



## FEATURES

- Operating Input Voltage From 4.5V to 36V
- 2.5V, 3.3V, 5V , 12V and Adjustable Output Version
- Adjustable Version Output Voltage Range , 1.25V to 30V  $\pm$  4% max Over Line and Load Regulation
- Available in SOT895 Package
- 150KHz/300KHz Fixed Constant Frequency
- Low Power Standby Mode,  $I_Q$  Typically 80 $\mu$ A
- TTL Shutdown Capability.
- Output Overvoltage Protection
- Current Limit and Thermal Shutdown Protection.

## APPLICATIONS

- Simple High Efficiency Step-down regulator
- On-Card Switching regulators
- Fixed Voltage power supply for LCD Monitor

## DESCRIPTION

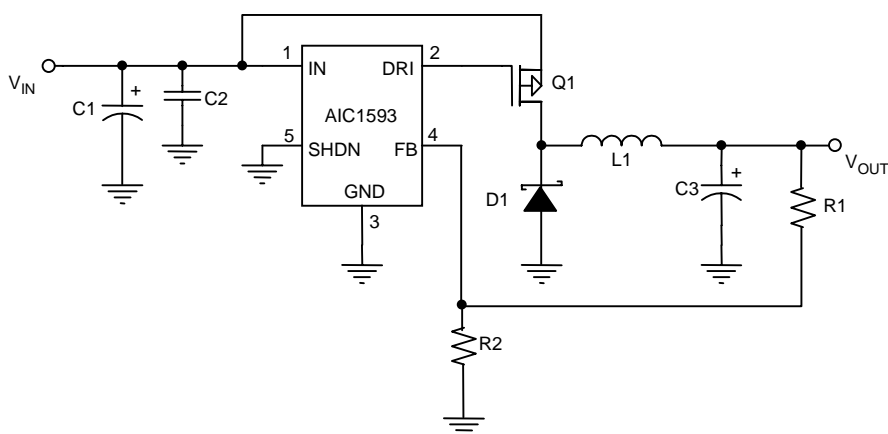
The AIC1593 series are step-down monolithic PWM controller to provide fixed voltages of 2.5V , 3.3V, 5.0V , 12V and using an external divider to adjust output voltage from 1.25V to 30V with excellent line and load regulation. The only peripheral components can be used with the IC for PMOS or PNP transistor, a coil, a diode, and capacitors.

Switching frequency up to 150KHz/300KHz are achievable thus allowing smaller sized filter components. Internal current limit and thermal shutdown circuits provide protection from overloads. It also provides output overvoltage and short protection under fault conditions.

The internal precision reference combined with voltage feedback loop provides optimum output voltage accuracy and fast load transient response.

Packages available are in standard DIP8 for standard assembly and SOT895 ,SOP8 for SMD.

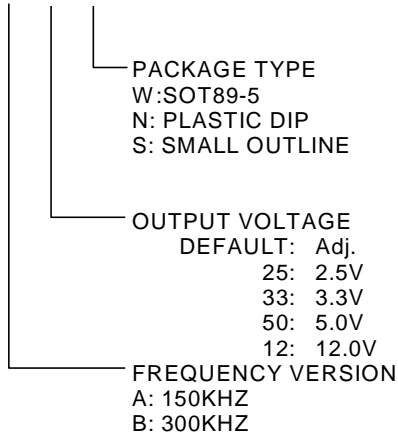
## TYPICAL APPLICATION CIRCUIT





### ORDERING INFORMATION

AIC1593X-XXCX



ORDER NUMBER	PIN CONFIGURATION
AIC1593A(B)CW AIC1593A(B)-25CW AIC1593A(B)-33CW AIC1593A(B)-50CW AIC1593A(B)-12CW (TO263-5)	FRONT VIEW 1: IN 2: DRI 3: GND 4: FB 5: SHDN 
AIC1593A(B)CN AIC1593A(B)-25CN AIC1593A(B)-33CN AIC1593A(B)-50CN AIC1593A(B)-12CN (DIP8)	TOP VIEW 
AIC1593A(B)CS AIC1593A(B)-25CS AIC1593A(B)-33CS AIC1593A(B)-50CS AIC1593A(B)-12CS (SO8)	

### ABSOLUTE MAXIMUM RATINGS

- Supply Voltage ..... 36V
- FB, SHDN Pin Input Voltage ..... 25V
- Operating Temperature Range ..... 0°C ~ 70°C
- Storage Temperature Range..... -65°C ~ 150°C

### TEST CIRCUIT

Refer to Typical Application Circuit.

