PRELIMINARY SPECIFICATION

LOW POWER MONOLITHIC TTL ELEMENT

DUAL EXCLUSIVE OR GATE

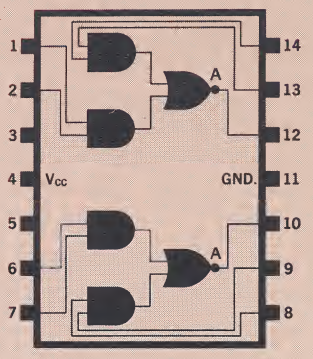
OCTOBER 1966

SE440J

The SE440J is a semiconductor integrated circuit fabricated within a monolithic substrate by planar and epitaxial techniques. It was designed for maximum speed consistent with extremely low power operation. It is intended for use in applications where high density packaging and the ability to drive high capacitances associated with multilayer printed-circuit boards are important considerations. The SE440J offers two EXCLUSIVE-OR gates in the TO-88, 14-lead flat package. It is compatible with the other elements of the SE400 Series under worst-case temperature and power supply variations.

FEATURES

• LOW POWER	7.5 mW
• HIGH NOISE MARGIN	1.0 Volt
• HIGH FAN-OUT	8
• BROAD TEMPERATURE RANGE	-55°C to +125°C
• EXCLUSIVE "OR" FUNCTION	
• HIGH SPEED	30 ns



NOTE:

(1) A — Active pull-up

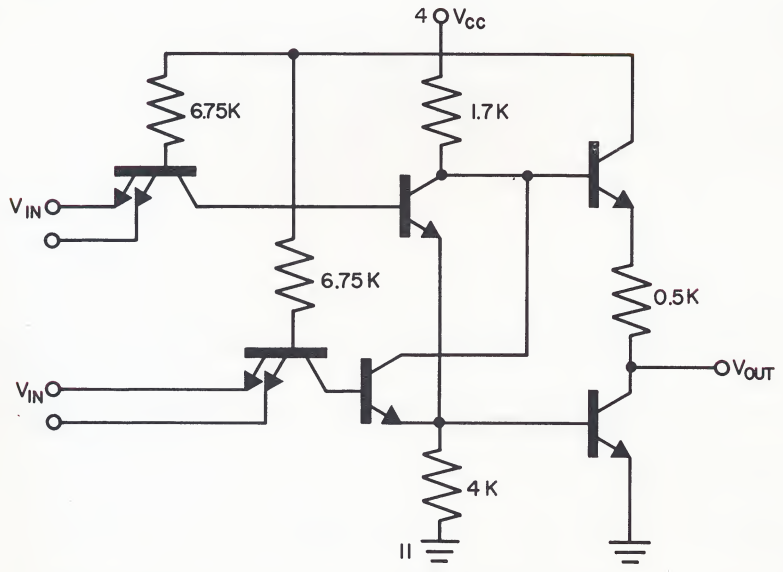
$$\bar{A}B + \bar{B}A = C$$

TRUTH TABLE

$\bar{A}$	B	$\bar{B}$	A	C
1	1	0	0	0
0	0	1	1	0
0	1	1	0	1
1	0	0	1	1

BASIC CIRCUIT SCHEMATIC

NOTE: ½ of SE440J shown. Component values are typical.



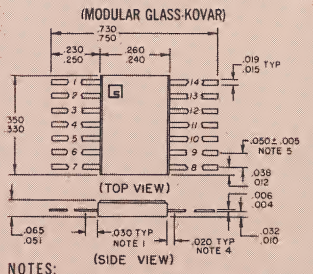
ABSOLUTE MAXIMUM RATINGS

INPUT VOLTAGE	6.0V	OPERATING TEMP.	-55°C to +125°C
V_{cc}	6.0V	STORAGE TEMP.	-65°C to +150°C
INPUT CURRENT	±10mA	θ(Junct. to Still Air)	0.3°C/mW
OUTPUT CURRENT	+30mA, -10mA	JUNCTION TEMP.	175°C Max.

Maximum ratings are limiting values above which serviceability may be impaired.

J-PACKAGE—(TO-88)

(MODULAR GLASS-KOVAR)



NOTES:
(1) Recommended minimum offset before lead bend.
(2) All leads weldable and solderable.
(3) All dimensions in inches.
(4) Lead spacing dimensions apply to this area only.
(5) Spacing tolerances non-cumulative.

SE440J

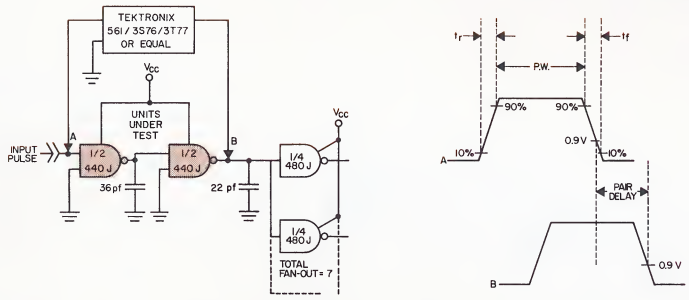
ELECTRICAL CHARACTERISTICS (Notes: 1, 2, 3, 4, 5, 6)

CHARACTERISTIC	LIMITS				TEST CONDITIONS					
	MIN.	TYP.	MAX.	UNITS	TEMP.	V_{cc}	DRIVEN INPUT	OTHER INPUTS	OUTPUTS	NOTES
"1" OUTPUT VOLTAGE	2.70	2.80		V	-55°C	4.0V	0.9V		-180μA	8
	2.70	2.80		V	+25°C	4.0V	0.9V		-180μA	8
	2.70	2.85		V	+125°C	4.0V	0.7V		-180μA	8
"0" OUTPUT VOLTAGE		0.20	0.30	V	-55°C	4.0V	1.9V	1.9V	4.5mA	
		0.25	0.30	V	+25°C	4.0V	1.7V	1.7V	5.6mA	
		0.25	0.30	V	+125°C	4.0V	1.3V	1.3V	5.6mA	
		0.20	0.30	V	-55°C	3.6V	1.9V	1.9V	3.7mA	
"0" INPUT CURRENT	-0.31	-0.43	-0.55	mA	+25°C	4.0V	0.3V	0V		
		-0.49	-0.62	mA	+25°C	4.4V	0.3V	0V		
"1" INPUT CURRENT		0.4	10	μA	+25°C	3.6V	3.6V	0V		
		4.0	20	μA	+125°C	3.6V	3.6V	0V		
PAIR DELAY (Figure 1)	35		74	ns	+25°C	4.0V			DC F.O.=7	9
	38		88	ns	+25°C	3.6V			DC F.O.=7	9
	33		66	ns	+25°C	4.4V			DC F.O.=7	9
OUTPUT FALLING RATE (Figure 2)			30	ns/V	-55°C	3.6V			AC F.O.=1	10, 11
			30	ns/V	+25°C	3.6V			AC F.O.=3	10, 11
INPUT CAPACITANCE			3.0	pf	+25°C	4.0V	2.0V	0V		7
POWER CONSUMPTION (PER GATE)										
OUTPUT "0"		11	16	mW	+125°C	4.0V				
OUTPUT "1"		4.0	5.6	mW	+125°C	4.0V	0V			
INPUT VOLTAGE RATING	6.0			V	+25°C	4.0V	50μA	0V		
OUTPUT SHORT CIRCUIT CURRENT	-3.6		-7.8	mA	+25°C	4.0V	0V	0V	0V	

