

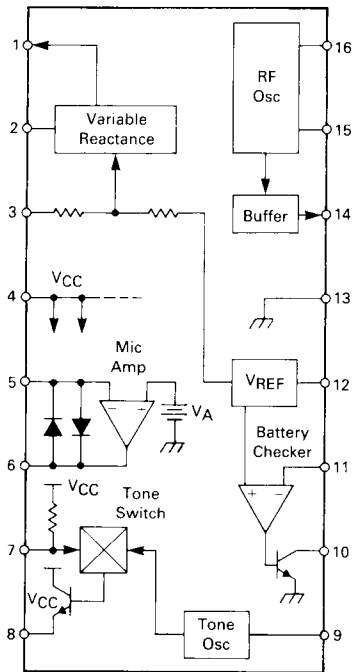
**MOTOROLA**  
**SEMICONDUCTOR**  
**TECHNICAL DATA**

**LOW POWER FM TRANSMITTER SYSTEM**

The MC2831A is a one-chip FM transmitter subsystem designed for cordless telephone and FM communication equipment. It includes a Microphone Amplifier, Pilot Tone Oscillator, Voltage Controlled Oscillator and Battery Monitor.

- Wide Range of Operating Supply Voltage (3.0 V–8.0 V)
- Low Drain Current (4.0 mA Typ Full Operation at  $V_{CC} = 4.0$  V)
- Battery Checker (290  $\mu$ A Typ at  $V_{CC} = 4.0$  V)
- Low Number of External Parts Required
- Users Must Comply with Local Regulations on R.F. Transmission (FCC, DOT, P.T.T., etc)

**FUNCTIONAL BLOCK DIAGRAM**



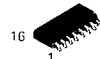
**MC2831A**

**LOW POWER FM TRANSMITTER SYSTEM**

**SILICON MONOLITHIC INTEGRATED CIRCUIT**

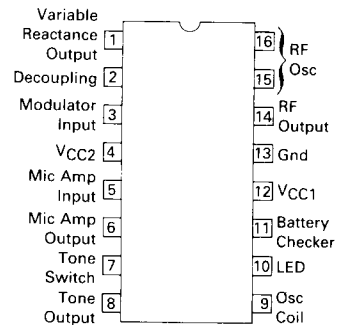


**P SUFFIX**  
 PLASTIC PACKAGE  
 CASE 648



**D SUFFIX**  
 PLASTIC PACKAGE  
 CASE 751B  
 (SO-16)

**PIN ASSIGNMENTS**



**ORDERING INFORMATION**

Device	Temperature Range	Package
MC2831AD	-30°C to +75°C	SO-16
MC2831AP		Plastic DIP

# MC2831A

## MAXIMUM RATINGS (T<sub>A</sub> = 25°C, unless otherwise noted)

Rating	Symbol	Value	Unit
Power Supply Voltage	V <sub>CC</sub>	10	Vdc
Operating Supply Voltage Range	V <sub>CC</sub>	3.0 to 8.0	Vdc
Battery Checker Output Sink Current	I <sub>LED</sub>	25	mA
Junction Temperature	T <sub>J</sub>	+150	°C
Operating Ambient Temperature Range	T <sub>A</sub>	-30 to +75	°C
Storage Temperature Range	T <sub>stg</sub>	-65 to +150	°C

## ELECTRICAL CHARACTERISTICS (V<sub>CC1</sub> = 4.0 Vdc, V<sub>CC2</sub> = 4.0 Vdc, T<sub>A</sub> = 25°C, unless otherwise noted)

Characteristic	Symbol	Pin	Min	Typ	Max	Unit
Drain Current	I <sub>CC1</sub>	12	150	290	420	μA
Drain Current	I <sub>CC2</sub>	4	2.2	3.6	6.5	mA

## BATTERY CHECKER

Threshold Voltage (LED Off → On)	V <sub>TB</sub>	11	1.0	1.2	1.4	Vdc
Output Saturation Voltage (Pin 11 = 0 V, Pin 10 Sink Current = 5.0 mA)	V <sub>OSAT</sub>	10	—	0.15	0.5	Vdc

## MIC AMPLIFIER

Voltage Gain, Closed Loop (V <sub>in</sub> = 1.0 mV <sub>rms</sub> , f <sub>in</sub> = 1.0 kHz)	A <sub>V</sub>	5, 6	27	30	33	dB
Output DC Voltage	V <sub>Odc</sub>	6	1.1	1.4	1.7	Vdc
Output Swing (V <sub>in</sub> = 30 mV <sub>rms</sub> , f <sub>in</sub> = 1.0 kHz)	V <sub>OP-P</sub>	6	0.8	1.2	1.6	V <sub>p-p</sub>
Total Harmonic Distortion (V <sub>O</sub> = 31 mV <sub>rms</sub> , f <sub>in</sub> = 1.0 kHz)	THD	6	—	0.7	—	%

