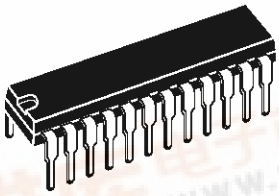
SGS-THOMSON MICROELECTRONICS

TEA6430

AUDIO CELLULAR MATRIX

- 5 STEREO INPUTS - 4 STEREO OUTPUTS
- 3-STATE OPERATION FOR EACH OUTPUT
- GAIN OUTPUT CONTROL 0dB/2/4/6dB/MUTE FOR EACH
- VERY LOW NOISE AND DISTORTION
- I^2C BUS CONTROL
- 4 SUB-ADDRESS FACILITY
- 90dB CROSSTALK BETWEEN ANY INPUT AND OUTPUT



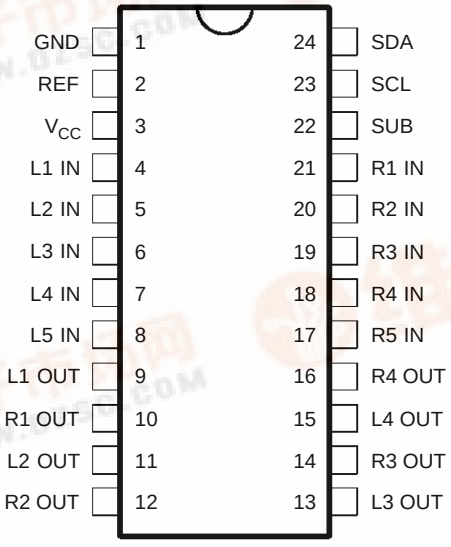
SHRINK 24
(Plastic Package)

ORDER CODE : TEA6430

DESCRIPTION

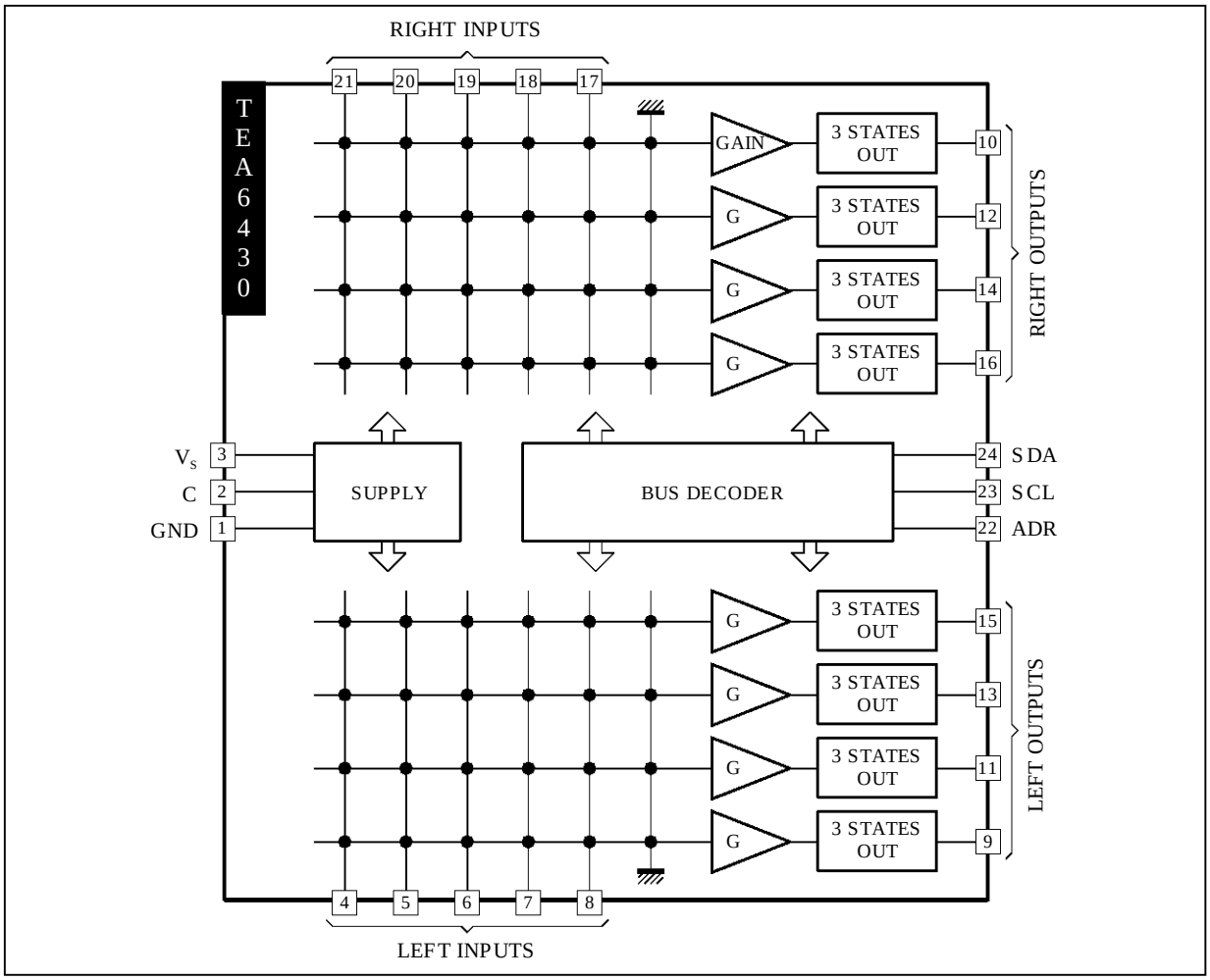
The TEA6430 switches 5 stereo inputs on 4 stereo outputs, providing the customer with high quality sound (low noise, low distortion). The 4 stereo outputs can be set separately in high impedance state, to enable parallel connection of several devices (up to 4). All functions are controlled through the I^2C bus.

