



钲地半导体
Tudi Semiconductor

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Product Specification

TUDI-ICL7660

CMOS Voltage Converters

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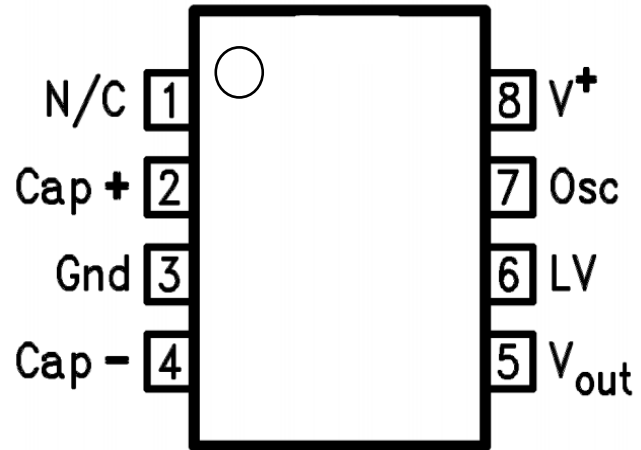
**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales



Features

- Simple Conversion of +5V Logic Supply to $\pm 5V$ Supplies
- Simple Voltage Multiplication ($V_{OUT} = (-) nV_{IN}$)
- Typical Open Circuit Voltage Conversion Efficiency 99.9%
- Typical Power Efficiency 98%
- Wide Operating Voltage Range
 - ICL7660-1.5V to 10.0V
 - ICL7660-1.5V to 12.0V
- ICL7660A 100% Tested at 3V
- Easy to Use - Requires Only 2 External Non-Critical Passive Components
- No External Diode Over Full Temp. and Voltage Range
- Pb-Free Plus Anneal Available (RoHS Compliant)



Pin Diagram

Description

The ICL7660 and ICL7660A are monolithic CMOS power supply circuits which offer unique performance advantages over previously available devices. The ICL7660 performs supply voltage conversions from positive to negative for an input range of +1.5V to +10.0V resulting in complementary output voltages of -1.5V to -10.0V and the ICL7660A does the same conversions with an input range of +1.5V to +12.0V resulting in complementary output voltages of -1.5V to -12.0V. Only 2 noncritical external capacitors are needed for the charge pump and charge reservoir functions.

The ICL7660 and ICL7660A can also be connected to function as voltage doublers and will generate output voltages up to +18.6V with a +10V input. Contained on the chip are a series DC supply regulator, RC oscillator, voltage level translator, and four output power MOS switches. A unique logic element senses the most negative voltage in the device and ensures that the output N-Channel switch source-substrate junctions are not forward biased. This assures latchup free operation. The oscillator, when unloaded, oscillates at a nominal frequency of 10kHz for an input supply voltage of 5.0V. This frequency can be lowered by the addition of an external capacitor to the "OSC" terminal, or the oscillator may be overdriven by an external clock. The "LV" terminal may be tied to GROUND to bypass the internal series regulator and improve low voltage (LV) operation. At medium to high voltages (+3.5V to +10.0V for the ICL7660 and +3.5V to +12.0V for the ICL7660A), the LV pin is left floating to prevent device latchup.

Applications

- On Board Negative Supply for Dynamic RAMs
- Localized μ Processor (8080 Type) Negative Supplies
- Inexpensive Negative Supplies
- Data Acquisition Systems



Pin Description

Name	Pin#	Function
NC	1	
CAP+	2	"+" Capacitor Plate
GND	3	Ground
CAP-	4	"-" Capacitor Plate
VOUT	5	Output Voltage
LV	6	Low Supply Voltage
OSC	7	Oscillator
V+	8	Supply Voltage

Electrical Characteristics

(V+ = 5V, TA = 25°C, COSC = 0, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Supply Current	I+	RL=∞	-	170	500	μA
Supply Voltage Range-Lo	VL+	MIN≤TA≤MAX,RL=10kΩ, LV to GND	1.5	-	3.5	V
Supply Voltage Range-Hi	VL+	MIN≤TA≤MAX,RL=10kΩ, LV to Open	3.0	-	10	V
Output Source Resistans	RoUT	IouT=20mA,TA=25°C	-	55	100	Ω
		IouT=20mA,0°C≤TA≤70°C	-	-	120	
		V+=2V,IOUT=3mA, LV to GND,0°C≤TA≤70°C	-	-	300	
Oscillator Frequency	fosc		8	-	18	kHz
Power Efficiency	PEF	RL=5kΩ	95	98	-	%
Voltage Conversion Efficiency	VoUTEF	RL=∞	97	99.9	-	%
Oscillator Impedance	Zosc	V+=2V	-	1.0	-	MΩ
		V+=5V	-	100	-	kΩ



