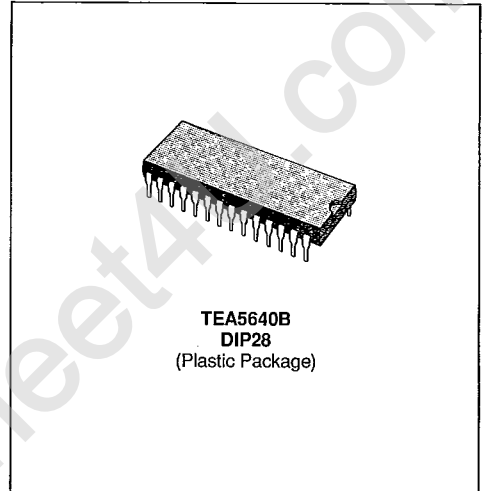


**PAL/SECAM COLOR TV DECODER**

- FULLY AUTOMATIC MULTISTANDARD SWITCHING : THE CIRCUIT INCLUDES A SCANNING CONTROL SYSTEM USED FOR THE AUTOMATIC STANDARD RECOGNITION
- NO CRYSTALS REQUIRED : ALL THE FREQUENCIES ARE SYNTHESIZED FROM THE EXTERNAL REFERENCE FREQUENCY OF 62.5 kHz, AND FROM SPECIFIED DATA STORED IN AN INTERNAL ROM
- AUTOMATIC BELL FILTER ADJUSTMENT
- ONLY ONE DELAY LINE COMPENSATION ADJUSTMENT
- AUTOMATIC INTERNAL PAL OSCILLATOR ADJUSTMENT
- AUTOMATIC ADJUSTMENT FOR FOB AND FOR IN SECAM
- POSITIVE R-Y AND B-Y OUTPUTS

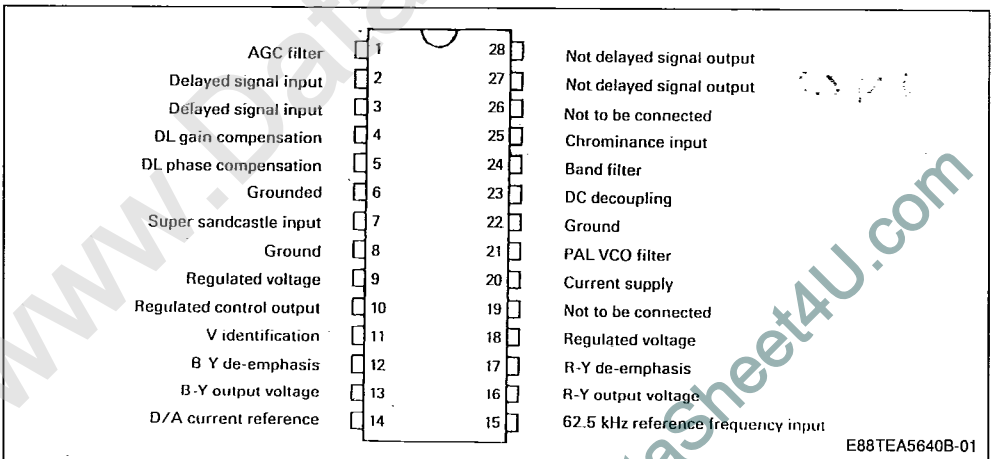
frequency locked loops that allow the elimination of PAL crystal. The circuit uses an external reference frequency of 62.5 kHz generally provided by the frequency synthesis tuner of the TV set.



**DESCRIPTION**

The TEA5640B is a multistandard TV decoder for PAL-SECAM. The circuit automatically selects the standard corresponding to the input signal. It produces all the reference frequencies required for decoding, which is achieved by a digital frequency synthesizer. Included on the chip are, four numerical

