.C.P Threshold Voltage	V _{FB} >450mV	1.0	1.15	1.2	V

Oscillator(OSC)

f _{OSC}		300	360	400	KHz
f _{OSC} Change with Voltage	V _{CC} =3.0 V to 20V	-	5		%
f _{OSC} Change with Temperature	T _A =-25°C to 85°C	-	5	-	%

ELECTRICAL CHARACTERISTICS

$V_{IN} = 6V$, $T_A = -40^{\circ}C$ to $+85^{\circ}C$, unless otherwise noted. Typical values are $T_A = 25^{\circ}C$

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
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Error Amplifier(EA)

Input Threshold Voltage	$V_{FB} = 450mV$	490	500	510	mV
V_T Change with Voltage	$V_{CC} = 3V$ to $20V$	-	5	20	mV
V_T Change with Temperature	$T_A = -25^{\circ}C$ to $85^{\circ}C$	-	1	-	%
Input Bias Current	--	-1.0	-0.2	1.0	μA
Voltage Gain	--	-	100	-	V/V
Frequency Bandwidth	$A_v = 0$ dB	-	6	-	MHz
Output Voltage Swing Positive	$V_{IN-} = 0.3V$	0.78	0.87	-	V
Output Voltage Swing Negative	$V_{IN-} = 0.7V$	-	0.05	0.2	
Output Source Current	$V_{FB} = 450mV$	-	-45	-30	μA
Output Sink Current		30	45	-	μA

Idle Period Adjustment

Maximum duty cycle	$V_{IN-} = 0.2V$	-	80	-	%
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Output

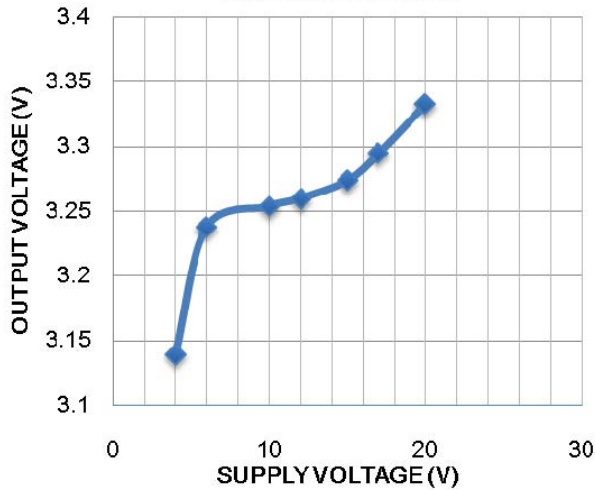
PMOS D-S voltage	$V_{FB} = 0.1V$	-20	-		V
PMOS source current		-3			A
PMOS On resistance	$V_{CC} = 5.0V$, $V_{IN-} = 0V$	40.5	52		m Ω
	$V_{CC} = 10V$, $V_{IN-} = 0V$	64	87		
Output leakage current	SCP active	5	-		μA

Total device

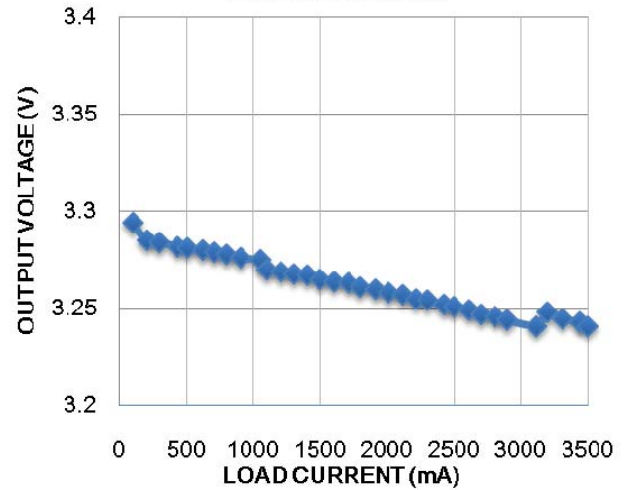
Standby supply current		-	3	5	mA
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TYPICAL PERFORMANCE CHARACTERISTICS