PIN CONNECTIONS



6430-01.EPS

BLOCK DIAGRAM



The output loads have to be larger than 2kΩ (typical 10kΩ) and 1500pF

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	12	V
V_I	Voltage at Pin i to GND	0, V_{CC}	V
T_{oper}	Operating Ambient Temperature	0, + 70	^oC
T_{stg}	Storage Temperature	-20, + 150	^oC

6430-01.TBL

THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient Thermal Resistance	75	$^oC/W$

6430-02.TBL

ELECTRICAL CHARACTERISTICS

(V_{CC} = 8V, T_{amb} = 25°C, R_L = 10kΩ, R_G = 600Ω, f = 1kHz, G = 0dB, V_{IN} = 0.5V_{RMS} ;
3-state is controlled by I^2C bus, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
SUPPLY						
V_{CC}	Supply Voltage		7.2	8	10.2	V
I_{CC}	Supply Current		4	7	10	mA
RR	Ripple Rejection	V_{IN} = 0.5V_{RMS}, f = 1kHz	70			dB
AUDIO INPUTS						
V_{IN}	Max. Signal Amplitude		2			V_{RMS}
V_{DC}	Input DC Level			V_{CC}/2		V
R_I	Input Resistance		30	50	100	kΩ
AUDIO OUTPUTS						
R_{OUT}	Output Resistance			60	100	Ω
Z_{HI}	Output "off" Impedance	f = 20kHz, output disabled	50			kΩ
V_{OFF}	DC Offset Change	Switching between inputs, see note 1		0.1	5	mV
V_{OUT}	Output DC Level		0.4 V_{CC}	V_{CC}/2	0.6 V_{CC}	V
V_N	Output Noise Voltage	B = 20-20kHz, flat, see note 2		2.5		µV
G	Gain	B = 20-20kHz, R_L = 2kΩ	-0.5	0	+0.5	dB
	Isolation "off" State	f = 1kHz, output disabled	85			dB
THD	Distortion	V_{IN} = 1V_{RMS}, f = 1kHz		0.01	0.05	%
V_{CL}	Clipping Level	d = 0.3%	2	2.3		V_{RMS}
C_S	L, R Channel Separation	f = 1kHz	-85			dB
	Crosstalk Audio Channels	f = 1kHz, see note 3	-85	-100		dB
C_L	Load Capacitance		1500			pF

