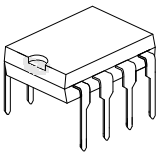
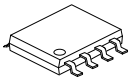
U2429

CMOS IC

SERIAL DATA CONTROL DUAL ELECTRONIC VOLUME



DIP-8



SOP-8

■ DESCRIPTION

The UTC **U2429** is a dual channel electronic volume controlled with 2-wire serial data.

The built-in reference circuit can compose of an electronic volume with less external parts.

■ FEATURES

* Built-in reference circuit
* Control with serial data Volume 0 ~ -83dB (1dB/step), -∞ (Independent control is allowed in each channel)
* Low noise and low distortion VNO = 5μVrms (ATT = -∞) THD = 0.01% Typ. (V0 = 0.5Vrms)

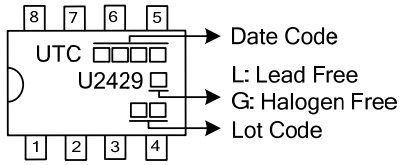
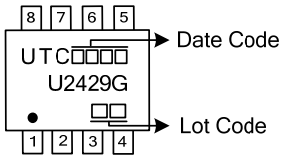
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U2429L-D08-T	U2429G-D08-T	DIP-8	Tube
-	U2429G-S08-R	SOP-8	Tape Reel

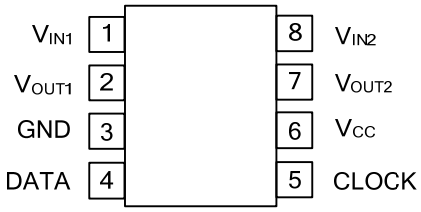
U2429L-D08-T
(1)Packing Type
(2)Packing Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) D08: DIP-8, S08: SOP-8
(3) L: Lead Free, G: Halogen Free and Lead Free

■ MARKING

DIP-8	SOP-8
	

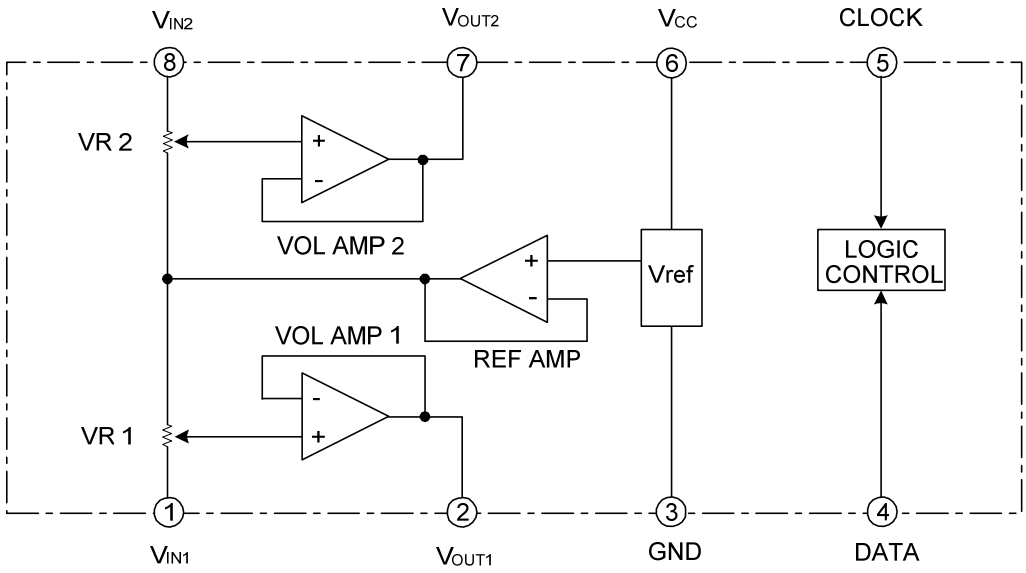
■ PIN CONFIGURATION



■ PIN DESCRIPTION

PIN NO	PIN NAME	DESCRIPTION
1	$V_{IN\,1}$	1-ch input pin
2	V_{OUT1}	1-ch output pin
3	GND	Ground pin
4	DATA	Control data input pin. Inputs data in synchronization with clock.
5	CLOCK	Clock input pin for transferring serial data.
6	V_{CC}	Power supply pin. Stabilize the pin with decoupling capacitor.
7	V_{OUT2}	2-ch output pin
8	V_{IN2}	1-ch input pin

