SGS-THOMSON MICROELECTRONICS

STV5725

4-HEAD PLAYBACK AND RECORD AMPLIFIER FOR VCR

PRELIMINARY DATA

- ONE 5V POWER SUPPLY
- PLAYBACK/RECORD MODE SELECTION THROUGH A LOGIC INPUT
- PINNING COMPATIBLE WITH STV5727 AND STV5728
- SO20 PACKAGE

PLAYBACK MODE

- LOW NOISE AND WIDE BAND AMPLIFIERS FOR 4 HEADS
- AUTOMATIC OFFSET CANCELLATION BETWEEN THE 2 SELECTED HEADS
- ONE PLAYBACK OUTPUT WITH AGC
- ONE PLAYBACK OUTPUT (CONSTANT GAIN)
- ONE OUTPUT FOR AUTOMATIC VIDEO TRACKING
- SP/LP ENVELOPE COMPARATOR OUTPUT

RECORD MODE

- TRANSCONDUCTANCE AMPLIFIER

DESCRIPTION

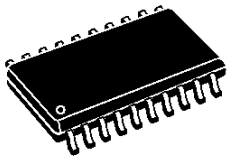
STV5725 is intended for 4 heads VCR applications. It includes all the electrical functions necessary to achieve play-back and record processing for VHS applications.
Record or Playback Mode can be selected through SWR Pin. SWH allows to select the video head input (H1SP or H2SP, H1LP or H2LP), while SWM will select the mode SP or LP.

Playback Mode

Signals applied on H1SP, H2SP, H1LP and H2LP input pins will be amplified by 60dB voltage gain. I_{OUTSP} and I_{OUTLP} Pins are AC short-circuited to ground. The input signal can be selected through SWH and SWM inputs and the corresponding output signal will be available on Pin CPB. The offset voltage between the two selected heads is automatically cancelled after 32 switching head cycles. A constant output signal will be available on Pin YPB thanks to an AGC function (Automatic Gain Control). The time constant of the AGC is determined by the capacitor value connected to CAGC Pin. For Automatic Tracking, a signal which is a function of the selected input signal amplitude is present on Pin TRIV.

Record Mode

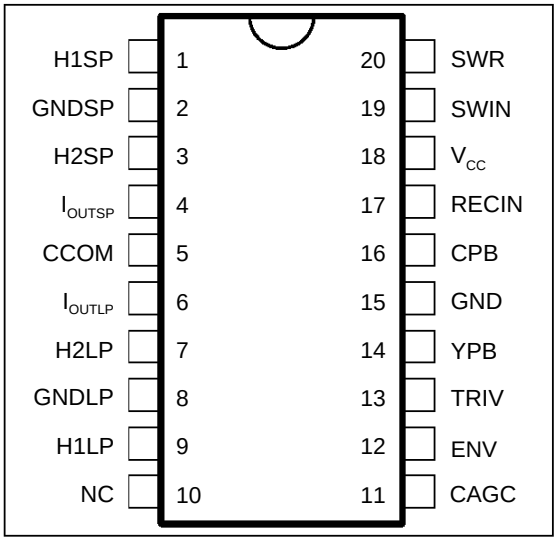
The current input applied on RECIN Pin is amplified through a transconductance amplifier. Special care has been taken to speed up commutation from Playback to Record and from Record to Playback, avoiding spikes through the loads (the rotary transformers). The recording current level in LP mode is 0.9 time the value of SP one.



