



钜地半导体
Tudi Semiconductor

Product Specification

TUDI-TJ7660

Charge Pump Voltage Converters

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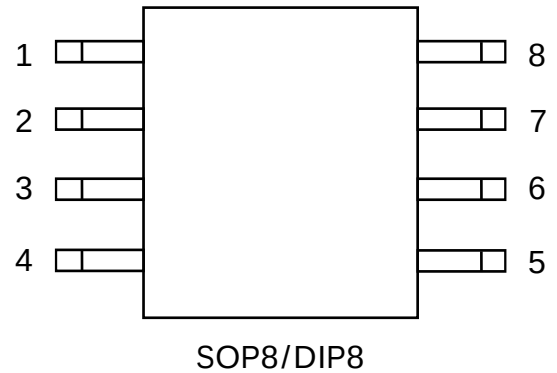
**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales



FEATURES

- Package: SOP-8/DIP-8
- Operating supply voltage range: 1.5V ~ 10.0V
- Typical power conversion efficiency: 98%
- Supports voltage inversion, voltage doubling, voltage division and multiple times voltage output
- BOOST pin for oscillator frequency boosting
- No-load supply current: maximum 180μA at 5V supply
- No external diodes required for high-voltage operation



DESCRIPTION

The TJ7660 is a monolithic DC/DC voltage converter IC manufactured using a specialized process. It features voltage inversion, doubling, dividing, and multi-stage voltage multiplication. The pinout is compatible with the TJ7660. It operates stably over a 1.5V to 10V range and requires no external diodes across the entire temperature range. It can deliver 10mA of current for every 0.5V voltage drop. The BOOST input allows the oscillator frequency to be increased to above the audio range, which reduces output ripple and consequently lowers the requirement for external capacitor values. The TJ7660 combines low quiescent current with high conversion efficiency. It integrates an oscillator control circuit and four power MOSFET switching transistors. Application configurations include negative voltage generation, voltage doubling, and input voltage halving (1/2 division).

Applications

- Generates -5V from a +5V logic supply
- Personal communication equipment
- Power supply for LCD display modules
- Positive and negative symmetrical power supply generation for operational amplifiers
- Power supply for EIA/TIA-232E and EIA/TIA-562 interfaces
- Power supply for A/D converters
- Handheld instrumentation
- Panel meters



Pin Description

Pin No.	Pin Name	Pin No.	Pin Name
1	BOOST	2	CAP+
3	GND	4	CAP-
5	V _{OUT}	6	LV
7	OSC	8	V+

Pin Name	Pin No.	Function Description
BOOST	1	Frequency boost control terminal. Connecting BOOST to V+ increases the internal oscillator frequency by a factor of six. If an external oscillator is employed, the BOOST pin has no effect and shall be left open.
CAP+	2	Connect to the negative terminal of the charge-pump capacitor.
GND	3	Ground reference. In most applications, the negative terminal of the storage capacitor shall be connected to this pin.
CAP-	4	Connect to the positive terminal of the charge-pump capacitor.
V _{OUT}	5	Positive voltage output terminal. In most applications, the positive terminal of the storage capacitor shall be connected to this pin.
LV	6	Low-voltage operation select pin. Tie this pin to GND when the supply voltage is below 3.5V.
OSC	7	Oscillator-frequency-control input. An external capacitor can be connected to lower the internal oscillator frequency.
V+	8	Positive supply voltage input (1.5 ~ 10 V). V+ is also the chip substrate connection point.