NOTES:

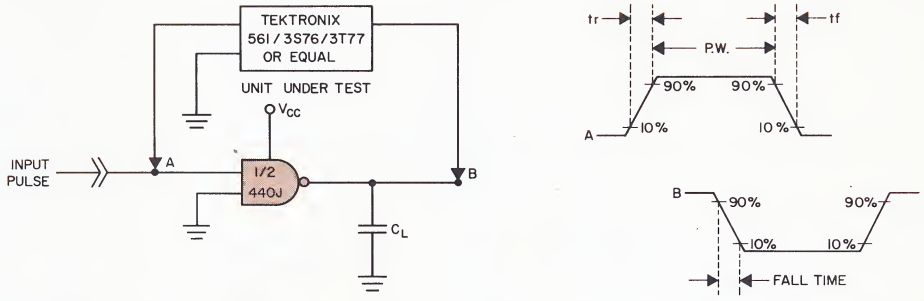
(1) All voltage and capacitance measurements are referenced to the ground terminal. Terminals not specifically referenced are left electrically open.
(2) All measurements are taken with Pin 11 tied to zero volts.
(3) Positive current flow is defined as into the terminal referenced.
(4) Positive NAND Logic definition: "UP" Level = "1", "DOWN" Level = "0".
(5) Precautionary measures should be taken to ensure current limiting in accordance with maximum ratings should the isolation diodes become forward biased.
(6) Measurements apply to each gate element independently.
(7) Capacitance as measured on Boonton Electronic Corporation Model 75A-S8 Capacitance Bridge or equivalent, f = 1 MHz, Vac = 25 mVrms. All pins not specifically referenced are tied to guard for capacitance tests.
(8) Output leakage current is supplied through a resistor to ground.
(9) DC fan-out is defined in terms of a Signetics Standard Load, which is an SE480J gate input or an equivalent impedance.
(10) One AC fan-out is defined as equivalent to one clock pulse input of an SE424J or a 50 pf capacitance load.
(11) Output Falling Rate = $\frac{t_f}{0.8\,(V1_o - V0_o)}$ = ns/V.
(12) Manufacturer reserves the right to make design or process changes and improvements.

FIGURE 1 — PAIR DELAY



NOTES: (1) Capacitance values shown above include probe and test fixture capacitance.
(2) Input Pulse Characteristics: Amplitude=+2.7 V; f=1.0 MHz; PW=350 ns; t_r=t_f=10 ns.

FIGURE 2 — FALL TIME



NOTES: (1) C_L includes test fixture and probe capacitance. C_L=77 pf at T_A=-55°C; C_L=187 pf at T_A +25°C.
(2) Input Pulse Characteristics: Amplitude=+2.7 V; f=1.0 MHz; PW=200 ns; t_r=t_f=10 ns.

SIGNETICS CORPORATION • 811 EAST ARQUES AVENUE, SUNNYVALE CALIFORNIA • TEL: (408) 739-7700 • TWX: (910) 339-9220

Printed in U.S.A.

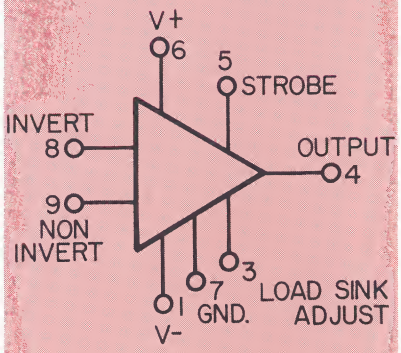
VOLTAGE COMPARATOR

SIGNETICS MONOLITHIC LINEAR CIRCUITS

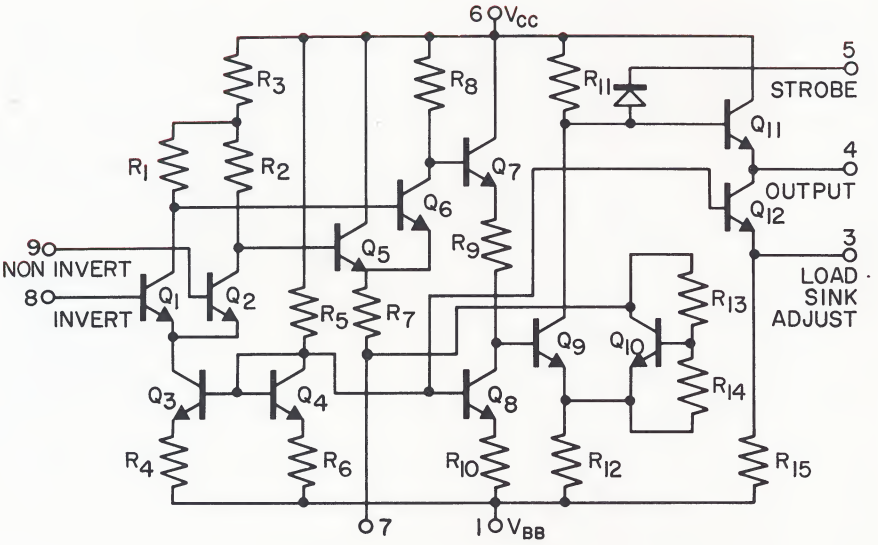
SE518G
SE518K

The Signetics SE518 is a medium-gain, high-frequency differential amplifier fabricated within a monolithic silicon substrate by planar and epitaxial techniques. It is designed for voltage comparator, sense amplifier and general broadband amplifier applications. Its superior current sinking and current sourcing capabilities make it ideal for driving digital circuitry. The SE518 is designed to operate over the full MIL temperature range of -55°C to +125°C and is guaranteed to meet or exceed all environmental requirements of MIL-S-19500D and MIL-STD-750. Among the device's outstanding features are:

