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REF102

## Precision VOLTAGE REFERENCE

### FEATURES

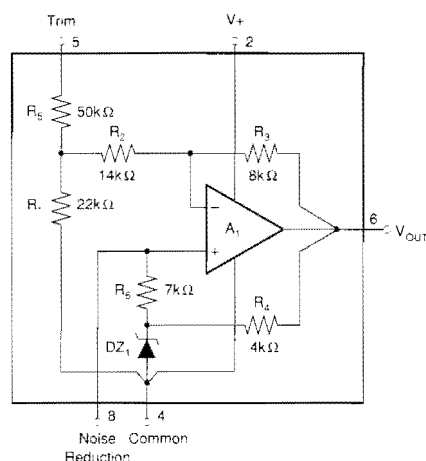
- +10V  $\pm 0.0025V$  OUTPUT
- VERY LOW DRIFT: 2.5ppm/ $^{\circ}C$  max
- EXCELLENT STABILITY: 5ppm/1000hr typ
- EXCELLENT LINE REGULATION: 1ppm/V max
- EXCELLENT LOAD REGULATION: 10ppm/mA max
- LOW NOISE: 5 $\mu$ Vp-p typ, 0.1Hz to 10Hz
- WIDE SUPPLY RANGE: 11.4VDC to 36VDC
- LOW QUIESCENT CURRENT: 1.4mA max
- PACKAGE OPTIONS: HERMETIC TO-99, PLASTIC DIP, SOIC

### APPLICATIONS

- PRECISION-CALIBRATED VOLTAGE STANDARD
- D/A AND A/D CONVERTER REFERENCE
- PRECISION CURRENT REFERENCE
- ACCURATE COMPARATOR THRESHOLD REFERENCE
- DIGITAL VOLTMETERS
- TEST EQUIPMENT
- PC-BASED INSTRUMENTATION

### DESCRIPTION

The REF102 is a precision 10V voltage reference. The drift is laser-trimmed to 2.5ppm/ $^{\circ}C$  max (CM grade) over the industrial temperature range and 5ppm/ $^{\circ}C$  max (SM grade) over the military temperature range. The REF102 achieves its precision without a heater. This results in low power, fast warm-up, excellent stability, and low noise. The output voltage is extremely insensitive to both line and load variations and can be externally adjusted with minimal effect on drift and stability. Single supply operation from 11.4V to 36V and excellent overall specifications make the REF102 an ideal choice for demanding instrumentation and system reference applications.



International Airport Industrial Park • Mailing Address: PO Box 11400 • Tucson, AZ 85734 • Street Address: 6730 S. Tucson Blvd. • Tucson, AZ 85706  
Tel: (520) 746-1111 • Twx: 910-952-1111 • Cable: BBRCORP • Telex: 066-6491 • FAX: (520) 889-1510 • Immediate Product Info: (800) 548-6132



PDS-900D

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REFERENCES AND REGULATORS

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## SPECIFICATIONS

### ELECTRICAL

At  $T_A = +25^\circ\text{C}$  and  $V_S = +15\text{V}$  power supply unless otherwise noted.

PARAMETER	CONDITIONS	REF102A, R			REF102B, S			REF102C, M			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
OUTPUT VOLTAGE											
Initial	$T_A = 25^\circ\text{C}$	9.99		10.01	9.995		10.005	9.9975		10.0025	V
vs Temperature <sup>(1)</sup>				10			5			2.5	ppm/°C
vs Supply											
(Line Regulation)	$V_S = 11.4\text{V to } 36\text{V}$			2			1			1	ppm/V
vs Output Current											
(Load Regulation)	$I_L = 0\text{mA to } +10\text{mA}$			20			10			10	ppm/mA
	$I_L = 0\text{mA to } -5\text{mA}$			40			20			20	ppm/mA
vs Time	$T_A = 25^\circ\text{C}$										
M Package			5			*			*		ppm/1000hr
P, U Packages <sup>(2)</sup>			20			*			*		ppm/1000hr
Trim Range <sup>(3)</sup>		±3			*			*			%
Capacitive Load, max			1000			*			*		pF
NOISE	(0.1Hz to 10Hz)		5			*			*		μV p-p
OUTPUT CURRENT		+10, -5			*			*			mA
INPUT VOLTAGE RANGE		+11.4		+36	*		*	*		*	V
QUIESCENT CURRENT	( $I_{OUT} = 0$ )			+1.4			*			*	mA
WARM-UP TIME <sup>(4)</sup>	(To 0.1%)		15			*			*		μs
TEMPERATURE RANGE											
Specification											
REF102A, B, C		-25		+85	*		*	*		*	°C
REF102R, S		-55		+125	*		*	*		*	°C

\*Specifications same as REF102A/R.

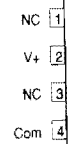
NOTES: (1) The "box" method is used to specify output voltage drift vs temperature. See the Discussion of Performance section. (2) Typically 50ppm/1000hrs after 168hr powered stabilization. (3) Trimming the offset voltage affects drift slightly. See Installation and Operating Instructions for details. (4) With noise reduction pin floating. See Typical Performance Curves for details.

