Product Specifications
July 1995 *(1 of 4)*

2.4 to 2.5 GHz Power Amplifier-T/R Switch

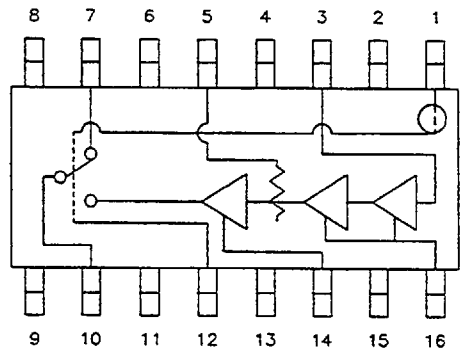
Features

- ❑ +20 dBm Output Power
- ❑ Power Control
- ❑ PCMCIA Compatible

Applications

- ❑ Wireless LANs
- ❑ Wireless PABXs
- ❑ 2.4 GHz ISM Band Radios

Functional Block Diagram



Description

The CAS2403 is a power amplifier-switch designed for PCS/PCN and WLAN applications in the 2.4 to 2.5 GHz frequency range. This product provides a +20 dBm output signal from a -5.5 dBm input signal. An output switch is used to switch the RF path between Receive and Transmit modes.

The power amplifier operates from a single +5 Volt supply. An internal attenuator provides 8 dB power control range for minimizing near-far problems and balancing receive signal levels from multiple transmitters at a hub receiver. A -4.5 Volt control voltage is necessary for transmit-receive switch operation and power down functions.

Absolute Maximum Ratings

Parameter	Rating	Parameter	Rating	Parameter	Rating
Storage Temperature	-65°C to +150°C	Channel Temperature	175°C	Operating Temperature	-20°C to +70°C
Soldering Temperature	260°C for 5 Sec	Positive Supply	+6V*	Negative Control Voltage	-5.5V*

* Maximum potential difference across device: (+V) – (-V) = 11.5V.

Recommended Operating Conditions

Parameter	Typ	Units	Parameter	Typ	Units
Positive Supply (+V)	4.75 to 5.25	Volts	Positive Control Voltage	0 to +0.2	Volts
Negative Control Voltage	-4.0 to -4.5	Volts			

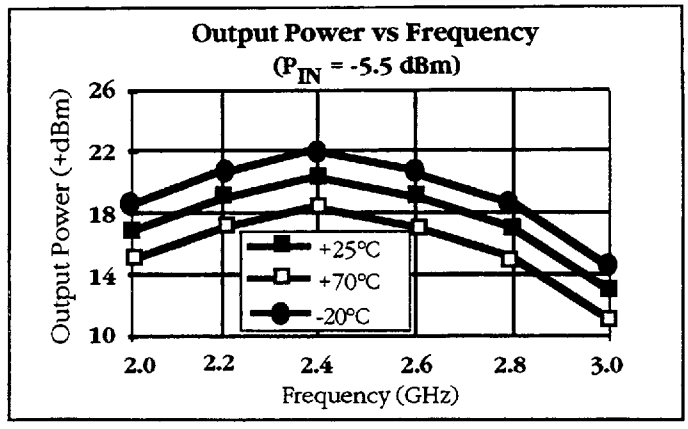
Electrical Characteristics

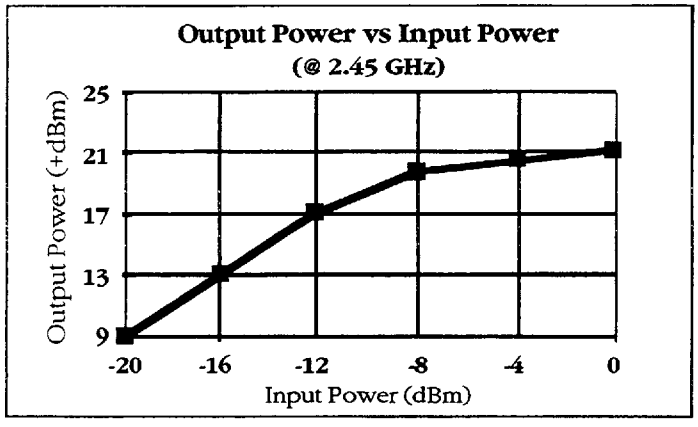
The following specifications are guaranteed at +25°C with supply voltage (+V) = +5.0V ±5% , negative control voltage (-V) = -4.1V ±5%, RF input power = -5.5 dBm, frequency = 2.45 GHz.

