

# PRELIMINARY DATA SHEET

## ISG510067

### DTV IF AGC AMPLIFIER



#### FEATURES

- 3.3 V SINGLE SUPPLY OPERATION
- LOW POWER CONSUMPTION (330 mW)
- LOW DISTORTION
- 85 dB TOTAL VOLTAGE GAIN
- 54 dB TOTAL GAIN CONTROL RANGE
- 25-100 MHz OPERATION

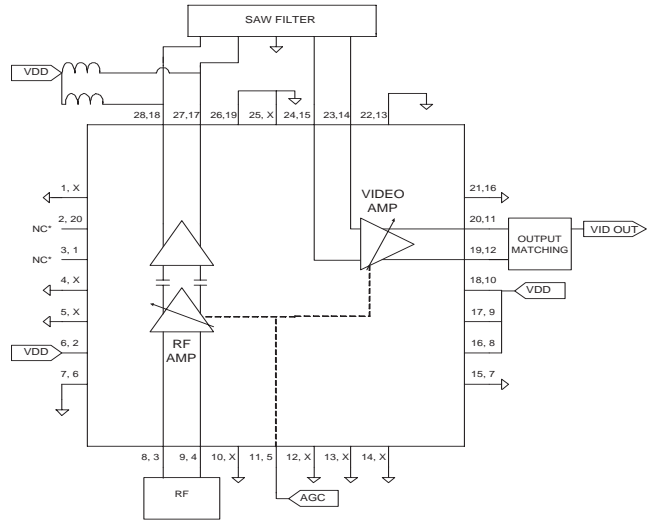
#### DESCRIPTION

The ISG510067 consists of an input AGC amplifier and a video/AGC amplifier. The amplifiers are designed to interface directly with standard saw filters. 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 V<sub>PP</sub> into a 500 Ω load. There are two package options MLP28 and TSSOP 20.

#### APPLICATIONS

- Digital Terrestrial Tuners • Digital TV Sets.

#### FUNCTIONAL DIAGRAM



#### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C, V<sub>DD</sub> = 3.3 V, unless otherwise specified)

SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
<b>RF Performance</b>					
R <sub>FIN</sub>	RF Input Frequency Range	MHz		43.75	100
G <sub>MAX</sub>	Maximum Gain*	dB		85	
V <sub>AGC</sub>	AGC Voltage	V	0		3
AGC	AGC Dynamic Range V <sub>AGC</sub> = 0 to 3 V	dB		54	
IM3	Third Order Intermodulation, 1 V <sub>PP</sub> Differential Output, 1K ohm load	dBc		60	
	Third Order Intermodulation, 2 V <sub>PP</sub> Differential Output, 1K ohm load	dBc		48	
I <sub>FOUT</sub>	IF Output Level, Differential Output, 1K ohm load	V <sub>PP</sub>		1	
NF	Noise Figure, V <sub>AGC</sub> = 3 V	dB		13.5	
G <sub>INPUT</sub>	Input Amp Gain, V <sub>AGC</sub> = 3 V	dB		44	
G <sub>VIDEO</sub>	Video Amp Gain, V <sub>AGC</sub> = 3 V	dB		55	
<b>DC Performance</b>					
V <sub>DD</sub>	Supply Voltage	V		3.3	
I <sub>DD</sub>	Supply Current	mA		100	

\* Includes saw filter loss.

#### ABSOLUTE MAXIMUM RATINGS

(T<sub>c</sub> = 25°C unless otherwise noted)

