

## DUAL 2 A LOW DROP OUT INTELLIGENT POWER SWITCH

ADVANCE DATA

- LOW POWER DISSIPATION (LOW  $V_{SAT}$  : 0.6 V @ 2 A)
- 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 + 32 V)
- THE OUTPUTS CAN WITHSTAND VOLTAGES LOWER THAN GROUND
- WITHSTAND ON  $V_{CC}$  SPIKES UP TO (60 V, 10 ms)
- DIFFERENTIAL INPUTS

### DESCRIPTION

The UAF1780-1781-1782 are dual interface circuits 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 devices are 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.

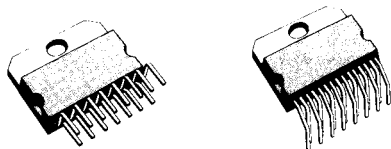
Corresponding output is turned off in case of prolonged desaturation or excessive internal dissipation. This condition is reflected by a low level on ALARM output terminal. This protection unit can be reactivated by applying a logic low signal to RESET input.

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 devices operate within a supply voltage range of + 8 V to + 32 V.

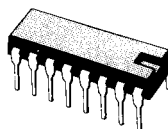
### MULTIWATT-15



#### ORDER CODES :

UAF1780SP  
 UAF1782SP  
 UAF1780HSP  
 UAF1782HSP

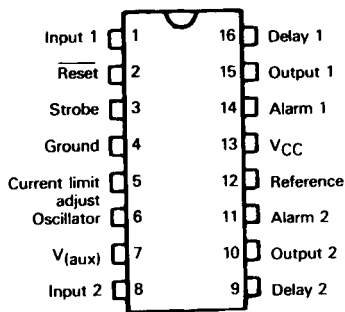
### DIP-16/2



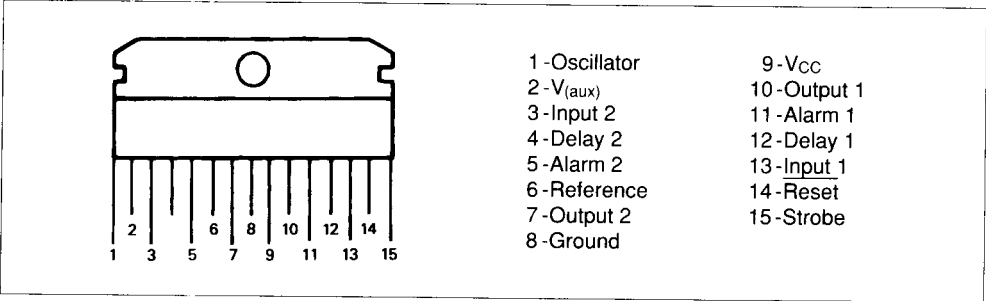
#### ORDER CODE :

