

S510065

CATV OUT-OF-BAND TUNER



FEATURES

- 3.3V SINGLE SUPPLY OPERATION
- LOW POWER CONSUMPTION (400 mW)
- Low DISTORTION: -55dBc@1VPP
- 82 dB TOTAL CONVERSION GAIN
- 55 dB TOTAL GAIN CONTROL RANGE
- LOW LO-RF LEAKAGE

DESCRIPTION

The S510065-55Z is a downconverter designed to be used as an Out-of-Band Tuner for use in CATV set-top box and Digital Cable Ready TV applications. The S510065-55Z consists of an input AGC amplifier, mixer, and a video/AGC amplifier. This device offers optimum performance with low power consumption and low distortion. There are two Package Options QFN 28 and TSSOP 20. The product is RoHS Compliant

APPLICATIONS

- Cable Set-Top Boxes • Digital Cable Ready TV Sets.

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

SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
RF Performance					
RF _{IN}	RF Input Frequency Range, High Side L.O.	MHz	50		150
LO _{IN}	LO Input Frequency Range, High Side L.O.	MHz	80		220
CG _{MAX}	Maximum Conversion Gain*	dB		82	
V _{AGC}	AGC Voltage	V	0		3
AGC	AGC Dynamic Range V _{AGC} = 0 to 3 V	dB	50	55	
IM ₃	Third Order Intermodulation, 1 V _{PP} Differential Output, 1K ohm load	dBc	50	55	
IF _{OUT}	IF Output Level, Differential Output, 1K ohm load	V _{PP}		1	2
NF	Noise Figure, V _{AGC} = 3 V	dB		13	15
G _{INPUT}	RF Amp/Mixer Conversion Gain, V _{AGC} = 3 V	dB		41	
G _{VIDEO}	Video Amplifier Gain, V _{AGC} = 3 V	dB		55	
LO-RF LEAKAGE	LO leakage at the RF port	dBm		-95	-85
DC Performance					
V _{DD}	Supply Voltage	V	3.2	3.3	3.4
I _{DD}	Supply Current	mA		117	135

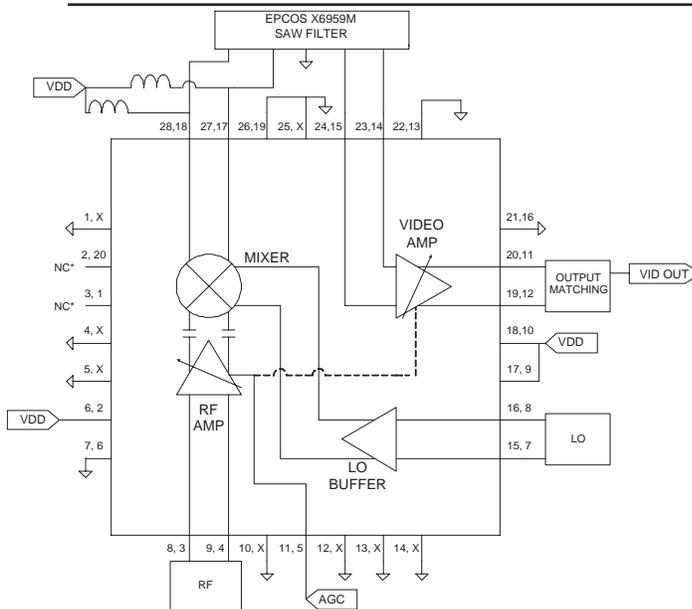
* Includes saw filter loss.

ABSOLUTE MAXIMUM RATINGS

(T_C = 25°C unless otherwise noted)