**PIN CONNECTIONS**



S G S-THOMSON

30E D

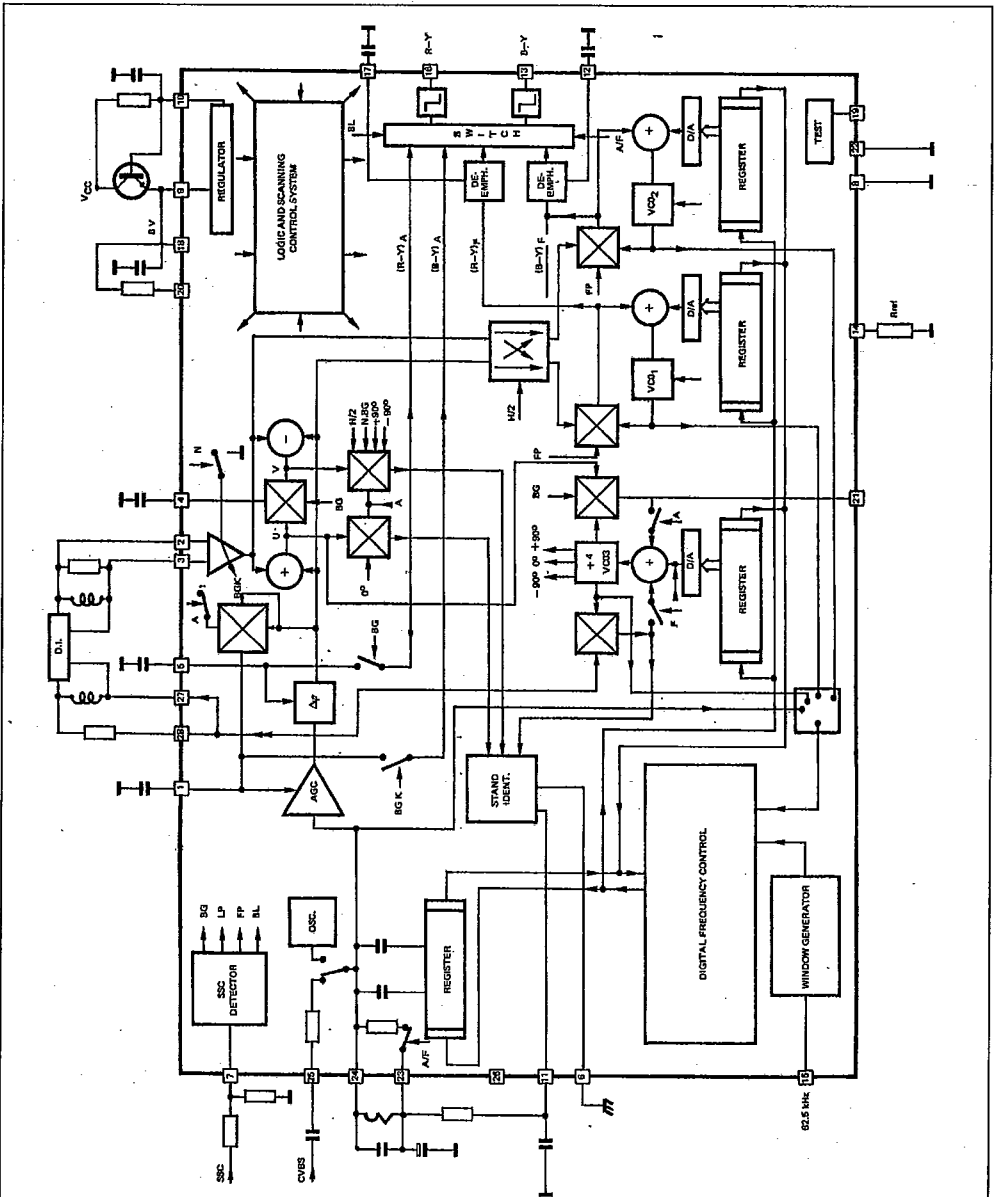
## FEATURES

- FULL AUTOMATIC MULTISTANDARD SWITCHING :
- THE CIRCUIT INCLUDES A SCANNING CONTROL SYSTEM THAT PROVIDES ALL THE SWITCHINGS REQUIRED FOR THE AUTOMATIC STANDARD RECOGNITION. THIS SYSTEM IS SYNCHRONIZED BY THE FRAME PULSE.
- NO CRYSTAL REQUIREMENT :  
THE PAL FREQUENCIES ARE SYNTHESIZED ORIGINALLY BY THE EXTERNAL REFERENCE FREQUENCY OF 62.5 kHz AND DATA STORED IN THE ROM.
- AUTOMATIC GAIN ADJUSTMENT OF THE BELL FILTER : BY SWITCHING AN INTERNAL CAPACITOR NETWORK INCLUDED IN A DIGITAL LOOP.
- AUTOMATIC GAIN ADJUSTMENT OF THE DELAY LINE COMPENSATIONS :  
THIS ADJUSTMENT IS MADE ON THE BURST AND IS REFRESHED EVERY LINE RETRACE
- AUTOMATIC ADJUSTMENT FOR PAL OSCILLATOR :  
THIS OSCILLATOR HAS A DIGITAL AND AN ANALOGIC LOOP. THE PAL FREQUENCIES ARE MEMORIZED IN A ROM CONNECTED TO THE DIGITAL LOOP. THE DIGITAL LOOP GIVES THE RIGHT FREQUENCY AND THE ANALOGIC ONE HOLDS THE PHASE.
- AUTOMATIC ADJUSTMENT OF FoR AND FoB IN SECAM : THESE FREQUENCIES ARE PROGRAMMED IN THE ROM AND ARE SENT TO TWO OTHER DIGITAL LOOPS WHEN SECAM STANDARD IS SELECTED.
- AUTOMATIC DIFFERENCE PHASE ERROR COMPENSATION IN PAL MODE.  
THE PAL VCO IS LOCKED ON THE BURST AND DURING THE LINE, ON THE BLUE PICTURE CONTENT (0° axis color vector).



## BLOCK DIAGRAM

S G S - THOMSON



S : Secam ; BP : Bandfilter adjustment ; P : Pal ; BG : Burstgate  
 LP : Line Pulse ; FP : Frame Pulse  
 A : Amplit. Modul. ; F : Freq. Modul. ; K : Identification ; BL : Blanking

E88TEA5640B-03

S G S-THOMSON

30E D

**STANDARD SWITCHING AND INHIBITION**

SECAM recognition :

- When SECAM on, pin 12 and pin 17 DC voltages are lower than 5 V.
- For PAL standard, pin 12 and pin 17 DC voltages are regulated  $V_{CC}$  (typical 8 V).

**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V	Supply Voltage Pins 9 - 18	9.5	V
I	Current Pin 20	200	mA
T <sub>oper</sub>	Operating Temperature Range	0 to 70	°C
T <sub>stg</sub>	Storage Temperature	- 40 to 150	°C

**THERMAL DATA**

R <sub>th (j-a)</sub>	Junction Ambient Thermal Resistance (with mini 10 % Cu on board)	55	°C/W
-----------------------	---	----	------

**ELECTRICAL CHARACTERISTICS**

T<sub>amb</sub> = 25 °C ; V<sub>CC</sub> = 12 V ; With Normalized Color Bar Pattern Input Signal (75 %) Subcarrier Level : 320 mVPP

