

**Broadband Standard Product**  
**AT0000601-20 GaAs Step Attenuator DC - 6GHz**  
**Single Bit, 0/20dB using MESFET Elements**

February 11, 2009

*Preliminary*

[www.aeroflex.com/bband](http://www.aeroflex.com/bband)



**DESCRIPTION**

The AT0000601-20 is a single bit, 0/20 dB high linearity solid state step attenuator using Agilent Technologies GaAs technology. It provides low insertion loss with very low distortion and is ideal for use in military or space communication systems.

This design incorporates two 10 dB “T” attenuators combined with integral series and shunt MESFET switching elements. It also incorporates a unique diode/resistor bias topology to improve low frequency RF performance and the active MMIC is fabricated with Agilent Technologies GaAs process which provides high reliability and repeatability.

**FEATURES**

- DC to 6GHz Frequency Range
- Single Bit 20dB Attenuation value
- 65dB Third Harmonic Intercept point
- Less than 1μS switching speed
- P1dB > 30dBm @ 3GHz
- Compact Size
- Hermetic Package

**SPECIFICATIONS**

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>**

PARAMETER	SYMBOL	MIN	MAX	UNITS
Control Line Voltages	V <sub>C1,2</sub>	-12	+12	Volts
CW RF Input Power	P <sub>IN(C/W)</sub>	-	30	dBm
Operating Temperature – Case	T <sub>OP</sub>	-55	+125	°C
Storage Temperature – Case	T <sub>ST</sub>	-65	+125	°C

1. Stresses above those listed under "Absolute Maximums Rating" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

*Aeroflex Plainview*

SCD14001 Rev A

## SPECIFICATIONS

### DC ELECTRICAL CHARACTERISTICS

(TA = +25°C)

SYMBOL	PARAMETER/CONDITIONS	MIN	TYP	MAX	UNIT
V <sub>C1,2(+)</sub>	Positive Control Line Voltage	7	10	10.5	Volts
V <sub>C1,2(-)</sub>	Negative Control Line Voltage	-10.5	-10	-7	Volts
I <sub>L(+)</sub>	Positive Control Line Leakage Current	-	-	50	μA
I <sub>L(-)</sub>	Negative Control Line Leakage Current	-	-	50	μA

### RF ELECTRICAL CHARACTERISTICS

(TA = +25°C, Z<sub>0</sub> = 50Ω, V<sub>C1,2</sub> = ±10V)

PARAMETER/CONDITIONS	TYP	MAX	TYP	MAX	UNIT
Guaranteed Operating Bandwidth	DC - 3.0		DC - 6.0		GHz
Minimum Insertion Loss (V <sub>C1</sub> = +10V, V <sub>C2</sub> = -10V)	1.0 <u>1/</u>	-	1.5	-	dB
Attenuation Step (@ -20dB State)	20	-	19.8	-	dB
Return Loss	15	-	12	-	dB
Rise Time Switching Speed (10% - 90% of RF Swing, f <sub>0</sub> = 3GHz)	1	-	1	-	μs
Settling Time (to < 0.005 of Final Value)	2	-	2	-	ms
Second Harmonic Intercept Point (Referred to P <sub>IN</sub> )	95	-	65	-	dBm
Third Harmonic Intercept Point (Referred to P <sub>IN</sub> )	65	-	65	-	dBm
Two-Tone Third Order Intercept Point (For two-tone power levels < +20dBm) (Referred to P <sub>IN</sub> )	56	-	56	-	dBm
Input Power @ 1dB increase in insertion loss:	30 <u>2/</u>	-	30	-	dBm
Maximum Continuous RF Input Power	-	27	-	27	dBm

Notes:

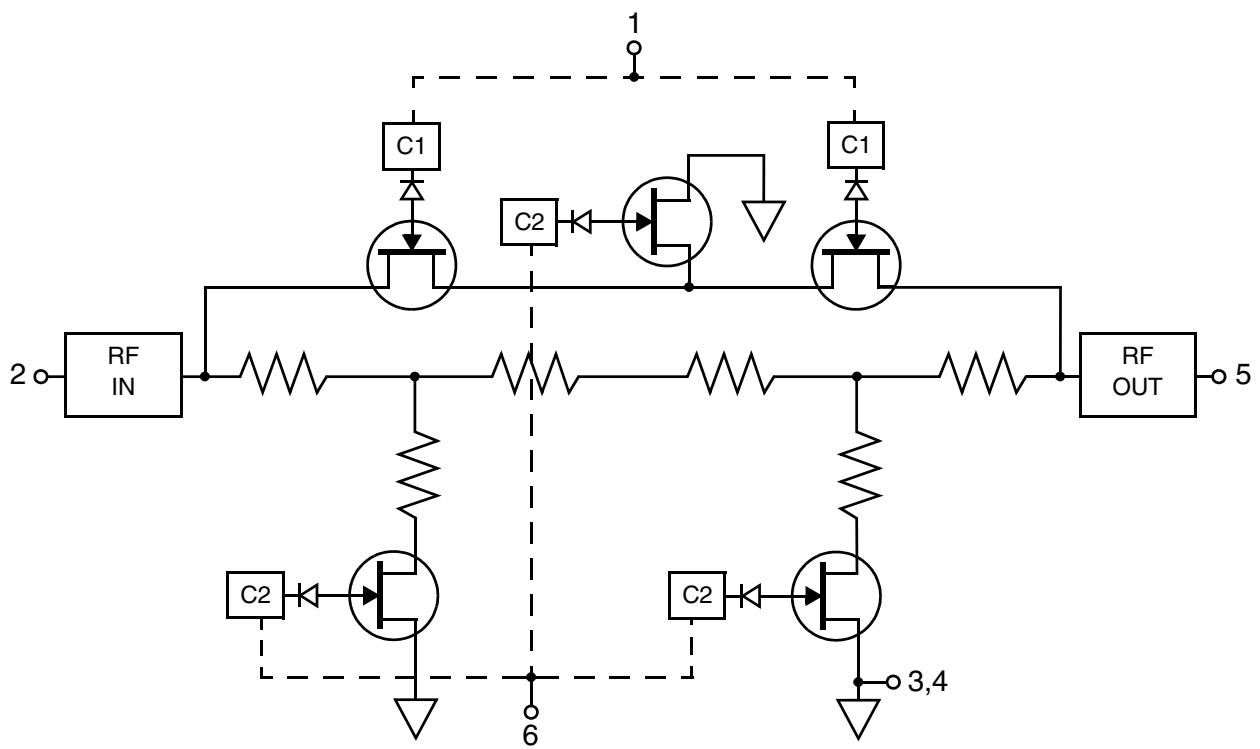
1/ Typical IL<sub>(min)</sub> @ <10 MHz = 0.5 dB.

