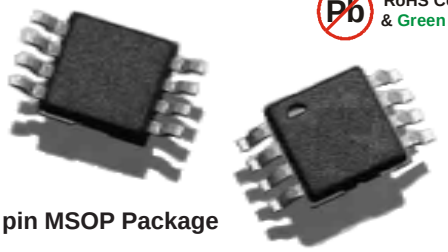
Preliminary

S510069-28Z

AGC Amplifier

RoHS Compliant & Green Package

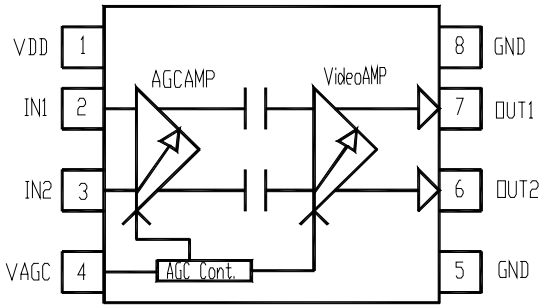


8 pin MSOP Package

Product Description

Sirenza Microdevice's S510069-28Z is a Variable Gain Amplifier (VGA), designed for use in Digital and Analog RF tuners and linear applications requiring IF signal amplification and control before the A/D converter. This IC consists of two amplifier stages that are AC coupled. Gain control is delayed between the two stages for minimal noise figure impact over the first 30 dB of gain control while maintaining excellent linearity performance. This product is RoHS compliant.

Functional Block Diagram



Product Features

- Low Distortion: IM3<-60 dBc@ 1 V_{PP} Output
- 55 dB Gain Control Range (12 dB to 69 dB Gain)
- Low Power Consumption (275 mW)
- 3.3 V Single Supply Operation

Applications

- Digital & Analog TV Tuners
- Digital TV, CATV and DBS Set-Top Receivers
- PCTV
- Video Cards

Electrical Specifications (T_A=25°C, V_{DD}=3.3V, unless otherwise specified)

Symbol	Parameters	Unit	Typical App Ckt.			Optional App Ckt.		
			Min.	Typ.	Max.	Min.	Typ.	Max.
RFIN	RF Input Frequency Range	MHz	30		100	30		100
GMAX	Maximum Gain, RF=44MHz, VAGC=3.0V	dB	66	69	70		62	
GMIN	Minimum Gain, RF=44MHz, VAGC=0.0V	dB	11		13		5	
VAGC	AGC Voltage	V	0.0		3.0	0.0		3.0
AGC	AGC Dynamic Range, AGC =0.0V to 3.0 V	dB	55	57			57	
IM3	1 Vpp out, 1K Load over 50 dB range	dBC	60	63		55		
V out	IF Output Level, Differential Output, 1Kohm load	Vpp		1.0			1.0	
NF	Noise Figure, VAGC = 3.0 V	dB			16.0			16.0
Z_{IN}	Input Impedance (Single Ended)	Ohms		500			500	
Z_{OUT}	Output Impedance (Open Drain)	Ohms		1K			1K	
V_{DD}	Supply Voltage	V	3.1	3.3	3.5	3.1	3.3	3.5
I_{DD}	Supply Current	mA	62	78	82	62	78	82
R_{TH}	Thermal Resistance	°C/W		207			207	

Pin Out Descriptions

Pin #	Function	Description
1	V_{DD}	RF Supply +3.3V
2	IN1	RF AMP positive input.
3	IN2	RF AMP negative input.
4	VAGC	Automatic Gain Control, Min Gain @ AGC = 0 V, Max Gain @ AGC = 3.0 V.
5, 8	GND	Ground pins. Connect to the ground plane with shortest possible length to minimize inductance.
6	OUT2	AMP negative output
7	OUT1	AMP positive output.