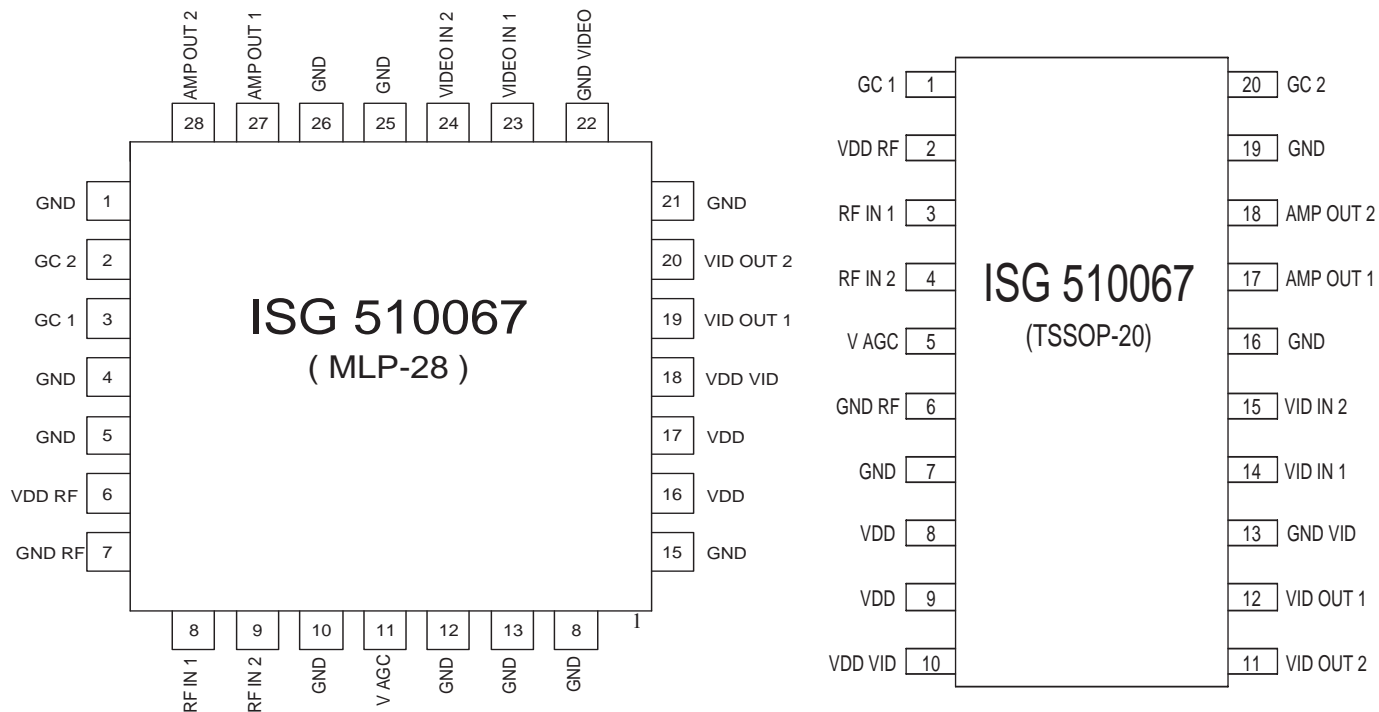
SYMBOLS	PARAMETERS	UNITS	RATINGS
V <sub>DD</sub> (GND)	Supply Voltage (GND)	V	-0.3 to +3.6
T <sub>OP</sub>	Operating Temperature	°C	-40 to +85
T <sub>STG</sub>	Storage Temperature	°C	-65 to +150
	Junction Temperature	°C	+150
	Thermal Resistance (θ <sub>ja</sub> )	°C/W	34

Note:

