



## Product Preview

# Low Power Integrated Transmitter for ISM Band Applications

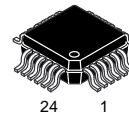
The MC13146 is an integrated RF transmitter targeted at ISM band applications. It features a 50  $\Omega$  linear Mixer with linearity control, voltage controlled oscillator, divide by 64/65 dual modulus Prescaler and Exciter. Together with the receiver chip (MC13145) and the baseband chip (MC33410), a complete 900 MHz cordless phone system can be implemented. This device may be used in applications within 2 GHz since its RF bandwidth is greater than 2.4 GHz.

- Low Distortion Exciter:  $P_{out\_1}$  dB Compression Point  $\approx$  8 dBm
- High Mixer Linearity: IIP3 = 10 dBm
- 50  $\Omega$  Mixer Input Impedance
- Differential Open Collector Mixer Output
- 20 dB Power Conversion Gain
- Low Power 64/65 Dual Modulus Prescaler (MC12054 type)
- 2.7 to 6.5 V Operation, Low Current Drain (25 mA @ 2.0 GHz)
- Powerdown Mode: <1.0  $\mu$ A
- 2.4 GHz RF Bandwidth
- 1.8 GHz IF Bandwidth

# MC13146

## LOW POWER DC – 2.0 GHz TRANSMITTER

### SEMICONDUCTOR TECHNICAL DATA

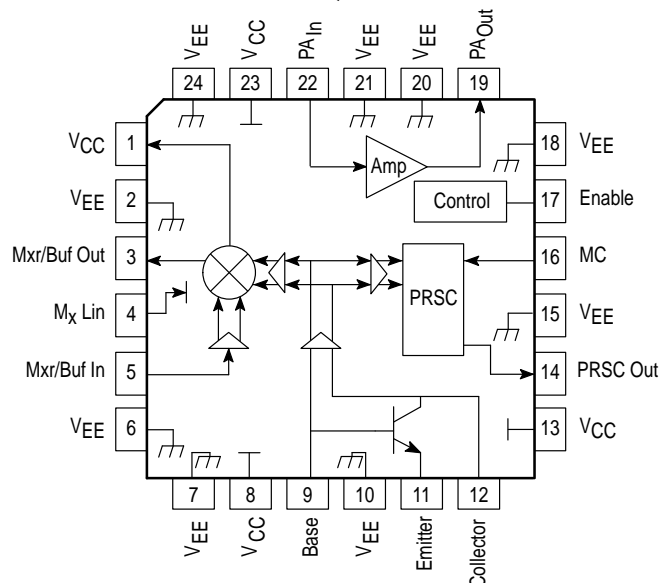


**FTA SUFFIX**  
PLASTIC PACKAGE  
CASE 977  
(LQFP-24)

### ORDERING INFORMATION

Device	Operating Temperature Range	Package
XC13146FTA	$T_A = -40^\circ$ to $+85^\circ\text{C}$	LQFP-24

### PIN CONNECTIONS LQFP-24



# MC13146

## MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Power Supply Voltage	$V_{CC(max)}$	7.0	Vdc
Junction Temperature	$T_J(max)$	150	°C
Storage Temperature Range	$T_{stg}$	-65 to +150	°C

**NOTE:** ESD data available upon request.

## RECOMMENDED OPERATING CONDITIONS

Characteristic	Symbol	Min	Typ	Max	Unit
Power Supply Voltage ( $T_A = 25^\circ\text{C}$ )	$V_{CC}$ $V_{EE}$	2.7 -	- 0	6.5 -	Vdc Vdc
RF Frequency Range	$f_{RF}$	1.0	-	2500	MHz
Ambient Temperature Range	$T_A$	-40	-	85	°C
Maximum Input Signal Level	$P_{IF}$	-	-10	-	dBm
- with no damage		-	15	-	dBm
- with minor performance degradation		-		-	

## TRANSMITTER DC ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , $V_{CC} = 3.0\text{ Vdc}$ , no input signal, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Total Supply Current (Enable = $V_{CC}$ )	$I_{total}$	-	25	-	mA
Power Down Current (Enable = $V_{EE}$ )	$I_{total}$	-	0.1	-	$\mu\text{A}$