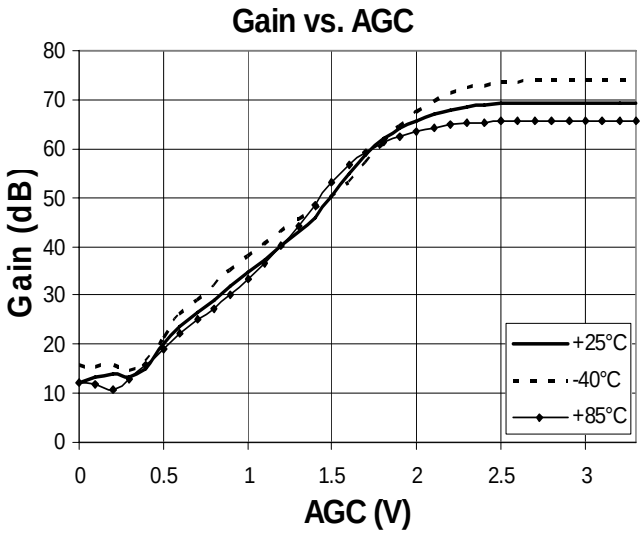
Absolute Maximum Ratings

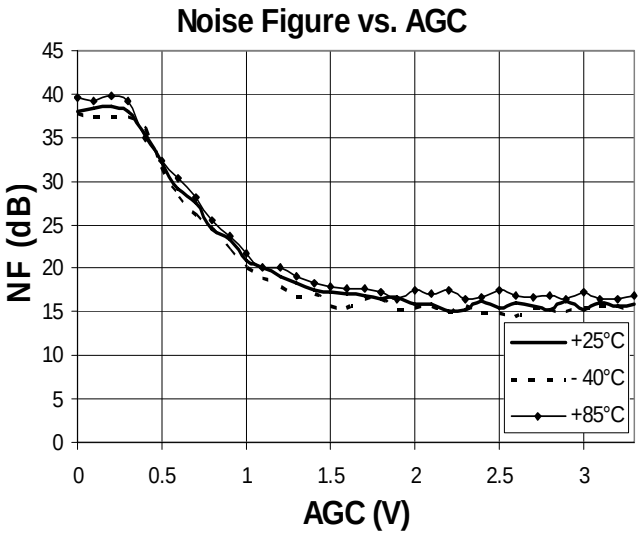
Parameters	Value	Unit
Supply Voltage (V_{DD})	-0.3 to +3.6	°C
Operating Temperature (T_{OP})	-40 to +85	°C
Storage Temperature (T_{STG})	-65 to +150	°C
Junction Temperature (T_J)	+150	°C
ESD Rating-Human Body Model (Class 2)	2000	V

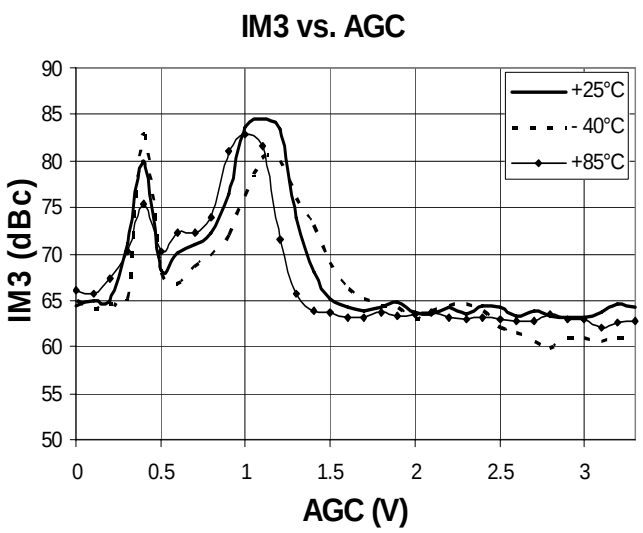
Operation in excess of any of these parameters may result in permanent damage.

