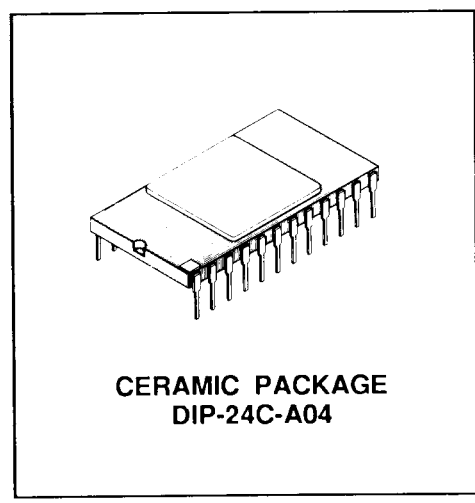


MB40547-7/-8 A/D CONVERTER

1 CHANNEL 8-BIT FLASH TYPE A/D CONVERTER

The Fujitsu MB40547 is an ultra-high A/D converter which is fabricated with Fujitsu Advanced Bipolar Technology. The MB40547 uses the full-parallel comparison technique (flash method) for high speed conversion and can convert wide-band analog signals such as video to digital signals at a sampling rate from DC to 30 Mega samples/sec. without any sampling/holding circuit. Because of such high-speed operation, the MB40547 is suitable for applications such as color-TV coding, video processing with computer, or radar signal processing.

- Resolution: 8 bits
- Linearity: MB40547-7: ± 1 LSB
MB40547-8: $\pm 1/2$ LSB
- Conversion Rate: 30 MSPS typ.
- Analog Input Voltage: 0 to $-2V$
- No need for external sampling/holding circuit
- Digital I/O level: 10K ECL level
- Output modes: Binary/2's Complement
- Single Power Supply: $-5.2V$
- Power consumption: 900 mW typ.
- Package: 24-pin DIP

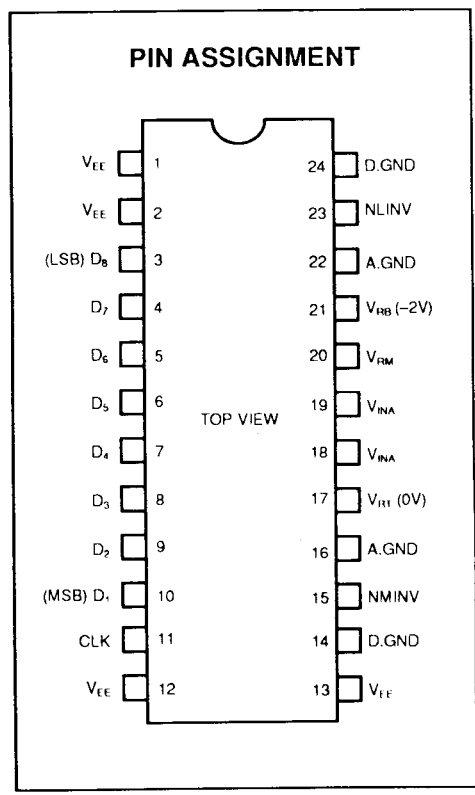


ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Power Supply Voltage	V_{EE}	+0.5 to -7.0	V
Digital Input Voltage	V_{IND}	+0.5 to V_{EE}	V
Analog Input Voltage	V_{INA}	+0.5 to V_{EE}	V
Analog Reference Voltage	V_R	+0.5 to V_{EE}	V
Output Current	I_o	-12^*	mA
Storage Temperature	T_{STG}	-55 to $+150$	$^{\circ}C$

