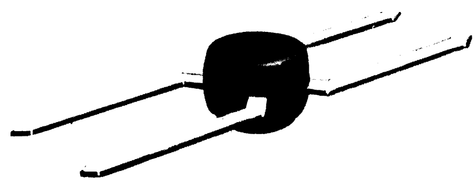
MEM 630 **MEM 631**
MEM 632

Dual Gate N-Channel Depletion Mode MOSFETS

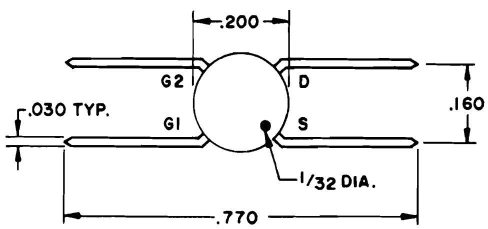
FEATURES

- Low Cost Plastic Package
- Monolithic Gate Protection Diodes
- Low Feedback Capacitance
- Silicon Nitride Passivation for Long Term Stability

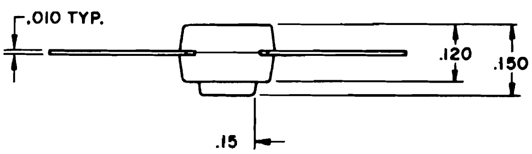


APPLICATIONS

TV Tuner RF Amplifiers and Mixers
FM Tuner RF Amplifiers and Mixers
IF Amplifiers
Synchronous Detectors
Wide Band RF Amplifiers



TOP VIEW



SIDE VIEW

LEADS CAN BE PREFORMED TO CUSTOMER SPECIFICATION.

DESCRIPTION

The MEM 6301 MEM 6311 MEM 632 are N-channel. Depletion Mode, Dual-Gate Metal Oxide Semiconductor transistors. They are protected from excessive input voltages by monolithic back-to-back diodes between gates and source.

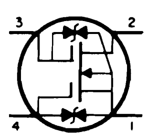
The MEM 630 is intended for use in high frequency RF amplifiers of FM radios. Typical Gps of 22 dB and noise figure of 2.5 dB at 105 MHz.

The MEM 631 is intended for use in VHF amplifiers and high frequency tuned amplifiers such as TV tuners and 44 MHz or 10.7 MHz IF amplifiers. Typical Gps of 19 dB and noise figure of 3.5 dB at 200 MHz. Typical Gps of 30 dB and noise figure of 2.5 dB at 44 MHz.

The MEM 632 is intended for use in HF and VHF mixers. The high conversion gain makes the MEM 632 ideal for TV or FM tuner mixer applications. 105 MHz to 10.7 MHz Conversion Gain of 20 dB. 200 MHz to 44 MHz Conversion Gain of 17 dB.

LEAD CONFIGURATION

1. SOURCE
2. DRAIN
3. GATE 2
4. GATE 1



MAXIMUM RATINGS

Drain – Source Voltage	V_{DS}	25Vdc
Drain Current	I_D	30mAdc
Total Device Dissipation (Package Limitations)	P_D @ T_A = 25°C	500mW
Derate Above 25°C		5.0mW/°C
Operating and Storage Junction Temperature Range		–65 to +175°C

ELECTRICAL CHARACTERISTICS (T_A=25°C UNLESS OTHERWISE SPECIFIED)