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



## PIN ASSIGNMENTS

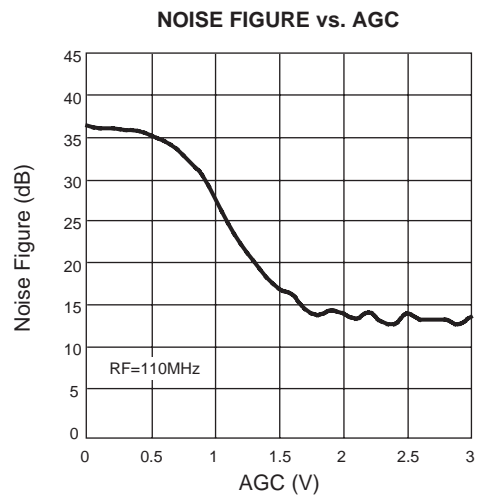
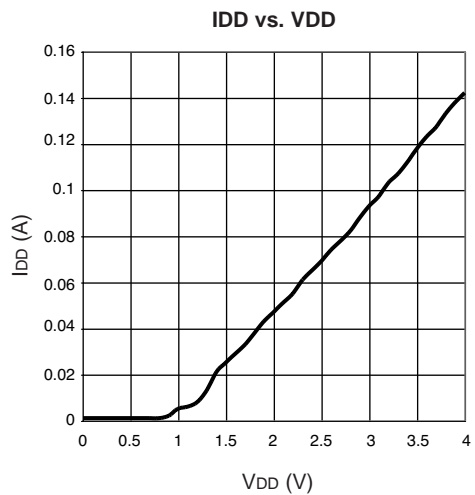
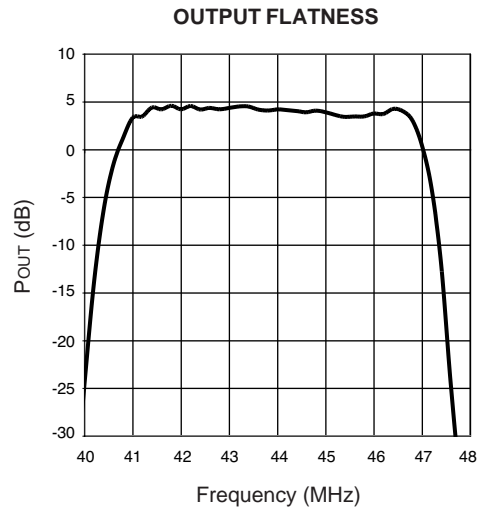
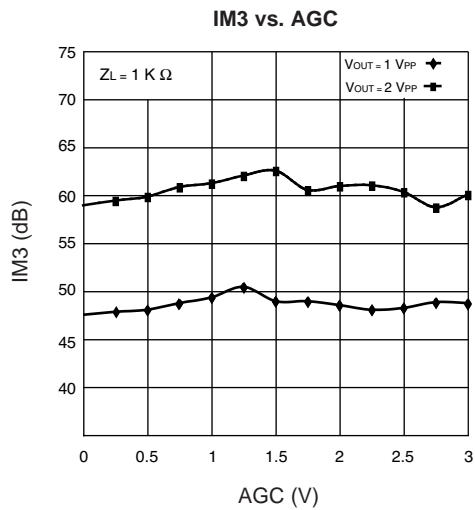
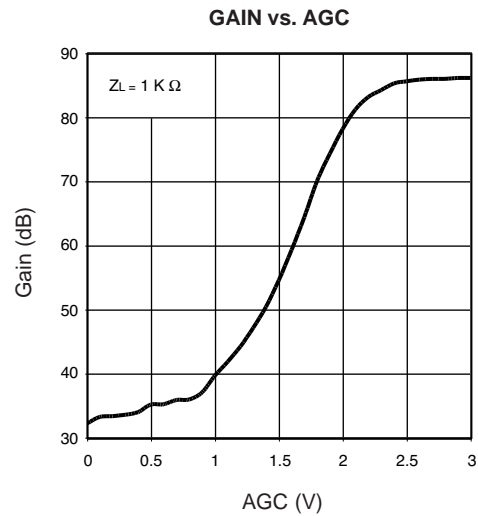
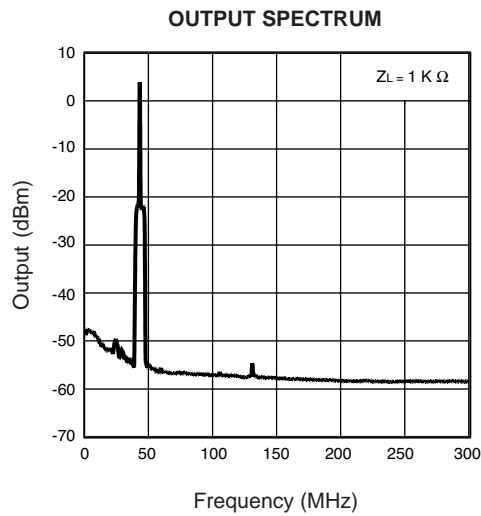