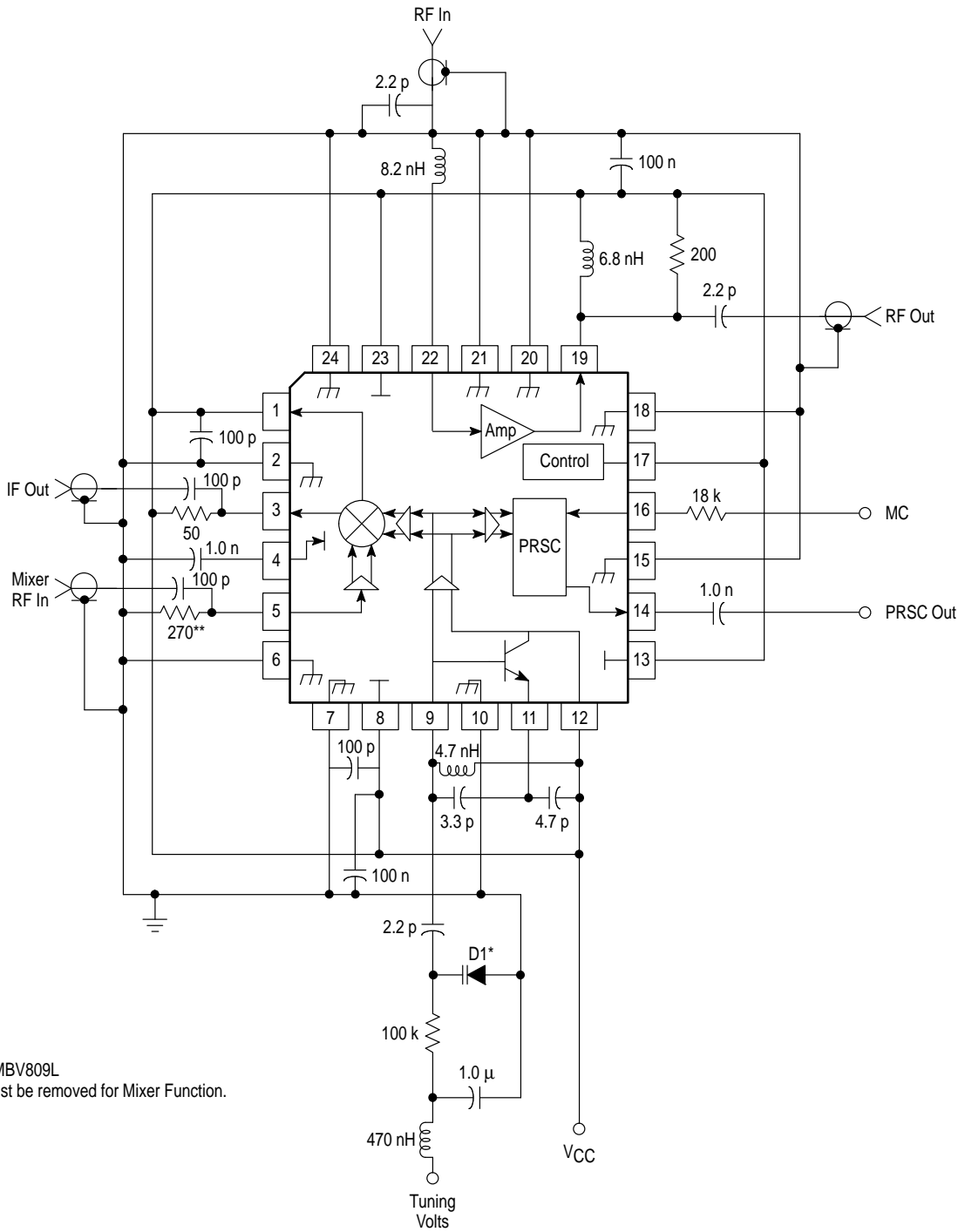
## TRANSMITTER AC ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ , $V_{CC} = 3.0\text{ Vdc}$ , Enable = 3.0 Vdc, unless otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
Output Power (with external matching)	$P_{A\_PO}$	-	0	-	dBm
Distortion (@ 820 MHz = $f_{IF\_out}$ ) (Note 1)	$P_{1dBC.Pt.}$	-	8.0	-	dBm
Mixer/Buffer (@ 900 MHz = $f_{OSC}$ ) (Note 1)	$P_{Mx/Buf\_out}$	-	-18	-	dBm
Output Harmonics (with external matching @ 820 MHz)					
2nd	$P_{A-2f}$	-	-25	-	dBc
3rd	$P_{A-3f}$	-	-35	-	dBc
VCO Phase Noise (@ 10 kHz offset) (Note 1)		-	-80	-	dBc/Hz
Mixer/Buffer Output Impedance		-	50	-	$\Omega$
Prescaler Output Level (10 k    8.0 pF load)		-	0.5	-	V <sub>pp</sub>
MC Current Input (optional)		-	200	-	$\mu\text{A}_{pp}$

