S510067

DTV IF AGC AMPLIFIER

FEATURES

- SINGLE 3.3 V SUPPLY OPERATION
- Low DISTORTION: -55dBC@1VPP
- 14-68 dB TOTAL VOLTAGE GAIN
- 54 dB TOTAL GAIN CONTROL RANGE
- 10-100 MHz OPERATION

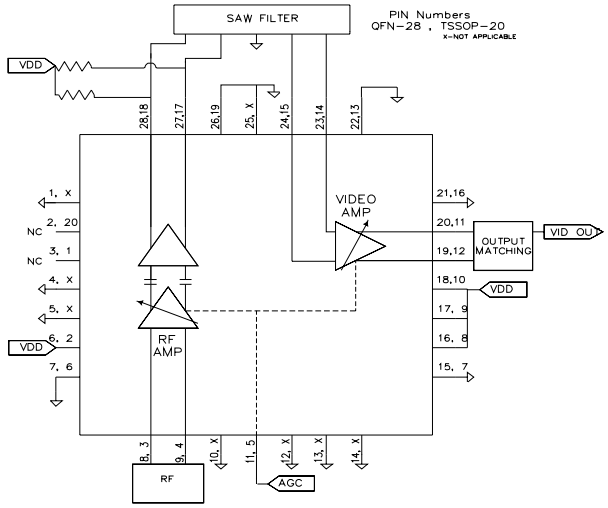
DESCRIPTION

The S510067 consists of an input Linear AGC amplifier and a video/AGC amplifier. The amplifiers are designed to interface directly with saw filters and A/D converters The AGC is delayed between the two blocks for optimal NF and IM3 performance across the full AGC range. The final stage is capable of providing 2 VPP into a 500Ω load. The part is offered in the QFN28 & 20 TSSOP package and is RoHS compliant.

APPLICATIONS

- Digital Terrestrial Tuners • Digital TV Sets.
- Digital Radios • Digital Set top boxes.

FUNCTIONAL DIAGRAM



ELECTRICAL CHARACTERISTICS (TA = 25°C, VDD = 3.3 V, unless otherwise specified)

SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
RF Performance					
RFIN	RF Input Frequency Range	MHz	10	43.75	100
RF Flatness	Gain flaness	dB		0.5	
Rfin	RF input power range	dBmV		22	25
GMAX	Maximum Gain*	dB		72	
VAGC	AGC Voltage	V	0		3
AGC	AGC Dynamic Range VAGC = 0 to 3 V	dB		54	
IM3	Third Order Intermodulation, 1 VPP Differential Output, 1K ohm load	dBc	50	55	
IFOUT	IF Output Level, Differential Output, 1K ohm load	VPP	1	1.2	2
Gain	Change vs NF increase ratio	dB			2/1
NF	Noise Figure, VAGC = 3 V	dB		13.5	
NF	Noise Figure, VAGC = 0 V	dB		30	32
GINPUT	Input Video Amp Gain, VAGC = 3 V	dB		39	
GVIDEO	Video Amp Gain, VAGC = 3 V	dB		47	
DC Performance					
VDD	Supply Voltage	V		3.3	
IDD	Supply Current	mA		100	125

* Includes saw filter loss.

ABSOLUTE MAXIMUM RATINGS

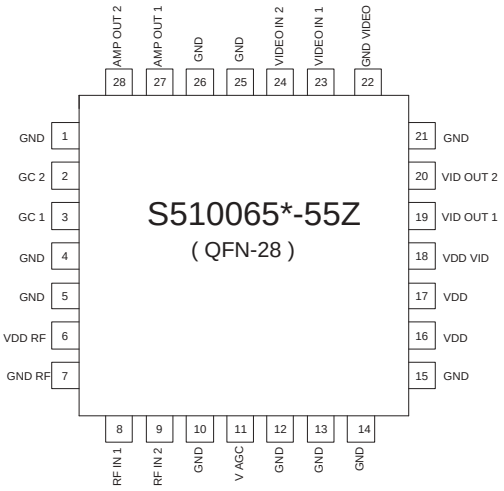
(TC = 25°C unless otherwise noted)

