

## FEATURES

- Provides power switching of up to 1.5 amps at voltages between 3.0 and 5.0 volts
- Five separate power switches
- Selectable battery switches for use with battery-backed systems
- Very low on impedance of 0.7Ω
- Battery backup current of 4 mA
- Diode-isolated battery path
- Available in 16-pin DIP or 16-pin SOIC surface mount package
- Low voltage drop battery path
- Connects directly to a variety of Dallas Semiconductor devices, adding increased switching capability for large battery backup current applications

## PIN ASSIGNMENT

OUT5	1	16	V <sub>CC</sub> /IN1
PF	2	15	PF
IN5	3	14	GND
IN2	4	13	OUT1
IN4	5	12	OUT2
V <sub>BATIN</sub>	6	11	OUT3
V <sub>BAT02</sub>	7	10	V <sub>BAT01</sub>
OUT4	8	9	IN3

16-Pin DIP (300-mil)

 See Mach. Drawings  
 Section

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## PIN DESCRIPTION

V <sub>CC</sub> /IN1	- +5V Input and Input 1
IN2 - IN5	- Inputs 2 - 5
OUT1 - 5	- Outputs 1 - 5
V <sub>BATIN</sub>	- External Battery Input
V <sub>BAT01</sub>	- Diode Protected Battery Output
V <sub>BAT02</sub>	- Low Voltage Drop Battery Output
PF, $\overline{PF}$	- Power-fail Inputs
GND	- Ground

## DESCRIPTION

The DS1336 Afterburner Chip is designed to provide power switching between a primary power supply (V<sub>CC</sub>) and a backup battery power supply (V<sub>BAT</sub>). Five V<sub>CC</sub> and two battery paths are provided which can be used individually or in parallel to supply uninterrupted power in applications such as SRAM networks. When used with one of the Dallas power monitoring devices listed in Table 1, the DS1336 allows a load to be switched from its main power supply V<sub>CC</sub> to a battery backup supply when V<sub>CC</sub> falls out of tolerance. A user may selectively tie together any combination of the output pins to provide the desired high current supply, providing up to 300 mA per OUT pin or a maximum of 1.5A. Depending upon the user's backup supply load requirements, either of the V<sub>BAT</sub> outputs may be tied to the OUT pins to supply

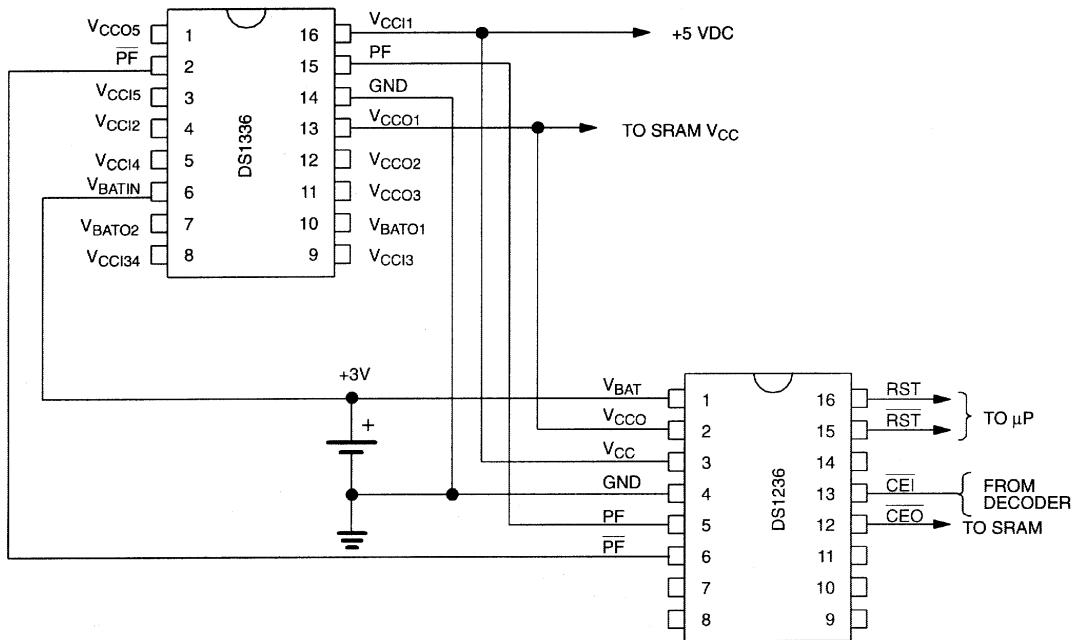
current when  $V_{CC}$  is out of tolerance. The DS1336 switches back to the higher current  $V_{CC}$  from battery current when PF and  $\overline{PF}$  become inactive.