Absolute Maximum Ratings

Condition	Min	Max
Supply Voltage	-	+12V
LV and OSC Input Voltage	-0.3V to(V++0.3V)for V+<5.5V	
	(V+-5.5V)to(V++0.3V)for V+>5.5V	
Current into LV	20μA for V+>3.5V	
Temperature Range	0°C	85°C
Thermal Resistance,θJA(°C/W)	-	150
Maximum Storage Temperature Range	-65°C	150°C
Lead Temperature (Soldering,10 seconds)		260°C

Note: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but specific performance is not ensured.

Typical Application Circuits

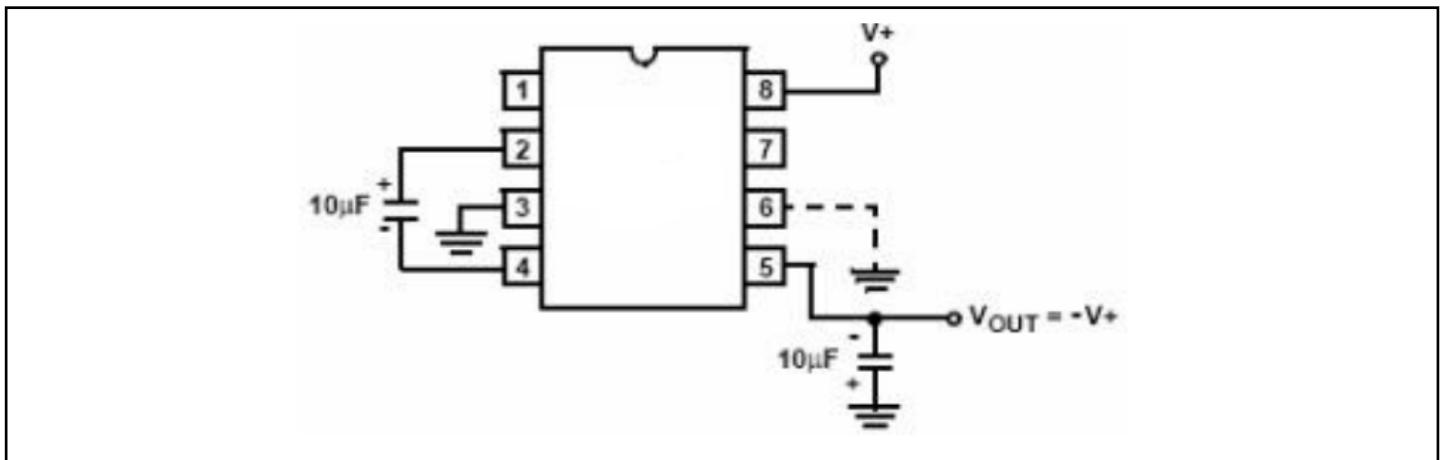


FIGURE 1. SIMPLE NEGATIVE CONVERTER

