HIGH FREQUENCY ANALOG BIPOLAR ARRAYS

The K09 array is manufactured using a very high frequency technology (Ft of NPN = 3GHz) which allows a 15V maximum supply operating voltage.

- TECHNOLOGY HF2C, 2 METAL LAYERS
- 1 METAL LAYER TO CUSTOMIZED
- 28 BONDING PADS (maximum)
- 188 NPN TRANSISTORS
- 28 PNP TRANSISTORS (placed in peripheral)
- 686 RESISTORS
- MAXIMUM SUPPLY VOLTAGE = 15V

DESCRIPTION

The K09 array is a prediffused bipolar array of components allowing the user to design his specific applications in a short cycle time and with a minimum risk of errors.

The K09 array from SGS-THOMSON Microelectronics is specially intended for use in video, telecommunication, instrumentation and other high frequency applications, but it could be used with benefit for low frequency applications.

Using kit parts for breadboard, the designer has the capability to validate the schematics in the final application environment.

ANALOG ARRAY :

The structure of the K09 based on a regular matrix of 3 x 7 tiles, improves the efficiency of the layout.

Each tile contains :
- 6 QN1 type NPN transistors
- 2 QN2 type NPN transistors
- 100, 200, 400 and 800 P+ type resistors, 1K, 2K, 4K, 8K and 16K Pextrinsec base resistors.

2 independent resistor tubs allow to place 2 positive power supplies if required.

Figure 1 : K09 array architecture.
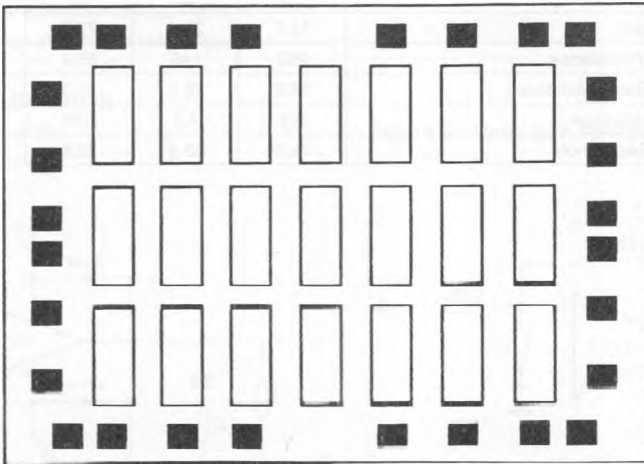
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MAXIMUM VOLTAGE

Volts	NPN	PNP
Collector-base	25	25
Collector-emitter	15	15
Collector-substrate	25	
Base-substrate		25
Emitter-base	5.8	
Base-emitter		25

Resistor voltage = 20V maximum.
Capacitor voltage = ± 20V maximum.

ELECTRICAL CHARACTERISTICS

Current Gain (hFE)		Resistor Tolerances	Resistors Matching
NPN	110 (@.1mA < I < 1mA)	± 25%	Same Value Resistor = ± 2%
PNP	60 (@ I = 10µA)		
$(Ft)_{NPN}$	3GHz (@ I = 1mA)		Different Value Resistor = ± 5%
$(Ft)_{PNP}$	10MHz (@ I = 10µA)		

DEVICES MODELING

All basic components are available with SPICE models, for the 4 different kinds of transistors, the parameters are :

Symbol	Parameter	QN1	QN2	QN4	PNP	Unit
Is	Transport Saturation Current (10^{-16})	2.1	4.19	10.5	0.5	A
B_F	Ideal Maximum Forward Beta	136	136	136	73	
V_{AF}	Forward Early Voltage	35	35	35	41	V
I_{KF}	Knee Current	14.7	29.4	73.5	43.10^{-3}	mA
R_B	Zero Bias Resistance	292	146	58.4	190	Ω
R_{BM}	Minimum Base Resistance	56.5	28.2	11.3	61.3	Ω
R_E	Emitter Resistance	9.8	4.9	1.96	8.90	Ω
R_C	Collector Resistance	79.5	53.9	32.6	8	Ω

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