



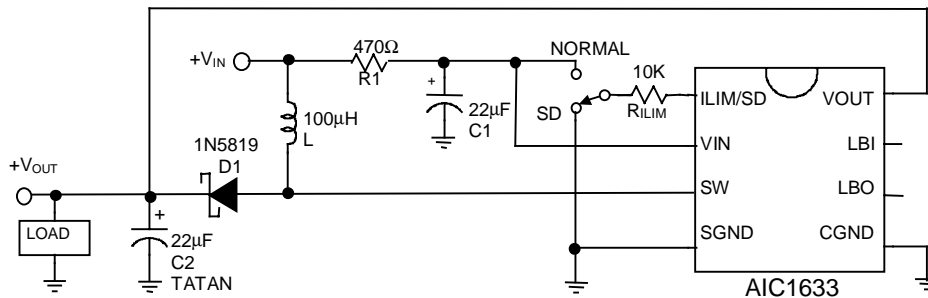
FEATURES

- High Efficiency Up To 87%.
- Power-Saving Shutdown Mode (7µA typical).
- Internal 0.8A Switch.
- 120KHz Switching Rate.
- Adjustable Switch Current Limit.
- On-Chip Low Battery Detector.

APPLICATIONS

- Pocket Organizers.
- Electronic Dictionaries.
- Cameras.
- Pagers.
- Bar-Code Scanners.
- LCD Displays.
- Battery Backup Supplies.
- Portable Instruments.

TYPICAL APPLICATION CIRCUIT



High-Efficiency Step-Up DC/DC Converter

ORDERING INFORMATION

AIC1633 XXX

- PACKAGE TYPE
N: PLASTIC DIP
S: SMALL OUTLINE
- TEMPERATURE RANGE
C=0°C~+70°C
- OUTPUT VOLTAGE
DEFAULT: 3.3V
3: 3.0V
5: 5.0V

ORDER NUMBER	PIN CONFIGURATION
AIC1633CN AIC1633-3CN AIC1633-5CN (PLASTIC DIP)	TOP VIEW
AIC1633CS AIC1633-3CS AIC1633-5CS (PLASTIC SO)	

**ABSOLUTE MAXIMUM RATINGS**

Supply Voltage	7.0V
Operating Temperature Range	0°C ~ 70°C
Storage Temperature Range	-65°C ~ 150°C

TEST CIRCUIT

Refer to Typical Application Circuit.

ELECTRICAL CHARACTERISTICS ($V_{IN}=3.0V$, $T_a=25^{\circ}C$, unless otherwise specified.)

PARAMETER	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Input Voltage		1.8		7	V
Output Voltage	$I_{LOAD}=70mA$ AIC1633 AIC1633-3 AIC1633-5	3.16 2.88 4.80	3.3 3 5	3.44 3.12 5.20	V
Switch off Current			105	140	μA
No Load Current	AIC1633/AIC1633-3 AIC1633-5		160 250		μA
Shutdown Mode Current			7	15	μA
Shutdown Recovery Time	$V_{IN}=2.5V$, $I_{LOAD}=70mA$		1.8		mS
Efficiency	$I_{LOAD}=70mA$ AIC1633/AIC1633-3 AIC1633-5		87 86		%
Line Regulation	$I_{LOAD}=40mA$ AIC1633, $V_{IN}=2.0\sim 3.3V$ AIC1633-3, $V_{IN}=2.0\sim 3.0V$ AIC1633-5, $V_{IN}=2.2\sim 4.5V$		0.6 0.6 0.5		$\%V_{OUT}$
Load Regulation	$I_{LOAD}=170mA$ AIC1633/AIC1633-3 AIC1633-5		0.6 0.5		$\%V_{OUT}$
Oscillator Frequency		90	120	150	KHz
LBI Pin Trip Point		1.17	1.22	1.27	V
SW "ON Resistance"	AIC1633/AIC1633-3 AIC1633-5		1.75 1.25		Ω
LBO "ON Resistance"	$V_{IN}=2V$		45		Ω