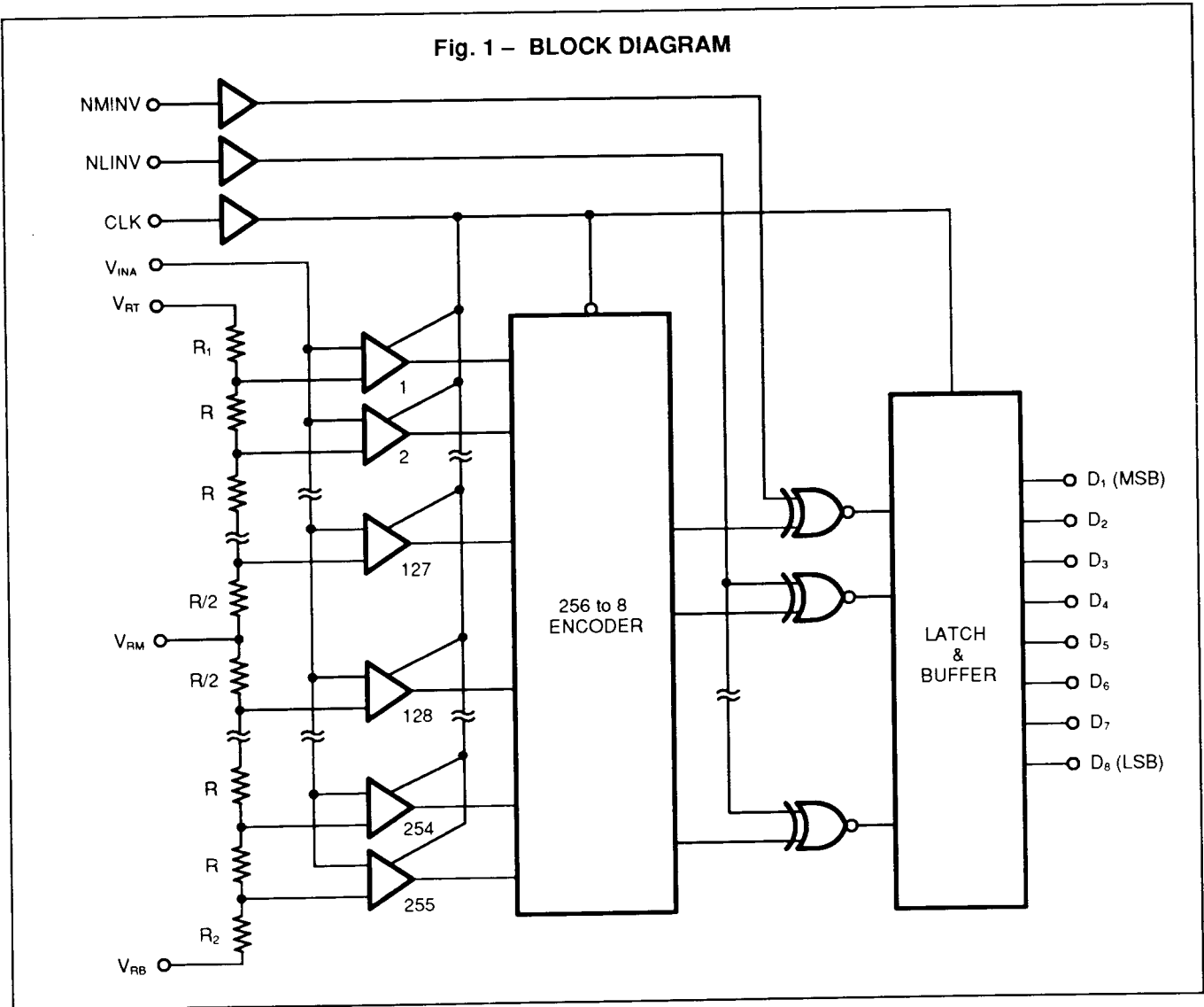
* Negative value of current means that the current flows from the device.

NOTE: Permanent device damage may occur if the above **Absolute Maximum Ratings** are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



This device contains circuitry to protect the inputs against damage due to high static voltages or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.

Fig. 1 – BLOCK DIAGRAM



RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Power Supply Voltage	V_{EE}	-5.6	-5.20	-4.94	V
Analog Input Voltage	V_{INA}	-2.0		0	V
Analog Reference Voltage (Top Side)	V_{RT}		0	0.1	V
Analog Reference Voltage (Bottom Side)	V_{RB}	-2.1	-2.0		V
Clock Pulse Width at High level	t_{W+}	25			ns
Clock Pulse Width at Low level	t_{W-}	25			ns
Operating Temperature	T_A	0		70	°C

The level of D.GND and A.GND should be same.