UAF1780DP-1781DP

### PIN CONNECTIONS



**PIN CONNECTIONS**



**ABSOLUTE MAXIMUM RATINGS**

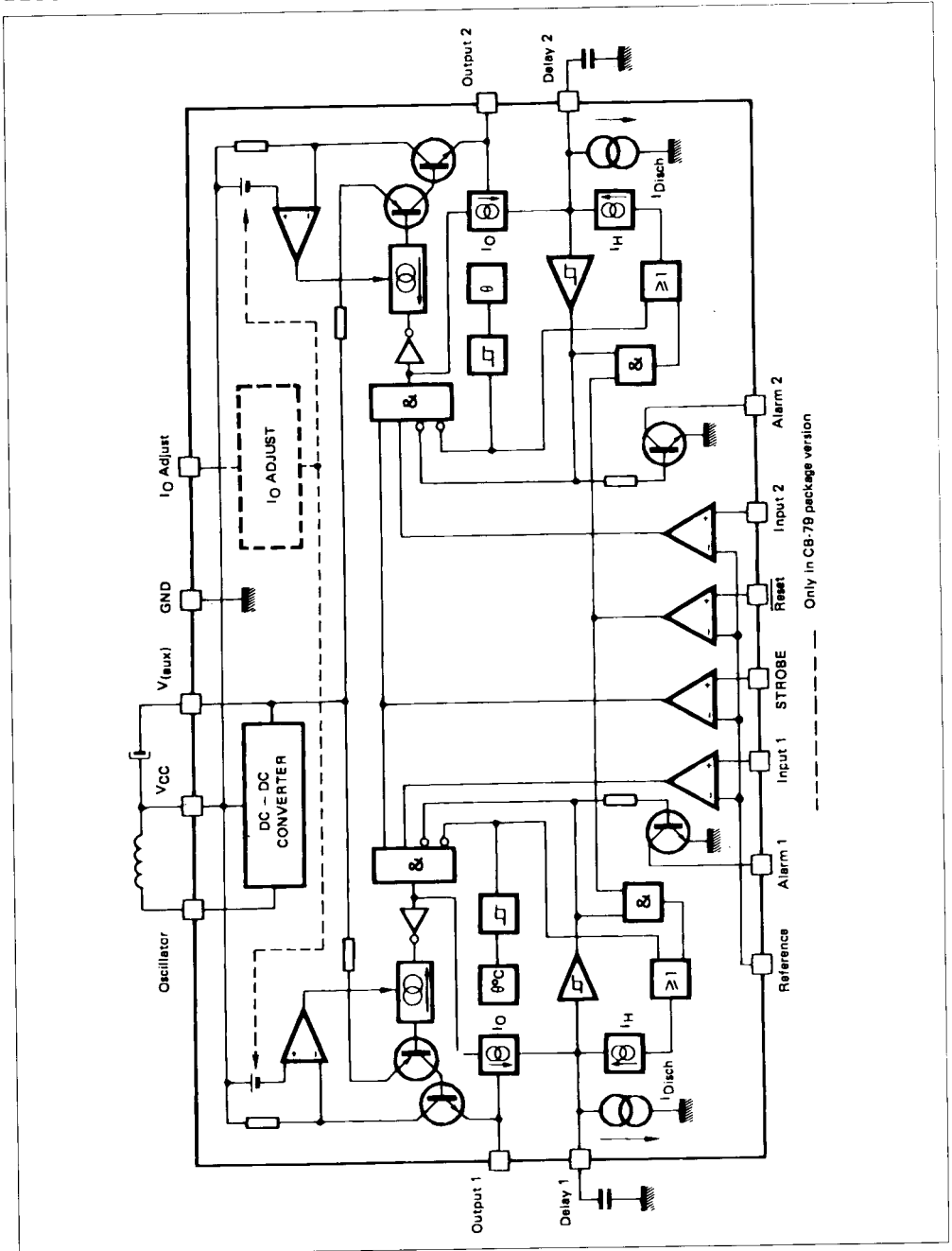
Symbol	Parameter	Value	Unit
$V_{CC}$ (*)	Supply Voltage	+ 35	V
$V_{I1}$ $V_{I2}$ $V_{reset}$ $V_{strobe}$	Input Voltages	30 to + 55	V
$I_O$	Output Current	Internally Limited	A
$I_L$	Current In DC/DC Converter Inductance	0.4	A
$P_{tot}$	Total Power Dissipation	Internally Limited	W
$T_{oper}$	Operating Free-air Temperature Range	- 40 to + 85	°C
$T_J$	Junction Temperature	+ 150	°C

\* + 60 V (10 mS)

**THERMAL DATA**

$R_{th(j-c)}$	Maximum Junction–case Thermal Resistance	DIP.16	25	°C/W
		Multiwatt	2.5	
$R_{th(j-a)}$	Maximum Junction–ambient Thermal Resistance	DIP.16	70	°C/W
		Multiwatt	40	