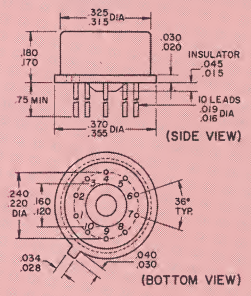
- STROBE CONTROL
- ADJUSTABLE CURRENT SINK
- RESPONSE TIME = 55 ns
- INPUT OFFSET VOLTAGE = 1.0mV
- OPEN LOOP GAIN = 2100
- OUTPUT IMPEDANCE = 50Ω
- BANDWIDTH = 5.0 MHz



CIRCUIT SCHEMATIC

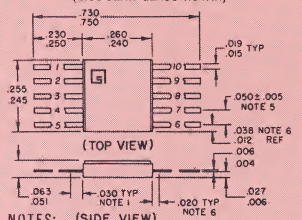


K-PACKAGE (TO-100)



G-PACKAGE—(TO-91)

(MODULAR GLASS-KOVAR)



NOTES:
(1) Recommended minimum offset before lead bend.
(2) All leads weldable and solderable.
(3) Pin 1 internally connected to case.
(4) All dimensions in inches.
(5) Tolerances are non-cumulative.
(6) Lead spacing dimensions apply to this area only.
(7) Signetics symbol on flat package locates lead No. 1.

ABSOLUTE MAXIMUM RATINGS

VOLTAGE APPLIED (Positive)	+8.0V
VOLTAGE APPLIED (Negative)	-4.0V
VOLTAGE APPLIED (Input)	±5.0V
POWER CONSUMPTION	300mW
POWER SUPPLY CURRENT RATING	-25mA
OUTPUT SOURCE CURRENT	20mA
STORAGE TEMPERATURE	-65°C to +150°C
OPERATING TEMPERATURE	-55°C to +125°C

Maximum ratings are limiting values above which serviceability may be impaired.

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ELECTRICAL CHARACTERISTICS (Note: 1)

ACCEPTANCE TEST SUB-GROUP	CHARACTERISTIC	SYMBOL	V^+=+6.0V, V^-=-3.0V			V^+=+4.0V, V^-=-2.0V			UNITS	TEMP.	NOTES	TEST CONDITIONS
			MIN.	TYP.	MAX.	MIN.	TYP.	MAX.				
A-5	OPEN LOOP VOLTAGE GAIN	A_{VO}				300			V/V	-55°C		
A-3						400	700		V/V	+25°C		
A-4						400	700		V/V	+125°C		
C-1			1600	2100					V/V	+25°C		
C-2	OPEN LOOP BANDWIDTH	BW	3.0	5.0		3.0	5.0		MHz	+25°C		V_4=1.0V
A-5	POWER SUPPLY CURRENT	I_1, I_6		19	25		12		mA	-55°C		$V_8=V_9$=0V
A-2					25				mA	+25°C		
A-4					25				mA	+125°C		
A-5	INPUT OFFSET VOLTAGE	$\|V_8-V_9\|$						5.0	mV	-55°C		V_4=1.0V, V_8=0V
A-2				1.0			2.0	4.0	mV	+25°C		
A-4								5.0	mV	+125°C		
	INPUT OFFSET CURRENT	$\|I_8-I_9\|$		2.0	10		2.0	10	μA	+25°C		
A-5	INPUT BIAS CURRENT	I_8, I_9						50	μA	-55°C		
A-2				28			20	25	μA	+25°C		
A-2	COMMON MODE REJECTION RATIO			80		70			db	+25°C		
	DIFFERENTIAL INPUT IMPEDANCE	Z_{IN}		2500			3000		Ω	+25°C		f≤10KHz
	OUTPUT IMPEDANCE	Z_{OUT}		50	100		50	100	Ω	+25°C		f≤10KHz
A-2	OUTPUT SINK CURRENT	I_4		2.8		1.6	2.0	2.2	mA	+25°C	2	V_8=0V, V_9=-0.1V
A-2	OUTPUT SOURCE CURRENT	I_4		15		15			mA	+25°C		V_8=0V, V_9=0.1V, R_L=150 Ω
A-5	OUTPUT VOLTAGE SWING (Positive)	V_4	4.7						V	-55°C		V_8=0V, V_9=0.1V
A-2			5.0	5.1			3.2		V	+25°C		
A-4			5.0						V	+125°C		
A-5	OUTPUT VOLTAGE SWING (Negative)	V_4	1.5						V	-55°C		V_8=0V, V_9=-0.1V
A-2			1.2	1.4			1.2		V	+25°C		
A-4			0.8						V	+125°C		
A-6	TURN ON DELAY TIME	t_{d_1}		40			40	50	ns	+25°C	3, 4	
A-6	RISE TIME	t_r		15			15	25	ns	+25°C	3, 4	
A-6	TURN OFF DELAY TIME	t_{d_2}		40			40	50	ns	+25°C	3, 4	
A-6	FALL TIME	t_f		15			15	25	ns	+25°C	3, 4	
	STROBE RELEASE TIME	T_R		5.0			5.0		ns	+25°C		
A-3	STROBE ON CURRENT	I_{5_A}		1.9		1.8	2.4	2.8	mA	+25°C		$V_5=V_8$=0V, V_9=0.1V
A-2	STROBE LEAKAGE CURRENT	I_{5_B}		0.05				0.1	μA	+25°C		V_5=8.0V, V_8=0V, V_9=-0.1V
A-4								10	μA	+125°C		

NOTES:

(1) All voltages are referenced to Pin 7. Pin 1 is connected to case.

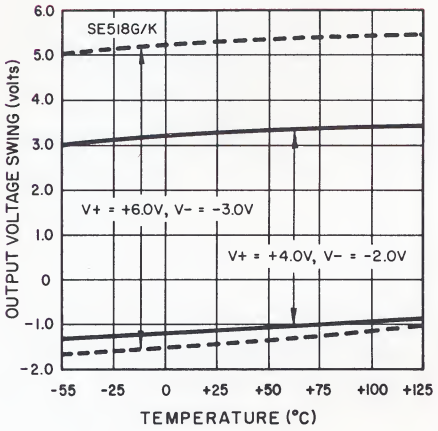
(2) Output sink current capability may be increased up to 10mA by connecting an external resistor between Pins 1 and 3.

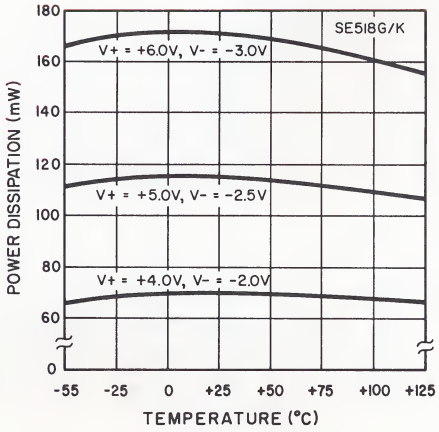
(3) Differential Overdrive Voltage = 10mV.

