

Features

- Guaranteed Start-Up from below 0.9V
- Low Input Current
- High Output Voltage Accuracy $\pm 2.5\%$
- Small Number of External Components needed
- Fixed Output Voltage: 3.3V, 5V
- Space Saving SOT-89 package

Applications

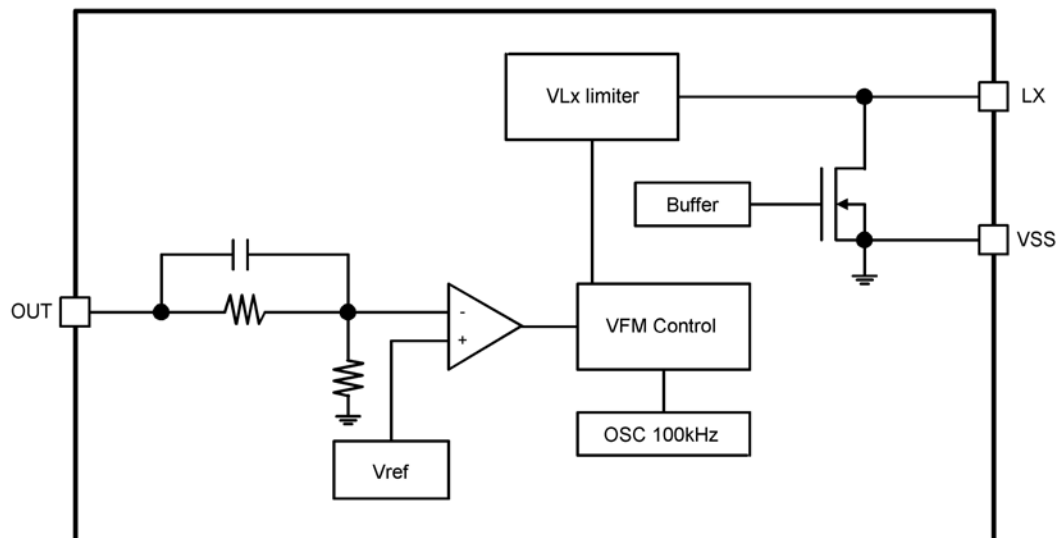
- Power source for battery-powered equipment
- Power source for cameras, camcorders, VCRs, PDAs, electronic data banks, and hand-held Communication equipment

General Description

The AT1301 is a high efficiency step-up DC/DC converter for applications using 1 to 4 cells battery. Only three external components are required to deliver a fixed output voltage of 3.3V, 5V. This device employ VFM for minimum supply current at low loads.

The VFM control circuit operating in 100kHz (typ.) switching rate results in smaller passive components. The small SOT-89 packages make the AT1301 an ideal choice of DC/DC Converter for space conscious applications.

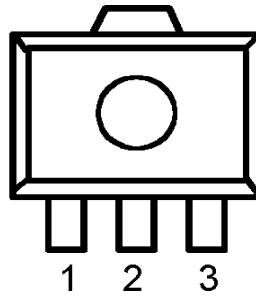
Block Diagram



Aimtron reserves the right without notice to change this circuitry and specifications.

Pin Configuration

AT1301 (SOT-89)



Pin Description

Pin No.	Symbol	I/O	Description
1	VSS	P	Ground Pin
2	OUT	P/O	Step-Up Output and Power Supply Pin
3	LX	O	Switching Pin

Ordering Information

Part number.	Output voltage	Remarks
AT1301-33	3.3V	□□□A
AT1301-50	5V	□□□B

Absolute Maximum Ratings

(T_a=+25°C)

Parameter	Symbol	Condition	Rated Value		Unit
			Min.	Max.	
Power supply voltage	V _{OUT}	—	—	10	V
LX pin voltage	V _{LX}	—	—	10	V
LX pin output current	I _{LX}	—	—	250	mA
Allowable dissipation	P _D	—	—	500	mW
Operating temperature	T _{OP}	—	0	+70	°C
Storage temperature	T _{stg}	—	-55	+125	°C

WARNING: Semiconductor devices can be permanently damaged by application of stress (voltage, current, temperature, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