## PILOT TONE OSCILLATOR (250 Ω LOADING)

Output AF Voltage (f <sub>O</sub> = 5.0 kHz)	V <sub>AFO</sub>	8	—	50	—	mV <sub>rms</sub>
Output DC Voltage	V <sub>Odc</sub>	8	—	1.4	—	Vdc
Total Harmonic Distortion (f <sub>O</sub> = 5.0 kHz, V <sub>AF</sub> = 150 mV <sub>rms</sub> )	THD	8	—	1.8	5.0	%
Tone Switch Threshold	—	7	1.1	1.4	1.7	Vdc

## FM MODULATOR (120 Ω LOADING)

Output RF Voltage (f <sub>O</sub> = 16.6 MHz)	VRFO	14	—	40	—	mV <sub>rms</sub>
Output DC Voltage	V <sub>Odc</sub>	14	—	1.3	—	Vdc
Modulation Sensitivity (Note 1) (V <sub>in</sub> = 1.0 V ± 0.2 V)	SEN	3, 14	6.0	10	18	Hz mVdc
Maximum Deviation (Note 1) (V <sub>in</sub> = 0 V to +2.0 V)	F <sub>dev</sub>	3, 14	± 2.5	± 5.0	± 12.5	kHz
RF Frequency Range	—	14	—	—	60	MHz

Note 1. Modulation sensitivity and maximum deviation are measured at 49.815 MHz, which is the third harmonic of the crystal frequency.

# MC2831A

FIGURE 1 — TEST CIRCUIT

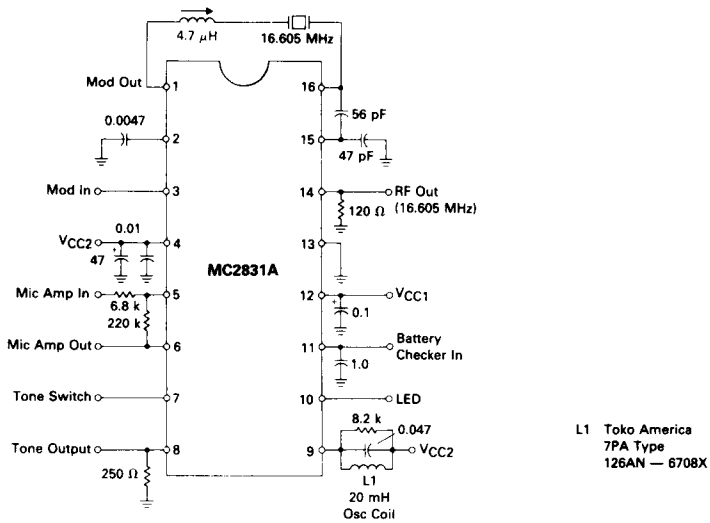
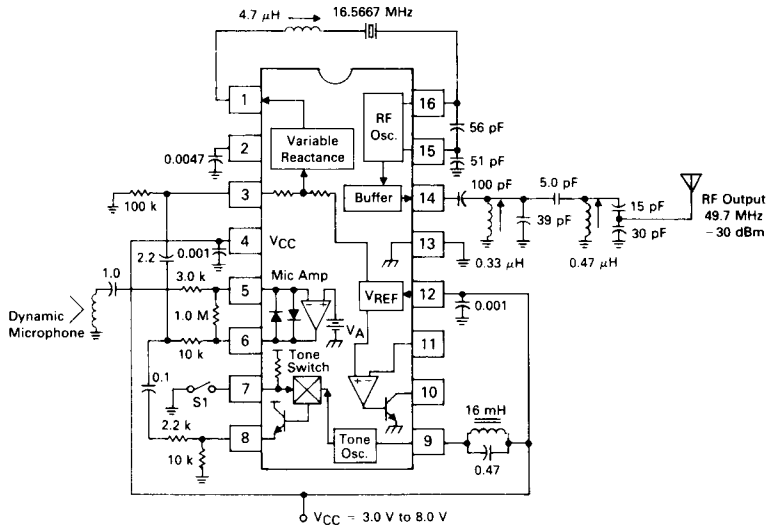


FIGURE 2 — SINGLE CHIP FM VHF TRANSMITTER AT 49.7 MHz



**NOTES:**

S1 is a normally closed push button type switch.

Battery checker circuit (Pins 10, 11) is not used in this application.

The crystal used is fundamental mode, calibrated for parallel resonance with a 32 pF load. The 49.7 MHz output is generated in the output buffer, which generates useful harmonics to 60 MHz.

All capacitors in microfarads, inductors in Henries and resistors in Ohms, unless otherwise specified.

The network on the output at Pin 14 provides output tuning and impedance matching to 50 ohms at 49.7 MHz. Harmonics are suppressed by more than 25 dB.