

DESCRIPTION

The 5596 is a monolithic Double-Balanced Modulator/Demodulator designed for use where the output voltage is a product of an input voltage (signal) and a switched function (carrier). The S5596 will operate over the full military temperature range of -55°C to +125°C. The N5596 is intended for applications within the range of 0°C to +70°C.

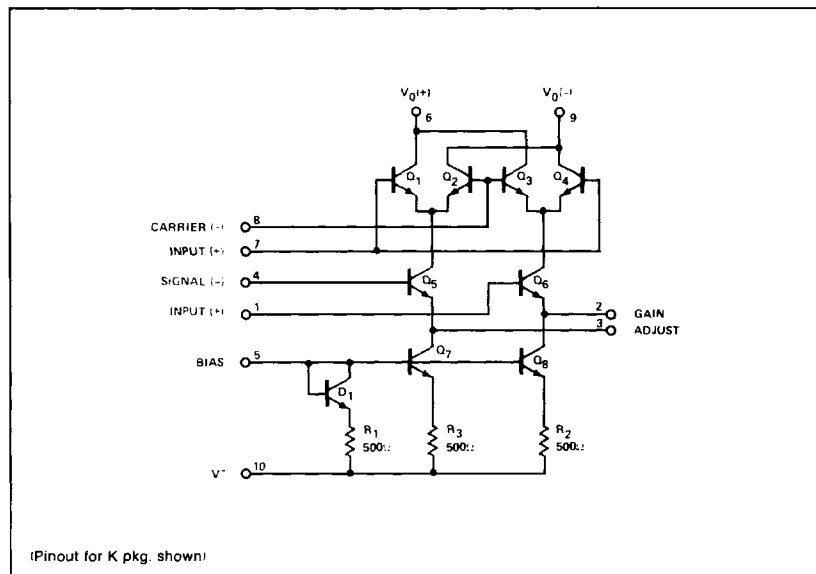
APPLICATIONS

- Suppressed carrier and amplitude modulation
- Synchronous detection
- FM detection
- Phase detection
- Sampling
- Single sideband
- Frequency doubling

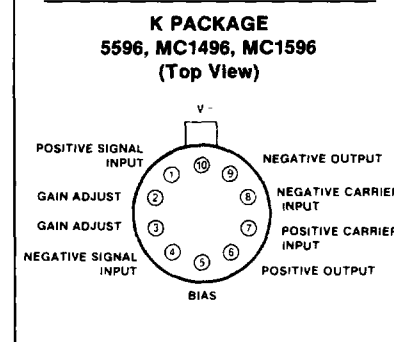
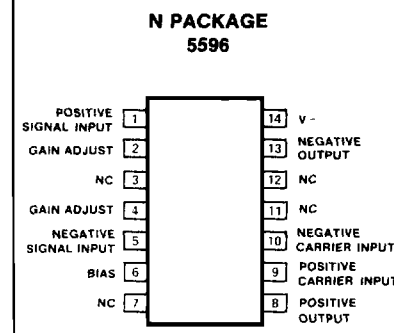
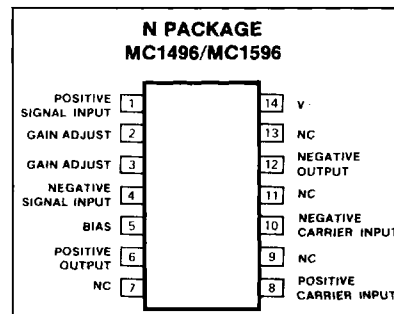
FEATURES

- Excellent carrier suppression
65dB typ @ 0.5MHz
50dB typ @ 10MHz
- Adjustable gain and signal handling
- Balanced inputs and outputs
- High common-mode rejection—85dB typ

EQUIVALENT SCHEMATIC



PIN CONFIGURATIONS



ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Applied voltage ^{1,2}	30	V
Differential input signal (V ₇ -V ₈)	±5.0	V
Differential input signal (V ₄ -V ₁)	(5 ± 15 R _θ)	V
Input signal (V ₂ -V ₁ , V ₃ -V ₄)	5.0	V
Bias current (I _b)	10	mA
Power dissipation (pkg. limitation)		
K package	680	mW
Derate above 25°C	5.4	mW/°C
A package (TO-116)	900	mW
Derate above 25°C	7.2	mW/°C
Operating temperature range	-55 to +125	°C
Storage temperature range	-65 to +150	°C

NOTES

1. Voltage applied between pins 6-7, 8-1, 9-7, 9-8, 7-4, 7-1, 8-4, 6-8, 2-5, 3-5.
2. Pin number references pertain to K package pinout only.

