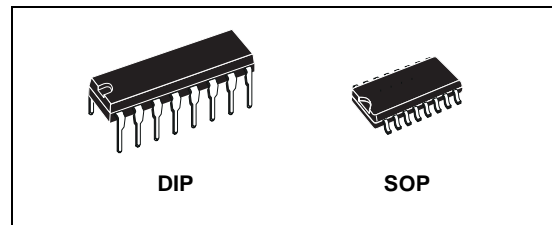




HCF4053B

TRIPLE 2-CHANNEL ANALOG MULTIPLEXER/DEMULTIPLEXER

- LOW "ON" RESISTANCE : 125Ω (Typ.) OVER 15V p.p SIGNAL-INPUT RANGE FOR $V_{DD} - V_{EE} = 15V$
- HIGH "OFF" RESISTANCE : CHANNEL LEAKAGE $\pm 100pA$ (Typ.) at $V_{DD} - V_{EE} = 18V$
- BINARY ADDRESS DECODING ON CHIP
- HIGH DEGREE OF LINEARITY : < 0.5% DISTORTION TYP. at $f_{IS} = 1KHz$, $V_{IS} = 5 V_{pp}$, $V_{DD} - V_{SS} \geq 10V$, $R_L = 10K\Omega$
- VERY LOW QUIESCENT POWER DISSIPATION UNDER ALL DIGITAL CONTROL INPUT AND SUPPLY CONDITIONS : 0.2 μW (Typ.) at $V_{DD} - V_{SS} = V_{DD} - V_{EE} = 10V$
- MATCHED SWITCH CHARACTERISTICS : $R_{ON} = 5\Omega$ (Typ.) FOR $V_{DD} - V_{EE} = 15V$
- WIDE RANGE OF DIGITAL AND ANALOG SIGNAL LEVELS : DIGITAL 3 to 20, ANALOG TO 20V p.p.
- QUIESCENT CURRENT SPECIF. UP TO 20V
- 5V, 10V AND 15V PARAMETRIC RATINGS
- INPUT LEAKAGE CURRENT
 $I_l = 100nA$ (MAX) AT $V_{DD} = 18V$ $T_A = 25^\circ C$
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC JESD13B " STANDARD SPECIFICATIONS FOR DESCRIPTION OF B SERIES CMOS DEVICES"



ORDER CODES

PACKAGE	TUBE	T & R
DIP	HCF4053BEY	
SOP	HCF4053BM1	HCF4053M013TR

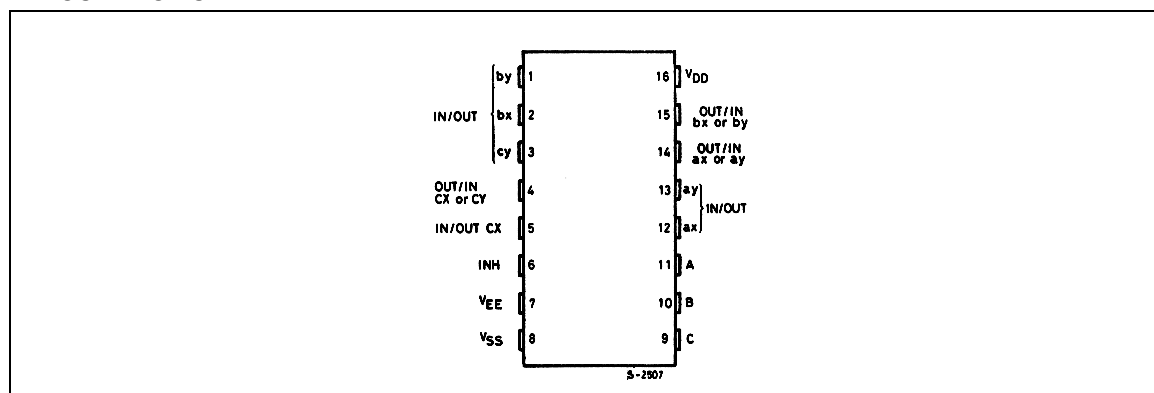
technology available in DIP and SOP packages. The HCF4053B analog multiplexer/demultiplexer is a digitally controlled analog switch having low ON impedance and very low OFF leakage current. This multiplexer circuit dissipate extremely low quiescent power over the full $V_{DD} - V_{SS}$ and $V_{DD} - V_{EE}$ supply voltage range, independent of the logic state of the control signals.