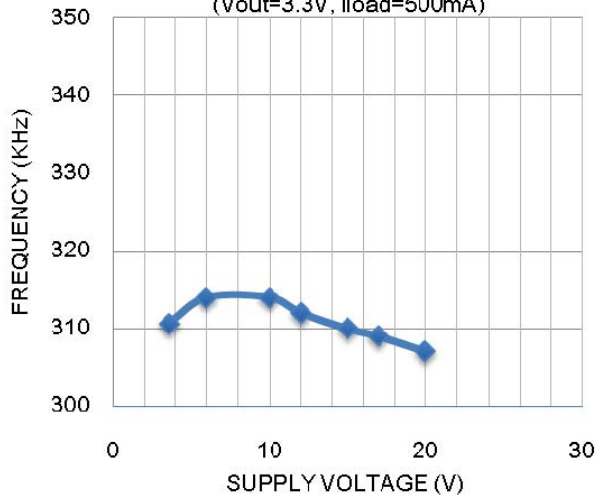
LINEAR REGULATION



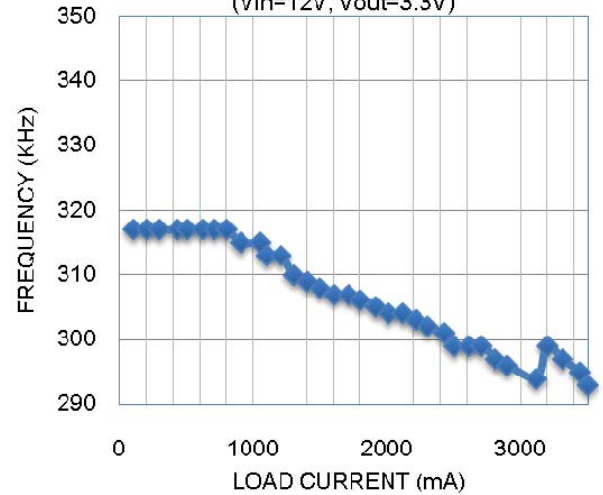
LOAD REGULATION



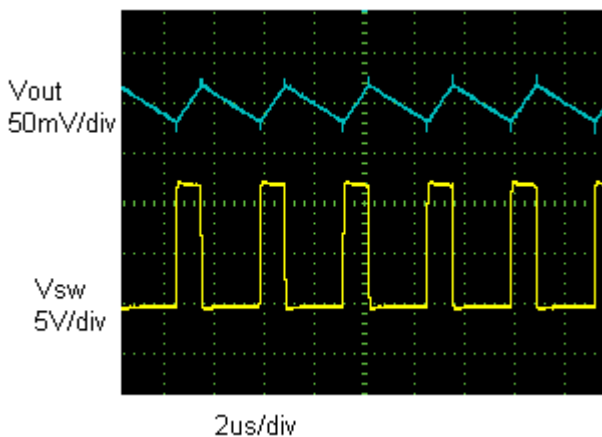
FREQUENCY vs. SUPPLY VOLTAGE
(Vout=3.3V, Iload=500mA)



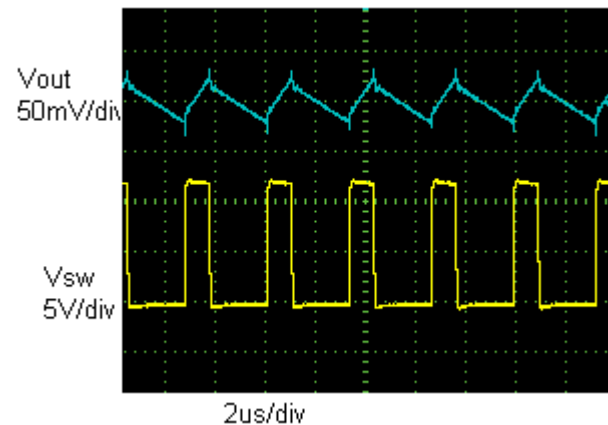
FREQUENCY vs. LOAD CURRENT
(Vin=12V, Vout=3.3V)



