MFC6010

DEVICE DISCONTINUED – CONSULT FACTORY

FM LIMITING IF AMPLIFIER

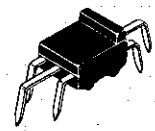
. . . a monolithic silicon integrated circuit designed especially for 10.7 MHz IF applications.

Highlights Include:

- High Stable Gain @ 10.7 MHz (40 dB typ)
- Low Feedback Capacitance ($|y_{12}|$ = 0.01 mmho typ)
- Non-Saturating Limiting (With Suitable Load)
- Compatible With CA3053 and μA703 (See Figures 7 and 8)

FM IF AMPLIFIER

Silicon Monolithic Functional Circuit



CASE 643A

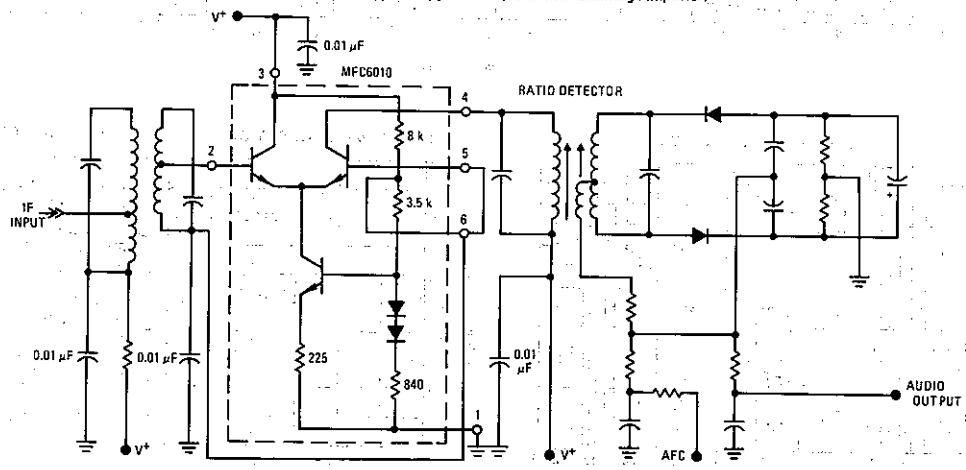
PLASTIC PACKAGE

MAXIMUM RATINGS (T_A = +25°C unless otherwise noted.)

Rating	Symbol	Value	Unit
Power Supply Voltage	V^+	20	Vdc
Output Collector Voltage	V_4	20	Vdc
Input Voltage*	V_2, V_5	±5.0	Volts
Power Dissipation @ T_A = 25°C (Package Limitation)	P_D	1.0	Watt
Derate above 25°C	$1/\theta_{JA}$	10	mW/°C
Operating Temperature Range	T_A	-10 to +75	°C

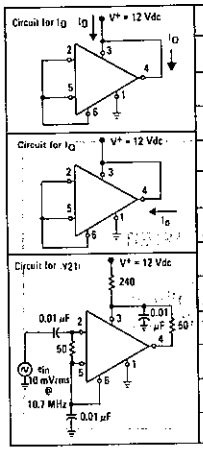
*Differential Voltage Swing.

FIGURE 1 – Typical Application (10.7 MHz Limiting Amplifier)



See Packaging Information Section for outline dimensions.

ELECTRICAL CHARACTERISTICS (V^+ = 12 Volts, f = 10.7 MHz, T_A = +25°C, unless otherwise noted.)



Characteristic	Symbol	Min	Typ	Max	Unit
Total Current Drain	I_D	–	–	10	mA
Output Quiescent Current	I_Q	1.75	3.2	5.0	mA
Output Saturation Voltage	V(sat)	–	3.5	–	Volts
Forward Transadmittance	$\|Y21\|$	25	–	–	mmhos
Reverse Transadmittance	$\|Y12\|$	–	0.01	–	mmho
Input Capacitance	C_{in}	–	6.0	–	pF
Input Conductance	G_{in}	–	0.4	–	mmho
Output Capacitance	C_{out}	–	2.5	–	pF
Output Conductance	G_{out}	–	35	–	µmhos
Noise Figure (R_S = 750 Ω)	N_F	–	7.0	–	dB
Maximum Stable Gain (Stern Factor = 3)	A_v	–	40	–	dB
Input Voltage (3.0 dB Limiting)	e_{in}	–	60	–	mV