DC CHARACTERISTICS

Analog System

($V_{EE} = -5.2V$, $T_A = 0$ to $70^\circ C$, Output Circuits: See TEST LOAD CIRCUIT)

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Resolution				8	bits
Linearity Error	MB40547-7			± 0.4	%
	MB40547-8			± 0.2	
Equivalent Input Resistance	R_{INA}	25			$k\Omega$
Input Capacitance	C_{INA}		130	250	pF
High-level Input Current	I_{IHA}			300	μA
Low-level Input Current	I_{ILA}			290	μA
Reference Current	I_{RB}	-36	-20		mA

Output Load: 510Ω is connected with $-5.2V$.

Digital System

($V_{EE} = -5.2V$, $T_A = 0$ to $70^\circ C$, Output Circuits: See TEST LOAD CIRCUIT)

Parameter	Symbol	T_A ($^\circ C$)	Value			Unit
			Min	Typ	Max	
High-level Output Voltage	V_{OHD}	0	-1.000		-0.840	V
		+25	-0.960		-0.810	
		+70	-0.900		-0.720	
Low-level Output Voltage	V_{OLD}	0	-1.870		-1.665	V
		+25	-0.850		-1.650	
		+70	-0.830		-1.625	
High-level Input Voltage	V_{IHD}	0	-1.145			V
		+25	-1.105			
		+70	-1.045			
Low-level Input Voltage	V_{ILD}	0			-1.490	V
		+25			-1.475	
		+70			-1.450	
High-level Input Current	I_{IHD}				220	μA
Low-level Input Current	I_{ILD}				180	μA
Power Supply Current	I_{EE}		-280	-170		μA

Output Load: 510Ω is connected with $-5.2V$.

SWITCHING CHARACTERISTICS

($V_{EE} = -5.2V$, $T_A = 25^\circ C$)

Parameter	Symbol	Value			Unit
		Min	Typ	Max	
Maximum Conversion Rate	FS	20	30		MSPS
Digital Output Delay	t_{pd}		15	25	ns

Fig. 2 – TIMING DIAGRAM

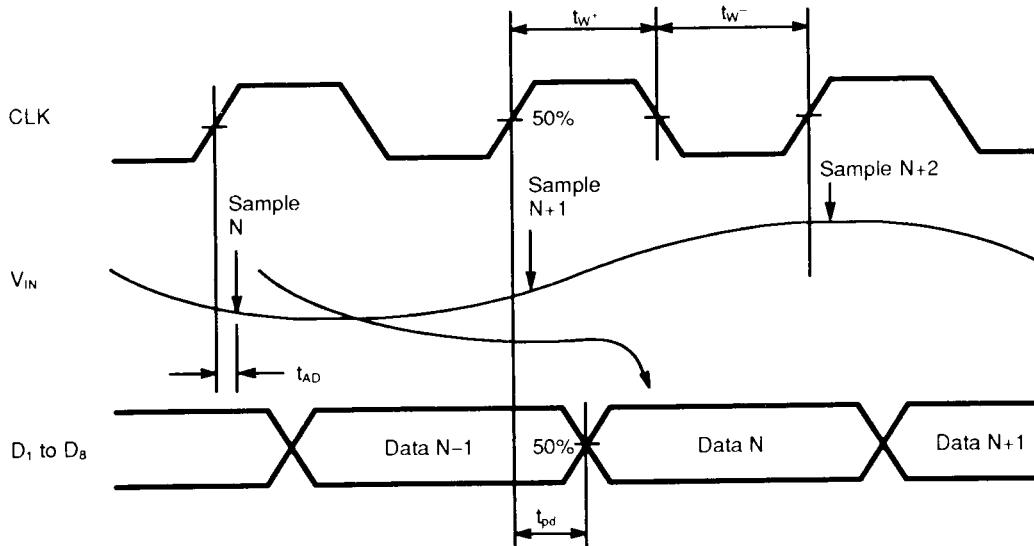
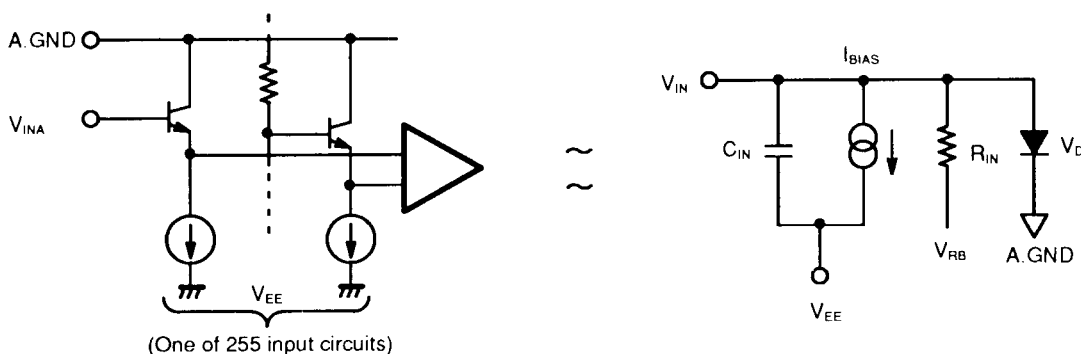