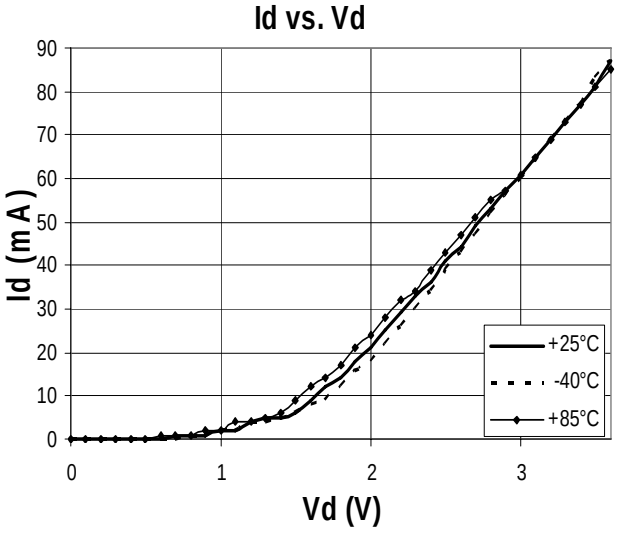
Caution: ESD Sensitive
Appropriate precaution in handling, packaging and testing devices must be observed.

Typical Application Circuit

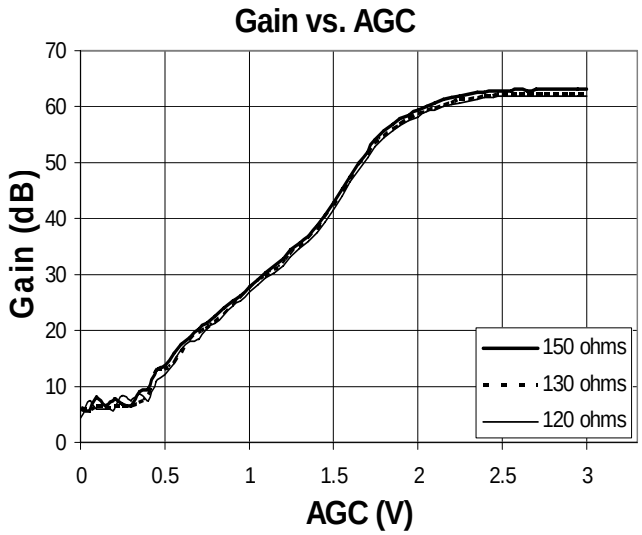