SYMBOLS	CHARACTERISTICS	TEST CONDITIONS		MEM630 Min	MEM630 Typ	MEM630 Max	MEM631 Min	MEM631 Typ	MEM631 Mu	MEM632 Min	MEM632 Typ	MEM632 Mu	UNITS
BV_{DSX}	Drain-Source Breakdown Voltage	I_D=10µA, V_S=0, V_{G1}=V_{G2}=–4.0V		20		–	20		–	20		–	volts
BV_{G1SO}	Gate 1-Source Breakdown Voltage	I_{G1}=±10µA, V_{G2S}=0		±6.0			±6.0			±6.0			volts
BV_{G2SO}	Gate 2-Source Breakdown Voltage	I_{G2}=±10µA, V_{G1S}=0		±6.0			±6.0			±6.0			volts
$V_{G1S (off)}$	Gate 1 to Source Cut off Voltage	V_{DS}=15V, V_{G2S}=4.0V, I_D=200µA		–		–4.0	–		–4.0	–		–4.0	volts
$V_{G2S (off)}$	Gate 2 to Source Cut off Voltage	V_{DS}=15V, V_{G1S}=4.0V, I_D=200µA		–		–2.0	–		–3.0	–		–2.0	volts
I_{G1SS}	Gate 1-Leakage Current	V_{G1S}=±4.0V V_{G2S}=0, V_{DS}=0		–		20	–		20	–		m	nAdc
I_{G2SS}	Gate 2-Leakage Current	V_{G2S}=±4.0V V_{G1S}=0 V_{DS}=0		–		20	–		20	–		20	nAdc
I_{DSS}	Zero-Gate Voltage Drain Current	V_{DS}=15V, V_{G1S}=0, V_{G2S}=4.0V		2.0	Note 3	18	5.0	Note 3	30	2.0	Note 3	20	mAdc
Y_{fs1}	Fwd. Transadmittance (Gate 1 – Drain)	V_{DS}=15V, V_{G2S}=4.0V, I_D=10mA, f=1.0kHz		10		20	10		20	10		20	mmho
Ciss	Input Capacitance	V_{DS}=15V		–	–	7.0	–	–	6.0	–	–	7.0	pF
Coss	Output Capacitance	V_{G2S}=4.0V		–	–	3.0	–	–	3.0	–	–	3.0	pF
Crss	Reverse Transfer Capacitance	I_D=I_{DSS}, f=1.0MHz		–	.03	–	–	.03	–	–	–	–	pF
NF	Common Source Noise Figure (See Note #1)	V_{DS}=15V, V_{G25}=4.0V,	f=105MHz	–	2.5	3.5	–	–	–	–	–	–	dB
		I_D=6.0mA,	f= 44MHz	–	–	–	–	2.5	3.0	–	–	–	dB
			f=200MHz	–	–	–	–	3.5	4.0	–	–	–	dB
Gps	Common Source Power Gain (See Note #2)	V_{DS}=15V, V_{G2S}=4.0V,	f=105MHz	17	22	–	–	–	–	–	–	–	dB
		I_D=6.0mA	f= 44MHz	–	–	–	–	30	–	–	–	–	dB
			f=200MHz	–	–	–	16	19	–	–	–	–	dB
Gc	Common Source Conversion Power Gain	V_{DD}=15V,		–	–	–	–	–	–	–		–	
		Signal Freq.=100MHz, Local Osc. f=110.7MHz		–	–	–	–	–	–	15	18	–	dB
		Signal Freq.=200MHz, Local Osc. f=244MHz		–	–	–	–	–	–	12	15	–	dB
riss	Input Resistance	V_{DS}=15V	f=105MHz	–	3.2	–	–	–	–	–	3.2	–	kΩ
		V_{G2S}=4.0V	f= 44MHz	–	–	–	–	15	–	–	–	–	kΩ
		I_D=6.0mA	f=200MHz	–	–	–	–	0.9	–	–	0.9	–	kΩ
ross	output Resistance	V_{DS}=15V	f=105MHz	–	3.5	–	–	–	–	–	–	–	kΩ
		V_{G2S}=400V	f= 44MHz	–	–	–	–	18	–	–	17	–	kΩ
		I_D=6.0mA	f=200MHz	–	–	–	–	1.5	–	–	–	–	kΩ
			f=10.7MHz	–	–	–	–	–	–	–	30	–	kΩ
|Yfs|	Magnitude of Fwd Transadmittance	V_{DS}=15V I_D=6.0mA	f=105MHz	–	14	–	–	–	–	–	–	–	mmho
		V_{G2S}=4.0V	f=200MHz	–	–	–	–	16	–	–	–	–	mmho
|Yrs|	Magnitude of Rev Transadmittance	VDS=15V, I_D=6.0mA	f=105MHz	–	18	–	–	–	–	–	–	–	µmho
		V_{G2S}=4.0V	f=200MHz	–	–	–	–	36	–	–	–	–	µmho
θfs	Angle of Fwd Transadmittance	V_{DS}=15V, I_D=6.0mA	f=105MHz	–	–18	–	–	–	–	–	–	–	degree
		V_{G2S}=4.0V	f=200MHz	–	–	–	–	–35	–	–	–	–	degree
θrs	Angle of Rev Transadmittance	V_{DS}=15V, I_D=6.0mA	f=105MHz	–	90	–	–	–	–	–	–	–	degree
		V_{G2S}=4.0V	f=200MHz	–	–	–	–	–30	–	–	–	–	degree