Fig. 3 – ANALOG INPUT EQUIVALENT CIRCUIT



- C_{IN} : Non-linear Emitter-follower Junction Capacitance
- R_{IN} : Linear Resistance Model for Input Current Transition by Comparator Switching:
Infinite value for $V_{IN} < V_{RB}$ or when CLK = HIGH.
- V_{RB} : Voltage at V_{RB} Terminal.
- I_{BIAS} : Constant Input Bias Current
- V_D : Diode consisting of the bases-collector junction of emitter-follower transistor.

Fig. 4 – DIGITAL INPUT EQUIVALENT CIRCUIT

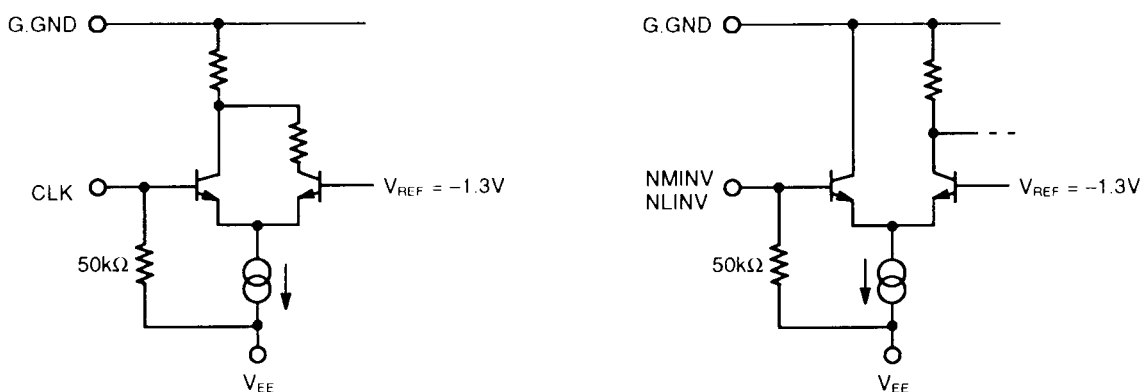
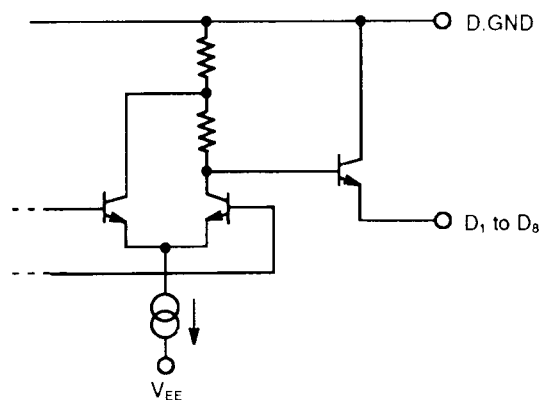
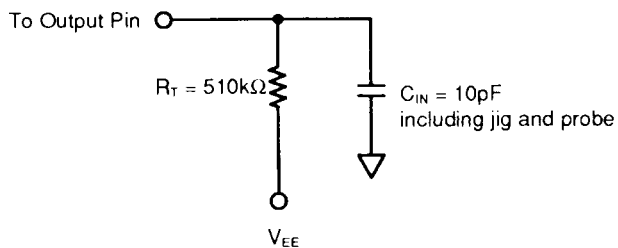