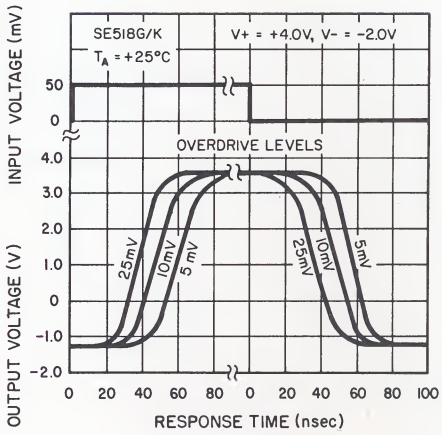
(4) $T_{ON} = t_{d_1} + t_r$, $T_{OFF} = t_{d_2} + t_f$.

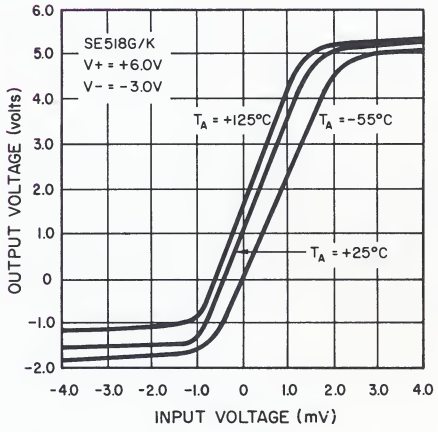
(5) Manufacturer reserves the right to make design or process changes.

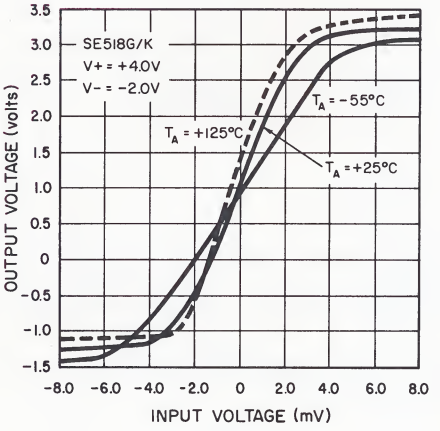
TYPICAL CHARACTERISTICS

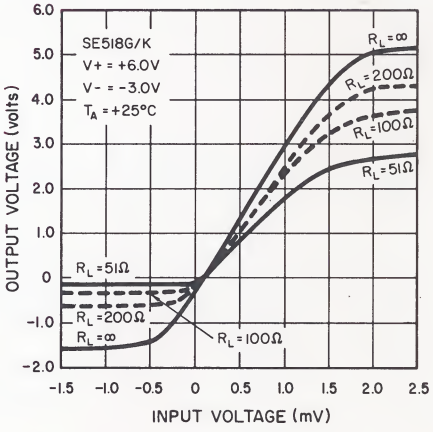


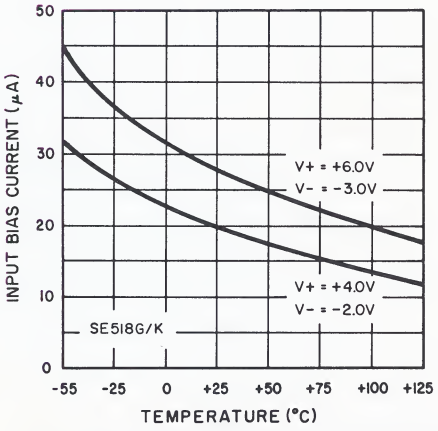


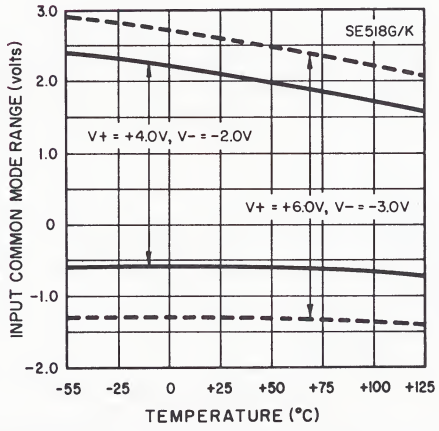


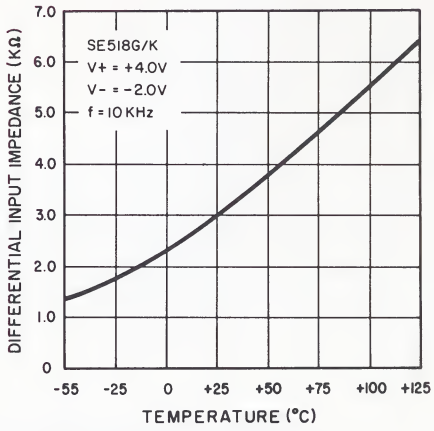




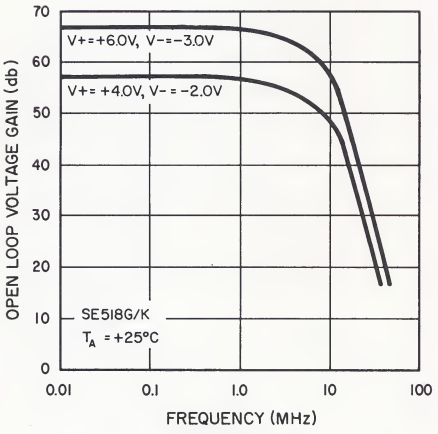


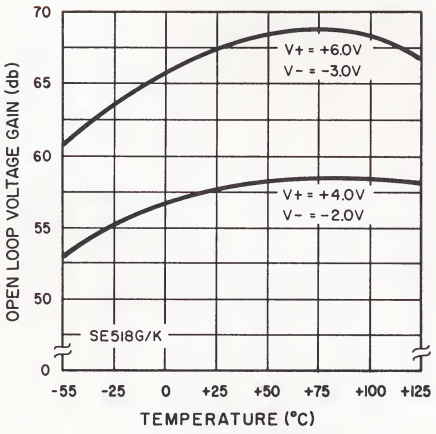


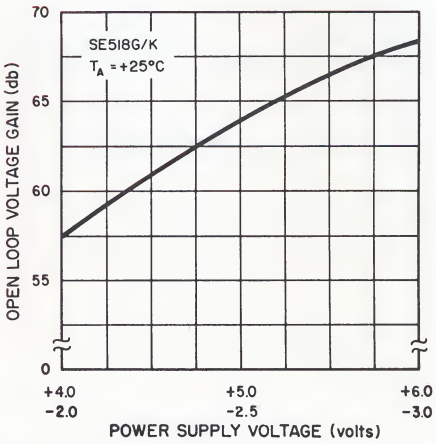




TYPICAL CHARACTERISTICS







SE518 fan-out for typical DTL loads is one, however, provision is made for increasing the current sinking capability by connecting an external resistor between Pins 1 and 3. The value of this resistance (R_{ext}) for any sinking current up to 10mA, may be determined from the following equation:

$$R_{(ext)} = \frac{V_{1-3}\ R_{1-3}}{I_S\ R_{1-3} - V_{1-3}}$$

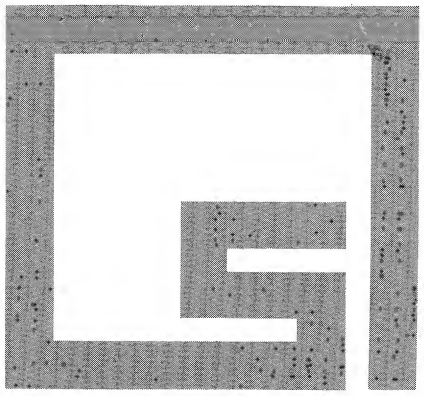
Where:

