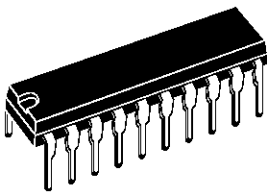
SGS-THOMSON MICROELECTRONICS

TEA6425

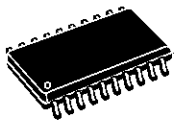
VIDEO CELLULAR MATRIX

- 6 VIDEO INPUTS - 8 VIDEO OUTPUTS
- 2 INTERNAL SELECTABLE YC ADDERS
- 15MHz BANDWIDTH @ -3dB
- SELECTABLE 0.5/6.5dB GAIN FOR EACH OUTPUT
- HIGH IMPEDANCE SWITCH FOR EACH OUTPUT (3-state operation)
- PROGRAMMABLE CLAMP MODE ON EACH INPUT (sync bottom or average value)
- -60dB CROSSTALK @ 5MHz
- 4 SUB-ADDRESS CAPABILITY
- I^2C BUS CONTROL



DIP20
(Plastic Package)

ORDER CODE : TEA6425



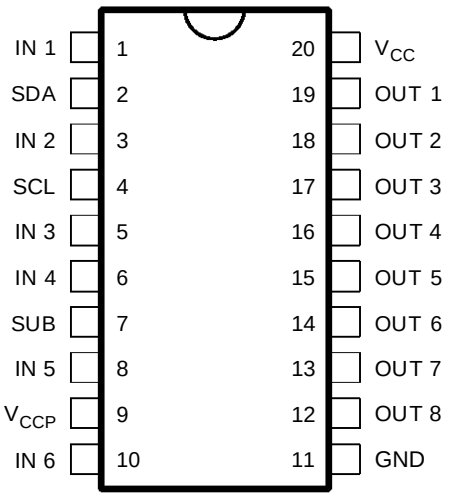
SO20L
(Plastic Micropackage)

ORDER CODE : TEA6425D

DESCRIPTION

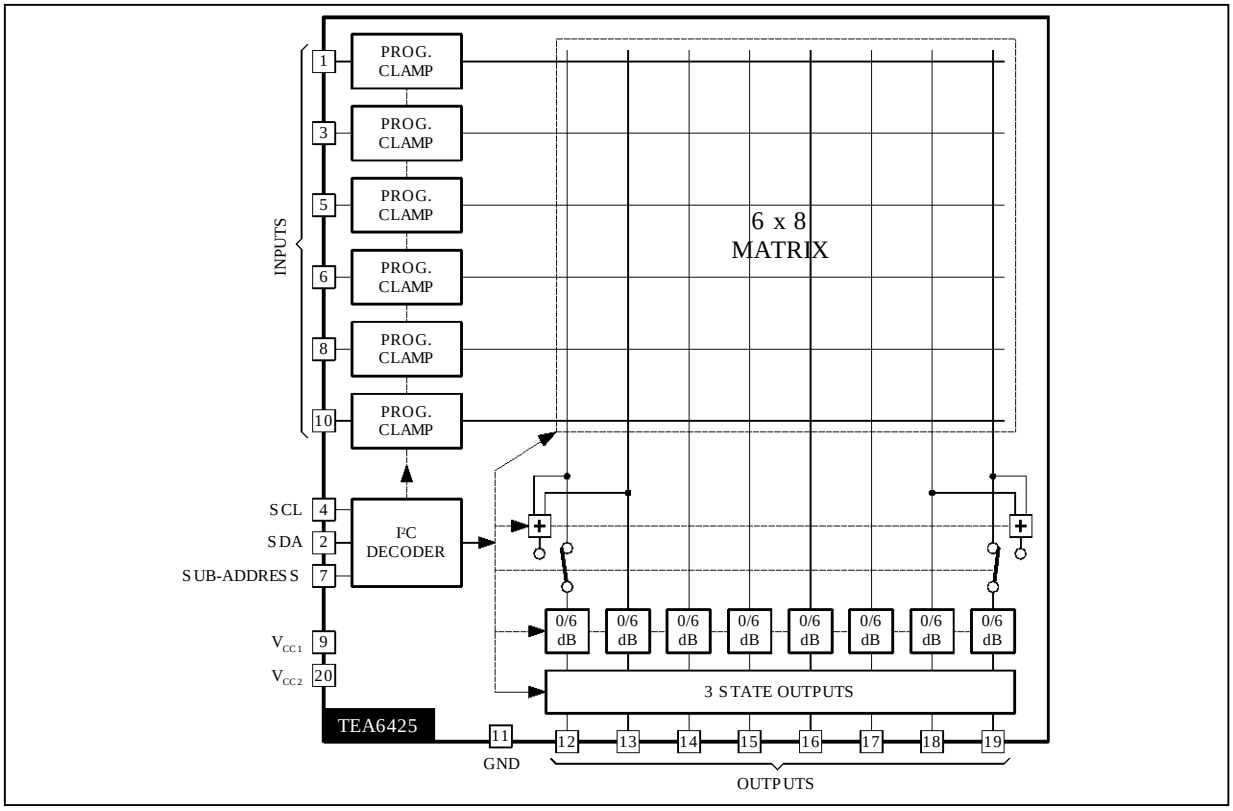
This device is intended for switching between video and chroma signals such as CVBS, SVHS, base-band CVBS, MAC. Each input clamp mode, each output gain, all switching are controlled through the I^2C bus. The 8 outputs can be set separately in high impedance state, to enable parallel DC connection of several devices (up to 4).

