



AWT921

Integrated High Power Amp 900 MHz
PRELIMINARY DATA SHEET - Rev 1.2

FEATURES

- High output power levels
- High Efficiency
- True Surface Mount Package with Integrated Heat Slug
- Internal Bias Circuit Requiring Nominal Input Voltages $\pm 10\%$
- Low Cost
- Off Chip Output Matching Circuit Allows Application Optimization



S11
SSOP-28
28 Pin Wide Body w/ Heat Slug

PRODUCT DESCRIPTION

The AWT921 is a monolithic amplifier for use in communication systems that require high gain and output intercept point. This device has been

specifically designed for multi carrier and micro cell base station applications.

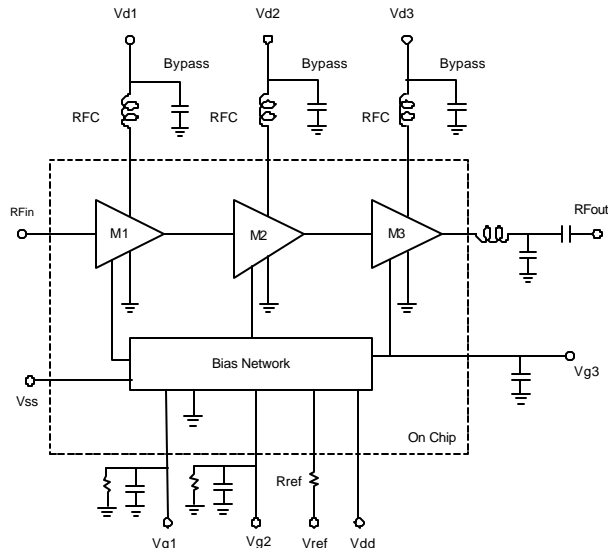


Figure 1: Block Diagram

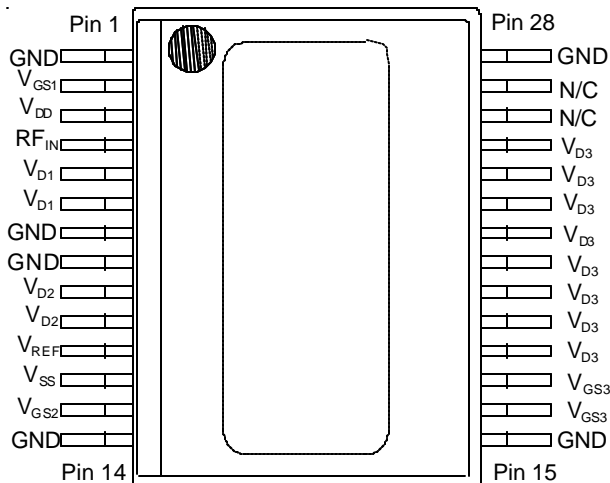


Figure 1: Pin Layout

Table 1: Pin Description

PIN	NAME	DESCRIPTION
1,14,15,28, slug	GND	AC and RF Ground
2	V_{GS1}	First Stage Gate terminal
3	V_{DD}	Positive Supply of Bias Circuit (+5V)
4	RF_{IN}	RF Input
5,6	V_{D1}	First Stage drain supply
7,8	GND	First Stage Source ground
9,10	V_{D2}	Second Stage drain supply
11	V_{REF}	Bias control Pin
12	V_{SS}	Negative Supply for Bias Circuit (-3V)
13	V_{GS2}	Second Stage Gate terminal
16,17	V_{GS3}	Third Stage Gate terminal
18-25	V_{D3}	Third Stage drain supply & RF out
26,27	N/C	Not Connected

Procedure for Amplifier Operation and Test

- 1) Slug must be thermally and electrically connected to obtain rated performance.
- 2) The V_{SS} Voltage should be applied first to the amplifier prior to V_{DD} , V_{REF} or V_{GS} voltages.
- 3) The Bias Pins V_{DD} and V_{REF} may be applied with no V_{SS} voltage present.
- 4) Always follow ESD precautions when handling these devices.

