SIEMENS

TV SAT IF-FM-Demodulator

TDA 6149-5X

Preliminary Data

Bipolar IC

Features

- Input sensitivity approx. – 40 dBm
- Symmetrical, low impedance IF input
- One AFC output providing DC voltage S-curve
- Reduced external components.

P-DSO-16-1

Type	Ordering Code	Package
TDA 6149-5X	Q67000-A5174	P-DSO-16-1 (SMD)

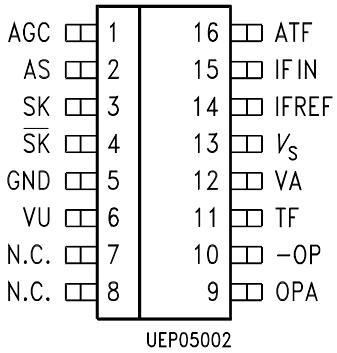
Amplifier and IF demodulator for satellite applications, consisting of: two-stage limiter amplifier; divider by 4; video amplifier; automatic gain control; AFC stage; reverse polarity switch for video signals.

Application

Used in satellite indoor units.

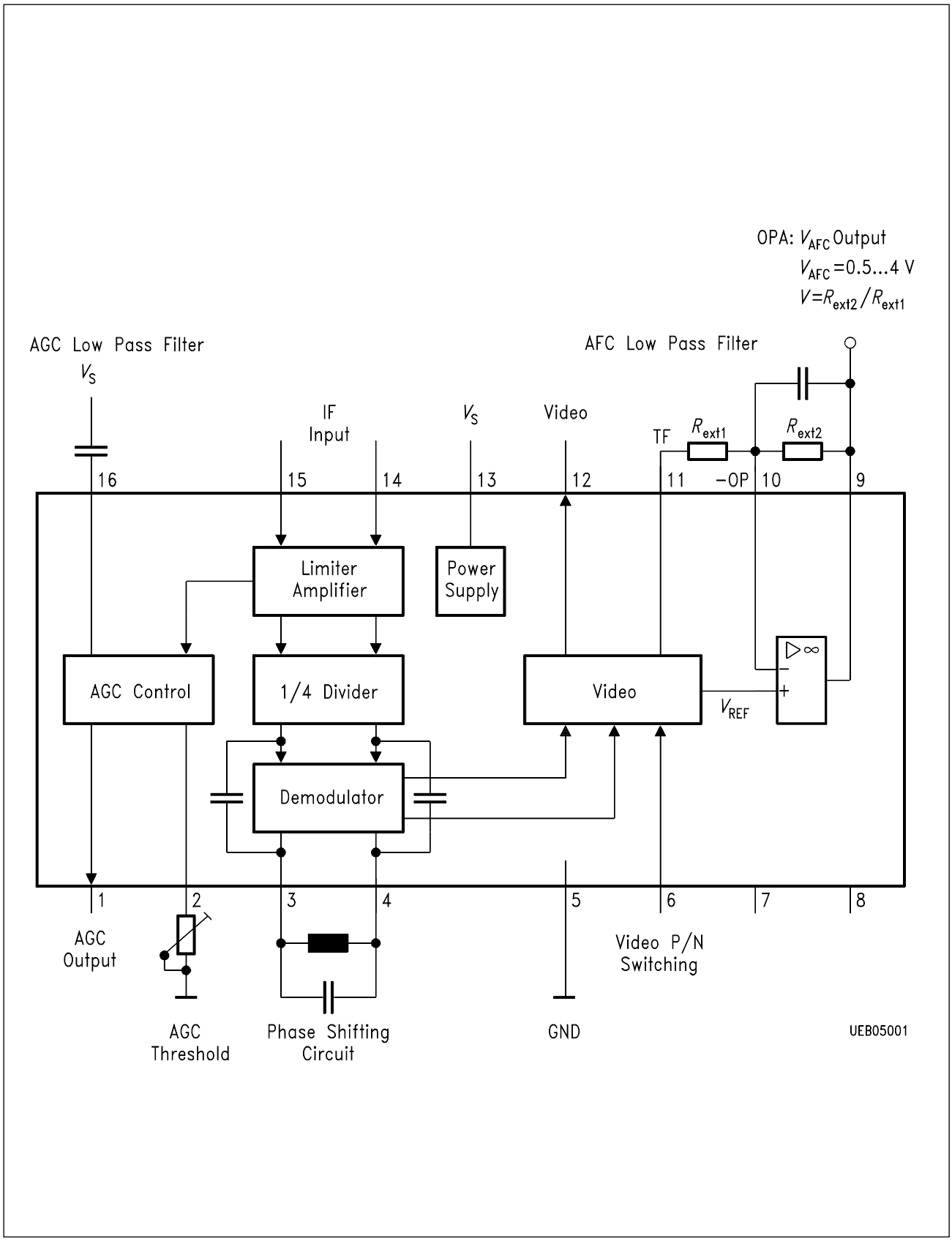
Pin Configuration
(top view)