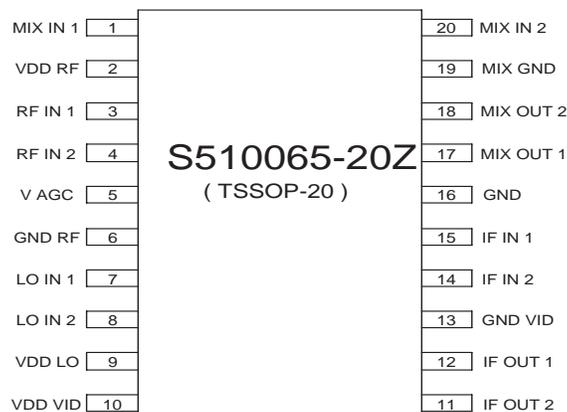
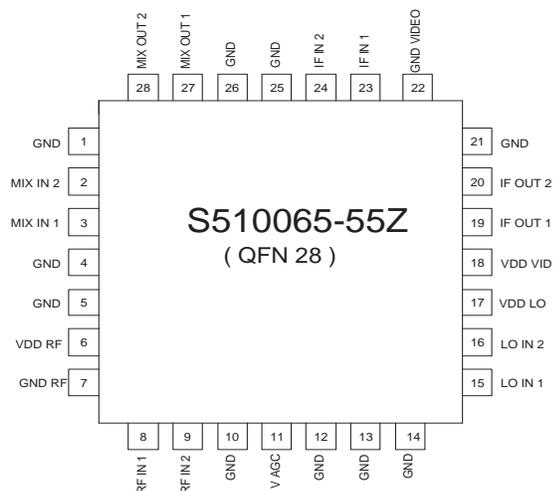
SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{DD} (GND)	Supply Voltage (GND)	V	-0.3 to +3.6
T _{OP}	Operating Temperature	°C	-40 to +85
T _{STG}	Storage Temperature	°C	-65 to +150
	Junction Temperature	°C	+150
	Thermal Resistance (θ _{ja})	°C/W	34

FUNCTIONAL DIAGRAM



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PIN ASSIGNMENTS

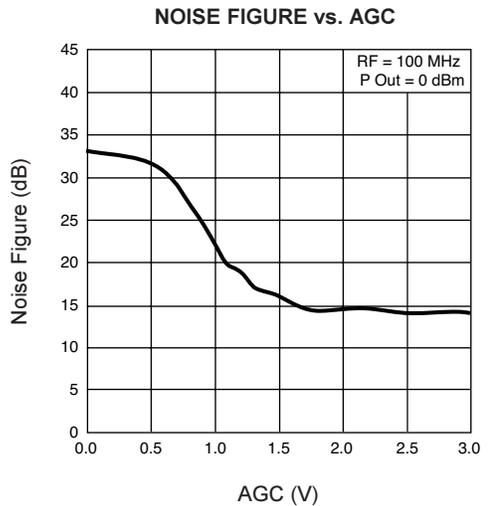
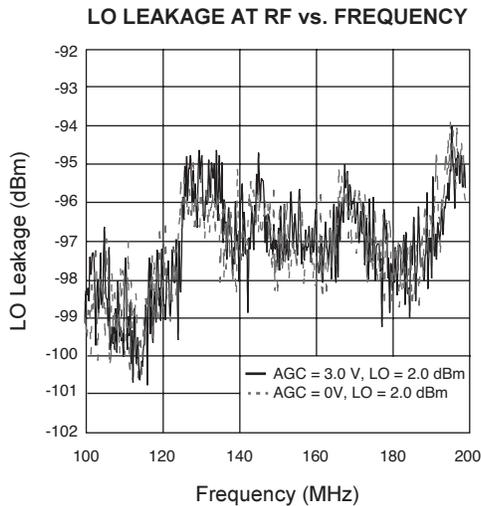
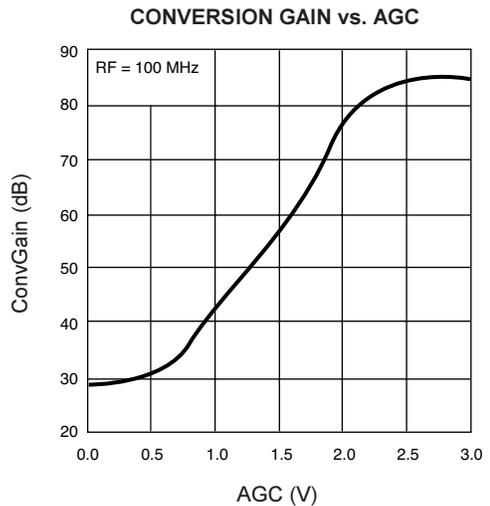
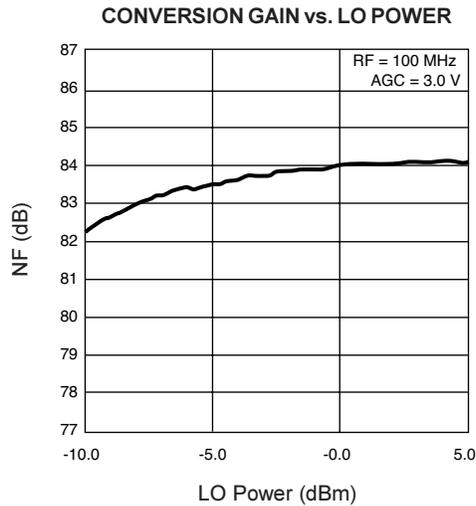
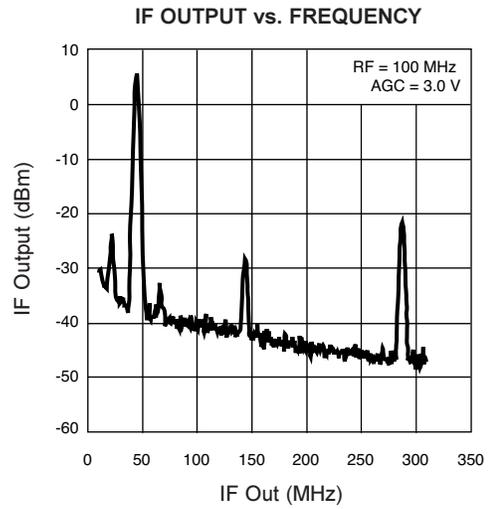
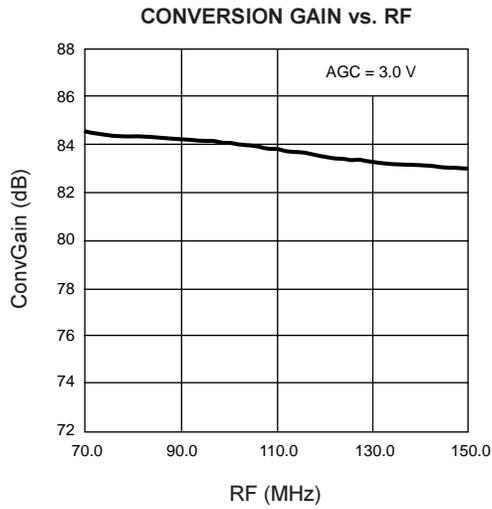


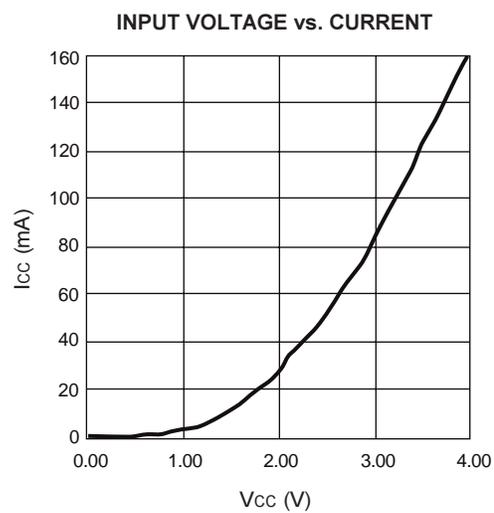
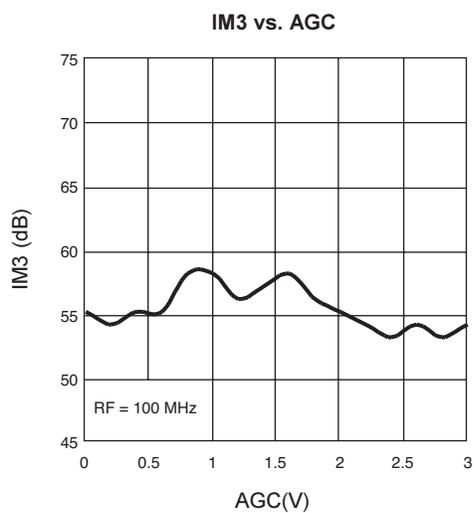
PIN FUNCTIONS

