

BRITISH STANDARDS INSTITUTION
2, PARK STREET, LONDON, W1A 2BS

BS CECC 90 202 - 001
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Specification available from: CECC 00 200, PD 9002 and:
BURR BROWN LIMITED
SIMPSON PARKWAY, KIRKTON CAMPUS, LIVINGSTON,
WEST LOTHIAN, SCOTLAND EH54 7BH
TEL: (0506) 414445
TELEX :727484

ELECTRONIC COMPONENTS OF ASSESSED QUALITY
IN ACCORDANCE WITH

BS CECC 90 000: 1985

BS CECC 90 200: 1987

MANUFACTURER'S TYPE NUMBER

OPA 27 A OPA 27 E

OPA 27 B OPA 27 F

OPA 27 C OPA 27 G

See PD 9002 and CECC 00 200

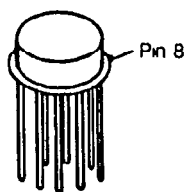
For ordering information see clause 1

**SILICON MONOLITHIC INTEGRATED
CIRCUIT ULTRA-LOW NOISE
PRECISION OPERATIONAL AMPLIFIER**

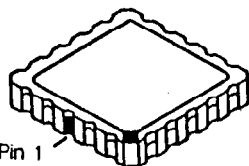
TYPICAL CONSTRUCTION:
HERMETICALLY SEALED,
METAL CAN PACKAGE AND
LEADLESS CHIP CARRIER

ASSESSMENT LEVELS Y AND L

Outlines not to scale: Isometric Projection



TO-99 (metal can) package



Leadless Chip Carrier package

For detail dimensions see Appendix D
of this Specification.

1. TYPE DESCRIPTION

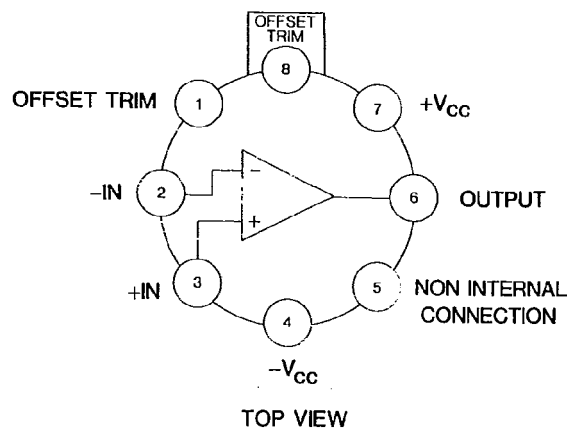
1.1

- Low Noise: $3.8 \text{ nV}/\sqrt{\text{Hz}}$ max at 1kHz
- Low Offset: $25 \mu\text{V}$ max
- Low Drift: $0.6 \mu\text{V}/^\circ\text{C}$ max
- High Open-Loop Gain: 120dB min
- High Common-Mode Rejection: 114dB min
- High Power Supply Rejection: 100dB min
- Fits OP-07, OP-05, AD-510, AD-517 Sockets

Refer to Qualified Products List PD9002 and/or CECC 00 200
for details of Manufacturers approved to this Specification.

1.2 TERMINAL IDENTIFICATION, TYPE DESIGNATION AND MARKING

1.2.1 TERMINAL IDENTIFICATION



1.2.2 TYPE DESIGNATION

TEMPERATURE RANGE	PACKAGE	
	TO-99 METAL CAN	LEADLESS CHIP CARRIER
-25 +85	OPA 27 EM OPA 27 FM OPA 27 GM	OPA 27 EL OPA 27 FL OPA 27 GL
-55 +125	OPA 27 AM OPA 27 BM OPA 27 CM	OPA 27 AL OPA 27 BL OPA 27 CL

1.2.3 MARKING

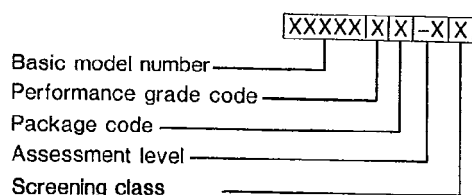
- (1) Each integrated circuit shall bear the following markings:
 - a. Terminal identification.
 - b. The manufacturer's type number and package material type.
 - c. Quality assessment level applied.
 - d. Screening class applied.
 - e. Date code.
 - f. CECC mark of conformity.
 - g. The factory logo.
- (2) Each primary package containing one or more of these circuits shall bear the markings (b), (c), (d) and (e) above, and in addition:
 - (g) The BS CECC detail specification number.

1.3 ORDERING INFORMATION

Orders for components to this specification shall contain the following minimum information:

- (a) Manufacturer's type number (including required suffix e.g. M), see clause 1.3.1.
- (b) Quantity.
- (c) The BS CECC specification number, issue and date, package style, assessment level and screening class.

1.3.1 INTERPRETATION OF MANUFACTURER'S TYPE NUMBER



KEY:

- Basic model number - OPA 27
 Performance grade code - A, B, C, E, F, or G
 Package code - M (TO-99 METAL CAN)
 L (LEADLESS CHIP CARRIER)

1.3.2 ASSESSMENT LEVELS

(With optional screening classes)

Assessment level Y
with application categories B AND E.

Assessment level L
with application categories B AND E.

