

## Description

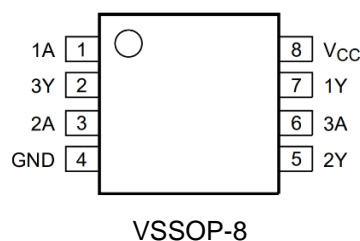
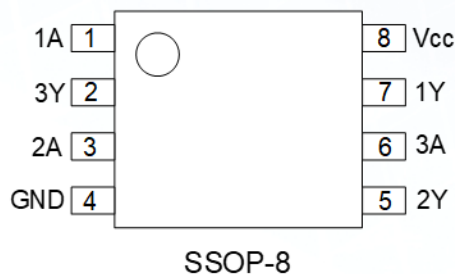
The 74LVC3G06 is a triple inverter with open-drain outputs. The device is designed for operation with a power supply range of 1.65V to 5.5V. The inputs are tolerant to 5.5V allowing this device to be used in a mixed voltage environment. The device is fully specified for partial power down applications using I<sub>OFF</sub>. The I<sub>OFF</sub> circuitry disables the output preventing damaging current backflow when the device is powered down.

Each of the inverters performs the positive Boolean function:

$$Y = \overline{A}$$

A pullup resistor is required for a logical HIGH output.

## Pin Assignments



## Features

- Wide Supply Voltage Range from 1.65V to 5.5V
- -24mA Output Drive at 3.3V
- CMOS Low-Power Consumption
- I<sub>OFF</sub> Supports Partial Power Down Mode Operation
- Inputs Accept up to 5.5V
- ESD Protection Tested per JESD 22  
Exceeds 2000V Human Body Model (A114)  
Exceeds 1000V Charged Device Model (C101)
- Latch-Up Exceeds 100mA per JESD 78, Class I
- Range of Package Options
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**  
<https://www.diodes.com/quality/product-definitions/>

## Applications

- Voltage-level shifting
- General-purpose logic
- Power down signal isolation
- Wide array of products such as:
  - PCs, networking, notebooks, netbooks, PDAs
  - Computer peripherals, hard drives, CD/DVD ROM
  - TV, DVD, DVR, set top boxes
  - Cell phones, personal navigation / GPS
  - MP3 players, cameras, video recorders

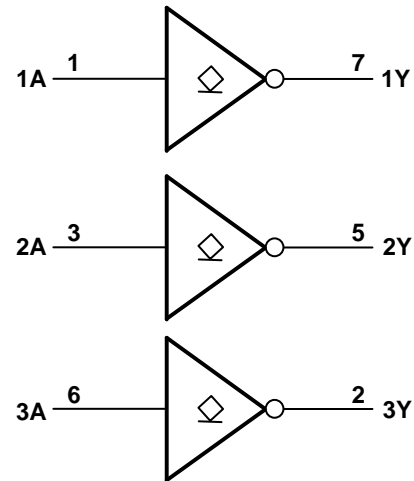
Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

## Pin Descriptions

Pin Name	Pin NO.	Description
1A	1	Data Input
3Y	2	Data Output
2A	3	Data Input
GND	4	Ground
2Y	5	Data Output
3A	6	Data Input
1Y	7	Data Output
V <sub>CC</sub>	8	Supply Voltage

## Logic Diagram



## Function Table

Inputs	Output
A	Y
H	L
L	Z

## Absolute Maximum Ratings (Notes 4, 5)

Symbol	Description	Rating	Unit
ESD HBM	Human Body Model ESD Protection	2	kV
ESD CDM	Charged Device Model ESD Protection	1	kV
V <sub>CC</sub>	Supply Voltage Range	-0.5 to 6.5	V
V <sub>I</sub>	Input Voltage Range	-0.5 to 6.5	V
V <sub>O</sub>	Voltage Applied to Output in High Impedance or I <sub>OFF</sub> State	-0.5 to 6.5	V
V <sub>O</sub>	Voltage Applied to Output in High or Low State	-0.5 to 6.5	V
I <sub>IK</sub>	Input Clamp Current V <sub>I</sub> < 0	-50	mA
I <sub>OK</sub>	Output Clamp Current V <sub>O</sub> < 0	-50	mA
I <sub>O</sub>	Continuous Output Current	±50	mA
I <sub>CC</sub> , I <sub>GND</sub>	Continuous Current Through V <sub>CC</sub> or GND	±100	mA
T <sub>J</sub>	Junction Temperature	+150	°C
T <sub>STG</sub>	Storage Temperature	-65 to +150	°C