Electrical Characteristics

Unless otherwise specified: $V^+ = 5.0V$, $LV_{pin} = 0V$, $BOOST_{pin} = open$, $I_{LOAD} = 0mA$, $T_A = T_{MIN} \sim T_{MAX}$

PARAMETER	TEST CONDITIONS		Min.	Typ.	Max.	UNIT
Supply Current	$R_L = +\infty$, Pin 1 connected to Pin 7, LV open	$T_A = +25^\circ C$		30	180	μA
		$T_A = 0^\circ C \sim +70^\circ C$			200	
		$T_A = -40^\circ C \sim +65^\circ C$			200	
	$R_L = +\infty$, Pin 1 = Pin 7 = $V^+ = 3V$			10		
Supply Voltage Range	$R_L = 10K\Omega$, LV open					V
	$R_L = 10K\Omega$, LV to GND		1.5		10	
Supply Current	$I_L = 20mA$ $f_{OSC} = 5kHz$ LV open	$T_A = +25^\circ C$		65	100	Ω
		$T_A = 0^\circ C \sim +70^\circ C$			130	
		$T_A = -40^\circ C \sim +65^\circ C$			130	
	$f_{OSC} = 1kHz$ $V^+ = 2V$, $I_L = 3mA$ LV to GND	$T_A = +25^\circ C$			325	
		$T_A = 0^\circ C \sim +70^\circ C$			325	
		$T_A = -40^\circ C \sim +65^\circ C$			325	
Oscillator Frequency	$C_{OSC} = 1pF$, LV to GND	$V^+ = 5V$	5			kHz
		$V^+ = 2V$	1			
Power Conversion Efficiency	$R_L = 5k\Omega$, $T_A = +25^\circ C$, $f_{OSC} = 5kHz$, LV open		95	98		%
Voltage-Inversion Efficiency	$R_L = +\infty$, $T_A = +25^\circ C$, LV open		97.0	99.9		%
Oscillator Source-Sink Current	$V_{OSC} = 0V$ or V^+ , LV open	Pin 1 = 0v			3	$M\Omega$
		Pin 1 = V^+			20	
Oscillator Impedance	$T_A = +25^\circ C$	$V^+ = 5V$		1000		k Ω
		$V^+ = 2V$		100		



Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply Voltage	V+ ~GND or GND~Vout	10.5	V
Input Voltage	1、 6、 7	$-0.3 \leq V_{IN}$	V
LV Input Current		20	μA
Continuous Power Dissipation, TA= +70	Plastic DIP	727	mV
	SO	471	mV
	μMAX	330	mV
	CERDIP	640	mV
	T0-99	533	mV
Storage Temperature Range		-65~ +150	°C
Operating Temperature Range			°C

Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
TJ7660D-TUDI	SOP8	Tape,Reel,4000	TJ7660D	-40°C to +85°C
TJ7660N-TUDI	DIP8	Tube,50,A box of 2000	TJ7660N	



Typical Application

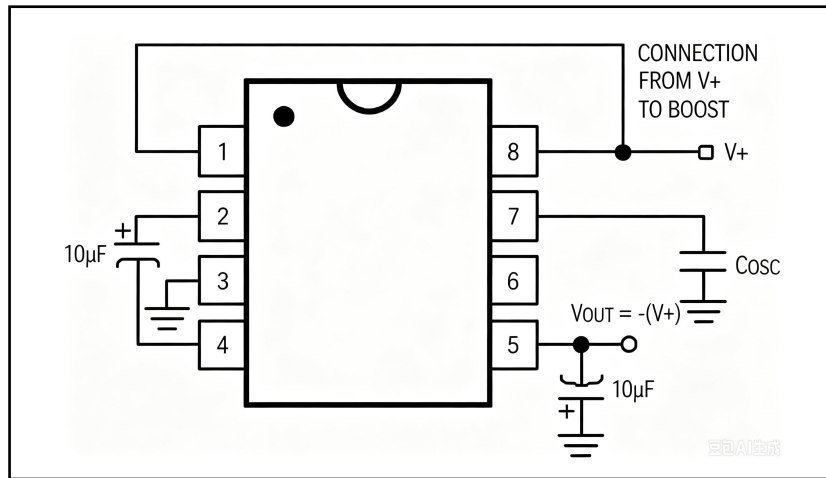


Figure 1.Negative Voltage Conversion (Using BOOST and COSC)