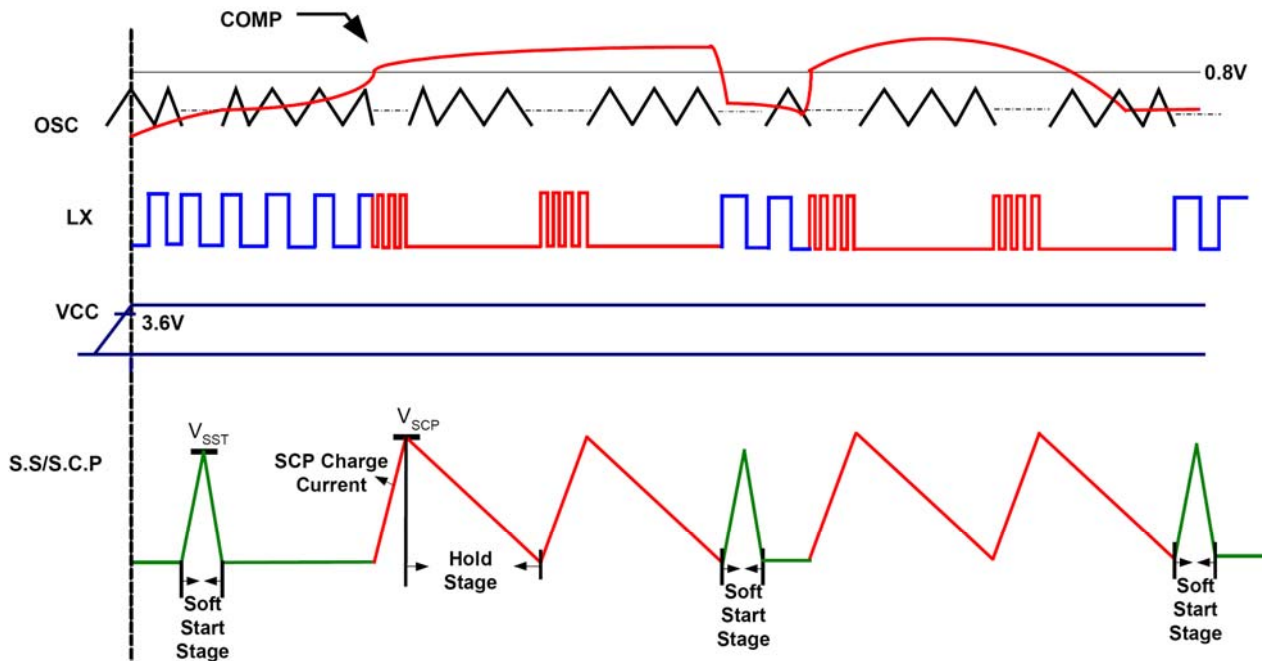
Vin=12V, Vout=3.3V, Iload=1.5A



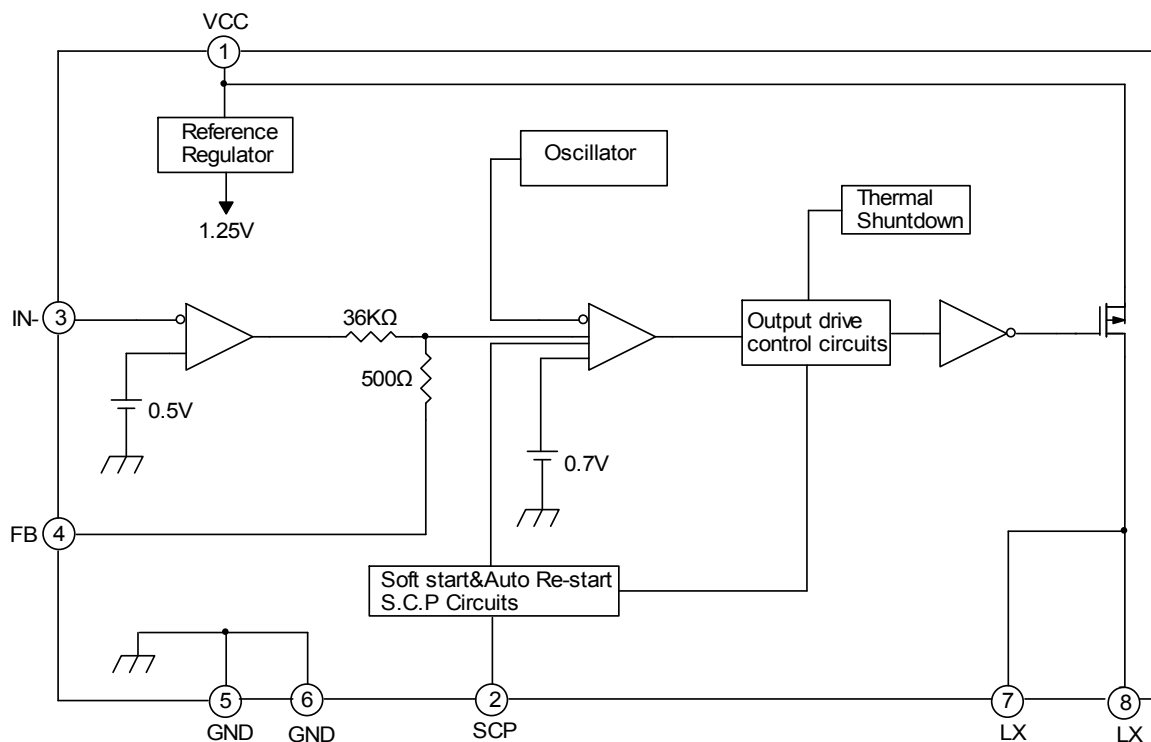
Vin=12V, Vout=5.0V, Iload=1.5A



TIMING WAVEFORM

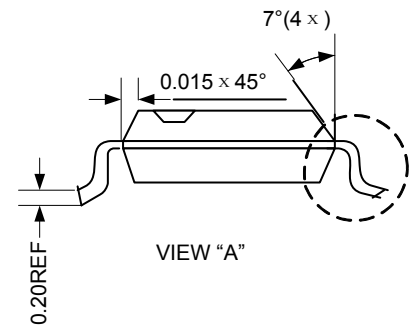