V_{1-3} = the voltage between Pins 1 and 3
(typically 0.4V at V^+ = 4.0V, V^- = 2.0V,
typically 0.56V at V^+ = +6.0V, V^- = -3.0V)

R_{1-3} = the value of the internal resistance between Pins 1 and 3
(typically 225 Ω)

I_S = desired sink current.

SIGNETICS INTEGRATED CIRCUITS



PRICE LIST

Effective September 12, 1966

SIGNETICS CORPORATION
811 EAST ARQUES AVENUE, SUNNYVALE, CALIFORNIA

CATALOG NUMBER	DESCRIPTION		Single Type 100 — 999	100 — 999†	25 — 99†	1 — 24
I	**COMPATIBLE DTL ELEMENTS (-55°C to +125°C) IN 10-LEAD TO-5 (Also available 0°C to +70°C) ****					
SE101K **	4-Input NAND/NOR Gate*			$ 11.95	$ 13.15	$ 15.00
SE102K **	3-Input NAND/NOR Gate*			11.75	12.90	14.70
SE105K **	6-Input Gate Expander			8.45	9.30	10.50
SE110K **	3-Input High Fan-Out NAND/NOR Gate*			12.45	14.60	16.55
SE113K **	Dual 3-Input High Fan-Out NAND/NOR Gate			12.45	14.60	16.55
SE115K **	Dual 2-Input NAND/NOR Gate			12.45	14.60	16.55
SE124K **	RST Binary Element			13.45	16.15	20.20
SE150K **	2-Input CLOCK/CAPACITIVE Line Driver			12.95	14.90	17.20
SE157K **	Dual 3-Input CLOCK/CAPACITIVE Line Driver			12.95	14.90	17.20
SE160K **	One-Shot Multivibrator*			38.50	46.00	57.50
SE161K **	One-Shot Multivibrator			48.00	57.50	72.00
SE181K **	Quadruple Inverter			13.45	16.15	20.20
CS700K **	Dual 3-2-Input NAND/NOR Gate			12.95	14.90	17.20
CS701K **	Dual 3-2-Input NAND/NOR Gate			12.95	14.90	17.20
CS704K	RST Binary Element			13.95	16.70	21.00
CS705K	Dual 3-Input AND Gate			9.75	11.20	13.00
CS709K	Dual 3-Input Gate Expander			5.55	6.65	8.30
CS715K	Dual 2-Input CLOCK/CAPACITIVE Line Driver*			13.45	16.10	20.00
CS716K	Dual 2-Input High Fan-Out NAND/NOR Gate*			12.95	15.60	19.50
II	**COMPATIBLE DTL ELEMENTS (-55°C to +125°C) IN 10-LEAD FLAT PACK (Also available 0°C to +70°C)****					
SE101G **	4-Input NAND/NOR Gate*			13.45	14.80	16.80
SE102G **	3-Input NAND/NOR Gate*			13.25	14.55	16.55
SE105G **	6-Input Gate Expander			9.95	11.00	12.40
SE110G **	3-Input High Fan-Out NAND/NOR Gate*			13.95	16.00	18.60
SE115G **	Dual 2-Input NAND/NOR Gate			13.95	16.00	18.60
SE124G **	RST Binary Element			14.95	18.00	22.40
SE150G **	2-Input CLOCK/CAPACITIVE Line Driver			14.45	16.60	19.15
SE160G **	One-Shot Multivibrator*			39.95	48.00	59.90
CS700G **	Dual 3-2-Input NAND/NOR Gate			14.45	16.60	19.15
CS701G **	Dual 3-2-Input NAND/NOR Gate			14.45	16.60	19.15
CS704G	RST Binary Element			15.45	18.50	23.20
CS705G	Dual 3-Input AND Gate			11.25	12.90	15.00
CS709G	Dual 3-Input AND Gate			7.05	8.40	10.50
III	**COMPATIBLE DTL ELEMENTS (-55°C to +125°C) IN 14-LEAD FLAT PACK**					
SE106J	Dual 5-Input Gate Expander		4.85	5.10	5.70	7.30
SE111J	Dual 4-Input High Fan-Out NAND/NOR Gate		10.20	10.80	12.25	15.50
SE112J	Dual 3-Input High Fan-Out NAND/NOR Gate*		10.20	10.80	12.25	15.50
SE116J	Dual 4-Input NAND/NOR Gate*		8.90	9.40	10.70	13.35
SE124J	RST Binary Element		11.90	12.50	14.30	17.85
SE125J	J-K Binary Element		13.20	13.90	15.80	19.80
SE155J	Dual 4-Input CLOCK/CAPACITIVE Line Driver		10.20	10.80	12.25	15.50
SE156J	Dual 4-Input CLOCK/CAPACITIVE Line Driver*		10.20	10.80	12.25	15.50
SE161J	One-Shot Multivibrator		39.95	40.20	48.00	59.90
SE170J	Triple 3-Input NAND/NOR Gate		9.90	10.40	11.90	14.80
SE180J	Quadruple 2-Input NAND/NOR Gate		9.90	10.40	11.90	14.80
CS720J	Quadruple 2-Input NAND/NOR Gate		10.40	10.95	12.50	15.60
CS721J	Triple 3-Input NAND/NOR Gate		10.40	10.95	12.50	15.60
CS727J	Triple 2-Input NAND/NOR Gate*		10.40	10.95	12.50	15.60
CS729J	RST Binary Element		12.40	13.10	14.90	18.60
CS730J	Dual 5-Input NAND/NOR Gate		9.40	9.90	11.25	14.10
CS731J	Quadruple 2-Input Gate Expander		5.35	5.65	6.40	8.00
CS732J	12-Input Gate Expander		5.35	5.65	6.40	8.00
IV	**COMPATIBLE DTL ELEMENTS (0°C to +70°C) IN 14-LEAD FLAT PACK**					
NE106J	Dual 5-Input Gate Expander		3.40	3.60	4.10	5.10
NE112J	Dual 3-Input High Fan-Out NAND/NOR Gate*		5.10	5.40	6.15	7.65
NE116J	Dual 4-Input NAND/NOR Gate*		4.35	4.60	5.20	6.55
NE124J	RST Binary Element		6.95	7.35	8.35	10.40
NE125J	J-K Binary Element		7.70	8.10	9.25	11.55
NE156J	Dual 4-Input CLOCK/CAPACITIVE LINE Driver*		5.10	5.40	6.15	7.65
NE161J	One-Shot Multivibrator		17.45	18.40	21.00	26.10
NE170J	Triple 3-Input NAND/NOR Gate		4.95	5.20	5.95	7.45
NE180J	Quadruple 2-Input NAND/NOR Gate		4.95	5.20	5.95	7.45
V	**COMPATIBLE DTL ELEMENTS (0°C to +70°C) IN 14-LEAD DUAL IN-LINE PACK**					
NE106A	Dual 5-Input Gate Expander	N	3.10	3.25	3.70	4.50
NE112A	Dual 3-Input High Fan-Out NAND/NOR Gate*	N	4.60	4.85	5.55	6.85
NE116A	Dual 4-Input NAND/NOR Gate*	N	3.90	4.15	4.70	5.90
NE124A	RST Binary Element	N	4.60	4.85	5.55	6.85
NE125A	J-K Binary Element	N	5.90	6.20	7.10	8.45
NE156A	Dual 4-Input CLOCK/CAPACITIVE Line Driver*	N	4.60	4.85	5.55	6.85
NE161A	One-Shot Multivibrator	N	15.70	16.50	19.00	23.40
NE170A	Triple 3-Input NAND/NOR Gate	N	3.90	4.15	4.70	5.90
NE180A	Quadruple 2-Input NAND/NOR Gate	N	3.90	4.15	4.70	5.90