PIN CONNECTIONS

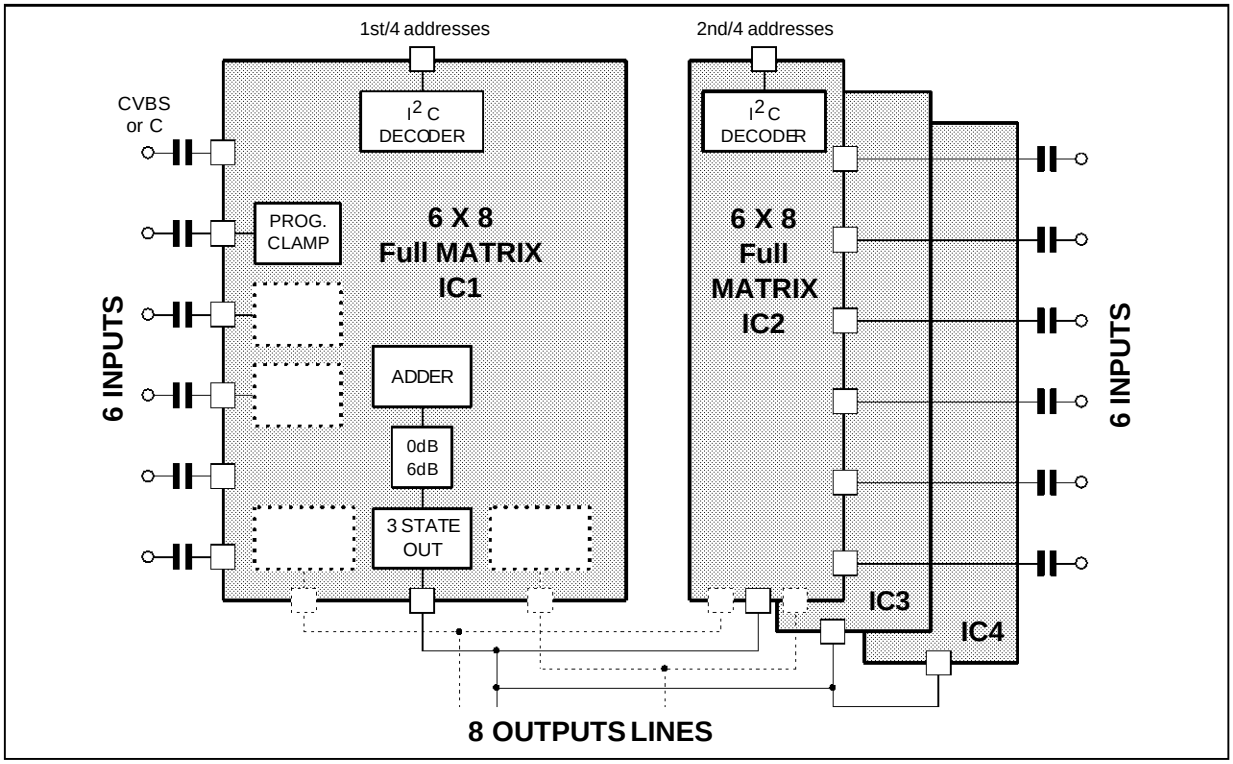


6425-01.EPS

BLOCK DIAGRAM



CELLULAR MATRICE CONNECTIONS



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

6425-01.TBL

THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ (j-a)}$	Junction-ambient Thermal Resistance	Min.	80	$^oC/W$

6425-02.TBL

ELECTRICAL CHARACTERISTICS (V_{CC} = 8V, T_{amb} = 25^{o}C, V_{IN} = 1V, Gain = 6.5dB, C_{load} = 20pF, R_{load} = 4.7kΩ ; Gain condition, clamp and 3-state are controlled by I^{2}C bus, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
SUPPLY						
V_{CC}	Supply Voltage		7.2	8	8.8	V
I_{CC}	Supply Current			45	60	mA
RR	Supply Voltage Rejection	f = 1kHz	40	46		dB
VIDEO INPUTS (clamping at bottom sync level)						
V_{IN}	Max. Signal Amplitude	Clamp Active	2			V_{PP}
V_{clamp}	Clamp Level	Clamp Active	1.7	2	2.3	V
V_{DC}	Input DC Level	Clamp Inactive	2.7	3	3.3	V
I_{IN}	Leakage Current	1 input connected to 1 output		2	5	µA
I_{clamp}	Clamp Current	V_{clamp} - 200mV		0.9	3	mA
VIDEO OUTPUTS						