Fig. 5

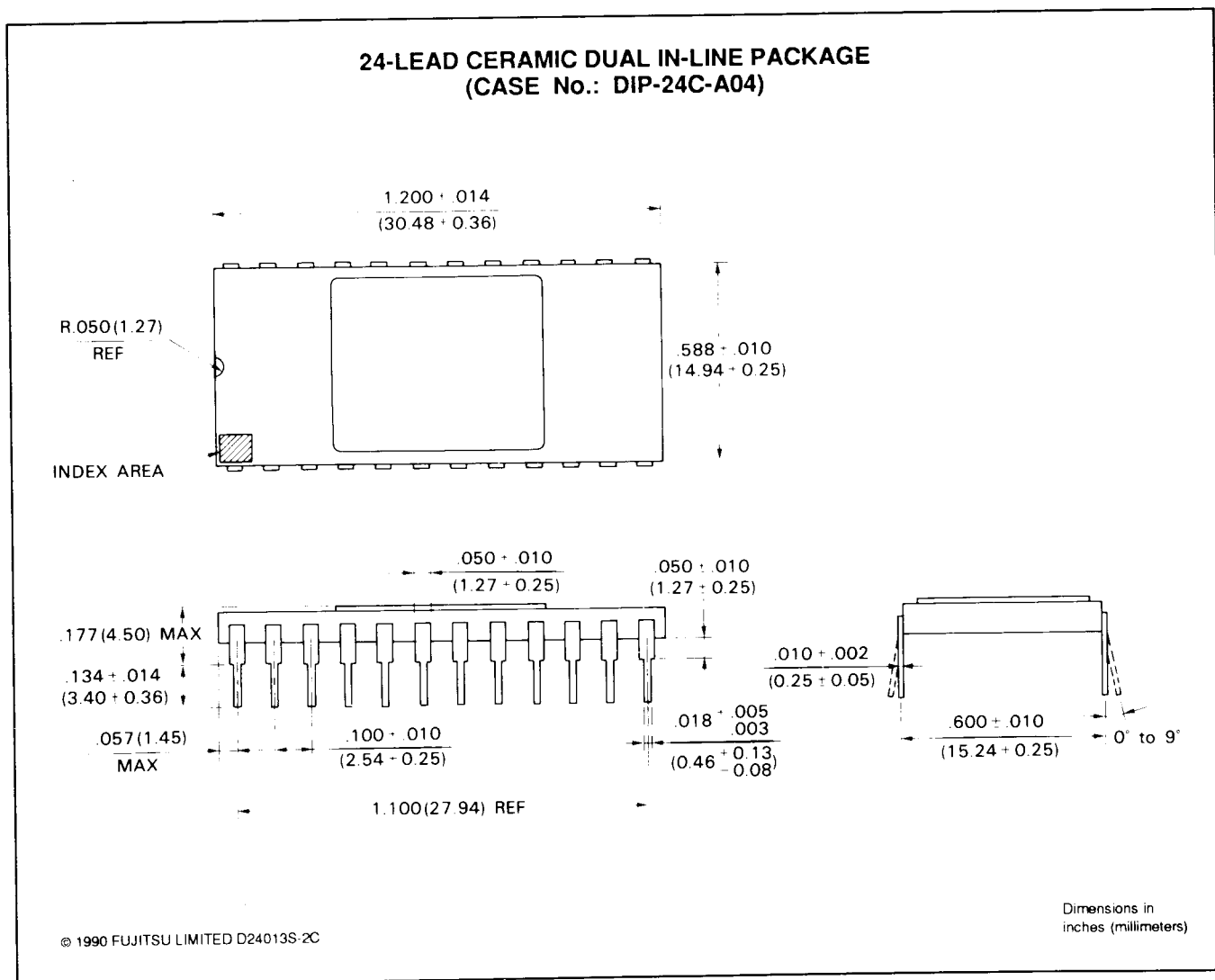
DIGITAL OUTPUT EQUIVALENT CIRCUIT



TEST LOAD CIRCUIT



PACKAGE DIMENSIONS



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