CATALOG NUMBER	DESCRIPTION		Single Type 1000 — 2499†	100 — 999	100 — 999†	25 — 99†	1 — 24
VI	**UTILOGIC ELEMENTS (-20°C to +85°C) IN 10-LEAD TO-5**						
SU300K	Dual 3-Input Gate Expander				$ 5.25	$ 6.30	$ 7.35
SU305K	6-Input AND Gate				5.85	6.95	8.20
SU306K	Dual 3-Input AND Gate				5.85	6.95	8.20
SU314K	7-Input NOR Gate				5.85	6.95	8.20
SU315K	Dual 3-Input NOR Gate				5.85	6.95	8.20
SU316K	Dual 2-Input NOR Gate*				5.85	6.95	8.20
SU320K	J-K Binary Element				9.50	11.40	13.30
SU331K	Dual 2-Input OR Gate*				5.85	6.95	8.20
SU332K	Dual 3-Input OR Gate				5.85	6.95	8.20
VII	**UTILOGIC ELEMENTS (-20°C to +85°C) IN 10-LEAD FLAT PACK**						
SU300G	Dual 3-Input Gate Expander				7.25	8.70	10.15
SU305G	6-Input AND Gate				7.85	9.35	11.00
SU306G	Dual 3-Input AND Gate				7.85	9.35	11.00
SU314G	7-Input NOR Gate				7.85	9.35	11.00
SU315G	Dual 3-Input NOR Gate				7.85	9.35	11.00
SU316G	Dual 2-Input NOR Gate*				7.85	9.35	11.00
SU320G	J-K Binary Element				11.50	13.80	16.10
SU331G	Dual 2-Input OR Gate*				7.85	9.35	11.00
SU332G	Dual 3-Input OR Gate				7.85	9.35	11.00
VIII	**UTILOGIC ELEMENTS (+10°C to +55°C) IN 10-LEAD TO-5**		1000 — 2499†				
LU300K	Dual 3-Input Gate Expander		$ 2.45	2.60	2.70	3.15	3.90
LU305K	6-Input AND Gate		2.65	2.80	2.95	3.35	4.20
LU306K	Dual 3-Input AND Gate		2.65	2.80	2.95	3.35	4.20
LU314K	7-Input NOR Gate		2.65	2.80	2.95	3.35	4.20
LU315K	Dual 3-Input NOR Gate		2.65	2.80	2.95	3.35	4.20
LU316K	Dual 2-Input NOR Gate*		2.65	2.80	2.95	3.35	4.20
LU320K	J-K Binary Element		3.55	3.75	3.95	4.50	5.55
LU331K	Dual 2-Input OR Gate*		2.65	2.80	2.95	3.35	4.20
LU332K	Dual 3-Input OR Gate		2.65	2.80	2.95	3.35	4.20
IX	**COMPATIBLE LOW-POWER ELEMENTS (-55°C to +125°C) IN 14-LEAD FLAT PACK**						
SE416J	Dual 4-Input NAND/NOR Gate*			14.95	15.80	17.95	22.50
SE417J	Dual 3-Input NAND/NOR Gate*	N		14.95	15.80	17.95	22.50
SE424J	Dual AC Binary Element			20.00	21.00	24.00	30.00
SE440J	Dual Exclusive-OR Gate	N		15.45	16.25	18.55	23.20
SE455J	Dual 4-Input BUFFER/DRIVER			15.45	16.25	18.55	23.20
SE480J	Quadruple 2-Input NAND/NOR Gate			15.45	16.25	18.55	23.20
X	**COMPATIBLE LOW-POWER ELEMENTS (0°C to +70°C) IN 14-LEAD FLAT PACK**						
NE416J	Dual 4-Input NAND/NOR Gate*			7.50	7.90	9.00	11.25
NE417J	Dual 3-Input NAND/NOR Gate*	N		7.50	7.90	9.00	11.25
NE424J	Dual AC Binary Element			10.00	10.50	12.00	15.00
NE440J	Dual Exclusive-OR Gate	N		8.00	8.40	9.60	12.00
NE455J	Dual 4-Input BUFFER/DRIVER			8.00	8.40	9.60	12.00
NE480J	Quadruple 2-Input NAND/NOR Gate			8.00	8.40	9.60	12.00
XI	**COMPATIBLE LOW-POWER ELEMENTS (0°C to +70°C) IN 14-LEAD DUAL IN-LINE PACK**						
NE416A	Dual 4-Input NAND/NOR Gate*	N		4.20	4.40	5.35	6.60
NE417A	Dual 3-Input NAND/NOR Gate*	N		4.20	4.40	5.35	6.60
NE424A	Dual AC Binary Element	N		8.00	8.40	9.60	12.00
NE440A	Dual Exclusive-OR Gate	N		4.20	4.40	5.35	6.60
NE455A	Dual 4-Input BUFFER/DRIVER	N		4.20	4.40	5.35	6.60
NE480A	Quadruple 2-Input NAND/NOR Gate	N		4.20	4.40	5.35	6.60
XII	**COMPATIBLE LOW-POWER ELEMENTS (+15°C to +55°C) IN 14-LEAD DUAL IN-LINE PACK**						
SP416A	Dual 4-Input NAND/NOR Gate*	N	3.30	3.50	3.70	4.20	5.25
SP417A	Dual 3-Input NAND/NOR Gate*	N	3.30	3.50	3.70	4.20	5.25
SP424A	Dual AC Binary Element	N	6.40	6.70	7.00	8.10	10.00
SP440A	Dual Exclusive-OR Gate	N	3.30	3.50	3.70	4.20	5.25
SP455A	Dual 4-Input BUFFER/DRIVER	N	3.30	3.50	3.70	4.20	5.25
SP480A	Quadruple 2-Input NAND/NOR Gate	N	3.30	3.50	3.70	4.20	5.25
XIII	**COMPATIBLE LOW-POWER ELEMENTS (0°C to +70°C) IN 14-LEAD DUAL IN-LINE PACK**						
ST416A	Dual 4-Input NAND/NOR Gate*	N	3.65	3.85	4.05	4.60	5.75
ST417A	Dual 3-Input NAND/NOR Gate*	N	3.65	3.85	4.05	4.60	5.75
ST424A	Dual AC Binary Element	N	6.95	7.35	8.00	9.60	11.00
ST440A	Dual Exclusive-OR Gate	N	3.65	3.85	4.05	4.60	5.75
ST455A	Dual 4-Input BUFFER/DRIVER	N	3.65	3.85	4.05	4.60	5.75
ST480A	Quadruple 2-Input NAND/NOR Gate	N	3.65	3.85	4.05	4.60	5.75
XIV	**LINEAR CIRCUITS (-55°C to +125°C) IN 10-LEAD TO-5**						
SE500K	Gated Sense Amplifier			15.00	15.75	18.00	22.50
SE501K	Video Amplifier			22.90	24.00	27.50	34.40

