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MC13751

Dual-Band Upmixer and Driver Amplifier

The MC13751 is an integrated transmit upmixer and driver amplifier designed for use in cellular phones. It includes two mixers and two RF step attenuators. The device is fabricated using Motorola's Advanced RF BiCMOS process with the SiGe:C option and is housed in a leadless QFN–24 package.

- Total Gain:
  22 dB for Low Band
  19.5 dB for High Band
- Total Current Consumption = 53 mA (Typ)
- Available in Tape and Reel, 2500 Units per 12 mm, 7 inch Reel

DUAL–BAND UPMIXER AND DRIVER AMPLIFIER

SEMICONDUCTOR TECHNICAL DATA

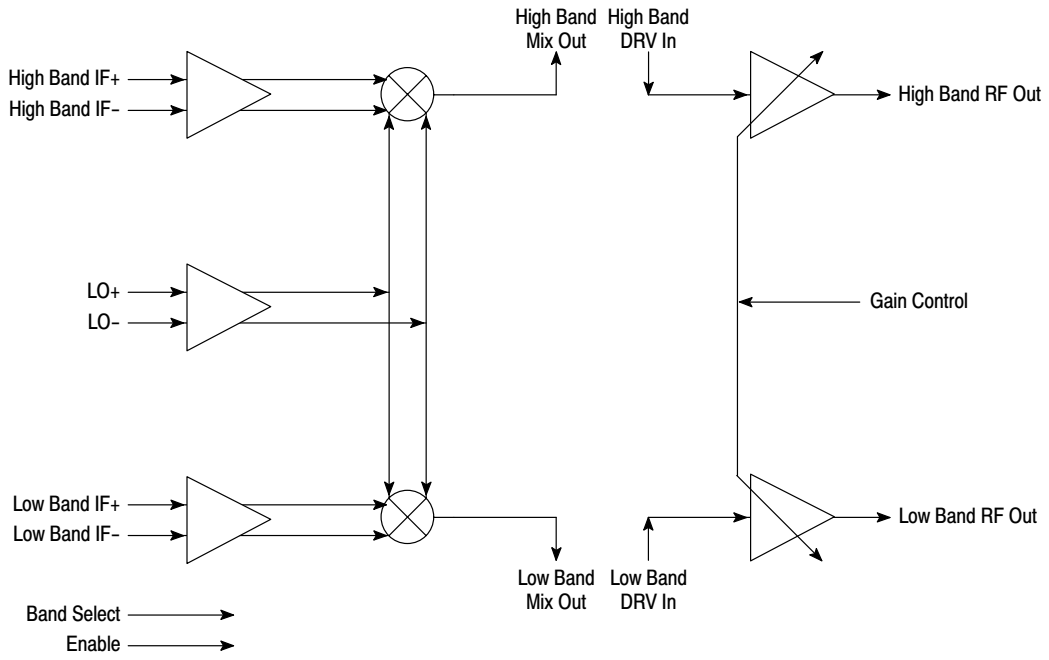
(Scale 2:1)

PLASTIC PACKAGE
CASE 1307
(QFN–24, Tape and Reel Only)

ORDERING INFORMATION

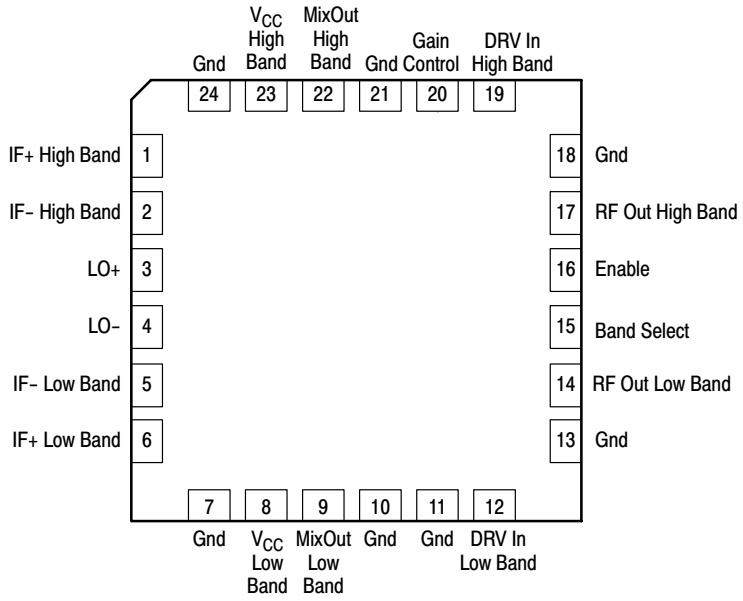
Device	Device Marking	Package
MC13751FCR2	MC751	QFN–24

Simplified Block Diagram



This device contains 223 active transistors.