- Notes:
- Stresses beyond the absolute maximum can result in immediate failure or reduced reliability. These are stress values and device operation should be within recommend values.
  - Forcing the maximum allowed voltage could cause a condition exceeding the maximum current or conversely forcing the maximum current could cause a condition exceeding the maximum voltage. The ratings of both current and voltage must be maintained within the controlled range.

## Recommended Operating Conditions (Note 6)

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CC</sub>	Operating Voltage	Operating	1.65	5.5	V
		Data Retention Only	1.5	—	V
V <sub>IH</sub>	High-Level Input Voltage	V <sub>CC</sub> = 1.65V to 1.95V	0.65 X V <sub>CC</sub>	—	V
		V <sub>CC</sub> = 2.3V to 2.7V	1.7	—	
		V <sub>CC</sub> = 3V to 3.6V	2	—	
		V <sub>CC</sub> = 4.5V to 5.5V	0.7 X V <sub>CC</sub>	—	
V <sub>IL</sub>	Low-Level Input Voltage	V <sub>CC</sub> = 1.65V to 1.95V	—	0.35 X V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3V to 2.7V	—	0.7	
		V <sub>CC</sub> = 3V to 3.6V	—	0.8	
		V <sub>CC</sub> = 4.5V to 5.5V	—	0.3 X V <sub>CC</sub>	
V <sub>I</sub>	Input Voltage	—	0	5.5	V
V <sub>O</sub>	Output Voltage	—	0	5.5	V
I <sub>OL</sub>	Low-Level Output Current	V <sub>CC</sub> = 1.65V	—	4	mA
		V <sub>CC</sub> = 2.3V	—	8	
		V <sub>CC</sub> = 3V	—	16	
			—	24	
		V <sub>CC</sub> = 4.5V	—	32	
Δt/ΔV	Input Transition Rise or Fall Rate	V <sub>CC</sub> = 1.8V ± 0.15V, 2.5V ± 0.2V	—	20	ns/V
		V <sub>CC</sub> = 1.65V to 2.7V	—	10	
		V <sub>CC</sub> = 2.7V to 5V	—	5	
T <sub>A</sub>	Operating Free-Air Temperature	—	-40	+125	°C

Note: 6. Unused inputs should be held at V<sub>CC</sub> or Ground for device proper operation.

## Electrical Characteristics

Symbol	Parameter	Test Conditions	V <sub>CC</sub>	-40°C to +85°C		-40°C to +125°C		Unit
				Min	Max	Min	Max	
V <sub>OL</sub>	Low-Level Output Voltage	I <sub>OL</sub> = 100µA	1.65V to 5.5V	—	0.1	—	0.1	V
		I <sub>OL</sub> = 4mA	1.65V	—	0.45	—	0.45	
		I <sub>OL</sub> = 8mA	2.3V	—	0.3	—	0.3	
		I <sub>OL</sub> = 16mA	3V	—	0.4	—	0.4	
		I <sub>OL</sub> = 24mA		—	0.55	—	0.75	
		I <sub>OL</sub> = 32mA	4.5V	—	0.55	—	0.75	
I <sub>I</sub>	Input Current	V <sub>I</sub> = 5.5V or GND	0 to 5.5V	—	±5	—	±5	µA
I <sub>OFF</sub>	Power Down Leakage Current	V <sub>I</sub> or V <sub>O</sub> = 5.5V	0	—	±10	—	±10	µA
I <sub>CC</sub>	Supply Current	V <sub>I</sub> = 5.5V of GND, I <sub>O</sub> = 0	1.65V to 5.5V	—	10	—	10	µA
ΔI <sub>CC</sub>	Additional Supply Current	Input at V <sub>CC</sub> – 0.6V	3V to 5.5V	—	500	—	500	µA
C <sub>I</sub>	Input Capacitance	V <sub>I</sub> = V <sub>CC</sub> or GND	3.3V	—	3.5 (Typ)	—	—	pF