**NOTE:** Tests run during test system/device characterization.

# MC13146

Figure 1. Test Circuit



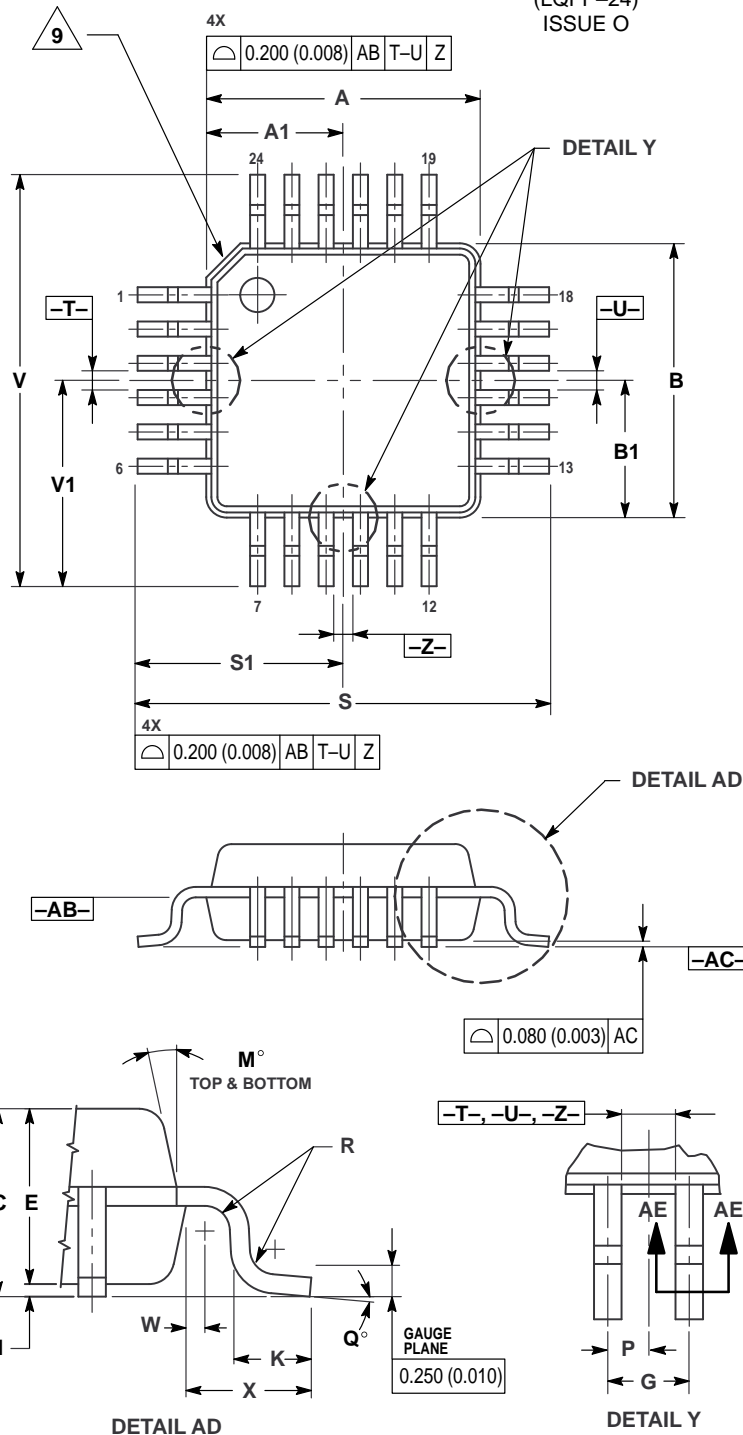
\* MMBV809L

\*\* Must be removed for Mixer Function.

# MC13146

## OUTLINE DIMENSIONS


FTA SUFFIX  
PLASTIC PACKAGE  
CASE 977-01  
(LQFP-24)  
ISSUE O



NOTES:

- 1 DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- 2 CONTROLLING DIMENSION: MILLIMETER.
- 3 DATUM PLANE -AB- IS LOCATED AT BOTTOM OF LEAD AND IS COINCIDENT WITH THE LEAD WHERE THE LEAD EXITS THE PLASTIC BODY AT THE BOTTOM OF THE PARTING LINE.
- 4 DATUMS -T-, -U-, AND -Z- TO BE DETERMINED AT DATUM PLANE -AB-.
- 5 DIMENSIONS S AND V TO BE DETERMINED AT DATUM PLANE -AC-.
- 6 DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.250 (0.010) PER SIDE. DIMENSIONS A AND B DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE -AB-.
- 7 DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR PROTRUSION SHALL NOT CAUSE THE D DIMENSION TO EXCEED 0.350 (0.014).
- 8 MINIMUM SOLDER PLATE THICKNESS SHALL BE 0.0076 (0.0003).
- 9 EXACT SHAPE OF EACH CORNER IS OPTIONAL.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.000 BSC		0.157 BSC	
A1	2.000 BSC		0.079 BSC	
B	4.000 BSC		0.157 BSC	
B1	2.000 BSC		0.079 BSC	
C	1.400	1.600	0.055	0.063
D	0.170	0.270	0.007	0.011
E	1.350	1.450	0.053	0.057
F	0.170	0.230	0.007	0.009
G	0.500 BSC		0.020 BSC	
H	0.050	0.150	0.002	0.006
J	0.090	0.200	0.004	0.008
K	0.500	0.700	0.020	0.028
M	12 °REF		12 °REF	
N	0.090	0.160	0.004	0.006
P	0.250 BSC		0.010 BSC	
Q	1 °	5 °	1 °	5 °
R	0.150	0.250	0.006	0.010
S	6.000 BSC		0.236 BSC	
S1	3.000 BSC		0.118 BSC	
V	6.000 BSC		0.236 BSC	
V1	3.000 BSC		0.118 BSC	
W	0.200 REF		0.008 REF	
X	1.000 REF		0.039 REF	

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