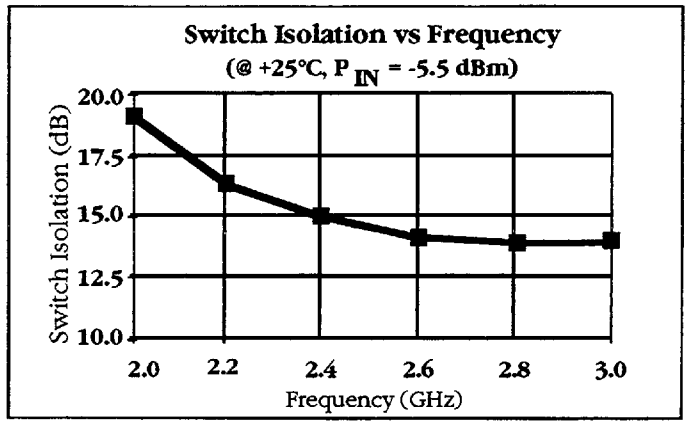
Parameter		Condition	Min	Typ	Max	Units
Frequency Range			2.4		2.5	GHz
Power Output (High)		P_{IN} = -5.5 dBm	18	20	24	dBm
Power Control Range		Attenuator High to Low	5	8	12	dB
Harmonics				-20		dBc
Output VSWR				2:1		
Input VSWR				2:1		
Switch Isolation		Transmit Mode	12	15		dB
Antenna (FIL Out) to (LNA Out) P_{IN} Insertion Loss		Receive Mode, P_{IN} = -20 dBm		0.8	1.1	dB
Positive Supply Current		Transmit Mode	100	225	250	mA
Negative Control Line Current:	T/R+	Negative Control Voltage (-V) = -4.5V		200	250	µA
	PA CNTL			400	450	µA
	DIG ATT			25	50	µA

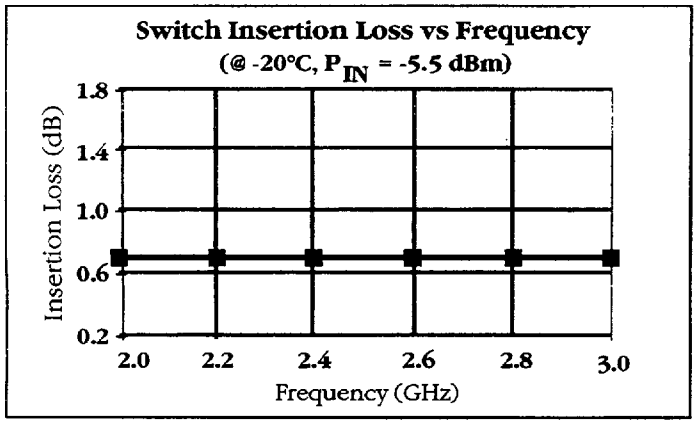
Typical Performance

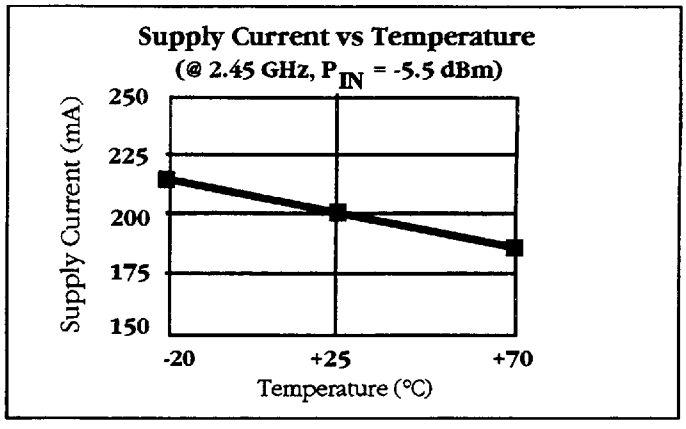
The following typical performance was tested at room temperature with positive supply (+V) = 5V ±5%, negative control voltage (-V) = -4.1V ±5%, P_{IN} = -5.5 dBm.