2/ Typical P<sub>-1dB</sub> @ <10 MHz = 25 dBm.

### LOGIC TABLE

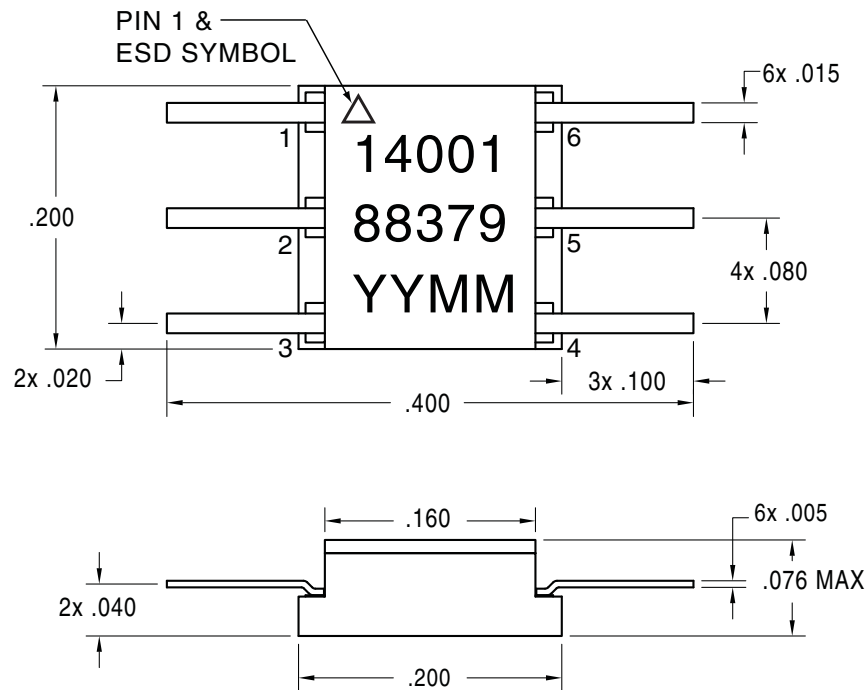
(V<sub>C1-2</sub> Typical values in volts)

ATTENUATION SETTING	V <sub>C1</sub>	V <sub>C2</sub>
Minimum Insertion Loss	+10	-10
-20dB State	-10	+10



## SCHEMATIC

## OUTLINE DRAWING



PIN	FUNCTION	PIN	FUNCTION
1	Vc1	4	GND
2	RFOUT	5	RFOUT
3	GND	6	Vc2

## ORDERING INFORMATION

MODEL NUMBER	HERMETICITY	PACKAGE
AT0000601-20	Hermetic	0.200L x 0.200W x .076Ht
AT0000601-20-H	Hermetic, Class H	
AT0000601-20-K	Hermetic, Class K	

**PLAINVIEW, NEW YORK**  
Toll Free: 800-THE-1553  
Fax: 516-694-6715

**INTERNATIONAL**  
Tel: 805-778-9229  
Fax: 805-778-1980

**NORTHEAST**  
Tel: 603-888-3975  
Fax: 603-888-4585

**SE AND MID-ATLANTIC**  
Tel: 321-951-4164  
Fax: 321-951-4254

**WEST COAST**  
Tel: 949-362-2260  
Fax: 949-362-2266

**CENTRAL**  
Tel: 719-594-8017  
Fax: 719-594-8468

[www.aeroflex.com](http://www.aeroflex.com) [info-ams@aeroflex.com](mailto:info-ams@aeroflex.com)

Aeroflex Microelectronic Solutions reserves the right to change at any time without notice the specifications, design, function, or form of its products described herein. All parameters must be validated for each customer's application by engineering. No liability is assumed as a result of use of this product. No patent licenses are implied.



Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused