

High-Efficiency, Bootstrapped DC/DC Converter

FEATURES

- 3V to 20V Input Voltage Operation.
- Internal 800mA Switch.
- Bootstrapped Driver for N-Channel MOSFET.
- High Efficiency (up to 90%).
- Fast Transient Response.
- Internal $\pm 2\%$ Reference.
- Low Quiescent Current at 1.6mA.
- Frequency Operation from 200Hz to 200KHz.

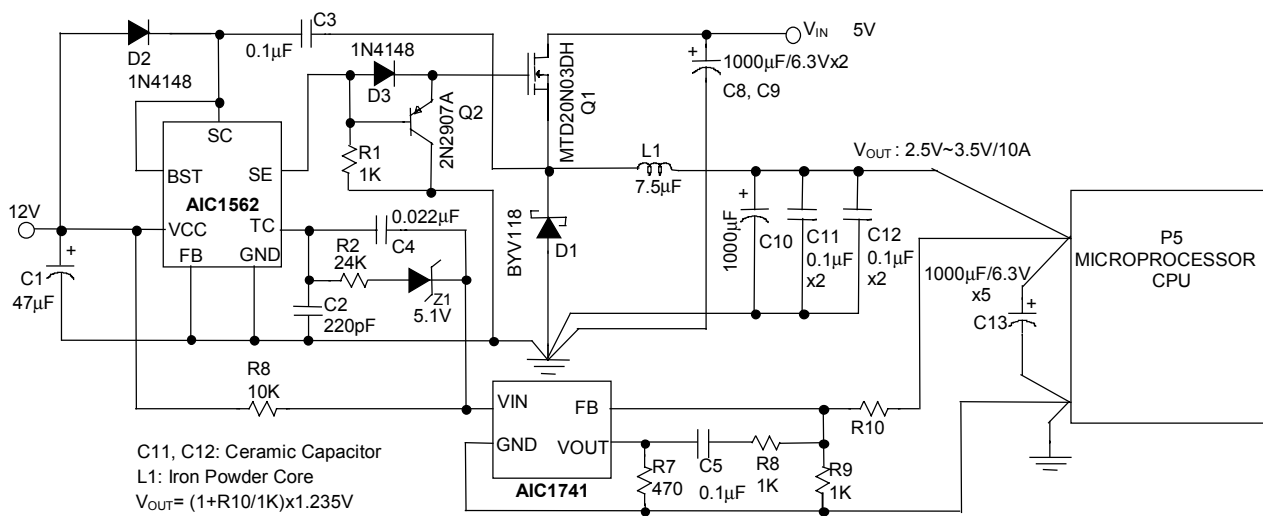
APPLICATIONS

- CPU Power Supplies for Mother Boards.
- DC/DC Converters for CPU VRMs.
- Step-Down DC-DC Converter Module.

DESCRIPTION

The AIC1562 is a high performance monolithic DC/DC converter drive IC with output-bootstrapping capability, designed specifically for driving N-channel MOSFET to achieve maximum possible power conversion efficiency. The device consists of an internal temperature compensated reference, comparator, controlled duty cycle oscillator, bootstrapped driver and a 800mA output switch. Working with the AIC1741, a low power adjustable regulator, the AIC1562 works at 100% duty cycle under heavy load transient conditions to minimize transient response time, making it an idea precision switching power solution to stringent requirements on computer mother boards.

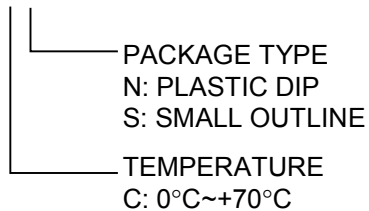
TYPICAL APPLICATION CIRCUIT

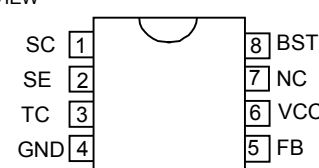


CPU Power Supply for P5 Mother Board

ORDERING INFORMATION

AIC1562 XX



ORDER NUMBER	PIN CONFIGURATION
AIC1562CN (PLASTIC DIP)	TOP VIEW 
AIC1562CS (PLASTIC SO)	

ABSOLUTE MAXIMUM RATINGS

Supply Voltage	20V
Comparator Input Voltage Range	-0.3V~20V
Switch Collector Voltage	20V
Switch Emitter Voltage	20V
Switch Collector to Emitter Voltage	20V
Driver Collector Voltage	20V
Switch Current	1A

