

UAA 1004-DP **UAA 1004-CM**

ZERO VOLTAGE SWITCH

Designed for use in high volume AC power switching applications with output drive capable of triggering SCR's or triacs. Other operational features include:

- Direct AC line or DC operation.
- A zero voltage crossing detector that synchronises the SCR or the triac at the zero crossing of the AC line voltage.
- High impedance input differential amplifier.
- Built-in hysteresis which avoids a DC current component through the load.
- Fail safe: a high impedance differential amplifier which supervises the sensor and insures that the triac will never turn "on" due to sensor failure.
- High power, asymmetric gate trigger pulses for power saving with internal current limitation. (Negative pulses)
- Voltage regulator for the supply of the sensor or other external circuits.

Typical Applications:

- | | |
|----------------------|------------------------|
| • heater control | • valve control |
| • hot plate control | • on-off power control |
| • photo control | • relay driver |
| • threshold detector | • lamp driver |

ZERO VOLTAGE SWITCH

**SILICON MONOLITHIC
INTEGRATED CIRCUIT**



DP SUFFIX
PLASTIC PACKAGE
CASE 626



CM SUFFIX
METAL PACKAGE
CASE 601
TO-99

PIN CONNECTIONS

1. INVERTING INPUT (INPUT AMP.)
2. NON INVERTING INPUT (FAIL SAFE)
3. AUXILIARY VOLTAGE (—)
4. + V_{CC} (GROUND)
5. AC LINE
6. OUTPUT
7. — V_{CC}
8. NON INVERTING INPUT (INPUT AMP.)

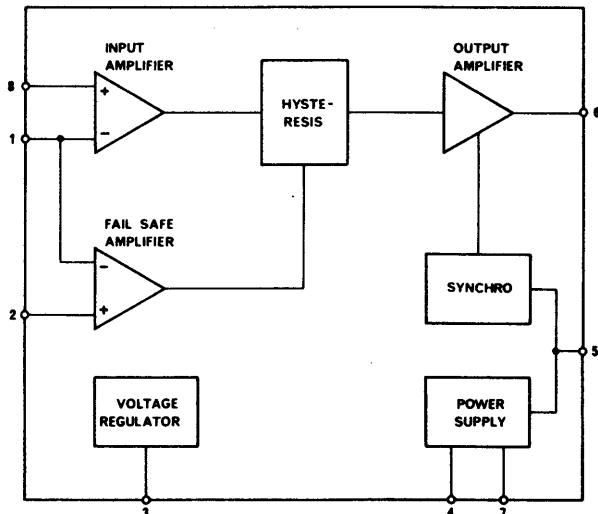


FIGURE 1 - BLOCK DIAGRAM

UAA 1004

MAXIMUM RATINGS

Rating	Symbol	UAA1004-DP	UAA1004-CM	Unit
External DC Power Supply	V_{CC} (4-7)	20		Vdc
AC Peak Supply Current (sine wave, 50-60 Hz)	I_{AC} (5-4)	55		mA
Differential Input Voltage	V_{in} (1-8)	± 6		Vdc
	V_{in} (1-2)	± 6		Vdc
Power Dissipation $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625	680	mW
	$1/\theta_{JA}$	5.0	4.6	mW/ $^\circ\text{C}$
Operating Temperature Range	T_A	-20 to +75	-55 to +125	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +125	-65 to +150	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$ Unless Otherwise Stated)

Characteristics		Symbol	Fig./Note	Min	Typ	Max	Unit
Input Differential Amplifier	Input Common Mode	CMV_{in}		-1		$-V_{CC} + 2$	V
	Input Bias Current	I_{bin}	Note 1			1	μA
	Input Offset Voltage	V_{oin}	Fig. 5	-10		+10	mV
Schmitt-Trigger	Hysteresis	V_{Hin}		+10		+20	mV
Fail Safe Amplifier	Input Common Mode	CMV_{is}		-1		$-V_{CC} + 2$	V
	Input Bias Current	I_{bin}	Note 1			1	μA
	Input Offset Voltage	V_{ofs}	Note 2	-20		+20	mV
Synchronization	Pulse Duration	t_{LH}	Fig. 3 + 4	100			μs
		t_{LHL}		75			μs
		t_H			20		μs
Output Amplifier	Current Sink	I_{out}	Note 4	80			mA
Voltage Regulator	Auxiliary Voltage	V_{Aux}			-7.7		V
		TC_{Aux}			-0.7		mV/ $^\circ\text{C}$
	Output Impedance	$Z_{o\text{ Aux}}$			10		Ω
	Load Current Range	I_{Aux}	Fig. 3	0.2		3	mA
Main Supply	AC Operation	V_{CC}	Fig. 3/Note 3		-14		V
	DC Operation	V_{CC}		-11			V
		I_{CC}	Note 5		1.9		mA