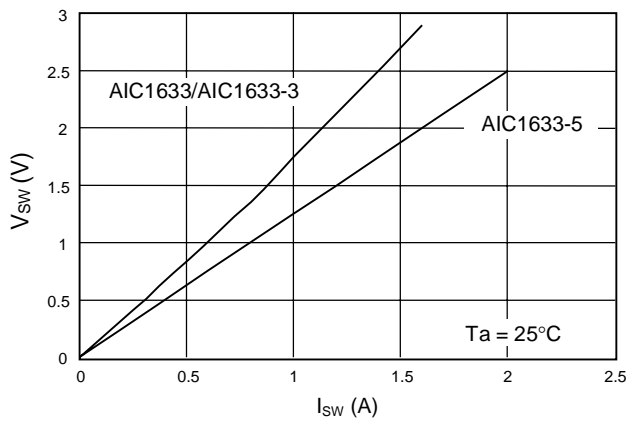


ELECTRICAL CHARACTERISTICS (CONTINUED)

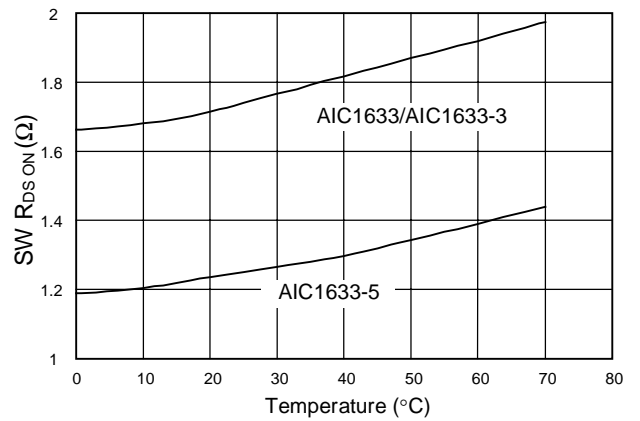
PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
SW Off Leakage				1	μA
Input Pin Bias Current				10	nA/Pin
Output Pin Leakage				10	nA/Pin

