

## FEATURES

- 2.4V ~ 7.0V Power supply.
- Low shutdown current at 0.1uA (Typical).
- Low quiescent current at 90.0uA (Typical).
- Adjustable Output Voltage to -40V.
- 60KHz ~ 160KHz Switching Frequency.
- High Efficiency with Low Cost External PNP Bipolar Transistor.
- Pulse Frequency Modulation Maintains High Efficiency (80%).
- Lead free and green package available. (RoHS Compliant)
- Space Saving Package :  
- 8-pin SOP package.

## GENERAL DESCRIPTION

The LY1152 is a high performance inverting DC/DC controller, and the LY1152 designed to drive an external power switch to generate adjustable negative voltages. Output voltage can be scaled to -40V.

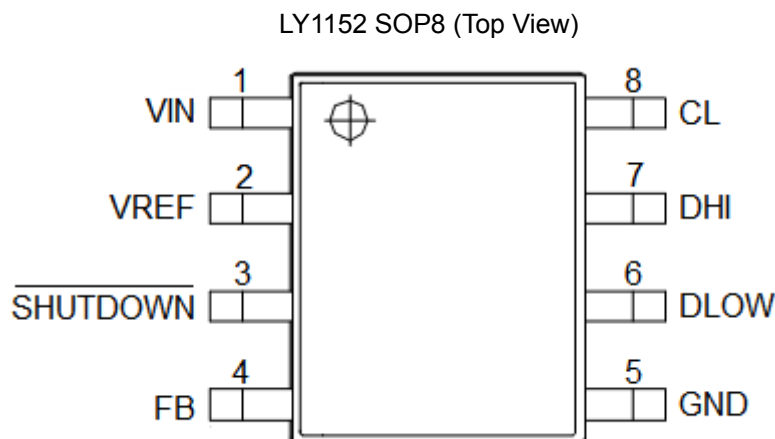
The LY1152 quiescent current is about 90.0uA and shutdown mode current can be reduced to 0.1uA. In the LCD bias contrast application, efficiency of 80% can be achieved with low cost PNP bipolar transistor drivers.

The LY1152 switching frequency can be around 60KHz to 160KHz range, and small size package is ideally suited for powered portable equipments.

## APPLICATION

- Negative Voltage Supply.
- Negative LCD Contrast Bias for
  - Portable Data Collection Terminals.
  - Notebook Computers.