TSSOP QFN-28

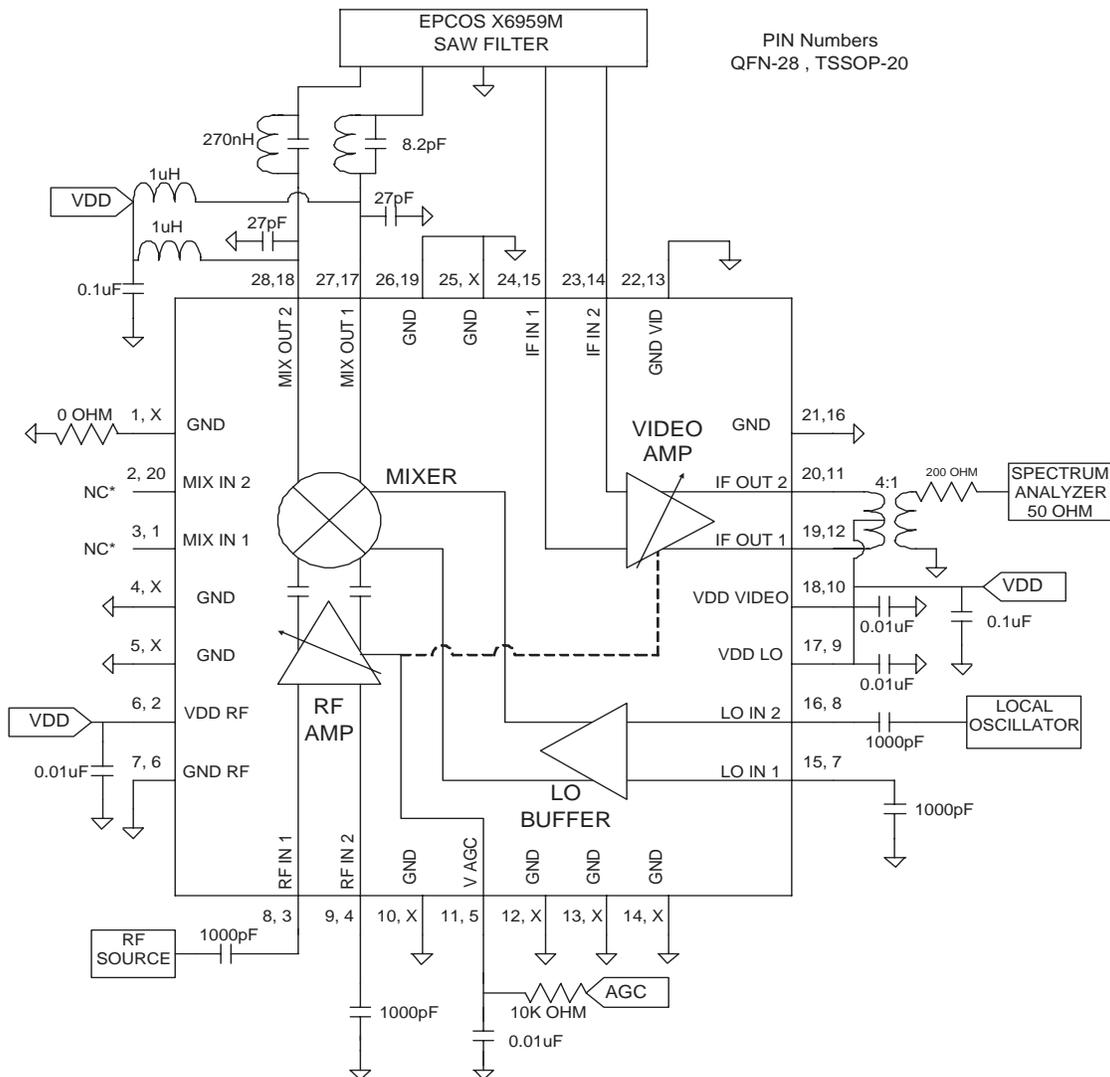
PIN NO.	PIN NO.	PIN NAME	DESCRIPTION
16 19	1, 4, 5, 10, 12, 13, 14, 21, 25, 26	GND	Ground pins. Connect to the ground plane with shortest possible length to minimize inductance.
20	2	MIX IN2	No connection.
1	3	MIX IN1	No connection.
2	6	VDD RF	RF AMP Supply, +3.3 V.
6	7	GND RF	RF AMP Ground. See GND.
3	8	RF IN1	RF AMP Positive Input. Input impedance, 1K ohms single ended. SEE APPLICATION PAGE 5.
4	9	RF IN2	RF AMP Negative Input. SEE APPLICATION PAGE 5.
5	11	AGC	Automatic Gain Control, Min Gain @ AGC = 0 V, Max Gain @ AGC = 3.0 V.
7	15	LO IN1	LO Buffer Positive Input.
8	16	LO IN2	LO Buffer Negative Input.
9	17	VDD LO	LO Buffer Supply, +3.3 V.
10	18	VDD VID	VIDEO AMP Input Stage Supply, +3.3 V.
12	19	IF OUT1	VIDEO AMP Negative Output. This pin and IFOUT2 form a 1K ohm output impedance. Open Drain See Application Page 5
11	20	IF OUT2	VIDEO AMP Positive Output. See IFOUT1.
13	22	GND VID	VIDEO AMP Ground. See GND.
15	23	IF IN1	VIDEO AMP Negative Input.
14	24	IF IN2	VIDEO AMP Positive Input.
17	27	MIX OUT1	MIXER Positive Output. Open Drain .See Application Page 5
18	28	MIX OUT2	MIXER Negative Output. Open Drain. See Application Page 5 .