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER		SYMBOL	RATINGS	UNIT
Supply Voltage		V_{CC}, V_{DD}	6.0	V
Power Dissipation	SOP-8	P_D	440	mW
	DIP-8		625	mW
Junction Temperature		T_J	125	°C
Operating Temperature		T_{OPR}	-20 ~ +85	°C
Storage Temperature		T_{STG}	-40 ~ +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.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply voltage range	V_{CC}	4.5 ~ 5.5	V
Rated supply voltage	V_{CC}	5	V

■ ELECTRICAL CHARACTERISTICS (V_{CC} = 5V, T_A= 25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Circuit current	I_{CC}			8	16	mA
Maximum attenuation	A_{TT}	A_{TT}=-∞		-90	-80	dB
Attenuation error	A_{TT}	A_{TT}=0	-2.0	0	2.0	dB
Maximum input voltage	V_{IM}	THD=1%, ATT=-6dB	1.5	1.7		Vrms
Maximum output voltage	V_{OM}	THD=1%	0.8	1.3		Vrms
Output noise voltage	V_{NO1}	A_{TT}=0, R_g=0		4	10	μVrms
	V_{NO2}	A_{TT}=-∞, R_g=0		5	10	μVrms
Total harmonic distortion	THD	f=1kHz, V_O=0.5Vrms, A_{TT}=0		0.01	0.05	%
Channel separation	CS	f=1kHz		-80	-70	dB

■ DC CHARACTERISTICS OF DIGITAL BLOCK

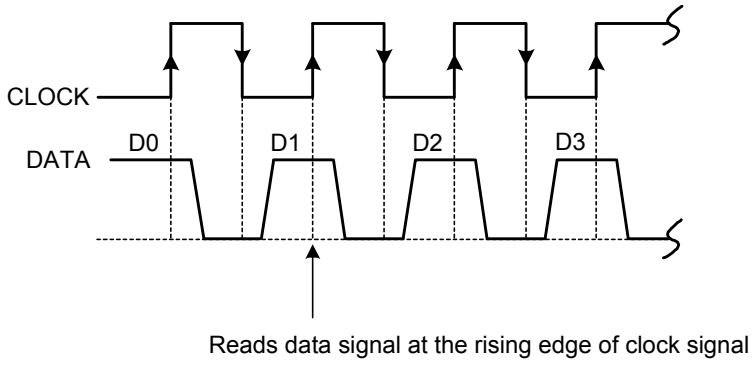
PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
"L" level input voltage	V_{IL}	Data, clock pin		0		0.2×V_{CC}	V
"H" level input voltage	V_{IH}			0.8×V_{CC}		V_{CC}	V
"L" level input current	I_{IL}	V_I=0	Data, clock pin	-10		10	μA
"H" level input current	I_{IH}	V_I=5V				10	μA

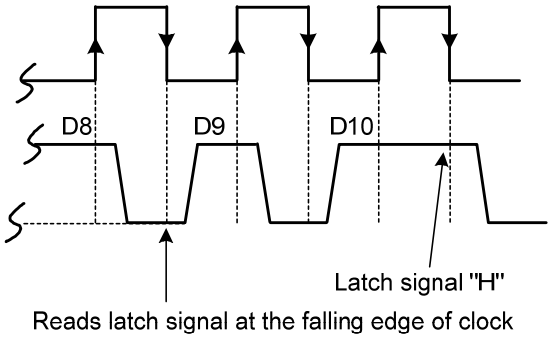
■ AC CHARACTERISTICS OF DIGITAL BLOCK

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Cycle time of clock	t_{cr}	V_{DD}=5V	4			μs
Pulse width of clock ("H" level)	t_{WHC}	V_{DD}=5V	1.6			μs
Pulse width of clock ("L" level)	t_{WLC}	V_{DD}=5V	1.6			μs
Clock rising time	t_r	V_{DD}=5V			0.4	μs
Clock falling time	t_f	V_{DD}=5V			0.4	μs
Data setup time	t_{SD}	V_{DD}=5V	0.8			μs
Data hold time	t_{HD}	V_{DD}=5V	0.8			μs