## PIN FUNCTIONS

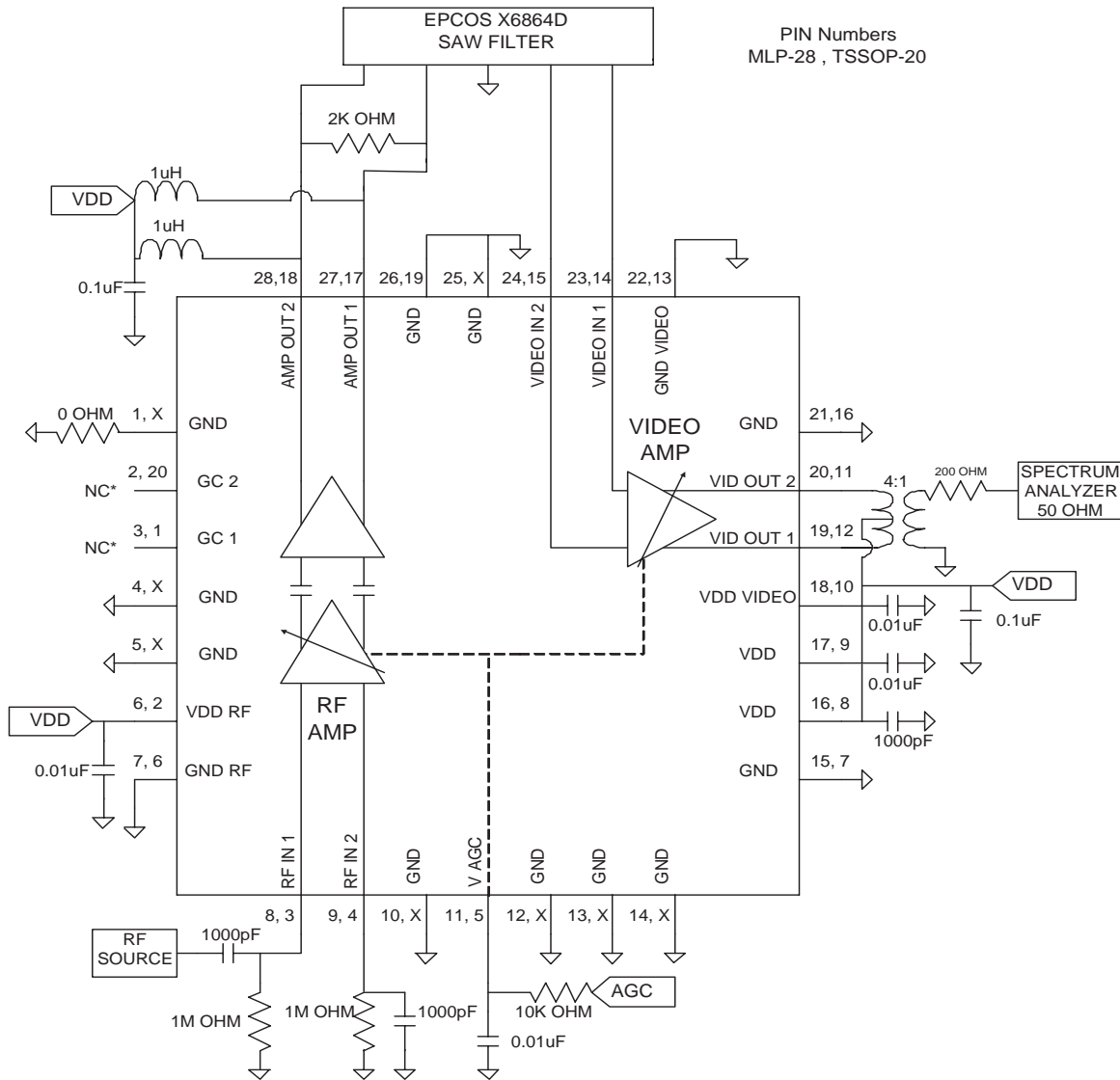
### TSSOP-20 MLP-28

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	GC1	Optional Gain control
1	3	GC2	Optional Gain control
2	6	VDD RF	INPUT AMP Supply, +3.3 V.
6	7	GND RF	INPUT AMP Ground. See GND.
3	8	RF IN1	INPUT AMP Positive Input. Input Impedance 150 ohms.
4	9	RF IN2	INPUT AMP Negative Input. Input Impedance 150 ohms.
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



## TYPICAL APPLICATION CIRCUIT



### Input Amplifier

This amplifier provides a maximum gain of 44 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.