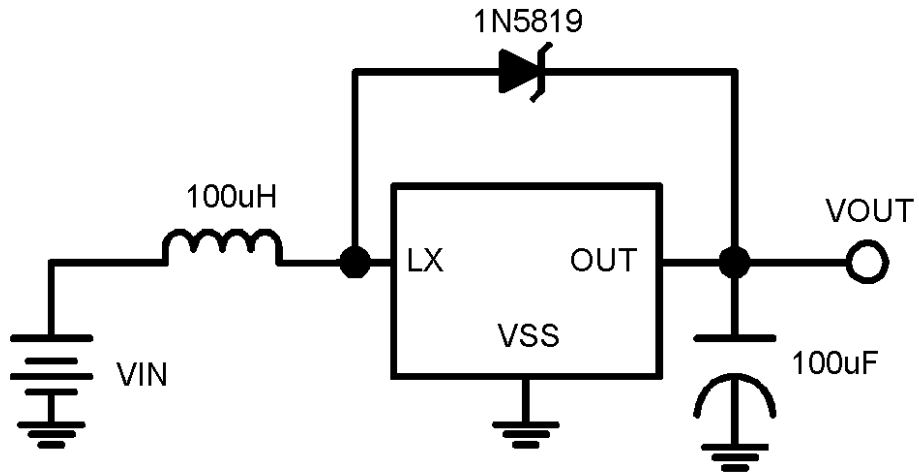
Electrical Characteristics

(T_a=+25°C)

Parameter	Part number	Symbol	Condition	Values			Unit
				Min.	Typ.	Max.	
Output Voltage	AT1301-33	V _{OUT}		3.218	3.300	3.382	V
	AT1301-50	V _{OUT}		4.875	5.000	5.125	V
Input Voltage		V _{IN}		-	-	8	V
Start-Up Voltage		V _{Start}	I _{OUT} =1mA V _{IN} =0→2V	-	0.7	0.9	V
Hold-On Voltage		V _{Hold}	I _{OUT} =1mA V _{IN} =2→0V	0.6	-	-	V
No-Load Input Current	AT1301-33	I _{IN1}	I _{OUT} =0mA	-	30	-	μA
	AT1301-50						
Supply Current	AT1301-33	I _{IN2}	V _{IN} = V _{OUT} + 0.5V Measurement of the IC input current in switch off	-	0.6	-	μA
	AT1301-50						
LX Switching Current	AT1301-33	I _{LX}	V _{LX} =0.4V	60	-	-	mA
	AT1301-50						
LX Leakage Current		I _{LXleak}	V _{LX} =8V V _{IN} =V _{OUT} +0.5V	-	0.6	0.8	mA
Maximum Oscillator Frequency		f _{OSC}		75	100	130	KHz
Oscillator Duty Cycle		DUTY	V _{LX} "L" side	60	70	80	%
Efficiency	AT1301-33	η	I _{OUT} =50mA	70	80	-	%
	AT1301-50						
V _{LX} Voltage Limit		V _{LXlimit}	LX Switch On	0.6	0.8	1.0	V

Unless otherwise provided, V_{IN}=2.0V (when V_{OUT}=3.3V); V_{IN}=3.0V (when V_{OUT}=5.0V), V_{SS}=0V, I_{OUT}=10mA, and use External Circuit of Typical Application (Fig 1).

Typical Application Schematic



Components Inductor(L):SPC-06704 100uH (TAIPEI MUL
TIPOWER ELECTRONICS CO.,LTD.)

Diode(D):1N5819

Capacitor(C):100uF(Tanttalum Type)