SO20
(Plastic Micropackage)

ORDER CODE : STV5725

PIN CONNECTIONS



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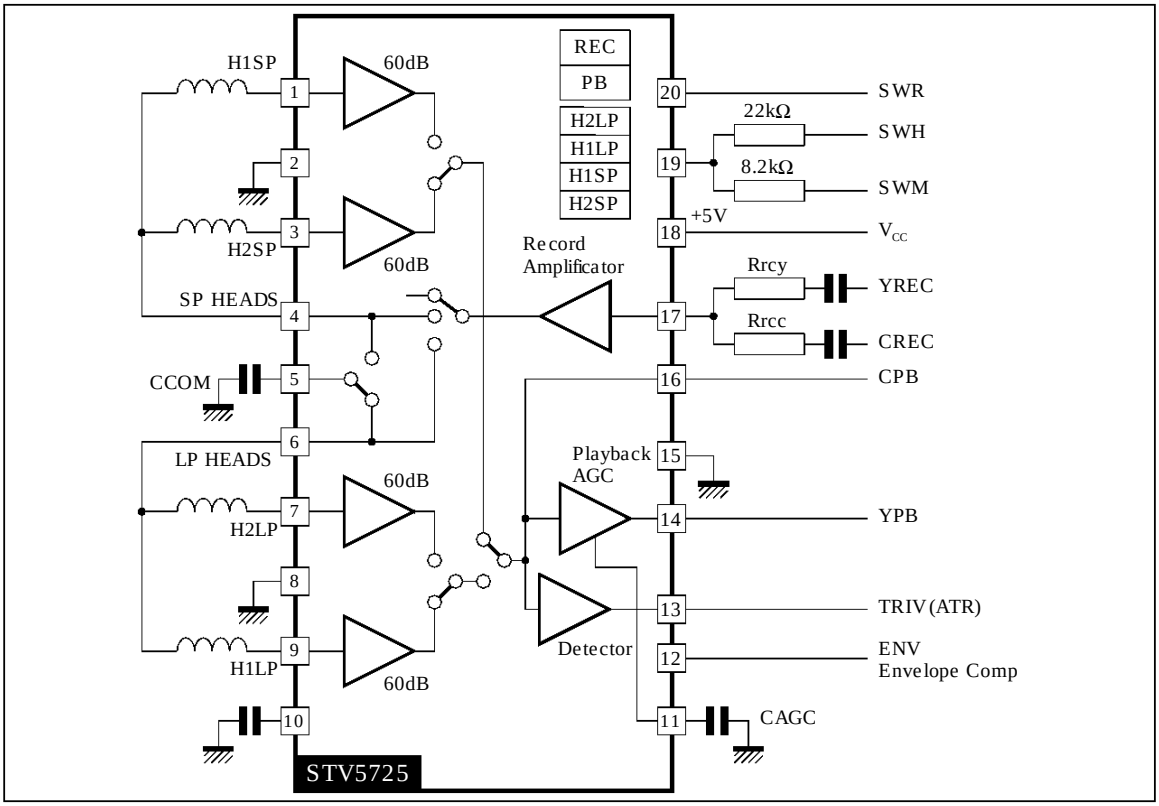
BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Power Supply Voltage	6	V
T_j	Junction Temperature	150	°C
T_{oper}	Operating Temperature	0, +70	°C

5725-01.TBL

THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{th\ (j-a)}$	Junction-ambient Thermal Resistance (IC solded on the PC board)	90	°C/W

5725-02.TBL

RECOMMENDED OPERATING CHARACTERISTICS

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{CC}	Power Supply	4.75	5	5.25	V
CAGC	Capacitance on Pin CAGC	4.7	22		nF
CCOM	Decoupling Capacitor	4.7	470		nF

5725-03.TBL

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, unless otherwise specified)