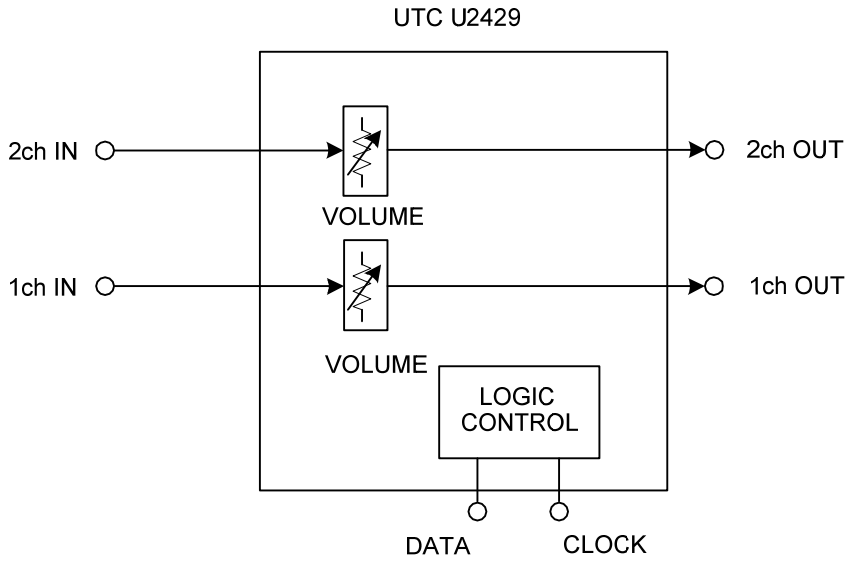
Note: UTC products on power start, DATA conversion or IC first start are all without delay time. When DATA reading is completed, the output immediately respond.

■ RELATIONSHIP BETWEEN DATA AND CLOCK

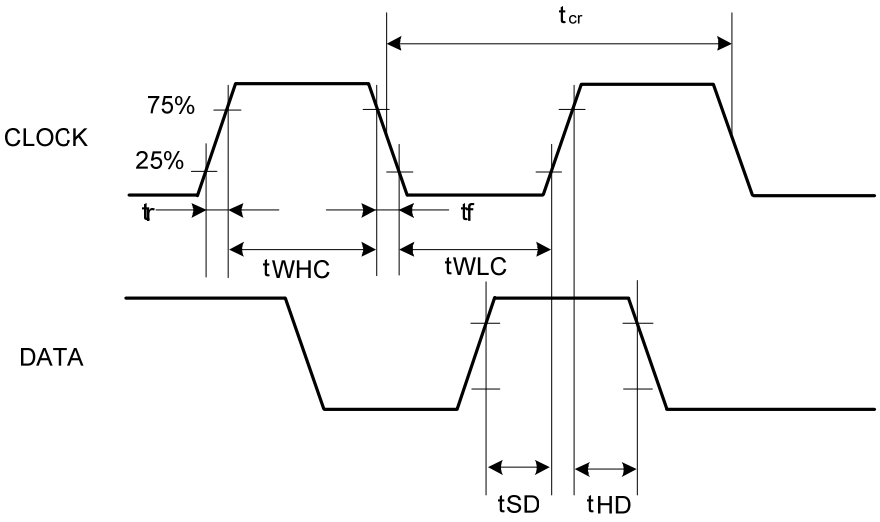




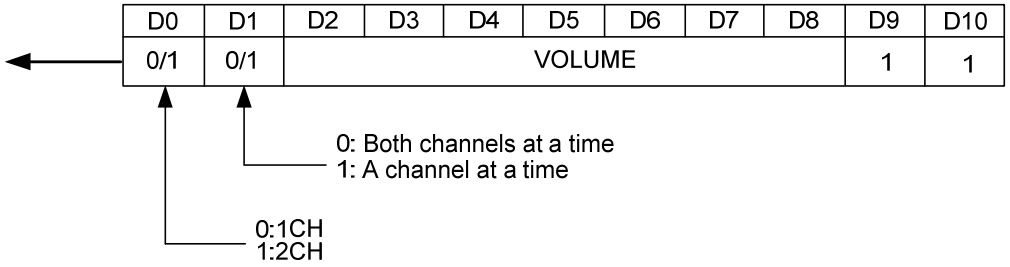
■ SYSTEM CONFIGURATION



■ CLOCK AND DATA TIMING



■ DATA INPUT FORMAT



■ VOLUME CODE

ATT1	D2	D3	D4	D5	D6
0dB	H	L	H	L	H
-4dB	L	L	H	L	H
-8dB	H	H	L	L	H
-12dB	L	H	L	L	H
-16dB	H	L	L	L	H
-20dB	L	L	L	L	H
-24dB	H	H	H	H	L
-28dB	L	H	H	H	L
-32dB	H	L	H	H	L
-36dB	L	L	H	H	L
-40dB	H	H	L	H	L
-44dB	L	H	L	H	L
-48dB	H	L	L	H	L
-52dB	L	L	L	H	L
-56dB	H	H	H	L	L
-60dB	L	H	H	L	L
-64dB	H	L	H	L	L
-68dB	L	L	H	L	L
-72dB	H	H	L	L	L
-76dB	L	H	L	L	L
-80dB	H	L	L	L	L
	L	L	L	L	L

ATT2	D7	D8
0dB	H	H
-1dB	L	H
-2dB	H	L
-3dB	L	L