CATALOG NUMBER	DESCRIPTION		1000 — 4999†	Single Type 100 — 999	100 — 999†	25 — 99†	1 — 24
XIV	**LINEAR CIRCUITS (-55°C to +125°C) IN 10-LEAD TO-5 (Continued)**						
SE504K	Gated Sense Amplifier			$ 15.00	$ 15.75	$ 18.00	$ 22.50
SE505K	General Purpose Differential Amplifier			15.00	15.75	18.00	22.50
SE506K	Differential Operational Amplifier			35.00	36.75	42.00	52.50
SE518K	Analog Comparator			15.00	15.75	18.00	22.50
XV	**LINEAR CIRCUITS (-55°C to +125°C) IN 10-LEAD FLAT PACK**						
SE500G	Gated Sense Amplifier			17.00	17.85	20.50	25.50
SE501G	Video Amplifier			24.90	26.15	29.95	37.40
SE504G	Gated Sense Amplifier			17.00	17.85	20.50	25.50
SE505G	General Purpose Differential Amplifier			17.00	17.85	20.50	25.50
SE506G	Differential Operational Amplifier			37.00	38.75	44.00	54.50
SE518G	Analog Comparator			17.00	17.75	20.50	25.50
XVI	**LINEAR CIRCUITS (0°C to +70°C) IN 10-LEAD TO-5**						
NE500K	Gated Sense Amplifier			7.50	7.90	9.00	11.25
NE501K	Video Amplifier			11.45	12.05	13.75	17.15
NE504K	Gated Sense Amplifier			7.50	7.90	9.00	11.25
NE505K	General Purpose Differential Amplifier			7.50	7.90	9.00	11.25
NE506K	Differential Operational Amplifier			17.50	18.50	21.00	26.25
NE518K	Analog Comparator			7.50	7.90	9.00	11.25
XVII	**COMPATIBLE DTL ELEMENTS (+15°C to +55°C) IN 14-LEAD DUAL IN-LINE PACK**						
SP616A	Dual 4-Input NAND/NOR Gate*	↓	$ 1.10	1.15	1.20	1.40	1.75
SP620A	J-K Binary Element	↓	2.20	2.30	2.40	2.75	3.45
SP629A	RST Binary Element	↓	2.20	2.30	2.40	2.75	3.45
SP631A	Quadruple 2-Input Gate Expander	↓	.95	1.00	1.05	1.20	1.50
SP659A	Dual 4-Input CLOCK/CAPACITIVE Driver*	↓	1.20	1.30	1.40	1.55	1.95
SP670A	Triple 3-Input NAND/NOR Gate	↓	1.20	1.30	1.40	1.55	1.95
SP680A	Quadruple 2-Input NAND/NOR Gate	↓	1.20	1.30	1.40	1.55	1.95
XVIII	**COMPATIBLE DTL ELEMENTS (0°C to +70°C) IN 14-LEAD DUAL IN-LINE PACK**						
ST616A	Dual 4-Input NAND/NOR Gate*	N	1.15	1.20	1.25	1.45	1.80
ST620A	J-K Binary Element	N	2.25	2.35	2.50	2.80	3.50
ST629A	RST Binary Element	N	2.25	2.35	2.50	2.80	3.50
ST631A	Quadruple 2-Input Gate Expander	N	1.00	1.05	1.10	1.25	1.55
ST659A	Dual 4-Input CLOCK/CAPACITIVE Driver*	N	1.25	1.35	1.45	1.60	2.00
ST670A	Triple 3-Input NAND/NOR Gate	N	1.25	1.35	1.45	1.60	2.00
ST680A	Quadruple 2-Input NAND/NOR Gate	N	1.25	1.35	1.45	1.60	2.00
XIX	**COMPATIBLE TTL ELEMENTS (-55°C to +125°C) IN 14-LEAD FLAT PACK**						
SE806J	Dual 4-Input Gate Expander			7.00	7.50	8.40	10.40
SE808J	Single 8-Input NAND Gate			8.90	9.40	10.70	13.35
SE816J	Dual 4-Input NAND Gate			8.90	9.40	10.70	13.35
SE825J	J-K Binary Element			13.20	13.90	15.80	19.80
SE826J	Dual AC Binary Element			20.00	21.00	24.00	30.00
SE840J	Dual Exclusive-OR Gate*			9.60	10.20	11.40	14.20
SE855J	Dual 4-Input Power Gate			10.20	10.80	12.25	15.50
SE870J	Triple 3-Input NAND Gate			9.90	10.40	11.90	14.80
SE880J	Quadruple 2-Input NAND Gate			9.90	10.40	11.90	14.80