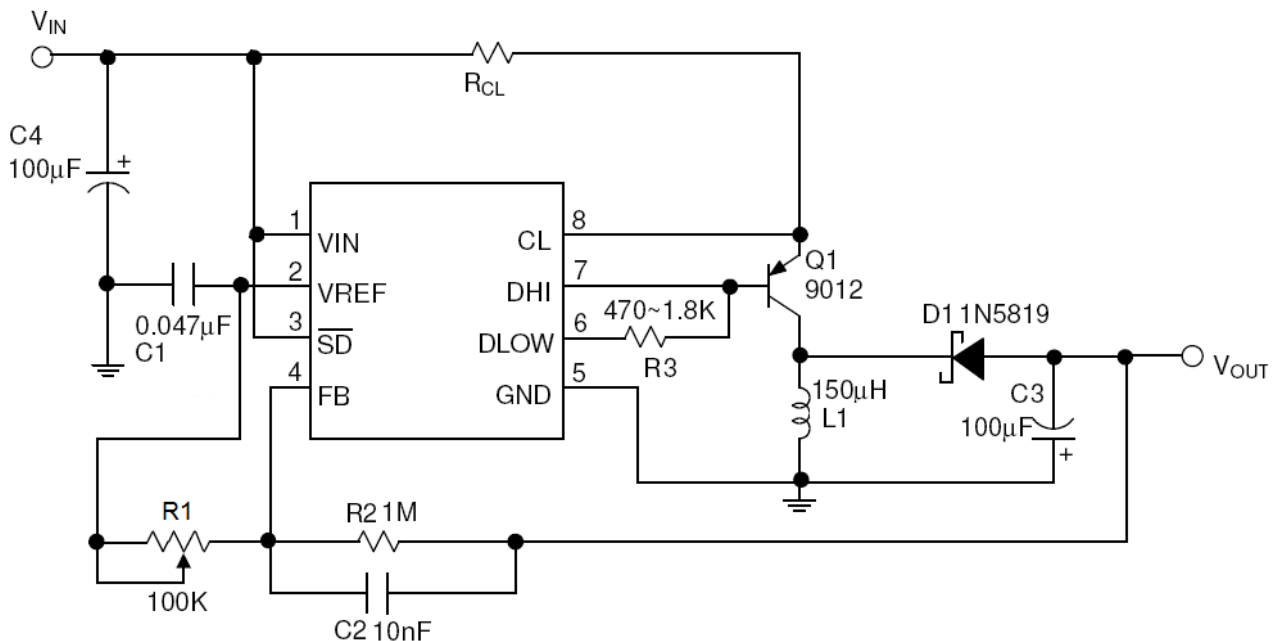
## PIN CONFIGURATION



**PIN DESCRIPTION**

SYMBOL	PIN NO	DESCRIPTION
VIN	1	Power supply input
VREF	2	Reference output (1.22V).(*1)
SHUTDOWN	3	Shutdown the device.(when low level is enable)(*2)
FB	4	Feedback signal input to sense ground.(*3)
GND	5	Ground.
DLOW	6	Driver sinking output.(*4)
DHI	7	Driver sourcing output.(*5)
CL	8	Current-limit input.(*6)

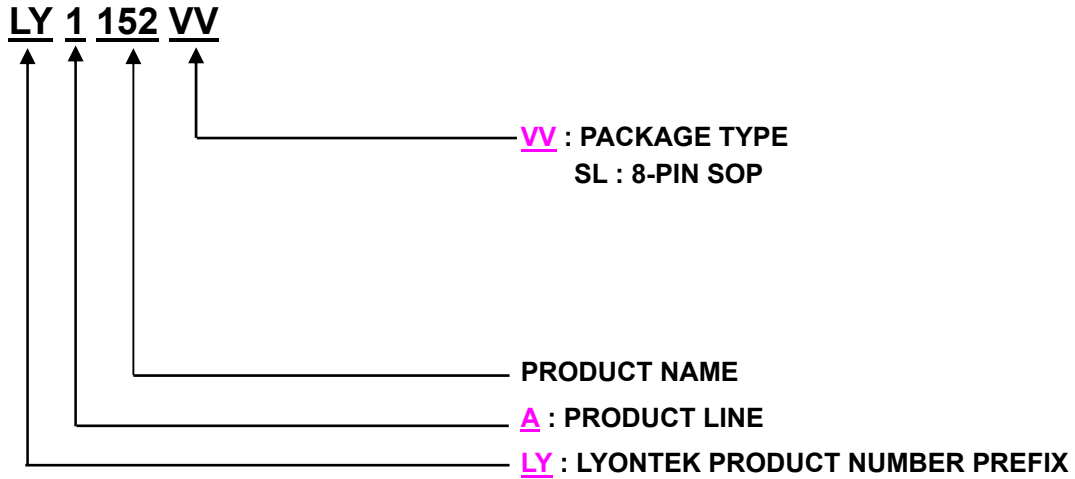
- (\*1) : Bypass with 0.047 $\mu$ F capacitor to GND, Sourcing capability is guaranteed to be greater than 250 $\mu$ A.
- (\*2) : >1.5V = operation mode, GND = shutdown, In shutdown mode DLOW and DHI pins are at high level.
- (\*3) : Connecting a resistor R2 to VOUT and a resistor R1 to VREF pin yields the output voltage:  
 $V_{OUT} = -(R2/R1) \times V_{REF}$
- (\*4) : When using an external PNP bipolar transistor, connect a resistor R3 from this pin to DHI. R3 value depends on V<sub>IN</sub>, inductor and PNP bipolar transistor. By adjusting the R3 value, efficiency can be optimized.
- (\*5) : Connect to base of the PNP bipolar transistor.
- (\*6) : This pin clamps the switch peak current to prevent over-current damage to the external switch.  
 The RCL resistor equation:  
 $R = V / I = 100\text{mV}(\text{CL Threshold}) / 100\text{mA}(\text{the current}(100\text{mA}) \text{ depend on user})$   
 $R = 1\Omega$ , (so the RCL resistor use 1 $\Omega$ ).

**APPLICATION CIRCUIT**


**Figure 1. Application schematic for negative LCD contrast BIOS power supply**



### ORDERING INFORMATION



### ABSOLUTE MAXIMUM RATINGS\*

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V <sub>DD</sub>	7.0	V
Operating Temperature	T <sub>A</sub>	-40 to 85 (I grade)	°C
Storage Temperature	T <sub>STG</sub>	-65 to 150	°C
Junction Temperature	T <sub>JMAX</sub>	125	°C
Soldering Temperature (under 10 sec)	T <sub>SOLDER</sub>	260	°C

### ELECTRICAL CHARACTERISTICS (V<sub>IN</sub>=5.0V, T<sub>A</sub> = 25°C)

Refer to Typical Application Circuit.