## OPERATION

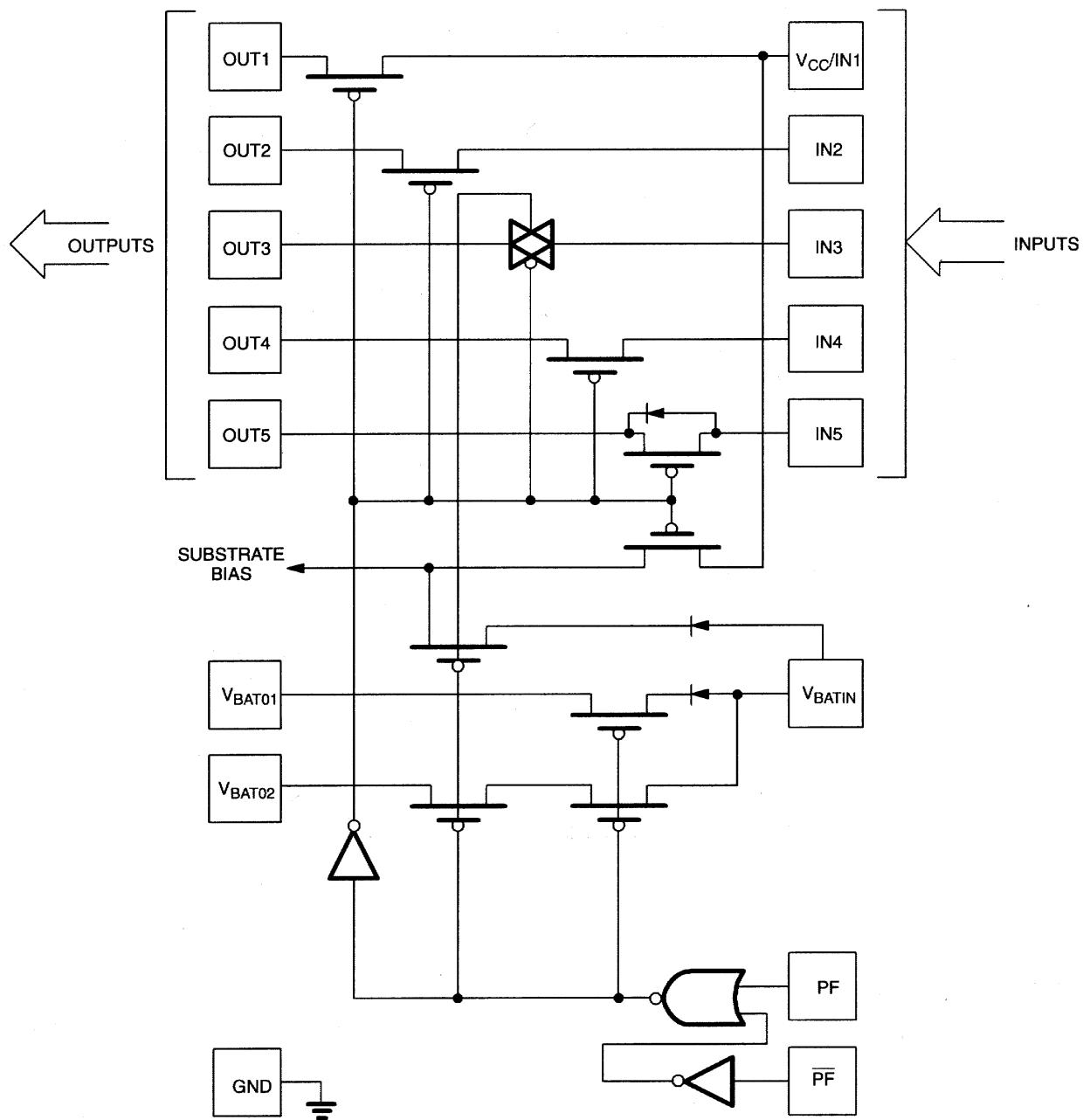
The required PF or  $\overline{PF}$  input which controls the switching between the main  $V_{CC}$  and backup battery can be supplied by any of the devices listed in Table 1. All of the devices provide the DS1336 with a PF or  $\overline{PF}$  signal, switching between a main supply  $V_{CC}$  and backup supply  $V_{BAT}$  when  $V_{CC}$  falls out of tolerance. For applications requiring switching from the  $V_{CC}$  supply inputs to  $V_{BAT}$ , the required PF or  $\overline{PF}$  input to the DS1336 can be provided by the DS1236, DS1239, DS5001, or DS5340. For applications requiring switching from the  $V_{CC}$  inputs to the  $V_{BAT}$  input when  $V_{CC}$  begins falling out of tolerance, any of the Dallas Semiconductor devices listed in Table 1 can provide the DS1336 with the required switching input. A typical application is shown in Figure 1. For applications where switching between  $V_{CC}$  and  $V_{BAT}$  must occur at a voltage level such that  $V_{CC}$  is still greater than  $V_{BAT}$ , the OUT5 pin is recommended as it provides a diode path which will provide for a gradual transition between  $V_{CC}$  and  $V_{BAT}$ . OUT5 can be tied to the other OUTPUT pins to provide a gradual transition for all five current paths. In applications where tri-state switching is desired, OUT5 should be omitted. Only the PF/ $\overline{PF}$  pin is required for switching. In cases where the PF input will not be used, it should be connected to GND.