When a logic "1" is present at the inhibit input terminal all channel are off. This device is a triple 2-channel multiplexer having three separate digital control inputs, A, B, and C, and an inhibit input. Each control input selects one of a pair of channels which are connected in a single pole double-throw configuration.

DESCRIPTION

The HCF4053B is a monolithic integrated circuit fabricated in Metal Oxide Semiconductor

PIN CONNECTION



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage	-0.5 to +22	V
V_I	DC Input Voltage	-0.5 to $V_{DD} + 0.5$	V
I_I	DC Input Current	± 10	mA
P_D	Power Dissipation per Package	500 (*)	mW
	Power Dissipation per Output Transistor	100	mW
T_{op}	Operating Temperature	-55 to +125	°C
T_{stg}	Storage Temperature	-65 to +150	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

All voltage values are referred to V_{SS} pin voltage.

(*) 500mW at 65 °C; derate to 300mW by 10mW/°C from 65°C to 85°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage	3 to 20	V
V_I	Input Voltage	0 to V_{DD}	V
T_{op}	Operating Temperature	-55 to 125	°C


HCF4053B

DC SPECIFICATIONS

Symbol	Parameter	Test Condition				Value						Unit	
		V _{IS} (V)	V _{EE} (V)	V _{SS} (V)	V _{DD} (V)	T _A = 25°C			-40 to 85°C		-55 to 125°C		
						Min.	Typ.	Max.	Min.	Max.	Min.		Max.
I _L	Quiescent Device Current (all switches ON or all switches OFF)				5		0.04	5		150		150	μA
					10		0.04	10		300		300	
					15		0.04	20		600		600	
					20		0.08	100		3000		3000	
SWITCH													
R _{ON}	Resistance	0 ≤ V _I ≤ V _{DD}	0	0	5		470	1050		1200		1200	Ω
					10		180	400		520		520	
					15		125	280		360		360	
Δ _{ON}	Resistance Δ _{RON} (between any 2 of 4 switches)	0 ≤ V _I ≤ V _{DD}	0	0	5		10						Ω
					10		10						
					15		5						
OFF*	Channel Leakage Current (All Channel OFF) (COMMON O/I)		0	0	18		±0.1	100		1000		1000	nA
OFF*	Channel Leakage Current (Any Channel OFF)		0	0	18		±0.1	100		1000		1000	nA
C _I	Input Capacitance						5						pF
C _O	Output Capacitance		-5	-5	5		9						
C _{IO}	Feed through						0.2						
CONTROL (Address or Inhibit)													
V _{IL}	Input Low Voltage	= V _{DD} thru 1KΩ	V _{EE} = V _{SS} R _L = 1KΩ to V _{SS} I _{IS} < 2μA (on all OFF channels)	5			1.5		1.5		1.5		V
				10			3		3		3		
				15			4		4		4		
V _{IH}	Input High Voltage	= V _{DD} thru 1KΩ	V _{EE} = V _{SS} R _L = 1KΩ to V _{SS} I _{IS} < 2μA (on all OFF channels)	5	3.5			3.5		3.5			V
				10	7			7		7			
				15	11			11		11			
I _{IH} , I _{IL}	Input Leakage Current		V _I = 0/18V	18		±10 ⁻³	±0.1		±1		±1		μA
C _I	Input Capacitance					5	7.5						pF

* Determined by minimum feasible leakage measurement for automating testing.

DYNAMIC ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}C$, $C_L = 50pF$, all input square wave rise and fall time = 20 ns)

