



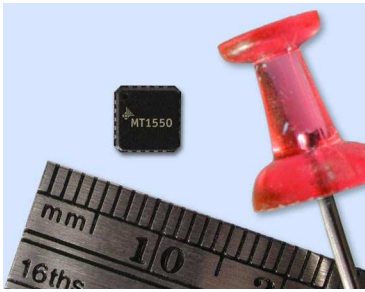
M I C R O T U N E

RF SILICON AND SYSTEMS SOLUTIONS  
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 1.1 upstream standard. The MT1550 also includes an on-chip input anti-aliasing filter, thereby reducing external system costs.

The device's specified frequency range is from 5MHz to 65MHz, and can output 67dBmV through a 1:1 impedance-ratio transformer. A 3-wire digital serial bus controls the variable gain, with gain control available in 1dB steps and a nominal 59dB 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 16mV<sub>p-p</sub> at 61dBmV output level during transmit enable/disable switching.

Operating from a single +3.3V supply, the amplifier's typical current draw at maximum gain, or minimum attenuation, is 259mA. Additional internal circuitry reduces the amplifier's power consumption depending on gain setting. Transmit-disable mode power supply current is reduced to a nominal of 62mA. A shutdown mode further reduces current to a nominal of 70μA.

The MT1550 is available in a 20-pin MicroLeadFrame™ 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
- Maximum output level of 67dBmV
- Low power-up/down transients of 16mV<sub>p-p</sub> typical at 61dBmV output
- Ultra low third harmonic distortion
- Single +3.3V supply
- 59dB gain range
- Gain programmable in 1dB steps
- Low transmit output noise floor: -50dBmV in 160kHz
- Low transmit-disable output noise: 1nV / √Hz
- Two power-down modes
- Primarily for set-top boxes
- DOCSIS 1.1 compatible

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# MT1550 UPSTREAM AMPLIFIER

## PRODUCT BRIEF

### DC ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT
Supply voltage	3.15		3.45	V
Supply current, shutdown mode		70	110	$\mu$ A

#### SUPPLY CURRENT, TRANSMIT MODE, FILTER ENABLED

Gain code = 52 to 63		259		mA
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#### DIGITAL INPUT

High voltage	2.0			V
Low voltage			0.7	V
Current		0		$\mu$ A

### AC ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT
Output 1dB compression point		69		dBmV
Output step size		1		dB
Gain accuracy		59		dB

#### VOLTAGE GAIN

Gain code = 4		-29.5		dB
Gain code = 63		29.5		dB

#### GAIN RESPONSE

Fin = 42MHz		0.2		dB
Fin = 65MHz		0.4		dB

#### TXEN

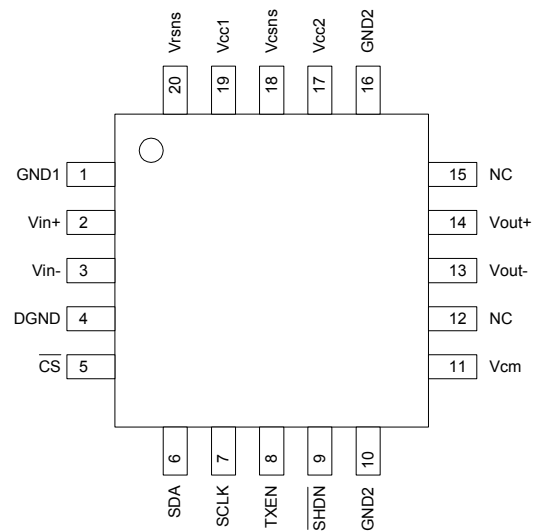
TXEN enable/disable time			5	$\mu$ s
TXEN transient duration		1.5		$\mu$ s
TXEN transient step size, $V_{OUT} = 61$ dBmV		16	64	mVp-p
TXEN transient step size, min gain			7	mVp-p

#### INPUT/OUTPUT

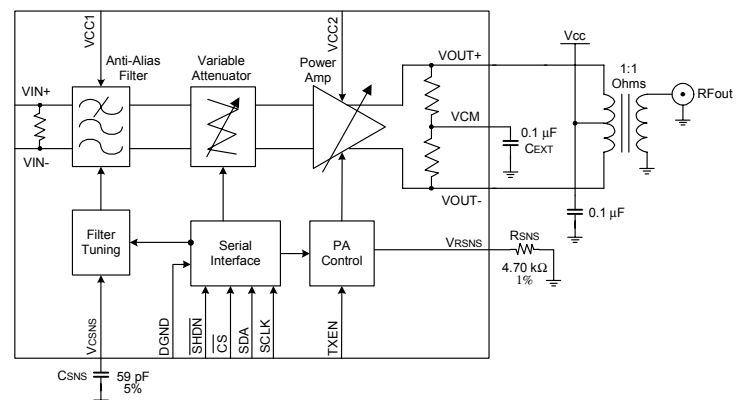
Input impedance		1.55		k $\Omega$
Output return loss, $Z_0 = 75\Omega$		16		dB

### 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	$^{\circ}$ C
Storage temperature range	-40	+150	$^{\circ}$ C
Lead temperature (soldering, 4 seconds)		+245	$^{\circ}$ C



MT1550 Pin Diagram



MT1550 Block Diagram



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PB-00058 — Rev 1.0

DEC 2002