

UNISONIC TECHNOLOGIES CO., LTD

UTL7660

Preliminary

CMOS IC

CHARGE PUMP DC-DC VOLTAGE CONVERTER

DESCRIPTION

UTC **UTL7660** is a charge pump DC-DC voltage converter using AL-gate CMOS technology and optimization design. It converters a +1.5V to +10V input to a corresponding -1.5V to -10V output using only two external capacitors, eliminating inductors and their associated cost, size and EMI. The on-board oscillator operates at a nominal frequency of 10KHZ. Operation frequency can be decreased by adding an external capacitor to the oscillator (OSC) terminal.

FEATURES

- * Converts +5V Logic supply to ±5V double-phase electrical Voltage
- * Wide input voltage range: 1.5V~10V
- * Efficient voltage conversion: 99.9%
- * Good power efficiency: 98%
- * Low power supply:50uA@5Vin
- * Only two external capacitors required
- * Compatible with RS232 negative power supply standard
- * No Dx diode needed for high voltage operation

ORDERING INFORMATION

Ordering Number		Deekene	Decking	
Lead Free	Halogen Free	Раскаде	Packing	
UTL7660L-S08-R	UTL7660G-S08-R	SOP-8	Tape Reel	

UTL7660G- <u>S08-R</u> (1)Packing Type (2)Package Type (3)Green Package	(1) R: Tape Reel (2) S08: SOP-8 (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING





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PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO.	SYMBOL	DESCRIPTION	
1	NC	No connection	
2	CAP⁺	Connection external capacitor (+) pin	
3	GND	Ground Pin	
4	CAP-	Connection external capacitor (-) pin	
5	Vout	Voltage output pin	
6	LV	Low voltage selection pin	
7	OSC	Connecting oscillation capacitor pin	
8	Vcc	Power supply pin	

BLOCK DIAGRAM





■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		Vcc	10.5	V
LV and OSC Inputs Voltage	V_{CC} <5.5V	Vı	-0.3 ~ V _{CC} +0.3	V
	V _{CC} >5.5V		V_{CC} -5.5 ~ V_{CC} +0.3	V
Current Into LV	V _{CC} >3.5V	ILV	20	μA
Output Short-circuit duration	$V_{SUPPLY} \pm 5.5V$	tos	Continuous	
Junction Temperature		TJ	+150	°C
Storage Temperature		T _{STG}	-55 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

ELECTRICAL CHARACTERISTICS (T_A = 25°C, unless otherwise specified)

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PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V _{cc} = 5V, C _{osc} = 0, LV = Open				-	-	
Supply Current	lcc	RL=∞		45	110	uA
Supply Voltage Range (Low)	Vcc_low	RL=10KΩ, LV=GND	1.5		3.5	V
Supply Voltage Range (high)	Vсс_нідн	R∟=10KΩ, LV Open	3		10	V
	Rout	Io=20mA		55		Ω
Output Source Resistance		Vcc=2V, Io=3mA, LV=GND		160		Ω
Oscillator Frequency	fosc			10		kHz
Power Efficiency	ηpower	RL=5KΩ	95	98		%
Voltage Conversion Efficiency	ηνουτ	RL=∞	99	99.9		%
$V_{cc} = 3V, C_{osc} = 0, LV = GND$				-	_	
Supply Current	lcc	RL=∞		24	50	uA
Output Source Resistance	Rout	Io=10mA		80		Ω
Oscillator Frequency	fosc	Cosc=0	5	9		kHz
Power Efficiency	ηpower	R _L =5KΩ	95	98		%
Voltage Conversion Efficiency	ηνουτ	RL=∞	99			%



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TESTING CIRCUIT



APPLICATION INFORMATION

Do's and Don'ts

- 1. Do not exceed maximum supply voltages.
- 2. Do not connect terminal-6(LV) to terminal-3(GND) when supply voltages greater than 3.5V.
- 3. Do not make the terminal-5 (Vour) short to terminal-8 (Vcc) for supply voltages above 5.5V for extended periods.
- 4. When using polarized capacitors, the positive terminal of C1 must be connected to terminal-2 (CAP+), and the positive terminal of C2 must be connected to GND.
- 5. If the voltage supply has a large source impedance $(25\Omega 30\Omega)$, then a 2.2µF capacitor from terminal-8(V_{CC}) to ground may be required to limit rising-rate of input voltage to less than 2V/uS.
- 6. Ensure that the terminal-5 (V_{OUT}) does not go more positive than terminal-3 (GND). Device latch up occurs under these conditions. A UTC 1N4148 or similar diode placed in parallel with C2 prevents the device from latching up under these conditions (anode to terminal 5, cathode to terminal 3)

TYPICAL APPLICATION CIRCUIT



Above figure is the basic application circuit to provide a negative supply from -1.5V ~ -10V while a positive supply from +1.5V ~ +10V is available. When V_{CC} =+5V, the output resistance is about 100 Ω ; The output voltage is -4V while the load current is 10mA.



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TYPICAL APPLICATION CIRCUIT (Cont.)

ROUT = ROUT (of **UTL7660**) /n (number of devices)



 $V_{OUT} = -n (V_{IN})$



Cascading Devices for Increased Output Voltage

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