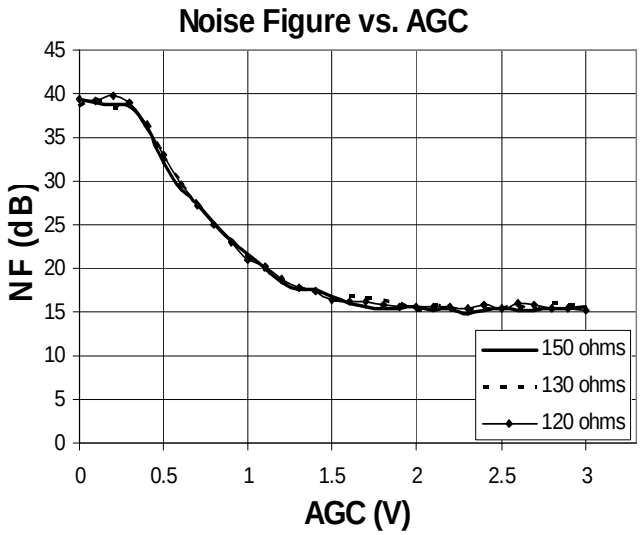


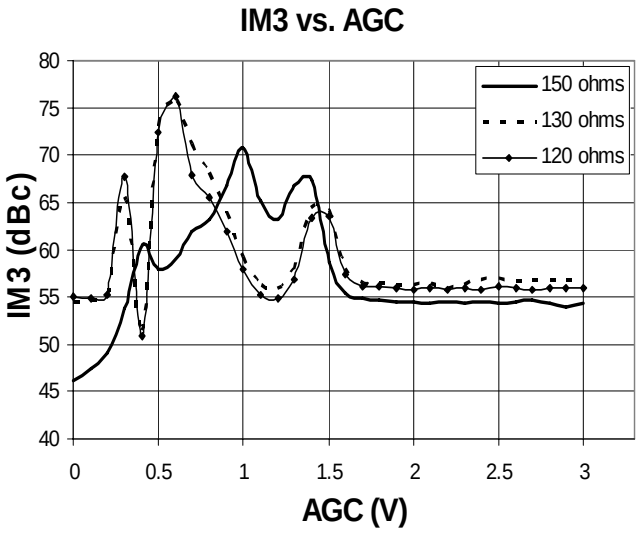




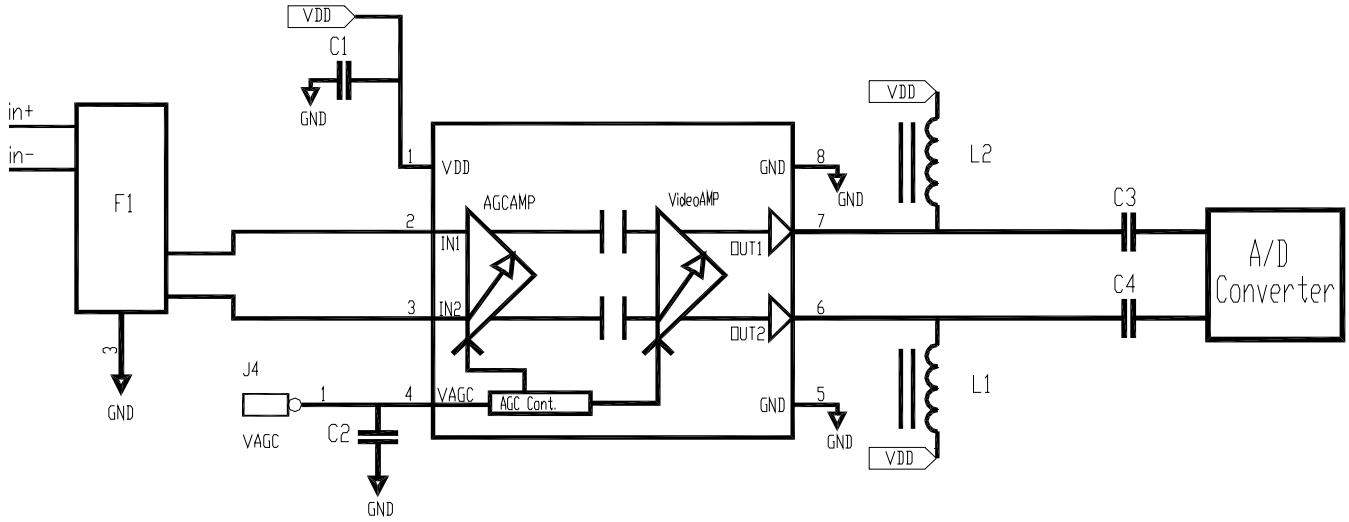
Optional Application Circuit (Resistive pull-ups at output)