6430-03.TBL

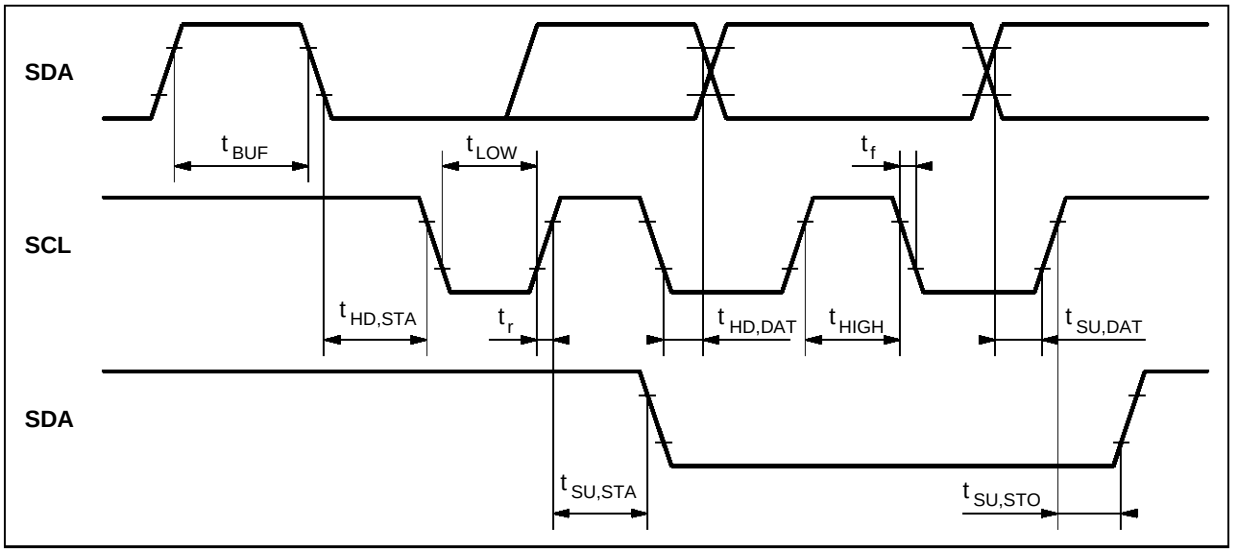
Notes : 1. DC offset change is less than maximum limit, in all configurations (one or several devices in parallel), provided that the reference Pins (P2) are all connected together.
2. Flat filter according to CCIR-468-4, B = 20Hz-20kHz
3. Measured from any selected output which contains no signal to a set of other outputs.

I²C BUS CHARACTERISTICS

Symbol	Parameter	Test Conditions	Standard Mode		Fast Mode		Unit
			Min.	Max.	Min.	Max.	
SCL							
V_{IL}	Low Level Input Voltage		- 0.3	+ 1.5	- 0.3	+ 1.5	V
V_{IH}	High Level Input Voltage		3.0	V_{CC} + 0.5	3.0	V_{CC} + 0.5	V
I_{LI}	Input Leakage Current	V_I = 0 to V_{DD}	- 10	+ 10	- 10	+ 10	µA
f_{SCL}	Clock Frequency		0	100	0	400	kHz
t_R	Input Rise Time	1.5V to 3V		1000		300	ns
t_F	Input Fall Time	1.5V to 3V		300		300	ns
C_I	Input Capacitance			10		10	pF
SDA							
V_{IL}	Low Level Input Voltage		- 0.3	+ 1.5	- 0.3	+ 1.5	V
V_{IH}	High Level Input Voltage		3.0	V_{CC} + 0.5	3.0	V_{CC} + 0.5	V
I_{LI}	Input Leakage Current	V_I = 0 to V_{DD}	- 10	+ 10	- 10	+ 10	µA
C_I	Input Capacitance			10		10	pF
t_R	Input Rise Time	1.5V to 3V		1000		300	ns
t_F	Input Fall Time	1.5V to 3V		300		300	ns
V_{OL}	Low Level Output Voltage	I_{OL} = 3mA		0.4		0.4	V
t_F	Output Fall Time	3V to 1.5V		250		250	ns
C_L	Load Capacitance			400		400	pF
TIMING							
t_{LOW}	Clock Low Period		4.7		1.3		ms
t_{HIGH}	Clock High Period		4.0		0.6		ms
$t_{SU,\ DAT}$	Data Set-up Time		250		100		ns
$t_{HD,\ DAT}$	Data Hold Time		0	340	0	340	ns
$t_{SU,\ STO}$	Set-up Time from Clock High to Stop		4.0		0.6		µs
t_{BUF}	Start Set-up Time following a Stop		4.7		1.3		µs
$t_{HD,\ STA}$	Start Hold Time		4.0		0.6		µs
$t_{SU,\ STA}$	Start Set-up Time following Clock Low-to High Transition		4.7		0.6		µs

6430-04.TBL

Figure 1 : I²C Bus Timing



6430-03.EPS

I²C BUS SELECTION

I²C Bus Slave Address

Address	A6	A5	A4	A3	A2	A1	A0	R/W
Value	1	0	0	1	1	A1	A0	0

Sub-address I²C

Symbol	Parameter	Conditions		Pin 22 Voltage (typ.)	Unit
Vsub	Slave address HEXA	Sub-address (see note)			
		A1	A0		
1	98	0	0	GND	V
2	9E	1	1	V_{CC}	V
3	9C	1	0	1/3	V_{CC}
4	9A	0	1	2/3	V_{CC}

Note : The first 3 levels are defined by connecting the sub-address pin to the appropriate level. Sub-address 4 will be selected when this pin is left open.

