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
- hot plate control
- photo control
- threshold detector
- valve control
- on-off power control
- relay driver
- 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.)

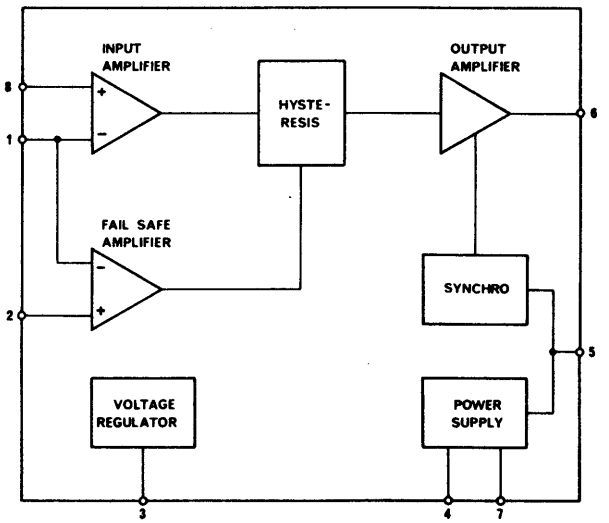


FIGURE 1 - BLOCK DIAGRAM

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°C	P_D	625	680	mW
Derate above 25°C	$1/\theta_{JA}$	5.0	4.6	mW/°C
Operating Temperature Range	T_A	— 20 to + 75	— 55 to + 125	°C
Storage Temperature Range	T_{stg}	— 55 to + 125	— 65 to + 150	°C

ELECTRICAL CHARACTERISTICS (T_A = + 25°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_{fs}		— 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_{LII}	Fig. 3 + 4	100			μs
		t_{LIII}		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/°C
	Output Impedance	$Z_{o\ Aux}$			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

1. As the input amplifier has a common pin with the fail safe amplifier, the input bias current of each amplifier is defined as:
$$I_{bia} = \frac{1}{4}(I_{bs} + I_{b1} + I_{b2})$$
2. 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.
3. Measured with I_{Aux} = 0
4. Measured at V_{CC} = 14 V
5. Measured with I_{out} = 0 and I_{Aux} = 0

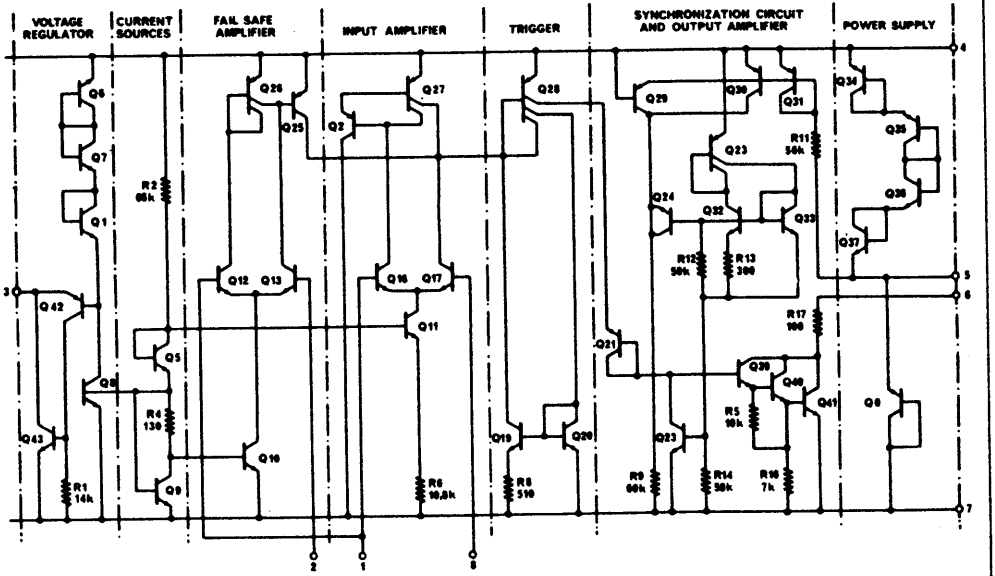


FIGURE 2 - CIRCUIT SCHEMATIC

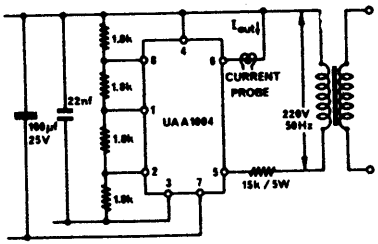


FIGURE 3 - BASIC TEST CONFIGURATION

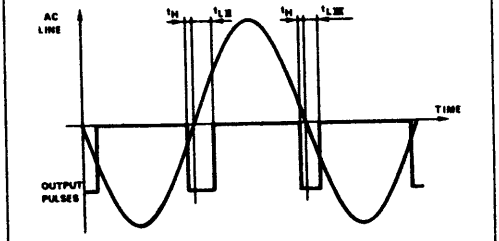
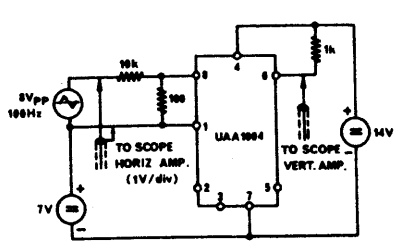