Example:

OPA 27 AM-YB is a device type OPA 27, performance grade level A, package TO-99 (metal can) with CECC assessment and application category YB. (For details of screening procedures see Appendix A)

2.0 RATINGS (LIMITING VALUES) (Not for inspection purposes.)

CLAUSE NO.	CHARACTERISTIC	SYMBOL	LIMIT
2.1	Voltages on any terminal referred to $-V_{CC}$ shall not exceed the range of 0 to $+V_{CC}$.	-	-
2.2	Maximum continuous positive supply voltage. Maximum continuous negative supply voltage	V_{CC} $-V_{CC}$	+22V -22V
2.3	Output current (continuous)	I_{io}	$\pm 10\text{mA}$
2.4	Internal Power Dissipation (See Note 3)	P_D	500mW
2.5	Maximum common mode input voltage (See Note 1)	V_I	$\pm 22\text{V}$
2.6	Maximum differential input voltage (See Note 4)	V_{ID}	$\pm 0.7\text{V}$
2.7	Ambient operating temperature range for A, B and C VERSIONS Ambient operating temperature range for E, F, and G, VERSIONS	T_{amb} T_{amb}	-55°C to +125°C -25°C to +85°C
2.8	Storage temperature range	T_{stg}	-65°C to +150°C
2.9	Shock Vibration Acceleration steady state	- - -	14,700m/s ² 196m/s ² 294,000m/s ²
2.11	Max value of output short-circuit current (See Note 2)	I_{IOS}	60mA continuous

Note 1: For supply voltage less than $\pm 22\text{VDC}$ the absolute maximum input voltage is equal to the supply voltage.

Note 2: Short circuit may be to power supply common only with $\pm V_{CC} = 15\text{V}$

Note 3: Derate 7.1mW/°C above 80°C, for TO-99 package.

Note 4: The inputs are protected by back to back diodes. Current limiting resistors are not used in order to achieve low noise. If differential input voltage exceeds $\pm 0.7\text{V}$, the input current should be limited to 25mA.

3.1
(cont'd)

CLAUSE	DESCRIPTION	SYMBOL	VERSIONS	VALUE		UNITS	IEC METHOD
				MIN	MAX		
3.21	SLEW RATE ($V_O = \pm 10V, R_L = 2K\Omega$)	S_{VOAV}	ALL	± 1.7	—	V/ μs	A-16
3.22	Gain Bandwidth Product (See Note 1)	GW_R	ALL	5	—	MHz	A-17
3.24	Short Circuit Current	I_{sc}	ALL	—	60	mA	—
—	Supply Operating Voltages	$+V_{CC}$ $-V_{EE}$	ALL	4	22	V	—

Note 1 : Applies to Open Loop Test only.

3.2

ASSOCIATED CHARACTERISTICS OVER OPERATING TEMPERATURE RANGEFor E, F, G VERSIONS $T_{max} = 85^\circ C$, $T_{min} = -25^\circ C$ For A, B, C VERSIONS $T_{max} = 125^\circ C$, $T_{min} = -55^\circ C$

CLAUSE	DESCRIPTION	SYMBOL	VERSIONS	VALUE		UNITS	IEC METHOD
				MIN	MAX		
3.3	Output Current ($R_L = 2K\Omega$)	I_{IO}	ALL	± 5	—	mA	—
3.4	Supply Current ($I_O = 0mA$)	I_{CC}	A, B, E, F	—	± 4.7	mA	A-01
			C, G	—	± 5.7	mA	
3.7	Input Offset Voltage ($V_{CM} = OVDC$) Average Drift	V_{IO}	A	—	± 60	μV	A-04
			B	—	± 200	μV	
			C	—	± 300	μV	
			E	—	± 50	μV	
			F	—	± 140	μV	
			G	—	± 220	μV	
			A, E	—	± 0.6	$\mu V/^\circ C$	
			B, F	—	± 1.3	$\mu V/^\circ C$	
			C, G	—	± 1.8	$\mu V/^\circ C$	
3.9	Input Offset Current ($V_{CM} = OVDC$)	I_{IO}	A, E	—	50	nA	A-05
			B, F	—	85	nA	
			C, G	—	135	nA	
3.10	Input Bias Current ($V_{CM} = OVDC$)	I_B	A, E	—	± 60	nA	A-06
			B, F	—	± 95	nA	
			C, G	—	± 150	nA	
3.14	Open loop differential mode small signal voltage amplification ($R_L \geq 2K\Omega$)	A_{VD}	A	116	—	dB	A-09
			B	114	—	dB	
			C	110	—	dB	
			E	118	—	dB	
			F	117	—	dB	
			G	113	—	dB	
3.16	Common Mode Rejection ($V_N = \pm 10VDC$)	CMR	A	108	—	dB	A-11
			B	100	—	dB	
			C	94	—	dB	
			E	110	—	dB	
			F	102	—	dB	
			G	96	—	dB	
3.17	Power Supply Rejection Ratio $\pm V_{CC} = 4.5V$ to $18V$	PSRR	A	96	—	dB	A-12
			B	94	—	dB	
			C	86	—	dB	
			E	97	—	dB	
			F	96	—	dB	
			G	90	—	dB	
3.18	Output Voltage Range ($R_L \geq 2K\Omega$)	V_O	A	± 11.5	—	V	A-13
			B, G	± 11.0	—	V	
			C	± 10.5	—	V	
			E	± 11.7	—	V	
			F	± 11.4	—	V	