Playback Mode

V_{CC} = 5V, no load on YPB and CPB Pins, after 32 SWH (SWitching Head) cycles.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
PLAYBACK AMPLIFIER						
I_{CC1}	Supply Current		34	46	54	mA
GPB	Playback Gain	Sinewave 600kHz, 0.4mV$_{PP}$ on inputs	58	60	62	dB
EN	Equivalent Voltage Noise	Input grounded via I_{OUT} Pin @ 600kHz, BW = 10kHz	0.5	0.6	0.7	$\frac{nV}{\sqrt{Hz}}$
IN	Equivalent Input Current	Input open @ 6MHz, BW = 10kHz	1.4	2	2.6	$\frac{pA}{\sqrt{Hz}}$
CRT1	Crosstalk	Sinewave @ 4MHz, 0.4mV$_{PP}$		-35	-30	dB
CRT2	Crosstalk	Sinewave @ 600kHz, 0.4mV$_{PP}$		-50		dB
CRT3	Crosstalk Between SP1 and LP2 Channels (or SP2 to LP1 Channels)	Sinewave @ 6MHz, 0.4mV$_{PP}$		-60	-50	dB
RPBSW	Playback Switch on Resistor	@ 6MHz	0.8	2.5	18	Ω
BWLCF	Attenuation @ 100kHz	Reference level @ 600kHz	-1	0	1	dB
BWHCF	Attenuation @ 8MHz	Reference level @ 4MHz	-3	-1	1	dB
C_{IN}	Input Capacitance	@ 6MHz	22	27	32	pF
R_{IN}	Input Resistance	@ 6MHz	500	730	930	Ω
ZCPB	Output Resistance	DC	5	14	50	Ω
VDCPB1	DC Level on Pin CPB		1.35	1.75	2.15	V
DVDC	Head Switch Offset		-200	0	200	mV
SHPB1	2nd Harmonic	Sinewave @ 4MHz, 0.4mV$_{PP}$		-43	-37	dB
PLAYBACK AGC FUNCTION						
ZYPB	Output Impedance @ YPB		5	14	50	Ω
VDCPB2	DC Level @ YPB		1.15	1.45	1.85	V
BWLCF2	Attenuation @ 100kHz	Reference @ 4MHz, PB AGC locked	-1	0	1	dB
BWHCF2	Attenuation @ 8MHz	Reference @ 4MHz, PB AGC locked	-3	-1	1	dB
VLPB	Output Amplitude	Sinuswave @ 4MHz, 0.4mV$_{PP}$ on input	160	200	250	mV$_{PP}$
SHPB2	Second Harmonic	Sinuswave @ 4MHz, 0.4mV$_{PP}$ on input		-44	-40	dB
IPB+	CAGC Sink Current		50	100	150	µA
IPB-	CAGC Source Current		-150	-100	-50	µA
DVLP	AGC Sensitivity	Sinuswave @ 4MHz, 0.2mV$_{PP}$ on input, -5dB and +6dB	-1	0	1	dB
TRIV FUNCTION						
VTRIV0	Output Level (1)	SP mode, V_{cpb} = 0mV$_{PP}$ @ 4MHz	0.05	0.28	0.7	V
VTRIV4	Output Level (4)	LP mode, V_{cpb} = 600mV$_{PP}$ @ 4MHz	3.8	4.1	4.5	V
VTRIV5	Output Level (5)	SP mode, V_{cpb} = 100mV$_{PP}$ @ 4MHz		1.33		V
VTRIV6	Output Level (6)	SP mode, V_{cpb} = 200mV$_{PP}$ @ 4MHz		2.27		V
VTRIV7	Output Level (7)	LP mode, V_{cpb} = 100mV$_{PP}$ @ 4MHz	1.4	1.8	2.2	V
VTRIV8	Output Level (8)	LP mode, V_{cpb} = 200mV$_{PP}$ @ 4MHz		3.11		V
VTRIV9	Output Level (9)	SP mode, V_{cpb} = 300mV$_{PP}$ @ 4MHz		2.95		V
VTRIV10	Output Level (10)	SP mode, V_{cpb} = 600mV$_{PP}$ @ 4MHz	3.45	3.85	4.25	V
FTRIV1	Response Lower Frequency, Attenuation @ 1MHz	Reference : SP mode, V_{cpb} = 100mV$_{PP}$ @ 4MHz		-6		dB
FTRIV2	Response Higher Frequency, Attenuation @ 8MHz	Reference : SP mode, V_{cpb} = 100mV$_{PP}$ @ 4MHz		-1		dB

5725-04.TBL

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, unless otherwise specified) (continued)