TYPICAL PERFORMANCE CURVES



TYPICAL PERFORMANCE CURVES (CON'T)

TYPICAL APPLICATION CIRCUIT



RF Amplifier

This amplifier provides a maximum gain of 29 dB. The gain is programmed by applying a DC voltage (from 0 to 3 V) to the AGC pin, providing 27 dB of range.

Downconversion Mixer

This double balanced mixer has 12 dB of conversion gain. The outputs of the mixer are both open drain and require pull-up inductors to VDD.

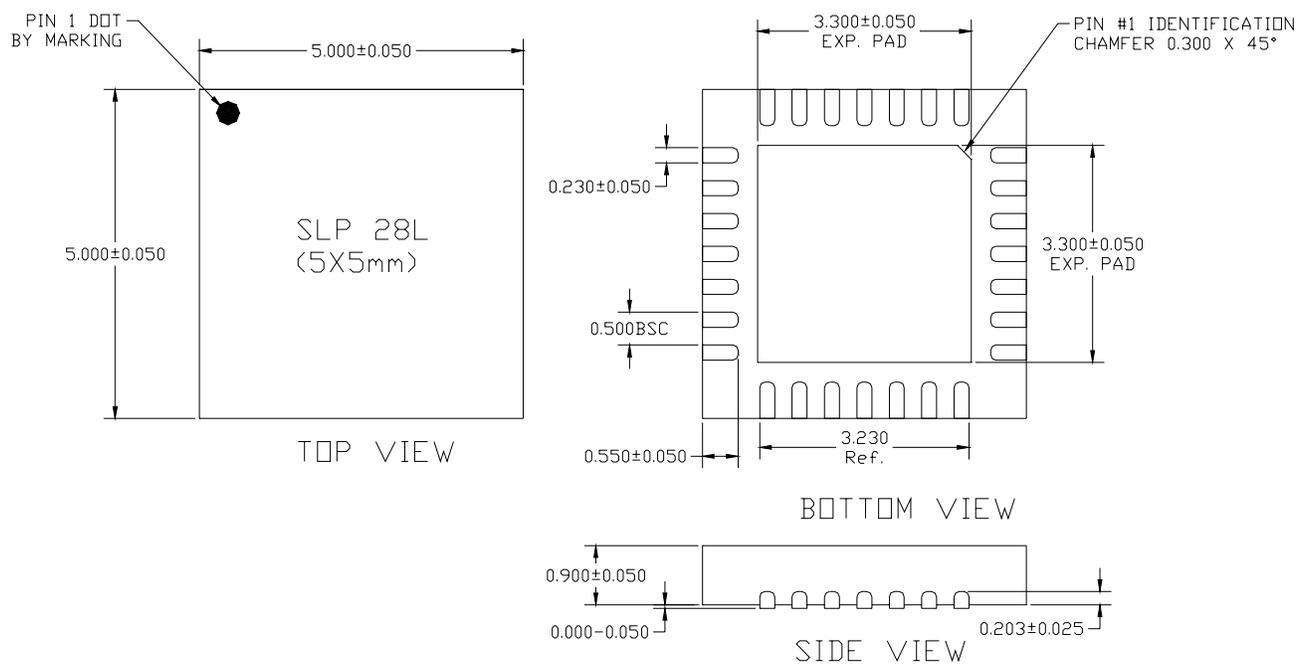
Video Amplifier

This amplifier provides a maximum gain of 55 dB. The gain is programmed by applying a DC voltage (from 0 to 3 V) to the AGC pin, providing 28 dB of range. The outputs of the video amp are both open drain and require pull-up inductors to VDD.