**ELECTRICAL CHARACTERISTICS** ( $T_J=25^{\circ}\text{C}$ ,  $V_{IN}=18\text{V}$ )

PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Voltage		4.5		36	V
Fixed Output Voltage	AIC1593-25 ( $V_{IN} > 4.5\text{V}$ )		2.5		V
	AIC1593-33 ( $V_{IN} > 4.5\text{V}$ )		3.3		V
	AIC1593-50 ( $V_{IN} > 7.0\text{V}$ )		5.0		V
	AIC1593-12 ( $V_{IN} > 15\text{V}$ )		12.0		V
Feedback Voltage	AIC1593 Adjustable		1.25		V
Output Voltage Regulation				4	%
Quiescent Current	Internal switch off		1	5	mA
Shutdown Quiescent Current	SHDN = 5V (OFF)		80		$\mu\text{A}$
Logic Input High	(Regulator OFF)	2			V
Logic Input Low	(Regulator ON)			0.8	V
Oscillator Frequency	AIC1593A series		150		KHz
Oscillator Frequency	AIC1593B series		300		KHz
Driver Sinking "ON Resistance"			TBD		$\Omega$
Driver Sinking "OFF Resistance"			TBD		$\Omega$
Over Voltage Protection			120		%
Maximum Duty Cycle		100			%
Efficiency	$V_o=5\text{V}$ , $I_o=3\text{A}$		90		%



## ■ PIN DESCRIPTIONS

### **SOT-89-5**

**PIN 1: IN** Supply voltage input for the IC switching regulator. A suitable input bypass capacitor must be present at this pin to minimize voltage transients and to supply the switching currents needed by the regulator.

**PIN 2: DRI** Push-Pull driver output to drive an external PMOS or PNP transistor. When driving a PNP bipolar transistor, a base resistor and a capacitor to the base of PNP are recommended.

**PIN 3: GND** Ground requires a short, low noise connection to ensure good load regulation.

### **SO8/ DIP8**

**PIN 1: IN** Supply voltage input for the IC switching regulator. A suitable input bypass capacitor must be present at this pin to minimize voltage transients and to supply the switching currents needed by the regulator.

**PIN 2: DRI** Push-Pull driver output to drive an external PMOS or PNP transistor. When driving a PNP bipolar transistor, a base resistor and a capacitor to the base of PNP are recommended.

**PIN 3, 4: GND** Ground requires a short, low noise connection to ensure good load regulation.

**PIN 4: FB** Feedback input for fixed-output or adjustable-output version. Connect directly to output for fixed operation version or to a resistor divider for adjustable operation versions.

**PIN 5: SHDN** Allows the switching regulator circuit to be shutdown using logic level signals thus dropping the total input supply current to approximately 80 $\mu$ A. Drive it high to disable the reference, control circuitry, and internal switches. Drive low or connect to GND for normal operation.

**PIN 5: FB** Feedback input for fixed-output or adjustable-output version. Connect directly to output for fixed operation version or to a resistor divider for adjustable operation versions.

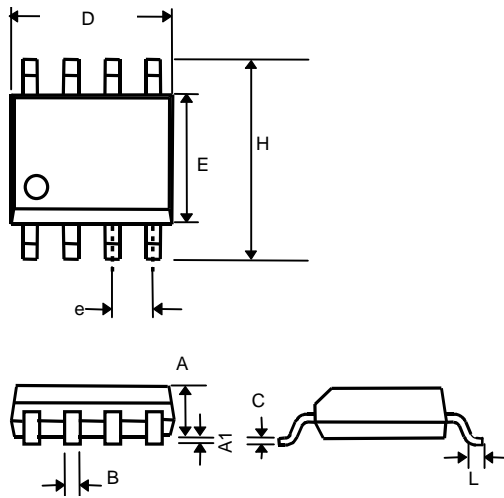
**PIN 6: SHDN** Allows the switching regulator circuit to be shutdown using logic level signals thus dropping the total input supply current to approximately 80 $\mu$ A. Drive it high to disable the reference, control circuitry, and internal switches. Drive low or connect to GND for normal operation.

**PIN 7, 8: N.C.** - Not connected.



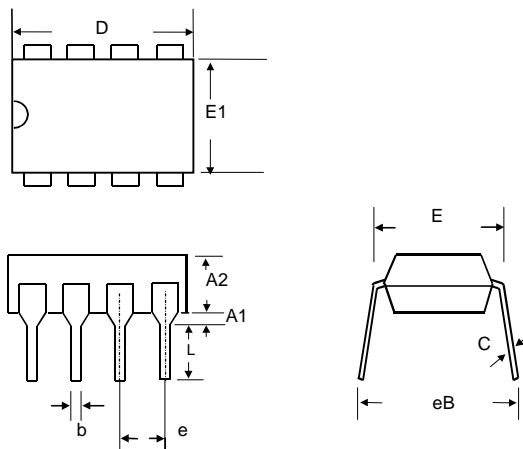
**PHYSICAL DIMENSIONS**

● **8 LEAD PLASTIC SO (unit: mm)**



SYMBOL	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.33	0.51
C	0.19	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27(TYP)	
H	5.80	6.20
L	0.40	1.27

● **8 LEAD PLASTIC DIP (unit: mm)**



SYMBOL	MIN	MAX
A1	0.381	—
A2	2.92	4.96
b	0.35	0.56
C	0.20	0.36
D	9.01	10.16
E	7.62	8.26
E1	6.09	7.12
e	2.54 (TYP)	
eB	—	10.92
L	2.92	3.81