Refer to Application Diagram Page (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
<b>Supplies</b>					
Vreg	Regulated Voltage (I <sub>10</sub> = 4 mA) Pins 9 - 18	7.5	8	8.5	V
ICC	Supply Current Pin 9 + Pin 18		90	120	mA
I <sub>9</sub>	Supply Current Pin 9			90	mA
I <sub>18</sub>	Supply Current Pin 18			27	mA
VI2L	DC Voltage at I <sub>20</sub> = 15 mA Pin 20		0.8		V
I <sub>10</sub>	Input Current Pin 10	2		20	mA
	Transfer Characteristic (I <sub>10</sub> = 4.0 mA)		250		mA/V
<b>Current Reference</b>					
V14	DC Voltage (I <sub>14</sub> = 0.77 mA) Pin 14	1.2	1.4	1.6	V
<b>Internal Bias</b>					
V 24	DC Voltage Impedance (I <sub>out</sub> = 2 mA) Pin 24	3.7	4.2 90	4.7 110	V Ω
<b>Reference Clock Input</b>					
I15L	F = 62.5 kHz ± 6Hz Low Level Input Current (V15 = 2.1 V) Pin 15	- 20	- 10	- 5	μA
I15H	High Level Input Current (V15 = 3.2 V)		5	10	μA
V15L	Low Level Input Voltage R Source = 68 kΩ			1	V
V15H	High Level Input Voltage R Source = 68 kΩ	4			V
	Voltage Threshold		2.8		V
<b>Super Sandcastle Detector</b>					
VB	Blanking Threshold Pin 7	0.5	0.75	0.9	V
VL	Line Threshold	1.6	1.8	1.9	V
V6	Burst Gate Threshold	3.2	3.5	3.8	V
	Minimum Frame Blanking Duration	1.15			mS
I7	Input Current (V7 = 1.75 V)	- 20		0	μA
	Max Input Voltage Pin 7			6.0	V

## ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V25	<b>Chrominance Input</b> Pin 25				
	DC Voltage		5.5		V
	Maximum AC Input Voltage			0.64	V <sub>pp</sub>
	Impedance	0.8	1		k $\Omega$
	<b>Automatic Gain Control</b>				
	SECAM MODE				
	• 0 dB Reference Voltage for Measurement on Pins 27 - 28 (chroma Input voltage V25 = 320 mVpp)	50	150	250	mVpp
	• AC Voltage Variation on Pins 27 - 28 (V25 = + 6 dB)	- 3		+ 3	dB
	• AC Voltage Variation on Pins 27 -28 (V25 = - 24 dB)	- 5		+ 2	dB
	PAL MODE WITH IDENTIFICATION				
	• 0 dB Reference Voltage for Measurement on Pins 13 -16 (chroma input voltage V25 = 320 mVpp)				
	• AC Voltage Variation on Pins 13 - 16 (V25 = + 6 dB)	- 3		+ 3	dB
	• AC Voltage Variation on Pins 13 - 16 (V25 = - 24 dB)	- 5		+ 2	dB
	<b>Demodulator Part</b>				
	GENERALITIES				
V13	B-Y Output DC Voltage Pin 13	3	3.5	4	V
V16	R-Y Output DC Voltage Pin 16	3.2	3.7	4.2	V
	Maximum Sink Current Pin 13	0.4			mA
	Maximum Sink Current Pin 16	0.4			mA
	Differential Delay Time Between PAL/SECAM			50	nS
	Delay Diff Tolerance			50	nS
	Delay Between Chroma Output and Luma Signal		450		nS
	B-Y Output AC Impedance ( $\pm 50 \mu\text{A}$ )		250		$\Omega$
	R-Y Output AC Impedance ( $\pm 50 \mu\text{A}$ )		250		$\Omega$
	Blanking Level Offset			$\pm 2$	%
	<b>Secam Mode</b>				
VBYS	B-Y AC Voltage	1.0	1.34	1.6	V <sub>pp</sub>
VRYS	R-Y AC Voltage	0.8	1.05	1.3	V <sub>pp</sub>
	B-Y/R-Y Ratio	1.1		1.45	
	Residual Subcarrier		30		mVpp
	<b>Pal Mode</b>				
VBYP	B-Y AC Voltage	1.0	1.34	1.6	V <sub>pp</sub>
VRYP	R-Y AC Voltage	0.8	1.05	1.3	V <sub>pp</sub>
	B-Y/R-Y Ratio	1.0		1.3	
	Residual Subcarrier		30		mVpp