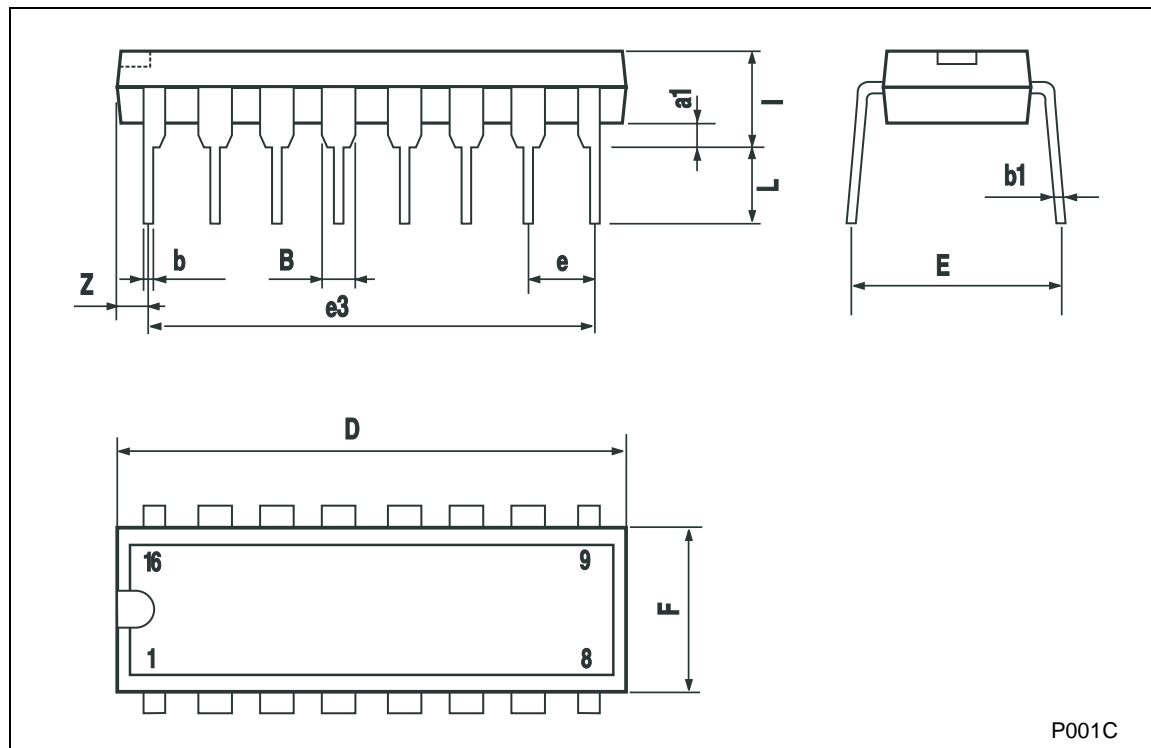
Parameter	Test Condition						Value			Unit	
	V_{EE} (V)	R_L (K Ω)	f_i (KHz)	V_I (V)	V_{SS} (V)	V_{DD} (V)	Min.	Typ.	Max.		
Propagation Delay Time (signal input to output)		200		V_{DD} 		5		30	60	ns	
						10		15	30		
						15		11	20		
Frequency Response Channel "ON" (sine wave input) at $20 \log V_O/V_I = -3dB$	$= V_{SS}$	1		5(*)		10	V_O at Common OUT/IN	25		MHz	
							V_O at any channel	60			
Feed through (all channels OFF) at $20 \log V_O/V_I = -40dB$	$= V_{SS}$	1		5(*)		10	V_O at Common OUT/IN	10		MHz	
							V_O at any channel	8			
Frequency Signal Crosstalk at $20 \log V_O/V_I = -40dB$	$= V_{SS}$	1		5(*)		10	Between any 2 Sections (IN pin 2, OUT pin 14)	2.5		MHz	
							Between any 2 Sections (IN pin 15, OUT pin 14)	6			
Sine Wave Distortion $f_{IS} = 1KHz$ Sine Wave	$= V_{SS}$	10	1	2(*)		5		0.3		%	
				3(*)		10		0.2			
				5(*)		15		0.12			
CONTROL (Address or Inhibit)											
Propagation Delay: Address to Signal OUT (Channels ON or OFF)	0					0	5	360	720	ns	
	0					0	10	160	320		
	0					0	15	120	240		
	-5					0	5	225	450		
Propagation Delay: Inhibit to Signal OUT (Channel turning ON)	0	1				0	5	360	720	ns	
	0					0	10	160	320		
	0					0	15	120	240		
	-10					0	5	200	400		
Propagation Delay: Inhibit to Signal OUT (Channel turning OFF)	0	10					5	200	450	ns	
	0						10	90	210		
	0						15	70	160		
	-10						5	130	300		
Address or Inhibit to Signal Crosstalk	0	10 (1)				0	10	$V_C = V_{DD} - V_{SS}$ (square wave)	65		mV peak

(1) Both ends of channel.

* Peak to Peak voltage symmetrical about $(V_{DD} - V_{EE}) / 2$

Plastic DIP-16 (0.25) MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050



P001C