BURR-BROWN®

SDM506/507

PRELIMINARY INFORMATION
SUBJECT TO CHANGE
WITHOUT NOTICE

16-Channel Single Ended Input/ 8-Channel Differential Input 16-BIT DATA ACQUISITION SYSTEMS

FEATURES

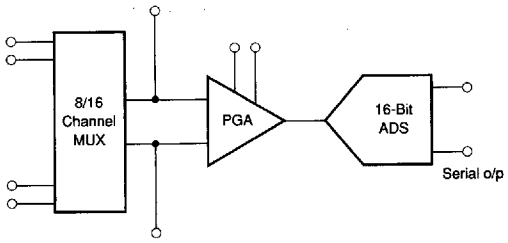
- 16-BIT RESOLUTION
- 100kHz THROUGHPUT
- PROGRAMMABLE GAINS (1, 10, 100, 1000)
- SERIAL OUTPUT DATA
- 16 SINGLE-ENDED INPUTS: SDM506
- 8 DIFFERENTIAL INPUTS: SDM507
- OVERVOLTAGE PROTECTION
- ANALOG INPUTS: 70Vp-p
- 44-PIN PLCC PACKAGE
- TEMPERATURE RANGE: –40°C to +85°C
- LOWER POWER: 450mW

DESCRIPTION

The SDM506/507 are complete 16-bit data acquisition systems with input multiplexer, serial output, and programmable gains of 1, 10, 100, and 1000. The SDM506 has 16 single-ended inputs and the SDM507 has 8 differential inputs.

All these features are contained within a space-saving 44-pin plastic-leaded chip carrier providing the ideal data aquisition solution when space is at a premium.

The SDM506/507 will accept unipolar or bipolar voltage inputs in the range 0V to +4V, 0V to +5V, 0V to +10V, ±3.33V, ±5V and ±10V. For low level signals, dynamic range can be increased by using the programmable gain amplifier. Input overvoltage protection on the analog input channels provide fault-free operation for input voltages up to ±35V.



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PDS-1295

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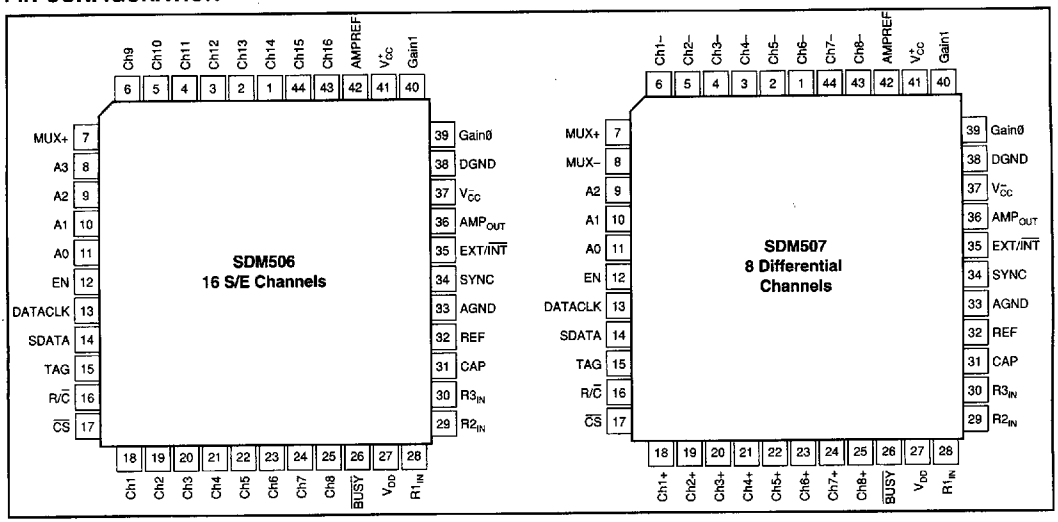
SPECIFICATIONS—PRELIMINARY

At T_A = –40°C to +85°C, f_S = 100kHz, V_{DIG} = V_{ANA} = +5V, ±V_{CC} = ±15V, ±10V input range, and G = 1 using internal reference, unless otherwise specified.