### ORDERING INFORMATION

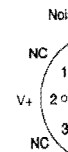
MODEL
REF102AU
REF102AP
REF102BP
REF102AM
REF102BM
REF102CM
REF102RM
REF102SM

### PIN CONFIGURATION

Top View



Top View



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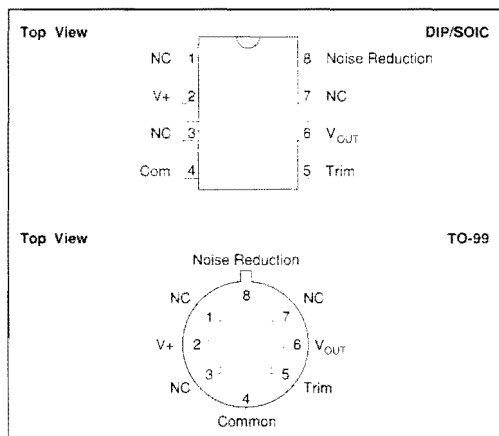
## ORDERING INFORMATION

MODEL	PACKAGE	TEMPERATURE RANGE	MAX INITIAL ERROR (mV)	MAX DRIFT (ppm/°C)
REF102AU	8-Pin SOIC	-25°C to +85°C	±10	±10
REF102AP	8-Pin Plastic DIP	-25°C to +85°C	±10	±10
REF102BP	8-Pin Plastic DIP	-25°C to +85°C	±5	±5
REF102AM	Metal TO-99	-25°C to +85°C	±10	±10
REF102BM	Metal TO-99	-25°C to +85°C	±5	±5
REF102CM	Metal TO-99	-25°C to +85°C	±2.5	±2.5
REF102RM	Metal TO-99	-55°C to +125°C	±10	±10
REF102SM	Metal TO-99	-55°C to +125°C	±5	±5

MAX	UNITS
0.0025	V
2.5	ppm/°C
1	ppm/V
10	ppm/mA
20	ppm/mA
	ppm/1000hr
	ppm/1000hr
	%
	pF
	μV/p-p
	mA
	V
	mA
	μs
	°C
	°C

nm/1000hrs after 168hr  
reduction pin floating.

## PIN CONFIGURATIONS



## ABSOLUTE MAXIMUM RATINGS

Input Voltage	+40V
Operating Temperature	-25°C to +85°C
P.U.	-55°C to +125°C
M	-55°C to +125°C
Storage Temperature Range	-40°C to +85°C
P.U.	-65°C to +150°C
M	-65°C to +150°C
Lead Temperature (soldering, 10s)	+300°C
(SOIC, 3s)	+260°C
Short-Circuit Protection to Common or V+	Continuous

## PACKAGE INFORMATION

MODEL	PACKAGE	PACKAGE DRAWING NUMBER <sup>(1)</sup>
REF102AU	8-Pin SOIC	182
REF102AP	8-Pin Plastic DIP	006
REF102BP	8-Pin Plastic DIP	006
REF102AM	Metal-TO-99	001
REF102BM	Metal-TO-99	001
REF102CM	Metal-TO-99	001
REF102RM	Metal-TO-99	001
REF102SM	Metal-TO-99	001

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

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REFERENCES AND REGULATORS

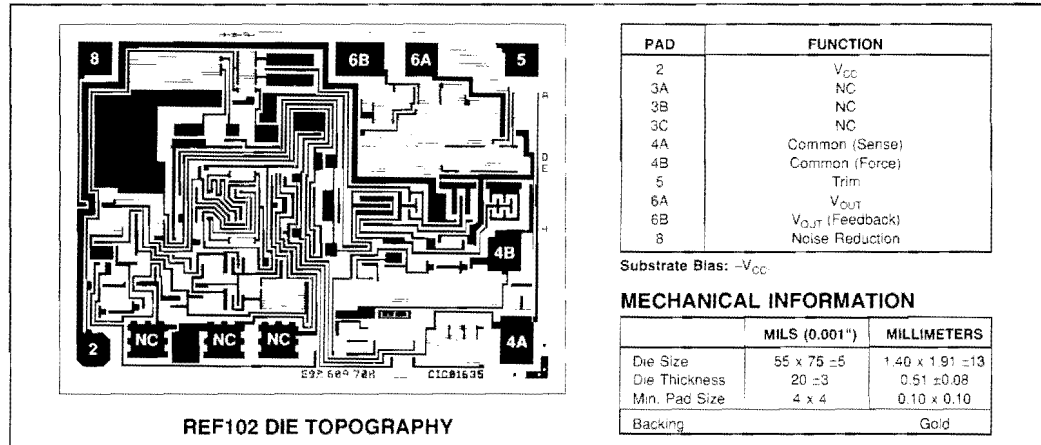
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Burr-Brown IC Data Book—Linear Products