TYPICAL PERFORMANCE CHARACTERISTICS

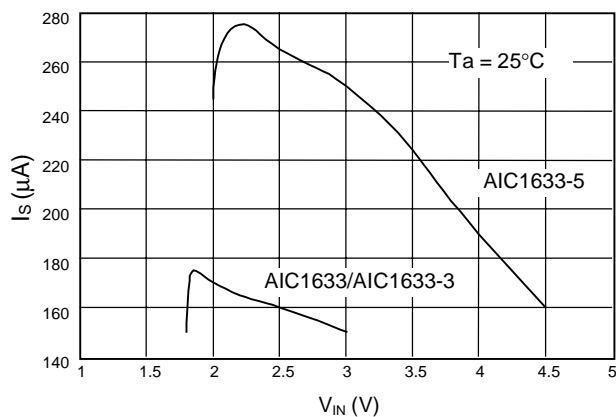
Switch Voltage vs Current



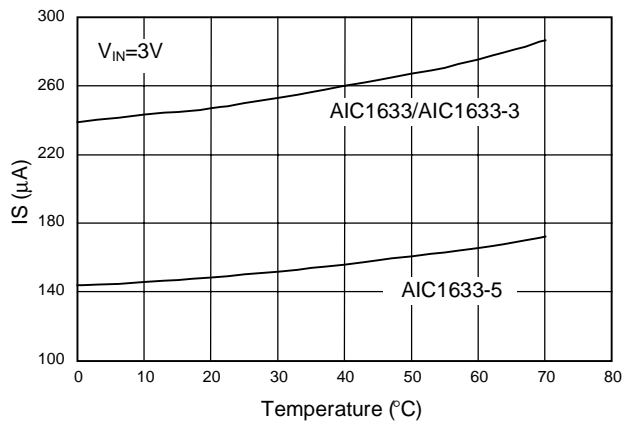
SW ON Resistance vs Temperature



No Load Supply Current vs Input Voltage



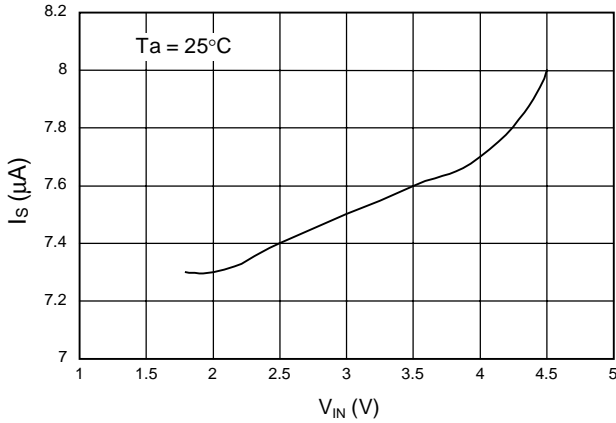
No Load Supply Current vs Temperature



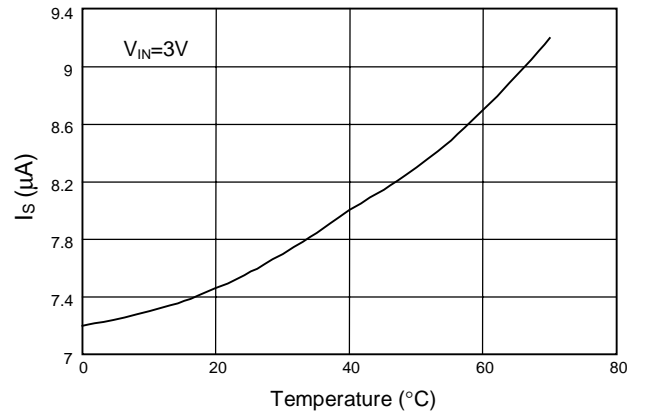


TYPICAL PERFORMANCE CHARACTERISTICS (CONTINUED)

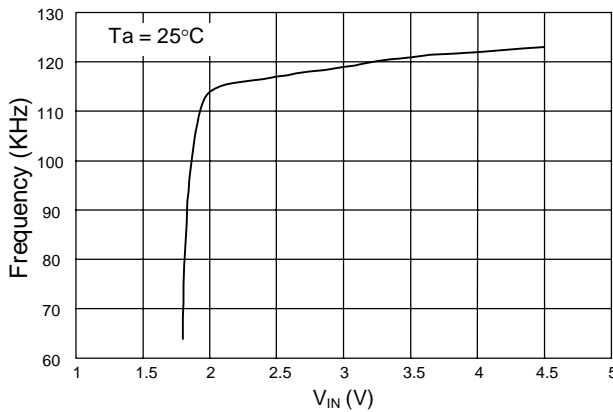
Shutdown Mode Supply Current vs Input Voltage



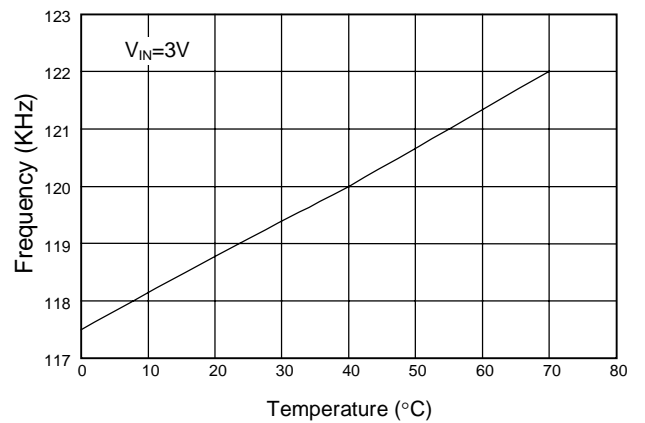
Shutdown Mode Supply Current vs Temperature