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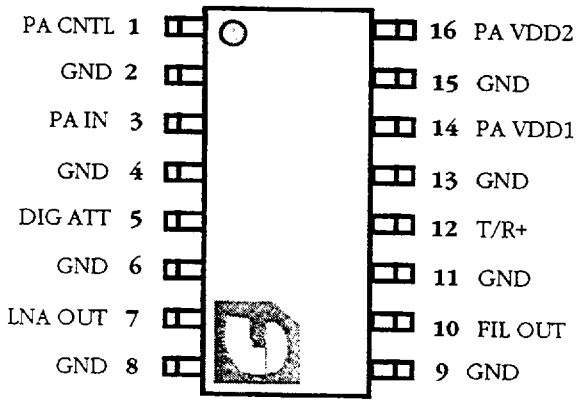
Connection Diagram and Pin Description



Pin #	Name	Description
1	PA CNTL	Power Amp Control. This pin works in tandem with the T/R+ pin to control the mode of the Power Amp and T/R Switch. Refer to Table 1. When there is a -4.1 Volt level applied to this pin and a 0 Volt level applied to the T/R+ pin, the T/R Switch in the CAS2403 will be in the receive mode and the gate of the Power Amp will be "pinched" off. When there is a 0 Volt level applied to the PA CNTL pin and a -4.1 Volt level applied to the T/R+ pin, then the T/R Switch in the CAS2403 will be in the transmit mode and the Power Amp will be biased.
2	GND	Ground
3	PA IN	Power Amp RF In. This is a 50 Ω port and if connected to a filter requires an in-band VSWR of 2:1 or better.
4	GND	Ground
5	DIG ATT	Attenuator Control Port. The application of a -4.1 Volt level to this pin results in the power amp being placed into a low output power mode approximately 10 dB less that the high output power mode. The application of a 0 Volt level to this pin places the power amp into a high output power mode of typically +20 dBm. The attenuator is either high or low depending on the level of the applied voltage.
6	GND	Ground
7	LNA OUT	Receive Port of T/R Switch. This is a 50 Ω port that normally connects to the receive LNA in the system. When the CAS2403 is used in conjunction with the Celeritek CCV2501 Converter, this pin must be decoupled to pin 4 of the CCV2501 because it supplies both the received RF signal and the transmit/receive mode control DC voltage. Refer to Celeritek application note AP-0005 for more information.

Table 1: Control Logic Table

Pin #	Pin[1] Name	Receive Mode	Transmit Mode High Power (≈ +20dBm)	Transmit Mode Low Power (≈ +10dBm)
12	T/R+	High	Low	Low
1	PA CNTL	Low	High	High
5	DIG ATT[2]	Don't Care	High	Low

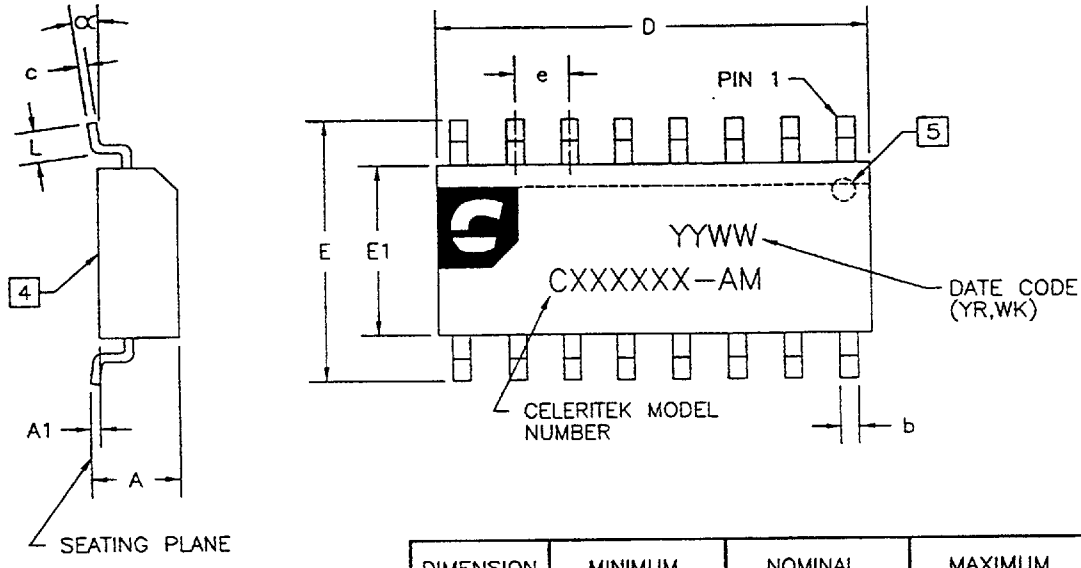
Logic High = 0 to +0.2 Volts, Logic Low = -4.0 to -4.5 Volts