Note:

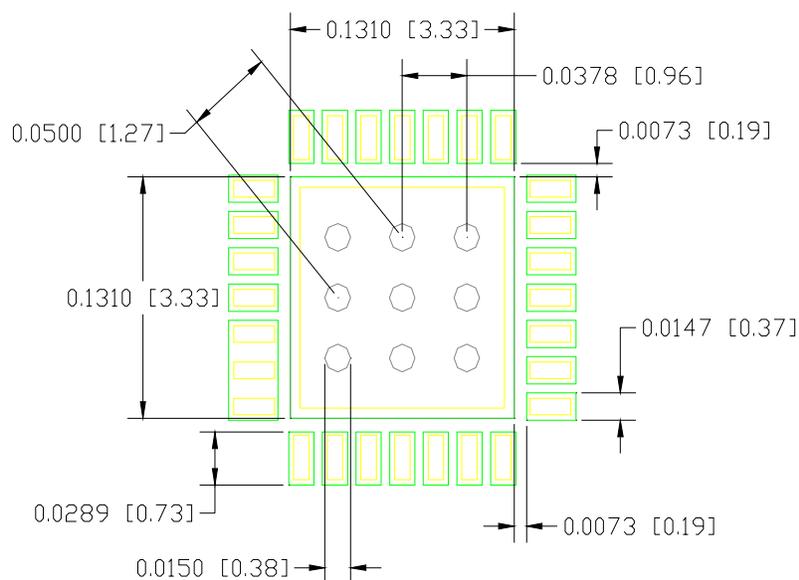
1. The RF amplifier and video amplifier are controlled by a single AGC so the overall dynamic range is the sum of the RF amplifier range and the video amplifier range.

PACKAGE INFORMATION QFN-28 (Units in mm)

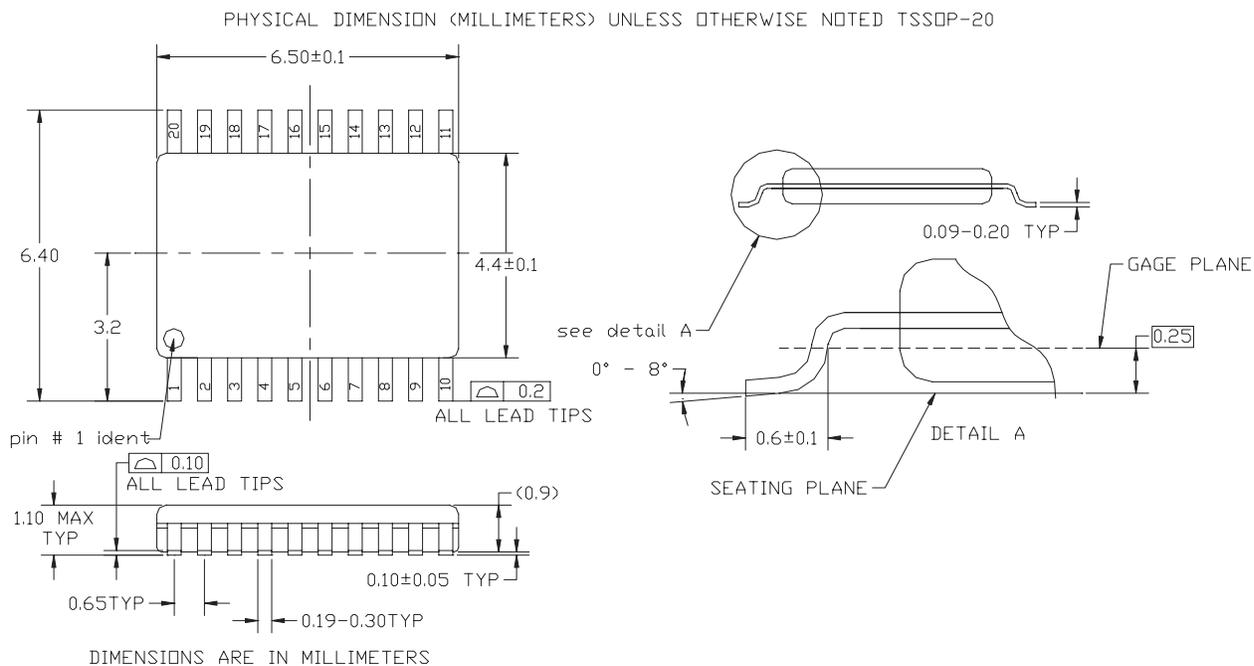


1. Dimensions and tolerances conform to ASME Y14.5-1994.
2. All dimensions are in millimeters. All angles are in degrees.
3. The exposed thermal pad is also an electrical ground.

LAND PATTERN FOR TERMINALS AND THERMAL/GROUND PAD



PACKAGE INFORMATION TSSOP-20 (CON'T)



LAND PATTERN FOR TSSOP-20 (CON'T)

PHYSICAL DIMENSION (MILLIMETERS) UNLESS OTHERWISE NOTED TSSOP-20