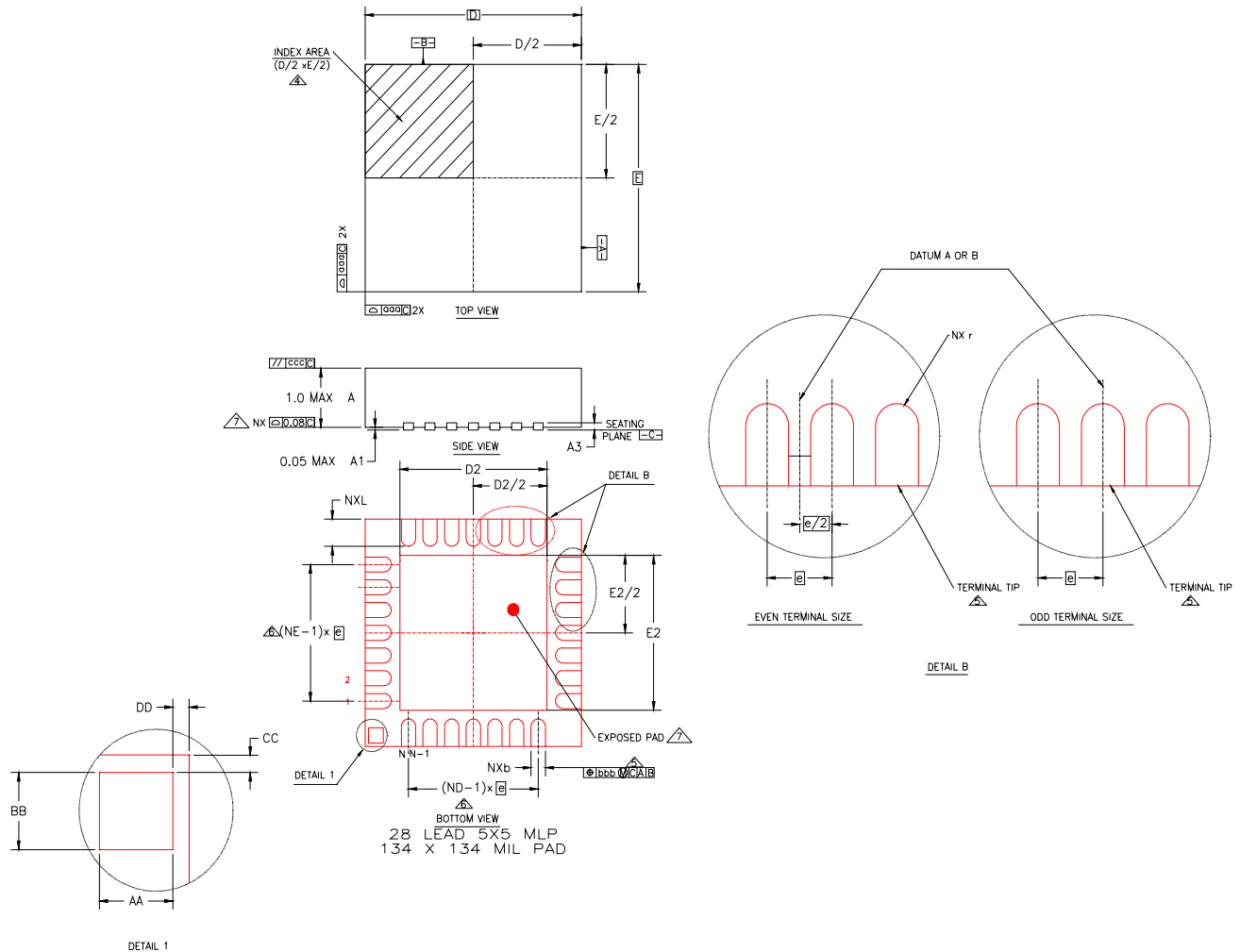
### Video Amplifier

This amplifier provides a maximum gain of 55 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 VDD. Up to 2 V<sub>PP</sub> can be delivered into a 500  $\Omega$  load.

#### Note:

- 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.
- Inserting a resistor between GC1 and GC2 will reduce overall gain of the RF Amp stage. (A 300  $\Omega$  resistor will reduce gain by approximately 10 dB.)

## PACKAGE INFORMATION MLP-28 (Units in mm)



PLEASE REFER TO DIMENSION TABLE FOR PIN # 1 DIMENSION.