S G S-THOMSON

30E D

S G S-THOMSON

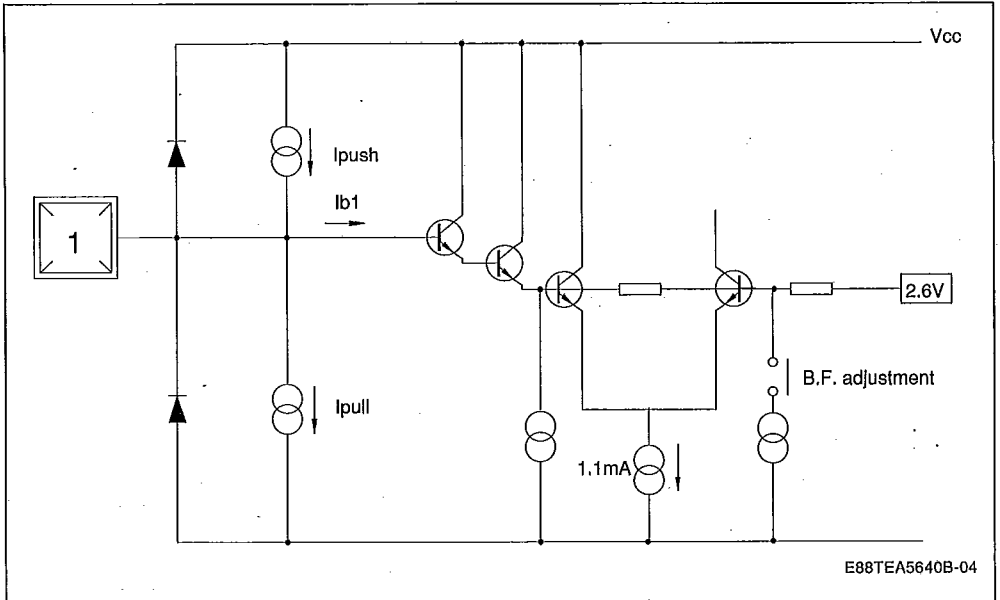
30E D

## ELECTRICAL CHARACTERISTICS (continued)

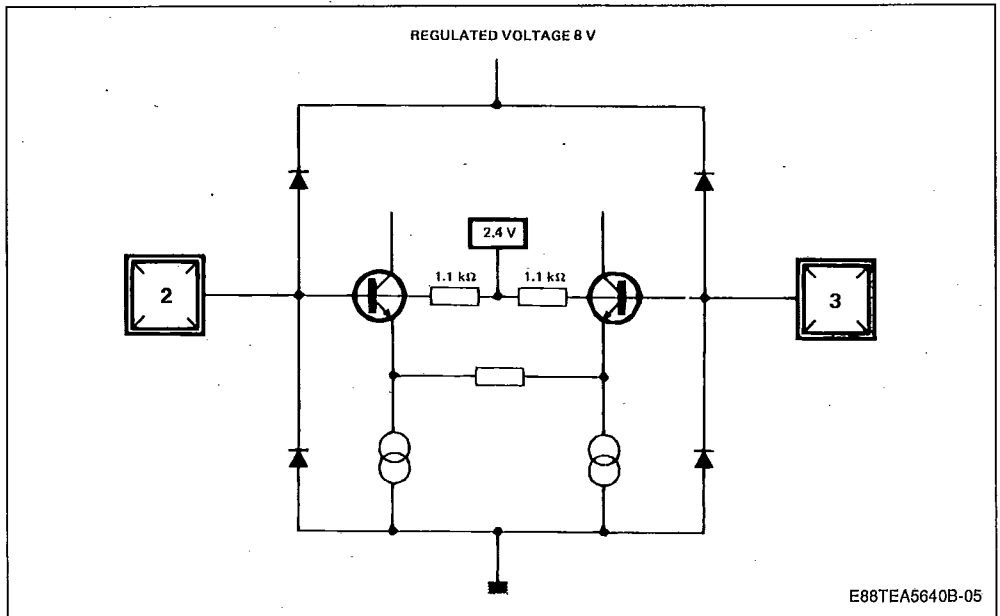
Symbol	Parameter	Min.	Typ.	Max.	Unit
	<b>De-Emphasis</b> SECAM MODE DC Voltage (blanking level) Impedance PAL MODE DC Voltage Impedance	Pins 12 - 17		3.5 11	4.0 V k $\Omega$
	<b>Reference Oscillator PLL</b> Catching Range in PAL Mode Holding Range		$\pm 350$ $\pm 500$		Hz Hz
$\Delta F$	<b>Band Filter</b> Impedance SECAM Mode PAL Mode Minimum Switchable Internal Capacitance (all standards) Maximum Switchable Internal Capacitance (all standards) Internal Oscillator Frequency Range for L = 10 $\mu$ H C = 68 pF Frequency Offset, After Automatic Adjustement	Pin 23	3.7 0.85	4.7 1.1 20 50	5.7 1.35 k $\Omega$ k $\Omega$ pF pF kHz kHz
V27 V28 I27 I28	<b>Undelayed Signal Outputs</b> DC Voltage Sink Current Impedance	Pins 27 - 28		1.6 1 30	V mA $\Omega$
	<b>Identification</b> Burst Attenuation Range / Nominal Level SECAM Mode (line Identification) Pal Mode		30 30		dB dB
	<b>Delayed Signal Input</b> DC Voltage in PAL Mode Input Impedance	Pins 2 - 3	0.88	2.4 1.1	1.32 V k $\Omega$
	<b>Delay Line Attenuation Compensation</b> Range of Automatic Attenuation Compensation		- 3	- 9	- 15 dB
	<b>Delay Line Phase Shift Compensation</b> Range of Phase Shift Compensation with a 100K $\Omega$ Potentiometer (see application diagram p. 3)		$\pm 30$		Degree
VTHH VTHL	<b>Alternation Line Detection PAL or SECAM</b> High Differential Threshold (VTHH = V11H - V24) Low Differential Threshold (VTHL = V11L - V24) Leakage Current Threshold (V11 = V24 + 1V)	Pin 11	200 - 350		350 - 200 0.5 mV mV $\mu$ A