NOTES

- As the input amplifier has a common pin with the fail safe amplifier, the input bias current of each amplifier is defined as:

$$I_{bin} = \frac{1}{4} (I_{b0} + I_{b1} + I_{b2})$$
- This characteristic can be measured as in Fig. 5. The function generator must be connected between pins 1 & 2 and the input amplifier must be biased with pin 8 positive and pin 1 negative.
- Measured with $I_{Aux} = 0$
- Measured at $V_{CC} = 14\text{ V}$
- Measured with $I_{out} = 0$ and $I_{Aux} = 0$

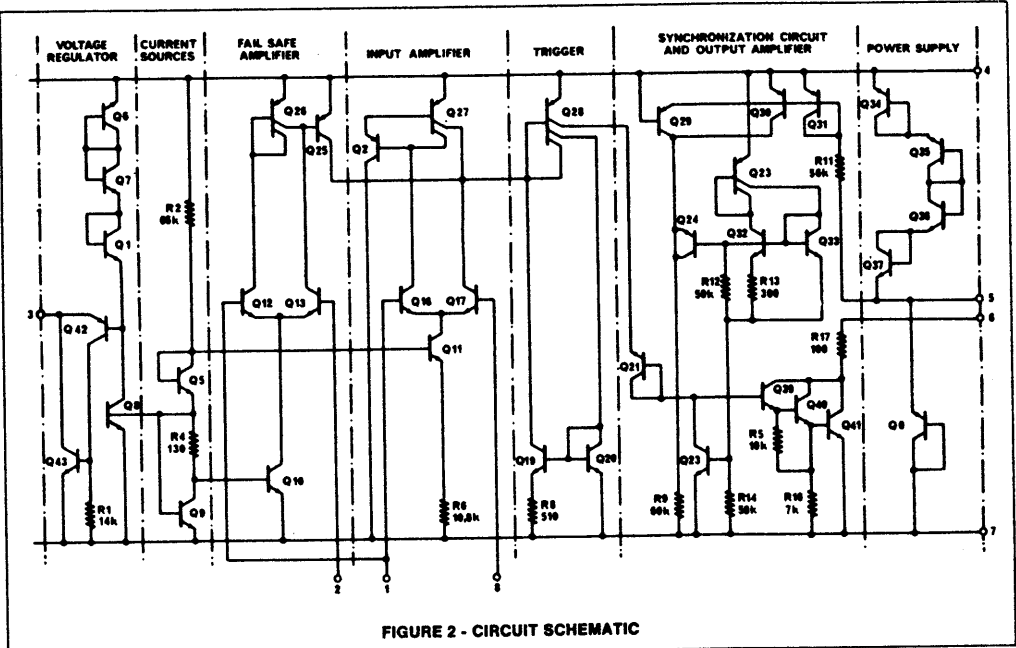


FIGURE 2 - CIRCUIT SCHEMATIC

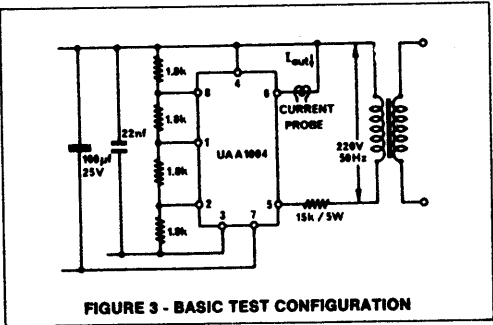


FIGURE 3 - BASIC TEST CONFIGURATION

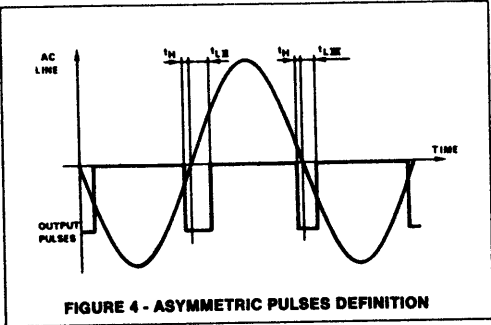


FIGURE 4 - ASYMMETRIC PULSES DEFINITION

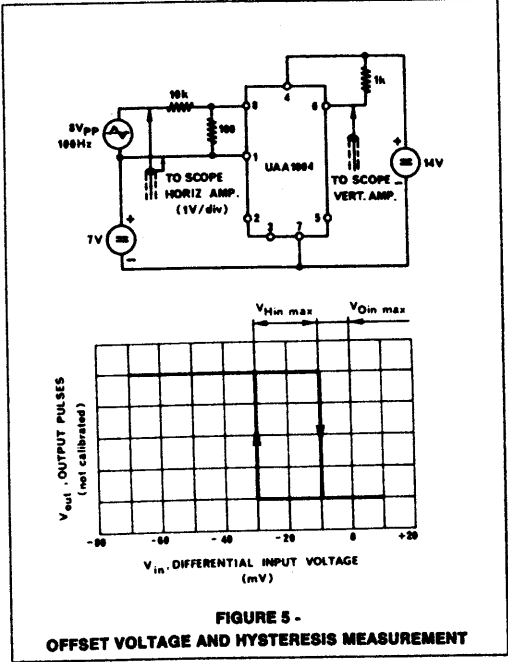


FIGURE 5 - OFFSET VOLTAGE AND HYSTERESIS MEASUREMENT

TYPICAL APPLICATIONS

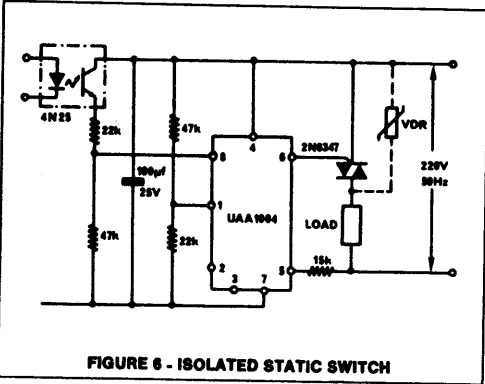


FIGURE 6 - ISOLATED STATIC SWITCH

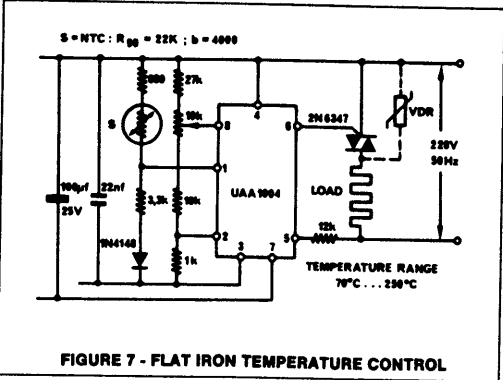


FIGURE 7 - FLAT IRON TEMPERATURE CONTROL

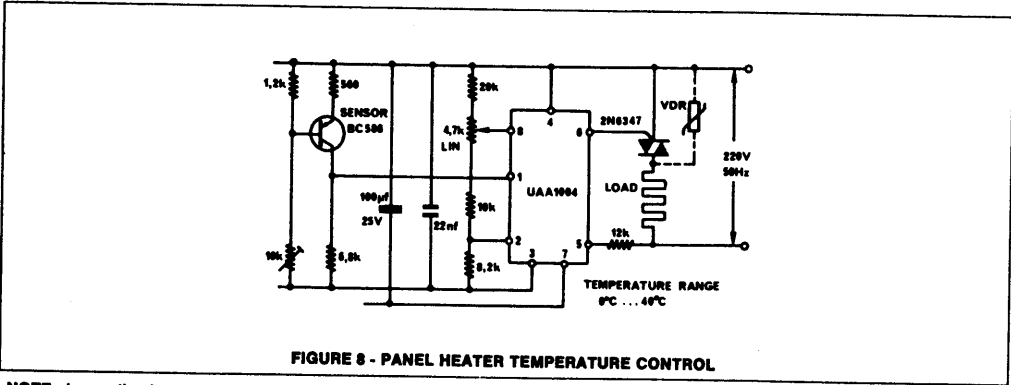


FIGURE 8 - PANEL HEATER TEMPERATURE CONTROL

