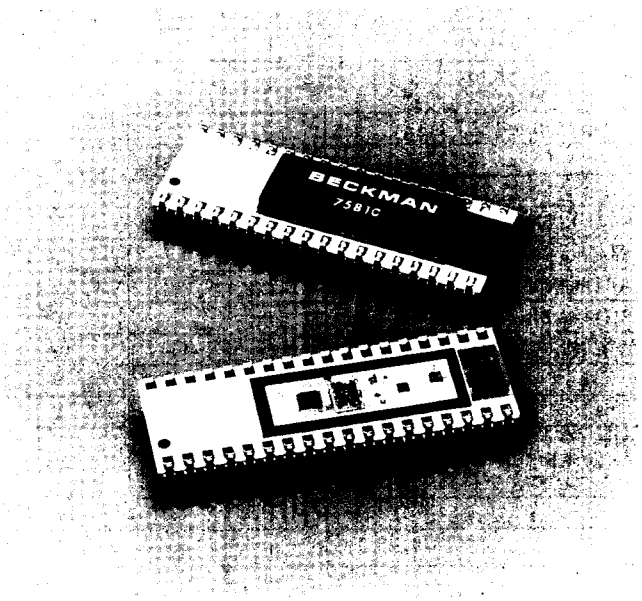
Series 7581
Microprocessor Compatible CMOS 12-Bit D/A Converter



Beckman Model 7581C is the first CMOS 12-bit digital-to-analog converter to offer the combination of complete microprocessor compatibility with the versatile, low cost analog circuitry of the popular DAC80.

The 7581C includes the output buffer amplifier for multiple output voltage ranges, an internal reference, and two programmable input registers which buffer the DAC from the microprocessor data bus. The outstanding features of the 7581C include:

- True 12-bit accuracy
- Microprocessor compatible
- Low cost
- Low power CMOS design
- TTL or CMOS input compatibility
- Programmable 0 to 5V, 0 to 10V, ±2.5V, ±5V, ±10V outputs
- Serial or parallel input formats—switchable upon command
- Voltage references of +8.5V, +6.5V, −8V available for system use
- No +5V supply required
- One model for ±12V to ±17V supplies
- ±0.012% (±½ LSB) linearity guaranteed over 0°C to +70°C
- ±0.005% pretrimmed zero offset
- Four quadrant multiplying capability