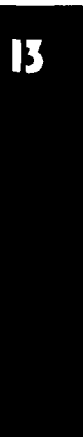
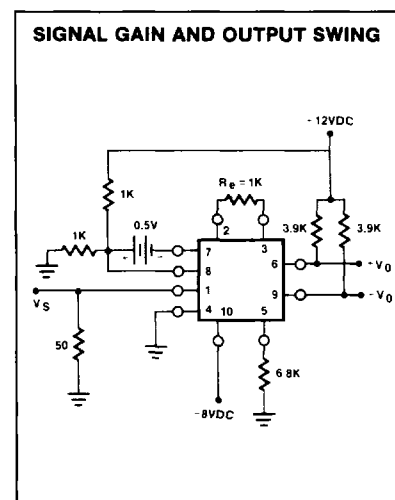
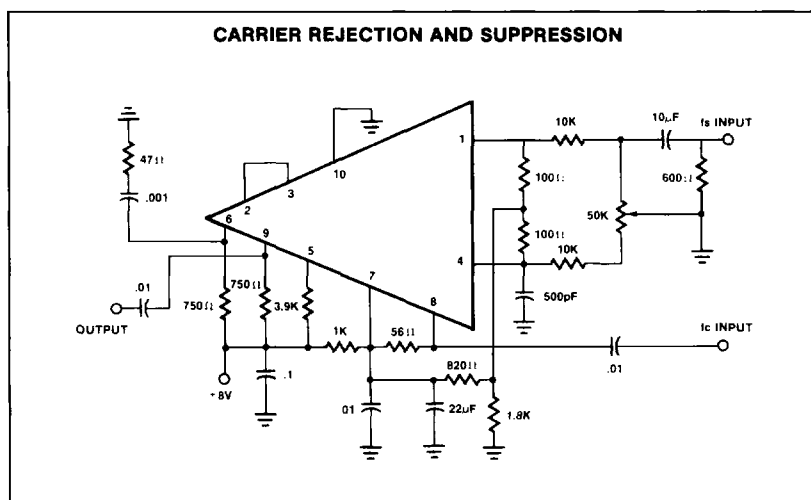
DC ELECTRICAL CHARACTERISTICS

$V^+ = +12Vdc$, $V^- = -9.0Vdc$, $I_S = 1.0mA$, $R_L = 3.9k\Omega$, $R_e = 1.0k\Omega$, $T_A = 25^\circ C$ unless otherwise specified.

PARAMETER	TEST CONDITIONS	MC1596			MC1496/5596			UNIT
		Min	Typ	Max	Min	Typ	Max	
R_{ip} C_{ip}	Single-ended input impedance Parallel input resistance Parallel input capacitance		200 2.0			200 2.0		$k\Omega$ pF
R_{op} C_{op}	Single-ended output impedance Parallel output resistance Parallel output capacitance		40 5.0			40 5.0		$k\Omega$ pF
I_{bS} I_{bC}	Input bias current $I_{bS} = \frac{I_1 + I_4}{2}$ $I_{bC} = \frac{I_7 + I_8}{2}$		12 12	25 25		12 12	30 30	μA μA
I_{ioS} I_{ioC}	Input offset current $I_{ioS} = I_1 - I_4$ $I_{ioC} = I_7 - I_8$		0.7 0.7	5.0 5.0		0.7 0.7	7.0 7.0	μA μA
T_{cIio} I_{oo}	Average temperature coefficient of input offset current Output offset current $I_{oo} = I_6 - I_9$		2.0 14			2.0 15		nA/ $^\circ C$ μA
T_{cIoo} V_o	Average temperature coefficient of output offset current Common-mode quiescent output voltage (Pin 6 or Pin 9)		90 8.0			90 8.0		nA/ $^\circ C$ Vdc
I_{D+} I_{D-}	Power supply current $I_{D+} = I_6 + I_9$ $I_{D-} = I_{10}$		2.0 3.0	3.0 4.0		2.0 3.0	4.0 5.0	mAdc
P_D	DC power dissipation		33			33		mW

NOTE

Pin number references pertain to K package pinout only.



AC ELECTRICAL CHARACTERISTICS $V^+ = +12V_{dc}$, $V^- = -9.0V_{dc}$, $I_S = 1.0mAdc$, $R_L = 3.9k\Omega$, $R_e = 1.0k\Omega$, $T_A = +25^\circ C$ unless otherwise specified.

PARAMETER	TEST CONDITIONS	MC1596			MC1496/5596			UNIT
		Min	Typ	Max	Min	Typ	Max	
V _{CFT} Carrier feedthrough	$V_C = 60mV_{rms}$ sinewave and offset adjusted to zero $f_C = 1.0kHz$ $f_C = 10MHz$ $V_C = 300mV_{p-p}$ squarewave: Offset adjusted to zero $f_C = 1.0kHz$ Offset not adjusted $f_C = 1.0kHz$		40 140			40 140		μV_{rms}
			0.04 20	0.2 100		0.04 20	0.4 200	
V _{CS} Carrier suppressions	$f_S = 10kHz$, $300mV_{rms}$ sinewave $f_C = 500kHz$, $60mV_{rms}$ sinewave $f_C = 10MHz$, $60mV_{rms}$ sinewave	50	65 50		40	65 50		dB
BW _{3dB} Transadmittance bandwidth (Magnitude) ($R_L = 50\Omega$)	Carrier input port, $V_C = 60mV_{rms}$ sinewave $f_S = 1.0kHz$, $300mV_{rms}$ sinewave Signal input port, $V_S = 300mV_{rms}$ sinewave $ V_C = 0.5V_{dc}$		300			300		MHz
			80			80		MHz
AV _S Signal gain	$V_S = 100mV_{rms}$; $f = 1.0kHz$ $ V_C = 0.5V_{dc}$	2.5	3.5		2.5	3.5		V/V
CMV Common-mode input swing	Signal port, $f_S = 1.0kHz$		5.0			5.0		Vp-p
ACM Common-mode gain	Signal port, $f_S = 1.0kHz$ $ V_C = 0.5V_{dc}$		-85			-85		dB
DV _{OUT} Differential output voltage swing capability			8.0			8.0		Vp-p

NOTE

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