BLOCK DIAGRAM



**ELECTRICAL CHARACTERISTICS**

$V_{CC} = +24\text{ V}$ ,  $-40\text{ }^\circ\text{C} \leq T_{\text{amb}} \leq +85\text{ }^\circ\text{C}$  (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_{CC}$	Supply Voltage	8		32	V
$I_{CC}$	Supply Current Input 1 = Input 2 : Low Input 1 = Input 1 : High, $I_O = 2 \times 2\text{ A}$	-	7 25	32	mA
$I_I$	Input Current (all inputs) $V_I > V_{ref}$ $V_I < V_{ref}$		15 0	50	
$I_{OHA}$	High Level Alarm Output Leakage Current ( $V_A = +10\text{ V}$ )		0	10	$\mu\text{A}$
$V_{OLA}$	Low Level Alarm Output Voltage ( $I_A = +10\text{ mA}$ )		1.1	1.3	V
$V_{CC} - V_O$	Power Outputs Dropout Voltage $I_O = 0.5\text{ A}$ $I_O = 1\text{ A}$ $I_O = 2\text{ A}$		0.15 0.3 0.6	0.25 0.4 0.7	V
$I_{OL}$	Power Outputs Leakage Current			100	$\mu\text{A}$
$t_{reset}$	Reset Pulse Duration ( $C1 = C2 = 1\text{ }\mu\text{F}$ )		400		mS
$t_d$	Delay Time before Desaturation Monitoring Unit Becomes Active ( $C1 = C2 = 1\text{ }\mu\text{F}$ ) $V_{CC} - V_O = +12\text{ V}$ $V_{CC} - V_O = +24\text{ V}$ $V_{CC} - V_O = +32\text{ V}$		20 10 5		mS
$V_{ref}$	Reference Input Voltage	1.4		55	V
$I_{ref}$	Reference Input Current ( $V_{ref} = 1.4\text{ V}$ ) All Inputs $< V_{ref}$ All Inputs $> V_{ref}$	-1	80 0	150 +1	$\mu\text{A}$
$I_O$	Available Output Current  UAF1780DP $R_O = \infty$ $R_O = 2\text{ K}\Omega$ UAF1780SP UAF1781DP $R_O = \infty$ $R_O = 2\text{ K}\Omega$ UAF1782SP		2.5 1 2.5 2 1 2		A
$V_{CC} - V_O$	Maximum Output Voltage Swing		-	50	V
$V_{aux} - V_{CC}$	DC/DC Output Voltage $0.5\text{ A} < I_O < 2\text{ A}$ (each output) $CO = 47\text{ }\mu\text{F}$ , $L = 100\text{ }\mu\text{H}$	-	1.25	-	V

Fig 1 - DIP 16 PACKAGE.

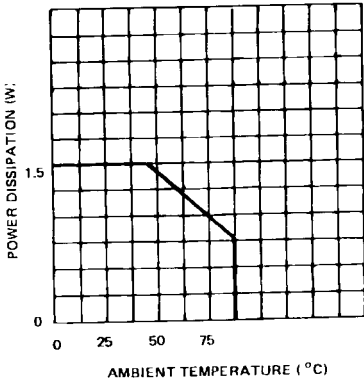


Fig 2 - MULTIWATT PACKAGE

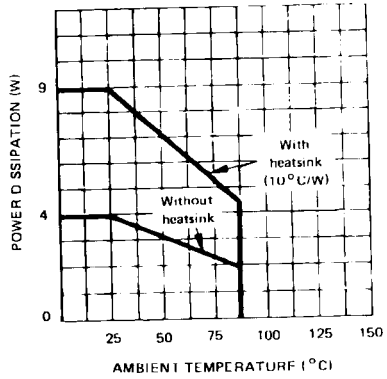


Fig 3 - AVAILABLE OUTPUT CURRENT VS EXTERNAL RESISTANCE VALUE DIP 16 PACKAGE.

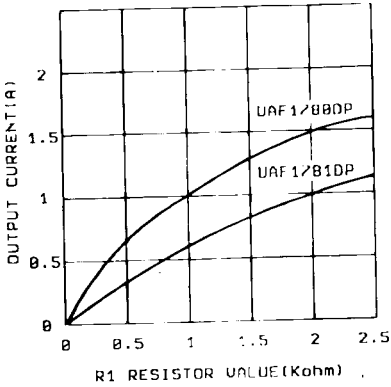


Fig 4 - SATURATION VOLTAGE VS OUTPUT CURRENT.

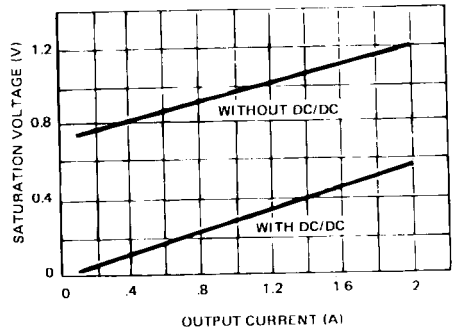


Fig 5 - RESPONSE TIME.

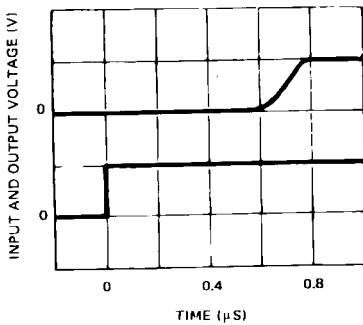


Fig 6 - RESPONSE TIME.