R_{OUT}	Output Resistance			15	50	Ω
Z_{HI}	Output "off" Impedance	no load	50			kΩ
C_{HI}	C_{OUT} in 3-state	no load		3		pF
G1	Voltage Gain	f = 100kHz	0	0.5	1	dB
G2	Voltage Gain	f = 100kHz	6	6.5	7	dB
V_{sync}	Top Level Sync (Y or CVBS)	G = 6.5dB, Clamp Active	1	1.25	2	V
V_{bias}	Output Mean Level (chroma)	G = 0.5dB, Clamp Inactive G = 6.5dB, Clamp Inactive	2 3	2.4 3.4	3 4	V V
	Isolation "off" State	f = 5MHz	60			dB
	Crosstalk Attenuation between Channels	f = 5MHz	50	60		dB
B	Bandwidth	C_{load} = 20pF, G = 6.5dB at ± 0.5dB at ± 1dB at - 3dB		 5 10 21		MHz

6425-03.TBL

FUNCTIONAL DESCRIPTION

This device is controlled via the I^{2}C bus. 4 addresses can be selected by a 4-level detector on Pin 7, thus enabling parallel connection of 4 devices.

Via the I^{2}C bus :

- The input signals can be clamped at their negative peak (top sync).
- The gain factor of the outputs can be selected between 0.5 and 6.5dB.
- Each of the 6 inputs can be connected to the 8 outputs.
- Each output can individually be set in a high impedance state.