When either PF or  $\overline{PF}$  is active, either of the  $V_{BAT0X}$  outputs is available, although they should not be tied together (Figure 2, "DS1336 Block Diagram").  $V_{BAT01}$  is recommended for sensitive applications such as providing backup current to timekeepers, because its diode isolated path provides for increased protection.  $V_{BAT02}$  is not recommended for applications where it would be tied to an OUTPUT pin supplying a voltage greater than that of the backup battery because  $V_{BAT02}$  is not a diode isolated current path.

## TYPICAL APPLICATION Figure 1



## DS1336 BLOCK DIAGRAM Figure 2



**DALLAS SEMICONDUCTOR DEVICES WHICH PROVIDE PF OR  $\overline{PF}$  INPUT TO NIL** Table 1

<b>DEVICE</b>	<b>SWITCH &gt; <math>V_{BAT}</math></b>	<b>SWITCH AT <math>V_{BAT}</math></b>	<b>DEVICE</b>	<b>SWITCH &gt; <math>V_{BAT}</math></b>	<b>SWITCH AT <math>V_{BAT}</math></b>
DS1211	X		DS1238	X	X
DS1212	X		DS1239	X	X
DS1231	X		DS1259	X	
DS1232	X		DS1260	X	
DS1233	X		DS1610	X	
DS1233A		X	DS1632	X	
DS1233D	X		DS1833	X	
DS1234	X		DS5001	X	X
DS1236	X	X	DS5340	X	X
DS1237	X				

**ABSOLUTE MAXIMUM RATINGS\***

Voltage on Any Pin Relative to Ground	-0.3V to +7.0V
Operating Temperature	0°C to 70°C
Storage Temperature	-55°C to +125°C
Soldering Temperature	260°C for 10 seconds

- \* This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

**DC OPERATING CONDITIONS** $(t_A = 0^\circ\text{C} \text{ to } 70^\circ\text{C}; V_{CC} = 5\text{V} \pm 10\%)$ 

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Supply Voltage	$V_{CC1}$	3.0	5.0	5.5	V	1
Supply Current	$I_{CC1}$		0.25	1.0	mA	
Supply Current	$I_{CC2}$		50	100	nA	3
Input Low Voltage	$V_{IL}$			0.8	V	1
Input High Voltage	$V_{IH}$	2.0		$V_{CC}$	V	1
Current Output $V_{CC}=V_{CC1}$ , $PF=0$ , $\bar{PF}=1$	$I_{CCO}$			300	mA	2
Current Output $V_{CC}=0$ , $PF=1$ , $\bar{PF}=0$	$I_{BAT01-2}$			4.0	mA	4
Current, Forward Bias of $V_{CC5}$ Diode	$I_{FB}$			20	mA	
Off Impedance	$R_{OFF1}$	5.0			$M\Omega$	5
Off Impedance	$R_{OFF2}$	10			$M\Omega$	6
On Impedance	$R_{ON1}$			0.7	$\Omega$	7
On Impedance	$R_{ON2}$			50	$\Omega$	8

**AC CHARACTERISTICS** $(t_A = 0^\circ\text{C} \text{ to } 70^\circ\text{C}; V_{CC} = 5\text{V} \pm 10\%)$ 

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	NOTES
Propagation Delay	$t_{PD}$		10		ns	9
Switch Delay Power-fail	$t_{PF}$		100		ns	
Switch Delay Power-on	$t_{PON}$			100	ns	
Capacitance PF, $\bar{PF}$	$C_I$			7	pF	

**NOTES:**

1. All voltages referenced to ground.
2.  $I_{CCO}$  with a voltage drop of 0.2 volts from any  $V_{CCO}$  output.
3.  $V_{CC}=0$ ,  $V_{BATIN}=3.0$  volts.
4.  $V_{BAT01}$  with a voltage drop of 1.0 volts.
5.  $R_{OFF1}$  applies to  $V_{CCO1, 2, 3, 4}$ .
6.  $R_{OFF2}$  applies to  $V_{BAT01, 2}$ .

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- 7. Applies to  $V_{CCO1-5}$ , 300 mA.
  - 8. Applies to  $V_{BATO1-2}$ , 4 mA.
  - 9.  $V_{CCI3}$  to  $V_{CCO3}$  delay when used as chip enable control for write protection of a memory device. In this application a current 8 mA source current on  $V_{CCI3}$  with 50 pF load on  $V_{CCO3}$  can be accommodated.