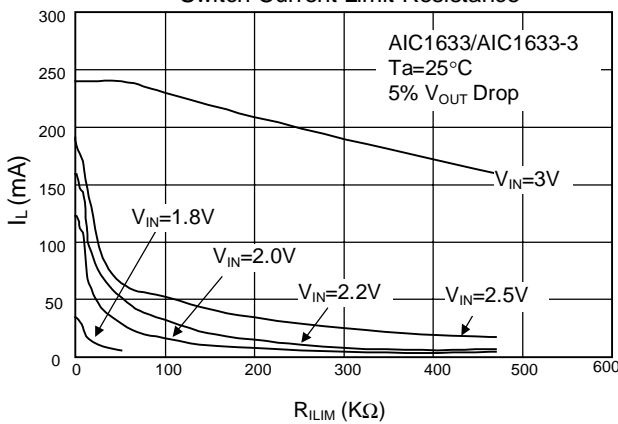
Oscillator Frequency vs Input Voltage



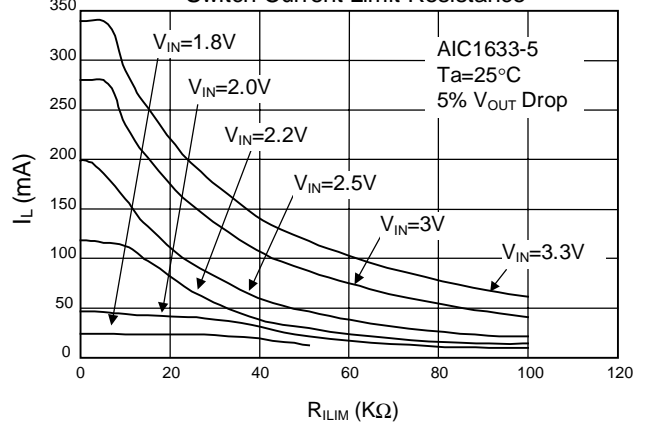
Oscillator Frequency vs Temperature



Maximum Load Current vs Switch Current Limit Resistance

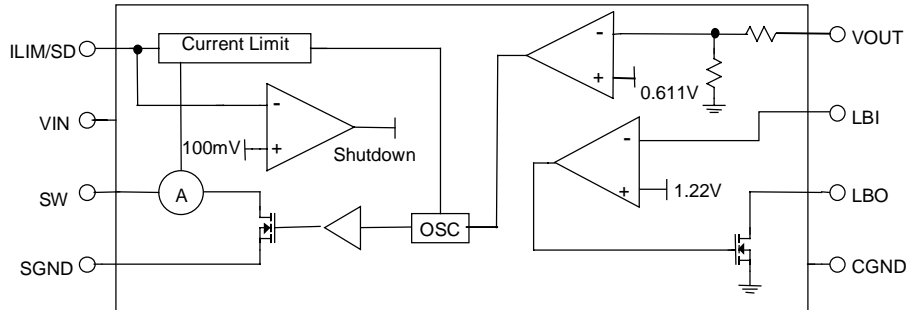


Maximum Load Current vs Switch Current Limit Resistance





■ BLOCK DIAGRAM



■ PIN DESCRIPTIONS

- PIN 1: ILIM/SD- 1. Connected to VIN pin through a resistor to set the switch peak current. It serves to protect IC and inductor, as well as to improve efficiency and output ripples. However, supply capability of the AIC1633 is limited by the current limit resistor. (See typical performance characteristics). The ILIM/SD pin should be shorted to VIN pin if limiting on switch peak current is not intended.
2. The AIC1633 goes in shutdown mode and consumes less than 10 μ A when ILIM/SD pin is pulled to ground.
- PIN 2: VIN - Input supply.
- PIN 3: SW - Drain of the power switch, to be connected to inductor/ diode.
- PIN 4: SGND - Ground connected to source of power switch.
- PIN 5: CGND - Ground for control circuits of the IC. It should be separated from SGND to avoid the interference.
- PIN 6: LBO - Open drain output of the battery low detector, with 45 Ω "ON resistance" at $V_{IN}=2V$. It is pulled low when the voltage on LBI pin is below 1.22V.
- PIN 7: LBI - The noninverting input of the battery low detector, of which the inverting input is internally connects to 1.22V voltage reference.
- PIN 8: VOUT - The output voltage feedbacks to the IC through this pin.