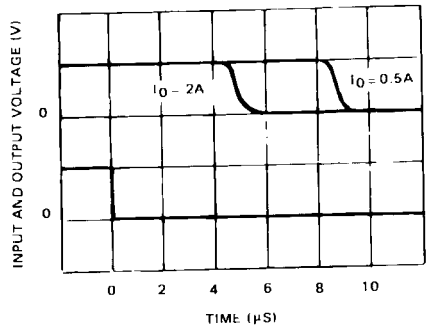
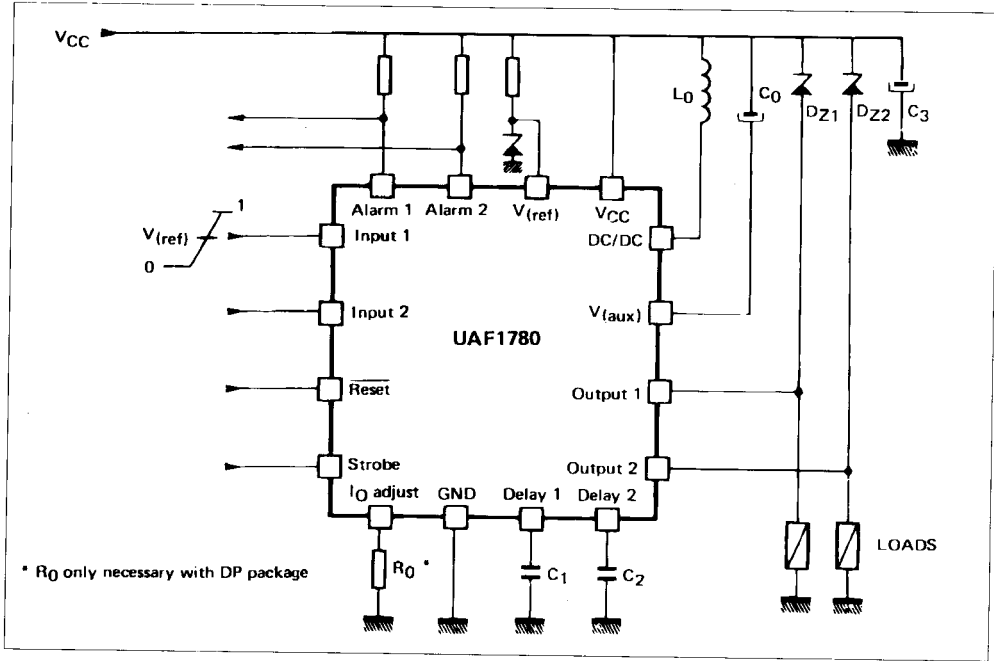
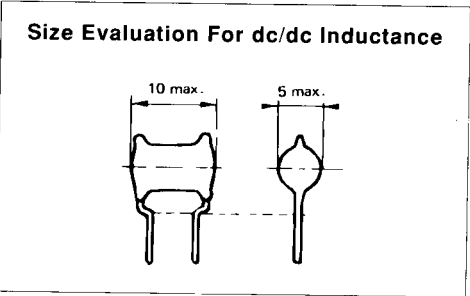


Figure 7 : Typical Application.



- L<sub>0</sub> and C<sub>0</sub> are the external elements of the dc/dc converter. Typical values and characteristics of these components are as follows :  
 For L<sub>0</sub> : - inductance = 100 μH (tolerance ± 10%)  
 - maximal current ≥ 400 mA



For C<sub>0</sub> : The value of this capacitor is not critical, a capacitor of C<sub>1</sub> ≥ 47 F, V<sub>n</sub> ≥ 6.3 V will be suitable for the majority of the applications.

- The on-chip dc/dc converter can be disabled by connecting V<sub>(aux)</sub> terminal to V<sub>CC</sub> and leaving "Oscillator" pin floating.

- C<sub>1</sub> and C<sub>2</sub> 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.

$$t_d = \frac{C \cdot 3.5 V}{7 \mu A}$$

With C<sub>2</sub> = C<sub>3</sub> = 1 μF, the outputs are protected against voltage transients of as high as + 32 V and the response time of the desaturation monitoring unit is 400 ms.

- DZ<sub>1</sub> and DZ<sub>2</sub> Zener Diodes are required in the case of inductive loads. V<sub>Z</sub> of these diodes should be < 60 V.
- R<sub>0</sub> 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.