DUAL 2-A LOW DROP OUT INTELLIGENT POWER SWITCH

ADVANCE INFORMATION

The UAF1780 is a dual interface circuit delivering high output currents and capable of driving any type of load.

An on-chip dc/dc conversion unit in conjunction with a few low-cost external components (a low value inductor and a low voltage capacitor) are implemented to limit the saturation voltage thereby optimizing the efficiency.

The device is particularly well protected against destructive overloads. Each output implements a current limit circuitry, a desaturation monitoring unit for the detection of overloads and short-circuits, and a thermal protection feature.

Corresponding output is turned off in case of prolonged desaturation or excessive internal dissipation. This condition is reflected by a low level on ALARM ouput terminal. This protection unit can be reactivated by applying a logic low signal to RESET input.

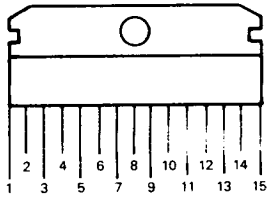
However , for inductive loads, a delay is imposed on signal applied to this RESET input so as to prevent a rapid and premature conduction of output transistors.

A logic high signal applied to STROBE input will disable both power outputs.

The device operates within a supply voltage range of +8V to +32V

- Low power dissipation (low V_{SAT} : 0.6V @ 2A)
- All inputs are operational with control signals higher than V_{CC}
- All inputs withstand voltages lower than ground
- High output currents
- Protection of output transistors (up to +32V)
- The outputs can withstand voltages lower than ground
- Withstand on V_{CC} spikes up to (60V, 10ms)
- Differential inputs

PIN ASSIGNMENT

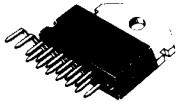


1 - Oscillator
2 - $V_{(aux)}$
3 - Input 2
4 - Delay 2
5 - Alarm 2
6 - Reference
7 - Output 2
8 - Ground
9 - V_{CC}
10 - Output 1
11 - Alarm 1
12 - Delay 1
13 - Input 1
14 - $\overline{\text{Reset}}$
15 - Strobe