Power Dissipation and Thermal Characteristics

DIP Package

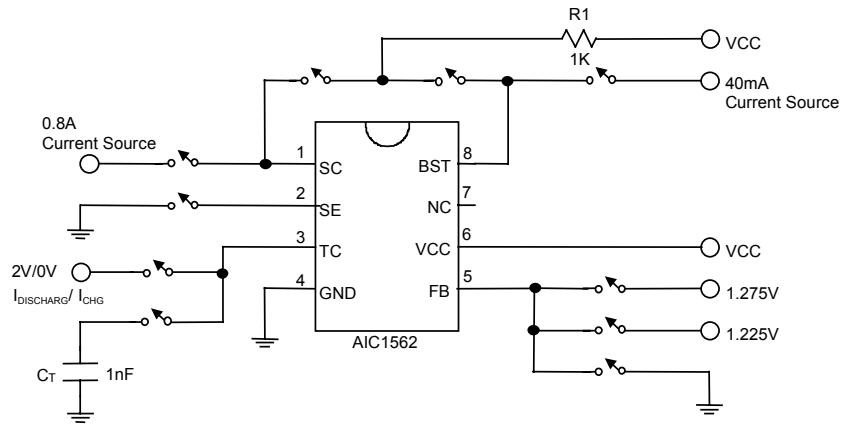
Ta= 25°C	1.0W
Thermal Resistance	100°C/W

SO Package

Ta= 25°C	625mW
Thermal Resistance	160°C/W

Operating Junction Temperature	125°C
Operating Ambient Temperature Range	0°C~70°C
Storage Temperature Range.....	- 65°C ~ 150°C

TEST CIRCUIT

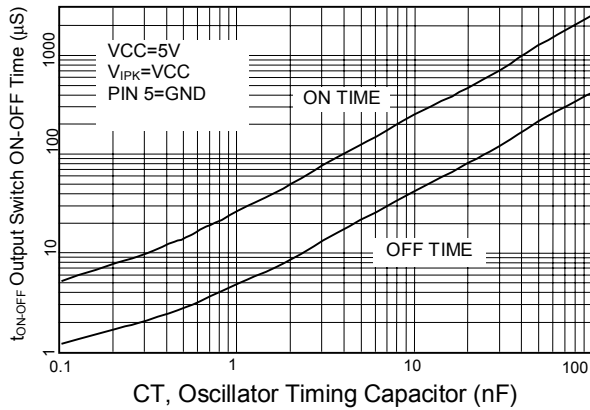


ELECTRICAL CHARACTERISTICS ($V_{CC}=5V$, $T_a=25^{\circ}C$ unless otherwise specified.)

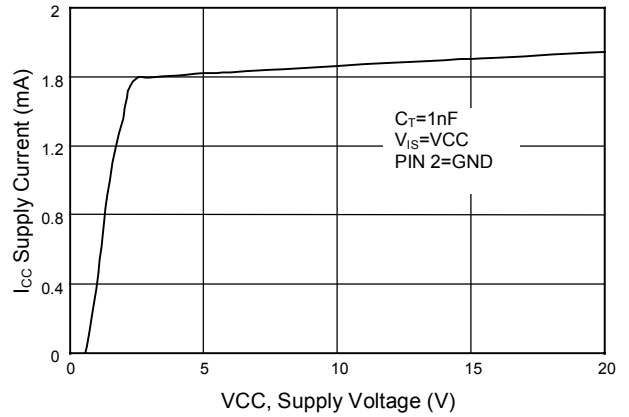
PARAMETER	TEST CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Oscillator						
Charging Current	$5.0V \leq V_{CC} \leq 20V$	I_{CHG}	15	25	35	A
Discharge Current	$5.0 \leq V_{CC} \leq 20V$	I_{DISCHG}	120	150	180	μA
Voltage Swing	PIN 3	V_{OSC}		0.6		V
Discharge to Charge Current Ratio	$V_{IS} = V_{CC}$	I_{DISCHG} / I_{CHG}		6.0		
Output Switch						
Saturation Voltage, Emitter Follower Connection	$I_{SE}=0.8A$; $V_{BST} = V_{SC} = V_{CC}$	$V_{CE(SAT)}$		1.6	2.0	V
Saturation Voltage	$I_{SC}=0.8A$; $I_{BST} = 40mA$, (Forced $\cong 20$)	$V_{CE(SAT)}$		0.5	0.8	V
DC Current Gain	$I_{SC} = 0.8A$; $V_{CE}=5.0V$	h_{FE}	35	120		
Collector Off-State Current	$V_{CE}=20V$	$I_{C(OFF)}$		10		nA
Comparactor						
Threshold Voltage	$T_a=25^{\circ}C$ $0^{\circ}C \leq T_a \leq 70^{\circ}C$	V_{FB}	1.225	1.25	1.275	V
			1.21		1.29	V
Threshold Voltage Line Regulation	$3.0V \leq V_{CC} \leq 20V$	REG_{LINE}		0.1	0.5	mV/V
Input Bias Current	$V_{IN}=0V$	I_{IB}		0.4	2	μA
Supply current	$V_{IS} = V_{CC}$, pin 5 > V_{FB} $5.0V \leq V_{CC} \leq 20V$ $C_T=1nF$ PIN 2=GND Remaining pins open	I_{CC}		1.6	3	mA