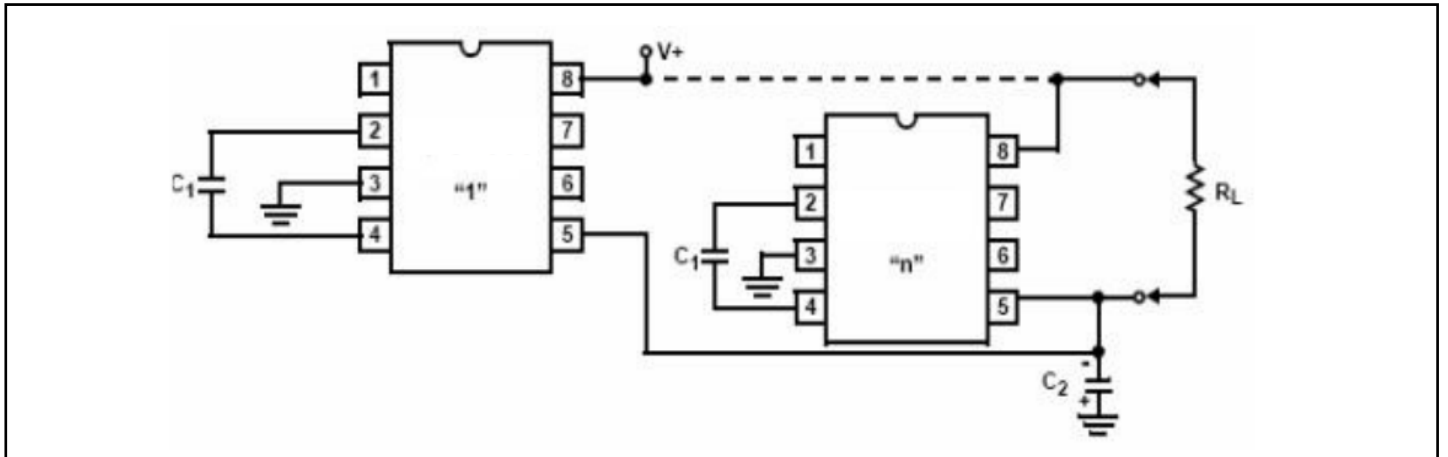


FIGURE 2. PARALLELING DEVICES

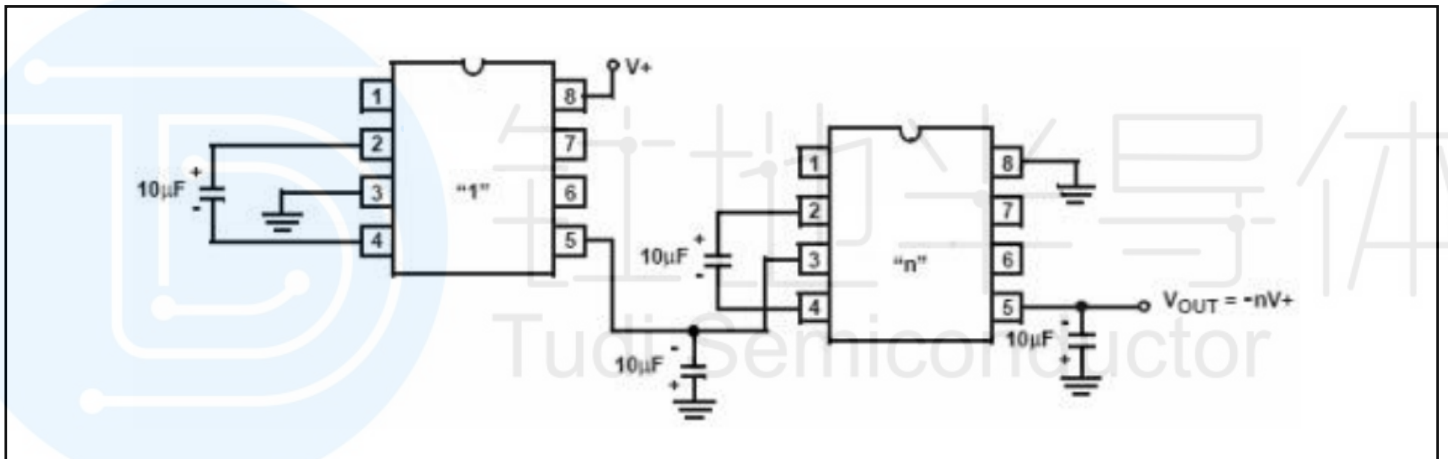


FIGURE 3. CASCADING DEVICES FOR INCREASED OUTPUT VOLTAGE

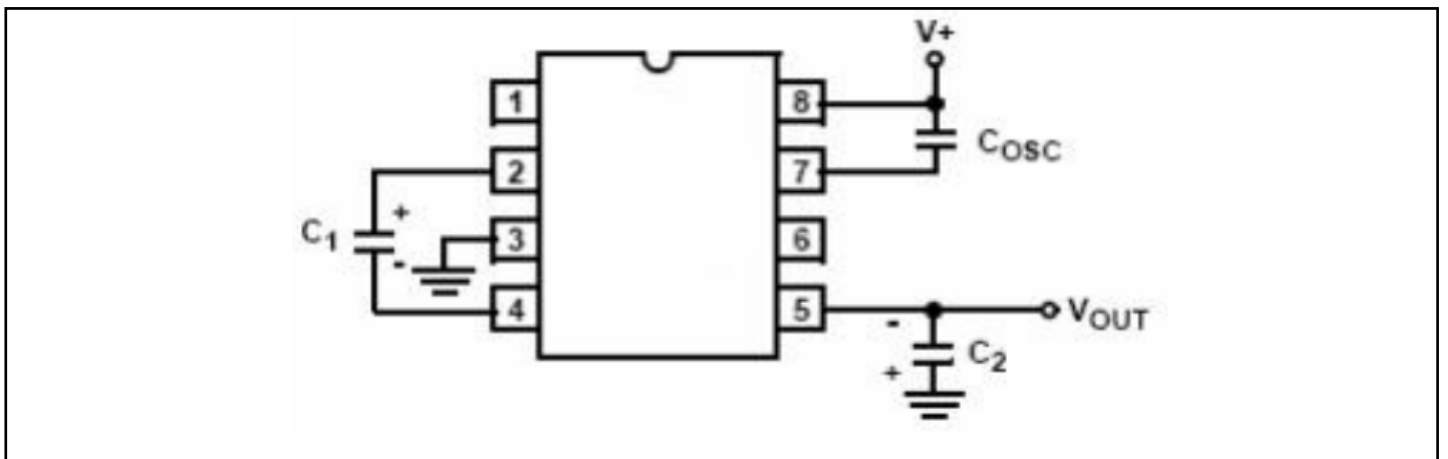


FIGURE 4. LOWERING OSCILLATOR FREQUENCY

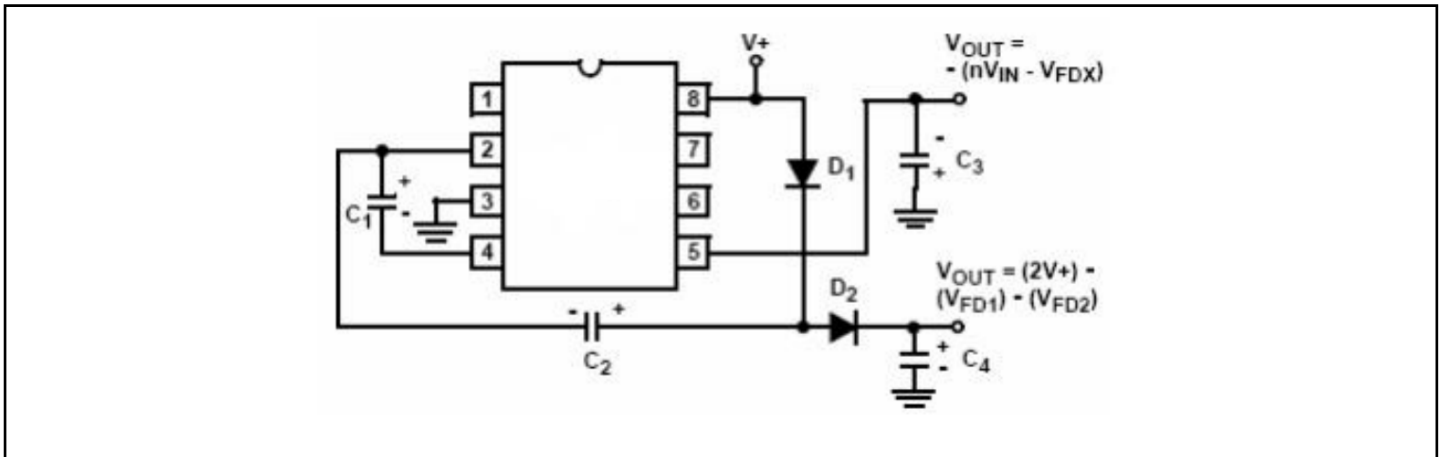