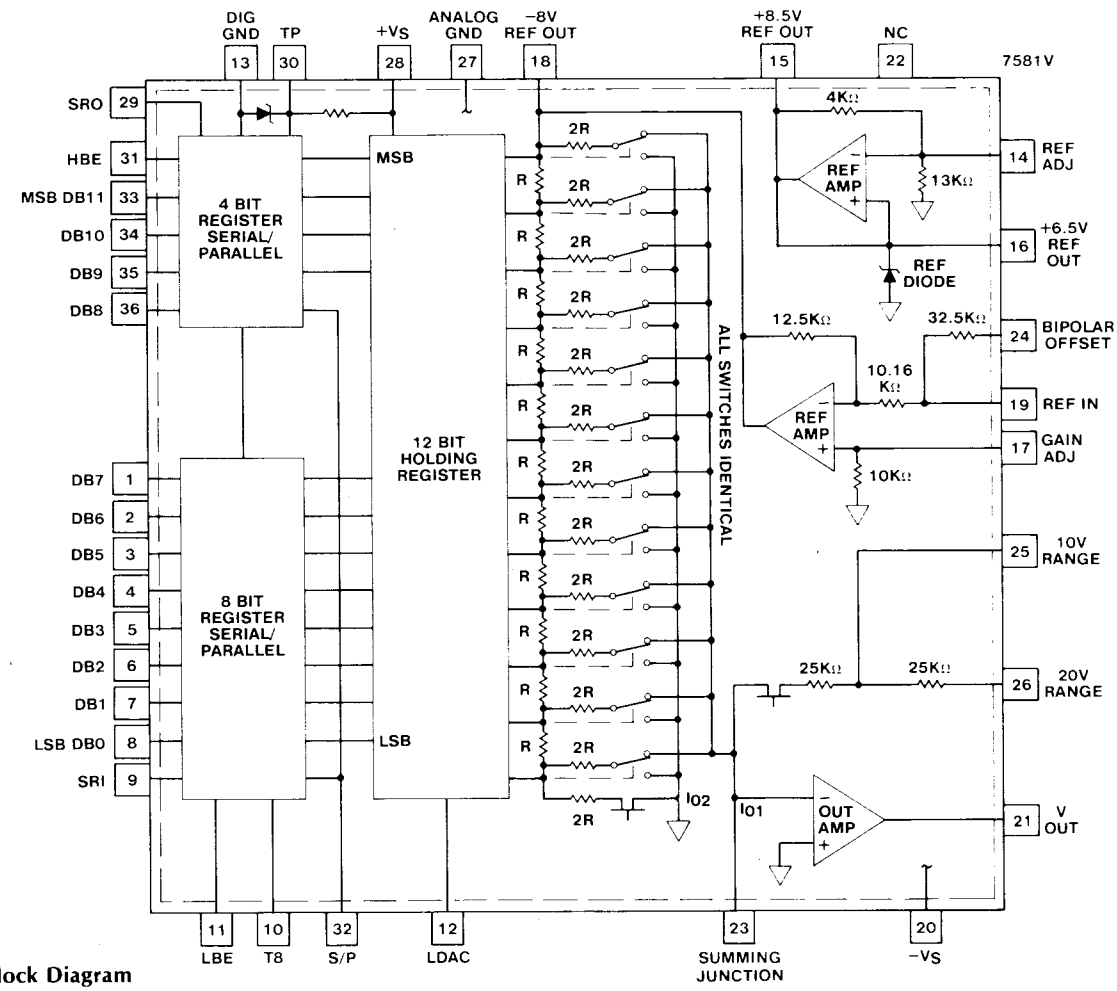


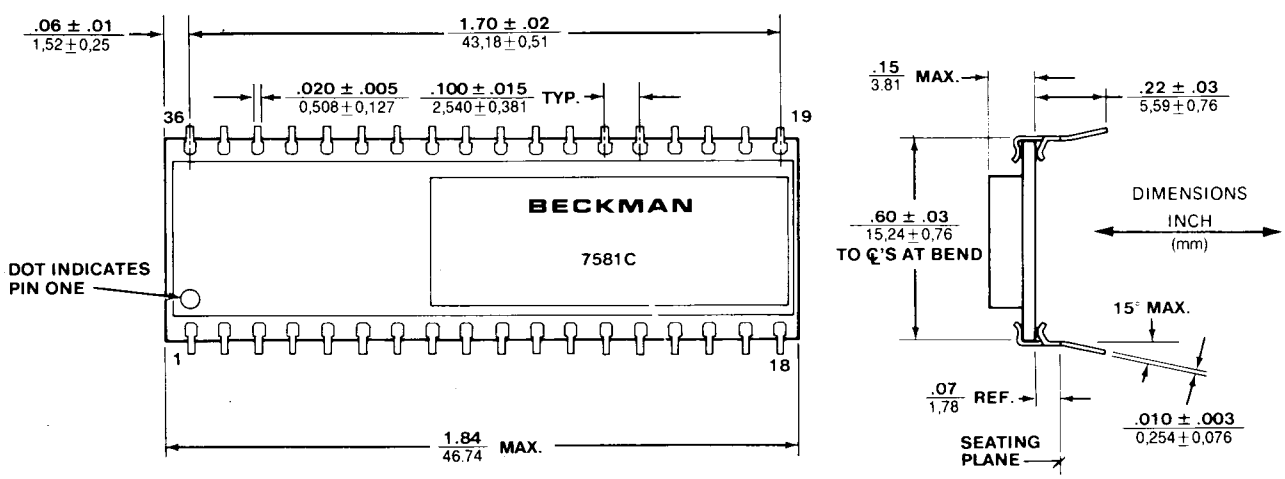
Figure 1.
7581C Block Diagram

Table I—Performance Specifications (The following specs hold for 25°C and rated power supply unless otherwise stated).

	Parameter	Condition	Minimum	Typical	Maximum	Units
Digital Input	Logic "1"		2.4		+Vs	Volts
	Logic "0"		−0.3		+0.8	Volts
	Input Currents			1		μA
Accuracy	Linearity	0°C to 70°C		±¼	±½	LSB
	Differential Linearity	0°C to 70°C		±½		LSB
	Gain Error			±.05	±.2	%FSR
	Offset Error			±.005	±.02	%FSR
	Offset Drift Unipolar	0°C to 70°C			±2	P10⁶FSR/°C
	Offset Drift Bipolar	0°C to 70°C			±15	P10⁶FSR/°C
	Gain Drift	(Incl. REF) 0°C to 70°C			30	P10⁶FSR/°C
	Gain Drift	(Not Incl. REF) 0°C to 70°C		+5		P10⁶FSR/°C
Reference Voltages	+6.5 Volt Reference			6.5		Volts
	+6.5 Volt Reference Current				200	μA
	+8.5 Volt Reference			+8.5		Volts
	+8.5 Volt Reference Current				5	mA
	+8.5 Volt Reference Tempco			20		P10⁶FSR/°C
	+6.5 Volt Reference Tempco			20		P10⁶FSR/°C
Speed	Settling Time	0 to +10V Range		6		μs
	Settling Time	−10V to +10V Range		12		μs
	Slew Rate			20		V/μs
Output	Range	±2.5, ±5, ±10, +5, +10				Volts
	Output Current		±5			mA
	Output Impedance (DC)			.05		Ω
Digital AC Characteristics (see Figure 9)	Parallel Data & Serial 8-Bit Word					
	Data Set-up	tDW	750			nsec
	Data Hold	tDH	50			nsec
	Pulse Width	LDAC, HBE, LBE t0	500			nsec
	Serial Data 12-Bit Word					
	Data Set-up	tDW	300			nsec
	Data Hold	tDH	450			nsec
	Pulse Width	LDAC, HBE, LBE t0	500			nsec
Power Supply	Supply Sensitivity	±Vs		±.002		%FSR/%Vs
	Supply Voltage Range	±Vs	±11.4		17	V
	Supply Currents	+Vs = +15V		6	13	mA
		−Vs = −15V		−4	−9	mA
Temp.	Specification Range		0		+70	°C
	Storage Range		−55		+100	°C

Notes:

1. All digital inputs must be connected to either a logic low or a logic high.



Outline Drawing—Series 7581C