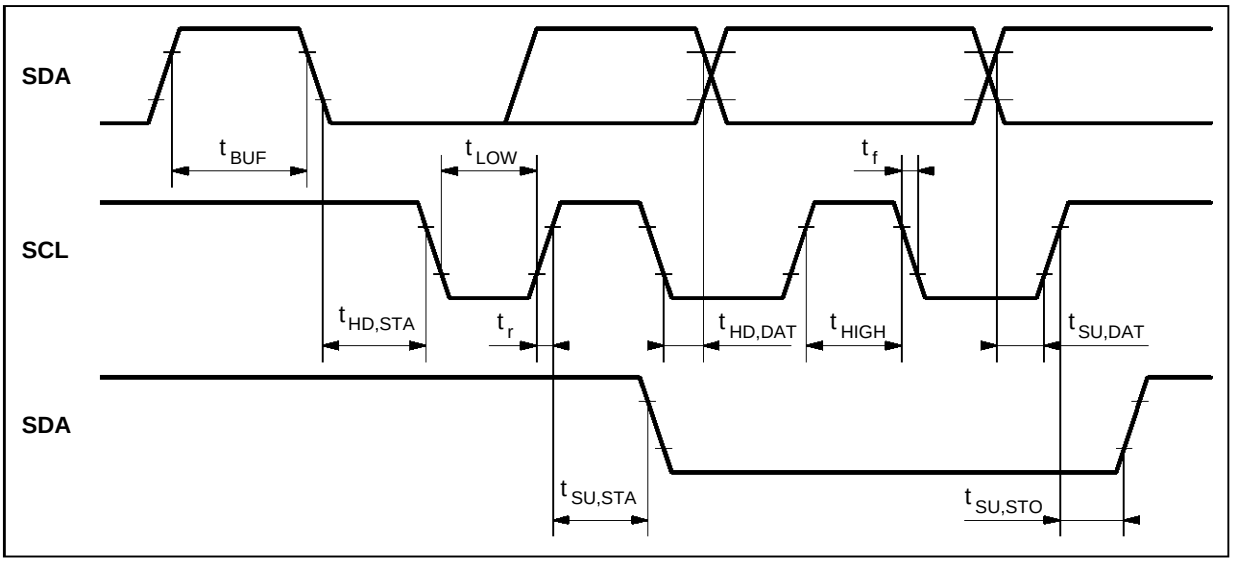
Two internal SVHS mixers will add the selected Y and C inputs. Two dedicated outputs will have the option to select this added signal also.

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		µs
t_{HIGH}	Clock High Period		4.0		0.6		µs
$t_{SU, DAT}$	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

6425-04.TBL

Figure 1 : I²C Bus Timing



6425-04.EPS

I²C BUS SELECTION

I²C Bus Slave Address

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

Sub-address I²C

Symbol	Parameter	Conditions		Pin 7 Voltage (typ.)	Unit
Vsub	Slave address HEXA	Sub-address (see note)			
		A1	A0		
1	90	0	0	GND	V
2	96	1	1	V_{CC}	V
3	94	1	0	1/3	V_{CC}
4	92	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.

1st Data Byte

	b7	b6	b5	b4	b3	b2	b1	b0	Selected Output
	a2	a1	a0	*	*	*	*	I	
Output Select	0	0	0	*	*	*	*	0	OUT1
	0	0	1	*	*	*	*	0	OUT2
	0	1	0	*	*	*	*	0	OUT3
	0	1	1	*	*	*	*	0	OUT4
	1	0	0	*	*	*	*	0	OUT5
	1	0	1	*	*	*	*	0	OUT6
	1	1	0	*	*	*	*	0	OUT7
	1	1	1	*	*	*	*	0	OUT8

2nd Data Byte

	b7	b6	b5	b4	b3	b2	b1	b0	Action
	a2	a1	a0	*	*	*	*	I	
Input Select	0	0	0	*	*	*	*	1	IN1
	0	0	1	*	*	*	*	1	IN2
	0	1	0	*	*	*	*	1	IN3
	0	1	1	*	*	*	*	1	IN4
	1	0	0	*	*	*	*	1	IN5
	1	0	1	*	*	*	*	1	IN6
Clamp	*	*	*	0	*	*	*	1	Free
	*	*	*	1	*	*	*	1	Clamped
Gain	*	*	*	*	0	*	*	1	0.5dB
	*	*	*	*	1	*	*	1	6.5dB
Mixer	*	*	*	*	*	0	*	1	Disabled
	*	*	*	*	*	1	*	1	Enabled
Tri-state	*	*	*	*	*	*	0	1	Low impedance
	*	*	*	*	*	*	1	1	Tri-state

Power On Reset

When active : outputs in 3-state, inputs are clamped.