FIGURE 5. COMBINED NEGATIVE VOLTAGE CONVERTER AND POSITIVE DOUBLER

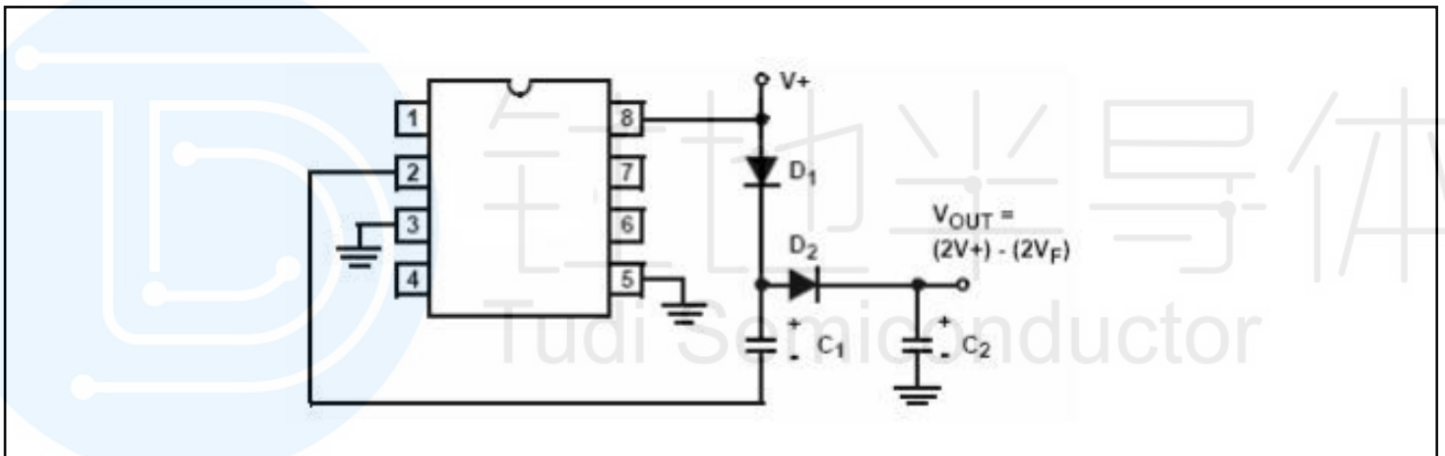


FIGURE 6. POSITIVE VOLT DOUBLER

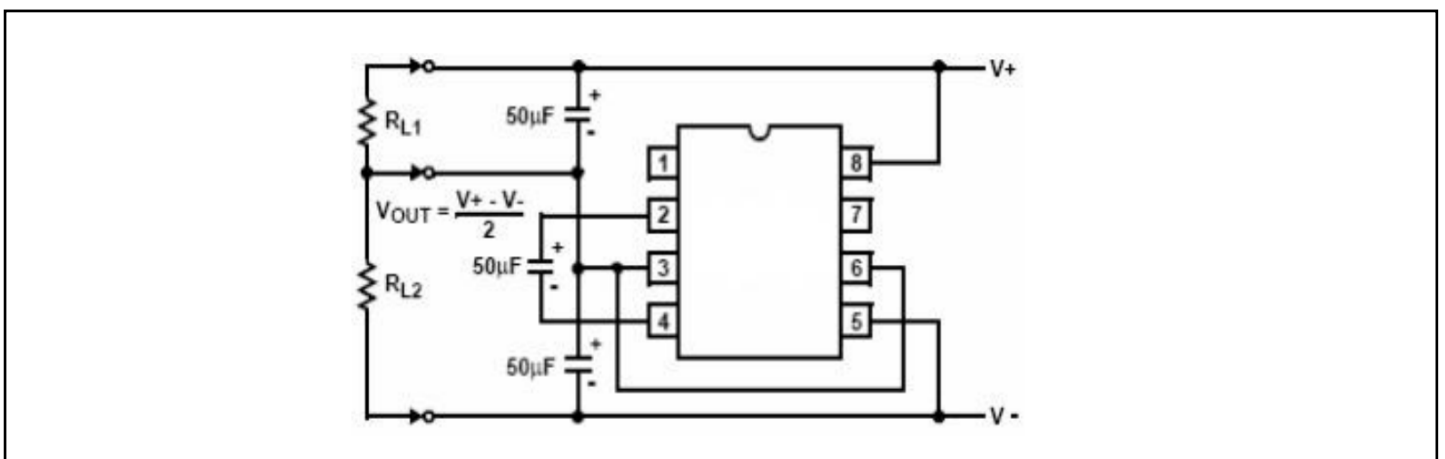
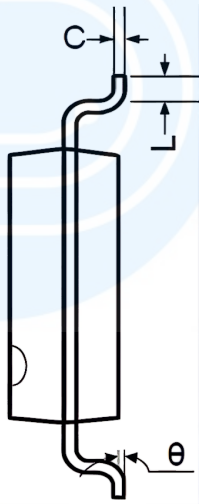
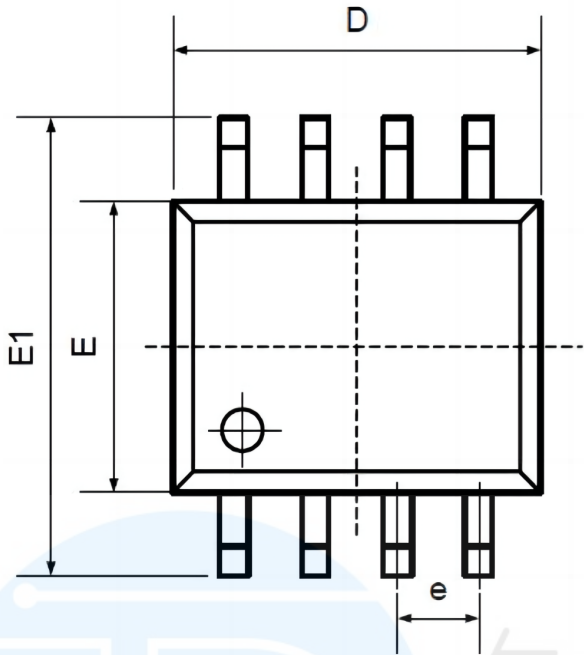