APPLICATION EXAMPLES

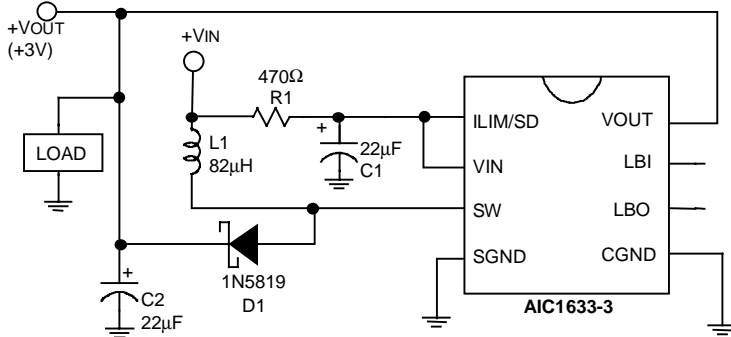


Fig. 1 3V Output Step-Up Converter

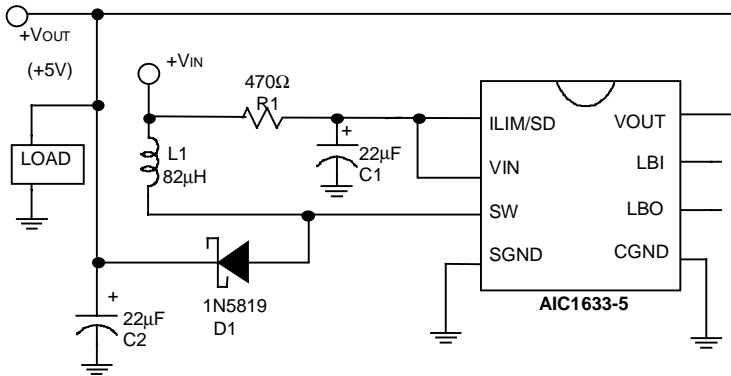
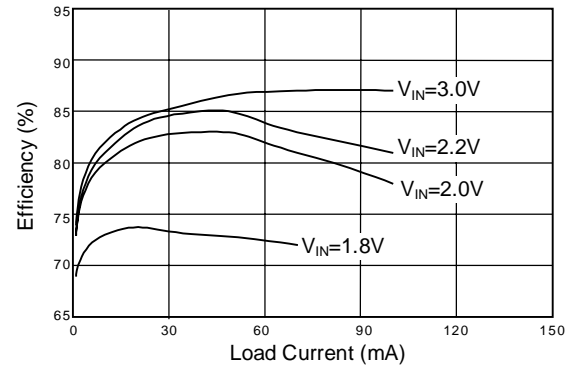
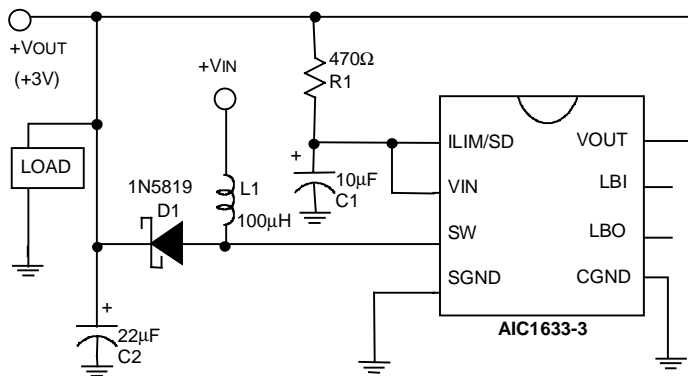
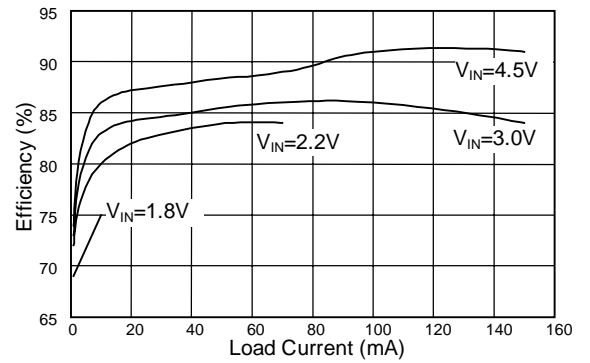
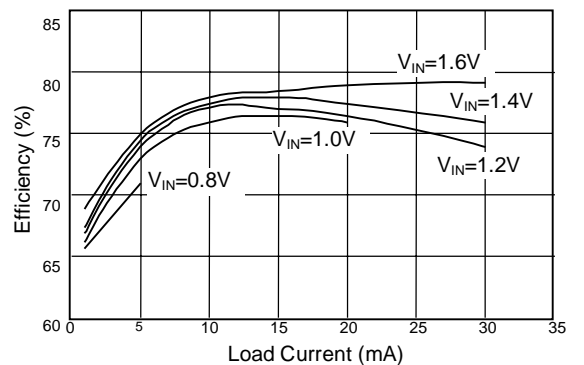