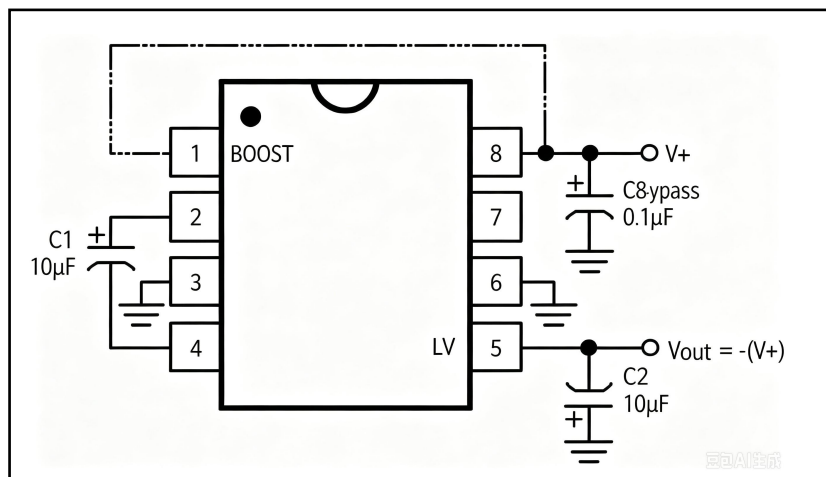


Figure 2.Negative Voltage Conversion (Using BOOST and LV)

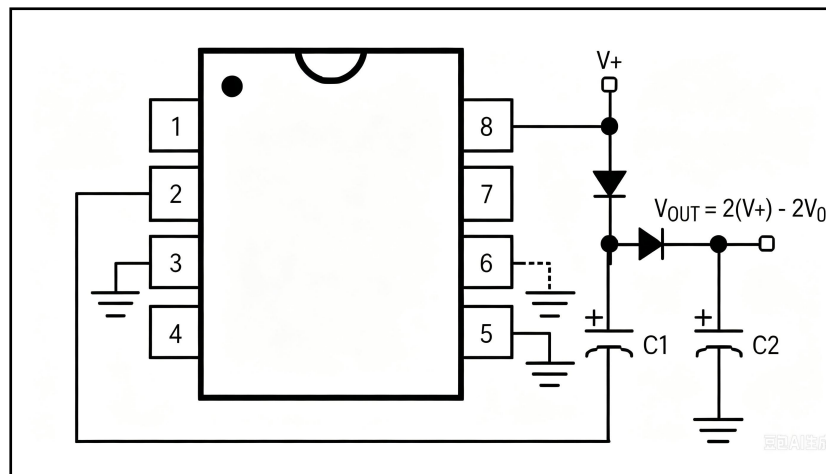
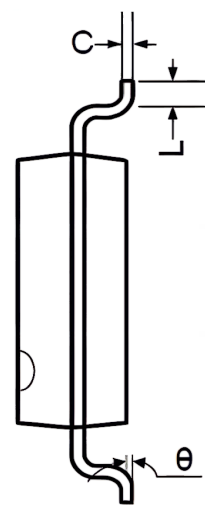
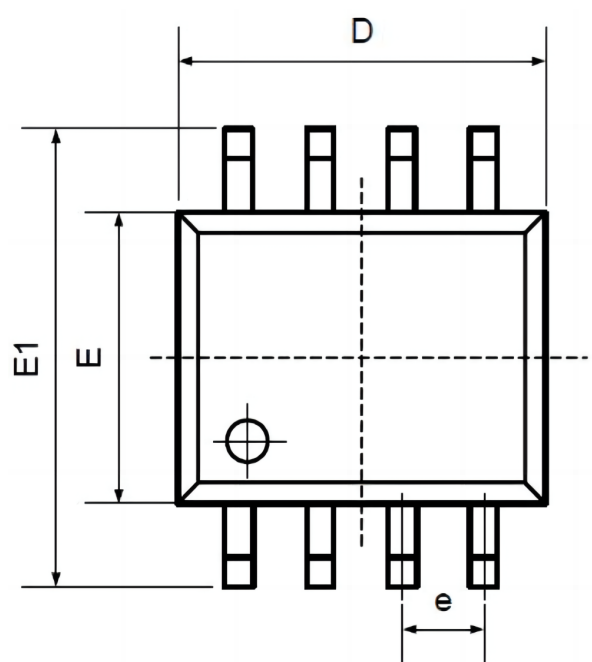