BIPOLAR

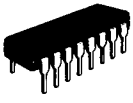
CASES

CB-501



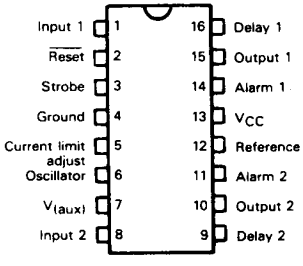
SP SUFFIX
MULTIWATT 15

CB-79

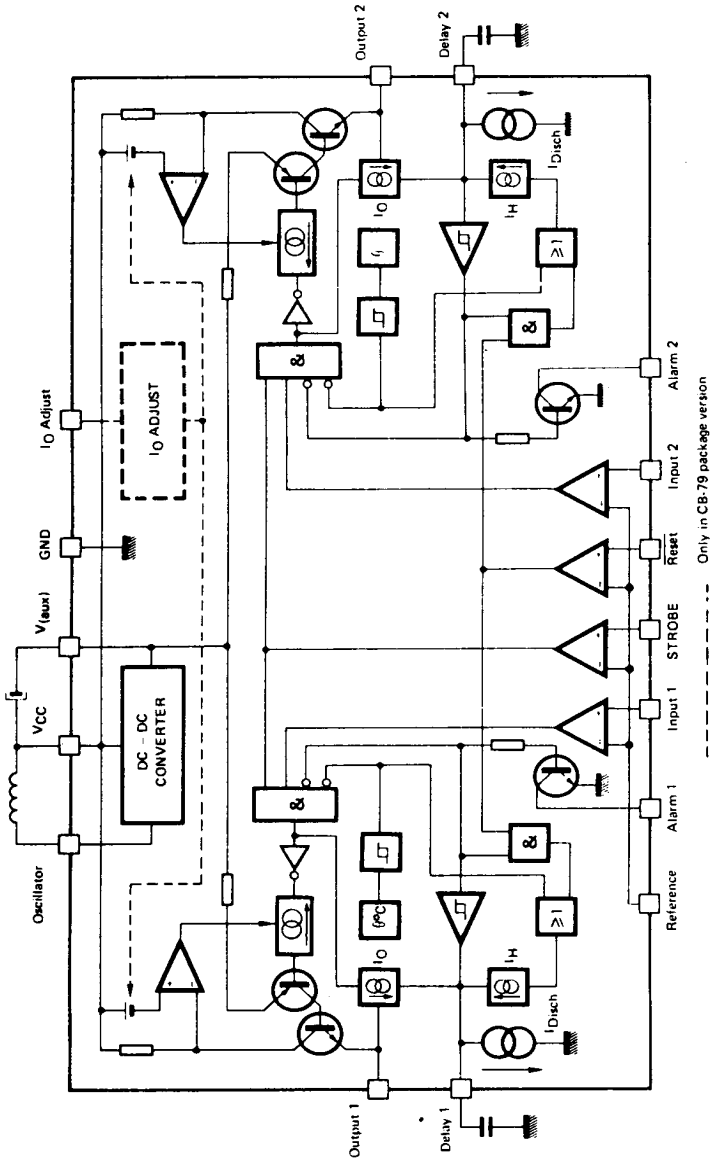


DP SUFFIX
PLASTIC PACKAGE

PIN ASSIGNMENT



BLOCK DIAGRAM



MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Supply voltage	V_{CC}*	+ 35	V
Input voltages	V_{I1} V_{I2} V_{reset} V_{strobe}	− 30 to + 55	V
Output current	I_O	Internally limited	A
Current in DC/DC converter inductance	I_L	0.4	A
Total power dissipation	P_{tot}	Internally limited	W
Operating free-air temperature range	T_{oper}	40 to + 85	°C
Junction temperature	T_j	+ 150	°C

* + 60 V (10 mS)

THERMAL CHARACTERISTICS

Characteristic		Symbol	Value	Unit
Maximum junction-case thermal resistance	CB-79 CB-501	$R_{th(j-c)}$	25 2.5	°C/W
Maximum junction-ambient thermal resistance	CB-79 CB-501	$R_{th(j-a)}$	70 40	°C/W

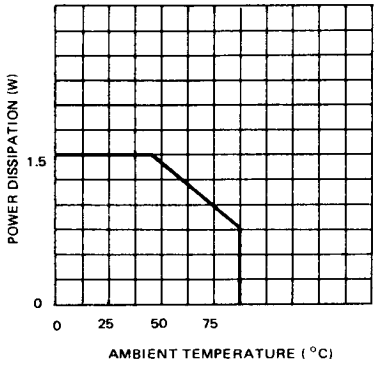
ELECTRICAL OPERATING CHARACTERISTICS

V_{CC} = + 24 V, − 40°C, ≤ T_{amb} ≤ + 85°C (unless otherwise specified)