ELECTRICAL CHARACTERISTICS**Table 2: Electrical Specifications:**⁽¹⁾(Pin +12 dBm, fo = 925-960 MHz, V_{DS1} = V_{DS2} = V_{DS3} = 8.5V, V_{SS} = -3V, V_{REF} = +5V, V_{DD} = +5V, Tc = 25°C, 50Ω System⁽²⁾)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Frequency	fo	925	-	960	MHz
Power Output	P _{OUT}	-	+39	-	dBm
Power Added Efficiency	η _{EFF}	-	40	-	%
Gain @ P _{OUT} = +37.5 dBm	PG	26	28	-	dB
Harmonics @ 37.5 dBm P _{OUT} 2nd 3rd			30 35		dBc
Stability: -60 dBc all spurious outputs relative to desired signal	-	-	3:1	-	VSWR load, all phase angles,
Bias Supply Currents	I _{SS} I _{REF} I _{DD}	-	8 1.2 8	-	mA mA mA
Quiescent Currents	I _{DQ1} I _{DQ2} I _{DQ3}		100 250 200		
Input Return Loss	-	-	12	-	dB
Gain Flatness vs. Frequency @ P _{OUT} = +37.5 dBm @ P _{OUT} = +30 dBm	Δ PG	-	±0.5 ±0.5	-	dB dB
Thermal Resistance ³			4.5		C/W

Notes:

- As measured in ANADIGICS test fixture, see application section
- 50W Measurement system after off chip matching circuit, input terminated in 50W
- Thermal resistance for junction to bottom of slug. $Q_{jc} = (T_j - T_c) / ((I_{D1} + I_{D2} + I_{D3}) * V_{SUP} - P_{OUT})$

Table 3: Absolute Maximum Ratings

PIN	NAME	MAX RATING	PIN	NAME	MAX RATING
2	V _{DD}	+7V _{DC}	11	V _{REF}	+7 V _{DC}
3	RF _{IN}	+20 dBm	12	V _{SS}	-7 V _{DC}
4,5	V _{D1}	+10 V _{DC}	18,19,20,21,22,-23,24,25	V _{D3}	+10 V _{DC}
8,9	V _{D2}	+10 V _{DC}			

Stresses in excess of the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability.

Operating Temperature: -30 to + 85° C

Storage Temperature: -55 to + 100° C

PERFORMANCE DATA

Conditions unless otherwise stated (Pin +12 dBm, fo = 925-960 MHz, V_{DS1} = V_{DS2} = V_{DS3} = 8.5V, V_{SS} = -3V, V_{REF} = +5V, V_{DD} = + 5 V, Tc=25°C, 50 W system ⁽²⁾)

Figure 2: P_{OUT} & Eff vs. Pin

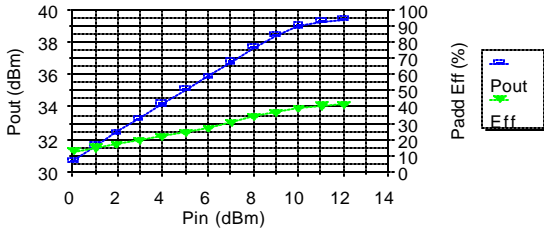


Figure 3: P_{OUT} & Eff vs. Frequency

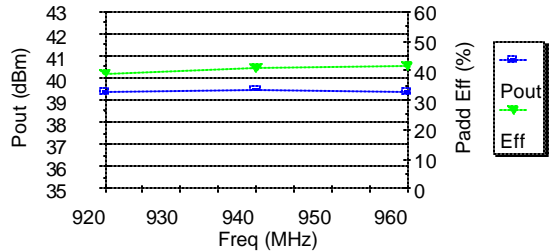


Figure 4: P_{OUT} vs. Supply Voltage

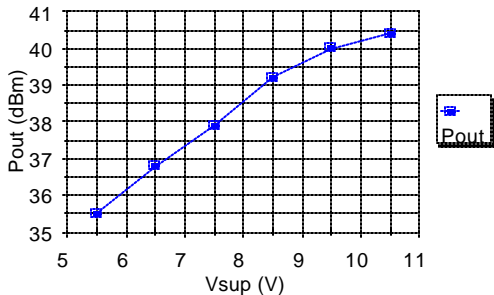
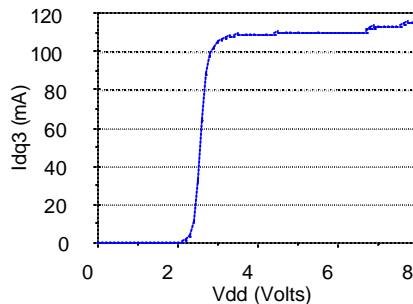