PARAMETER	CONDITIONS	SDM506/507 MIN	SDM506/507 TYP	SDM506/507 MAX	UNITS
RESOLUTION				16	Bits
ANALOG INPUT					
Voltage Ranges			±10, ±5, ±3.33		V
			0-10, 0-5, 0-4		V
Input Impedance: On Channel	10^{10}		10		GΩ
Off Channel	10^{10}		10		GΩ
Input Capacitance: On Channel	20		20		pF
Off Channel	20		20		pF
THROUGHPUT SPEED					
Conversion Time			7.6		
Complete Cycle	Acquire and Convert			8	µs
Throughput Rate		100		10	µs kHz
DC ACCURACY					
Integral Linearity Error				8	LSB[1]
Differential Linearity Error				+3, –2	LSB
No Missing Codes		15			Bits
Transition Noise[2]			1.3		LSB
Full Scale Error[3, 4]				±1	%
Full Scale Error Drift			±10		ppm/°C
Full Scale Error[3, 4]	Ext. 2.50V Ref		±1		%
Full Scale Error Drift	Ext. 2.50V Ref		±5		ppm/°C
Bipolar Zero Error[3]			±13	±25	mV
Bipolar Zero Error Drift			±5		ppm/°C
Power Supply Sensitivity	+4.75V < V_D < +5.25V			±8	LSB
AC ACCURACY					
Spurious-Free Dynamic Range	f_{IN} = 45kHz		87		dB
Total Harmonic Distortion	f_{IN} = 45kHz		–87		dB
Signal-to-(Noise and Distortion)	f_{IN} = 45kHz		80		dB
	–60dB Input		30		dB
Signal-to-Noise	f_{IN} = 45kHz		80		dB
Full-Power Bandwidth[6]			250		kHz
SAMPLING DYNAMICS					
Aperture Delay			40		ns
Aperture Jitter			Sufficient to Meet AC Specs		
Transient Response	FS Step			2	µs
Overvoltage Recovery[7]			5		µs
REFERENCE					
Internal Reference Voltage		2.48	2.5	2.52	V
Internal Reference Source Current	Must Use External Buffer		1		µs
External Reference Voltage Range for Specified Linearity		2.3	2.5	2.7	V
External Reference Current Drain	Ext. 2.50V Ref			100	µA
DIGITAL INPUTS					
Logic Levels:					
V_{IL}		–0.3		+0.8	V
V_{IH}		+4.0		V_D +0.3V	V
I_{IL}				±10	µA
I_{IH}				±10	µA
DIGITAL OUTPUTS					
Data Format			Serial 16 Bits		
Data Coding			Binary Two's Complement		
V_{OL}	I_{SINK} = 1.6mA			+0.4	V
V_{OH}	I_{SOURCE} = 500µA	+4			V
Leakage Current	High-Z-State, V_{OUT} = 0V to V_{DIG}			±5	µA
Output Capacitance	High-Z-State			15	pF
POWER SUPPLIES					
V_{DIG}	Must be ≤ V_{ANA}	+4.75	+5	+5.25	V
V_{ANA}		+4.75	+5	+5.25	V
V_{CC}		±11.4		±18	V
I_{DIG}			0.3		mA
I_{ANA}			16		mA
V_{CC}			7		mA
Power Dissipation, f_S = 100kHz				450	mW
TEMPERATURE RANGE					
Specified Performance		–40		+85	°C
Storage		–65		+150	°C
Thermal Resistance, θ_{JA}					
Plastic PLCC			75		°C/W

NOTES: (1) LSB means Least Significant Bit. For the 16-bit, ±10V input SDM506/507, one LSB is 305µV. (2) Typical rms noise at worst case transitions and temperatures. (3) As measured with fixed resistors shown in Figures 10 and 11. Adjustable to zero with external potentiometer. (4) Full scale error is the worst case of –Full Scale or +Full Scale untrimmed deviation from ideal first and last code transitions, divided by the transition voltage (not divided by the full-scale range) and includes the effect of offset error. (5) All specifications in dB are referred to a full-scale ±10V input. (6) Full-Power Bandwidth defined as Full-Scale input frequency at which Signal-to-(Noise + Distortion) degrades to 60dB, or 10 bits of accuracy. (7) Recovers to specified performance after 2 x FS input overvoltage.

PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

Analog Inputs:	
$R1_{IN}$	±25V
$R2_{IN}$	±25V
$R3_{IN}$	±25V
CAP	V_{ANA} +0.3V to A_{GND} –0.3V
REF	Indefinite Short to A_{GND}, Momentary Short to V_{ANA}
Analog Input Overvoltage:	
CH1-CH16 V_{CC+}	+20V
V_{CC-}	–20V
Supplies:	
V_{DIG}	+7V
V_{ANA}	+7V
V_{CC}	±18V
V_{DIG} to V_{ANA}	±0.3V
DGND to AGND	±0.3V
Digital Inputs	–0.3V to V_{DIG} +0.3V
Maximum Junction Temperature	+165°C
Lead Temperature (soldering, 10s)	+300°C

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE	PACKAGE DRAWING NUMBER(1)	TEMPERATURE RANGE
SDM506	44-Pin PLCC	329	–40°C to +85°C
SDM507	44-Pin PLCC	329	–40°C to +85°C

NOTE: (1) For detailed drawing and dimension table, please see end of data sheet, or Appendix C of Burr-Brown IC Data Book.

ELECTROSTATIC DISCHARGE SENSITIVITY

This integrated circuit can be damaged by ESD. Burr-Brown recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.