Data Byte

	b7	b6	b5	b4	b3	b2	b1	b0	Action
	T	01	00	G1	G0	I2	I1	I0	
Input Select	*	*	*	*	*	0	0	0	IN1
	*	*	*	*	*	0	0	1	IN2
	*	*	*	*	*	0	1	0	IN3
	*	*	*	*	*	0	1	1	IN4
	*	*	*	*	*	1	0	0	IN5
	*	*	*	*	*	1	0	1	Mute
Output Select	*	0	0	*	*	*	*	*	OUT1
	*	0	1	*	*	*	*	*	OUT2
	*	1	0	*	*	*	*	*	OUT3
	*	1	1	*	*	*	*	*	OUT4
Gain	*	*	*	0	0	*	*	*	6dB
	*	*	*	0	1	*	*	*	4dB
	*	*	*	1	0	*	*	*	2dB
	*	*	*	1	1	*	*	*	0dB
Tri-state	0	*	*	*	*	*	*	*	Low impedance
	1	*	*	*	*	*	*	*	Tri-state

Example : 00111100 enables L(R)2 out and connect it with a gain of 0dB to L(R)5 in.

Power On Reset

When active : outputs in 3-state. All outputs are disabled and L(R)5 is selected to drive all outputs. Gain = 0dB.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Reset	Start of Reset	Incr. V_{CC}			2.5	V
		Decr. V_{CC}			4.2	V
	End of Reset	Incr. V_{CC}	4.5			V

