

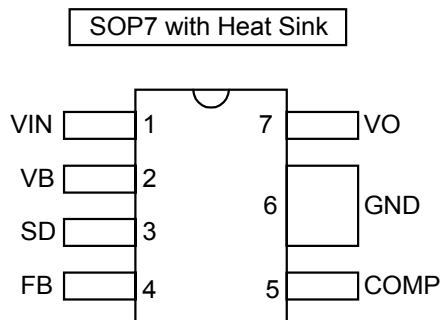
■ Features

- Output voltage: 3.3V
- 300KHz $\pm 15\%$ fixed switching frequency
- Voltage mode non-synchronous PWM control
- Thermal-shutdown and current-limit protection
- ON/OFF shutdown control input
- Operating voltage can be up to 22V
- Output load current: 2.5A
- SOP-7L packages
- Low power standby mode
- Built-in switching transistor on chip

■ Applications

- Simple High-efficiency step-down regulator
- On-card switching regulators
- Positive to negative converter
- DSL Modems
- Portable Computers
- Regulated Wall Adapters
- Distributed Power

■ Pin Assignment



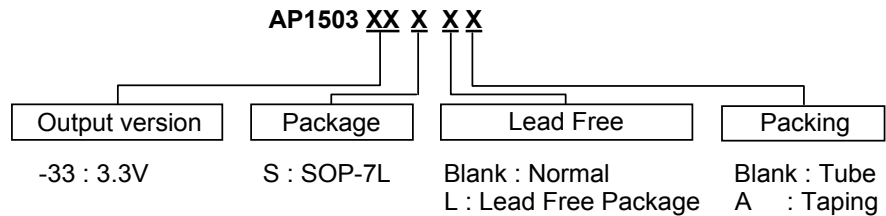
■ General Description

The AP1503 series are monolithic ICs designed for step-down DC/DC converters, and own the ability of driving a 2.5A load without additional transistor components. Due to reducing the number of external component, the board space can be saved easily. The external shutdown function can be controlled by logic level and then come into standby mode. The external compensation makes feedback control have good line and load regulation. Regarding protected function, thermal shutdown is to prevent over temperature operating from damage, and current limit is against over current operating of the output switch. The AP1503 series operates at a switching frequency of 300KHz thus allowing smaller sized filter components than what would be needed with lower frequency switching regulators. Other features include a guaranteed $\pm 2\%$ tolerance on output voltage under specified input voltage and output load conditions, and $\pm 15\%$ on the oscillator frequency. The output version included fixed 3.3V, 5V. The packages are available in a standard SOP-7 lead package.