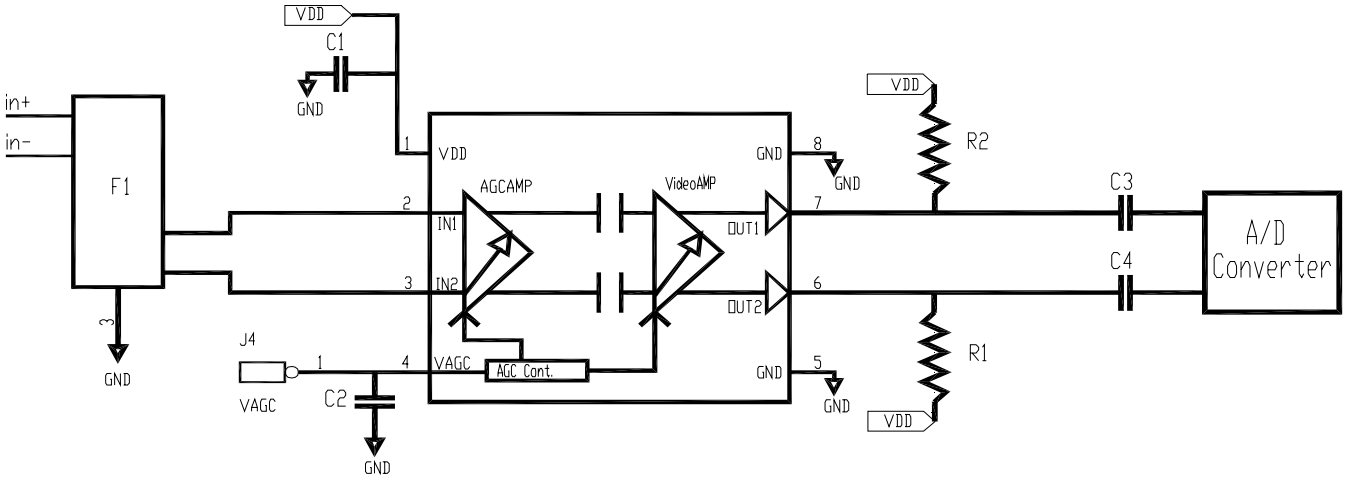


Typical Application Circuit



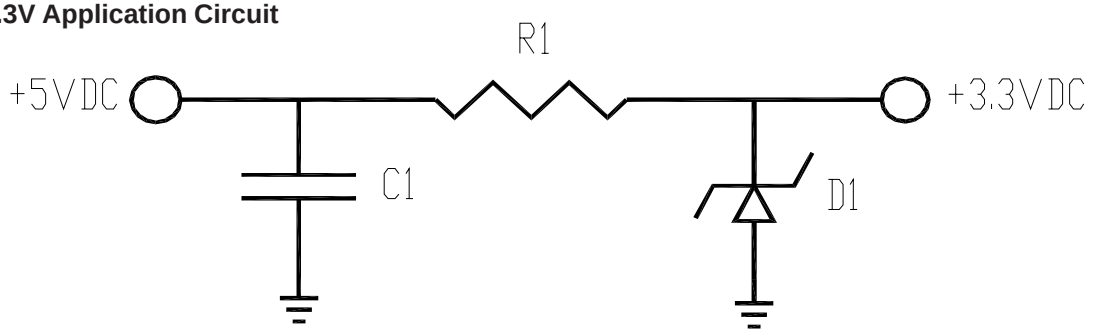
Component	Description	Value	Manufacturer	P/N
C1, C2, C3, C4	Capacitor	0.01uF	Samsung	CL05B103KBNC
L1, L2	Ferrite Bead	600Ohm/100mA	Steward	HZ0402A601R-00
F1	SAW Filter	44MHz	Epcos	X6959