## Package Characteristics

Symbol	Parameter	Package	Test Conditions	Min	Typ	Max	Unit
Θ <sub>JA</sub>	Thermal Resistance Junction-to-Ambient	SSOP-8	Note 7	—	130	—	°C/W
		VSSOP-8	Note 7	—	155	—	°C/W
Θ <sub>JC</sub>	Thermal Resistance Junction-to-Case	SSOP-8	Note 7	—	36	—	°C/W
		VSSOP-8	Note 7	—	38	—	°C/W

Note: 7. Test condition: Device mounted on JEDEC 2s2p High-K board, FR-4 substrate PCB, 2oz copper with minimum recommended pad layout.

## Operating Characteristics (T<sub>A</sub> = +25°C, V<sub>CC</sub> = 3.3V)

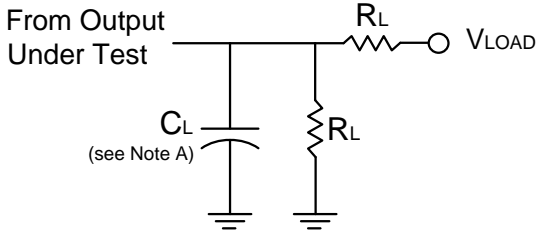
Symbol	Parameter	Test Conditions	V <sub>CC</sub> = 1.8V	V <sub>CC</sub> = 2.5V	V <sub>CC</sub> = 3.3V	V <sub>CC</sub> = 5V	Unit
			Typ	Typ	Typ	Typ	
C <sub>PD</sub>	Power Dissipation Capacitance	f = 10MHz, 1 Input Switching	2	2	3	4	pF

## Switching Characteristics

Figure 1

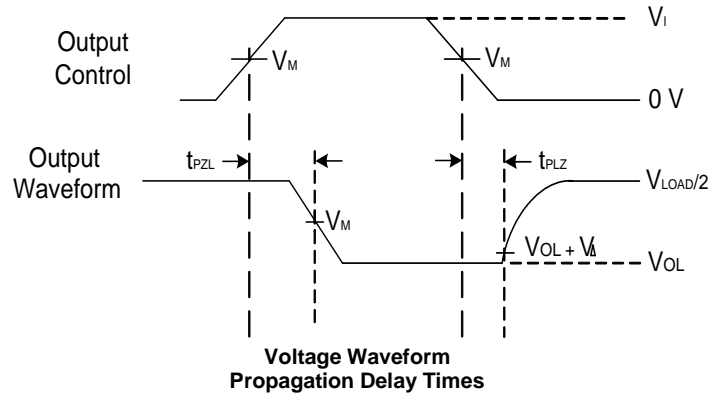
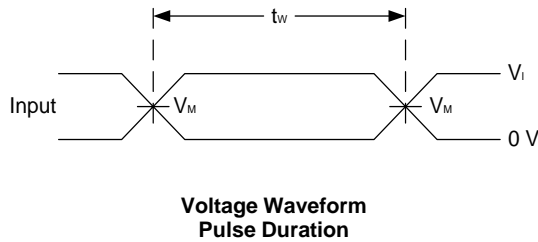
Parameter	From Input	To Output	V <sub>CC</sub>	T <sub>A</sub> = -40°C to +85°C		T <sub>A</sub> = -40°C to +125°C		Unit
				Min	Max	Min	Max	
t <sub>PD</sub>	A	Y	1.8V ± 0.15V	1.8	7.2	1.8	7.8	ns
			2.5V ± 0.2V	1	3.9	1	4.5	
			3.3V ± 0.3V	1	3.4	1	4.0	
			5.0V ± 0.5V	1	2.9	1	3.5	

