

DUAL 2-A SOURCE DRIVER

- OUTPUT CURRENT UP TO 2.5 A
- WIDE RANGE OF SUPPLY VOLTAGES : + 8 to + 32 V
- CAN WITHSTAND OVERVOLTAGES OF AS HIGH AS 60 V BETWEEN V_{CC} AND GROUND
- INTERNAL ZENER DIODE PROVIDES FAST SWITCHING OF INDUCTIVE LOADS
- OUTPUT VOLTAGE CAN BE LOWER THAN GROUND

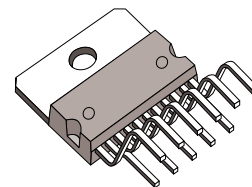
DESCRIPTION

The TDF1778 is a dual source driver delivering high output currents and capable to drive any type of loads (Electrovalves, contactors, lamps).

This device is essentially blow-out proof, each output is protected against short-circuits. If internal dissipation becomes too high, drivers will shut down to prevent excessive heating. An "ALARM" output is provided to indicate the action of the thermal protection. To reactivate the power outputs, the reset input must be forced to low state.

"SENSE" information of both power outputs are ORed together and then processed internally.

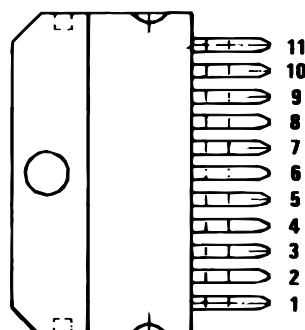
A "STROBE" input is also provided to offer the possibility of disabling the power outputs.



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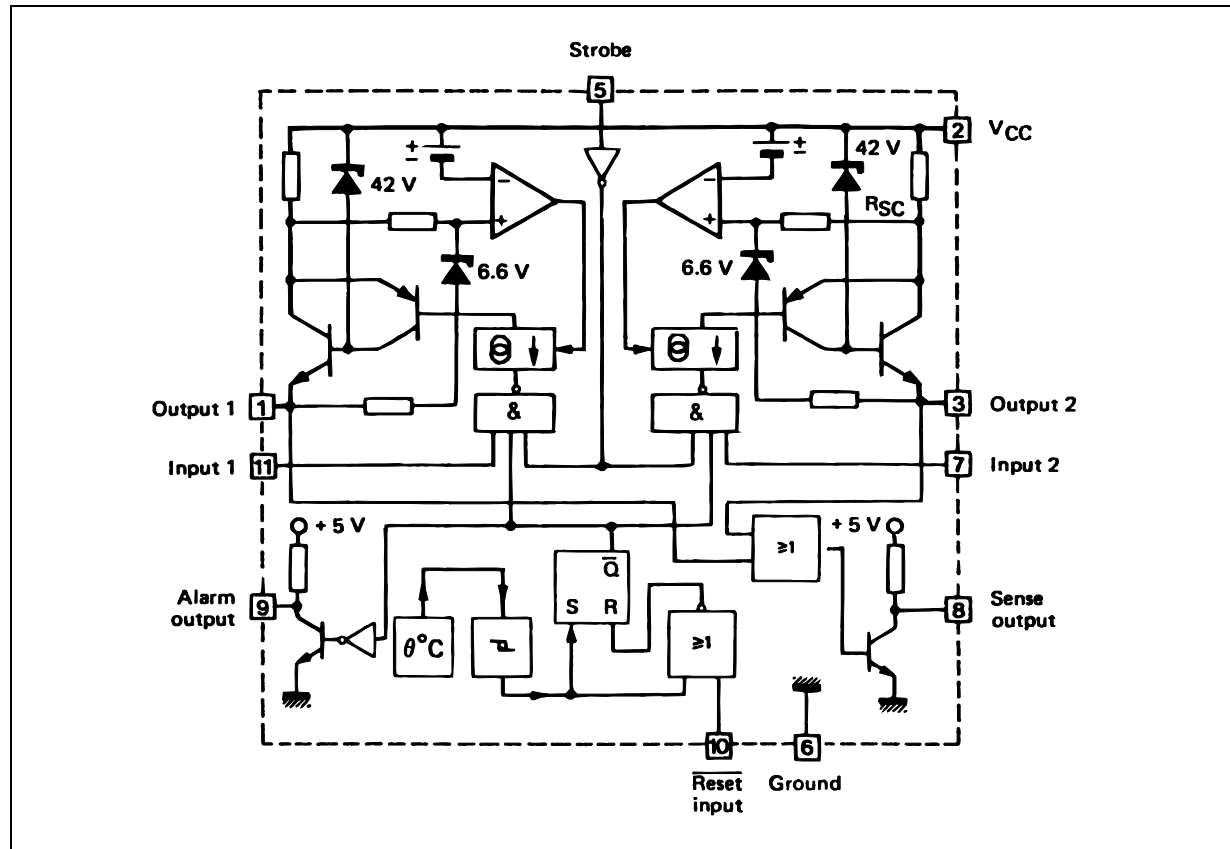
ORDERING NUMBER : TDF1778SP

PIN CONNECTION



- 1 - Output 1
- 2 - VCC
- 3 - Output 2
- 4 - N.C.
- 5 - Strobe
- 6 - Ground
- 7 - Input 2
- 8 - Sense output
- 9 - Alarm output
- 10 - Reset input
- 11 - Input 1

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	35 V (60 V/10 ms)	V
V_I, V_{reset}	Input Voltage (pins 7, 10 and 11)	- 30 to + 50	V
V_{strobe}	Strobe Input Voltage	- 0.5 to V_{CC}	V
I_O	Output Current	Internally Limited	A
P_{tot}	Power Dissipation	Internally Limited	W
T_{oper}	Operating Ambient Temperature Range	- 40 to + 85	°C
T_j	Junction Temperature	+ 150	°C

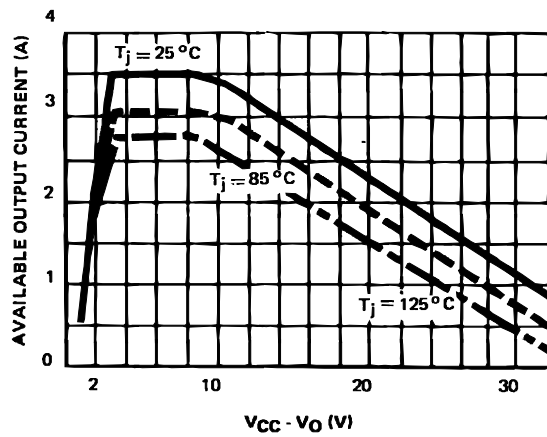
THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction-case Thermal Resistance	Max. 3	°C/W
$R_{th(j-a)}$	Junction-ambient Thermal Resistance	Max. 40	°C/W

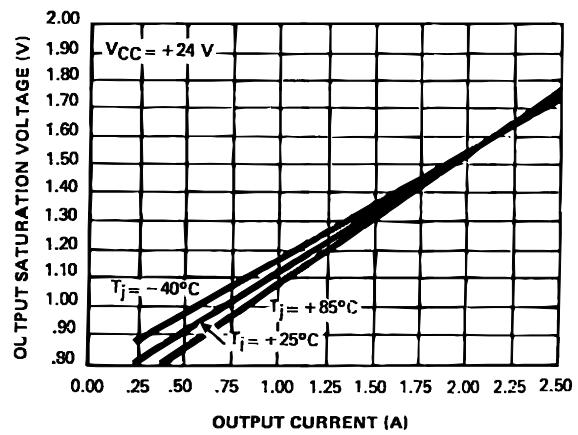
ELECTRICAL CHARACTERISTICS ($V_{CC} = +24V$, $-40^{\circ}C < T_j < +85^{\circ}C$, unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{CC}	Power Supply Voltage	8	—	32	V
I_{CC}	Power Supply Current (pin 6), $I_{O1} = I_{O2} = 2A$	—	—	20	mA
V_{IL} V_{IH}	Logic Input Voltage (pins 7, 10, 11)	— 2	— —	0.8 —	V
V_I	Logic Input Threshold (pin 5)	—	0.8	—	V
I_{IH}	High Level Input Current (pins 7, 10, 11) $V_I = +2V$	—	20	50	μA
I_{IL}	Low Level Input Current (pins 7, 10, 11) $V_I = +0.8V$	—5	0	+5	μA
V_{OH}	High Level Logic Output Voltage (pins 8, 9) $I(8) = I(9) = -30 \mu A$	2.4	4	—	V
V_{OL}	Low Level Logic Output Voltage (pins 8, 9) $I(8) = I(9) = 2 mA$	—	—	0.4	V
$V_{CC} - V_{O1}$ $V_{CC} - V_{O2}$	Output Saturation Voltage (V(7) high, V(11) high, $I_O = 2A$)	— —	1.5	1.8	V
I_{OL}	Low Level Input Current (pins 1, 3) V(7) Low, V(11) Low, $V_O = 0V$	—	400	1000	μA
$V_{CC} - V_{O1}$ $V_{CC} - V_{O2}$	Switch-off Output Voltage (inductive load)	40 —	44 —	48	V
I_{O1}, I_{O2}	Available Output Current (pins 1, 3), V(7) High, V(11) High, $V_{CC} - V_O = 32V$, $T_j = 25^{\circ}C$	100	—	—	mA
I_{Oalarm}	Available "Alarm" Output Current, V(9) = +4V	4	8	—	mA
I_{Osense}	Available "Sense" Output Current, V(8) = +4V	4	8	—	mA
$I_{IHsense}$	Output Sensing High Level Input Current (pins 1, 3) $V_I = +2V$	—	1	2	mA
$V_{IHsense}$	High Level "Sense" Input Voltage (pins 1, 3)	0.8	1.9	2.5	V

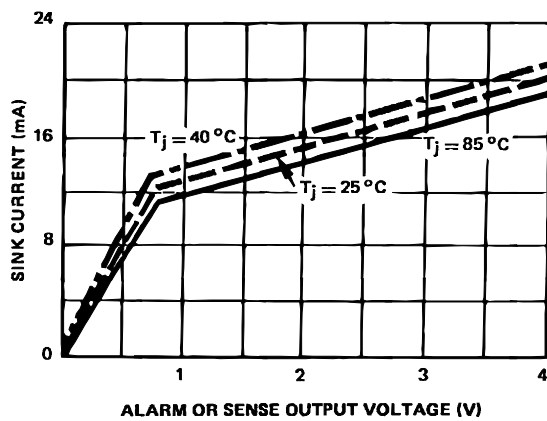
AVAILABLE OUTPUT CURRENT



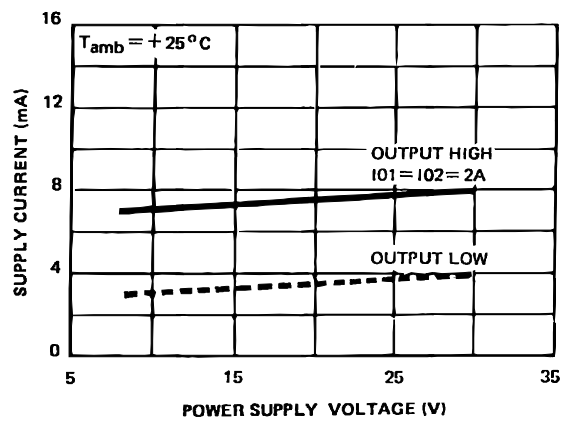
OUTPUT SATURATION VOLTAGE



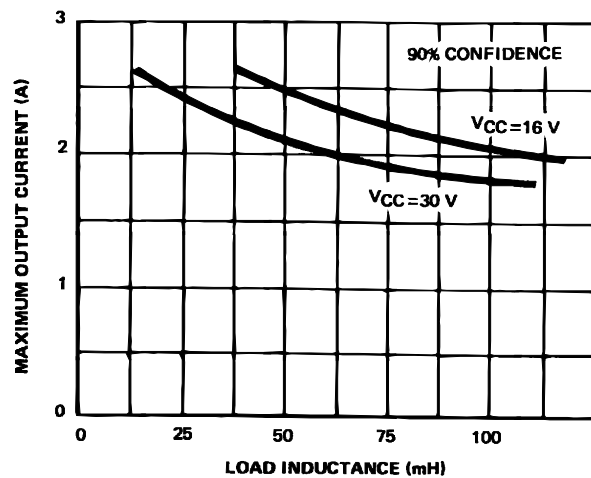
AVAILABLE ALARM OR SENSE OUTPUT CURRENTS



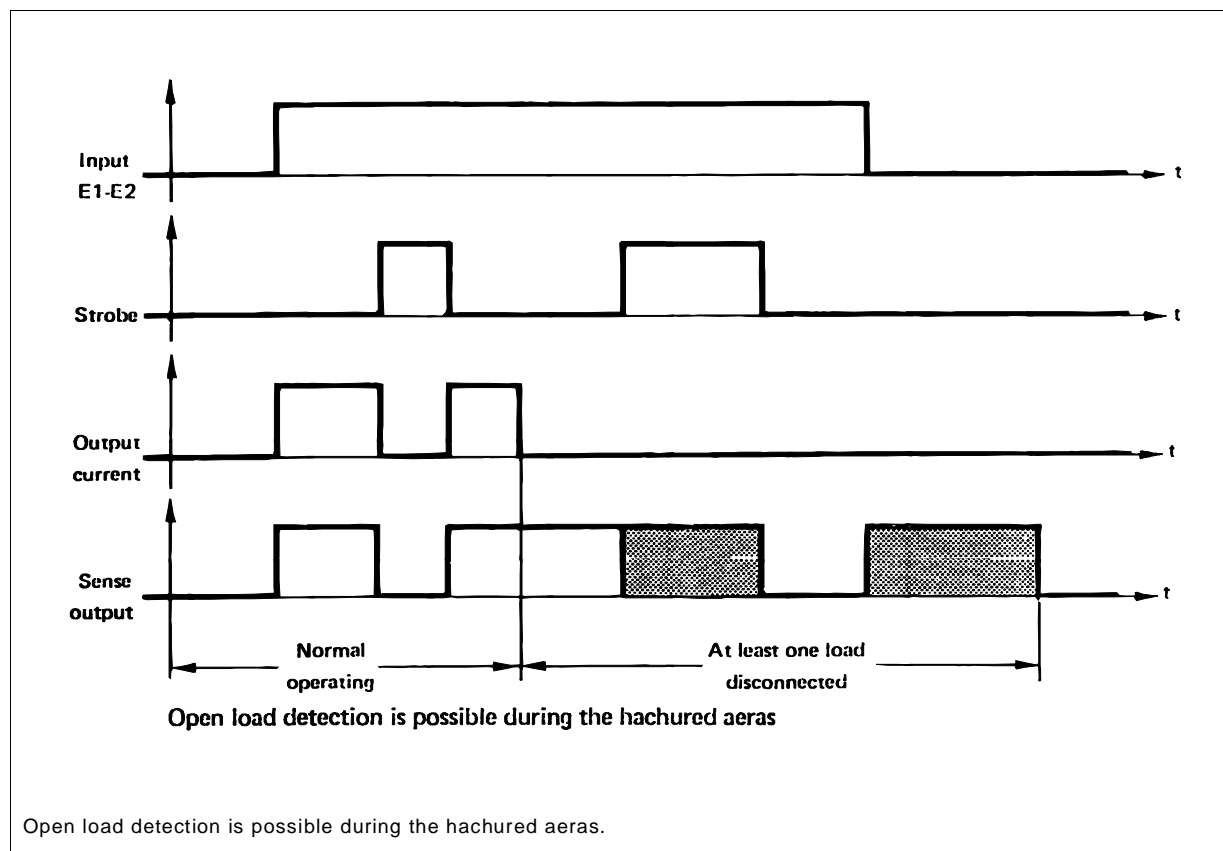
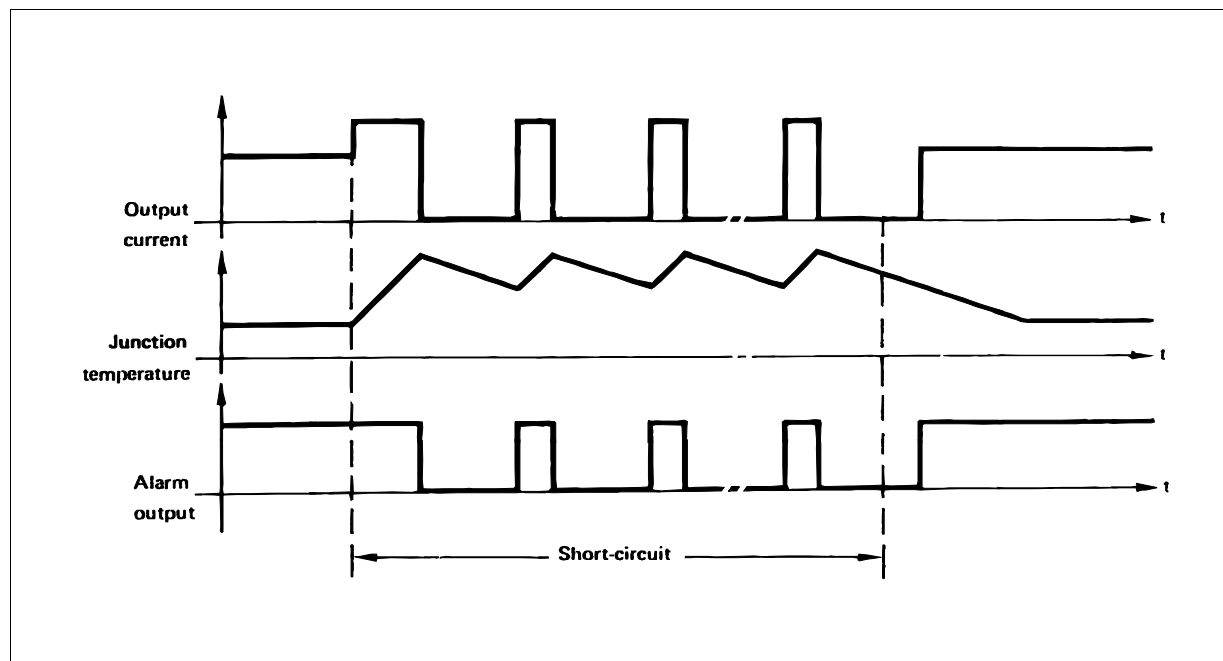
POWER SUPPLY CURRENT

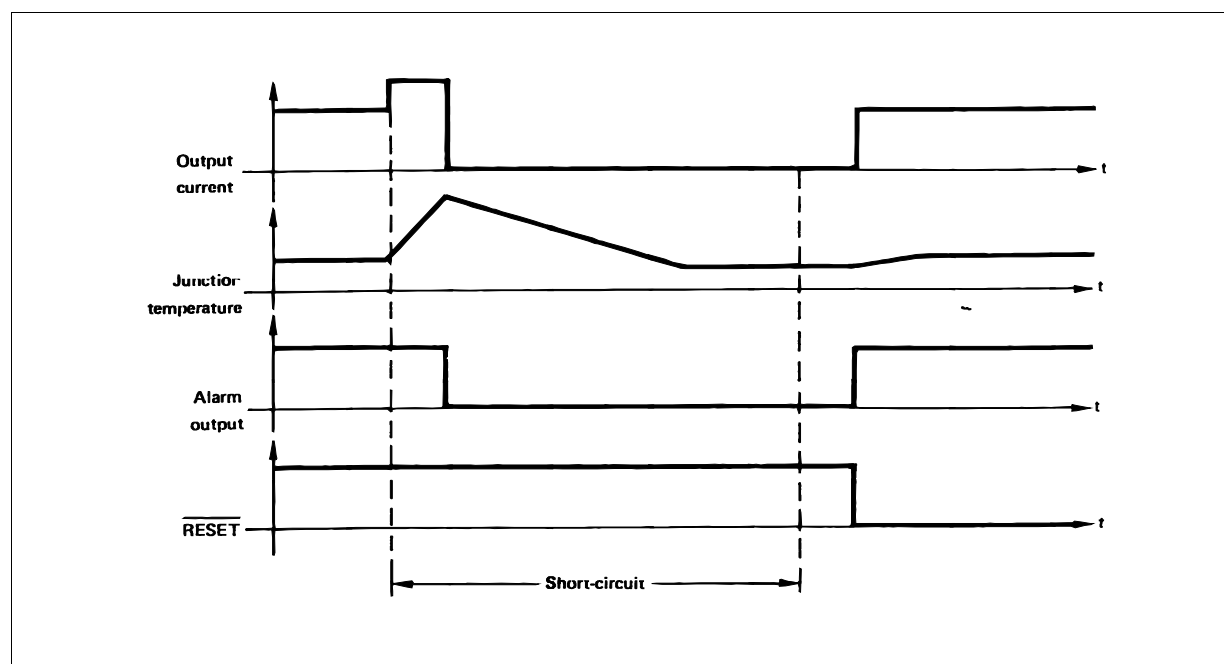


MAXIMUM OUTPUT CURRENT VS LOAD INDUCTANCE



OPEN LOAD DETECTION

SHORT CIRCUIT CONDITIONS WAVEFORMS WITH AUTOMATIC RESET/ $\overline{\text{RESET}} = 0$ 

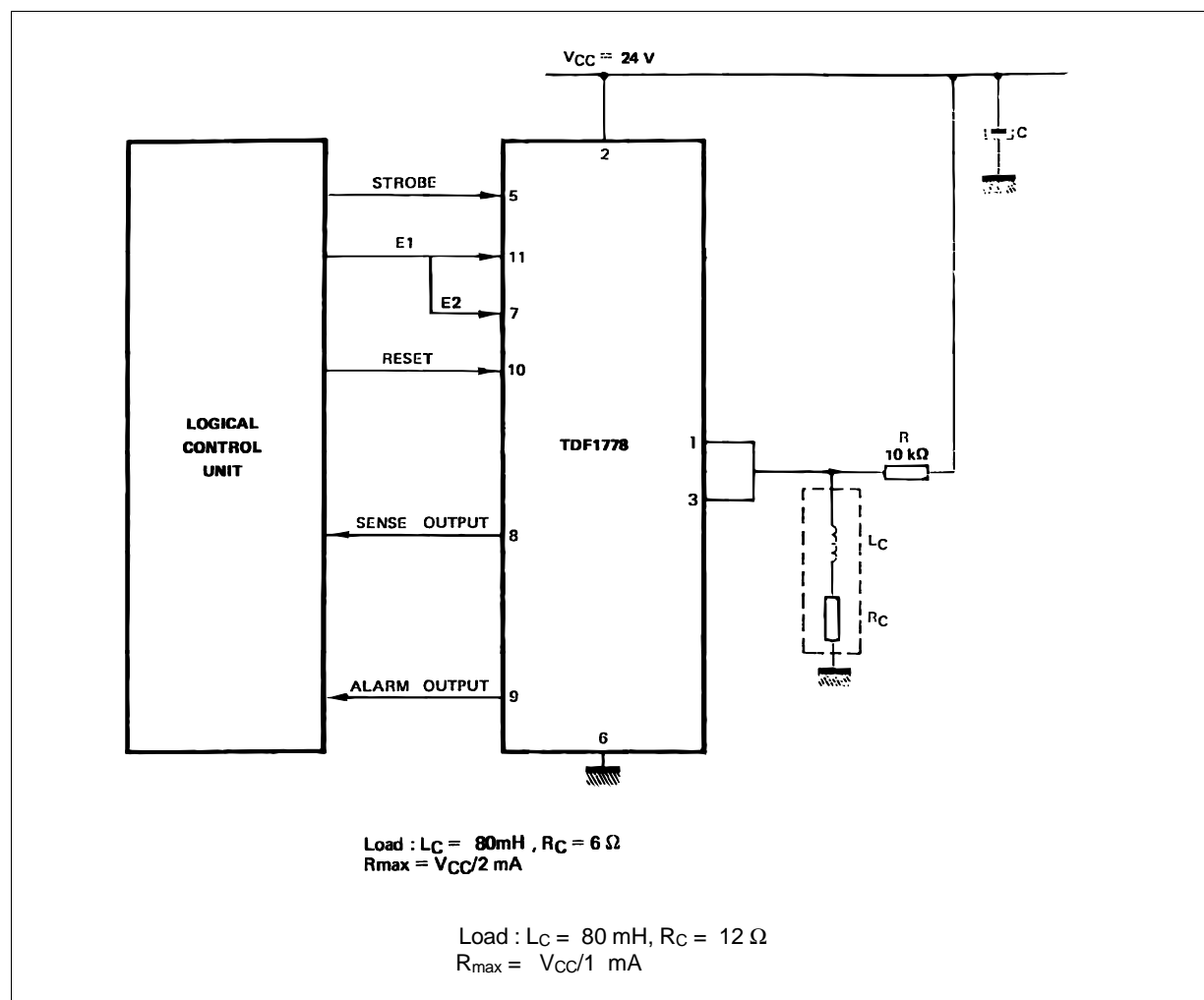


The circuit diagram on the left shows a Zener diode regulator using a TDF1778 integrated circuit. A DC voltage source V_{CC} is connected to the input of the IC. The output of the IC is connected to a load resistor through a series resistor. The output voltage is V_O . The Zener voltage is V_Z . The current through the Zener diode is I_Z . The current through the load resistor is I_{LOAD} . The collector-emitter voltage of the internal transistor is V_{CE} . The output voltage V_O is shown to be equal to V_Z .

The waveforms on the right show the response of the circuit to a load change. The top waveform is the load current I_{LOAD} , which starts at a constant value and then decreases linearly to zero. The middle waveform is the collector-emitter voltage V_{CE} , which starts at $V_Z + V_d$ and then drops to V_{CC} when the load current reaches zero. The bottom waveform is the output voltage V_O , which starts at V_Z and then drops to $V_Z - V_{CC}$ when the load current reaches zero.

TYPICAL APPLICATION

TYPICAL APPLICATION WITH TDF1778 TWO INDUCTIVE LOADS 2 A - 24 V



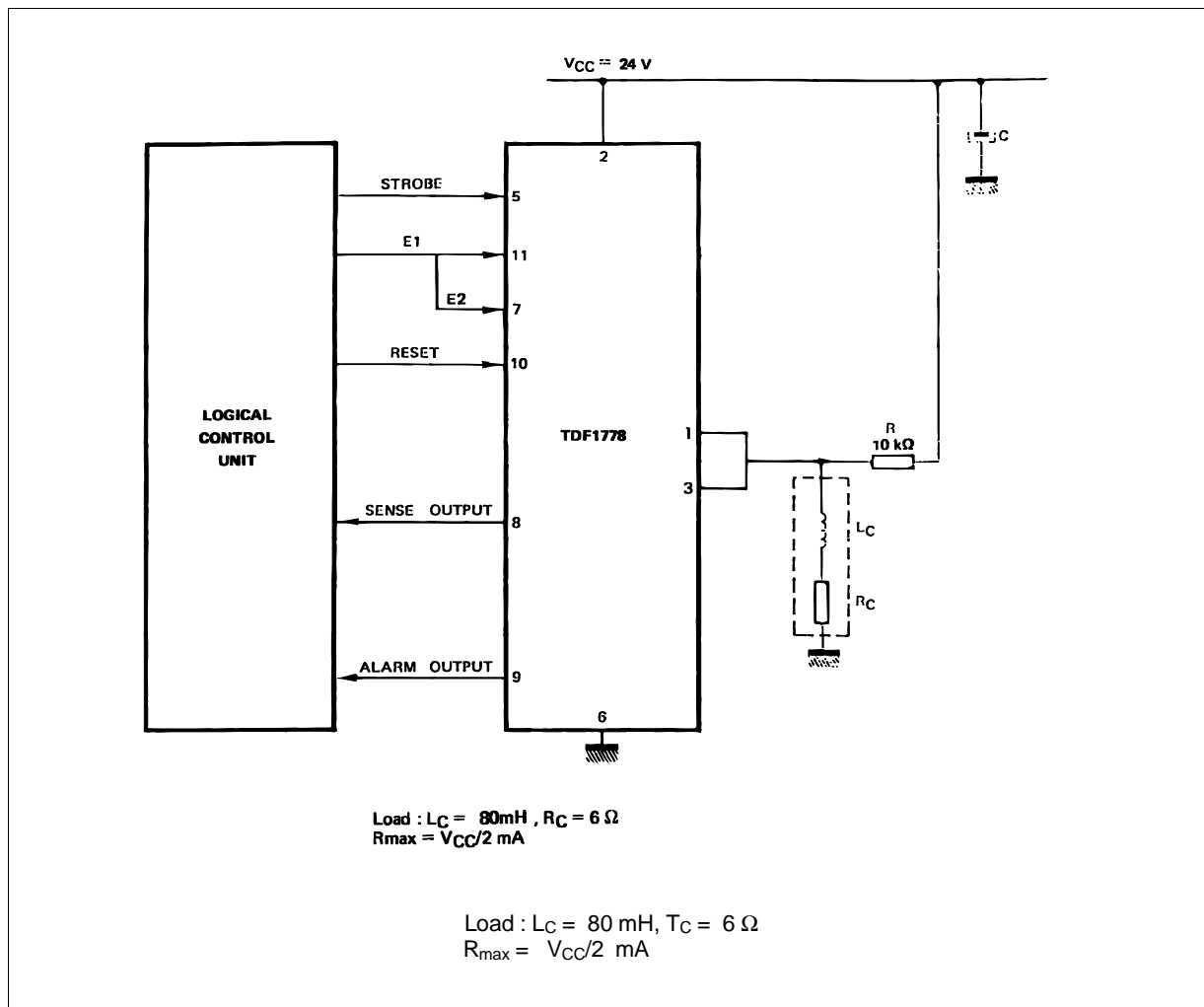
MAIN FEATURES

This application protected against short circuits.
 The load disconnection is detected when inputs E1 and E2 are low and the sense output is high.

When thermal protection is activated the pin 9 is low.
 Inputs and outputs are TTL compatible.

TDF1778

TDF1778 HIGH CURRENT APPLICATION WITH INDUCTIVE LOAD 24 V - 4 A

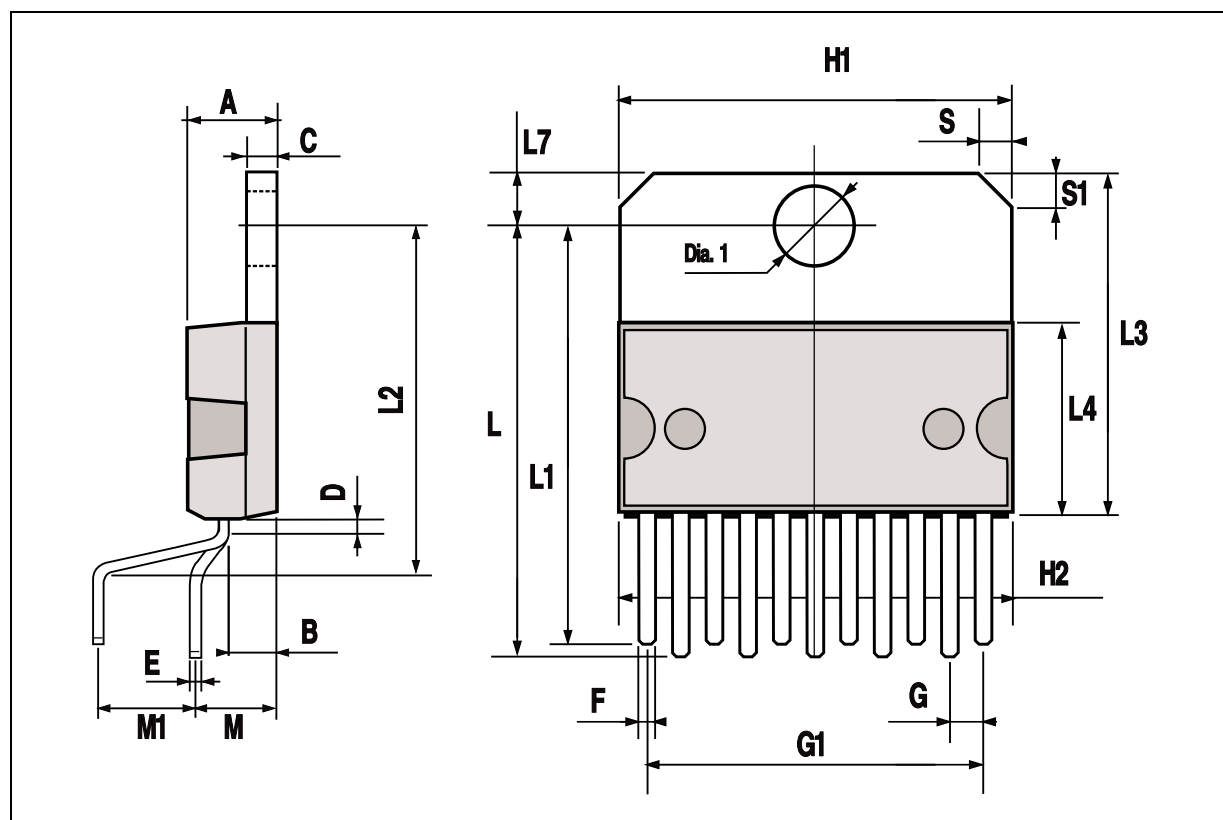


MAIN FEATURES

This application has the same features as the dual 2 A -12 V application.

MULTIWATT11 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			5			0.197
B			2.65			0.104
C			1.6			0.063
D		1			0.039	
E	0.49		0.55	0.019		0.022
F	0.88		0.95	0.035		0.037
G	1.45	1.7	1.95	0.057	0.067	0.077
G1	16.75	17	17.25	0.659	0.669	0.679
H1	19.6			0.772		
H2			20.2			0.795
L	21.9	22.2	22.5	0.862	0.874	0.886
L1	21.7	22.1	22.5	0.854	0.87	0.886
L2	17.4		18.1	0.685		0.713
L3	17.25	17.5	17.75	0.679	0.689	0.699
L4	10.3	10.7	10.9	0.406	0.421	0.429
L7	2.65		2.9	0.104		0.114
M	4.25	4.55	4.85	0.167	0.179	0.191
M1	4.73	5.08	5.43	0.186	0.200	0.214
S	1.9		2.6	0.075		0.102
S1	1.9		2.6	0.075		0.102
Dia1	3.65		3.85	0.144		0.152



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