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

PIN CONFIGURATIONS

Figure 2 : Video IN

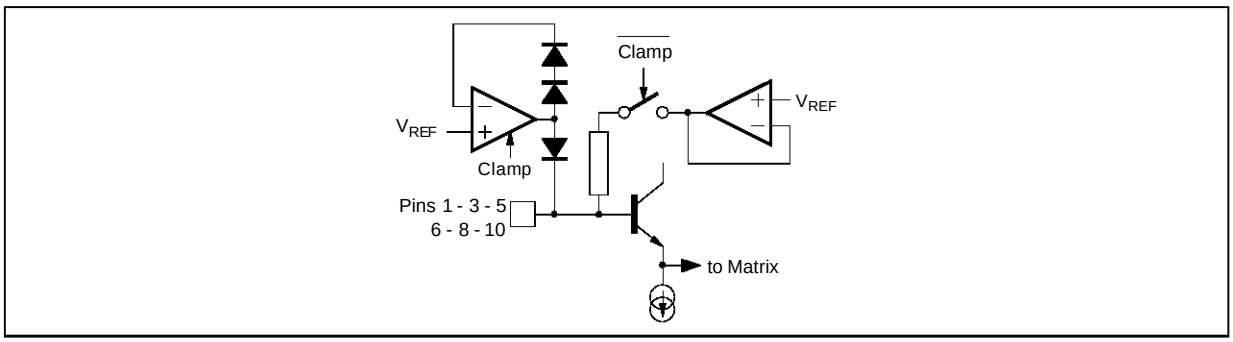