FIGURE 2 – LIMITING CHARACTERISTICS

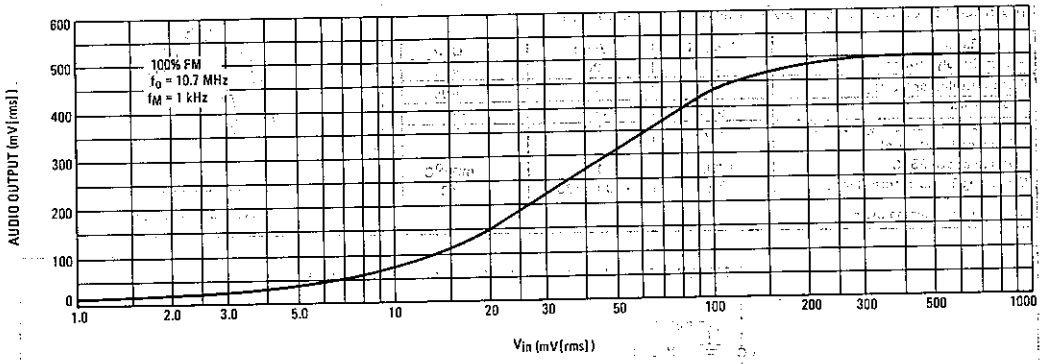


FIGURE 3 – AM REJECTION

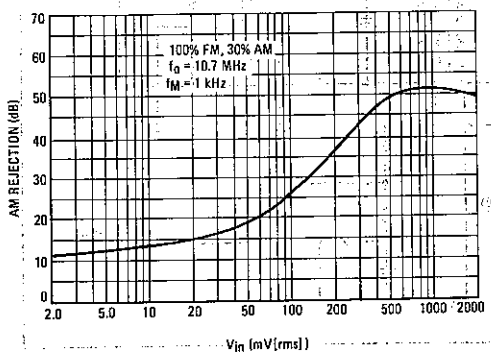
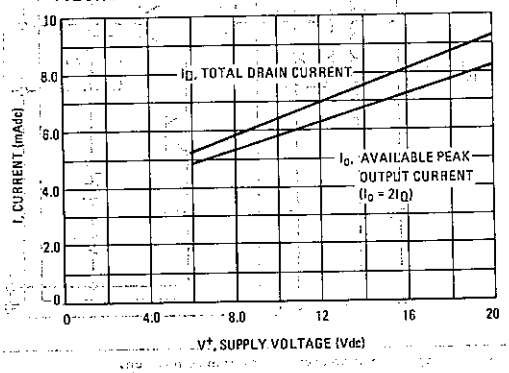
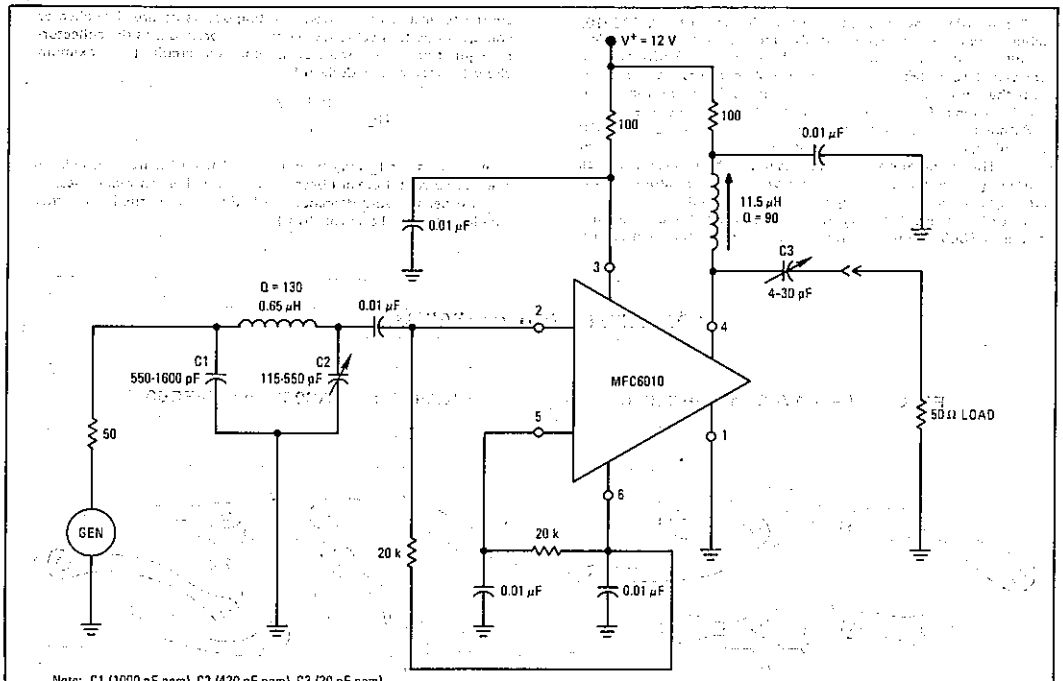