P-DSO-16



Pin Definitions and Functions

Pin No.	Symbol	Function
1	AGC	AGC-control voltage output
2	AS	AGC-threshold adjust
3	SK	Demodulator tank circuit
4	$\overline{SK}$	Demodulator tank circuit
5	GND	Ground
6	VP	Video polarity switch input for positive or negative modulation
7	N.C.	N.C.
8	N.C.	N.C.
9	OPA	V_{AFC} output voltage
10	– OP	Inverting input of the operating amplifier
11	TF	Video output for OP
12	VA	Video output
13	V_S	Supply voltage
14	IFREF	IF-reference input
15	IFIN	IF-input
16	ATF	AGC-low pass filter



Block Diagram

Circuit Description

By capacitive coupling, the FM modulated satellite IF signal is fed into the input of a symmetrical limiter amplifier. Asymmetrical operation of this limiter amplifier is also possible, if one of the two inputs is blocked against high frequency signals. The output signal of the amplifier is divided by four and sent directly as well as phase shifted to the quadrature demodulator and a following video amplifier. The phase shifting is done using an external LC tank circuit.

The AFC signal is derived from the video output by means of a low pass filter. The response of the AFC can be adjusted my means of external components connected to an internal operational amplifier.

The information for the field strength of the FM modulated IF satellite signal is available as a DC voltage at the AGC output. The AGC threshold can be adjusted by a potentiometer.

The polarity of the demodulated video signal can be inverted by an external switching voltage fed into the polarity switch input (pin 6).

Absolute Maximum Ratings
T_A = 0 to 70 °C

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		
Supply voltage	V_S	0	6	V	
AGC-control voltage output	V_1	1	13	V	Open collector
AGC-threshold input	V_2	0.3	2	V	
Demodulator LC-circuit input	$V_{3,4}$	– 0.3	3		
Video P/N-switching	V_6	– 0.3	6	V	
AFC-output	V_9	0	5	V	
– OP	V_{10}	2	3	V	
low pass output	V_{11}	1	5	V	
Capacity value	$C_{9,10}$	0	1	µF	
Video output	V_{12}	1	5	V	
IF-inputs	$V_{14,15}$	– 0.3	3	V	
AGC-low pass filter	V_{16}	– 0.3	5	V	
Junction temperature	T_j		150	°C	
Storage temperature	T_{stg}	– 40	125	°C	
Thermal resistance	$R_{th\ SA}$		125	K/W	