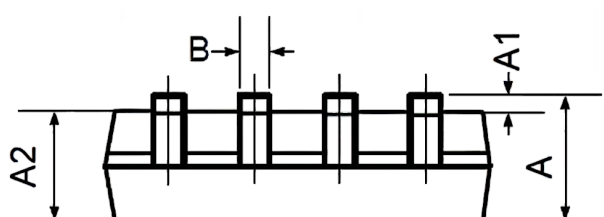
Figure 3.Voltage Doubler Output Circuit



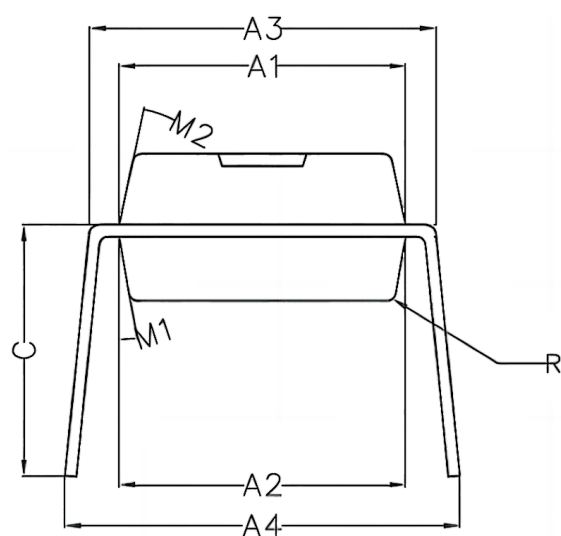
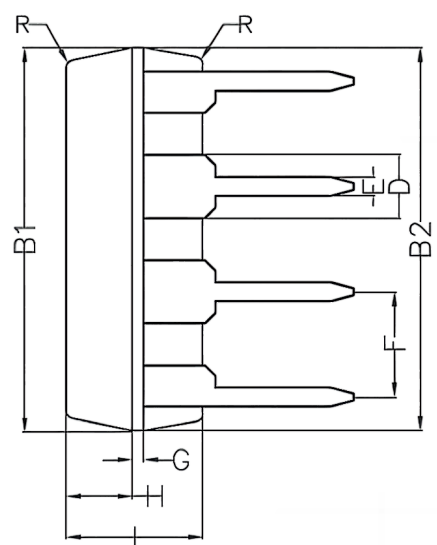
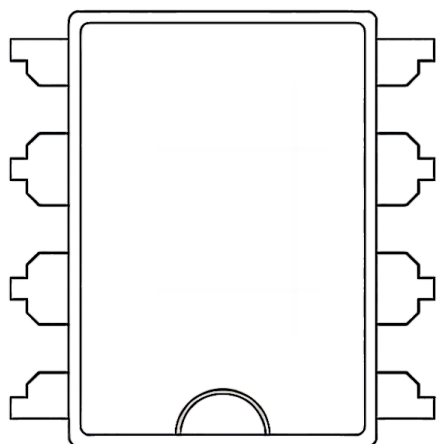
Package SOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Package DIP8



Symbol	Min	Non	Max
A1	6.28	6.33	6.38
A2	6.33	6.38	6.43
A3	7.52	7.62	7.72
A4	7.80	8.40	9.00
B1	9.15	9.20	9.25
B2	9.20	9.25	9.30
C		5.57	
D		1.52	
E	0.43	0.45	0.47
F		2.54	
G		0.25	
H	1.54	1.59	1.64
I	3.22	3.27	3.32
R		0.20	
M1	9°	10°	11°
M2	11°	12°	13°



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