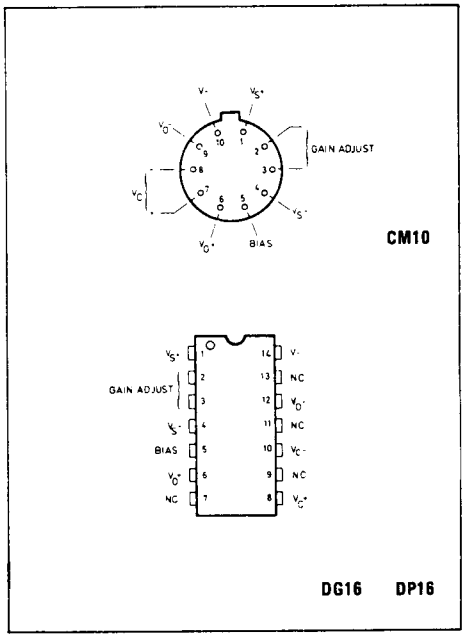
PLESSEY
Solid State

SL1496C SL1596C

DOUBLE-BALANCED MODULATOR/DEMODULATOR

The SL1596C and SL1496C are versatile monolithic integrated circuit double balanced modulators/demodulators, designed for use where the output voltage is the product of the signal input voltage and the switching carrier voltage. The SL1596 has an operating temperature range of −55°C to +125°C, whilst that of the SL1496 is 0°C to +70°C.



FEATURES

- Carrier Suppression — 65dB Typ. @ 500 kHz, 50dB Typ. @ 10 MHz
- Common Mode Rejection — 85dB Typ.
- Gain and Signal Handling Both Adjustable
- Balanced Inputs and Outputs

APPLICATIONS

- DSB, DSBSC, AM Modulation
- Synchronous Detection
- FM Detection
- Phase Detection
- Telephone FDM Systems

ORDERING CODES

SL1496C — CM, SL1496C — DG, SL1496C — DP
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ABSOLUTE MAXIMUM RATINGS

(Pin number reference to CM package)

Applied voltage*	30V
Differential input signal (V_7—V_8)	±5V
Differential input signal (V_4—V_1)	± (5+1.5R_E)V
Bias current (I_5)	10mA
Operating temperature range	
SL1496	0 °C to +70 °C
SL1596	−55 °C to +125 °C

CM Package

Storage temperature range	−55 °C to +175 °C
Junction temperature	+175 °C
Package dissipation (25 °C)	680mW

DG Package

Storage temperature range	−55 °C to +175 °C
Junction temperature	+175 °C
Package dissipation (25 °C)	600mW

DP Package

Storage temperature range	−55 °C to +125 °C
Junction temperature	+125 °C
Package dissipation (25 °C)	500mW

ELECTRICAL CHARACTERISTICS

Test Conditions (unless otherwise stated):–
$V^+ = +12V$ DC, $V^- = -8V$ DC, $I_5 = 1.0$ mA DC, $R_L = 3.9$ kΩ, $R_e = 1.0$ kΩ $T_A = +25°C$
All input and output characteristics single-ended, unless otherwise stated.

Characteristic*		SL1596 Min	SL1596 Typ	SL1596 Max	SL1496 Min	SL1496 Typ	SL1496 Max	Units
Carrier Feedthrough								μV(rms)
V_C = 60 mV(rms) sinewave and offset adjusted to zero	f_C = 1.0 kHz	–	40	–	–	40	–	
	f_C = 10 MHz	–	140	–	–	140	–	
V_C = 300 mVp-p square wave								mV(rms)
offset adjusted to zero	f_C = 1.0 kHz	–	0.04	0.2	–	0.04	0.4	
offset not adjusted	f_C = 1.0 kHz	–	20	100	–	20	200	
Carrier Suppression								dB
f_S = 10 kHz, 300 mV(rms)								
f_C = 500 kHz, 60 mV(rms) sinewave		50	65	–	40	65	–	
f_C = 10 MHz, 60 mV(rms) sinewave		–	50	–	–	50	–	
Signal Gain		2.5	3.5	–	2.5	3.5	–	V/V
V_S = 100 mV(rms), f = 1.0 kHz, $\lvert V_C \rvert$ = 0.5 V DC								
Single-Ended Input Impedance, Signal Port, f = 5.0 MHz								
Parallel Input Resistance		–	200	–	–	200	–	kΩ
Parallel Input Capacitance		–	2.0	–	–	2.0	–	pF
Single-Ended Output Impedance, f = 10 MHz								
Parallel Output Resistance		–	40	–	–	40	–	kΩ
Parallel Output Capacitance		–	5.0	–	–	5.0	–	pF
Input Bias Current $\frac{I_1 + I_4}{2}$, $\frac{I_7 + I_8}{2}$		–	12	25	–	12	30	μA
Input Offset Current $(I_1 - I_4)$, $(I_7 - I_8)$		–	0.7	5.0	–	0.7	7.0	μA
Average Temperature Coefficient of Input Offset Current (T_A = −55°C to +125°C)		–	2.0	–	–	2.0	–	nA/°C
Output Offset Current $(I_6 - I_9)$		–	14	50	–	14	80	μA
Average Temperature Coefficient of Output Offset Current (T_A = −55°C to +125°C)		–	90	–	–	90	–	nA/°C
Common-Mode Input Swing, Signal Port, f_S = 1.0 kHz		–	5.0	–	–	5.0	–	Vp-p
Common-Mode Gain, Signal Port, f_S = 1.0 kHz, $\lvert V_C \rvert$ = 0.5 V DC		–	85	–	–	−85	–	dB
Common-Mode Quiescent Output Voltage (Pin 6 or Pin 9)		–	8.0	–	–	8.0	–	V DC
Differential Output Voltage Swing Capability		–	8.0	–	–	8.0	–	Vp-p
Power Supply Current								mA DC
$I_6 + I_9$		–	2.0	3.0	–	2.0	4.0	
I_{10}		–	3.0	4.0	–	3.0	5.0	
DC Power Dissipation		–	33	–	–	33	–	mW

*Pin numbers are given for TO-5 package.

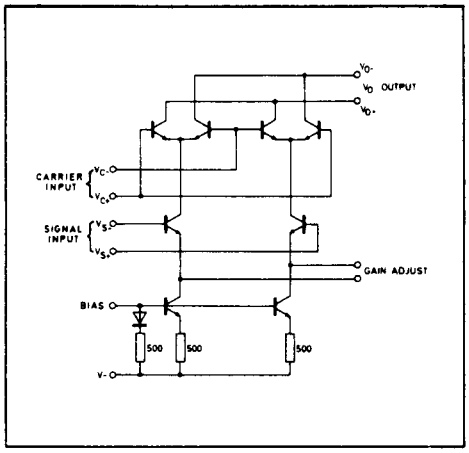

Fig. 2 Circuit diagram

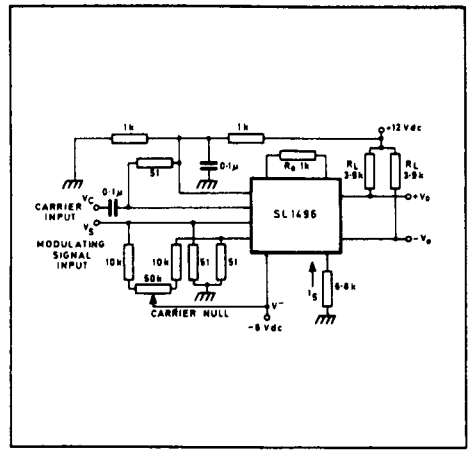

Fig. 3 Typical modulator circuit