Playback Mode (continued)

V_{CC} = 5V, no load on YPB and CPB Pins.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
SP/LP ENVELOPE DETECTOR						
R_{OH}	Output Resistance @ ENVC	Sinewave 600µV_{PP} @ 4 MHz on H2SP	0.65	1.6	2.8	kΩ
R_{OL}	Output Resistance @ ENVC	Sinewave 600µV_{PP} @ 4 MHz on H1LP	0.65	1.6	2.8	kΩ
VENVCH	Output Level		4		5	V
VENVCL	Output Level		0		1	V
SENS1	Sensibility	100µV_{PP} to 600µV_{PP} @ LP input pins			1	V
SENS2	Sensibility	100µV_{PP} to 600µV_{PP} @ SP input pins	4			V

Record Mode

V_{CC} = 5V, SWR = 5V, RRCY = 2.2kΩ, RRCC = 8.2kΩ, CCOM = 470nF, SWM = 0V.
Load 10µH//1kΩ for each simulated head.
Damping network of 1nF/620Ω connected between I_{OUTSP} record output and Ground.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
RECORD AMPLIFIER						
I_{CC2}	Current Supply		59	75	95	mA
IHA0	DC Current through I_{OUT}		27	42	55	mA
IHA2	2nd Harmonic	VRCY = 300mV_{PP} @ 4MHz		-49	-40	dB
IMAX	Maximum Current	@ 4MHz, 2nd harmonic < 35dB	35			mA_{PP}
BWRECL	Attenuation at 100kHz	Reference level @ 600kHz	-1	0	1	dB
BWRECH	Attenuation at 8MHz	Reference level @ 4MHz	-2	0	1	dB
TRSP	Transconductance SP	V_{IN} = 300mV_{PP} @ 4MHz	63	68	73	mA/V
TRLP	Transconductance LP	V_{IN} = 300mV_{PP} @ 4MHz, SWM = 5V	58	62.5	67	mA/V
RSAT	Output Stage Resistance	@ 4MHz	5	11	20	Ω
TRR	Transconductance Ratio	TRSP / TRLP	0.8	1	1.2	dB
RIOUT	Impedance on I_{OUTSP} (I_{OUTLP})	ΔV = 1V	40	100	300	kΩ
SWITCHING LEVELS						
VSWIN1	SWIN Input Threshold	Selects head H2SP	0		0.4	V
VSWIN2	SWIN Input Threshold	Selects head H1SP	1		2.2	V
VSWIN3	SWIN Input Threshold	Selects head H1LP	2.8		4	V
VSWIN4	SWIN Input Threshold	Selects head H2LP	4.6		5	V
ISWIN1	VSWIN = 0V	Input current	-1	-0.5	-0.1	µA
ISWIN2	VSWIN = 1.5V	Input current	0.1	0.4	2	µA
ISWIN3	VSWIN = 3.5V	Input current	0.1	0.4	2	µA
ISWIN4	VSWIN = 5V	Input current	0.1	0.5	2	µA
VSWRH	SWR Input Threshold	Selects record mode	3.5		5	V
VSWRL	SWR Input Threshold	Selects playback mode	0		1.5	V
ISWRH	VSWR = 5V	Input current	0	0.1	5	µA
ISWRL	VSWR = 0V	Input current	-10	-5	-0.5	µA
T_{ON}	Switching Delay	Signal appears on CPB			500	ns
T1	Delay from Playback to Record : Signal Disappears on Pin CPB			1		µs
T2	Delay from Record to Playback : Signal Appears on Pin CPB			800		µs
T3	Delay from Playback to Record : Signal Appears on Pin I_{OUTSP} or I_{OUTLP}			20		µs
T4	Delay from Record to Playback : Signal Disappears on Pin I_{OUTSP} or I_{OUTLP}			1		µs