TYPICAL PERFORMANCE CHARACTERISTICS

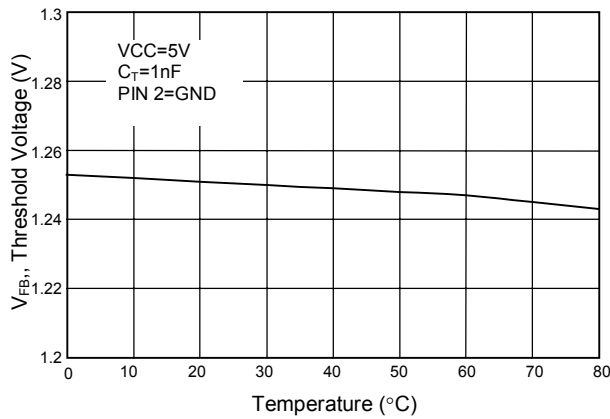
Output Switch ON-OFF Time vs. Oscillator Timing Capacitor



Standby Supply Current vs. Supply Voltage



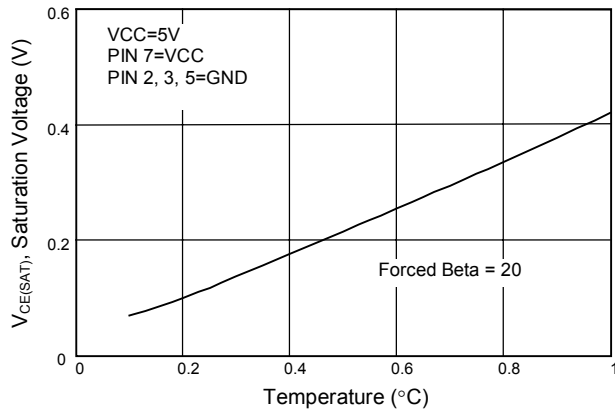
V_{FB} , Threshold Voltage vs Temperature



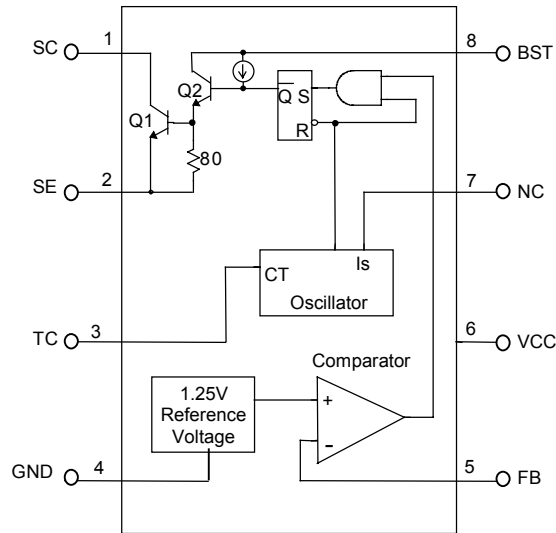
Emitter Follower Configuration Output Switch Saturation Voltage vs. Emitter Current



Common Emitter Configuration Output Switch Saturation Voltage vs. Collector Current



■ BLOCK DIAGRAM

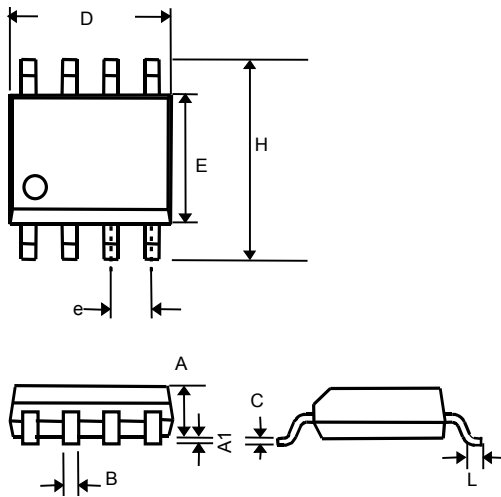


■ PIN DESCRIPTIONS

- PIN 1: SC - 0.8A switch collector.
- PIN 2: SE - Darlington switch emitter.
- PIN 3: TC - Oscillator timing capacitor.
- PIN 4: GND - Power ground.
- PIN 5: FB - Feedback comparator inverting input.
- PIN 6: VCC - Power supply input.
- PIN 7: NC -
- PIN 8: BST - Bootstrapped driver collector.

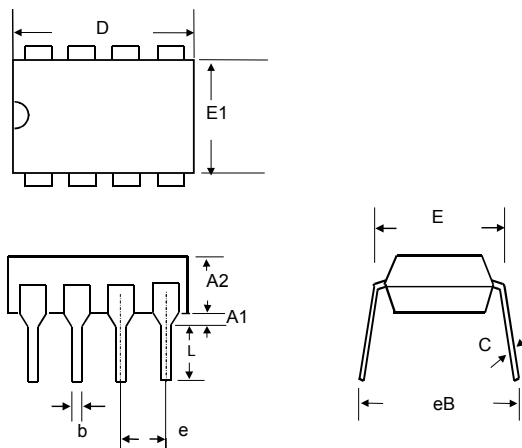
PHYSICAL DIMENSIONS

● 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