Figure 5: Idq3 vs. V_{dd}



Notes:

1: As measured in ANADIGICS test fixture, see application section

2: 50 W Measurement system after off chip matching circuit, input terminated in 50 W

Figure 6: I_{dq3} vs. V_{ref}

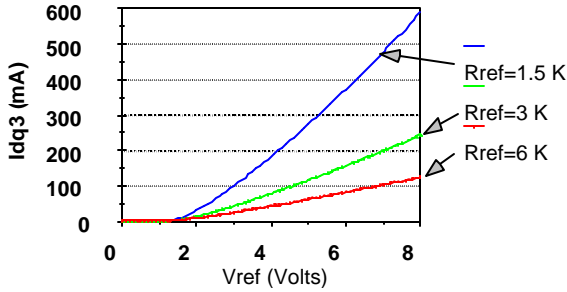


Figure 7: I_{dq3} vs. V_{ss}

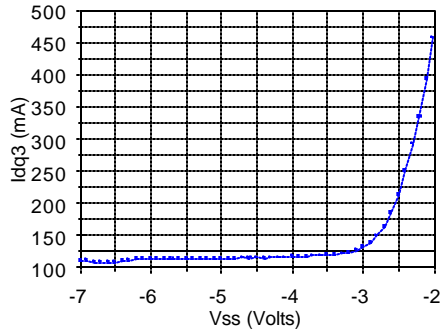


Figure 8: Bias Ckt Gain vs. V_{ref}

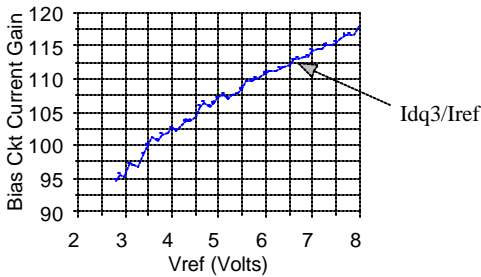


Figure 9: I_{q3} & I_{ref} vs. Temperature

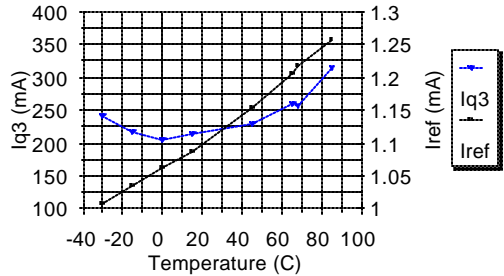


Figure 10: P_{out} & Eff vs. Temperature

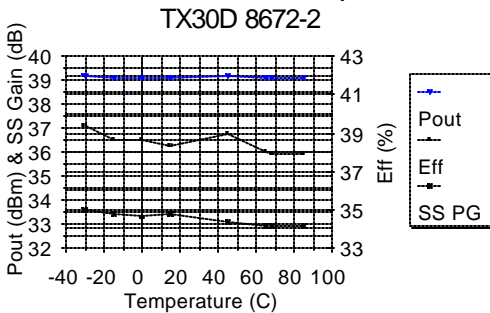


Figure 11: S22 Reverse Reflection Impedance

