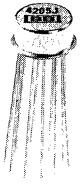
BURR-BROWN®



4203
4205

Integrated Circuit
MULTIPLIER-DIVIDERS

FEATURES

- LASER-TRIMMED
  Requires No Adjustment
- GUARANTEED ACCURACY - 1% or 2%
- SELF-CONTAINED
  No Additional Amplifiers
- FAST SLEWING - 25V/μsec
- SMALL PACKAGE - TO-100

APPLICATIONS

- MULTIPLICATION, DIVISION, SQUARING, SQUARE ROOTS
- RMS MEASUREMENTS
- FREQUENCY DOUBLER
- BALANCED MODULATOR AND DEMODULATOR
- ELECTRONIC GAIN CONTROL
- FUNCTION GENERATOR AND LINEARIZING CIRCUITS
- PROCESS CONTROL SYSTEMS

DESCRIPTION

Burr-Brown Models 4203 and 4205 are integrated circuit multipliers designed for general purpose usage. In addition to four-quadrant multiplication they also perform division and square rooting of analog signals, requiring no additional amplifiers in performing the above functions. They are laser-trimmed prior to final packaging and are guaranteed to their rated accuracy with no external components. This is a distinct advantage from the standpoints of cost and reliability.

These multipliers contain their own zener-regulated references and, as a result, are much less sensitive to supply voltage variation than were earlier IC multipliers. The fast (25V/μsec) slew rate and 1MHz bandwidth are key performance factors for applications where delay phase shift must be minimized. Harmonic distortion of the 4203 and 4205 remain low for frequencies well above 100kHz, an important asset in modulation applications.

Other desirable features are hermetic TO-100 package (10-pin version of TO-99) and wide temperature range of operation. The 4203S and 4205S are specified for operation over the full MIL temperature range.

International Airport Industrial Park - P.O. Box 11400 - Tucson, Arizona 85734 - Tel. (602) 746-1111 - Twx: 910-952-1111 - Cable: BBRCORP - Telex: 66-6491

PDS-473

SPECIFICATIONS

ELECTRICAL

Typical at +25°C with rated power supplies unless otherwise noted.
Percent specifications refer to % of full scale (10V).

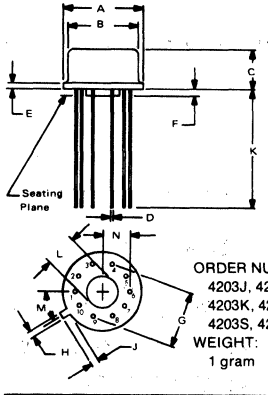
MODEL	4203J/4205J	4203K/4205K	4203S/4205S
OUTPUT FUNCTION 4203		XY/10	
4205		$(X_1 - X_2)(Y_1 - Y_2)/10$	
TOTAL ERROR*			
Internal Trim	2%, max	1%, max	1%, max
External Trim	1%	0.6%	0.6%
vs Temperature		0.04%/°C	
vs Supply		0.2%/%	
INDIVIDUAL ERRORS			
Output Offset at +25°C (X = Y = 0)		20mV, max	
vs Temperature (Operating Range)		0.4mV/°C	
vs Supply		10mV/%	
Scale Factor Error	1%	0.6%	0.6%
vs Temperature (Operating Range)		0.04%/°C	
vs Supply		0.1%/%	
Nonlinearity			
X(X = 20V, p-p; Y = ±10VDC)	0.8%	0.5%	0.5%
Y(Y = 20V, p-p; X = ±10VDC)		0.2%	
Feedthrough at 50Hz			
X = 0, Y = 20V, p-p (Internal Trim)		50mV, p-p	
(External Trim)		20mV, p-p	
vs Temperature		1mV, p-p/°C	
Y = 0, X = 20V, p-p (Internal Trim)		50mV, p-p	
(External Trim)		20mV, p-p	
vs Temperature		2mV, p-p/°C	
AC PERFORMANCE			
Slew Rate		25V/μsec	
-3dB Small Signal Bandwidth		1MHz	
1% Amplitude Error		40kHz	
1% Vector Error (0.57° phase shift)		10kHz	
Settling Time (2% of final value, 20V, step)		1μsec	
Overload Recovery Time		3μsec	
OUTPUT NOISE (X = Y = 0)			
10kHz to 10MHz		3mV, rms	
10Hz to 10kHz		600μV, rms	
INPUT CHARACTERISTICS			
Input Voltage Range			
Rated Operation		±10V	
Absolute Max		±15V	
Input Impedance, X		10MΩ	
Y		10MΩ	
Z		36kΩ	
OUTPUT CHARACTERISTICS			
Rated Output		±10V at ±5mA	
Output Impedance		1Ω	
POWER SUPPLY REQUIREMENTS			
Rated Voltage		±15VDC	
Operating Range		±12VDC to ±18VDC	
Quiescent Current		±4.5mA	
TEMPERATURE RANGE			
Operating, Rated Performance	0°C to 70°C		-55°C to +125°C
Storage		-65°C to +150°C	

*Total error is a tested maximum at +25°C and represents the maximum allowed value for the sum of the individual errors.

MECHANICAL

NOTE:
Leads in true position within 0.10" (0.25mm) R at MMC at seating plane.

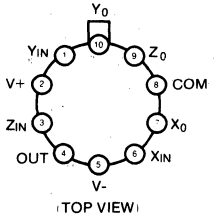
Pin numbers shown for reference only.
Numbers may not be marked on package.



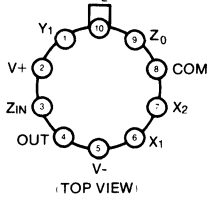
ORDER NUMBER:
4203J, 4205J
4203K, 4205K
4203S, 4205S
WEIGHT:
1 gram

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.335	.370	8.51	9.40
B	.305	.335	7.75	8.51
C	.165	.185	4.19	4.70
D	.016	.021	0.41	0.53
E	.010	.040	0.25	1.02
F	.010	.040	0.25	1.02
G	.230 BASIC		5.84 BASIC	
H	.028	.034	0.71	0.86
J	.029	.045	0.74	1.14
K	.500	--	12.70	--
L	.120	.160	3.05	4.06
M	36° BASIC		36° BASIC	
N	.110	.120	2.79	3.05

CONNECTION DIAGRAM



(TOP VIEW)
4203



(TOP VIEW)
4205