

1A Step Down Switching Voltage Regulator (ADVANCED INFORMATION)

FEATURES

- Guaranteed 1A Output Current
- High Efficiency
- Wide Input Voltage, up to 40V
- 3.3V, 5V, 12V and Adjustable Output Versions
- Thermal Shutdown and Current Limit Protection
- Requires only 4 External Components
- Low Power Standby Mode < 200mA Typical
- Adjustable Version Output 1.23V to 37V $\pm 4\%$ Max. over Line & Load Conditions
- Shutdown Capability (Standby Mode)
- 150kHz Fixed Frequency Internal Oscillator
- Uses Standard Inductors

APPLICATIONS

- Efficient Pre-Regulator for Linear Regulators
- On-Card Switching Regulators
- Positive to Negative Converter (Buck-Boost)
- Simple High-efficiency Step-down(Buck) Regulators
- Portable Instruments
- Negative Boost Converter

PRODUCT DESCRIPTION

The ALPHA Semiconductor AS2595 contains fixed and adjustable switching voltage regulators that requires a minimum of external components. All circuitry necessary to build a buck switching regulator is included.

The AS2595 is available in 3.3V, 5V, 12V & 15V fixed voltages, or an adjustable version with an output voltage range from 1.23V to 37V. The guaranteed accuracy for specified input and load conditions is $\pm 4\%$.

The AS2595 can supply 1A with an excellent load and line regulation. Protection such as cycle-by-cycle current limiting or thermal shutdown have been designed. In standby mode, the current consumption has been minimized (200mA).

For 0.5A or 3A step-down switching regulators refer to AS2594 & AS2596 data sheets.

ORDERING INFORMATION

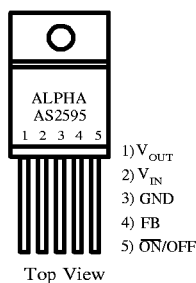
TO-220 5-PIN	TO-263 5-PIN	OPER. TEMP. RANGE
AS2595U-X	AS2595T-X	-40°C TO +85°C

X= Output Voltage (X=3.3V, 5.0V, 12V or Blank for Adjustable)

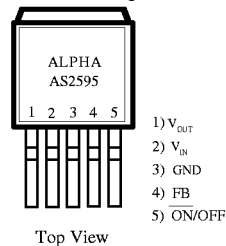
Consult factory for other fixed voltages.

PIN CONNECTIONS

TO-220-5 Package



TO-263-5 Package



ABSOLUTE MAXIMUM RATINGS

Maximum Supply Voltage 45V
 Off Pin Input Voltage $-0.3V \leq V \leq +25V$
 Output Voltage to Ground (Steady State) -1V
 Power Dissipation..... Internally Limited
 Storage Temperature Range..... -65°C to $+150^{\circ}\text{C}$
 Minimum ESD Rating
 C = 100pF, R = 1.5k Ω 2kV
 FB Pin..... 1kV

Operating Temperature Range..... $-40^{\circ}\text{C} \leq T_J \leq +85^{\circ}\text{C}$
 Supply Voltage..... 4.5V to 40V
 Lead Temperature (soldering, 10 sec.) $+260^{\circ}\text{C}$
 Maximum Junction Temperature..... $+150^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS $T_A = 25^{\circ}\text{C}$ $V_{IN} = 12\text{V}$, $I_{LOAD} = 100\text{mA}$ unless otherwise specified. Boldface type applies over full Operating Temperature Range.

Parameter	Conditions	AS2595			Units
		Typ	Min	Max	
Adjustable Regulators (Note 3)(Note 8)					
Output Voltage (V _{OUT})	4.75V < V _{IN} < 40V, 0.1A . I _{LOAD} . 1A, V _{OUT} programmed for 3.0V	1.230 1.230	1.193 1.180	1.267 1.280	V
Efficiency (Note 7)	V _{IN} = 12V, I _{LOAD} = 1A	78			%
3.3V Version (Note 3)(Note 9)					
Output Voltage (V _{OUT})	4.75V < V _{IN} < 40V, 0.1A . I _{LOAD} . 1A,	3.3 3.3	3.168 3.135	3.432 3.465	V
Efficiency	V _{IN} = 12V, I _{LOAD} = 1A	78			%
5V Version (Note 3)(Note 9)					
Output Voltage (V _{OUT})	4.75V < V _{IN} < 40V, 0.1A . I _{LOAD} . 1A,	5.0 5.0	4.800 4.750	5.200 5.250	V
Efficiency (Note 7)	V _{IN} = 12V, I _{LOAD} = 1A, V _{OUT} = 5V	82			%
12V Version (Note 3)(Note 9)					
Output Voltage (V _{OUT})	4.75V < V _{IN} < 40V, 0.1A . I _{LOAD} . 1A,	12 12	11.520 11.400	12.480 12.600	V
Efficiency (Note 7)	V _{IN} = 25V, I _{LOAD} = 1A	90			%

ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ $V_{IN} = 12\text{V}$, $I_{LOAD} = 100\text{mA}$ unless otherwise specified. Boldface type applies over full Operating Temperature Range.

Parameters	Conditions	AS2595			Units
		Typ	Min	Max	
Adjustable Regulator					
Feedback Bias Current	FB = 1.3V	10		50 100	nA
Fixed and Adjustable Regulators					
Oscillator Frequency		150	127 110	173 173	kHz
Saturation Voltage	I _{OUT} = 1A,	1		1.2 1.3	V
Max Duty Cycle	ON OFF	100 0			%
Current Limit	Peak Current, t _{ON} : 3.s,	1.5	1.2 1.15	2.4 2.6	A
Output Leakage Current	Output = 0V Output = -1V	2		50 15	.A mA
Quiescent Current		5		10	mA
Standby Quiescent Current	ON/OFF Pin = 5V (OFF)	85		200 250	.A
Thermal Resistance	U or T package, Junction to Case, U or T package, Junction to Ambient,	3 50			.C/W
ON/OFF Control, Fixed & Adjustable Regulators					
OFF Input Level	V _{OUT} = 0V	1.3	2.0		V
ON Input Level	V _{OUT} = 15V or 5V	1.3		0.6	V
OFF Logic Current	ON/OFF Pin = 2.5V (OFF)	5		15	.A
ON Logic Current	ON/OFF Pin = 0.5V (ON)	0.02		5	.A

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate test conditions for which the device is intended to be functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions see the Electrical Characteristics.

Note 2: All limits guaranteed at room temperature (standard type face) and at temperature extremes (bold type face). All room temperature limits are 100% production tested. All limits at temperature extremes are guaranteed via testing.

Note 3: External components such as the diode, inductor and capacitor can affect the system performance.

Note 4: Output (pin 2) sourcing current. No diode, inductor, or capacitor connected to input.

Note 5: Feedback (pin 4) removed from output and connected to 0V.

Note 6: Feedback (pin 4) removed from output and connected to 12V to force the output transistor OFF.