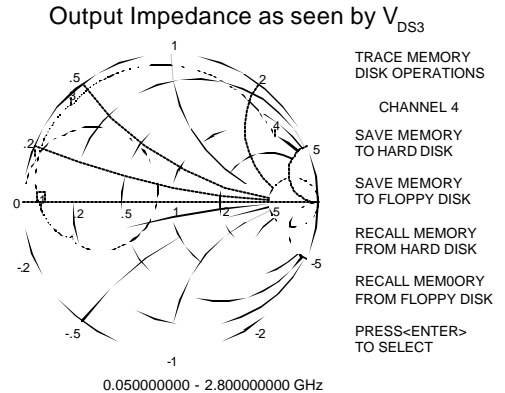


Figure 12: S11 Reverse Reflection Impedance

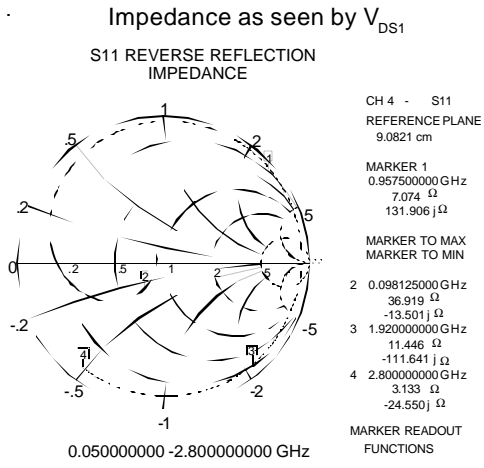


Figure 13: S11 Reverse Reflection Impedance

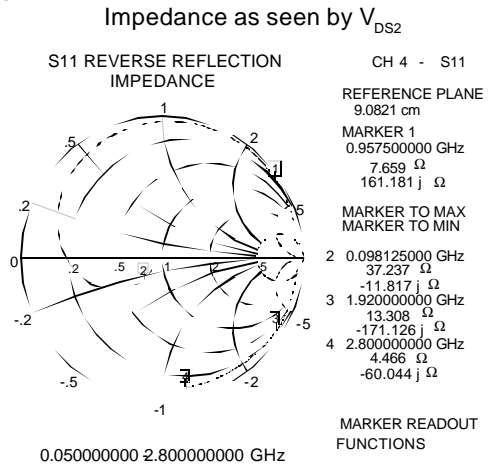


Figure 14: 925 - 960 MHz Test Circuit Schematic

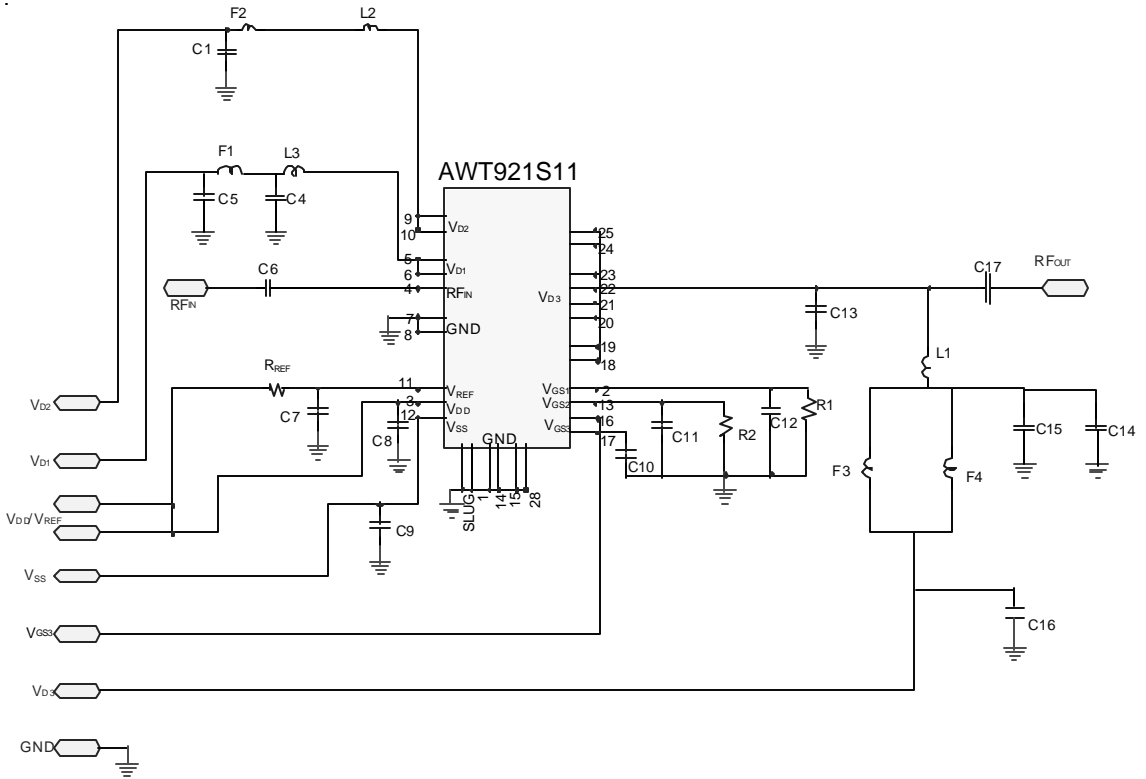


Table 4: Pin Designations

DESIGNATION	VALUE
R1	7500Ω
R2	2.2 KΩ
R _{REF}	1.8 KΩ
C1, C5, C16	2.2 μF
C4, C15, C19	33 pF
C6, C17	47 pF
C7, C8, C9, C12	0.01 μF
C10, C11	2700 pF
C13	11 pF
C14	4700 pF
L1	8 nH Colicraft, A03T
L2	12 nH
L3	6 nH
F1, F2, F3, F4,	Ferrite 47Ω @100 MHz, 1A Rating Taiyo Yuden, BK2125HS470

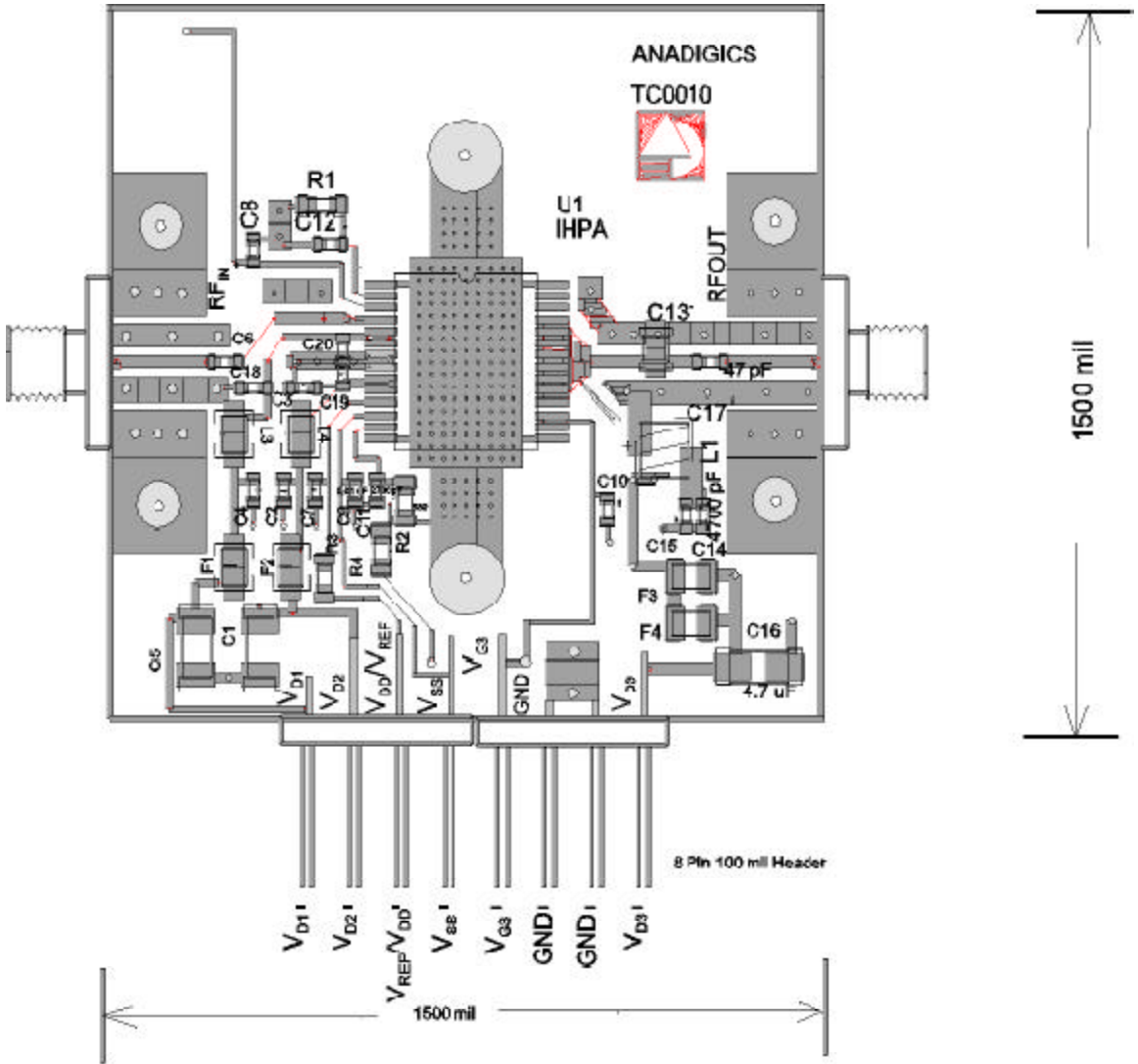


Figure 15: Test Circuit Top Layer Pattern

Notes: Board material -6 layer FR4

- 1) 1 oz. Copper
- 2) 14 mil core layers
- 3) Gerber Files available

Table 5: 925 - 960 MHz GSM Test Circuit Component Listing

DESIGNATION	VALUE	MANUFACTURE	MANUFACTURE PART #	WEB ADDRESS	PHONE CONTACT #
R1	7500	Panasonic	ERJ-36SYJ752V	www.panasonic.com	201-348-5232
R2	2.2 K	Panasonic	ERJ-36SYJ222V	www.panasonic.com	201-348-5232
RREF	1.8 K	Panasonic	ERJ-36SYJ182V	www.panasonic.com	201-348-5232
C1,C5,C16	2.2 uF	Panasonic	ECS-H1AY225R	www.panasonic.com	201-348-5232
C4,C15,C19	33 pF	Murata	GRM36COG330J50	www.murata.com	1-800-237-1431
C6,C17	47 pF	Murata	GRM36COG470J50	www.murata.com	1-800-237-1431
C7,C8,C9,C12	0.01 uF	Murata	GRM36X7R103K16	www.murata.com	1-800-237-1431
C10,C11	2700 pF	Murata	GRM36X7R272K50	www.murata.com	1-800-237-1431
C13	11 pF	American Technical Ceramics	ATC100A110JW150X	www.atc-cap.com	(516) 547-5700
C14	4700 pF	Murata	GRM36X7R472K25	www.murata.com	1-800-237-1431
L1	8 nH	Coilcraft	A03T	www.coilcraft.com	1-800-322-2645
L2	12 nH	Coilcraft	0805CS060XMBC	www.coilcraft.com	1-800-322-2645
L3	6.8 nH	Coilcraft	0805CS120XMBC	www.coilcraft.com	1-800-322-2645
F1,F2,F3,F4	Ferrite 47 @ 100 MHz, 1A Rating	Taiyo Yuden	BK2125HS470	www.t-yuden.com	800-348-2496

PACKAGE OUTLINE

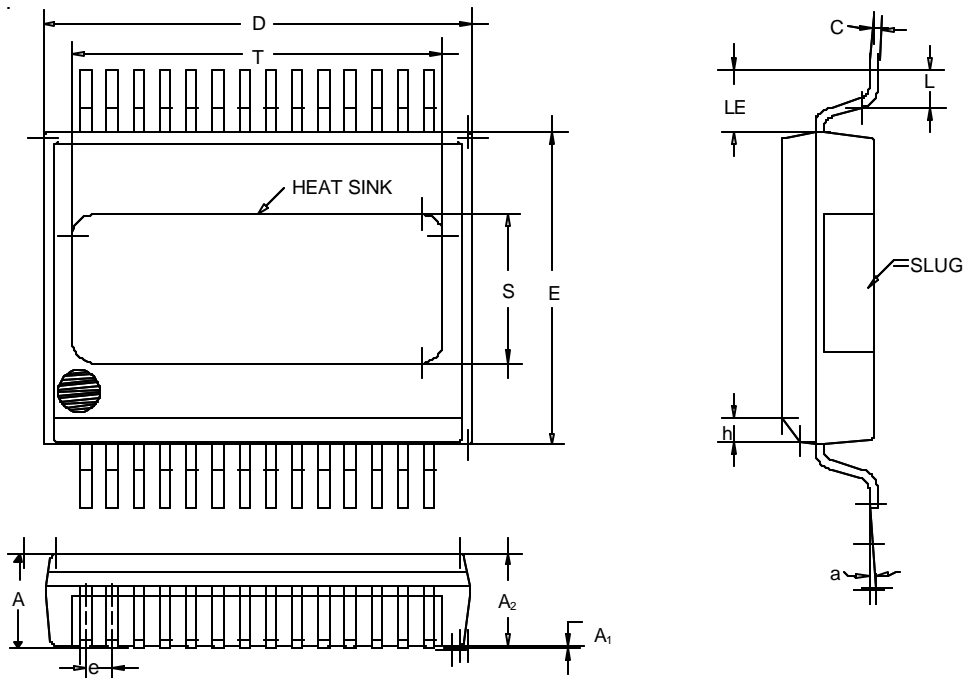


Figure 16: Package Outline Drawing

SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.087	0.093	2.21	2.36
A1	0.000	0.004	0.00	0.10
A2	0.087	0.089	2.21	2.25
B	0.008	0.012	0.36	0.46
C	0.007	0.009	0.18	0.25
D	0.400	0.408	10.16	10.36
E	0.292	0.296	7.42	7.52
e	0.025	BSC	0.64	BSC
H	0.410	0.418	10.41	40.62
h	0.018	0.024	0.48	0.61
L	0.034	0.038	0.86	0.97
LE	0.84		1.37	
a	0	8	0	8
S	0.139	0.141	3.54	3.55
T	0.349	0.351	8.86	8.92

Notes:

1. Controlling dimensions : inches.
2. Dimension "d" does not include mold flash, protrusions or gate burrs. Mold flash, protrusions and gate burrs shall not exceed 0.006 (0.16mm).
3. Dimension "e" does not include inter-lead or protrusions. Inter-lead flash and protrusions shall not exceed 0.010 (0.25mm) per side.
4. Maximum lead twist/skew to be 0.002 (0.05mm).
5. Mold flash shall not extend more than 0.010 (0.25mm) on any edge of heat slug.

NOTES

AWT921

ORDERING INFORMATION

ORDER NUMBER	PACKAGE DESCRIPTION	COMPONENT PACKAGING
AWT921S11	S11	28 Pin Body with Heat Slug



ANADIGICS, Inc.

141 Mount Bethel Road
Warren, New Jersey 07059, U.S.A.
Tel: +1 (908) 668-5000
Fax: +1 (908) 668-5132

URL: <http://www.anadigics.com>
E-mail: Mktg@anadigics.com

IMPORTANT NOTICE

ANADIGICS, Inc. reserves the right to make changes to its products or to discontinue any product at any time without notice. The product specifications contained in Advanced Product Information sheets and Preliminary Data Sheets are subject to change prior to a product's formal introduction. Information in Data Sheets have been carefully checked and are assumed to be reliable; however, ANADIGICS assumes no responsibilities for inaccuracies. ANADIGICS strongly urges customers to verify that the information they are using is current before placing orders.

WARNING

ANADIGICS products are not intended for use in life support appliances, devices or systems. Use of an ANADIGICS product in any such application without written consent is prohibited.