FIGURE 4 – CURRENT DRAIN AND OUTPUT CURRENT



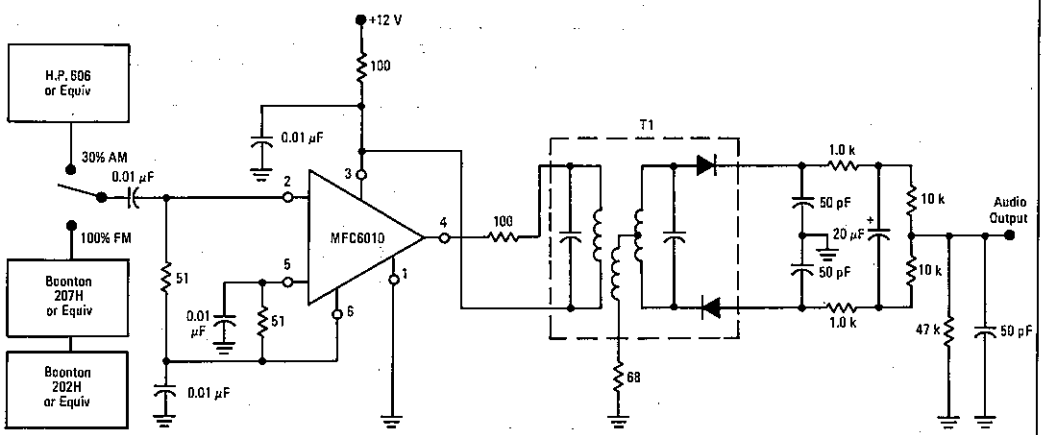
TEST CIRCUITS

FIGURE 5 – POWER-GAIN TEST CIRCUIT



Note: C1 (1000 pF nom), C2 (420 pF nom), C3 (20 pF nom) adjusted for maximum power gain.

FIGURE 6 – LIMITING AND AM REJECTION TEST CIRCUIT



T1 – Ratio Detector Primary Impedance ≈ 1.5 kΩ

APPLICATIONS INFORMATION

Because of the low reverse transfer admittance of the MFC6010, stability will be dependent mainly upon circuit layout. With careful design, very high gain (in the order of 40 dB) may be achieved at 10.7 MHz. The bias and supply currents may be varied from their normal values (shown in Figure 4) by shunting additional resistance from pin 6 to ground or to the supply line.

Although less gain may be realized when using the MFC6010 as a limiter, it is recommended that it be operated in a non-saturated mode. This mode of operation results in a high output impedance at limiting. Therefore the operation of the demodulator circuit is not subject to variable loading of the limiter output.

In order to avoid driving the amplifier transistor components of the MFC6010 into saturation, the load resistance must be chosen to ensure that current limiting occurs before the collector voltage drops to a value low enough to forward bias the collector-base junction. In a transformer coupled circuit, the maximum allowable load can be derived from

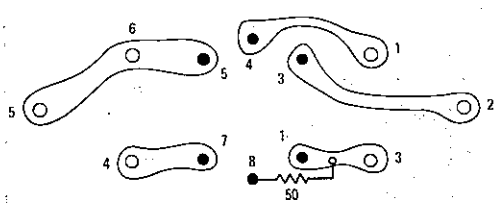
$$R_L = \frac{2\,(V^+ - V_S)}{I_o}$$

where values for I_o may be determined from Figure 4 (providing the bias currents have not been altered from their normal values).

In order to avoid degradation of AM rejection, the input signal should not exceed one volt (rms).

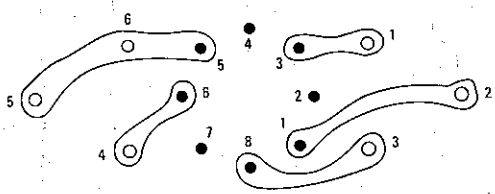
COMPATIBLE FOIL PATTERNS

FIGURE 7 – μA703 and MFC6010



○ Motorola terminal and pin number position

FIGURE 8 – CA3053* and MFC6010



● μA703 or CA3053 terminal and pin number position

*Foil patterns shown are intended to show pin-for-pin interconnection. Any change in the number of components is dictated by the requirements of the individual design.