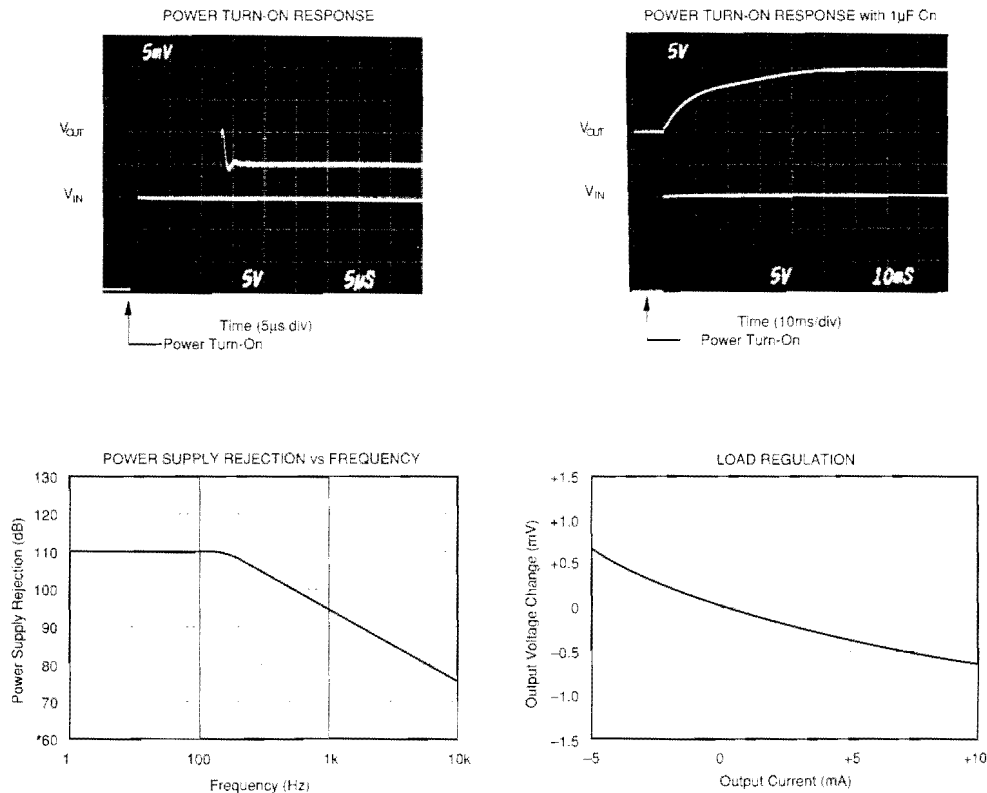
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# DICE INFORMATION



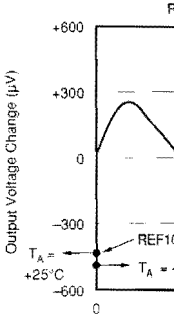
# TYPICAL PERFORMANCE CURVES

$T_A = +25^\circ\text{C}$ ,  $V_S = +15\text{V}$  unless otherwise noted.



# TYPICAL P

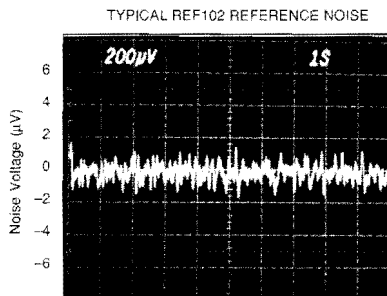
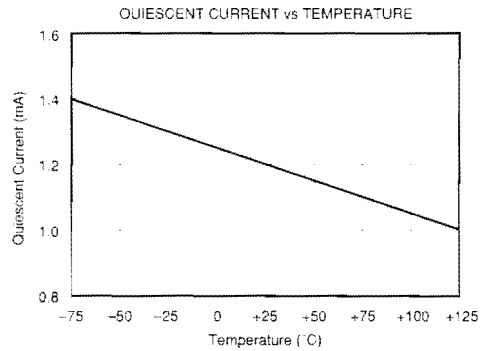
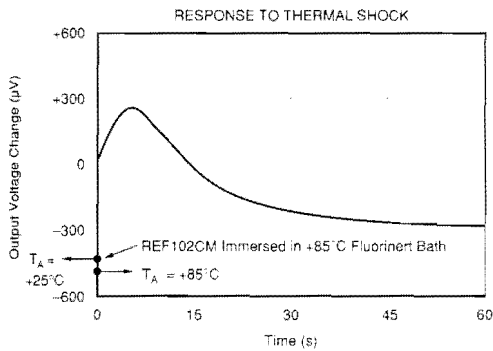
$T_A = +25^\circ\text{C}$ ,  $V_S = +15\text{V}$  unless otherwise noted.



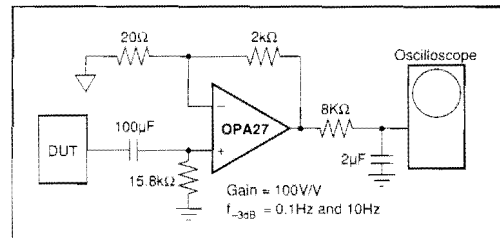
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## TYPICAL PERFORMANCE CURVES (CONT)

$T_A = +25^\circ\text{C}$ ,  $V_S = +15\text{V}$  unless otherwise noted.



Low Frequency Noise (1s/div)  
(See Noise Test Circuit)



Noise Test Circuit.

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