M I C R O T U N E™

CABLE MODEM TUNER AND DIGITAL SET-TOP BOX APPLICATIONS

MT2050 SINGLE-CHIP BROADBAND TUNER

APPLICATIONS

- Cable modems / voiceenabled cable modems
- Digital set-top boxes (STB)
- Home gateways

FEATURES

Preliminary and Confidential

- 48 MHz to 860 MHz input frequency range
- Works seamlessly with all analog and digital demodulators
- Low power dual-conversion architecture
- Minimal external components
- No manually tunable parts required
- Simple interface to external filters
- Integrated IF variable gain amplifier for direct connection to digital demodulators
- Fully compatible with NTSC, PAL, SECAM, DAVIC, DVB-C, DOCSIS 1.0, 1.1 and 2.0, EuroDOCSIS and other standards



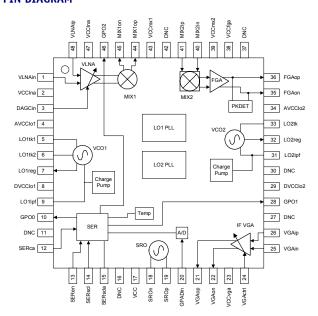
MT2050 Tuner

The MT2050 is an advanced single-chip broadband tuner that has been optimized for high performance cable modems and digital cable STBs that require low composite distortion and noise under digital cable environments. The MT2050 includes all active circuitry required to implement total RF functionality, making it the world's first complete RF/amplifier silicon front end. It is capable of receiving frequencies in the 48 MHz to 860 MHz range and converting a selected channel to a standard intermediate frequency (IF). Supported IF frequencies include NTSC, PAL, and digital standards including DOCSIS, EuroDOCSIS, DVB-C, and ITU J83, A, B, C.

The MT2050's low close-in phase noise allows it to be used for both digital and analog video signals including video, high speed data, and voice. Its dual-conversion architecture, with no requirement for tracking filters, yields the desirable characteristics of traditional cable television tuners: controlled input impedance across the entire input band, low in-band emissions, and outstanding image rejection.



PIN DIAGRAM



RECOMMENDED OPERATING CONDITIONS

| Parameter | MIN | Түр | Max | Unit |
|---|------|------|------|------|
| Input frequency range | 48 | | 860 | MHz |
| First intermediate center frequency | | 1220 | | MHz |
| Second intermediate center frequency (programmable) | 30 | | 60 | MHz |
| Supply voltage | 4.75 | 5 | 5.25 | V |
| Supply voltage ripple | | | 15 | mV |
| Operating junction temperature | | | 100 | °C |
| VGA output load impedance | 300 | | | Ω |
| Serial control clock | | | 400 | kHz |

ABSOLUTE MAXIMUM RATINGS

| Parameter | MIN | Max | Unit |
|---|------|----------|------|
| Supply voltage | | 6 | V |
| Storage temperature range | -40 | +150 | °C |
| Lead temperature (soldering, 4 seconds) | | +245 | °C |
| Input voltage | -0.3 | VCC +0.3 | V |

ELECTRICAL CHARACTERISTICS

| Parameter | MIN | Түр | Max | Unit |
|---------------------------------|------|------|------|--------|
| Power Supply | | | | |
| Active current | | 325 | | mA |
| Shut-down current | | 40 | | mA |
| Upconversion | | | | |
| Input frequency range | 48 | | 860 | MHz |
| Return loss | | 9.5 | | dB |
| First IF center frequency | | 1220 | | MHz |
| Noise figure, max gain | | 7 | | dB |
| Terminal voltage gain | | 18 | | dB |
| AGC range | 30 | | | dB |
| Gain variation at any frequency | -3 | | +3 | dB |
| OIP3 | 68 | 72 | | dBmV |
| Downconversion | | | | |
| Input frequency range | | 1220 | | MHz |
| Noise figure | | 10 | | dB |
| Terminal voltage gain | | 29 | | dB |
| Image rejection | 28 | 33 | | dBc |
| OIP3 | 77 | 79 | | dBmV |
| LO1 | | | | |
| LO frequency | 1268 | | 2080 | MHz |
| LO step size | | 1 | | kHz |
| Phase noise (10 kHz) | | -86 | | dBc/Hz |
| Phase noise (100 kHz) | | -109 | | dBc/Hz |
| Spurious | | | -60 | dBc |
| LO2 | | | | |
| LO frequency | 1160 | | 1190 | MHz |
| LO step size | | 50 | | kHz |
| Phase noise (10 kHz) | | -94 | | dBc/Hz |
| Phase noise (100 kHz) | | -114 | | dBc/Hz |
| Spurious | | | -60 | dBc |
| IF VGA | | | | |
| Frequency range | 30 | | 60 | MHz |
| Output voltage | | 1.0 | | Vp-p |
| Terminal voltage gain | 12.5 | | 51.5 | dB |
| Noise figure, max gain | | 12.5 | | dB |
| OIP3 | 76 | | | dBmV |
| Serial Interface | | | | |
| Serial clock frequency | | | 400 | kHz |
| V _{IH} | 2.3 | | | V |
| V _{IL} | | | 1.5 | V |

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