Fig. 2 5V Output Step-Up Converter



Start-Up V_{IN} Voltage = 1.4V

Fig. 3 1-Cell Input 3V Output Step-Up Converter





APPLICATION EXAMPLES (CONTINUED)

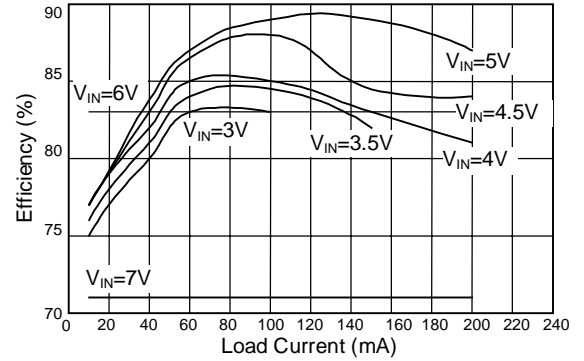
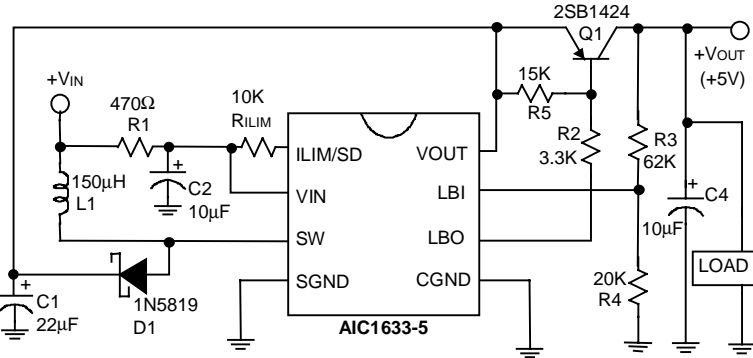
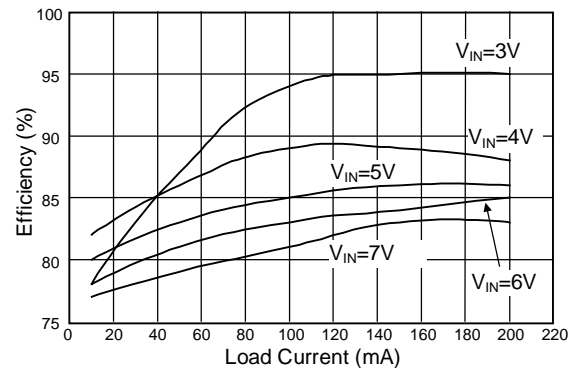
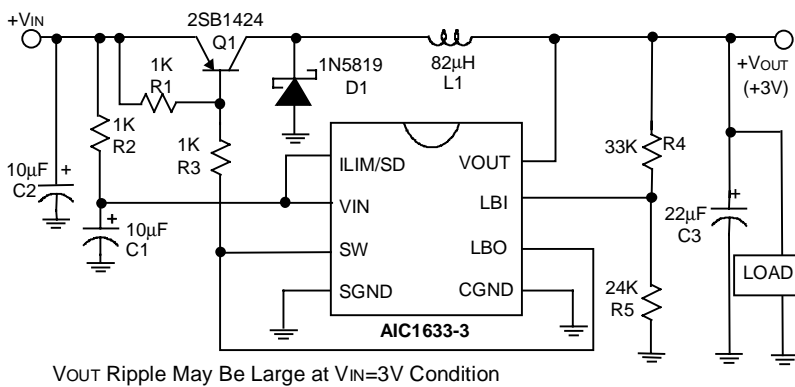


Fig. 4 4-Cell Input Step-Up/ Step-Down Converter



Vout Ripple May Be Large at VIN=3V Condition

Fig. 5 3-Cell Input 3V Output Step-Down Converter

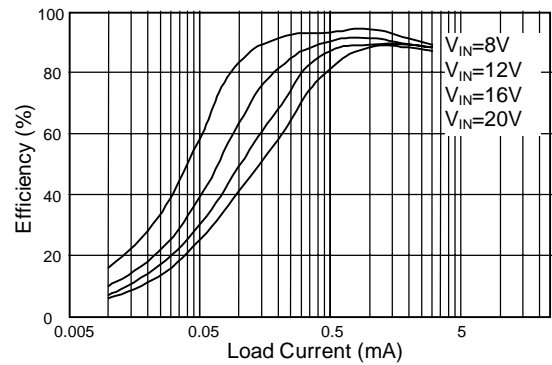
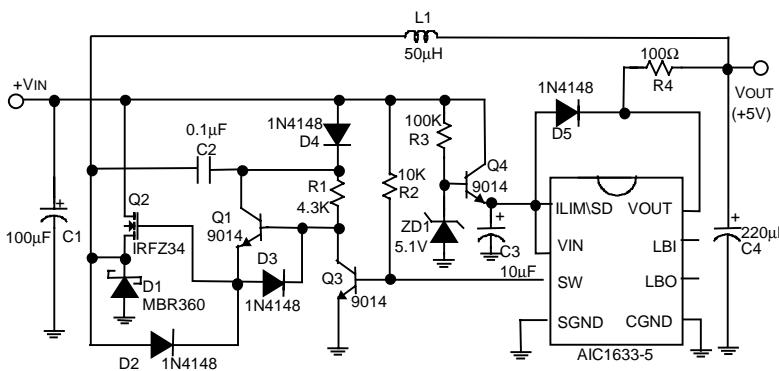
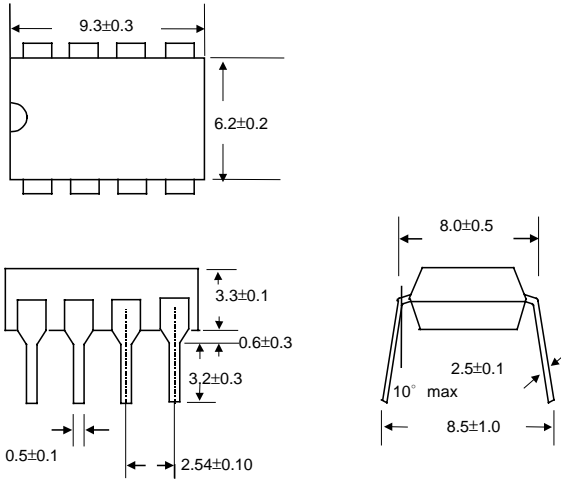


Fig. 6 Boost-Driven 5V Output Step-Down Converter

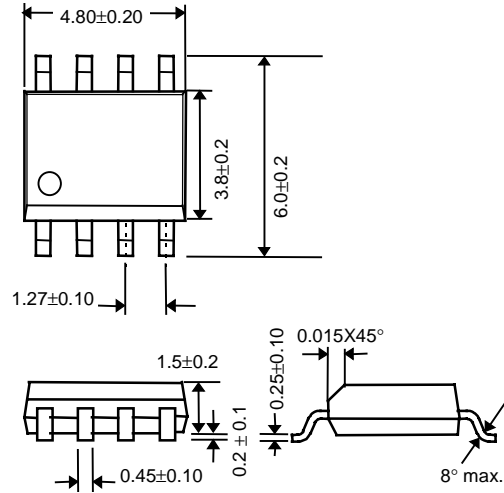


PHYSICAL DIMENSION

8 LEAD PLASTIC DIP



8 LEAD PLASTIC SO



UNIT: mm