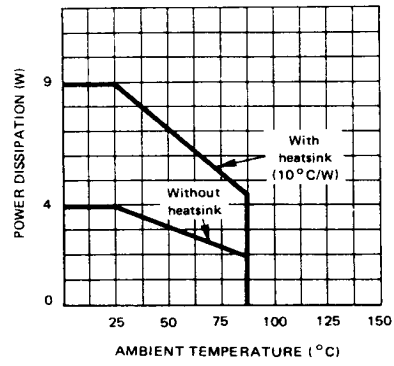
Characteristic	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V_{CC}	8		32	V
Supply current Input 1 = Input 2 : low Input 1 = Input 1 : high , I_O = 2 x 2A	I_{CC}		 7 25	 32	mA
Input current (all inputs) $V_I > V_{ref}$ $V_I < V_{ref}$	I_I		 15 0	 50 	μA
High level alarm output leakage current (V_A = + 10 V)	I_{OHA}		0	10	μA
Low level alarm output voltage (I_A = + 10 mA)	V_{OLA}		1.1	1.3	V
Power outputs dropout voltage I_O = 0.5 A I_O = 1 A I_O = 2 A	$V_{CC} - V_O$		 0.15 0.3 0.6	 0.25 0.4 0.7	V
Power outputs leakage current	I_{OL}			100	μA
Reset pulse duration (C1 = C2 = 1μF)	t_{reset}		400		mS
Delay time before desaturation monitoring unit becomes active (C1 = C2 = 1μF) $V_{CC} - V_O$ = − 12 V $V_{CC} - V_O$ = − 24 V $V_{CC} - V_O$ = − 32 V	t_d	 –	 20 10 5	 –	mS
Reference input voltage	V_{ref}	1.4		55	V
Reference input current (V_{ref} = 1.4 V) All inputs < V_{ref} All inputs > V_{ref}	I_{ref}	 1	 80 0	 150 − 1	μA
Available output current (Curve 3)	I_O	2.5	2.7		A
Maximum output voltage swing	$V_{CC} - V_O$	–	–	50	V
DC/DC output voltage CO = 47 μF, L = 100 μH 0.5 A < I_O < 2 A (each output)	$V_{aux} - V_{CC}$	–	1.25	–	V

MAXIMUM ADMISSIBLE POWER DISSIPATION

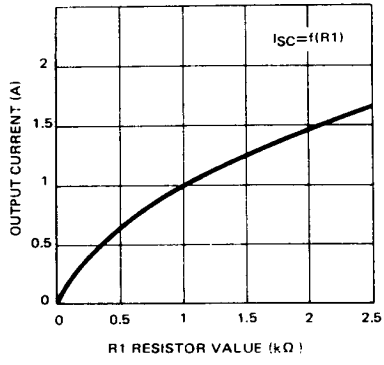
CURVE 1 - CB-79 PACKAGE



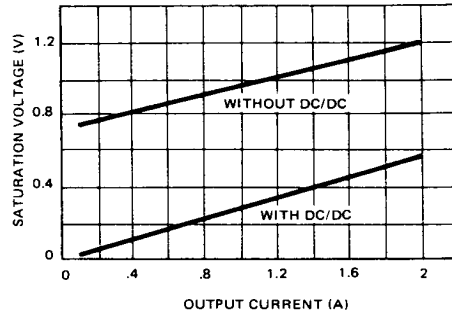
CURVE 2 - CB-501 PACKAGE



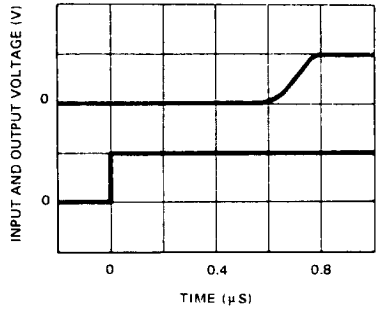
CURVE 3 - AVAILABLE OUTPUT CURRENT VS EXTERNAL RESISTANCE VALUE (CB-79 PACKAGE)