NOTE: In applications of Fig. 7 & 8, noise on the input amplifier (pins 8 & 1) must be kept below the minimum hysteresis specified. Care must be then taken in the layout of the PC board and in the wiring, or if necessary, put a RC filter at this input.

OUTLINE DIMENSIONS

CM SUFFIX
METAL PACKAGE
CASE 601
TO-99

DIM	MIN	MAX	MIN	MAX
A	8.510	9.380	0.335	0.370
B	7.750	8.500	0.305	0.335
C	4.200	4.690	0.165	0.185
D	4.070	4.532	0.161	0.181
E	-	1.070	-	0.040
F	0.406	0.482	0.016	0.019
G	5.080	TP	0.200	TP
H	0.712	0.864	0.028	0.034
J	0.727	1.140	0.029	0.045
K	12.700	-	0.500	-
M	45°	TYP	45°	TYP
N	-	1.270	-	0.050
P	6.350	12.100	0.250	0.500
Q	3.580	4.060	0.140	0.160
R	0.254	1.010	0.010	0.040

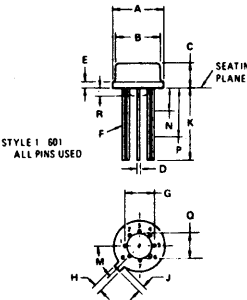
Weight $\approx$ 0.920 gram

DP SUFFIX
PLASTIC PACKAGE
CASE 626

DIM	MIN	MAX	MIN	MAX
A	9.39	9.90	370	390
B	6.09	6.35	240	250
C	3.43	3.94	135	155
D	3.81	4.83	0.15	0.19
E	-	1.14	-	0.045
F	7.54	TYP	0.100	TYP
G	7.62	1.57	0.30	0.60
H	5.08	NOM	0.25	NOM
J	7.62	1.02	0.30	0.040
K	2.92	3.43	115	135
L	7.0	TYP	70	TYP
M	0°	10°	0°	10°
N	20.3	27.9	0.08	0.11
P	7.37	7.87	290	310

NOTES:
1. DIMENSION "P" IS TO LEAD CENTERLINE WHEN FORMED PARALLEL.
2. FOUR (4) INSULATING STANDOFFS ARE PROVIDED.

Weight $\approx$ 0.446 gram



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