Fig. 1

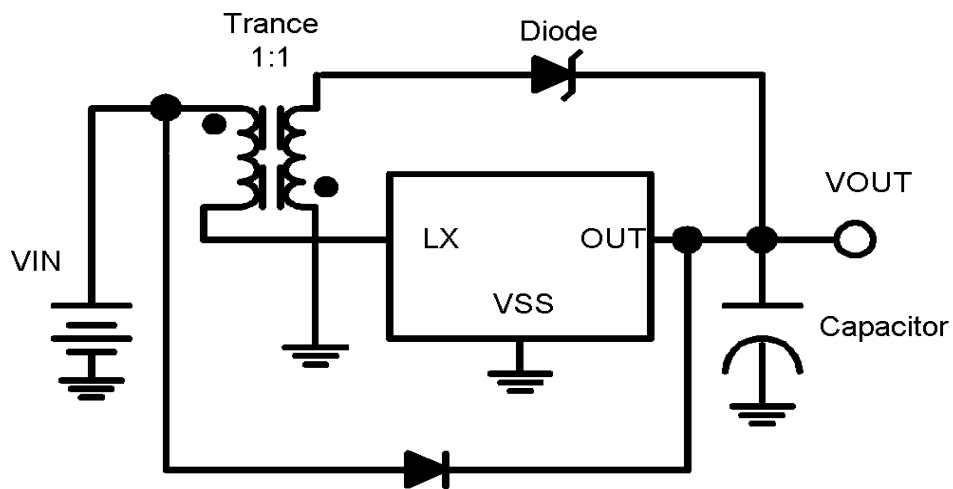
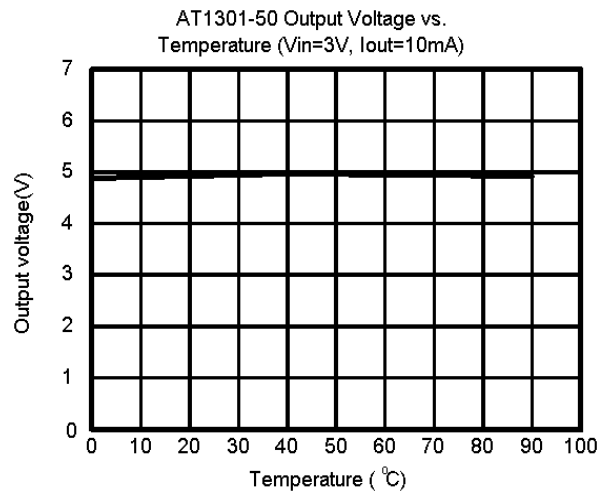
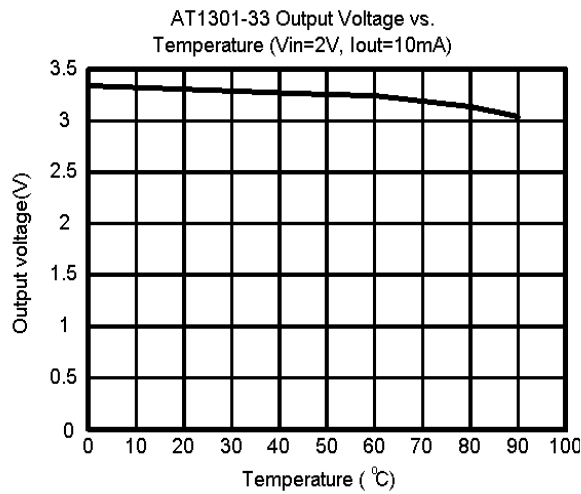
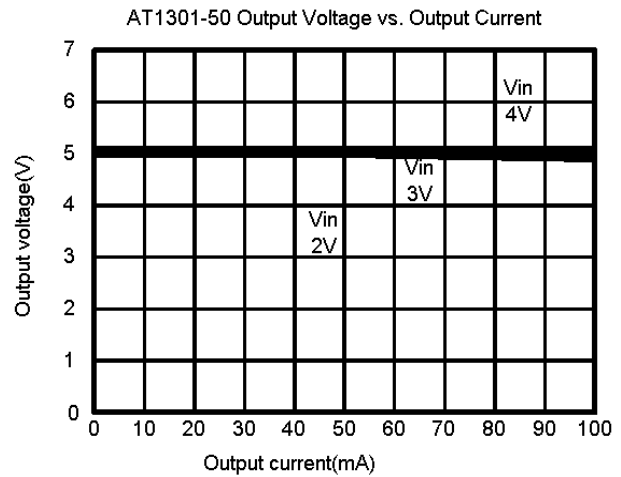