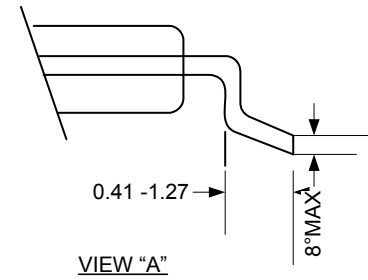
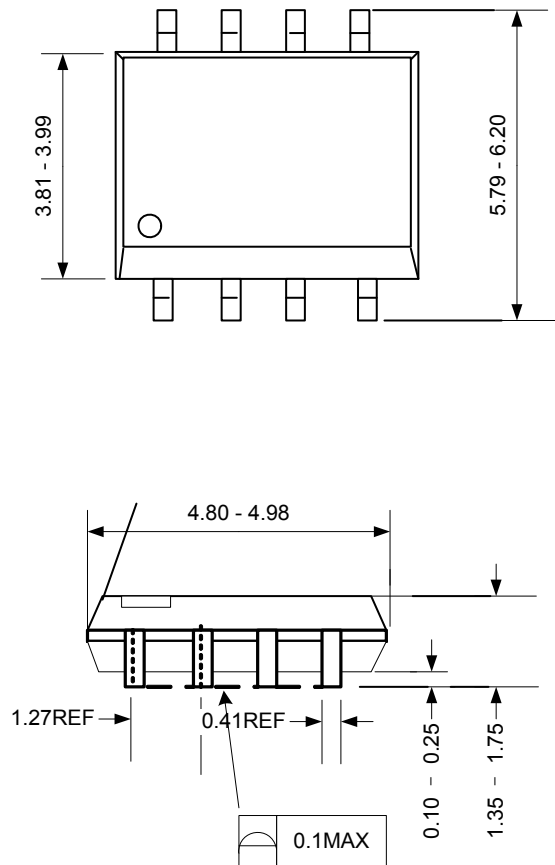


BLOCK DIAGRAM



PACKAGE DESCRIPTION Units: mm

Package
8-Lead Plastic SOP-8L



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