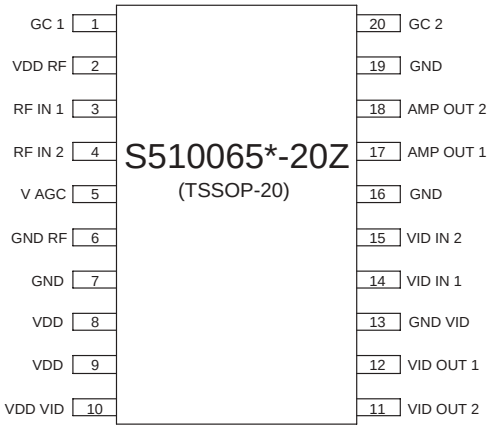
SYMBOLS	PARAMETERS	UNITS	RATINGS
VDD (GND)	Supply Voltage (GND)	V	-0.3 to +3.6
TOP	Operating Temperature	°C	-40 to +85
TSTG	Storage Temperature	°C	-65 to +150
	Junction Temperature	°C	+150
	Thermal Resistance (Ø ja)	°C/W	34

Note:
1. Operation in excess of any one of these parameters may result in permanent damage.

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PIN ASSIGNMENTS





***The tape and reels will be marked as S510067. The part is tested to the specification in this document.**

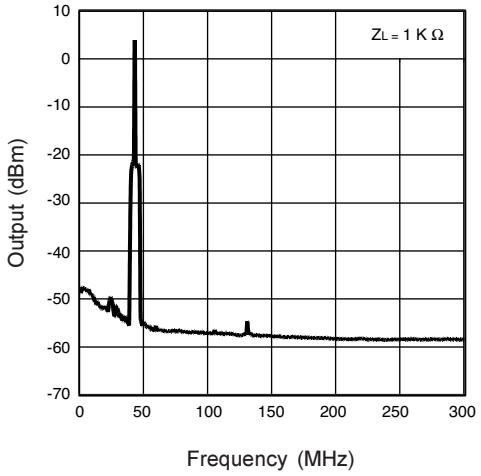
PIN FUNCTIONS

TSSOP-20 QFN-28

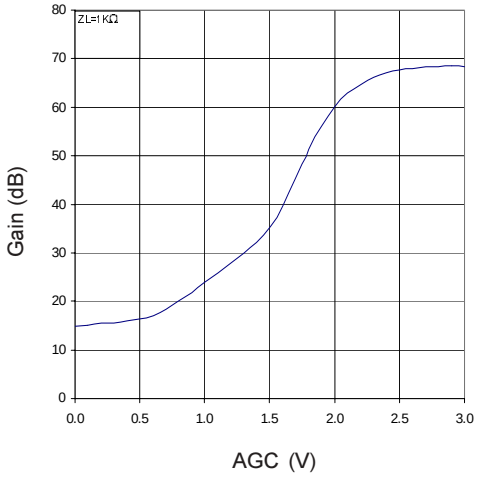
PIN NO.	PIN NO.	PIN NAME	DESCRIPTION
7,16,19	1, 4, 5, 10, 12,13,14, 15 21, 25, 26	GND	Ground pins. Connect to the ground plane with shortest possible length to minimize inductance.
20	2	NC	Float do not connect.
1	3	NC	Float do not connect.
2	6	VDD RF	INPUT AMP Supply, +3.3 V.
6	7	GND RF INPUT	AMP Ground. See GND.
3	8	RF IN1	RF AMP Positive Input. Input impedance, 1K ohms single ended. SEE APPLICATION PAGE 4.
4	9	RF IN2	RF AMP Negative Input. SEE APPLICATION PAGE 4.
5	11	AGC	Automatic Gain Control, Min Gain @ AGC = 0 V, Max Gain @ AGC = 3.0 V.
8	16	VDD	Supply Voltage, +3.3 V.
9	17	VDD	Supply Voltage, +3.3 V.
10	18	VDD VID	VIDEO AMP Input Stage Supply, +3.3 V.
12	19	VID OUT1	VIDEO AMP Negative Output. This pin and VID OUT2 form a 1K ohm output impedance. Open Drain - See Application Page 4.
11	20	VID OUT2	VIDEO AMP Positive Output. See VID OUT1.
13	22	GND VID	VIDEO AMP Ground. See GND.
14	23	VID IN1 VIDEO	AMP Negative Input.
15	24	VID IN2 VIDEO	AMP Positive Input.
17	27	AMP OUT1	INPUT AMP Positive Output. Open Drain . See Application Page 4.
18	28	AMP OUT2	INPUT AMP Negative Output. Open Drain .See Application Page 4.