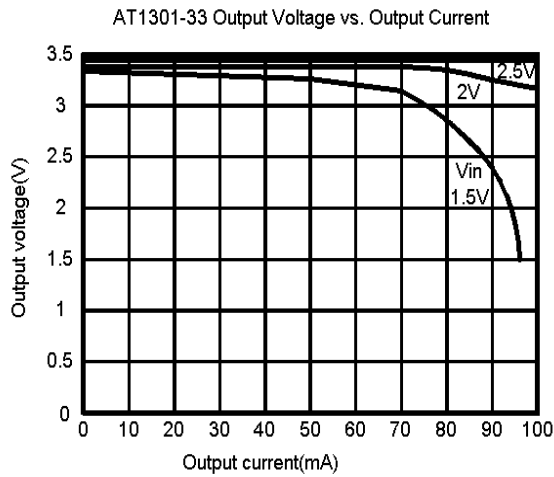
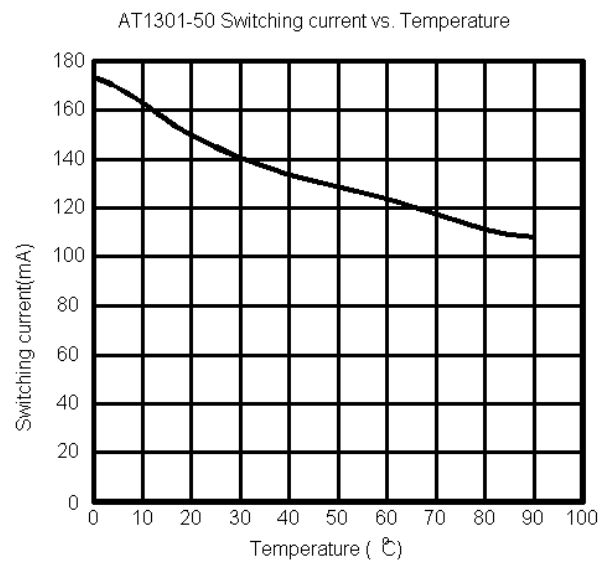
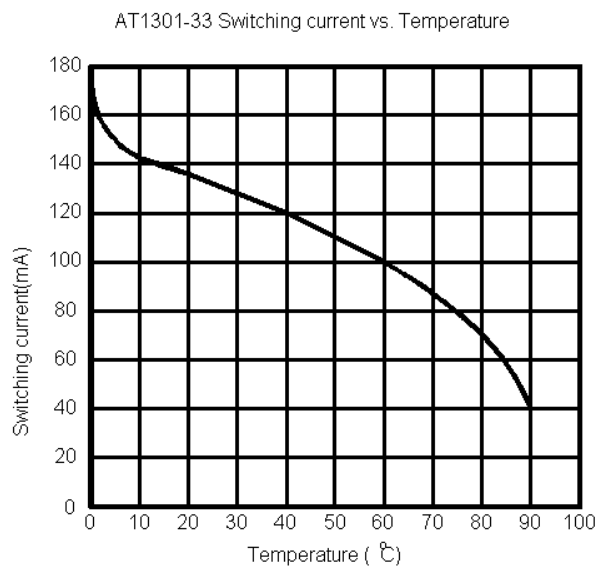
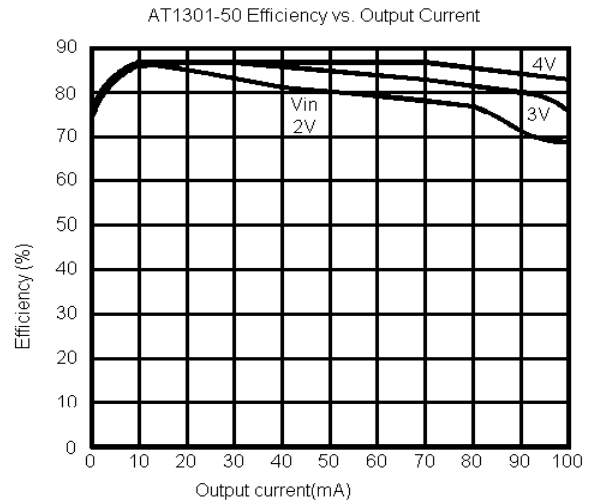
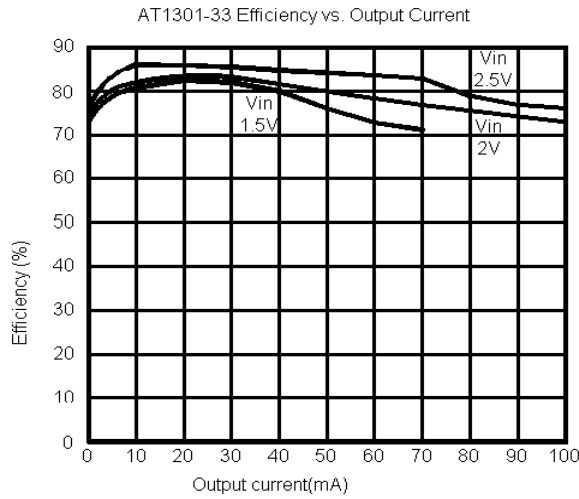