FIGURE 4 - ASYMMETRIC PULSES DEFINITION



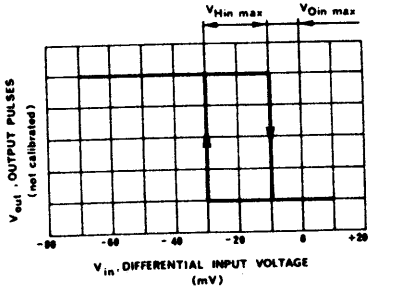


FIGURE 5 - OFFSET VOLTAGE AND HYSTERESIS MEASUREMENT

TYPICAL APPLICATIONS

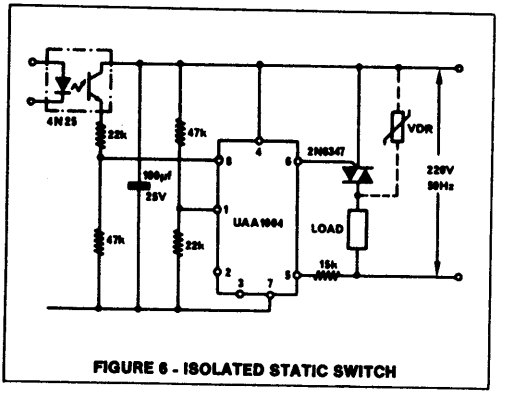


FIGURE 6 - ISOLATED STATIC SWITCH

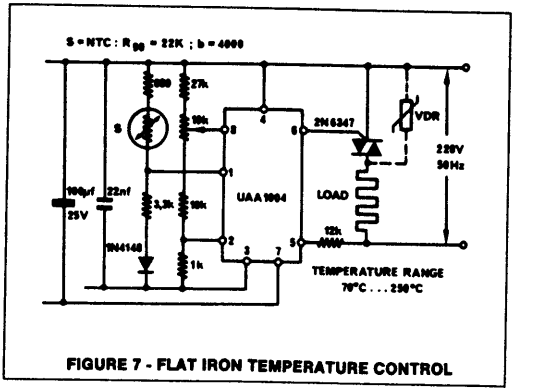


FIGURE 7 - FLAT IRON TEMPERATURE CONTROL

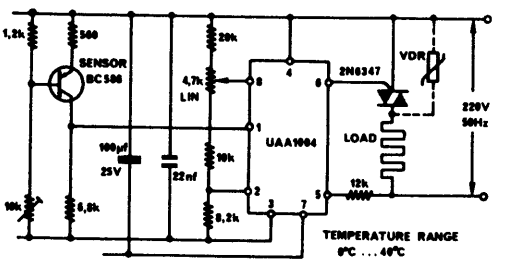
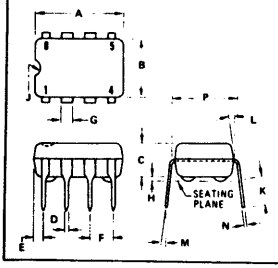


FIGURE 8 - PANEL HEATER TEMPERATURE CONTROL

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

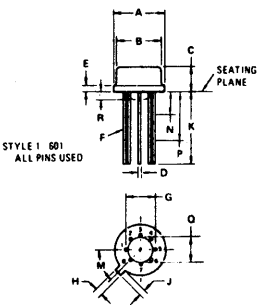
DP SUFFIX
PLASTIC PACKAGE
CASE 626



DIM	MILLIMETERS MIN	MAX	INCHES MIN	MAX
A	9.39	9.90	.370	.390
B	6.09	6.35	.240	.250
C	3.43	3.94	.135	.155
D	.381	.483	.015	.019
E	-	1.14	-	.045
F	2.54 TYP		0.100 TYP	
G	7.62	1.52	.030	.060
H	508 NOM		020 NOM	
J	.762	1.02R	.030	.040R
K	2.92	3.43	.115	.135
L	7° TYP		7° TYP	
M	0°	10°	0°	10°
N	.203	.279	.008	.011
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 ≈ 0.446 gram



CM SUFFIX
METAL PACKAGE
CASE 601
TO–99

DIM	MILLIMETERS MIN	MAX	INCHES MIN	MAX
A	8.510	9.398	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	0.533	0.016	0.021
E	-	1.020	-	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	0.737	1.140	0.029	0.045
K	12.700	-	0.500	
M	45° TYP		45° TYP	
N	-	1.270	-	0.050
P	6.350	12.700	0.250	0.500
Q	3.560	4.060	0.140	0.160
R	0.254	1.010	0.010	0.040

Weight ≈ 0.920 gram