PARAMETER	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Input voltage	-	2.4	-	7.0	V
Quiescent Current	V <sub>FB</sub> = -50mV	-	90	-	uA
Shutdown Current	V <sub>SHUTDOWN</sub> = 0V	-	0.1	1.0	uA
Shutdown Threshold	-	-	1.5	-	V
CL Threshold	-	-	100	-	mV
V <sub>REF</sub> Voltage	-	-	1.22	-	V
V <sub>REF</sub> Source Current	-	250	-	-	uA

**TYPICAL PERFORMANCE CHARACTERISTICS**

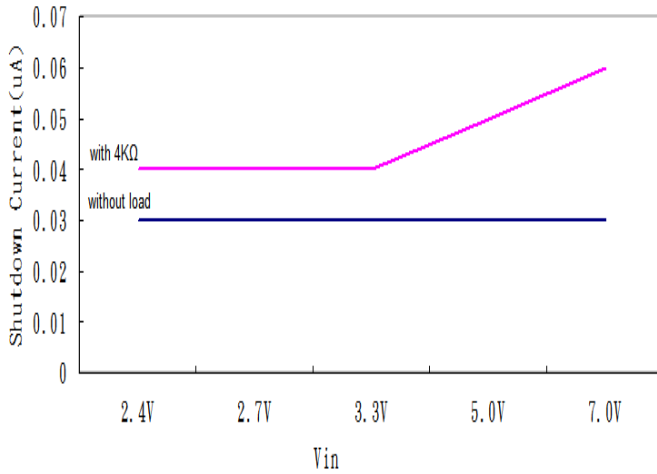


Fig.1 Shutdown Current vs Vin

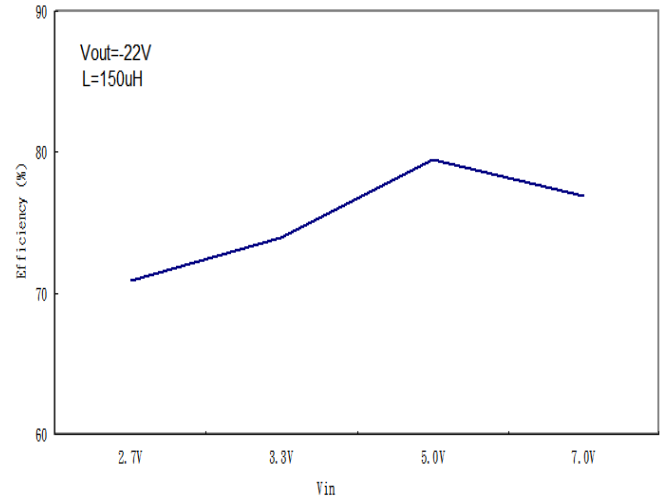


Fig.2 Efficiency vs Vin

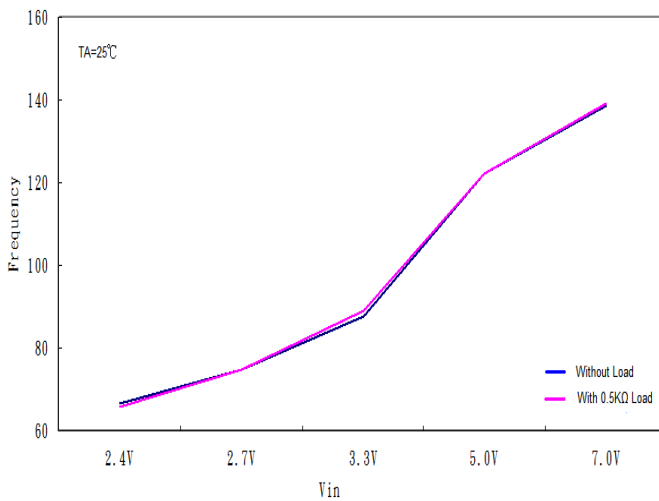


Fig.3 Frequency vs Vin

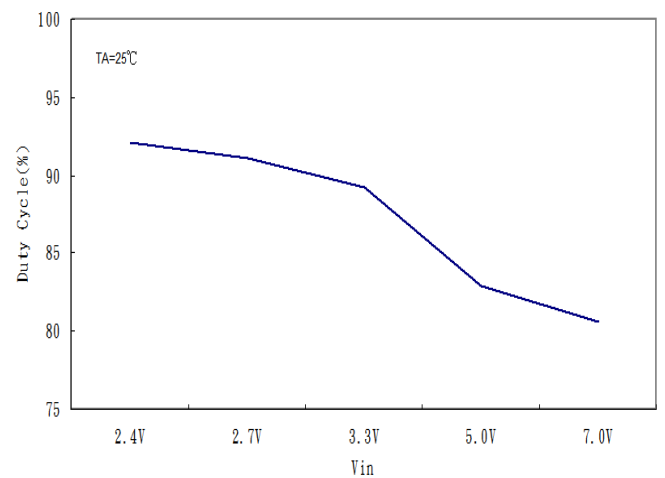


Fig.4 Duty Cycle vs Vin

#### PACKAGE OUTLINE DIMENSION

8-PIN SOP (150 mil) PACKAGE OUTLINE DIMENSION :