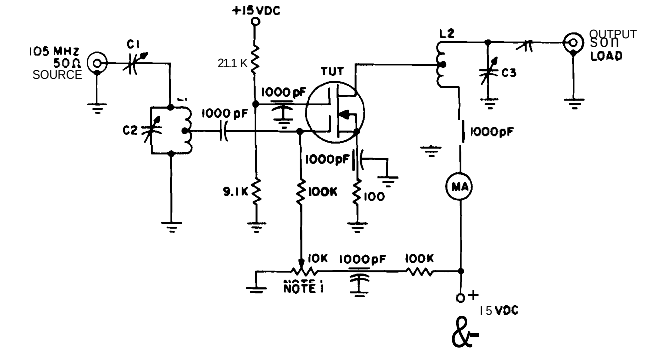
NOTES:
1. Noiw Figure: MEM630 See Fig. #1/MEM631 See Fig. #2 and #3
2. Power Gain: MEM630 See Fig. #1/MEM631 See Fig. #2 and #3

Device	I_{DSS} Range (mA)	Color Code	Suggested Source Resistor (ohms)	Suggested Biasing (volts)
MEM630	2-9	Black Dot	150	V_{G1} = +1.5
100 MHz R.F. Amplifier	7-18	Blue Dot	180	V_{G2S} = +4.0
MEM631	5-13	Black Dot	150*	V_{G1} = +1.5*
200 MHz R.F. Amplifier	11-22	Blue Dot	180*	V_{G2S} = +4.0*
	20-30	Red Dot	200*	
MEM632	2-9	Black Dot	100	V_{G1} = +0.5
Mixer	7-14	Blue Dot	100	V_{G2} = +1.5
	12.20	Red Dot	100	

*When the MEM631 is used as an I.F. amplifier, the suggested source resistor is 270 ohms with V_{G1} = +1.0 volts and V_{G2S}=+4.0 volts.

INDUSTRIAL/ MOSFET

Fig. 1 — 105 MHz POWER GAIN/NOISE FIGURE TEST CIRCUIT



L1 6T NO. 18 BARE COPPER WIRE ON 5/16" DIAM. CORE. 1/2" LONG TAP AT 4-1/21. C_t = 17.8pF R_t = 15K AT 100MHz, MOUNTEO.

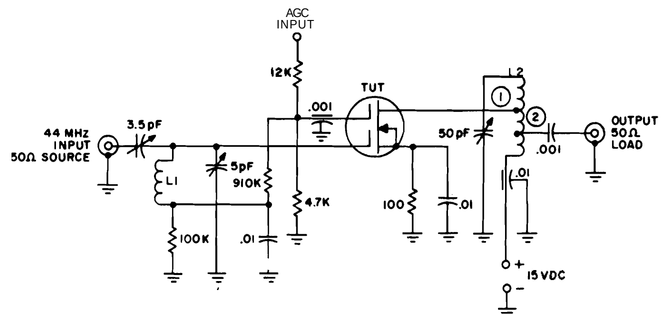
LZ SAME AS L1, BUT R_t = 30K MOUNTEO.

C1,C4 0.9 TO 7.0pF TRIMMER.

C2,C3 AIR VARIABLE CAPACITOR 20pF MAX.

NOTE 1: ADJUST 10K POT. FOR 6mA I_D.