8

DEVICE DISCONTINUED – CONSULT FACTORY

DUAL TOGGLE FLIP-FLOP

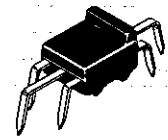
- Wide Operating Voltage Range – 6.0 to 16 Volts
- Regulated Supply Not Required
- Economical 6-Lead Plastic Package

DUAL TOGGLE FLIP-FLOP

Silicon Monolithic Functional Circuit

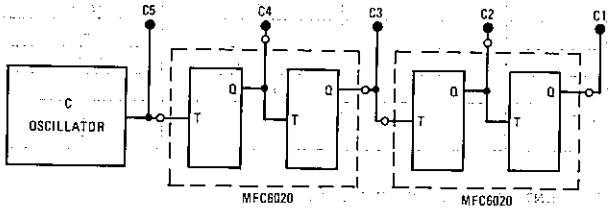
MAXIMUM RATINGS (T_A = +25°C unless otherwise noted.)

Rating	Value	Volts
Power Supply Voltage	19	Vdc
Output Sinking Current	10	mA
Negative Input Voltage	0.5	Vdc
Power Dissipation (Package Limitation) Derate above T_A = +25°C	1.0 10	Watts mW/°C
Operating and Storage Junction Temperature Range	-40 to +125	°C
Operating Temperature	-10 to +75	°C



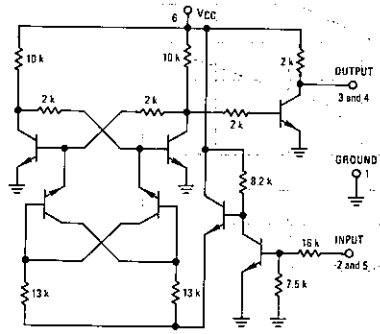
CASE 643A
PLASTIC PACKAGE

TYPICAL APPLICATION – ELECTRONIC ORGAN DIVIDER

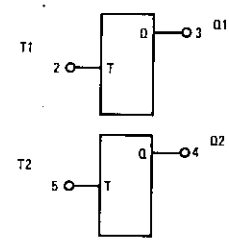


C4 = 261 Hz

FIGURE 1 – CIRCUIT SCHEMATIC (One Half of Circuit Shown)



BLOCK DIAGRAM



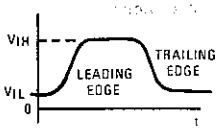
V_{CC} = Pin 6
GND = Pin 1

See Packaging Information Section for outline dimensions.

ELECTRICAL CHARACTERISTICS (V_{CC} = 12 Vdc, V_{in} = 4.0 V, Square Pulse, f = 10 kHz, 50% Duty Cycle, t_{PHL} = 1.0 V/μs, T_A = +25°C unless otherwise noted.)

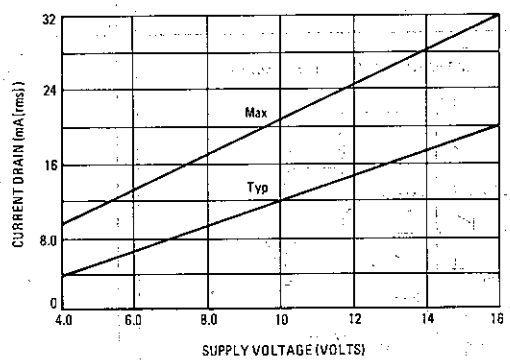
Characteristic	Min	Typ	Max	Unit
Operating Power Supply Voltage	6.0	–	16	Vdc
Toggle Frequency	–	3.0	–	MHz
Output Voltage (High) (V_{CC} = 6.0 Vdc) (V_{CC} = 16 Vdc)	 5.5 15.5	 – –	 – –	Vdc
Output Voltage (Low) (V_{CC} = 6.0 Vdc) (V_{CC} = 16 Vdc)	 – –	 – –	 0.3 0.5	Vdc
Operating Drain Current (V_{CC} = 16 Vdc)	–	–	32	mAdc
Output Sinking Current ($V_O \leq 1.0$ Vdc)	–	2.0	–	mAdc
Rise Time	–	250	–	ns
Storage Time	–	350	–	ns
Fall Time	–	60	–	ns
Input Resistance	10	–	–	kΩ
Output Resistance (Output High)	–	–	2.8	kΩ

INPUT PULSE REQUIREMENTS



Characteristic	Min	Max	Unit
Pulse Magnitude	+4.0	–	Volts
Zero Level	–	+1.0	Volts
Leading Edge	No Requirement		
Trailing Edge dv/dt	-1.0	–	$\frac{\text{Volts}}{\text{ms}}$

FIGURE 2 – RMS CURRENT DRAIN versus SUPPLY VOLTAGE



8

MFC6030A
MFC6032A
MFC6033A
MFC6034A

VOLTAGE REGULATORS

These devices are not recommended for new design, but Motorola will continue to supply these devices for existing applications.

For a complete data sheet, mail your request to Motorola Semiconductor Products Inc., P.O. Box 20912, Phoenix, Arizona 85036.