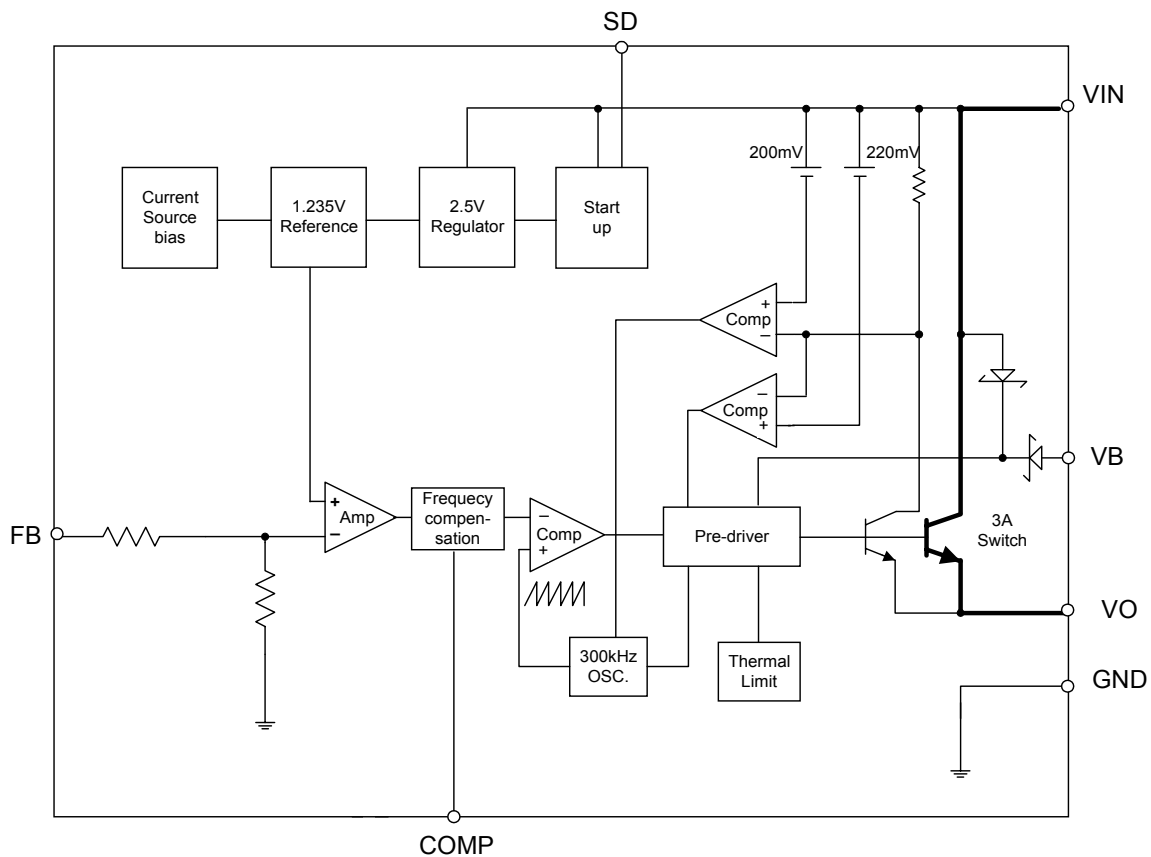
■ Pin Descriptions

Name	Description
V _{IN}	Operating voltage input
VB	Boost pin
SD	ON/OFF Shutdown
FB	Output voltage feedback control
COMP	Compensation pin
GND	Ground
VO	Switching output

■ Ordering Information



■ Block Diagram





■ Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V _{CC}	Supply Voltage	+26	V
V _{SD}	ON/OFF Pin input voltage	-0.3 to +25	V
V _{FB}	Feedback Pin voltage	-0.3 to +25	V
V _{OUT}	Output voltage to Ground	-1	V
P _D	Power dissipation	Internally limited	W
T _{ST}	Storage temperature	-65 to +150	°C
T _{OP}	Operating temperature	-40 to +125	°C
V _{OP}	Operating voltage	+7 to +40	V

■ Electrical Characteristics (All Output Voltage Versions)

Unless otherwise specified, V_{IN}=12V for 3.3V, 5V, I_{LOAD} = 0.5A

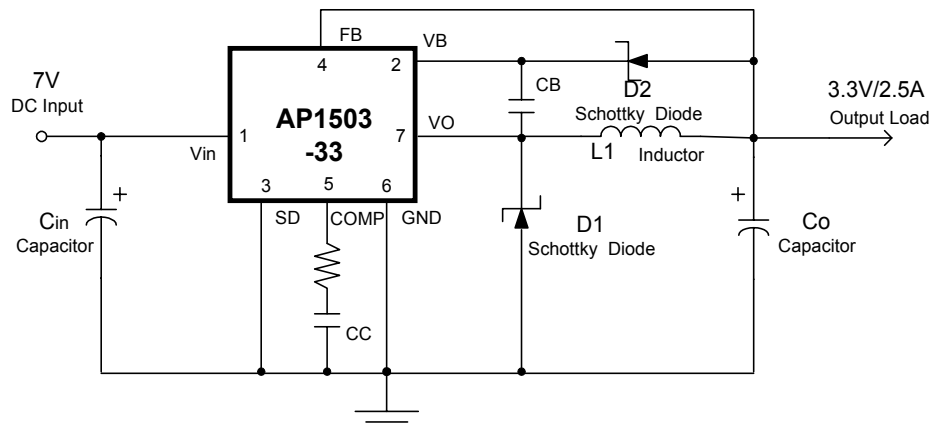
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
F _{OSC}	Oscillator frequency		255	300	345	KHz
			230		360	
V _{SAT}	Saturation voltage	I _{SW} =2A V _B =V _{IN} +2.5V.		0.4	0.5 0.6	V
DC	Max. Duty Cycle (ON)	V _{FB} =0V force driver on		90		%
	Min. Duty cycle (OFF)	V _{FB} =6V force driver off		0		
I _{CL}	Current limit	Peak current No outside circuit V _{FB} =0 force driver on	3	3.25	3.5	A
					4	
I _L	Output = 0	no outside circuit V _{FB} =6V force driver off V _{IN} =24V			-1	uA
	Output = -1					
V _C	COMP Min SW threshold	Duty Cycle=0%,F _B =3.5V		0.04		V
	2A I _{SW} threshold			0.8		
V _B	Min V _B above switch	I _{SW} =2A		2.6	3	V
I _B	Boost current	I _{SW} =1A I _{SW} =2A		120	140	mA
				130		
I _Q	Quiescent Current	V _{FB} =6 force driver off		5	10	mA
I _{STBY}	Standby Quiescent Current	ON/OFF pin=5V V _{IN} =24V		80	150	uA
					200	
V _{IL}	ON/OFF pin logic input threshold voltage	Low (regulator ON) High (regulator OFF)	-	1.3	0.6	V
V _{IH}			2.0		-	
I _H	ON/OFF pin logic input current	V _{LOGIC} =2.5V (OFF)			-0.1	uA
I _L	ON/OFF pin input current	V _{LOGIC} =0.5V (ON)			-1	
θ _{JC}	Thermal Resistance	SOP-7L	Junction to case	20		°C/W
θ _{JA}	Thermal Resistance With copper area of approximately 0.5 in ²	SOP-7L	Junction to ambient	50		°C/W