## INPUTS/OUTPUTS EQUIVALENT INTERNAL DIAGRAMS

## PIN 1

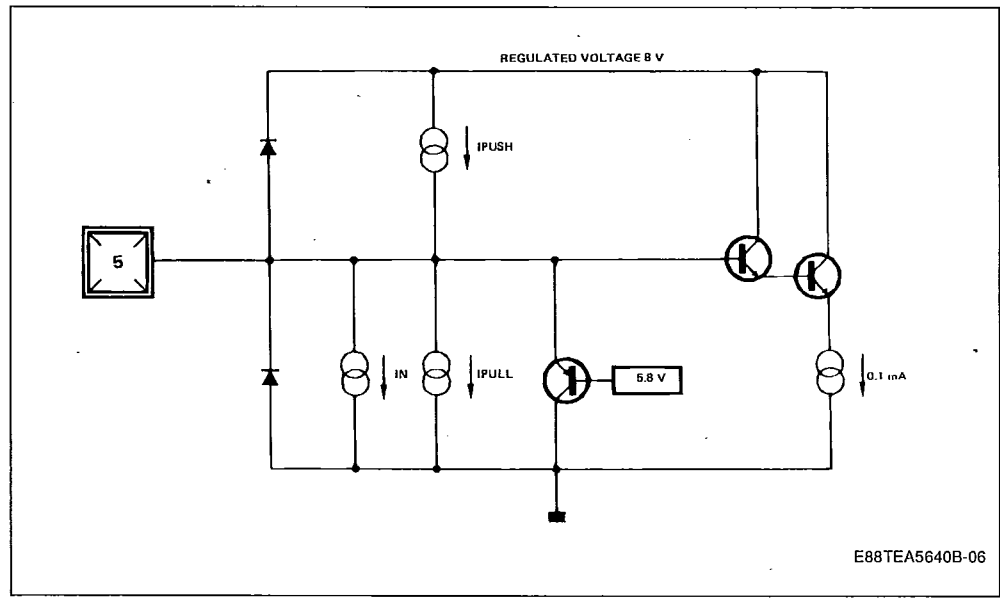


## PINS 2-3

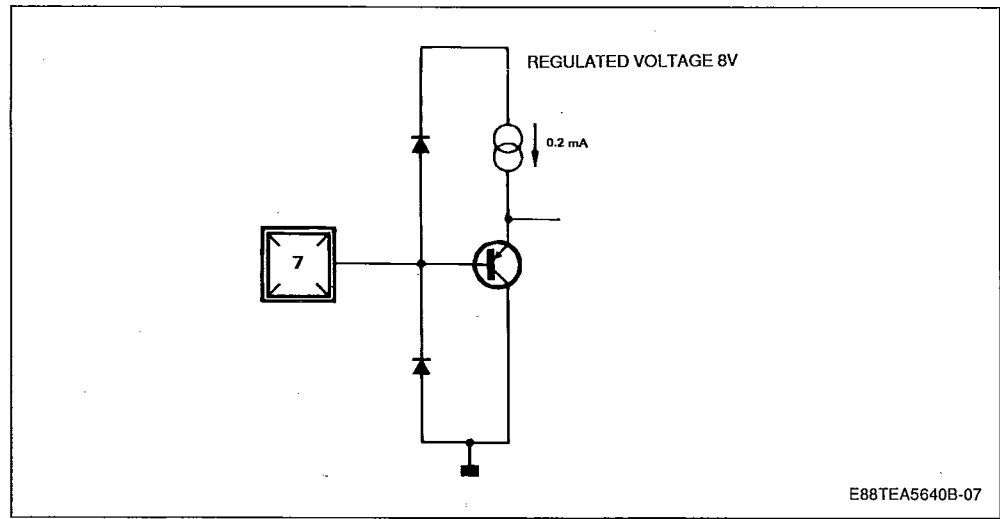




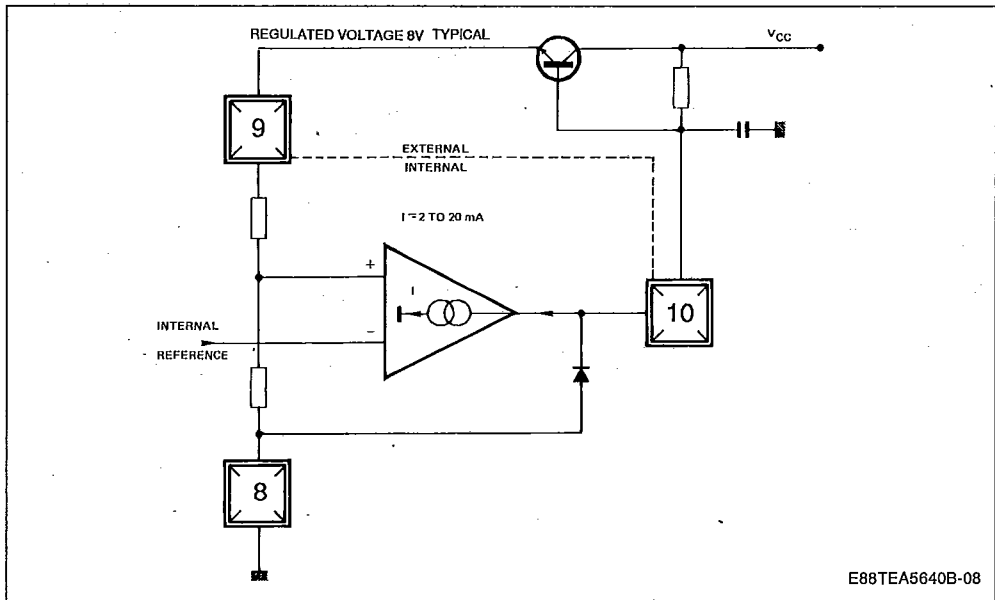
PIN 5