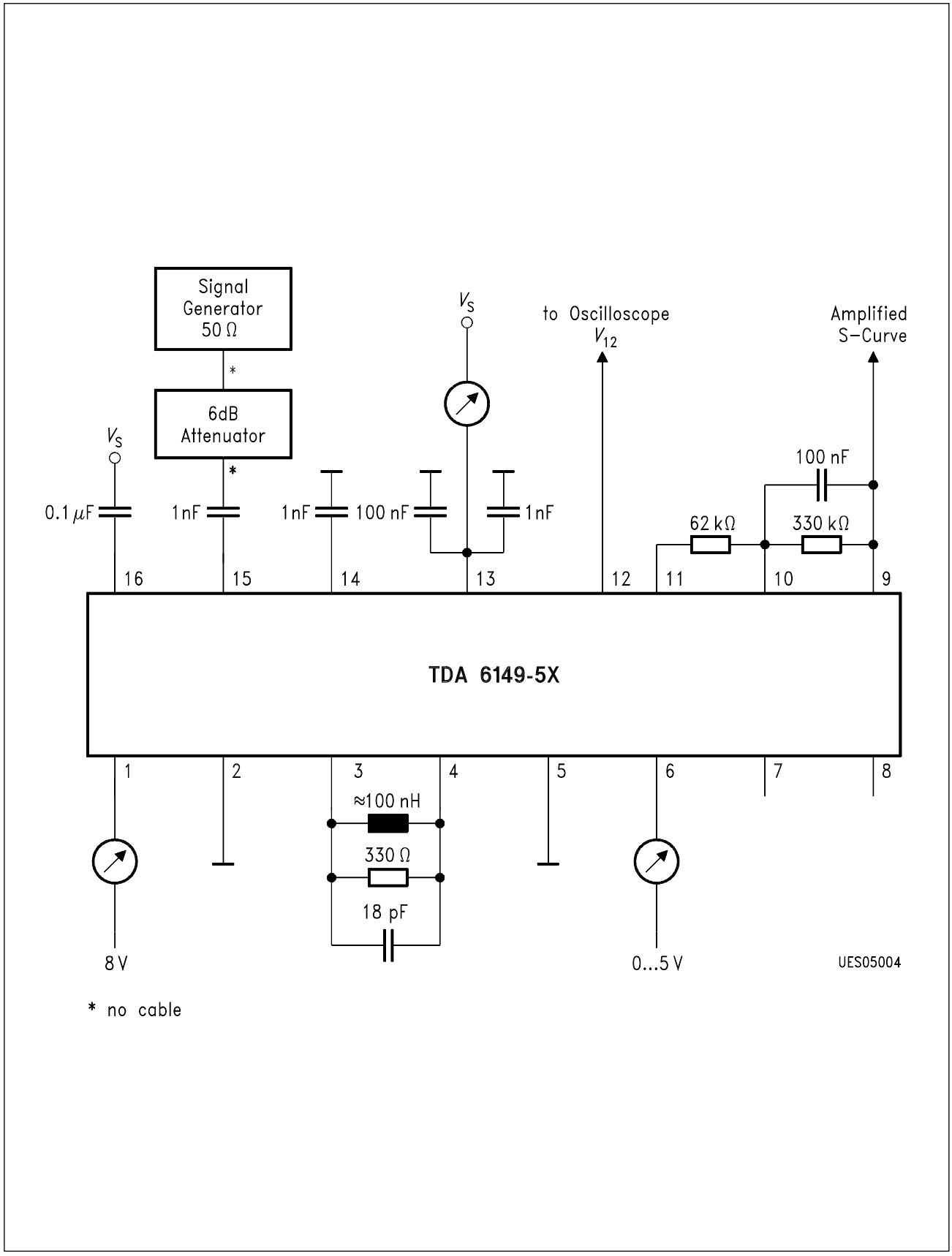
ESD-integrity (according MIL-Std 883 D, methode 3015.7): 1000-1999 V
exception: The pins #9 and #11 are not protected against voltage stress >500 V.