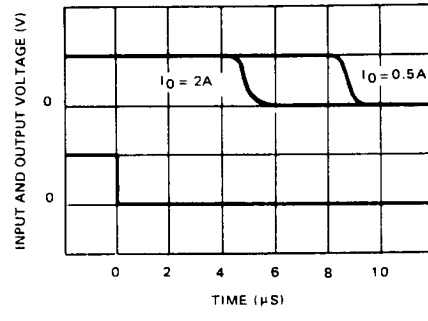


SATURATION VOLTAGE VS OUTPUT CURRENT

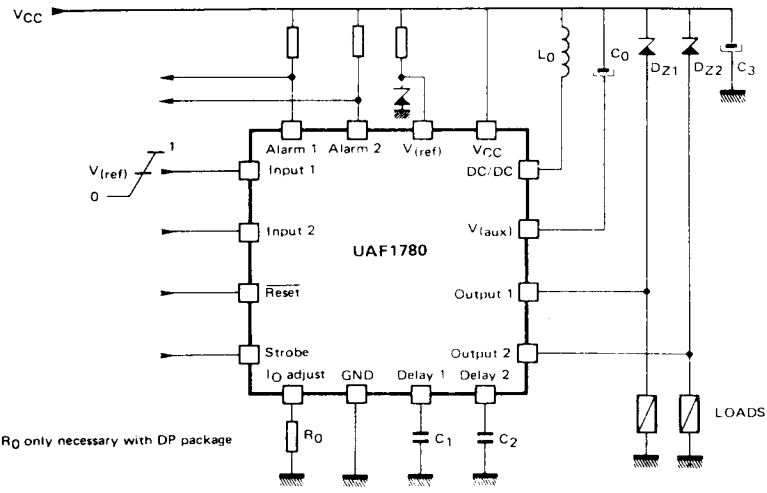


RESPONSE TIME



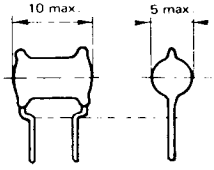


TYPICAL APPLICATION



- **L_0** and **C_0** are the external elements of the **dc/dc converter**. Typical values and characteristics of these components are as follows :

  For **L_0**: – Inductance = 100 μH (tolerance ± 10%)
  – Maximal current ≥ 400mA



SIZE EVALUATION FOR dc/dc INDUCTANCE

For **C_0** : The value of this capacitor is not critical, a capacitor of $C_1 \geq 47\mu F$, $V_n \geq 6.3$ V will be suitable for the majority of the applications.

- The on-chip **dc/dc converter** can be disabled by connecting $V_{(aux)}$ terminal to V_{CC} and leaving "Oscillator" pin floating.

- **C_1** and **C_2** implement two distinct functions :
  – response time required by the desaturation monitoring unit to become active,
  – time delay imposed on each power output prior to conduction.

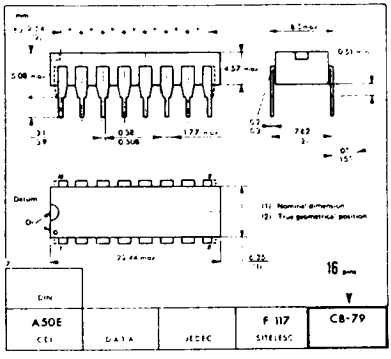
$$t_d \simeq \frac{C \times 3.5\ V}{7\ \mu A}$$

With $C_2 = C_3 = 1\ \mu F$, the outputs are protected against voltage transients of as high as + 32 V and the response time of the desaturation monitoring unit is **400ms**.

- **D_{Z1}** and **D_{Z2}** Zener Diodes are required in the case of inductive loads. V_Z of these diodes should be < 60 V.

- **R_0** determines the value of maximum output current (DIP package). Its value is given in curve 3, where output current values are plotted against the corresponding values of this resistor.

PHYSICAL DIMENSIONS



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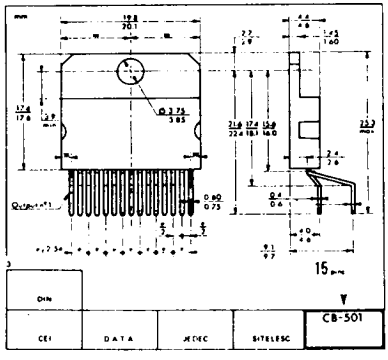
DP SUFFIX
PLASTIC PACKAGE



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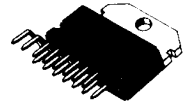

SP SUFFIX
PLASTIC PACKAGE

ORDERING INFORMATION

PART NUMBER	TEMPERATURE RANGE	PACKAGE	
		SP	DP
UAF1780	−40°C to +85°C	•	•
Example : UAF1780SP			

These specifications are subjet to change without notice.
Please inquire with our sales offices about the availability of the different products.