



HS2700 SERIES

T-58.07

PRECISION +10V,
-10V, $\pm 10V$ REFERENCES

FEATURES

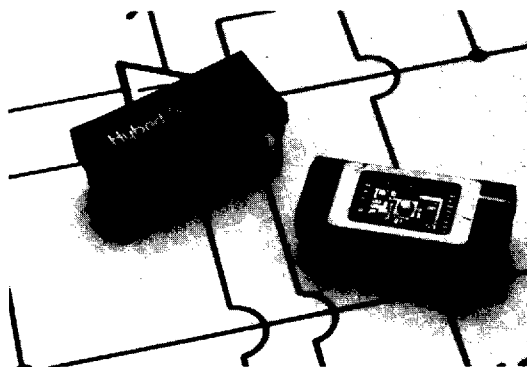
- High accuracy: 10.000 volts, $\pm 2.5mV$
- Low temperature coefficient: 3 ppm/ $^{\circ}C$
- 14-pin ceramic side brazed package
- Performance guaranteed $-55^{\circ}C$ to $+125^{\circ}C$
- AD2700 Series pin out compatibility

MODEL	OUTPUT
HS2700	+10.000V
HS2701	-10.000V
HS2702	$\pm 10.000V$

DESCRIPTION

The HS2700 Series offers a complete line of precision +10V, -10V, and $\pm 10V$ references. All models can be processed to MIL-STD-883C or commercial/industrial standards. The HS2700 Series combines precision laser trimmed nichrome resistors with premium grade gain and reference components for ultra-stable overall performance. Versions with tempcos as low as ± 3 ppm/ $^{\circ}C$ are available.

The HS2700 is a +10 volt reference with 10mA output drive capability making it suitable for use with high accuracy bipolar D/A converters or as a general positive system reference.

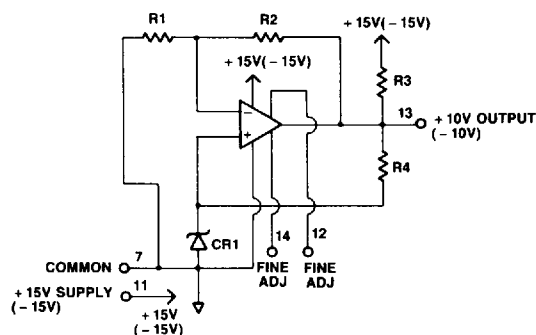


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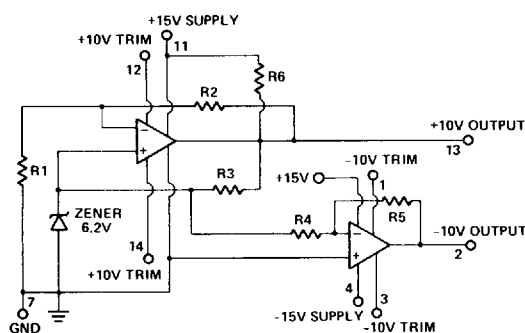
The HS2701 is a negative 10 volt reference designed to interface with CMOS D/A and A/D converters. For systems requiring a dual tracking reference, the HS2702 offers both positive and negative precision 10 volt outputs in a single package. Both are often used with the HS5240 Series 12-Bit A/D converters which require -10V external references for high accuracy over a wide temperature range.

Commercial "J" and "L" grades offer $-25^{\circ}C$ to $+85^{\circ}C$ operation while "S" and "U" grades operate from $-55^{\circ}C$ to $+125^{\circ}C$. Screening to MIL-STD-883C is available.

FUNCTIONAL DIAGRAMS



HS2700 (2701)



HS2702

SPECIFICATIONS(Maximum or minimum @ $E_{IN} \pm 15V$ @ $+25^{\circ}C$, $R_L = 2k\Omega$ unless otherwise noted.)