## Parameter Measurement Information (Notes B, C)



TEST	Condition
$t_{PLZ}$ (see Notes D and F)	$V_{LOAD}$
$t_{PZL}$ (see Notes D and E)	$V_{LOAD}$

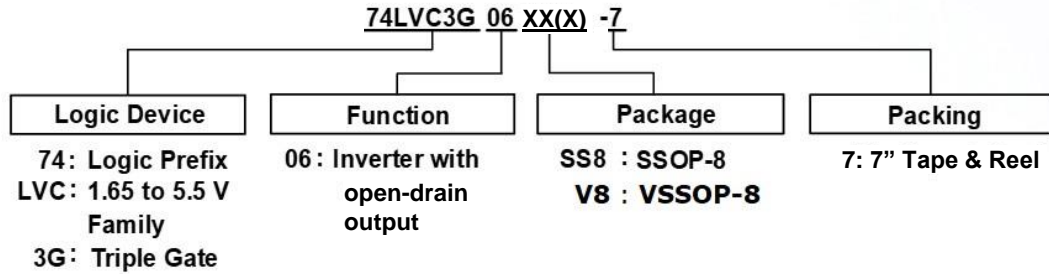
$V_{CC}$	Inputs		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_I$	$t_r/t_f$					
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC} / 2$	$2 \times V_{CC}$	30pF	1k $\Omega$	0.15V
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC} / 2$	$2 \times V_{CC}$	30pF	500 $\Omega$	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	6V	50pF	500 $\Omega$	0.3V
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC} / 2$	$2 \times V_{CC}$	50pF	500 $\Omega$	0.3V



**Figure 1. Load Circuit and Voltage Waveforms**

- Notes:
- A. Includes test lead and test apparatus capacitance.
  - B. All pulses are supplied at pulse repetition rate  $\leq 10MHz$ .
  - C. The inputs are measured one at a time with one transition per measurement.
  - D. For the open drain device  $t_{PLZ}$  and  $t_{PZL}$  are the same as  $t_{PD}$ .
  - E.  $t_{PZL}$  is measured at  $V_M$ .
  - F.  $t_{PLZ}$  is measured at  $V_{OL} + V_{\Delta}$ .

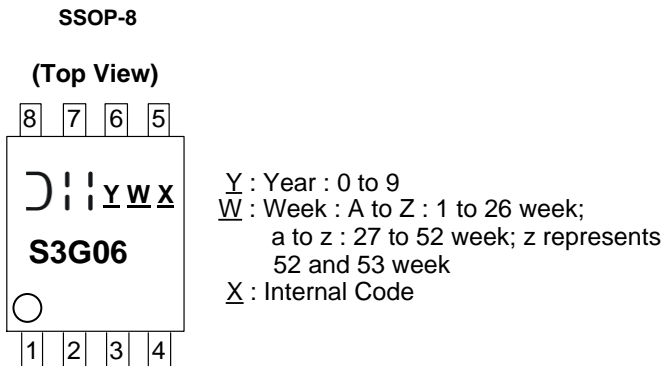
## Ordering Information



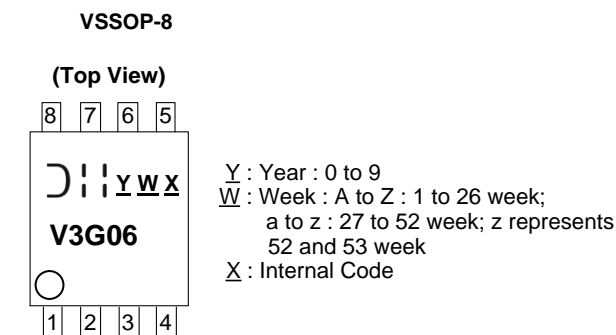
Part Number	Package Code	Package	Packing	
			Qty.	Carrier
74LVC3G06SS8-7	SS8	SSOP-8	3000	7" Tape and Reel (Note 8)
74LVC3G06V8-7	V8	VSSOP-8	3000	7" Tape and Reel (Note 8)

Note: 8. The taping orientation is located on our website at <http://www.diodes.com/package-outlines.html>.