CONTACT CONNECTIONS



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Supply Voltage	V_{CC}	3.6	V
LO Input Power		0	dBm
IF Input Level		0	dBm
Operating Temperature Range	T_A	–30 to 85	°C

NOTES: 1. Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the limits in the Electrical Characteristics tables.
2. ESD (electrostatic discharge) immunity meets Human Body Model (HBM) ≤250 V and Machine Model (MM) ≤25 V. Additional ESD data available upon request.

DC ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
Supply Voltage		2.7	2.78	2.86	V
Power Supply Current		–	53	64	mA
Enable Inactive State Active State		 – 1.6	 – –	 0.6 –	V
Band 800 MHz Enabled 1900 MHz Enabled		 – 1.6	 – –	 0.6 –	V
Power Down State Leakage Current (0.2 V Logic Levels)		–	–	25	μA
Gain Select Voltage Gain High = 1 Gain Low = 0		 1.6 –	 – –	 – 0.6	V
Gain Select (enable and band signals current)		–	–	10	μA

ELECTRICAL CHARACTERISTICS

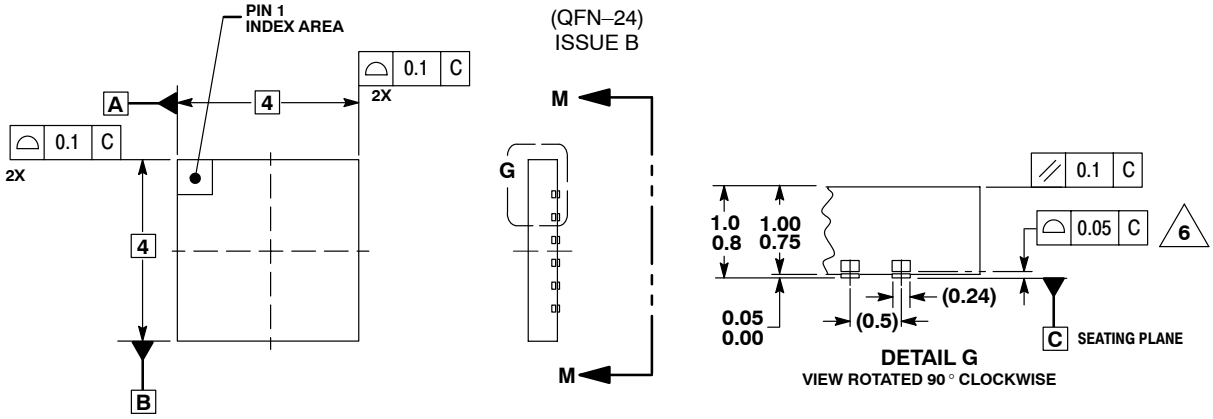
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
IF Frequency Low Band High Band			 150 150	 178 213	 250 250	MHz
LO Frequency Range Low Band High Band			 1002 2028	 – –	 1029 2125	MHz
RF Frequency Range Low Band High Band			 824 1850	 – –	 849 1910	MHz
IF Input Level, Both Bands (differential, typ –7.0 dBm)			–60	–	0	dBm
LO Input Level, Both Bands (differential)			–12	–10	–8.0	dBm
RF GMSK Output Level Both Bands Both Bands, Low Gain			 10 6.0	 – –	 – –	dBm
RF Linear Output Level, TDMA Both Bands Both Bands, Low Gain			 6.0 2.0	 – –	 – –	dBm
ACP @ f ±30 kHz, TDMA @ f ±60 kHz, TDMA @ f ±200 kHz, GSM @ f ±400 kHz, GSM			 –32 –51 –36 –66	 – – – –	 – – – –	dBc
Conversion Gain Mixer Low Band High Band			 6.3 6.5	 8.3 8.5	 10.3 10.5	dBc
Gain, Driver, High Gain Low Band High Band			 11.7 9.0	 13.7 11	 15.7 13	dBc
Gain, Drivers, Low Gain Low Band High Band			 7.7 5.0	 9.7 7.0	 11.7 9.0	dBc
Noise Figure Mixer (SSB) Drivers			 – –	 11 5.0	 14 8.0	dB
IF Impedance (differential)			–	200	–	Ω
LO Impedance (differential)			–	100	–	Ω
RF Impedance (Both Bands @ Mixer (rf out, driver rf in and driver rf out))			–	50	–	Ω