MODEL	HS 2700JD	HS 2700LD	HS 2700SD	HS 2700UD
ABSOLUTE MAX RATINGS				
Input Voltage (for applicable supply)	$\pm 20V$	*	*	*
Power Dissipation @ $+25^{\circ}C$				
HS 2700, 01	300mW	*	*	*
HS 2702	450mW	*	*	*
Operating Temperature Range	$-25^{\circ}C$ to $+85^{\circ}C$	*	$-55^{\circ}C$ to $+125^{\circ}C$	***
Storage Temperature Range	$-65^{\circ}C$ to $+150^{\circ}C$	*	*	*
Lead Temperature (soldering, 10s)	$+300^{\circ}C$	*	*	*
Short Circuit Protection (to GND)	Continuous	*	*	*
OUTPUT VOLTAGE ERROR @ $+25^{\circ}C$				
HS 2700 (10.000V)	$\pm 0.005V$	$\pm 0.0025V$	*	**
HS 2701 ($-10.000V$)	$\pm 0.005V$	$\pm 0.0025V$	*	**
HS 2702 ($\pm 10.000V$)	$\pm 0.005V$	$\pm 0.0025V$	*	**
OUTPUT CURRENT¹				
@ $+25^{\circ}C$	$\pm 10mA$	*	*	*
($V_{IN} = \pm 13$ to $\pm 18V$) over op. temp. range	$\pm 5mA$	$+5mA, -2mA$	**	**
OUTPUT VOLTAGE ERROR (T_{min} to T_{max})²				
HS 2700, 01	10ppm/ $^{\circ}C$ $\pm 11.0mV$	3ppm/ $^{\circ}C$ $\pm 4.3mV$	** $\pm 8mV$	** $\pm 5.5mV$
HS 2702	10ppm/ $^{\circ}C$ $\pm 11.0mV$	5ppm/ $^{\circ}C$ $\pm 5.5mV$	** $\pm 10.0mV$	** $\pm 5.5mV$
LINE REGULATION				
$V_{IN} = \pm 13.5$ to $\pm 16.5V$	300 $\mu V/V$	*	*	*
LOAD REGULATION				
0 to $+10mA$				
HS 2700	50 $\mu V/mA$	*	*	*
HS 2701	200 $\mu V/mA$	*	*	*
HS 2702	50 $\mu V/mA$	*	*	*
OUTPUT RESISTANCE				
	0.05 Ω	*	*	*
INPUT VOLTAGE, OPERATING				
	$\pm 13V$ to $\pm 18V$	*	*	*
QUIESCENT CURRENT				
HS 2700, 01	$\pm 14mA$	*	*	*
HS 2702	$+17mA, -4mA$	*	*	*
NOISE				
(0.1 to 10Hz)	50 μV p-p typ	*	*	*
OFFSET ADJUST RANGE				
(See Diagrams)	$\pm 20mV$ min	*	*	*
OFFSET ADJUST TEMP DRIFT EFFECT				
	$\pm 4 \mu V/^{\circ}C$ per mV of Adjust typ	*	*	*
PACKAGE				
	14-Pin Ceramic DIP			

NOTES:

*Same as "JD" grade performance. **Same as "LD" grade performance. ***Same as "SD" grade performance.

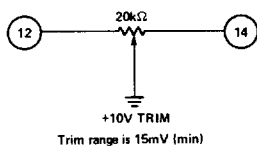
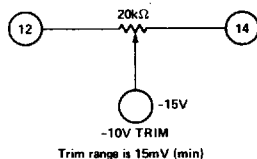
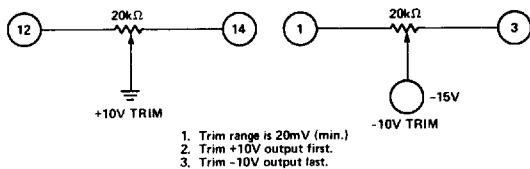
1. Specified with resistive load to common

2. Output voltage error as a function of temperature is determined using the box method. Each unit is tested at T_{min} , T_{max} and $+25^{\circ}C$. At each temperature V_{OUT} must fall within the rectangular area bounded by the minimum and maximum temperature and whose maximum V_{OUT} is equal to V_{OUT} nominal plus or minus the maximum $+25^{\circ}C$ error plus the maximum drift error from $+25^{\circ}C$. The box limits are noted below the drift values used to calculate the box.