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INPUTS/OUTPUTS EQUIVALENT INTERNAL DIAGRAMS

Figure 1

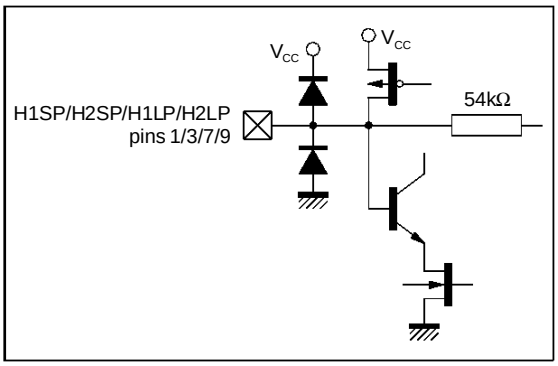


Figure 2

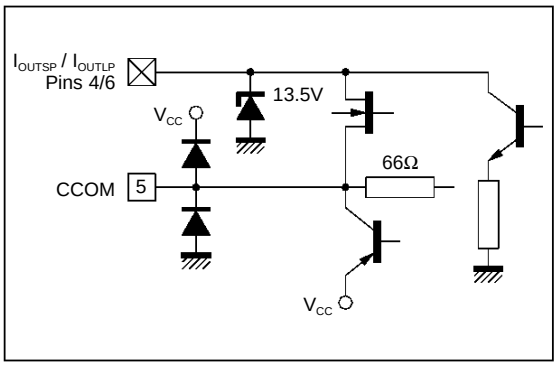


Figure 3

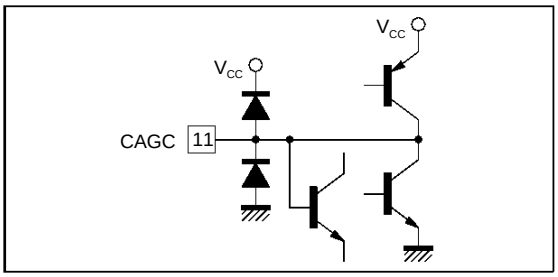
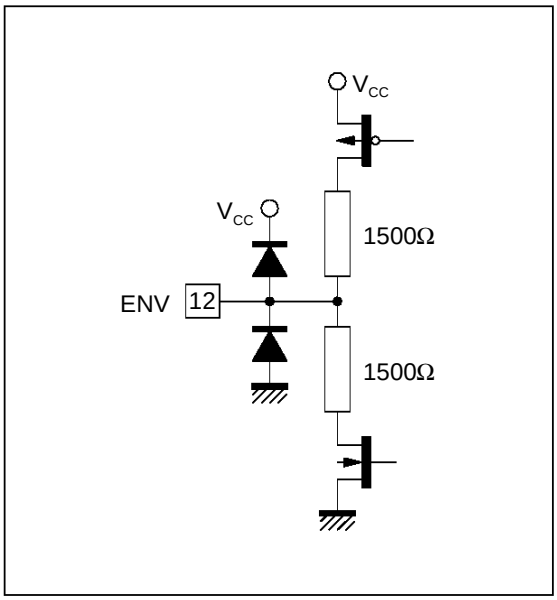


Figure 4



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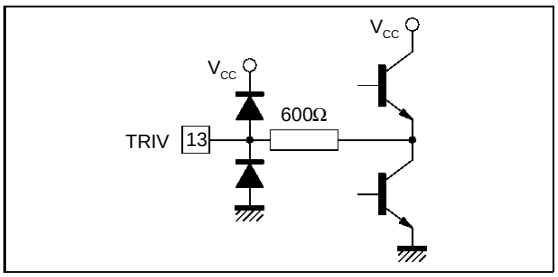