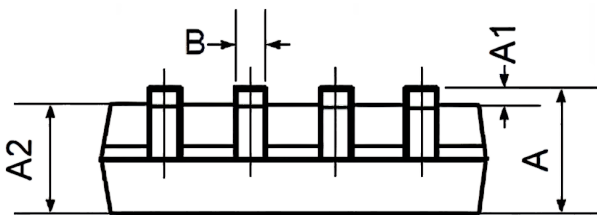
FIGURE 7. SPLITTING A SUPPLY IN HALF



Package SOP8

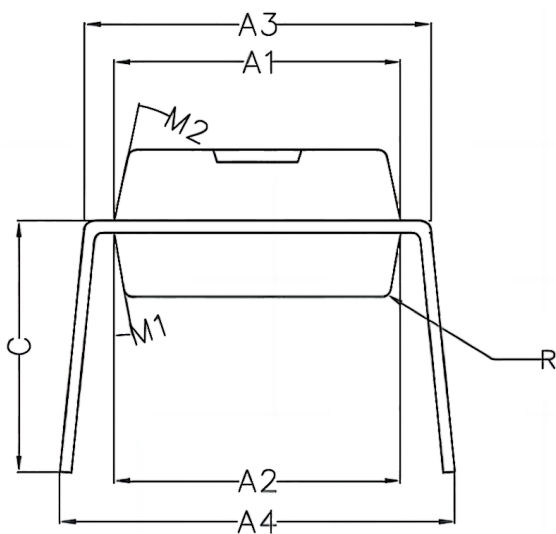
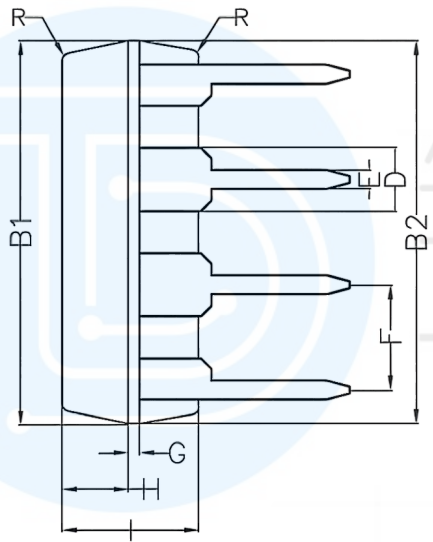
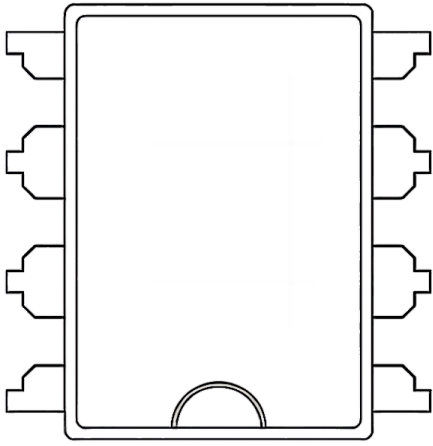


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP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



Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature	Operating Voltage
ICL7660CBAZA-T-TUDI	SOP8	Tape,Reel,2500	7660CBAZ	0°C to 70°C	1.5V to 10V
ICL7660CPAZ-TUDI	DIP8	Tube,50,A box of 2000	7660CPAZ		
ICL7660ACBAZA-T-TUDI	SOP8	Tape,Reel,2500	7660ACBAZ		
ICL7660ACPAZ-TUDI	DIP8	Tube,50,A box of 2000	7660ACPAZ		
ICL7660AIBAZA-T-TUDI	SOP8	Tape,Reel,2500	7660AIBAZ	0°C to 85°C	1.5V to 12V
ICL7660AIPAZ-TUDI	DIP8	Tube,50,A box of 2000	7660AIPAZ		



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