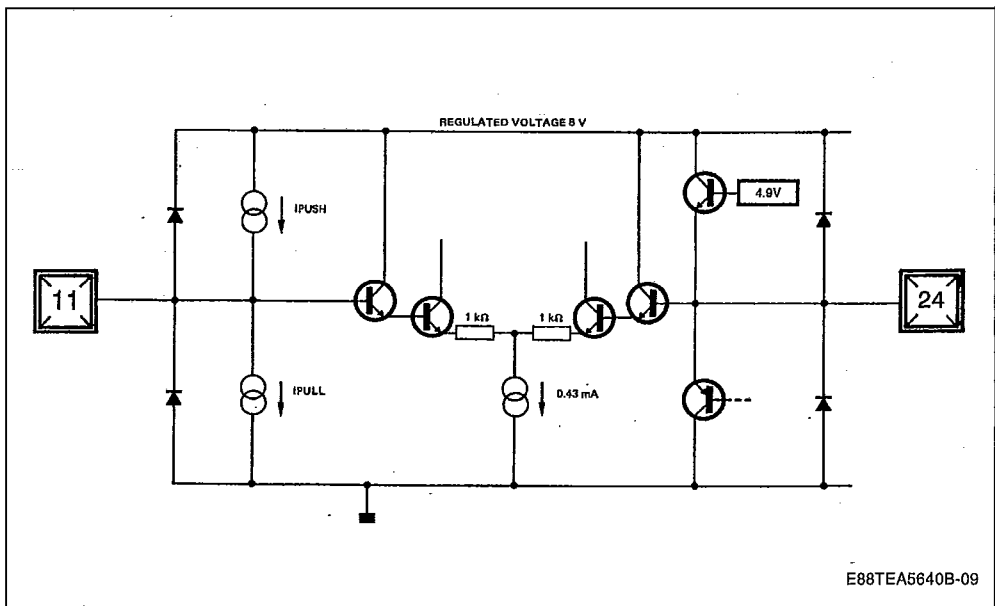
PIN 7



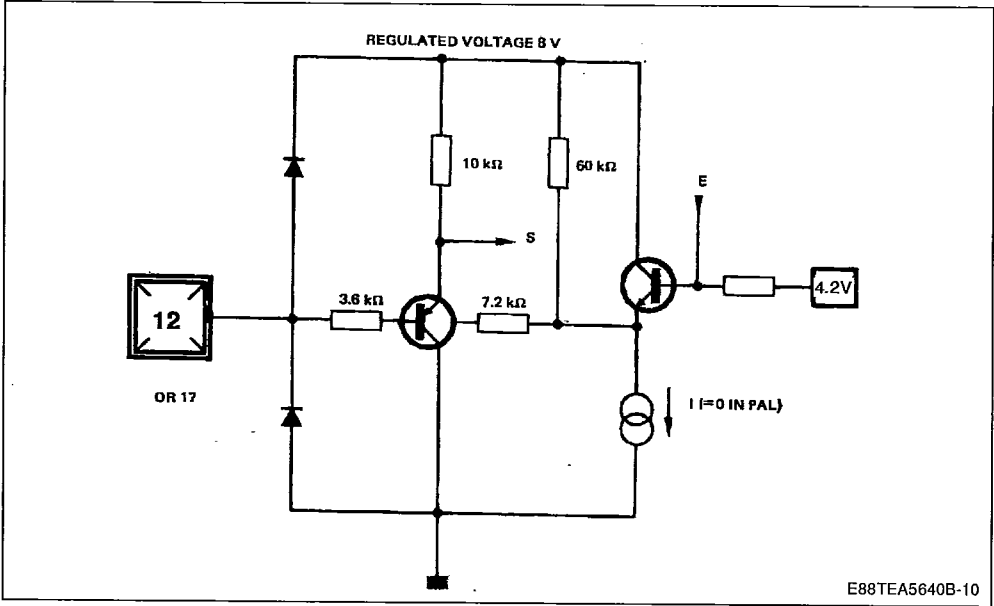
PINS 8-9-10



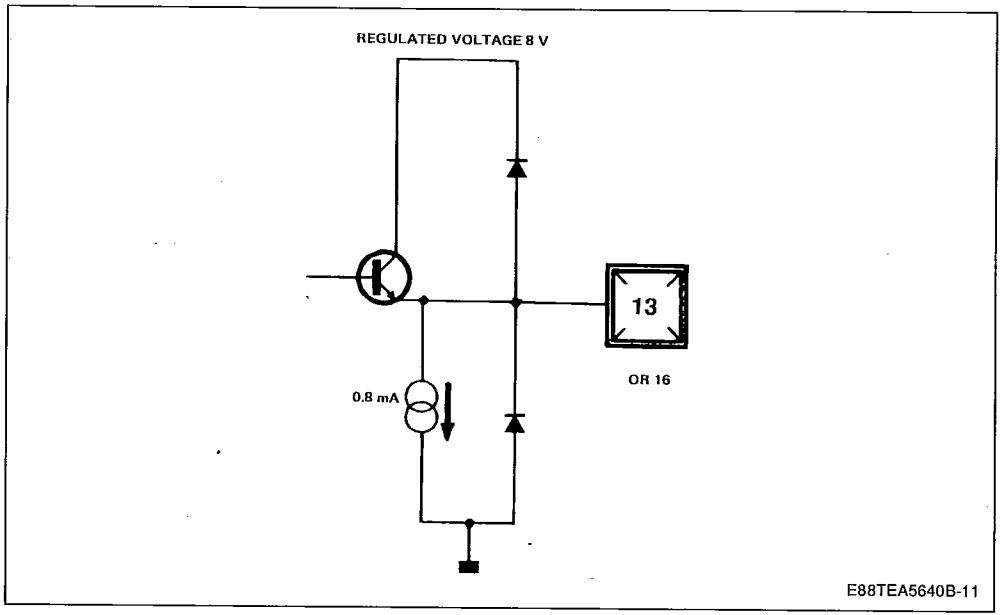
PINS 11-24



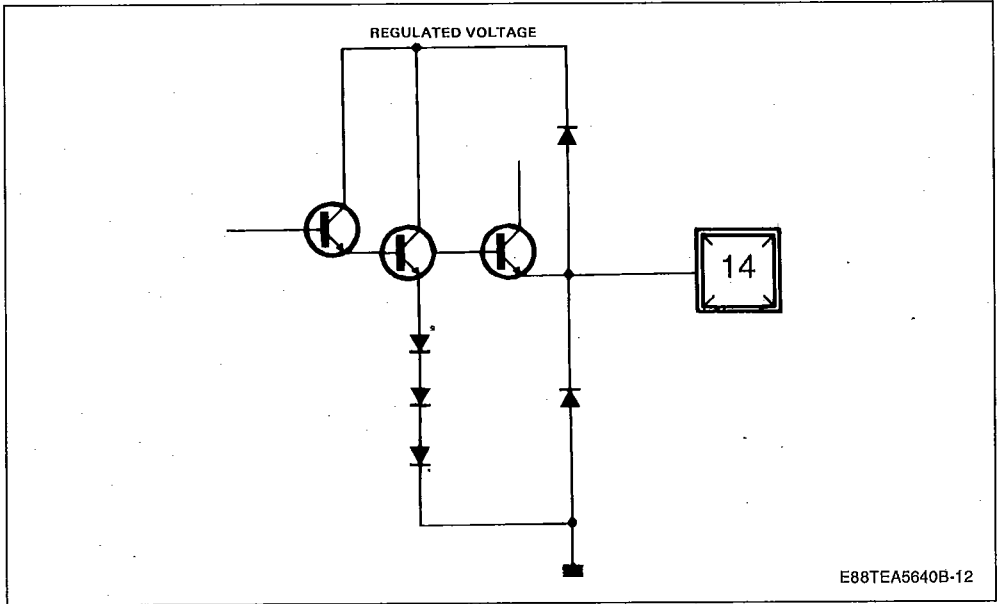
PINS 12 - 17