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CATALOG NUMBER	DESCRIPTION		1000 — 2499†	Single Type 100 — 999	100 — 999†	25 — 99†	1 — 24
XX	**COMPATIBLE TTL ELEMENTS (0°C to +70°C) IN 14-LEAD FLAT PACK**						
NE806J	Dual 4-Input Gate Expander			$ 3.50	$ 3.80	$ 4.20	$ 5.20
NE808J	Single 8-Input NAND Gate			4.35	4.60	5.20	6.55
NE816J	Dual 4-Input NAND Gate			4.35	4.60	5.20	6.55
NE825J	J-K Binary Element			7.70	8.10	9.25	11.55
NE826J	Dual AC Binary Element			10.00	10.50	12.00	15.00
NE840J	Dual Exclusive-OR Gate*			4.80	5.10	5.70	7.10
NE855J	Dual 4-Input Power Gate			5.10	5.40	6.15	7.65
NE870J	Triple 3-Input NAND Gate			4.95	5.20	5.95	7.45
NE880J	Quadruple 2-Input NAND Gate			4.95	5.20	5.95	7.45
XXI	**COMPATIBLE TTL ELEMENTS (+15°C to +55°C) IN 14-LEAD DUAL IN-LINE PACK**						
SP806A	Dual 4-Input Gate Expander		$ 2.95	3.10	3.25	3.70	4.65
SP808A	Single 8-Input NAND Gate		2.95	3.10	3.25	3.70	4.65
SP816A	Dual 4-Input NAND Gate		2.95	3.10	3.25	3.70	4.65
SP825A	J-K Binary Element		4.55	4.80	5.05	5.75	7.20
SP826A	Dual AC Binary Element		8.00	8.40	8.80	10.10	12.60
SP840A	Dual Exclusive-OR Gate*		3.30	3.50	3.70	4.20	5.25
SP855A	Dual 4-Input Power Gate		3.30	3.50	3.70	4.20	5.25
SP870A	Triple 3-Input NAND Gate		3.30	3.50	3.70	4.20	5.25
SP880A	Quadruple 2-Input NAND Gate		3.30	3.50	3.70	4.20	5.25
XXII	**COMPATIBLE TTL ELEMENTS (0°C to +70°C) IN 14-LEAD DUAL IN-LINE PACK**						
ST806A	Dual 4-Input Gate Expander	N	3.10	3.25	3.40	3.90	4.88
ST808A	Single 8-Input NAND Gate	N	3.25	3.40	3.55	4.10	5.10
ST816A	Dual 4-Input NAND Gate	N	3.25	3.40	3.55	4.10	5.10
ST825A	J-K Binary Element	N	5.00	5.25	5.60	6.30	7.90
ST826A	Dual AC Binary Element	N	8.80	9.20	9.65	11.00	13.80
ST840A	Dual Exclusive-OR Gate*	N	3.65	3.85	4.05	4.65	5.75
ST855A	Dual 4-Input Power Gate	N	3.65	3.85	4.05	4.65	5.75
ST870A	Triple 3-Input NAND Gate	N	3.65	3.85	4.05	4.65	5.75
ST880A	Quadruple 2-Input NAND Gate	N	3.65	3.85	4.05	4.65	5.75
XXIII	**COMPATIBLE TTL ELEMENTS (0°C to +70°C) IN 14-LEAD DUAL IN-LINE PACK**						
NE806A	Dual 4-Input Gate Expander			3.35	3.50	4.20	5.25
NE808A	Single 8-Input NAND Gate			3.65	3.85	4.60	5.75
NE816A	Dual 4-Input NAND Gate			3.65	3.85	4.60	5.75
NE825A	J-K Binary Element			5.70	6.00	7.20	9.00
NE826A	Dual AC Binary Element			10.00	10.50	12.00	15.00
NE840A	Dual Exclusive-OR Gate*			4.20	4.40	5.35	6.60
NE855A	Dual 4-Input Power Gate			4.20	4.40	5.35	6.60
NE870A	Triple 3-Input NAND Gate			4.20	4.40	5.35	6.60
NE880A	Quadruple 2-Input NAND Gate			4.20	4.40	5.35	6.60
XXIV	**COMPATIBLE MONOLITHIC SUB-SYSTEMS (0°C to +70°C) IN 14-LEAD DUAL IN-LINE PACK**						
S1280A	Decade Counter Unit	N		14.40	16.00	19.20	24.00
S1281A	Binary Counter Unit	N		14.40	16.00	19.20	24.00
XXV	**COMPATIBLE TTL HIGH-SPEED LOW-POWER ELEMENTS (-55°C to +125°C) IN 14-LEAD FLAT PACK**						
S8416J	Dual 4-Input NAND/NOR Gate*	N		6.20	6.50	7.45	9.30
S8417J	Dual 3-Input NAND/NOR Gate*	N		6.20	6.50	7.45	9.30
S8424J	Dual AC Binary Element	N		11.40	12.00	13.70	17.10
S8440J	Dual Exclusive-OR Gate	N		6.20	6.50	7.45	9.30
S8455J	Dual 4-Input BUFFER/DRIVER	N		7.10	7.45	8.50	10.60
S8480J	Quadruple 2-Input NAND/NOR Gate	N		6.20	6.50	7.45	9.30
S8806J	Dual 4-Input Gate Expander	N		6.20	6.50	7.45	9.30
S8808J	Single 8-Input NAND Gate	N		6.20	6.50	7.45	9.30
S8816J	Dual 4-Input NAND Gate	N		6.20	6.50	7.45	9.30
S8825J	J-K Binary Element	N		10.10	10.60	12.10	15.10
S8826J	Dual AC Binary Element	N		12.40	13.00	14.90	18.60
S8840J	Dual Exclusive-OR Gate*	N		6.20	6.50	7.45	9.30
S8855J	Dual 4-Input Power Gate	N		7.10	7.45	8.50	10.60
S8870J	Triple 3-Input NAND Gate	N		6.20	6.50	7.45	9.30
S8880J	Quadruple 2-Input NAND Gate	N		6.20	6.50	7.45	9.30

	XXVI DUMMY INTEGRATED CIRCUIT PACKAGES (Minimum quantity of 50 pieces)	50 Up
J (TO-88)	14-Lead Dummy Flat Package	$ .25
G (TO-88)	10-Lead Dummy Flat Package	.25
K (Modified TO-5)	10-Lead Dummy Package	.15

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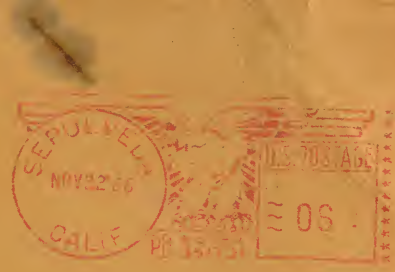

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