SGS-THOMSON MICROELECTRONICS

M079

N-CHANNEL 2 x 2 x 2 CROSSPOINT SWITCH WITH CONTROL MEMORY

- LOW ON RESISTANCE : 18Ω
- INTERNAL CONTROL LATCHES
- 5.5V_{PP} ANALOG SIGNAL CAPABILITY
- LESS THAN 1% TOTAL DISTORTION AT 0dbm
- LESS THAN – 90db CROSS-TALK AT 1.6KHz $2V_{rms}$

DIP14 (Plastic) **DIP14** (Ceramic)

ORDER CODES : M079B1
M079F1

DESCRIPTION

The M079 consists of a 2 x 2 x 2 crosspoint array and 4 memory cells. Connection between two paths is determined by the status of the corresponding memory elements. If the latch is ON the paths are connected, if OFF disconnected.

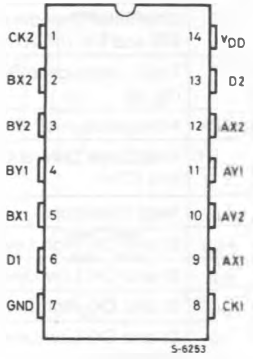
Every memory configuration can be set by writing the two D inputs using the two clocks. "1" on D determines the ON status and 0 the OFF status. The clock enters the Data input, on the high level. The correspondent switch is influenced at once. Data is then latched on falling edge of CK input. Thus storage is defined when CK goes down (see fig. 6, 7). CK and D levels are TTL compatible. The power on reset puts the memory elements into OFF status disconnecting the switches.

The M079 is available in 14 pin dual in-line plastic and ceramic packages.

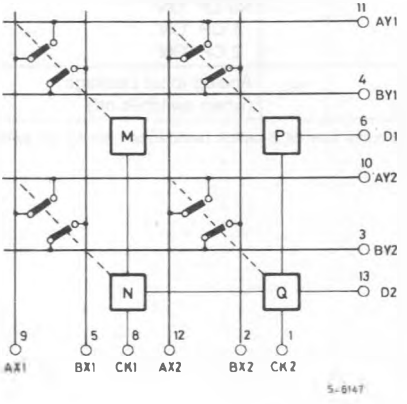
TRUTH TABLE

Logic Input D1	D2	CK1	CK2	Analog Connections Involved				Memory Status
1	X	1	0	AX1	BX1	AY1	BY1	M on
0	X	1	0	AX1	BX1	AY1	BY1	M off
X	1	1	0	AX1	BX1	AY2	BY2	N on
X	0	1	0	AX1	BX1	AY2	BY2	N off
1	X	0	1	AX2	BX2	AY1	BY1	P on
0	X	0	1	AX2	BX2	AY1	BY1	P off
X	1	0	1	AX2	BX2	AY2	BY2	Q on
X	0	0	1	AX2	BX2	AY2	BY2	Q off

PIN CONFIGURATION



BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage Range	– 0.5 to 14	V
V_i	Input Voltage Range (CK1, CK2, D1, D2)	V_{DD} + 0.5	V
V_{IN}, V_{OUT}	Differential Voltage between the Two Ends of every Crosspoint in "OFF" Status	14	V
P_{tot}	Power Dissipation	600	mW
T_{op}	Operating Temperature Range	0 to 70	°C
T_{stg}	Storage Temperature Range	– 55 to 150	°C

Stresses above those listed under "Absolute Maximum Ratings" may causes permanent damage to the device. This is a stress ratings only and functional operation of the the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions to extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, V_{DD} at 12V ± 5%, V_{EE} = 3V)

Symbol		Parameter	Test Conditions*	Min.	Typ.	Max.	Unit
Crosspoint	αN	(cross talk) Diaphony Attenuation beetween Each Couple (fig. 2)	V_{IN} = 2V_{rms} 1.6KHz	90			dB
	αN	Longitudinal Attenuation (fig. 3)	V_{IN} = 2V_{rms} 1.6KHz			0.15	dB
	RD	Differential Impedance between AXi and BXi (on AYm an BYm)	V_{IN} = 2V_{rms} 1.6KHz	200			KΩ
	RT	Total Longitudinal Resistance* (fig. 3)				18	Ω
	CP	Attenuation in off Status	V_{IN} = 2V_{rms} 1.6KHz	100			dB
	$\Delta\frac{RT}{2}$	Resistance Difference Related to one CP				1	Ω
		Total Distortion	V_{IN} = 0dBm 1.6KHz			1	%
Control Logic	V_{INH}	Di and CKi High Level Input		2.4			V
	V_{INL}	Di and CKi Low Level Input				0.8	V
	I_{INH}	Di and CKi High Level Input	VCK = 2.7V V_D = 2.7V			1	µA
	I_{INL}	Di and CKi Low Level Input Current	VCK = 0.4V V_D = 0.4V			1	µA
	I_{DD}	Supply Current : N0 CP "ON" 1 CP "ON" 2 CP "ON"				 3 2.5 2	 mA mA mA
	I_{AL}	Analog Input Leakage (when switches off)	V_{IN} = 0 to 12V			1	µA

* This is the sum of 2-switch resistance : the single switch is tested at 9Ω and its typical value is 5Ω.