PINS 13 - 16

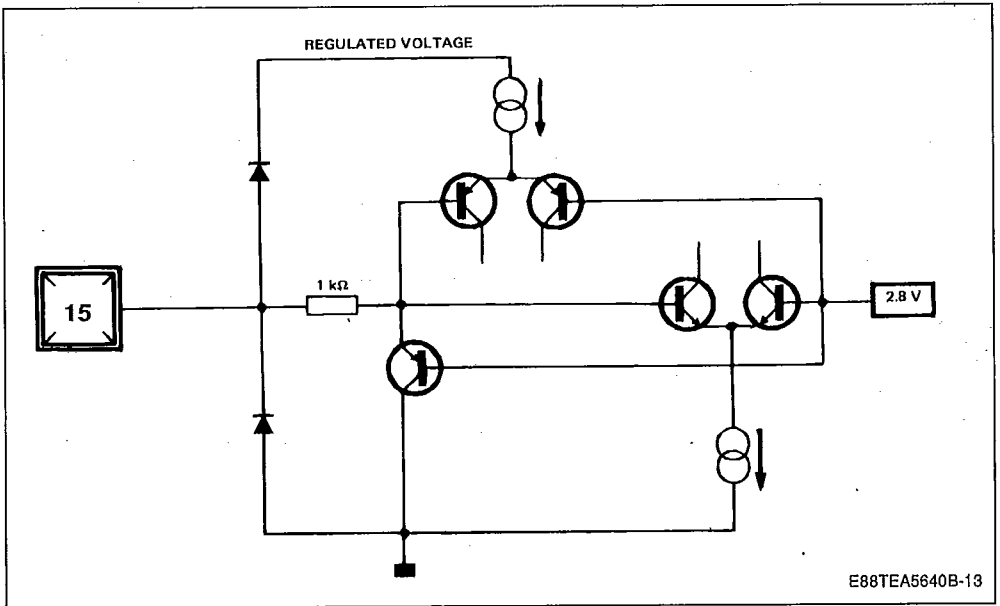


PIN 14



E88TEA5640B-12

PIN 15

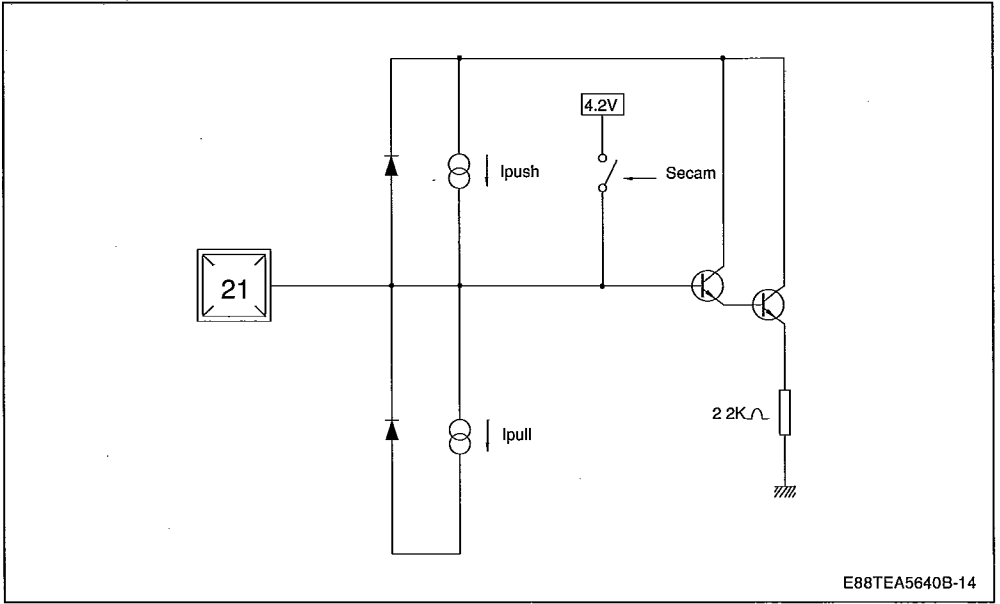


E88TEA5640B-13

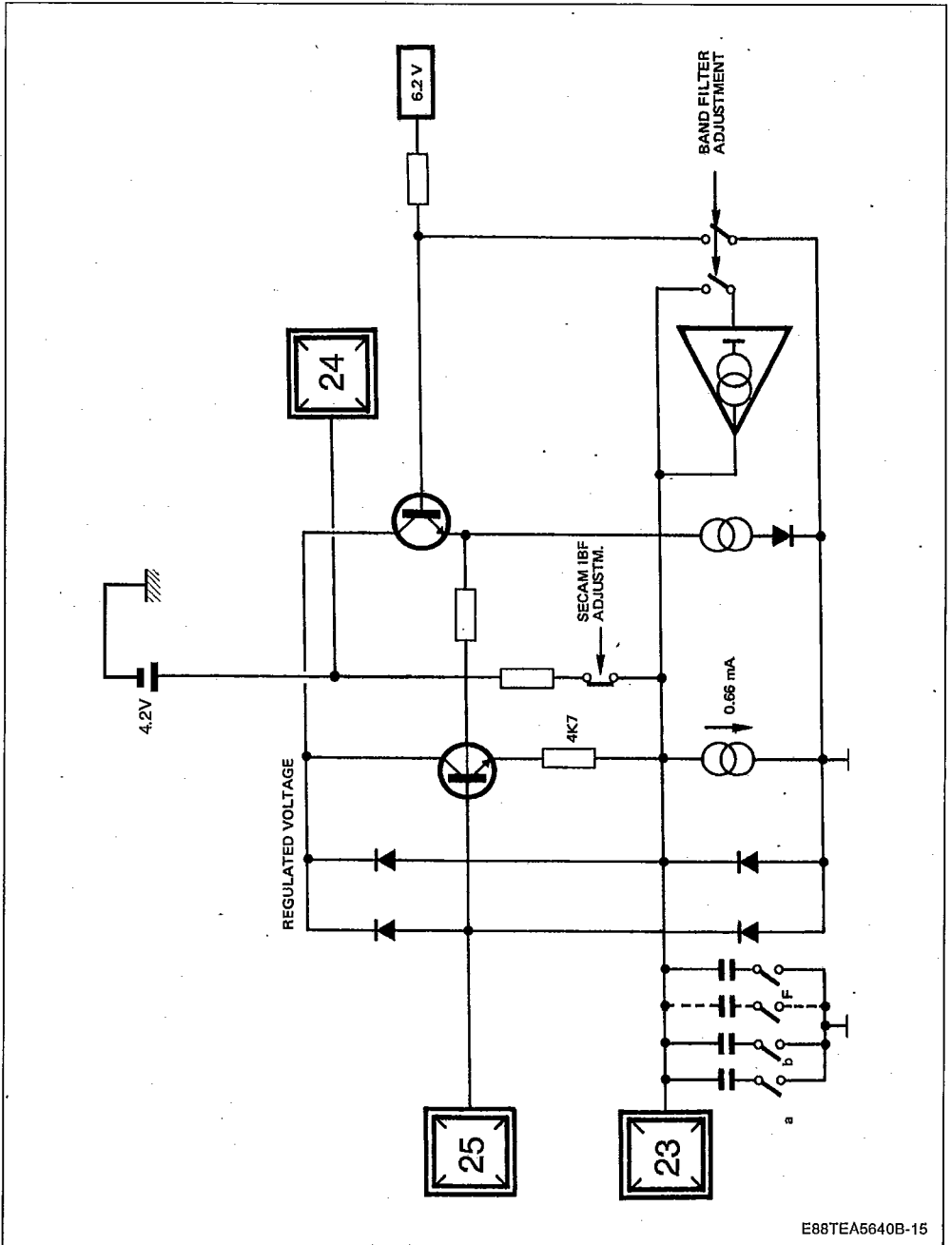
PIN 21

SGS-THOMSON