Optional Application Circuit



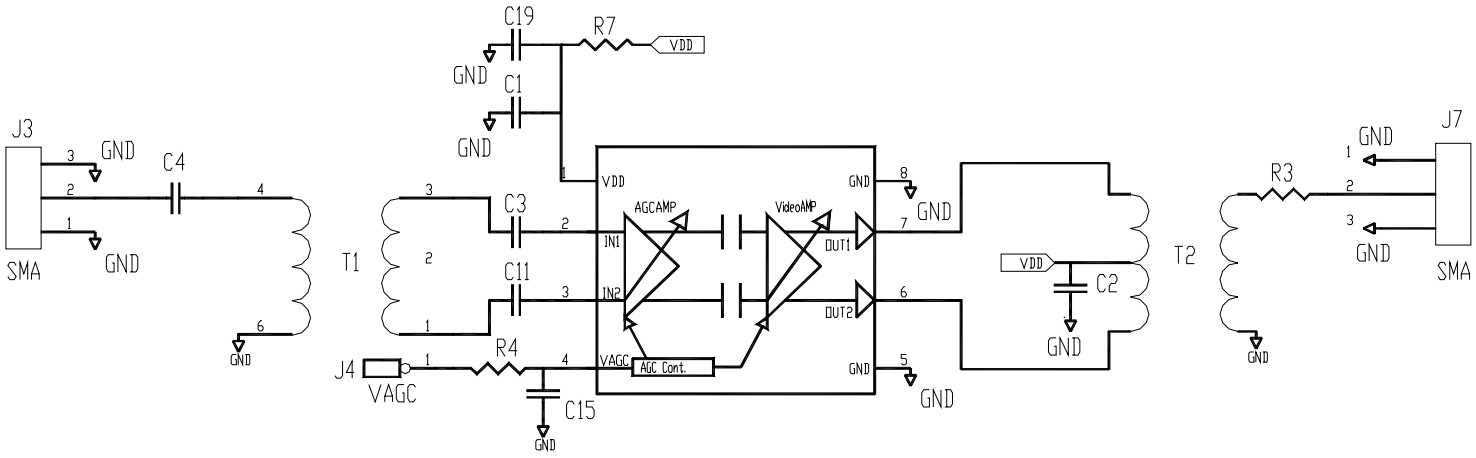
Component	Description	Value	Manufacturer	P/N
C1, C2, C3, C4	Capacitor	0.01uF	Samsung	CL05B103KBNC
R1, R2	Resistor	120 Ohms	KOA	RK73B1ETTP121J
F1	SAW Filter	44MHz	Epcos	X6959

5.0V to 3.3V Application Circuit



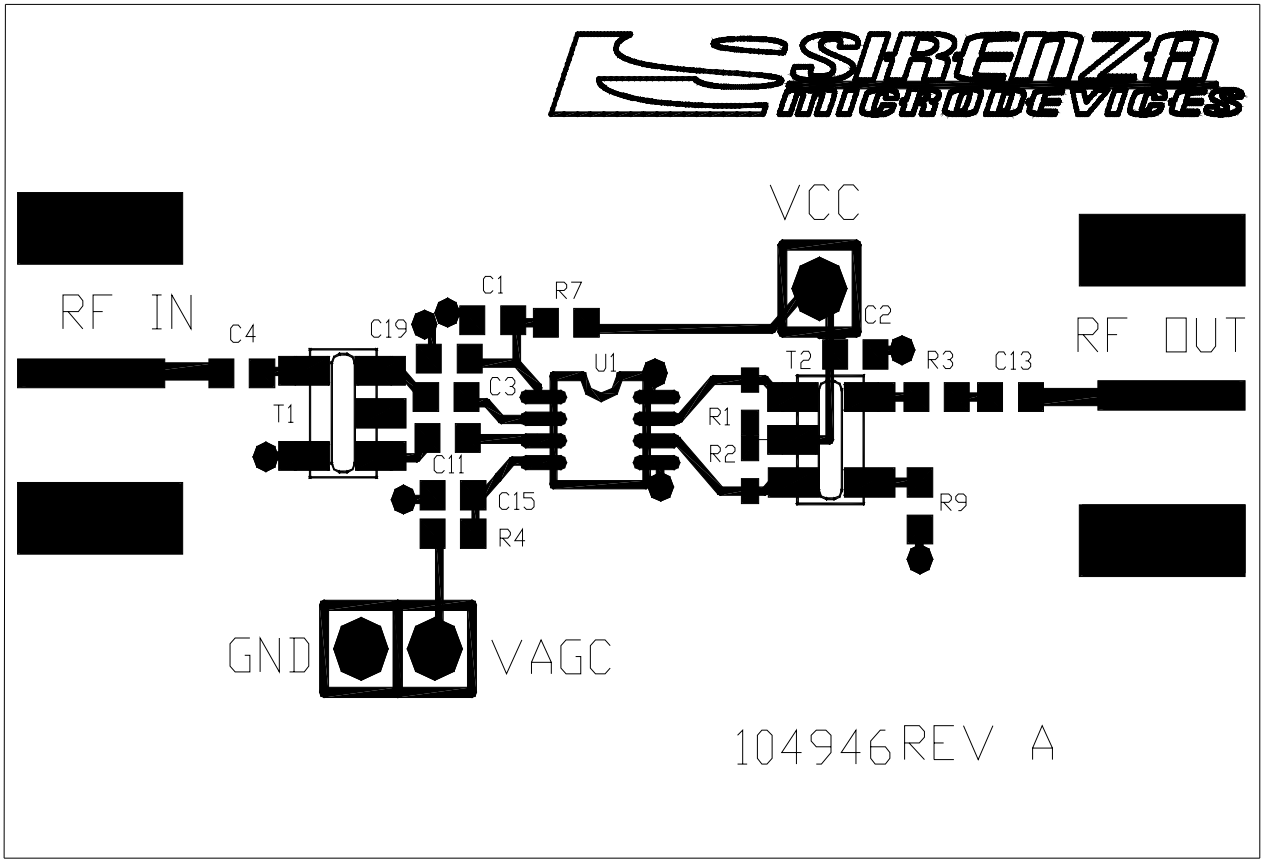
Component	Description	Value	Manufacturer	P/N
C1	Capacitor	0.1 uF	Panasonic	ECJ-1VB1C104K
R1	Resistor	18 Ohms	KOA	RK73B2BTTP180J
D1	Voltage Regulator Diode	3 Volt	Phillips	BZX79-B3V0
D1- Alt	Voltage Regulator Diode	3 Volt	Vishay	BZX55B3V0