Figure 3 : Video OUT

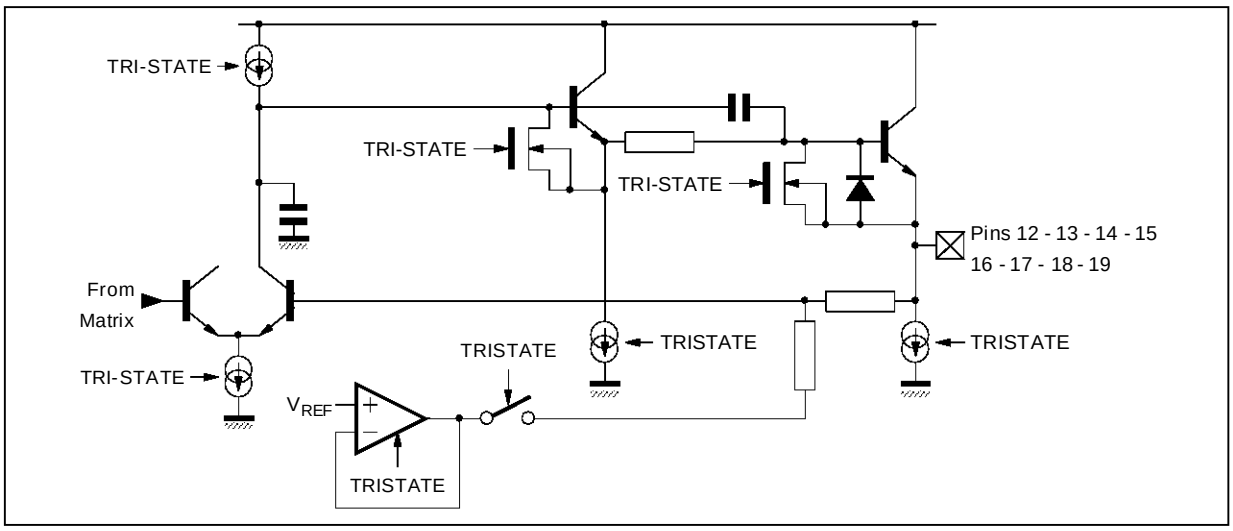


Figure 4 : PROG Pin