■ Electrical Characteristics (Continued)

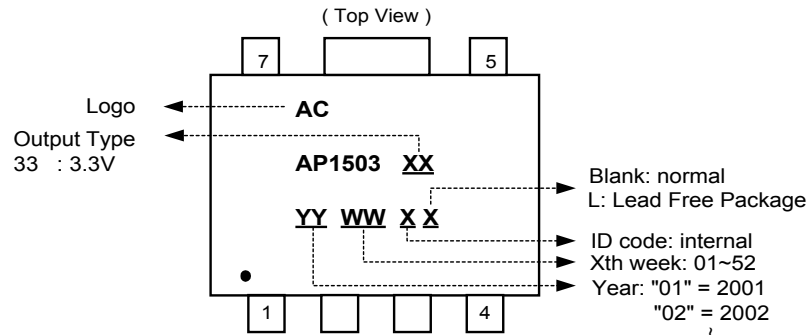
	Symbol	Parameter	Conditions	Typ.	Limit	Unit
AP1503-3.3V	V_{OUT}	Output voltage	$7V \leq V_{IN} \leq 24V$ $0.2A \leq I_{LOAD} \leq 2.5A$	3.3	3.23/3.2 3.37/3.4	V V_{MIN} V_{MAX}
	η	Efficiency	$V_{IN} = 12V, I_{LOAD} = 2A$	79		%

Specifications with **boldface type** are for full operating temperature range, the other type are for $T_J = 25^\circ C$.

■ Typical Application Circuit

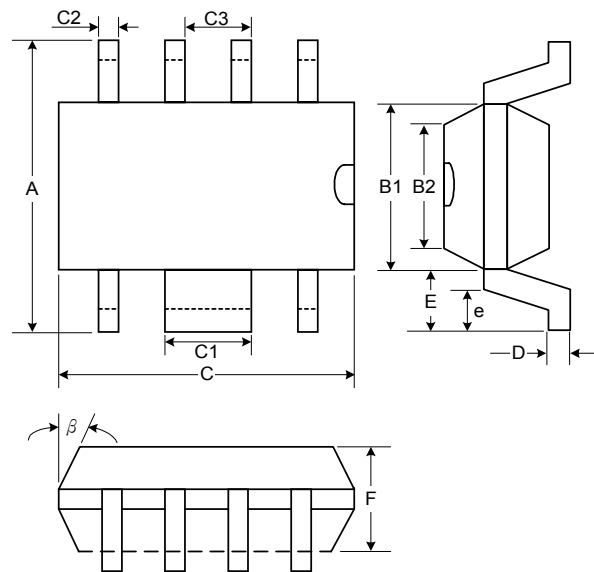


■ Marking Information



■ Package Information

Package Type: SOP-7L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	5.79	5.99	6.19	0.228	0.236	0.244
B1	3.83	3.91	3.99	0.151	0.154	0.157
B2	3.78	3.86	3.94	0.149	0.152	0.155
C	4.80	4.87	4.94	0.189	0.192	0.194
C1	1.57	1.67	1.77	0.062	0.066	0.070
C2	0.32	0.4	0.48	0.013	0.016	0.019
C3	1.17	1.27	1.37	0.046	0.050	0.054
D	0.19	0.22	0.25	0.007	0.009	0.010
E	1.04REF			0.041REF		
e	0.48	0.68	0.88	0.019	0.027	0.035
F	1.35	1.45	1.55	0.053	0.057	0.061
β	7°			7°		