



T-57-11

LT1026

Voltage Converter

FEATURES

- Generates + and - from Single Input
- Up to $\pm 18V$ Output
- Only Needs Four $1\mu F$ Capacitors
- No Inductors
- 10mA Output Current Min
- Operates Down to 4V
- No Latch Up
- 8 Pin Minidip

APPLICATIONS

- Line Drivers
- Op Amp Supplies
- Battery Splitters
- RS232 Power

DESCRIPTION

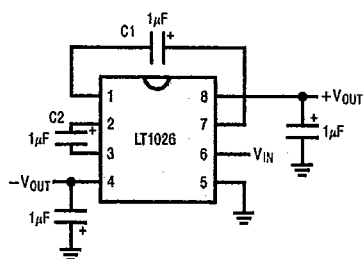
The LT1026 is a switched capacitor voltage doubler and inverter on a single monolithic die. Capable of operating from 4V to 10V input, it provides $\pm 7V$ to $\pm 18V$ out. Output currents of over 10mA are available. Two charge pumps first double the input voltage then invert the doubled voltage. Manufactured in bipolar technology, the LT1026 is not susceptible to latch up and generates up to 36V.

The LT1026 offers a convenient way of generating additional system voltages without using inductors. Powering interface circuits, op amps or data acquisition circuitry off logic supplies is simplified. Other Linear Technology voltage converters such as the low power LTC1044 CMOS and 100mA bipolar LT1054 are available.

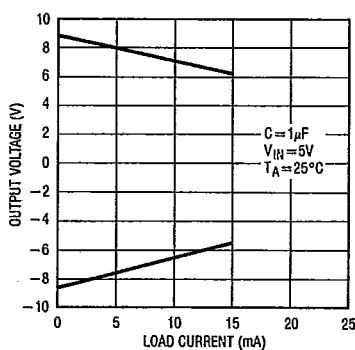
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TYPICAL APPLICATION

Voltage Doubler and Inverter



Output Voltage



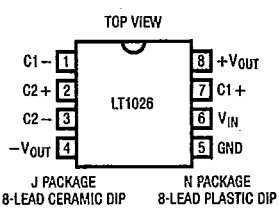
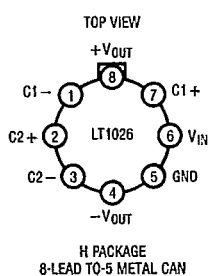
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ABSOLUTE MAXIMUM RATINGS

Supply Voltage	10V
V+	20V
V-	-20V
Short Circuit Duration	10 seconds
Operating Temperature Range	
LT1026M	-55°C to 125°C
LT1026C	0°C to 70°C
Lead Temperature (Soldering, 10 sec.)	300°C

PACKAGE/ORDER INFORMATION

 <p>J PACKAGE 8-LEAD CERAMIC DIP</p> <p>N PACKAGE 8-LEAD PLASTIC DIP</p>	ORDER PART NUMBER
	LT1026MJ LT1026CJ LT1026CN
 <p>H PACKAGE 8-LEAD TO-5 METAL CAN</p>	LT1026MH LT1026CH