AC CHARACTERISTICS (T_{amb} = 25°C, V_{DD} = 12V)

Symbol	Parameter	Refer to Figure	Min.	Typ.	Max.	Unit
f	Clock	fig. 5			0.7	MHz
t	Turn-on	fig. 6		300	500	ns
t	Turn-off	fig. 6		330	700	ns
t_S	Setup	fig. 7	300			ns
t_H	Hold	fig. 7	300			ns
t_W	Clock Pulse Width		300			ns

Supply voltage must rise in more than 5ms.						

Figure 2 : Cross Talk Measurement.

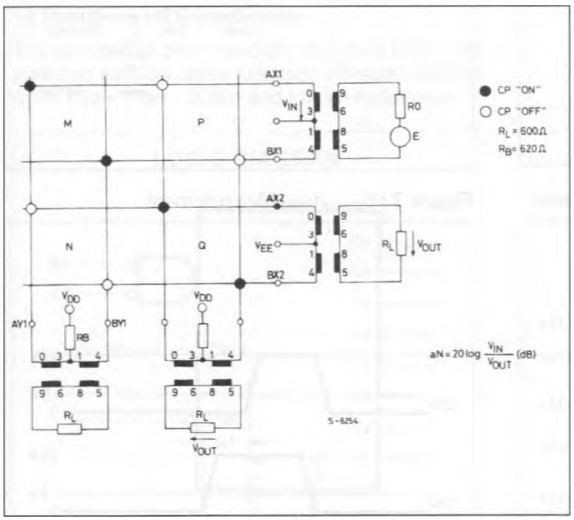


Figure 3 : Equivalent Circut of an Activated Phonic Connection.

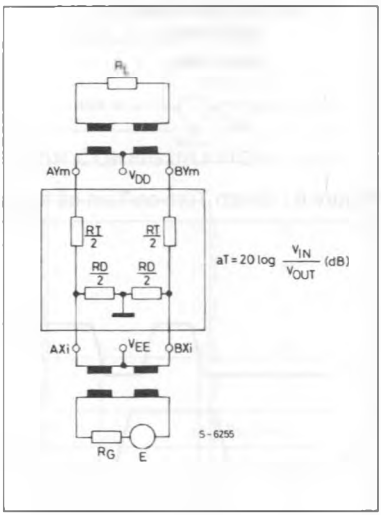


Figure 4 : Equivalent Circuit in Unactivated Phonic Connection.

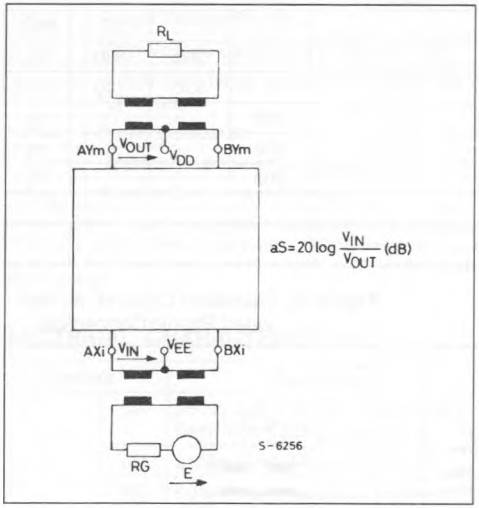


Figure 5 : Circuit for Turn-on/Turn-off Measurement.

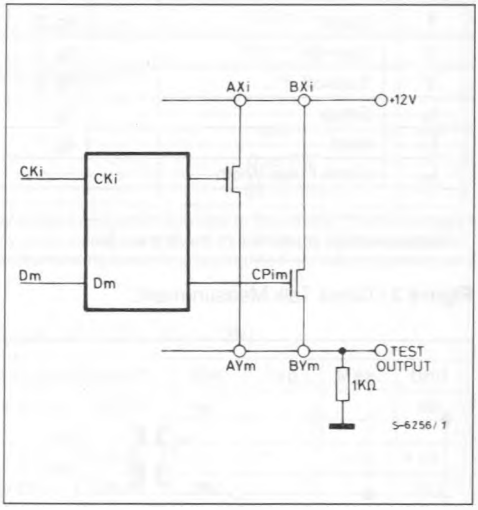


Figure 6 : Switch Turn-on/Turn-off Measurement.

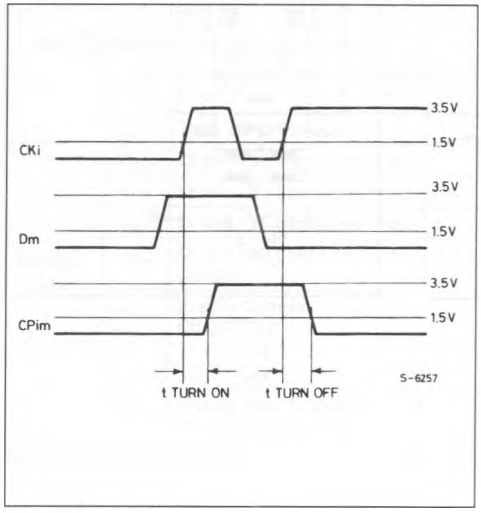


Figure 7 : $t_{set\text{-}up}/t_{Hold}$ Measurement.