1. Dimensions and tolerances conform to ASME Y14.5-1994.
2. All dimensions are in millimeters. All angles are in degrees.
3.  $N$  is the total number of terminals.
4. The terminal numbering convention shall conform to JESD 95-1, SPP-012. The terminal #1 identifier may be either a mold or marked feature.
5. Dimension  $b$  applies to metallized terminal and is measured between 0.25 and 0.3 mm from terminal tip.
6.  $ND$  and  $NE$  refer to the number of terminals on each  $D$  and  $E$  side respectively.
7. Co-planarity applies to the exposed heatsink slug as well as the terminals.

## PACKAGE INFORMATION MLP-28 (CONT)

### COMMON DIMENSIONS

SYMBOLS	MIN	NOM	MAX
A1	0	0.02	0.05
A3		0.20 REF	
r	b/2		
TOLERANCES OF FORM AND POSITION			
aaa		0.25	
bbb		0.1	
ccc		0.1	

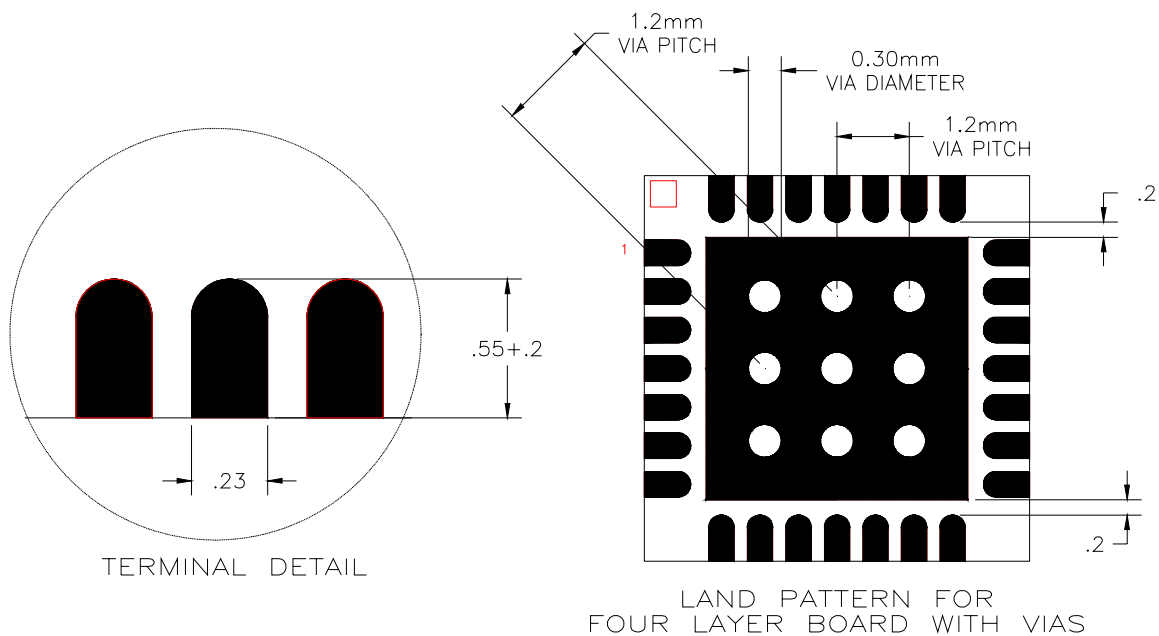
### SUMMARY TABLE & PIN #1 DIMENSIONS

BODY SIZE (MM)(MM)	PITCH COUNT	LEAD	AA	BB	CC	DD
5.00x5.00	0.50	28	0.435	0.435	0.18	0.18

### VARIATIONS

SYMBOLS	MIN	NOM	MAX	NOTE
A	0.80	0.90	1.00	
b	0.18	0.23	0.30	5
D	5.00 BSC			
D2	3.00	3.15	3.25	
E	5.00 BSC			
E2	3.00	3.15	3.25	
e	0.50 BSC			
L	0.45	0.55	0.65	
N	28			3
ND		7		6
NE		7		6
NOTE	1,2,4			

### LAND PATTERN FOR TERMINALS AND THERMAL PAD



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DATA SUBJECT TO CHANGE WITHOUT NOTICE