Fig. 2 Step-Up/Step-Down Circuit
with Flyback

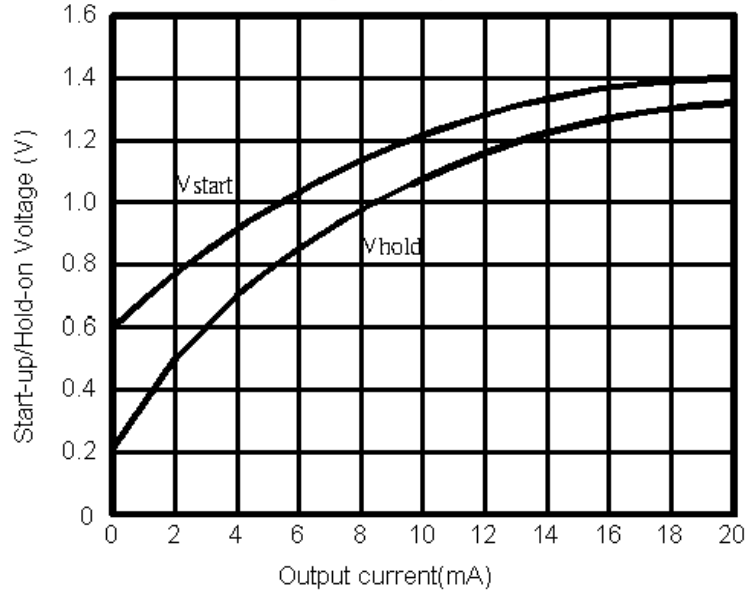
Operating Characteristics

Condition : $L = 100 \mu H$, $C = 22 \mu F$.

