



## MT1120 AUTOMOTIVE AM/FM ANTENNA AMPLIFIER SUBSYSTEM

PRELIMINARY PRODUCT BRIEF

The MT1120 is a highly integrated and complete RF amplifier subsystem for active AM/FM antennas



MT1120 High Performance Automotive AM/FM  
Amplifier Subsystem

The MT1120 is an advanced, low-power, highly integrated single-chip amplifier IC specifically designed for automotive AM/FM antenna systems requiring low noise and very low distortion. Additionally, the MT1120 integrates two true-RMS power detectors and two uncommitted op-amps in order to realize an AGC function for AM and FM by simply adding external PIN diodes. The thresholds of the AM and FM AGC function are variable and can be set according to the application requirements. The on-chip 2.5V temperature compensated reference generator and high output voltage op-amp combine to form a low-cost, reliable, automotive-capable power supply which can be directly derived from the car battery.

The MT1120 is capable of amplifying signals with frequencies in the 0.15 MHz to 30 MHz range for AM and 76 MHz to 162.4 MHz range for FM. External components determine the gain of the AM and FM amplifiers and can also be modified to extend the operating frequency of the MT1120.

The AM amplifier uses a highly sophisticated design technology in order to reach low noise, very low distortion, high input impedance and its capability to drive very low output impedance. The FM amplifier is matched to 50 ohms and is specially designed to perform with very low noise and distortion.

The small 28-pin QFN package of the MT1120 and the requirement for minimal external components enables a compact, cost-effective solution fulfilling automotive requirements.

## APPLICATIONS

- In-glass antennas
- Active roof antennas
- Other active AM/FM antenna systems

## FEATURES

- AM input frequency range 0.15 MHz to 30 MHz supports AM, DRM and HD Radio standards in the longwave, midwave and shortwave band
- FM input frequency range 76 MHz to 162.4 MHz supports FM and HD Radio standards in the FM and weather band
- Fully integrated amplifiers for AM and FM
- Fully integrated RMS level detectors and general purpose op-amps (PIN-diode drivers) for easy implementation of AGC functions for AM and FM
- On-chip reference voltage generator and high output voltage op-amp builds a reliable low-cost voltage regulator function
- Low noise
- Low power consumption
- Ultra low distortion
- Very high AM input impedance
- Very small package
- Highly sophisticated temperature compensation design technology to support the extended automotive ambient temperature range from -40° to 115°C.
- Integrated ESD protection
- Minimal external components
- 28-pin QFN package

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## PRODUCT BRIEF

### RECOMMENDED OPERATING CONDITIONS

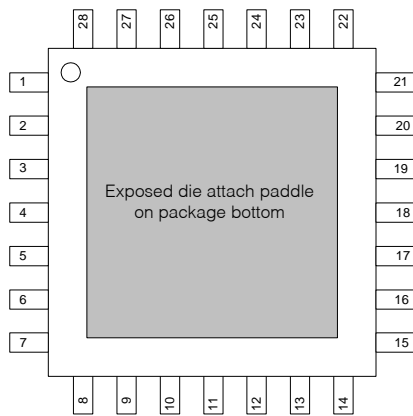
PARAMETER	MIN	TYP	MAX	UNIT
Input frequency range AM	0.15		30	MHz
Input frequency range FM	76		162.4	MHz
Supply voltage	5.75	6	6.25	V
Supply voltage ripple			15	mV

### ABSOLUTE MAXIMUM RATINGS

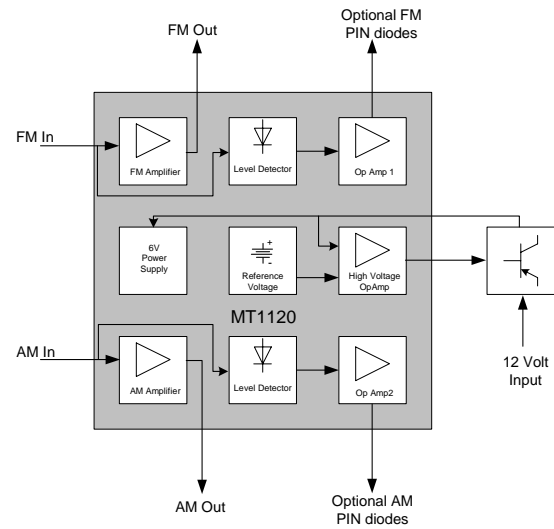
PARAMETER	MIN	MAX	UNIT
Supply voltage		6.5	V
Storage temperature range	-40	+150	°C
Operating Junction Temperature		+145	°C
Lead temperature (soldering 5 seconds, lead-free solder)		+260	°C
Input voltage	-0.3	VCC +0.3	V

### AMPLIFIER ELECTRICAL CHARACTERISTICS

PARAMETER	MIN	TYP	MAX	UNIT
<b>Power Supply</b>				
Active current		90		mA
<b>FM Signal Path</b>				
Input frequency range FM	76		162.4	MHz
FM gain	3		12	dB
FM input impedance		50		$\Omega$
Return loss FM		8		dB
OIP3 FM, Output Level 2 x 110dB $\mu$ V		140		dB $\mu$ V
FM noise figure at 6dB gain		2.7		dB
<b>AM Signal Path</b>				
Input frequency range AM	0.15		30	MHz
AM gain	0		10	dB
AM input resistance		1		M $\Omega$
AM input capacitance		10		pF
OIP3 AM, Output Level 2 x 110dB $\mu$ V		145		dB $\mu$ V
OIP2 AM, Output Level 2 x 110dB $\mu$ V		175		dB $\mu$ V
AM output noise at 6dB gain (BW=9KHz) @ 1 MHz		-6.5		dB $\mu$ V
<b>Op Amps</b>				
Input voltage range	0		Vcc	V
Output voltage range	0		Vcc	V
HV-amp input voltage range	0		Vcc	V
HV-amp output voltage range	0		36	V
Output current		20		mA
<b>Reference</b>				
Output voltage		2.5		V



MT1120 Pin Diagram



MT1120 Block Diagram



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