MICROTUNE

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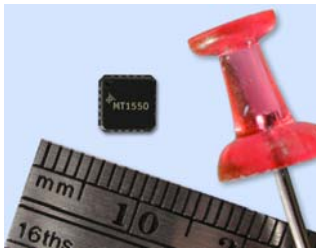
FOR BROADBAND COMMUNICATIONS, AUTOMOTIVE ELECTRONICS AND WIRELESS CONNECTIVITY

MT1550 UPSTREAM AMPLIFIER

PRODUCT BRIEF

The MT1550 is a 3.3V programmable gain upstream amplifier with integrated anti-aliasing filter.



MT1550 Upstream Amplifier

The MT1550 is a low-cost programmable-gain power amplifier IC for use in CATV upstream applications. The Microtune® MT1550 is a 3.3 volt part optimized for the DOCSIS® 1.0, 1.1, 2.0 and Euro-DOCSIS™ upstream standard. An on-chip input anti-aliasing filter is included to reduce external system costs.

The device's specified frequency range is from 5 MHz to 65 MHz, with an output P1dB > 67 dBmV through a 1:1 impedance-ratio transformer. A 3-wire digital serial bus controls the variable gain, with gain control available in 1 dB steps and a nominal 59 dB gain range.

The MT1550 may be disabled via an external control pin. The transmit-disable mode not only minimizes output noise by shutting off the output stage, but also maintains its output impedance at nominal levels. Output transients are nominally less than 16 mVp-p at 61 dBmV output level during transmit enable/disable switching.

Operating from a single 3.3 V supply, the amplifier typically draws 247 mA at maximum gain or minimum attenuation. Additional internal circuitry reduces the amplifier's power consumption depending on gain setting. Transmit-disable mode reduces the typical current draw to 60 mA, while shutdown mode further reduces it to 85 μA.

The MT1550 is available in a 20-pin Quad Flat No-Lead (QFN) package with an exposed pad for the extended industrial temperature range of -40°C to +85°C.

MT1550 APPLICATIONS

- Cable modems
- Telephony over cable
- Set-top box CATV

FEATURES

- Integrated on-chip anti-aliasing filter
- P1dB of 67 dBmV
- Low power-up/down transients of 16 mV_{p-p} typical at 61 dBmV output
- Ultra low third harmonic distortion
- Single 3.3 V supply
- 59 dB gain range
- Gain programmable in 1 dB steps
- Low transmit output noise floor: -50 dBmV in 160 kHz
- Low transmit-disable output noise: -68 dBmV
- Two power-down modes
- DOCSIS 1.0, 1.1, 2.0 and Euro-DOCSIS compatible

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DC ELECTRICAL CHARACTERISTICS

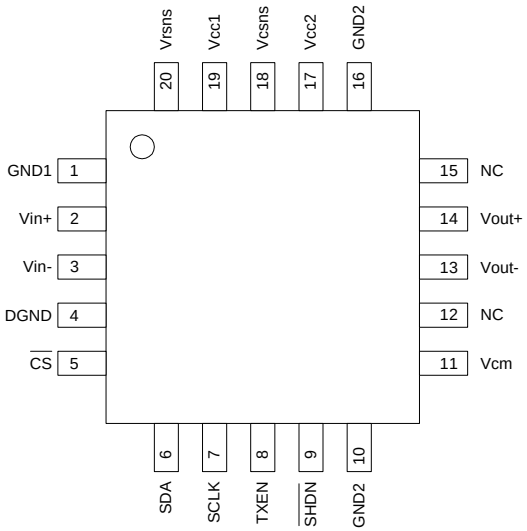
Parameter	Min	Typ	Max	Unit
Supply voltage	3.15		3.45	V
Supply current, shutdown mode		85	125	µA
Supply Current, Transmit Mode, Filter Enabled				
Gain code = 52 to 63		247		mA
Digital Input				
High voltage	2.0			V
Low voltage			0.7	V
Current		0		µA

AC ELECTRICAL CHARACTERISTICS

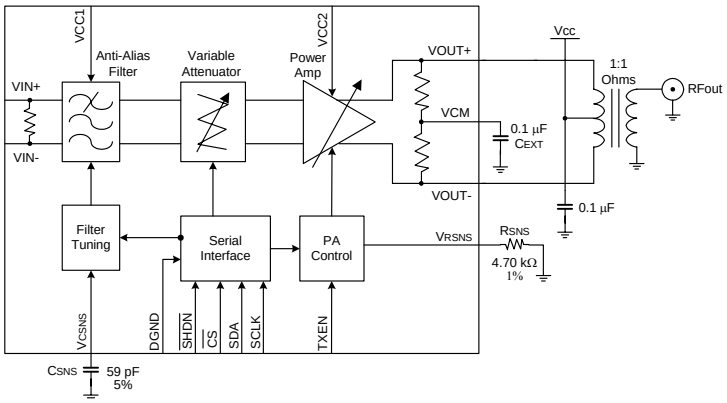
Parameter	Min	Typ	Max	Unit
Output 1dB compression point		70		dBmV
Output step size		1		dB
Voltage Gain				
Gain code = 4		-30		dB
Gain code = 63		29		dB
Gain Response				
Fin = 42MHz		1.1		dB
Fin = 65MHz		1.5		dB
TXEN				
TXEN enable/disable time			5	µs
TXEN transient duration		1.5		µs
TXEN transient step size, V_{OUT} = 61dBmV		16	64	mVp-p
TXEN transient step size, min gain			7	mVp-p
Input/Output				
Input impedance		1.55		kΩ
Output return loss, Z_0 = 75Ω		16		dB

STRESS RATINGS

Parameter	Min	Max	Unit
V_{CC} (V_{CC1}, V_{CC2})	-0.7	5	V
V_{OUT+}, V_{OUT-}	-0.7	5.5	V
Input voltage levels (all inputs), VCM	–0.7	V_{CC} + 0.7	V
Junction temperature		+125	°C
Storage temperature range	-40	+150	°C
Lead temperature (soldering, 4 seconds)		+245	°C



MT1550 Pin Diagram



MT1550 Block Diagram

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