ELECTRICAL CHARACTERISTICS

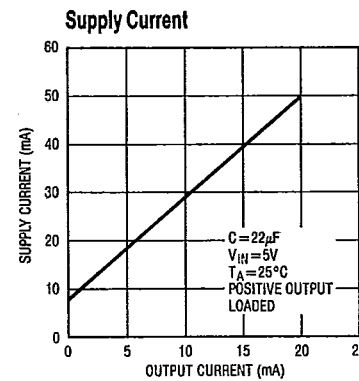
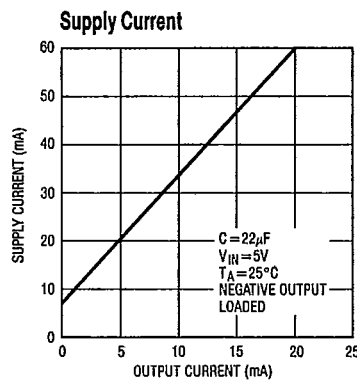
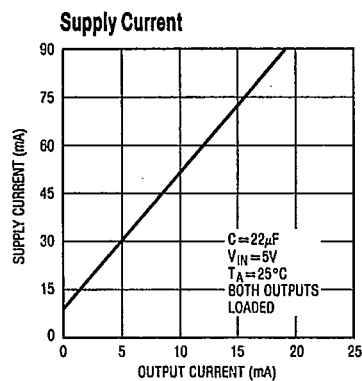
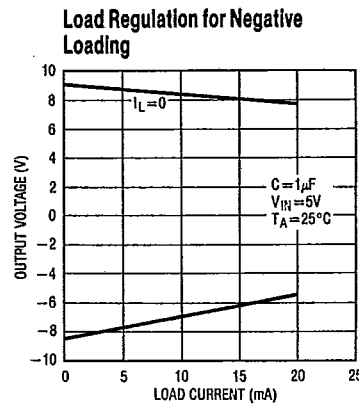
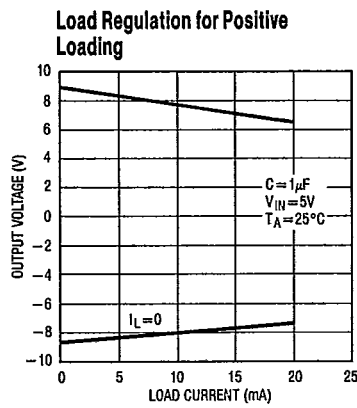
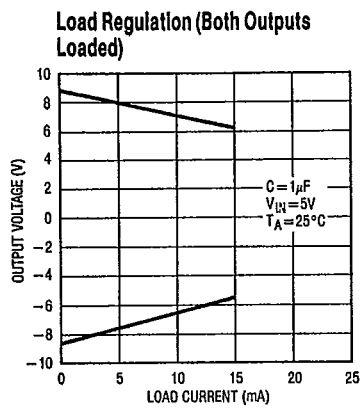
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Output Voltage	$V_{IN} = 4V$ $I_L = 0$ Positive (Note 1)	6.5	7		V
	$I_L = 0$ Negative	-6	-6.7		V
	$I_L = 10mA$ Positive	5.25	5.7		V
	$I_L = -10mA$ Negative	-4.5	-5		V
	$V_{IN} = 5V$ $I_L = 15mA$ Positive	6.25	7		V
	$I_L = -15mA$ Negative	-5.5	-6.2		V
	$V_{IN} = 10V$ $I_L = 0$ Positive	18	18.5		V
	$I_L = 0$ Negative	-17.7	-18		V
	$I_L = 10mA$ Positive	16	17.6		V
	$I_L = -10mA$ Negative	-15.3	-17		V
	$I_L = 15mA$ Positive	15.25	17		V
	$I_L = -15mA$ Negative	-14.5	-16.5		V
Supply Current	$V_{IN} = 5V$ $I_L = 10mA$, -10mA Positive	6.25	7.2		V
	Negative	-5.5	-6.5		V
	$V_{IN} = 10V$ $I_L = 10mA$, -10mA Positive	15	16.8		V
	Negative	-14.25	-15.75		V
	$V_{IN} = 4V$ $I_L = 0$		7	12.5	mA
	$V_{IN} = 10V$ $I_L = 0$		15	30	mA

The ● denotes specifications which apply over 0°C to 70°C for commercial or -55°C to 125°C for military grade devices. Loads are applied to individual outputs unless otherwise marked.

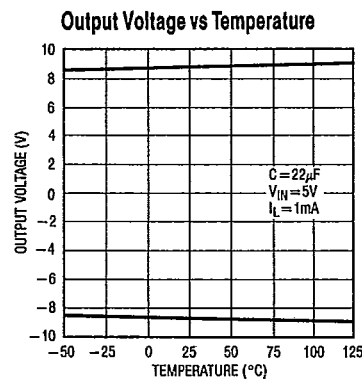
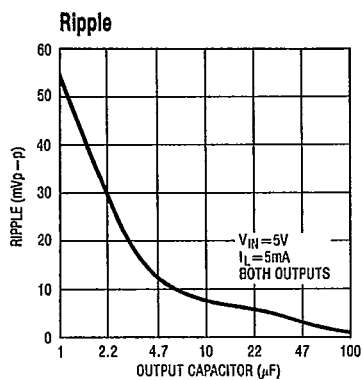
Note 1: V_{IN} Min = -4.5V for $T_A \leq 40^\circ C$

TYPICAL PERFORMANCE CHARACTERISTICS

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APPLICATION HINTS

The LT1026 is a non-regulating voltage converter which converts a single input voltage into both a positive and negative output at up to 15mA. A positive input voltage is first doubled and then the doubled voltage is inverted. The voltage output level is dependent on both the input voltage and the output loading. The total output current available depends on the individual loading of the outputs since loading on one output affects the load and the voltage of the other.

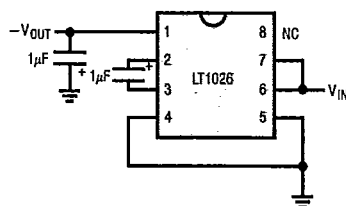
Only four external components are needed for operation. Two charge pump capacitors and two output storage capacitors. Nominal value for these capacitors is $1\mu\text{F}$, but the LT1026 will operate (with reduced performance) down to $0.1\mu\text{F}$. Higher value capacitors ($22\mu\text{F}$) will reduce ripple and slightly lower output impedance. For higher output currents the outputs of several converters may be paralleled with common output capacitors.

The substrate diodes are an inherent part of the IC, and must always be reversed biased to isolate the individual transistors. In the LT1026 the substrate is tied to the negative output. If the negative output is not used, such as when only the voltage doubler output is needed, the $-V_{OUT}$ must be tied to ground so the substrate diodes are properly biased. The substrate diodes must never become forward biased even during overload conditions. For example, pulling the $-V_{OUT}$ positive with respect to ground can forward bias the substrate diodes. Clamping the substrate to ground with an external diode would be needed to ensure proper operation and prevent the substrate from carrying any current.

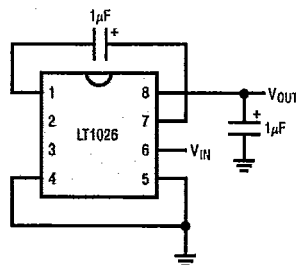
No overload protection is included on the LT1026. Neither output is damaged by momentary shorts, but during sustained shorts the resulting high current flow will overheat the IC.

TYPICAL APPLICATIONS

Positive to Negative Converter



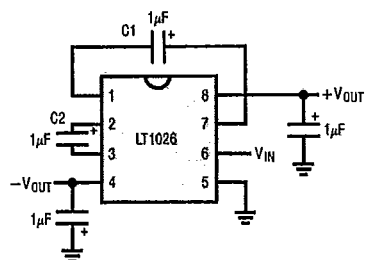
Voltage Doubler



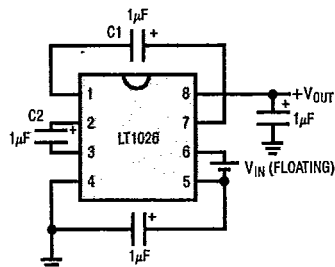
TYPICAL APPLICATIONS

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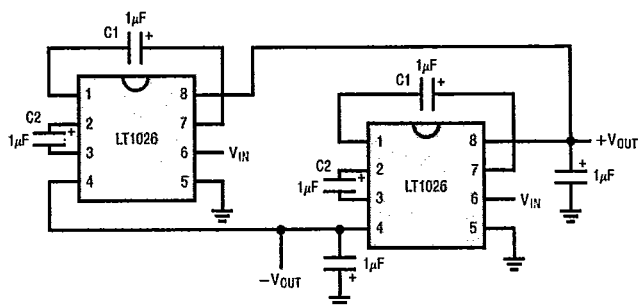
Standard Configuration Voltage Doubler and Inverter



Voltage Quadrupler

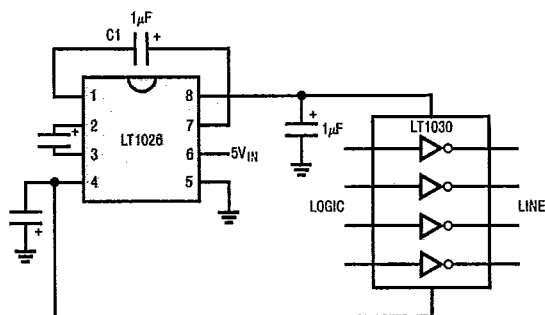


Parallel Converters for Higher Output Current and Lower Output Impedance



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5V Powered RS232 Line Driver

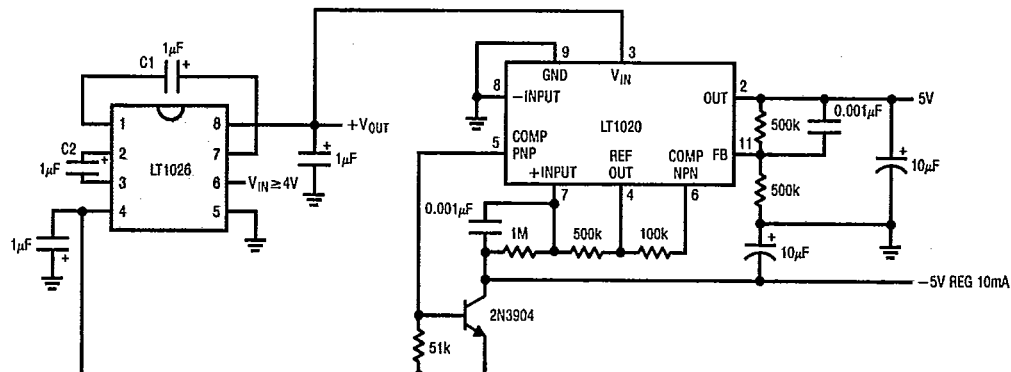


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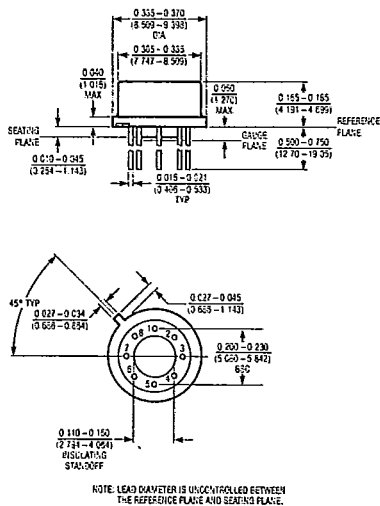
TYPICAL APPLICATIONS

Regulated Converter

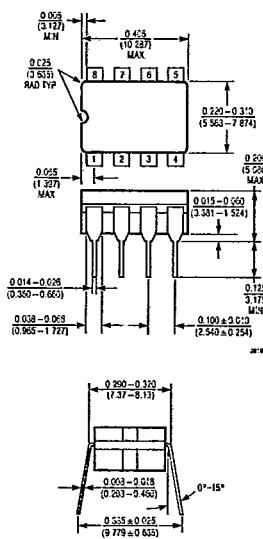


PACKAGE DESCRIPTION Dimensions in inches (millimeters) unless otherwise noted.

H Package
8-Lead TO-5 Metal Can



**J Package
8-Lead Ceramic DIP**



**N Package
8-Lead Plastic DIP**