Figure 6

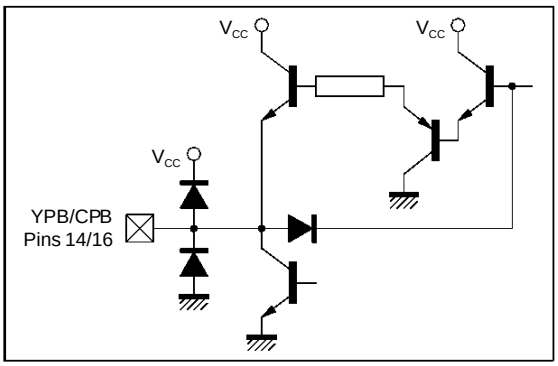
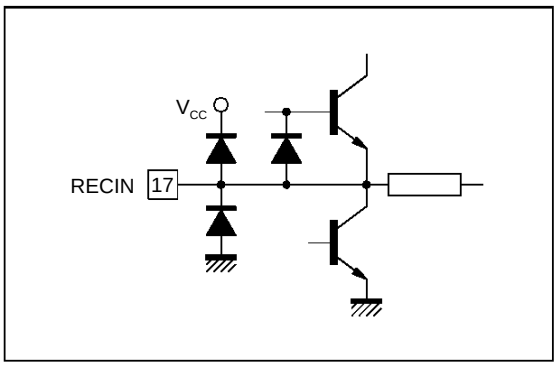


Figure 7



INPUTS/OUTPUTS EQUIVALENT INTERNAL DIAGRAMS (continued)

Figure 8

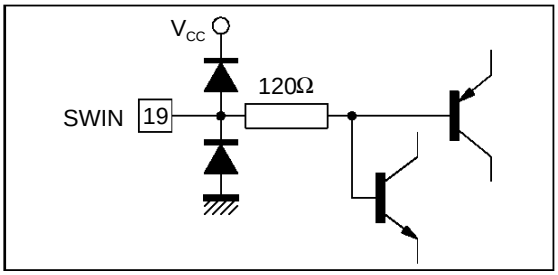
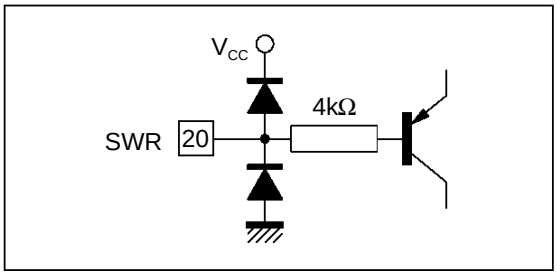
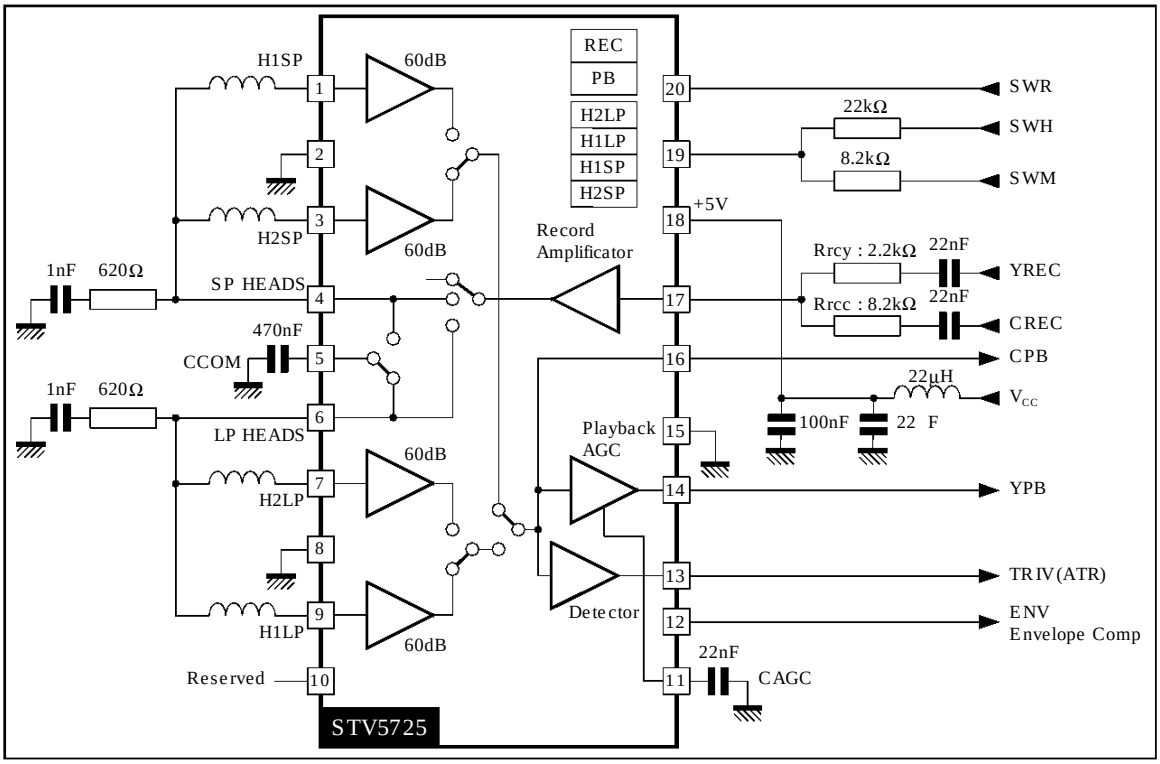