TYPICAL PERFORMANCE CURVES

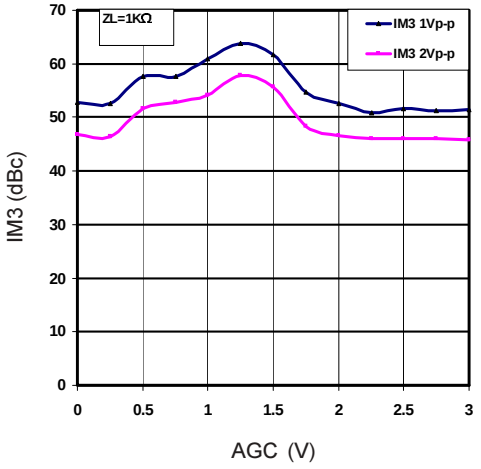
OUTPUT SPECTRUM



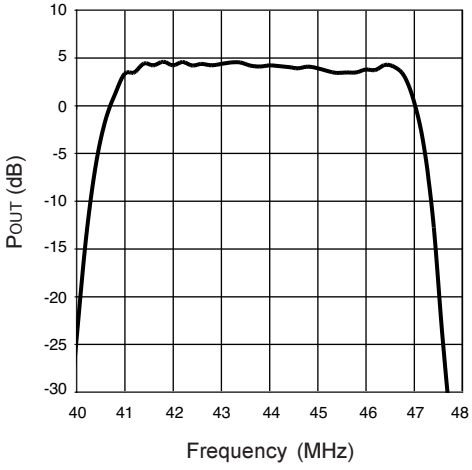
GAIN vs. AGC



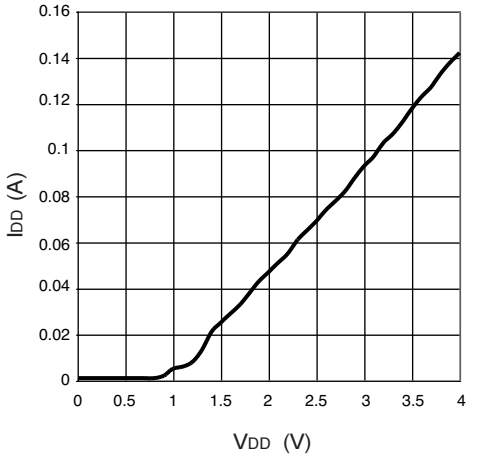
IM3 vs. AGC



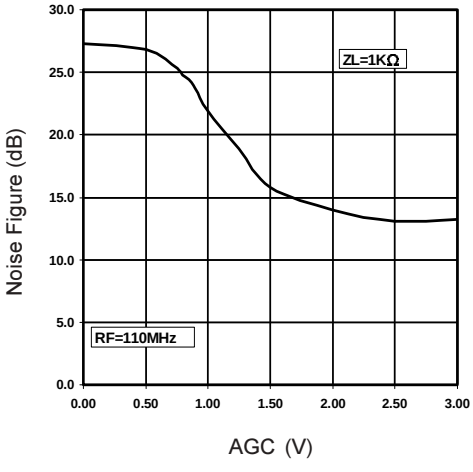
OUTPUT FLATNESS



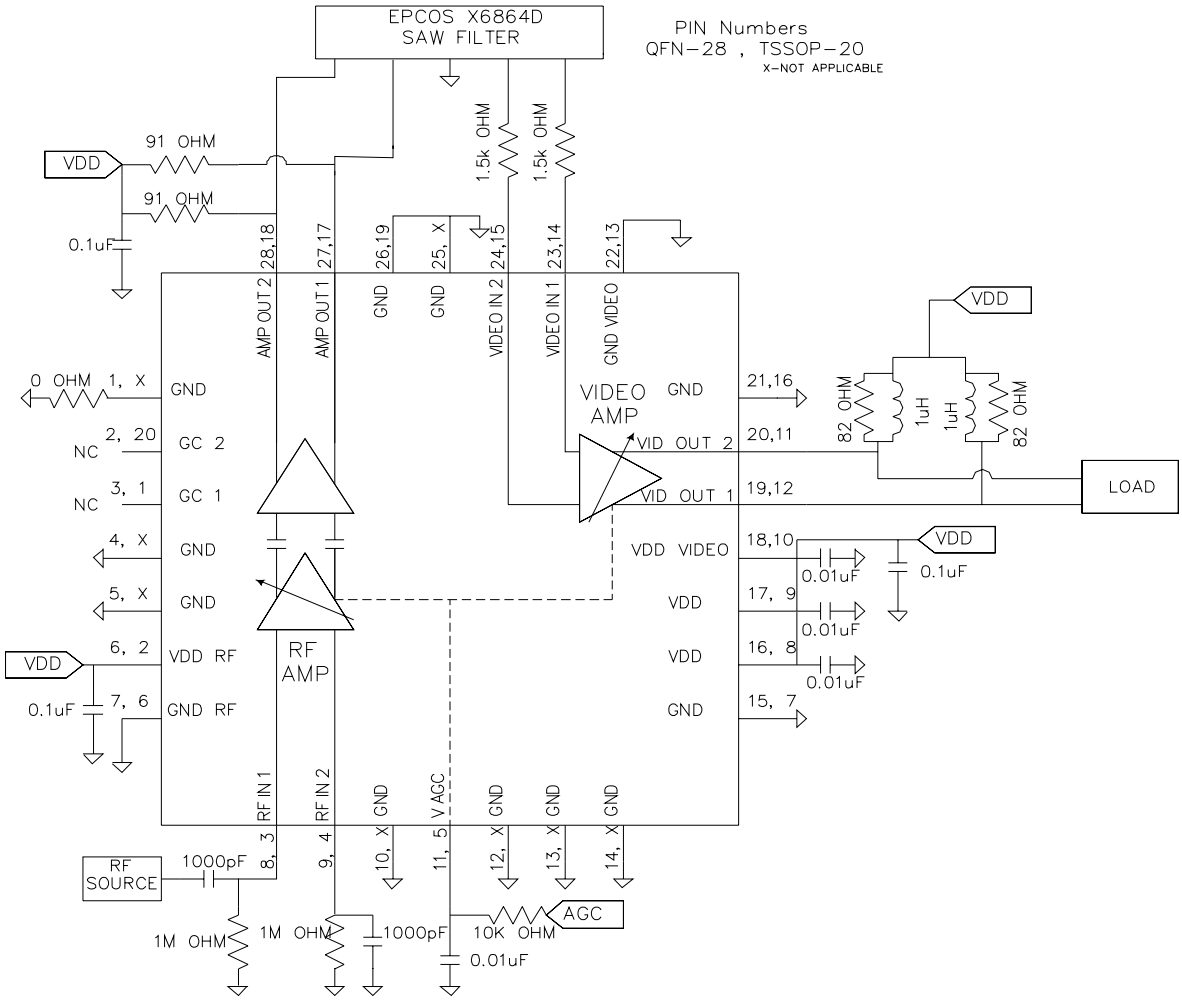
IDD vs. VDD



NOISE FIGURE vs. AGC



TYPICAL APPLICATION CIRCUIT



Input Amplifier

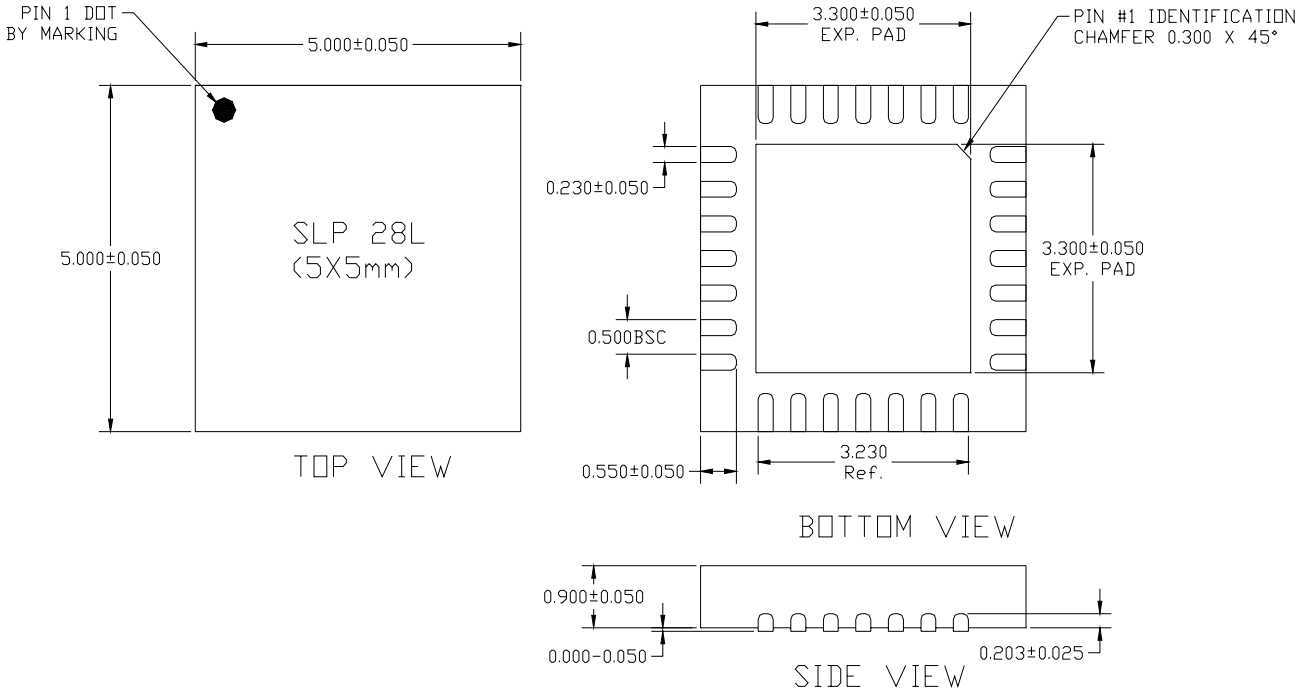
This amplifier provides a maximum gain of 39 dB. The gain is controlled by applying a DC voltage (from 0 to 3 V) to the AGC pin, providing 27 dB of range. The output stage current can be set between 10 mA (R = 20) and 30 mA (R = 0) by connecting an external resistor from pin 1 to ground.

Video Amplifier

This amplifier provides a maximum gain of 47 dB. The gain is controlled by applying a DC voltage (from 0 to 3 V) to the AGC pin, providing 27 dB of range. The outputs of the video amp are both open drain and require pull-up inductors to V_{DD}. Up to 2 V_{PP} can be delivered into a 500 Ω load.