Operating Range

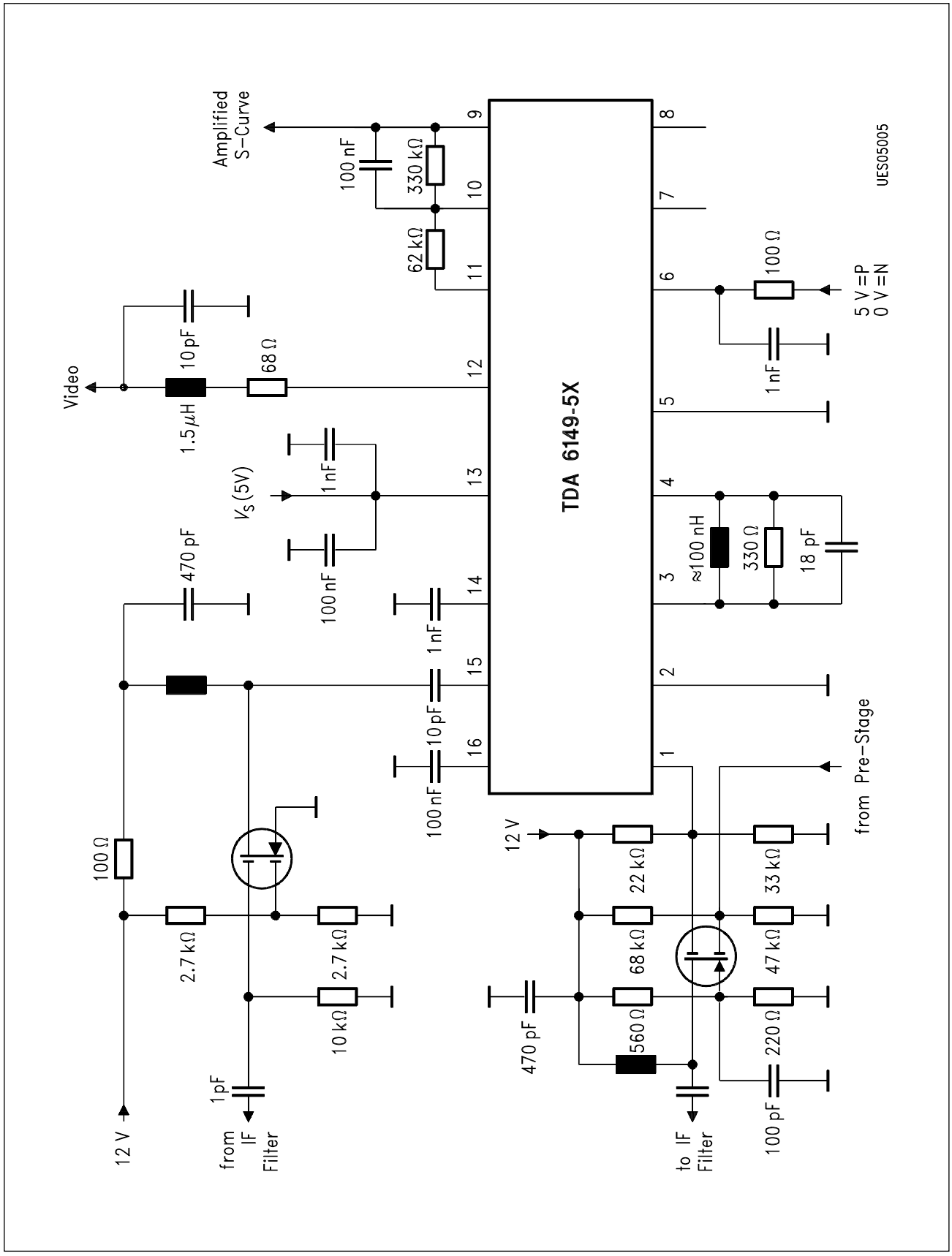
Supply voltage	V_S	4.5	5.5	V
Input frequency range	f_{15}	300	900	MHz
Ambient temperature during operation	T_A	0	70	°C

Characteristics
T_A = 25 °C; V_S = 5 V **(test circuit 1)**

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Power consumption	I_S	30	40	50	mA	
Input Sensitivity						
IF-input	a_{15}	– 40		3	dBm	f_{15} = 480 MHz
Video Output						
Video voltage (Δf = 13.5 MHz)	V_{12}	300		700	mV	
Distortion factor	THD		< 1		%	
Signal/noise ratio	S/N		70		dB	
Video P/N-Switching						
Positive polarity Input current Negative polarity Input current	V_6 I_{6H} V_6 I_{6L}	3.5		 50 1 – 50	V µA V µA	
AGC-Current (Open-collector current limited)						
a_{15} = – 22 dBm a_{15} = – 8 dBm	I_1 I_1		10 500		µA µA	V_1 = 8 V Pin 2 on ground V_1 = 8 V Pin 2 on ground
AFC-S-Curve						
f_{15} = 480 MHz	V_9		2.2		V	$R_{ext.1}$ = 62 kΩ $R_{ext.1}$ = 330 kΩ
f_{15} = 480 MHz +15 MHz	V_9		0		V	R_{L9} = ∞, V_6 = 0 V
f_{15} = 480 MHz – 15 MHz	V_9		4		V	R_{L9} = ∞, V_6 = 0 V
Temperature coeff.	$\Delta V_9/\Delta T$		– 4.2		mV/°C	R_{L9} = ∞, T_C of the LC-circuit at Pin 3, 4 = 0