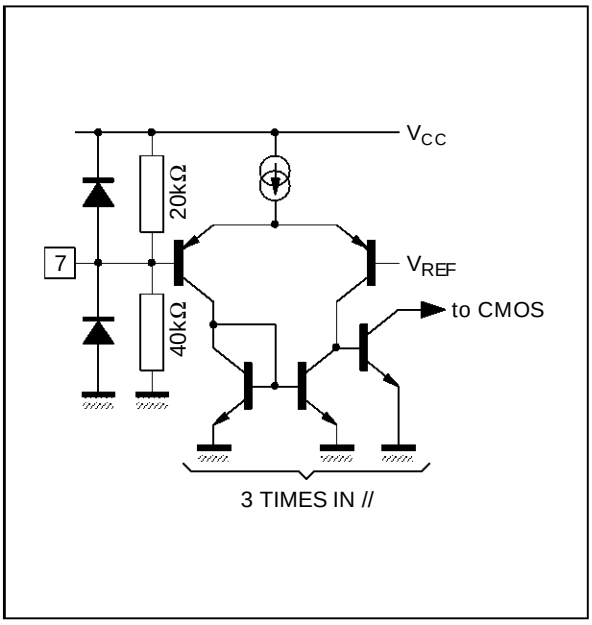
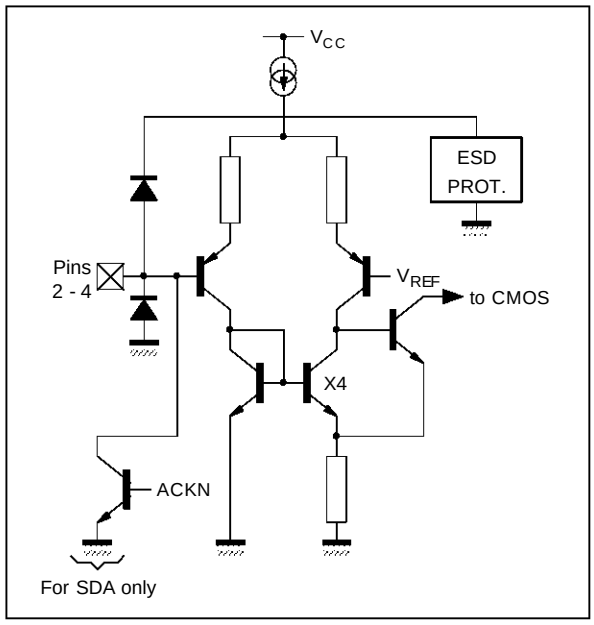
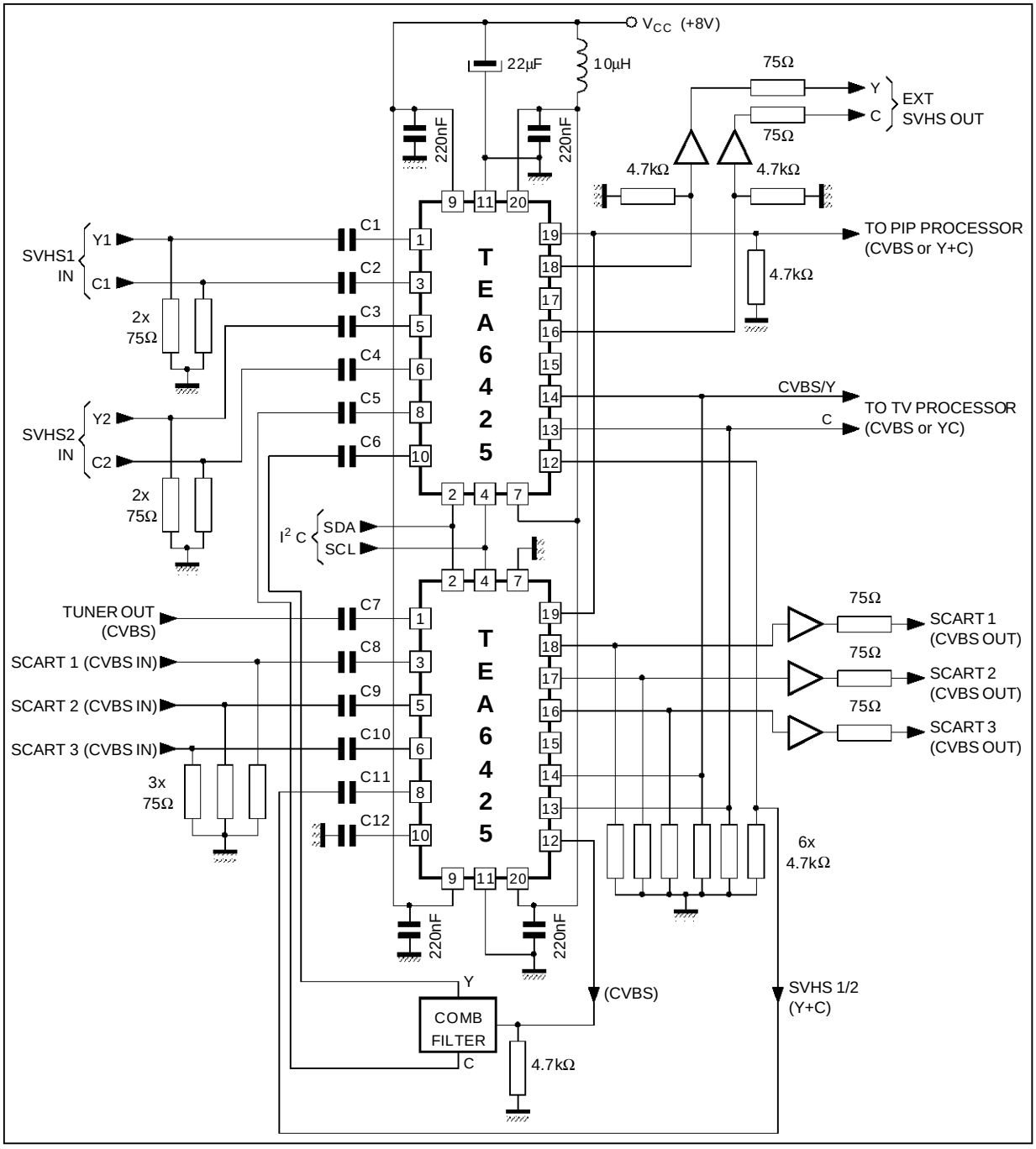