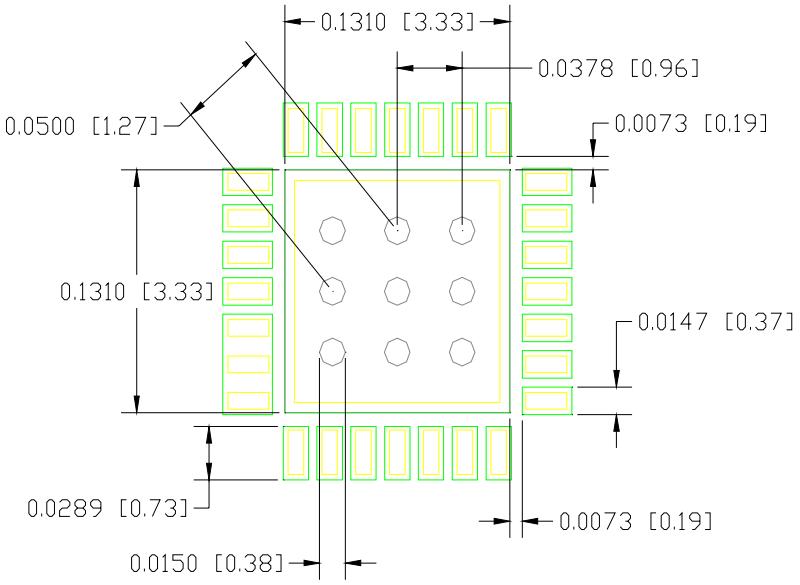
The input amplifier and video amplifier are controlled by a single AGC so the overall dynamic range is the sum of the input amplifier range and the video amplifier range.

PACKAGE INFORMATION QFN-28 (Units in mm)

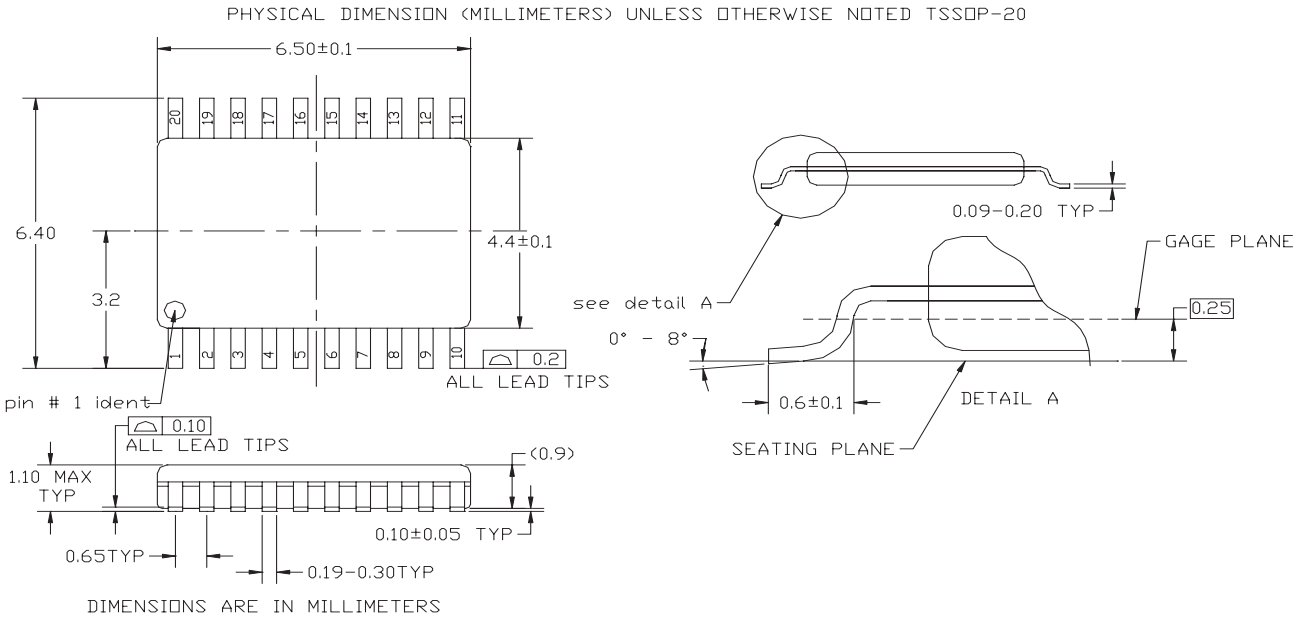


1. Dimensions and tolerances conform to ASME Y14.5-1994.
2. All dimensions are in millimeters. All angles are in degrees.
3. The exposed thermal pad is also an electrical ground .

LAND PATTERN FOR TERMINALS AND THERMAL/GROUND PAD



PACKAGE INFORMATION TSSOP-20 (CON'T)



LAND PATTERN FOR TSSOP-20 (CON'T)