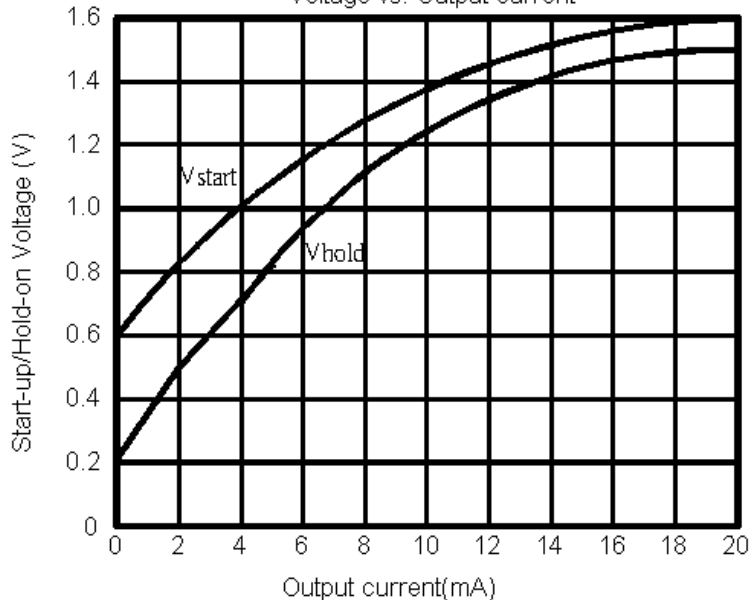




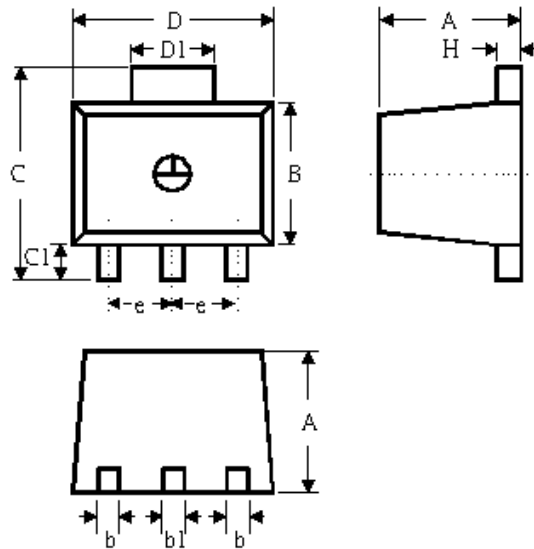
AT1301-33 Start-up/Hold-on
 Voltage vs. Output current



AT1301-50 Start-up/Hold-on
 Voltage vs. Output current



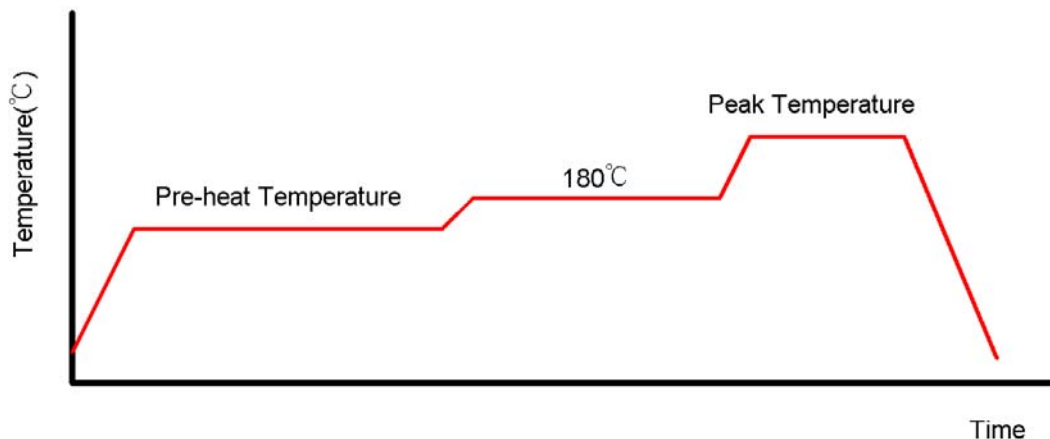
Package Information



Symbol	Dimension in millimeters		Dimensions in inches	
	Min	Max	Min	Max
A	1.397	1.600	0.055	0.063
b	0.356	0.483	0.014	0.019
B	2.388	2.591	0.094	0.102
b1	0.406	0.533	0.016	0.021
C	--	4.242	--	0.167
C1	0.787	1.194	0.031	0.047
D	4.394	4.597	0.173	0.181
D1	1.397	1.753	0.055	0.069
e	1.448	1.549	0.057	0.061
H	0.381	0.432	0.015	0.017

Reflow Condition (IR/Convection or VPR Reflow)

Reference JEDEC Standard J-STD-020A



Classification Reflow Profiles

	Convection or IR/Convection	VPR
Average Heating Rate(180°C to peak)	5°C/second max.	10°C/second max.
Preheat Temperature(125±20°C)	120 seconds max.	
Temperature maintained above 180°C	10~150 seconds	
Time within 5°C of actual Peak Temperature	10~20 seconds	60 seconds
Peak Temperature Range(Note 1)	219~225°C or 235~240°C	219~225°C or 235~240°C
Cooling Rate	6°C /second max.	10°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	

*1 The maximum peak temperatures for IR and VP reflow are depending on package dimensions.

Package Reflow Conditions

Pkg. Thickness ≥2.5mm and all bags	Pkg. Thickness <2.5mm and Pkg. Volume ≥350 mm ³	Pkg. Thickness <2.5mm and Pkg. Volume <350 mm ³
Convection 219~225°C		Convection 235~240°C
VPR 219~225°C		VPR 235~240°C
IR/Convection 219~225°C		IR/Convection 235~240°C