Test Circuit 1



Application Circuit

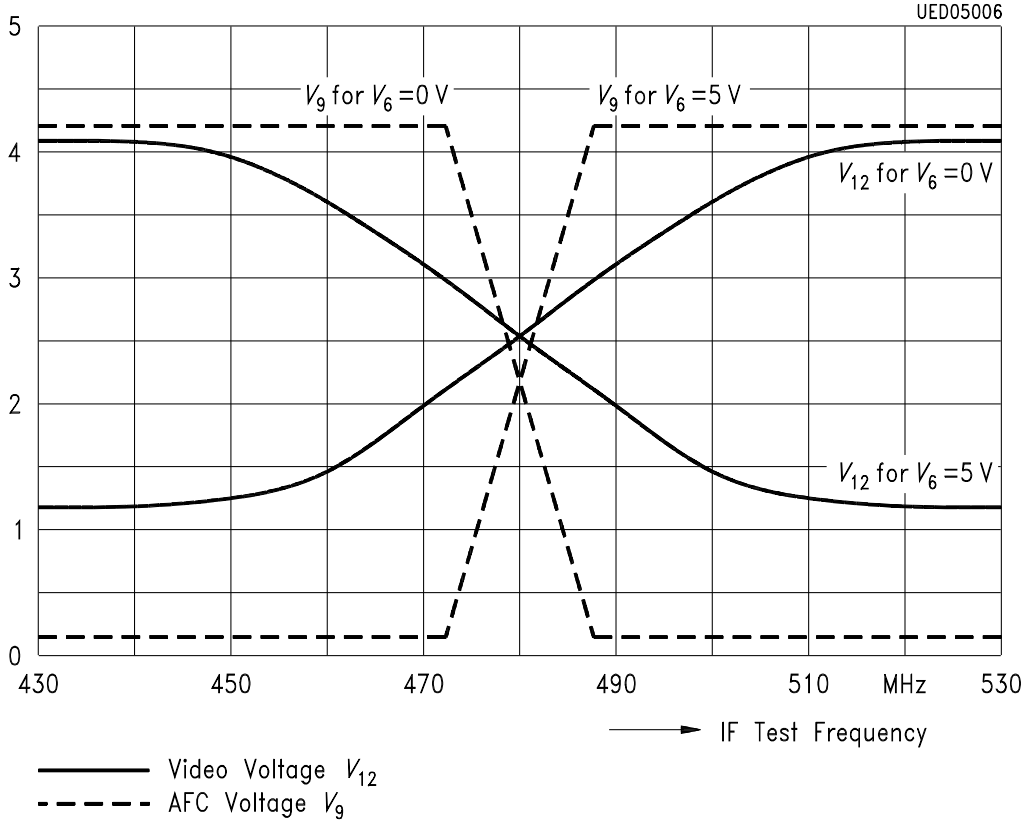


Diagram 1

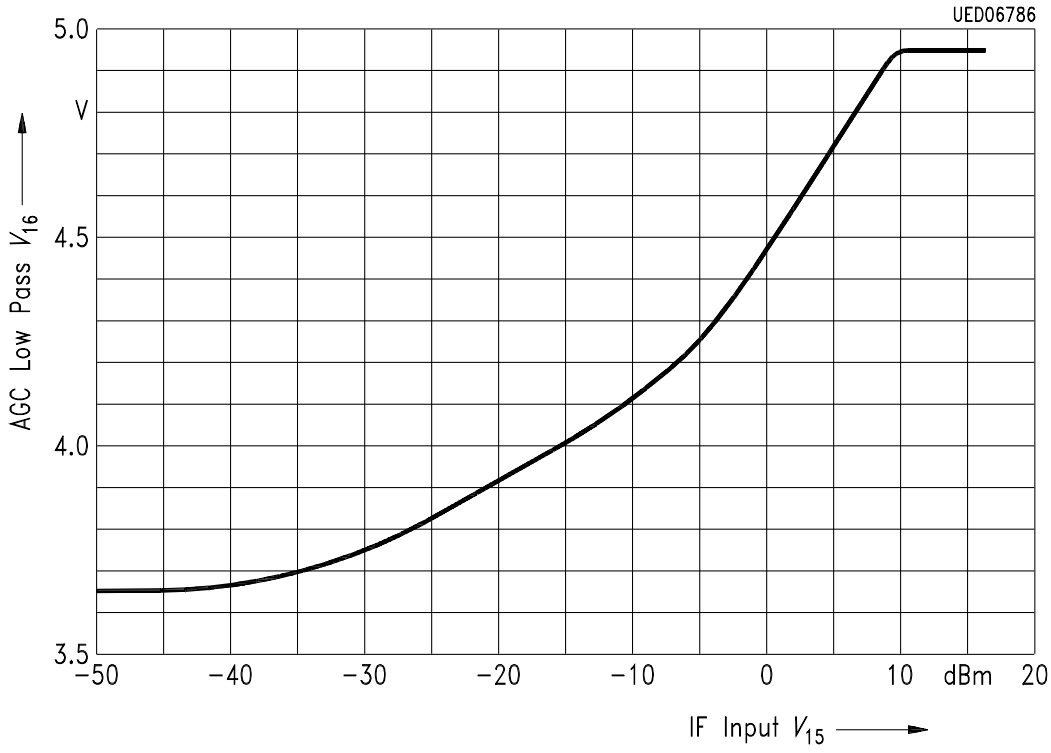


Diagram 2