30E D



E88TEA5640B-14

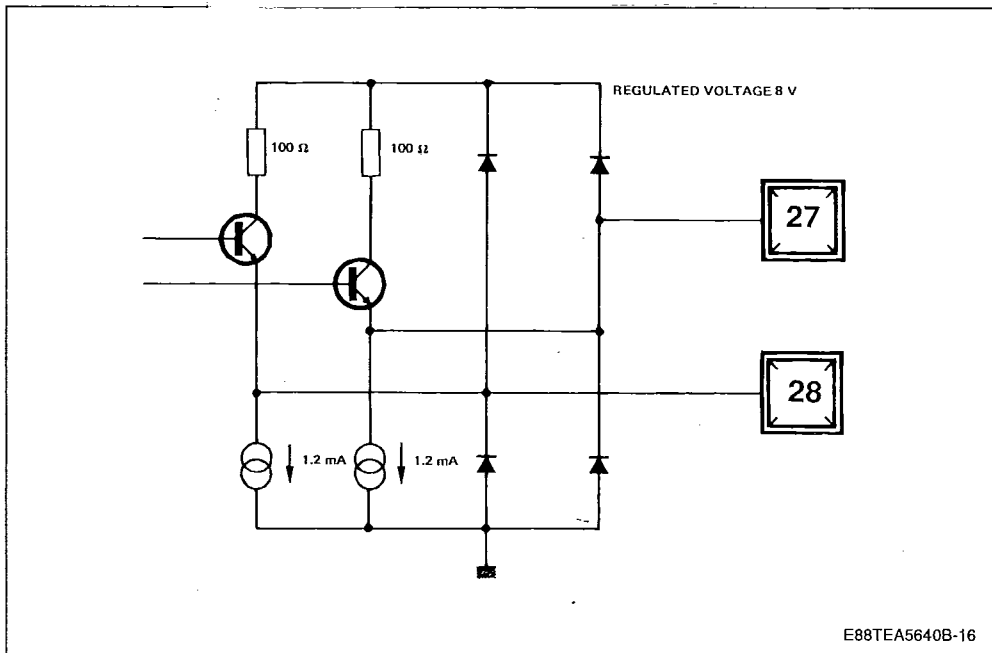


E88TEA5640B-15

PINS 27 - 28

SGS-THOMSON

30E D



E88TEA5640B-16

## PACKAGE MECHANICAL DATA

28 PINS - PLASTIC DIP

S G S-THOMSON

30E D