Figure 9



TYPICAL APPLICATION



SWITCH TABLE

SWR	SWM	SWH	Channel	ENVC
L (PB)	L	L	H2SP	HIGH if LP < SP
		H	H1SP	
	H	L	H1LP	LOW if LP > SP
		H	H2LP	
H (REC)	L	L	SP	
		H		
	H	L	LP	
		H		

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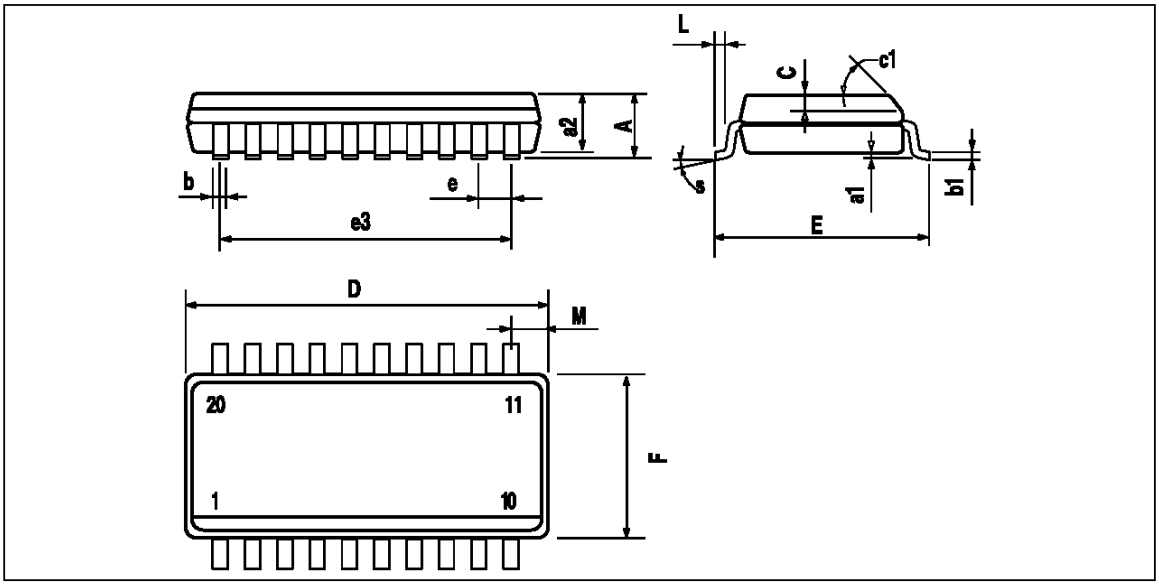
PACKAGE MECHANICAL DATA

20 PINS - PLASTIC MICROPACKAGE (SO)



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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° (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° (Max.)					

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