TYPICAL PERFORMANCES

Figure 1 : Supply Current as a Function of Supply Voltage

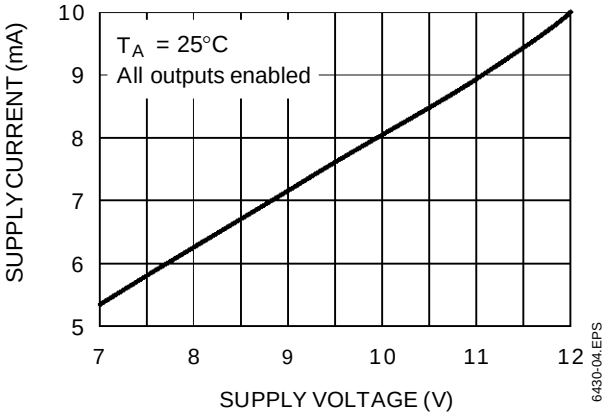


Figure 2 : Supply Current as a Function of Temperature

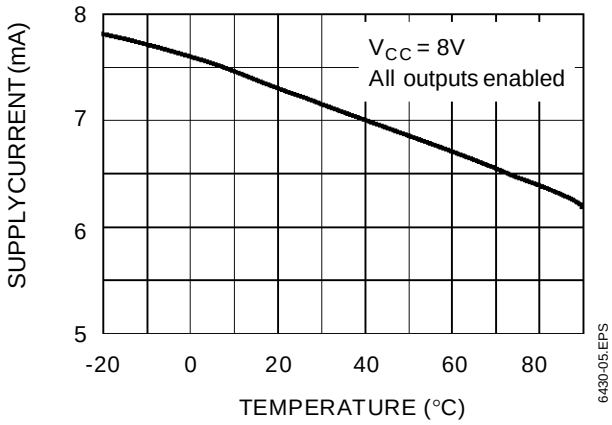


Figure 3 : Ripple Rejection as a Function of Supply Voltage

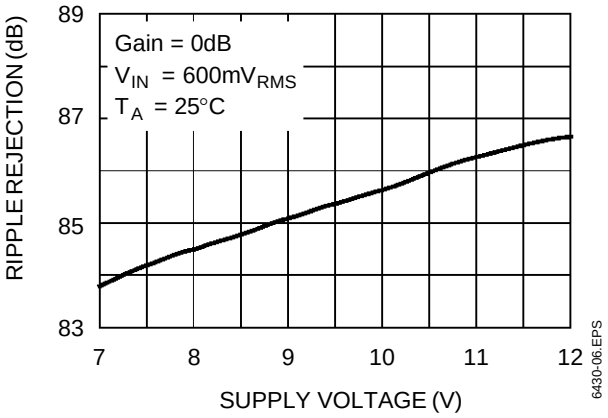


Figure 4 : Ripple Rejection as a Function of Temperature

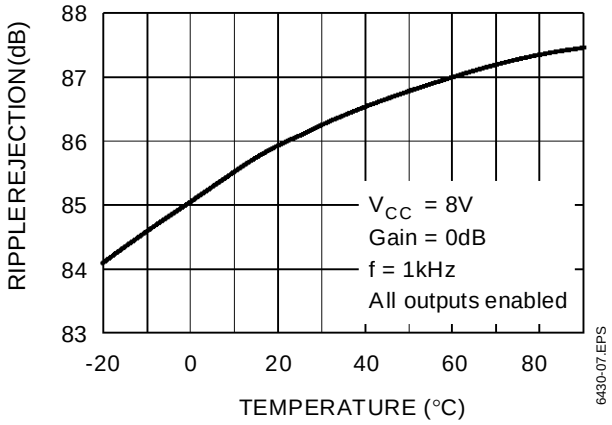


Figure 5 : Ripple Rejection as a Function of Gain

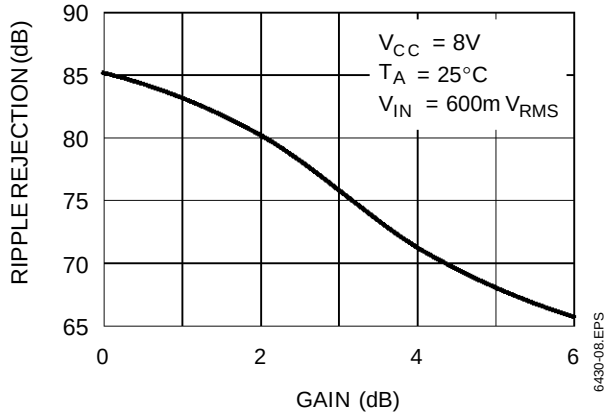
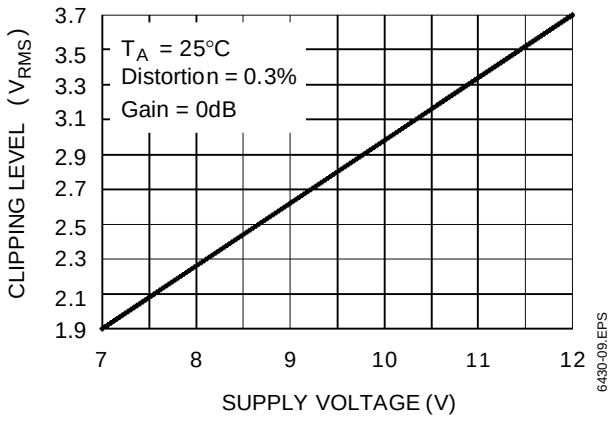


Figure 6 : Clipping Level as a Function of Supply Voltage



TYPICAL PERFORMANCES (continued)

Figure 7 : Distortion as a Function of Input Level

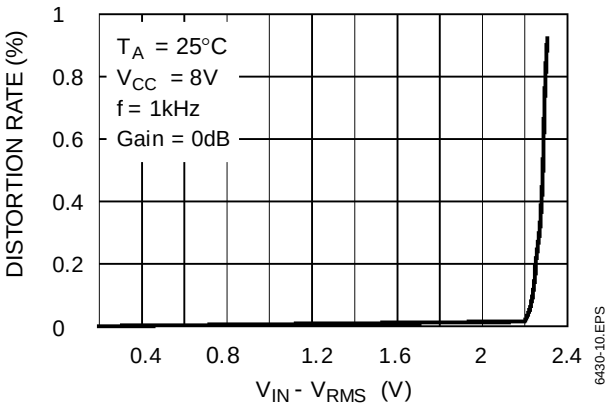


Figure 8 : Distortion as a Function of Gain

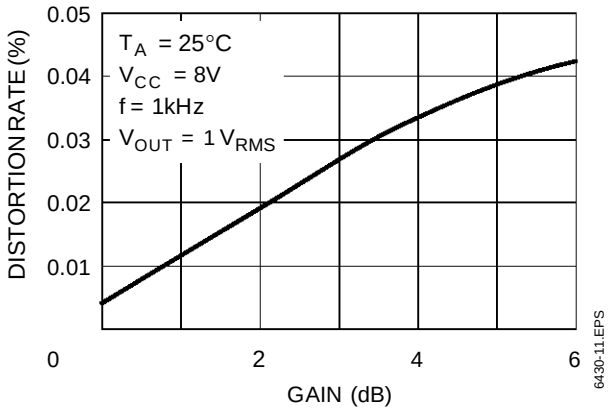


Figure 9 : Crosstalk Level as a Function of Frequency (Gain = 0dB)