Figure 5 : Bus Inputs

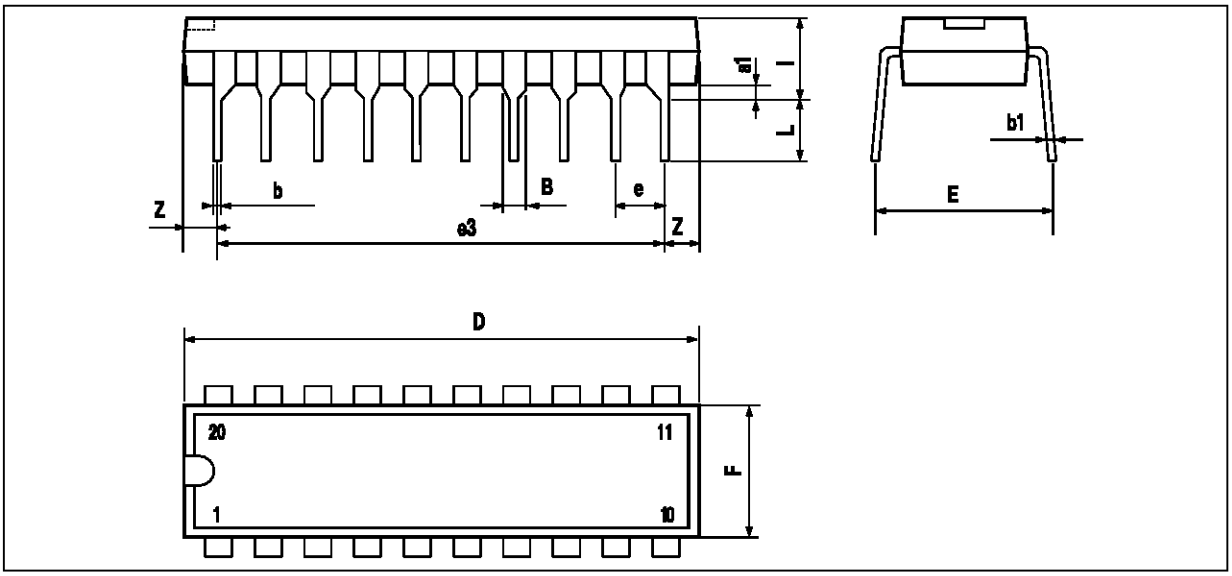


TYPICAL APPLICATION



PACKAGE MECHANICAL DATA

20 PINS - PLASTIC DIP



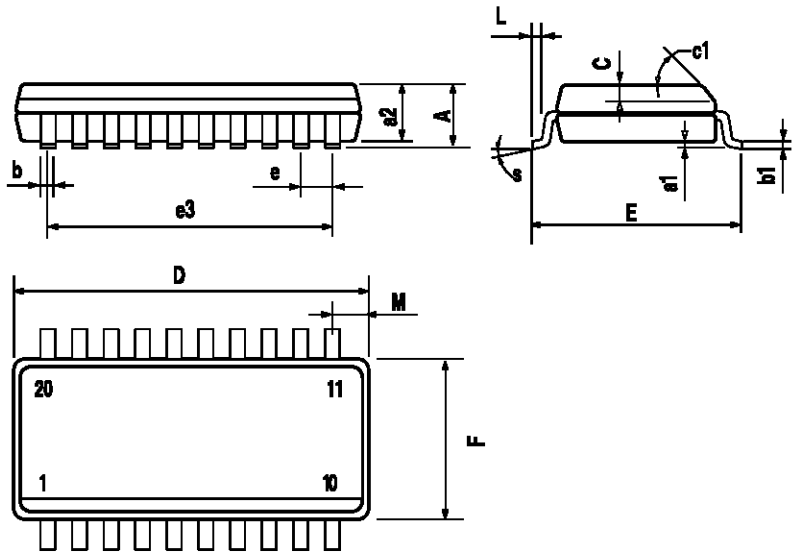
PM-DIP20.EPS

Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
a1	0.254			0.010		
B	1.39		1.65	0.055		0.065
b		0.45			0.018	
b1		0.25			0.010	
D			25.4			1.000
E		8.5			0.335	
e		2.54			0.100	
e3		22.86			0.900	
F			7.1			0.280
I			3.93			0.155
L		3.3			0.130	
Z			1.34			0.053

DIP20.TBL

PACKAGE MECHANICAL DATA

20 PINS - PLASTIC MICROPACKAGE



PM-SO20.EPS

Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			2.65			0.104
a1	0.1		0.3	0.004		0.012
a2			2.45			0.096
b	0.35		0.49	0.014		0.019
b1	0.23		0.32	0.009		0.013
C		0.5			0.020	
c1	45^o (typ.)					
D	12.6		13.0	0.496		0.512
E	10		10.65	0.394		0.419
e		1.27			0.050	
e3		11.43			0.450	
F	7.4		7.6	0.291		0.299
L	0.5		1.27	0.020		0.050
M			0.75			0.030
S	8^o (Max.)					

SO20.TBL