Evaluation Board Schematic



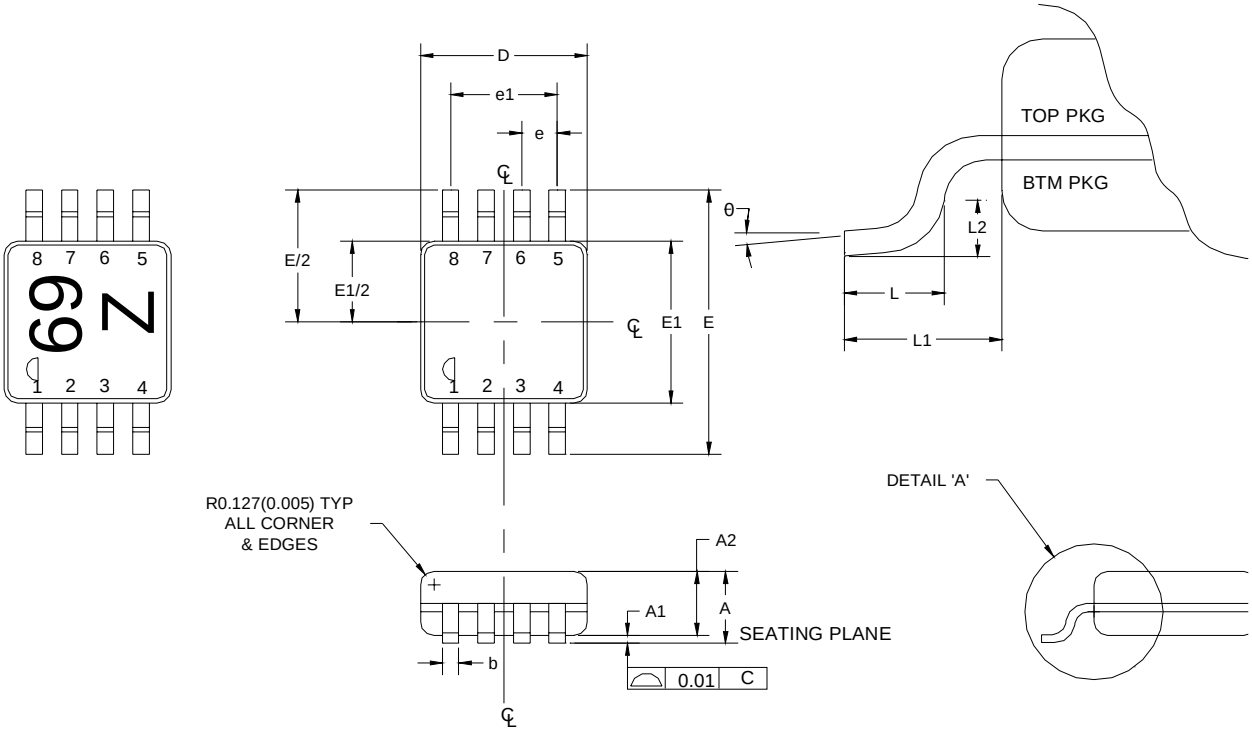
Component	Description	Value	Manufacturer	P/N
C1, C2, C3, C4, C11, C13, C15	Capacitor	0.01uF	Samsung	CL05B103KBNC
C19	Capacitor	100pF	Samsung	CL10C101JBNC
R7	Resistor	0 Ohms	Rohm	MCR01MZSJ000
R3	Resistor	200 Ohms	Samsung	RC1608J201CS
R4	Resistor	1K Ohms	Samsung	RC1608J102CS
F1	SAW Filter	44MHz	Epcos	X6959
T1, T2	Transformer	4 to 1	Mini Circuits	TC4-1T