SUNSTAR 商斯达实业集团是集研发、生产、工程、销售、代理经销、技术咨询、信息服务等为一体的高科技企业，是专业高科技电子产品生产厂家，是具有 10 多年历史的专业电子元器件供应商，是中国最早和最大的仓储式连锁规模经营大型综合电子零部件代理分销商之一，是一家专业代理和分销世界各大品牌 IC 芯片和电子元器件的连锁经营综合性国际公司，专业经营进口、国产名厂名牌电子元件，型号、种类齐全。在香港、北京、深圳、上海、西安、成都等全国主要电子市场设有直属分公司和产品展示展销窗口门市部专卖店及代理分销商，已在全国范围内建成强大统一的供货和代理分销网络。我们专业代理经销、开发生产电子元器件、集成电路、传感器、微波光电元器件、工控机/DOC/DOM 电子盘、专用电路、单片机开发、MCU/DSP/ARM/FPGA 软件硬件、二极管、三极管、模块等，是您可靠的一站式现货配套供应商、方案提供商、部件功能模块开发配套商。商斯达实业公司拥有庞大的资料库，有数位毕业于著名高校——有中国电子工业摇篮之称的西安电子科技大学（西军电）并长期从事国防尖端科技研究的高级工程师为您精挑细选、量身订做各种高科技电子元器件，并解决各种技术问题。

微波光电部专业代理经销高频、微波、光纤、光电元器件、组件、部件、模块、整机；电磁兼容元器件、材料、设备；微波 CAD、EDA 软件、开发测试仿真工具；微波、光纤仪器仪表。欢迎国外高科技微波、光纤厂商将优秀产品介绍到中国、共同开拓市场。长期大量现货专业批发高频、微波、卫星、光纤、电视、CATV 器件：晶振、VCO、连接器、PIN 开关、变容二极管、开关二极管、低噪晶体管、功率电阻及电容、放大器、功率管、MMIC、混频器、耦合器、功分器、振荡器、合成器、衰减器、滤波器、隔离器、环行器、移相器、调制解调器；光电子器件和组件：红外发射管、红外接收管、光电开关、光敏管、发光二极管和发光二极管组件、半导体激光二极管和激光器组件、光电探测器和光接收组件、光发射接收模块、光纤激光器和光放大器、光调制器、光开关、DWDM 用光发射和接收器件、用户接入系统光收发器件与模块、光纤连接器、光纤跳线/尾纤、光衰减器、光纤适配器、光隔离器、光耦合器、光环行器、光复用器/转换器；无线收发芯片和模组、蓝牙芯片和模组。

更多产品请看本公司产品专用销售网站：

商斯达中国传感器科技信息网：<http://www.sensor-ic.com/>

商斯达工控安防网：<http://www.pc-ps.net/>

商斯达电子元器件网：<http://www.sunstare.com/>

商斯达微波光电产品网：[HTTP://www.rfoe.net/](http://www.rfoe.net/)

商斯达消费电子产品网：<http://www.icasic.com/>

商斯达实业科技产品网：<http://www.sunstars.cn/> 微波元器件销售热线：

地址：深圳市福田区福华路福庆街鸿图大厦 1602 室

电话：0755-82884100 83397033 83396822 83398585

传真：0755-83376182 (0) 13823648918 MSN: SUNS8888@hotmail.com

邮编：518033 E-mail:szss20@163.com QQ: 195847376

深圳赛格展销部：深圳华强北路赛格电子市场 2583 号 电话：0755-83665529 25059422

技术支持：0755-83394033 13501568376

欢迎索取免费详细资料、设计指南和光盘；产品凡多，未能尽录，欢迎来电查询。

北京分公司：北京海淀区知春路 132 号中发电子大厦 3097 号

TEL: 010-81159046 82615020 13501189838 FAX: 010-62543996

上海分公司：上海市北京东路 668 号上海赛格电子市场 D125 号

TEL: 021-28311762 56703037 13701955389 FAX: 021-56703037

西安分公司：西安高新开发区 20 所(中国电子科技集团导航技术研究所)

西安劳动南路 88 号电子商城二楼 D23 号

TEL: 029-81022619 13072977981 FAX:029-88789382