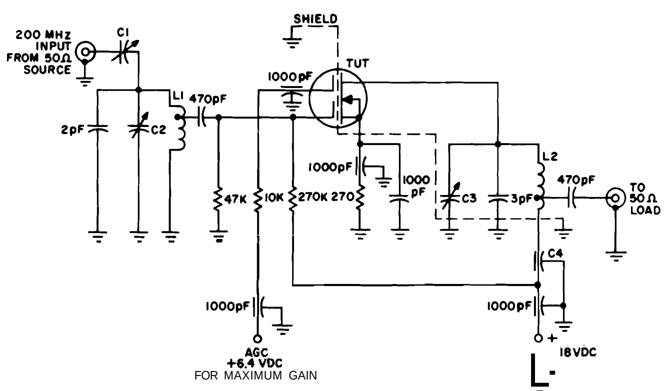
Fig. 2 — 44 MHz POWER GAIN/NOISE FIGURE TEST CIRCUIT



L1 14T NO 32 COTTON COVERED COPPER WIRE CLOSE WOUND ON 1/4" DIAM. FORM

L2 7T NO 16 BARE COPPER WIRE ON 1/2" FORM. 1/2" WNG
DRAIN TAP 2-1/21 FROM COLO END
(2) LOAD T4P 0.4T FROM COLO END

Fig. 3 — 200 MHz POWER GAIN/NOISE FIGURE TEST CIRCUIT



L1 4T NO.16 BARE COPPER WIRE 3/16" DIAM. FORM. 1/2" LONG TAP AT 3T FROM COLO END.

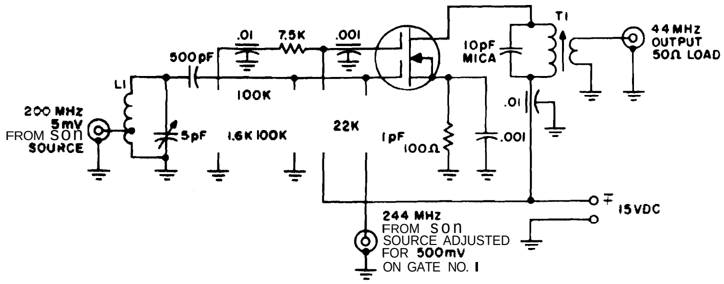
L2 4T NO. 16 1/4" DIAM. FORM. 1/2" LONG TAP AT 3/4T FROM COLO END.

C1 0.4 TO 7pF (ARCO 400).

C2,C3 1.3 TO 5pF VARIABLE.

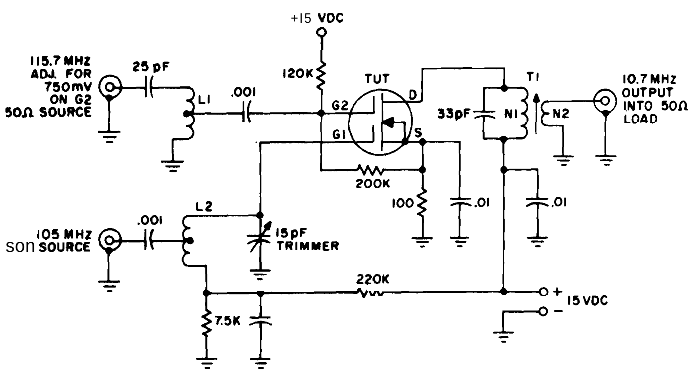
C4 1000pF BUTTON TYPE CAPACITOR.

Fig. 4 — 200 MHz to 44 MHz MIXER TEST CIRCUIT



L1 3T NO. 16 BARE COPPER WIRE ON 1/16" CORE. 1/2" LONG TAP AT 3/4T FROM COLD END
T1 PRIMARY 10T NO. 32 COTTON COVERED COPPER WIRE CLOSE WOUND ON 1/4" FORM.
SECONDARY 1T NO.32 ENAMELED COPPER WIRE ADJUSTED FOR 16 TO 1 TURNS RATIO.

Fig. 5 — 105 MHz to 10.7 MHz CONVERSION GAIN TEST CIRCUIT (PRODUCT MIXER)



L1 6T NO. 18 BARE COPPER WIRE ON 5/16" DIAM. CORE. 1/2" LONG TAP AT 2T FROM COLD END.
L2 4T NO. 18 BARE COPPER WIRE ON 5/16" DIAM. CORE, 3/8" LONG TAP AT 1T FROM COLD END
T1 Q_0 = 67 AT 10.7MHz, N1/N2 = 17.

INDUSTRIAL