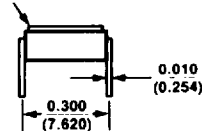
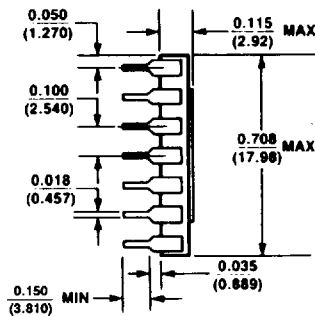
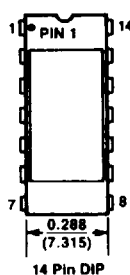
Specifications subject to change without notice.

APPLICATIONS INFORMATION

OPTIONAL ADJUSTMENTS

HS 2700

HS 2701

HS 2702


PACKAGE DIMENSIONS

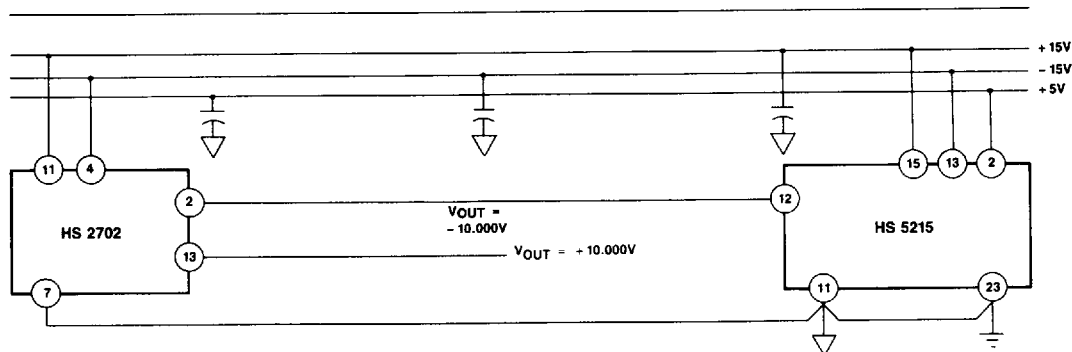
LEADS KOVAR

TOP VIEW

PIN OUT, HS 2702

1	-10V fine adj.
2	-10V OUT
3	-10V fine adj.
4	-15V
5	N/C
6	N/C
7	GND
8	N/C
9	N/C
10	T.P.
11	+15V
12	+10V fine adj.
13	+10V OUT
14	+10V fine adj.

PIN OUT, HS 2700, 2701

1	N/C
2	N/C
3	N/C
4	N/C
5	N/C
6	N/C
7	GND
8	N/C
9	N/C
10	N/C
11	+15V or (-15V)
12	V _{out} fine adj.
13	V _{out}
14	V _{out} fine adj.

5



Using HS 2702 Reference with the Fast, High Accuracy
HS 5215 - 12-Bit ADC

ORDERING INFORMATION

MODEL	OUTPUT VOLTAGE ERROR	STABILITY	OPERATING TEMPERATURE RANGE	SCREENING
HS 2700JD	$\pm 0.005V$	10 ppm/°C	-25°C to +85°C	—
HS 2700LD	$\pm 0.0025V$	3 ppm/°C	-25°C to +85°C	—
HS 2700SD/883	$\pm 0.005V$	3 ppm/°C	-55°C to +125°C	MIL-STD-883C
HS 2700UD/883	$\pm 0.0025V$	3 ppm/°C	-55°C to +125°C	MIL-STD-883C
HS 2701JD	$\pm 0.005V$	10 ppm/°C	-25°C to +85°C	—
HS 2701LD	$\pm 0.0025V$	3 ppm/°C	-25°C to +85°C	—
HS 2701SD/883	$\pm 0.005V$	3 ppm/°C	-55°C to +125°C	MIL-STD-883C
HS 2701UD/883	$\pm 0.0025V$	3 ppm/°C	-55°C to +125°C	MIL-STD-883C
HS 2702JD	$\pm 0.005V$	10 ppm/°C	-25°C to +85°C	—
HS 2702LD	$\pm 0.0025V$	5 ppm/°C	-25°C to +85°C	—
HS 2702SD/883	$\pm 0.005V$	5 ppm/°C	-55°C to +125°C	MIL-STD-883C
HS 2700UD/883	$\pm 0.0025V$	3 ppm/°C	-55°C to +125°C	MIL-STD-883C