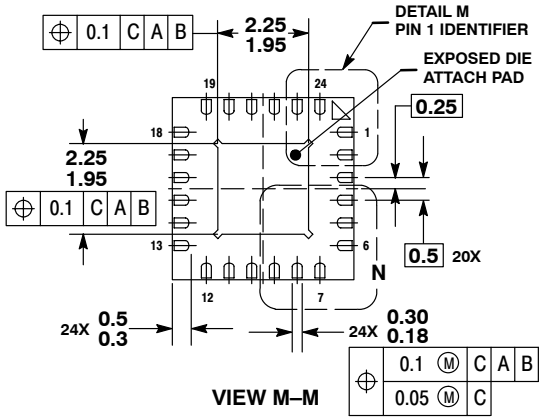
SPURIOUS (measured with interstage filter)

Characteristic	Symbol	Min	Typ	Max	Unit
LO Leakage to RF Port (Both bands, P_{out} = 6.0 dBm)		–	–	–20	dBc
IF Leakage to RF Port (Both bands)		–	–	–50	dBc
Image Supression (Both bands)		–	–	–20	dBc
2x Image Supression (Both bands)		–	–	–40	dBc
LO – 2x IF (Both bands)		–	–	–30	dBc
2x LO – 7x IF (Low band)		–	–	–40	dBc
5 * IF (Low band)		–	–	–80	dBc
11 * IF (Low band)		–	–	–80	dBc

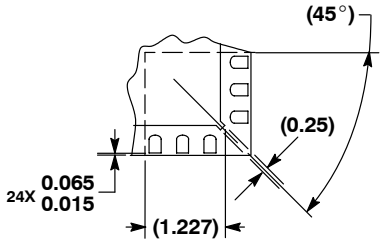
OUTLINE DIMENSIONS

PLASTIC PACKAGE
CASE 1307–01
(QFN–24)
ISSUE B



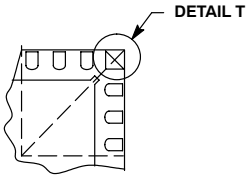


NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. THE COMPLETE JEDEC DESIGNATOR FOR THIS PACKAGE IS: HF-PQFP-N.
4. CORNER CHAMFER MAY NOT BE PRESENT. DIMENSIONS OF OPTIONAL FEATURES ARE FOR REFERENCE ONLY.
5. CORNER LEADS CAN BE USED FOR THERMAL OR GROUND AND ARE TIED TO THE DIE ATTACH PAD. THESE LEADS ARE NOT INCLUDED IN THE LEAD COUNT.
6. COPLANARITY APPLIES TO LEADS, CORNER LEADS, AND DIE ATTACH PAD.
7. FOR ANVIL SINGULATED QFN PACKAGES, MAXIMUM DRAFT ANGLE IS 12°.

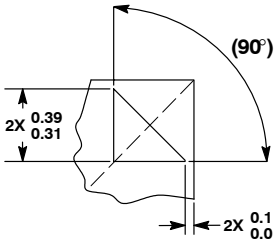


DETAIL N
PREFERRED CORNER CONFIGURATION

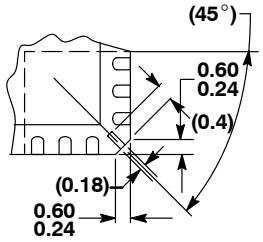
4



DETAIL M
PREFERRED PIN 1 BACKSIDE IDENTIFIER

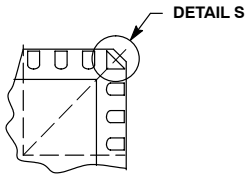


DETAIL T
PREFERRED PIN 1 BACKSIDE IDENTIFIER

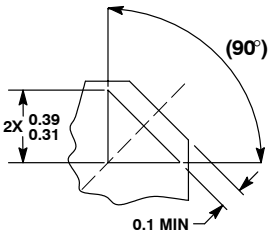


DETAIL N
CORNER CONFIGURATION OPTION

4 5



DETAIL M
PIN 1 BACKSIDE IDENTIFIER OPTION



DETAIL S
PIN 1 BACKSIDE IDENTIFIER OPTION

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