## Marking Information



Part Number	Package	Identification Code
74LVC3G06SS8-7	SSOP-8	S3G06

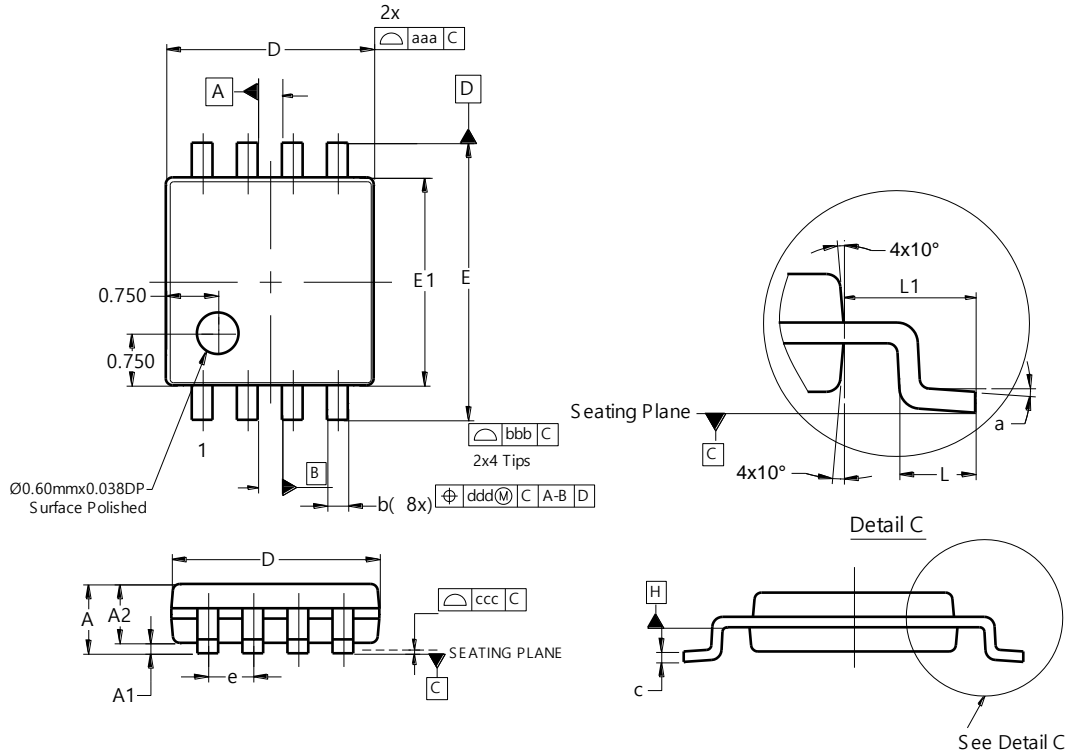


Part Number	Package	Identification Code
74LVC3G06V8-7	VSSOP-8	V3G06

## Package Outline Dimensions

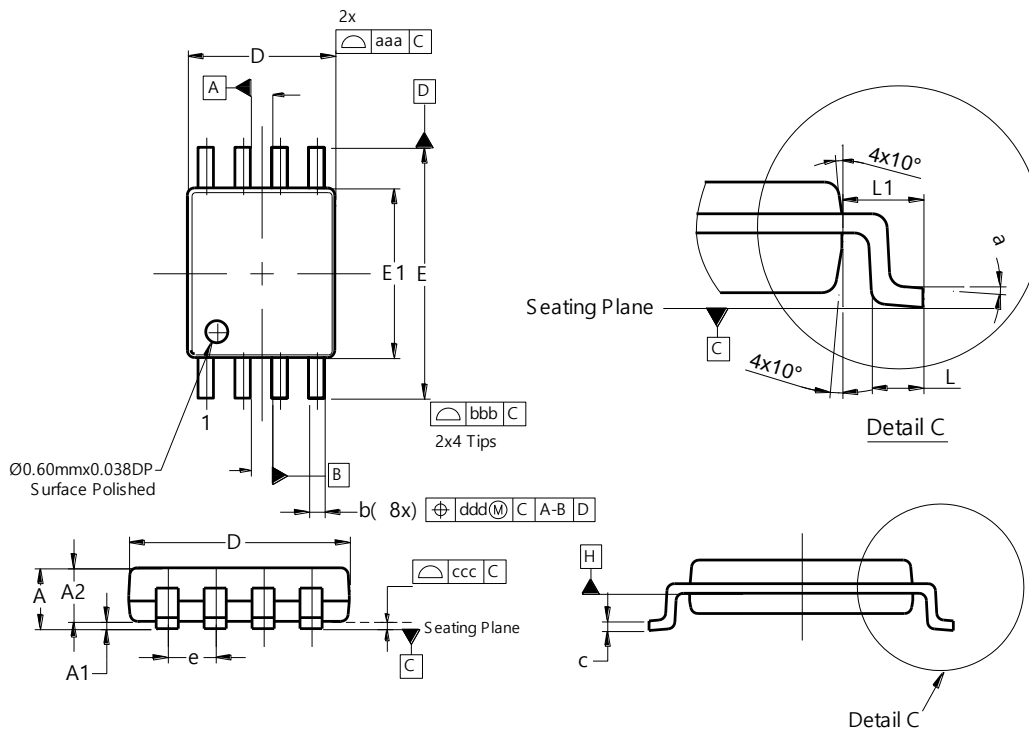
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SSOP-8



SSOP-8			
Dim	Min	Max	Typ
A	--	1.30	--
A1	0.05	0.15	--
A2	0.95	1.20	1.05
b	0.15	0.30	0.225
c	0.08	0.23	--
D	2.75	3.15	2.95
E	3.75	4.25	4.00
E1	2.70	2.90	2.80
e	--	--	0.65
L	0.20	0.60	0.40
L1	0.525	0.675	0.60
a	0°	8°	4°
aaa	0.20		
bbb	0.25		
ccc	0.10		
ddd	0.13		
All Dimensions in mm			

### VSSOP-8

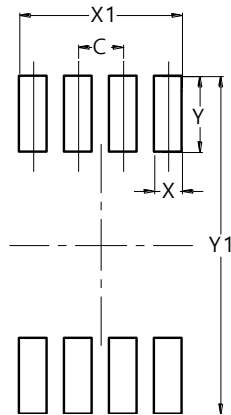


VSSOP-8			
Dim	Min	Max	Typ
A	0.60	0.90	--
A1	--	0.10	--
A2	0.60	0.80	--
b	0.17	0.25	0.21
c	0.08	0.13	--
D	1.90	2.10	2.00
E	3.20	3.60	3.40
E1	2.20	2.40	2.30
e	--	--	0.50
L	0.30	0.40	0.35
L1	0.50	0.60	0.55
a	0°	6°	3°
aaa	0.20		
bbb	0.25		
ccc	0.10		
ddd	0.13		
All Dimensions in mm			

## Suggested Pad Layout

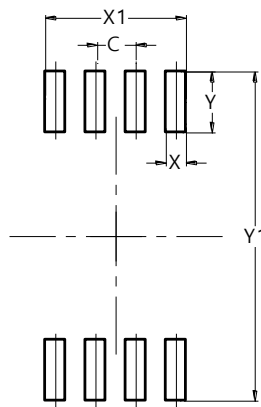
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SSOP-8



Dimensions	Value (in mm)
C	0.650
X	0.400
X1	2.350
Y	1.100
Y1	4.900

### VSSOP-8



Dimensions	Value (in mm)
C	0.500
X	0.250
X1	1.750
Y	0.750
Y1	4.050

## Mechanical Data

### SSOP-8

- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 <sup>(e3)</sup>
- Weight: 0.0169 grams (Approximate)

### VSSOP-8

- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 <sup>(e3)</sup>
- Weight: 0.011 grams (Approximate)



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