1. Proper operation of the device requires that all of the control pins be connected to either a 0 Volt DC or -4.1 Volt DC level. If any of the pins are left unconnected or are connected to an incorrect voltage, the device will not operate correctly and may be damaged.

2. The DIG ATT pin can be either 0 Volts or -4.1 Volts when the CAS2403 is in the receive mode. However, the application of a -4.1 Volt level will result in a slightly lower amount of power dissipation in the device.

Pin #	Name	Description
8	GND	Ground
9	GND	Ground
10	FIL OUT	Common Port of T/R Switch. This pin connects to the system antenna (usually through a band pass filter). It is a 50Ω port that requires a filter with an in-band VSWR of 2:1 or better.
11	GND	Ground
12	T/R+	Transmit/Receive Control. This pin works in tandem with the PA CNTL pin to control the mode of the T/R Switch. Refer to Table 1. When there is a 0 Volt level applied to this pin and a -4.1 Volt level applied to the PA CNTL pin, then the T/R Switch in the CAS2403 will be in the receive mode. When there is a -4.1 Volt level applied to the T/R+ pin and a 0 Volt level applied to the PA CNTL pin, then the T/R Switch in the CAS2403 will be in the transmit mode.
13	GND	Ground
14	PA VDD1	+5 Volt supply for the output stage of the power amplifier. It is very important that PA VDD1 is decoupled on the circuit board as close as possible to the CAS2403 package. Where PA VDD1 and PA VDD2 are connected together the connection node be decoupled to ground with a 0.01 µF capacitor.
15	GND	Ground
16	PA VDD2	+5 Volt supply for the first two stages of the power amplifier. It is very important that PA VDD1 is decoupled on the circuit board as close as possible to the CAS2403 package. Where PA VDD1 and PA VDD2 are connected together the connection node be decoupled to ground with a 0.01 µF capacitor.

Physical Dimensions



NOTES:(UNLESS OTHERWISE SPECIFIED)

1. DIMENSIONS ARE IN MILLIMETERS[INCHES].
2. LEAD MATERIAL: COPPER
3. BODY MATERIAL: PLASTIC (EPOXY).
4. COUNTRY OF ORIGIN, IF OTHER THAN U.S., SHALL BE MARKED ON THIS SURFACE.
5. PIN 1 IDENTIFICATION IS A DOT OR BEVELED EDGE.

DIMENSION	MINIMUM	NOMINAL	MAXIMUM
A	1.35[0.053]	1.63[0.064]	1.75[0.069]
A1	0.10[0.004]	0.15[0.006]	0.20[0.008]
b	0.35[0.014]		0.45[0.018]
c	0.19[0.007]		0.22[0.009]
D	9.80[0.385]	9.90[0.390]	10.00[0.394]
E	5.80[0.228]	5.99[0.236]	6.20[0.244]
E1	3.80[0.150]	3.91[0.154]	4.00[0.158]
e		1.27[0.050]	
L	0.508[0.020]	0.64[0.025]	1.143[0.045]
α	0°		8°

Ordering Information

The CAS2403 is available in a surface mount SOIC-16 plastic package (physical dimensions shown above).

Part Number for Ordering	Package
CAS2403-AM	**SOIC-16 surface mount narrow body plastic package**
CAS2403-AM-000T	**SOIC-16 plastic package in tape and reel**