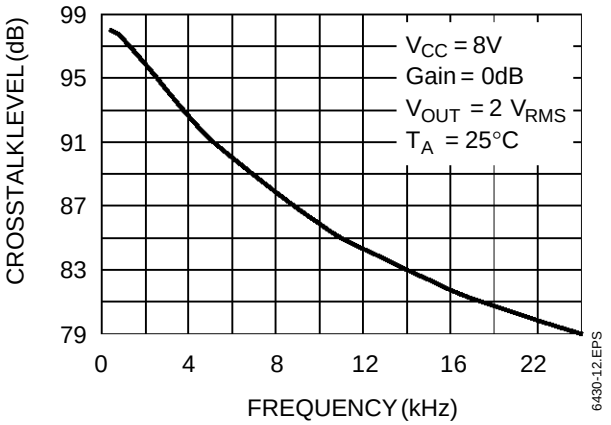
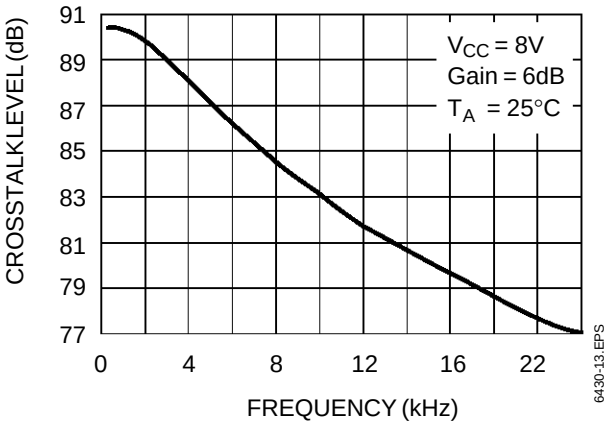


Figure 10 : Crosstalk Level as a Function of Frequency (Gain = 6dB)



PIN CONFIGURATIONS

Figure 11 : Audio IN

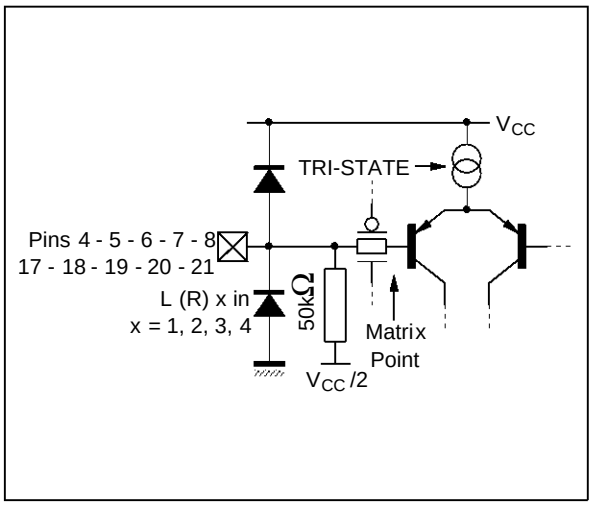


Figure 12 : Audio OUT

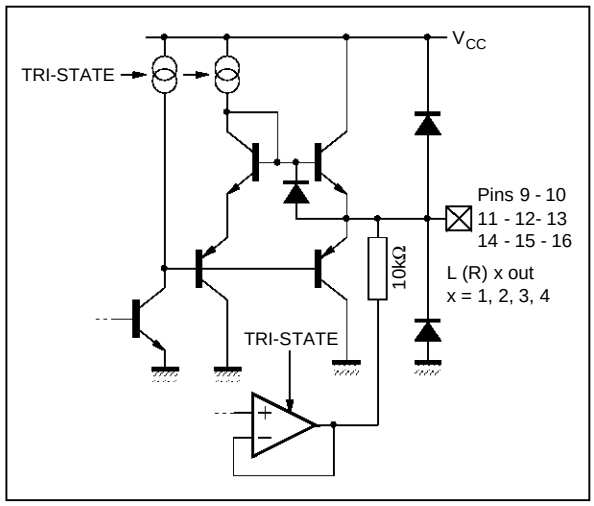


Figure 13 : PROG

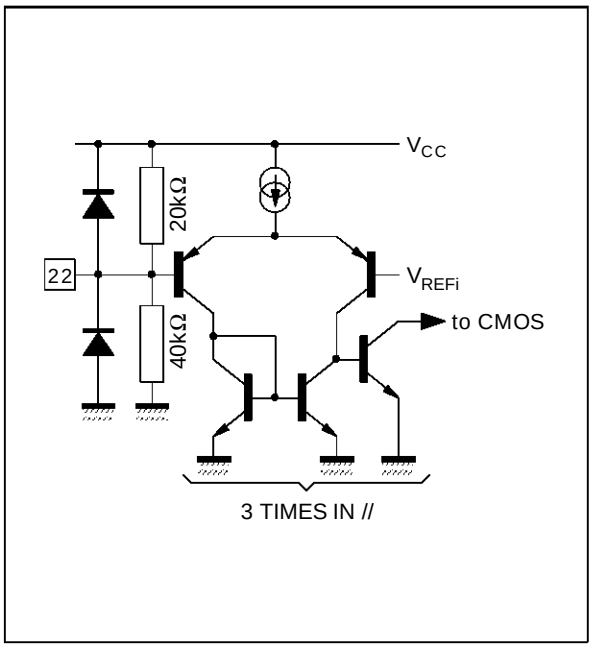
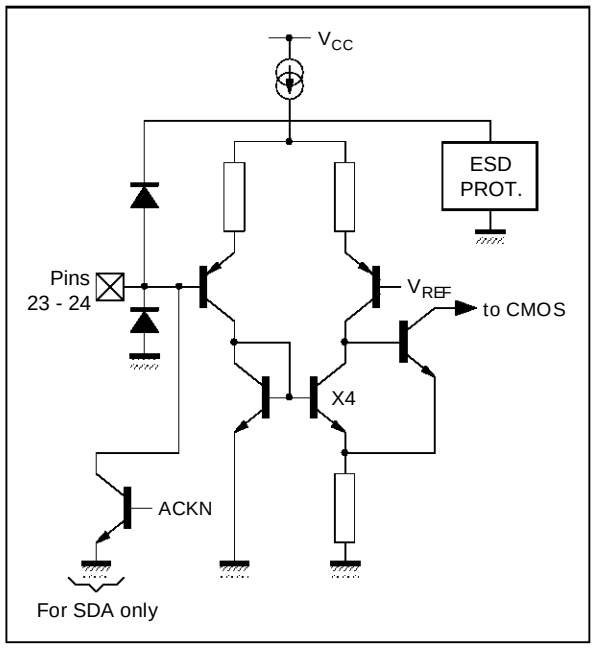
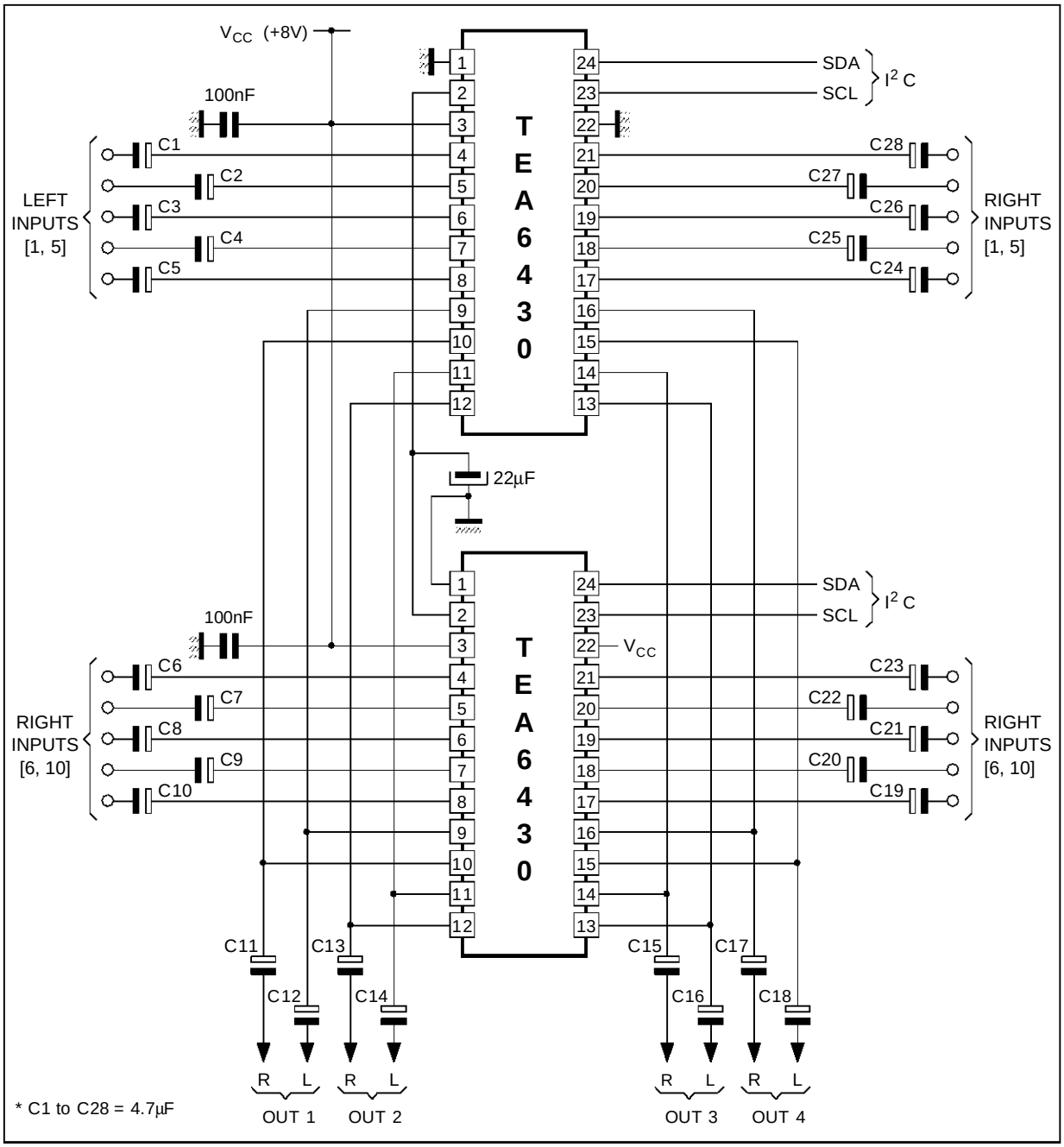


Figure 14 : Bus Inputs

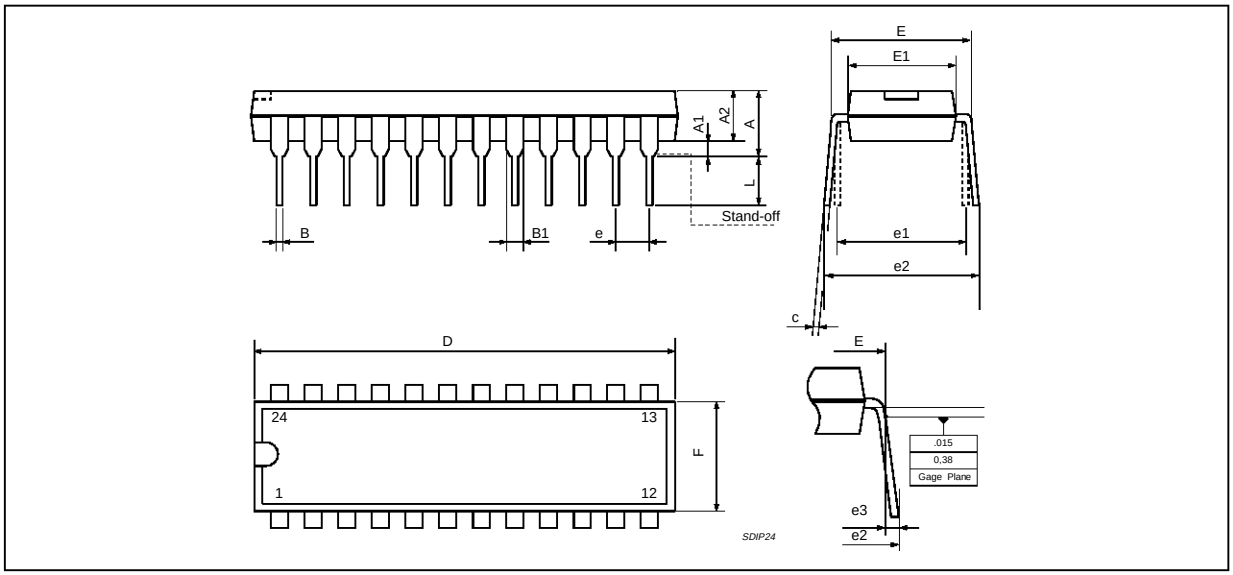


TYPICAL APPLICATION



PACKAGE MECHANICAL DATA

24 PINS - PLASTIC SHRINK DIP



PMSDIP24.EPS

Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5.08			0.20
A1	0.51			0.020		
A2	3.05	3.30	4.57	0.120	0.130	0.180
B	0.36	0.46	0.56	0.0142	0.0181	0.0220
B1	0.76	1.02	1.14	0.030	0.040	0.045
C	0.23	0.25	0.38	0.0090	0.0098	0.0150
D	22.61	22.86	23.11	0.890	0.90	0.910
E	7.62		8.64	0.30		0.340
E1	6.10	6.40	6.86	0.240	0.252	0270
e		1.778			0.070	
e1		7.62			0.30	
e2			10.92			0.430
e3			1.52			0.060
L	2.54	3.30	3.81	0.10	0.130	0.150

SDIP24.TBL