Evaluation Board Layout



Package Dimensions and Marking (Units in mm)

Package Type: MSOP8



SYMBOL	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	-	-	1.066	-	-	0.042
A1	0.050	0.10	0.150	0.002	0.004	0.006
A2	0.813	0.863	0.914	0.032	0.034	0.036
b	0.28	-	0.38	0.011	-	0.015
b1	0.280	0.30	0.33	0.011	0.012	0.013
c	0.139	-	0.23	0.0055	-	0.009
c1	0.139	0.152	0.165	0.0055	0.006	0.0065
D	2.90	3.00	3.10	0.114	0.118	0.122
E	4.775	4.876	4.978	0.188	0.192	0.196
E1	2.90	3.00	3.10	0.114	0.118	0.122
e	0.65 TYP			0.0255 TYP		
e1	1.95 TYP			0.0767 TYP		
L	0.406	0.56	0.686	0.016	0.022	0.027
L1	0.94 REF			0.037 REF		
L2	0.254 TYP			0.010 TYP		
θ	0°	-	8°	0°	-	8°

NOTES:

1. CONTROLLING DIMENSION : MILLIMETER CONVERTED INCH DIMENSION ARE NOT NECESSARILY EXACT.
2. DIMENSIONING AND TOLERANCES PER ANSI Y14.5M-1994.
3. DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSION OR GATE BURR, MOLD FLASH, PROTRUSION AND GATE BURR SHALL NOT EXCEED 0.15MM (0.006") PER SIDE. DIMENSION E1 DO NOT INCLUDE INTER-LEAD FLASH OR PROTRUSION, INTER-LEAD AND PROTRUSION SHALL NOT EXCEED 0.15MM (0.006") PER SIDE.
4. THE PACKAGE TOP BE SMALLER THAN THE PACKAGE BOTTOM. DIMENSION D AND E1 ARE DETERMINED AT THE OUTERMOST TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND THE BOTTOM OF THE PLASTIC BODY.
5. DIMENSION "b" DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBER PROTRUSION SHALL BE 0.08 MM (0.0031) TOTAL IN EXCESS OF THE "b" DIMENSION AT MAXIMUM MATERIAL CONDITION.