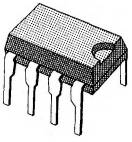
0.5 A INTELLINGENT POWER INTERFACE

ADVANCE DATA

- LOAD CONNECTED TO V_{CC}
- HIGH OUTPUT CURRENT 500mA
- SHORT CIRCUIT PROTECTION UP TO V_{CC} – 33 V
- INTERNAL THERMAL PROTECTION WITH EXTERNAL RESET AND SYNCHRONIZATION CAPABILITY
- LARGE SUPPLY VOLTAGE RANGE FROM 6 V UP 33 V
- SINK ALARM OUTPUT
- DIFFERENTIAL INPUTS FOR ANY LOGIC SIGNALS COMPATIBILITY
- INPUTS ARE OPERATIONAL WITH SIGNAL HIGHER THAN V_{CC} AND UP TO 45 V
- INPUT VOLTAGE CAN BE LOWER THAN GROUND
- OUTPUT VOLTAGE CAN BE GREATER THAN V_{CC} ($V_O \leq V_{CC}$ max.)
- OPEN LOAD DETECTION
- SHORT DURATION SHORT CIRCUIT DETECTION
- SUITABLE FOR PARALLEL DRIVING

Open load ans hort duration short-circuits may be detected through the output "status function".

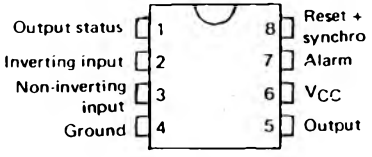
For higher output currents applications several devices can be put in parallel. In this configuration synchronous reactivation is achieved by connecting reset inputs in parallel.



MINIDIP/2

ORDER CODE : TDE1799DP

PIN CONNECTION

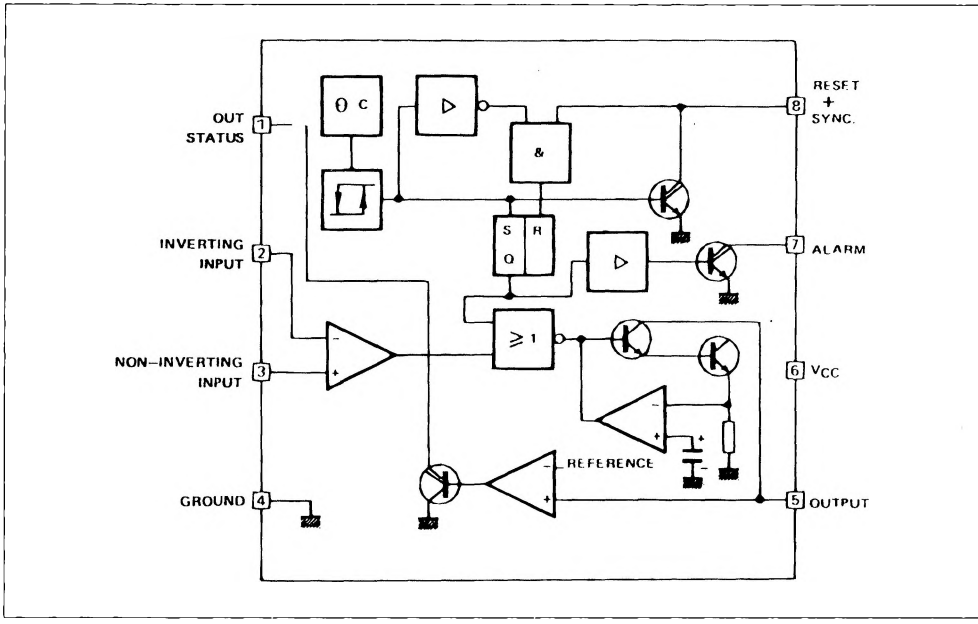


DESCRIPTION

The TDE1799 is an interface circuit delivering high currents and able to drive any kind of loads.

This device is essentially blow out proof. The output is protected from short-circuits with the positive supply or ground. In addition shut down is provided to keep the IC from overheating. If internal dissipation becomes too high, the driver will shut down to prevent excessive heating. The alarm output is activated after thermal shut down. If the reset input is high the output will alternatively switch on and off until the overload is removed.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

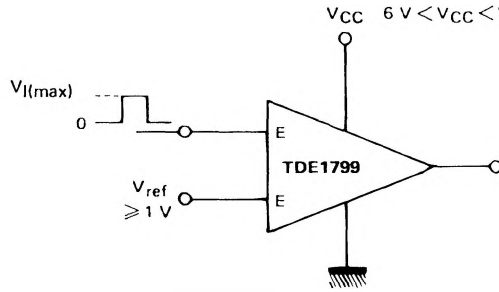
Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	50	V
V_{ID}	Input Differential Voltage	50	V
V_I	Input Voltage	– 30 to + 50	V
$V_{I\,reset}$	Reset Input Voltage	V_{CC} – 50 to V_{CC}	V
I_O	Output Current	Internally Limited	A
I_{sink}	Alarm and Reset Outputs Sink Current	20	mA
V_{OS} V_A	Output Status Voltage Alarm Voltage	V_{CC} – 50 to V_{CC}	V
P_{tot}	Power Dissipation	Internally Limited	mW
T_{oper}	Operating Ambient Temperature Range	– 25 to + 85	°C
T_{stg}	Storage Temperature Range	– 65 to + 150	°C

THERMAL DATA

$R_{th(j-c)}$	Maximum Junction-case Thermal Resistance (note 1)	30	°C/W
$R_{th(j-a)}$	Maximum Junction-ambient Thermal Resistance (note 1)	70	°C/W
$T_{shutdown}$	Minimum Thermal Shutdown Temperature	150	°C

Note : 1. Devices bonded on a 40 cm^2 glass-epoxy printed circuit 0.15 cm thick with 4 cm^2 of copper.

Figure 1.



The reference input can be inverting or the non-inverting one.

ELECTRICAL CHARACTERISTICS

- 25 °C ≤ T_{amb} ≤ + 85 °C, 6 V ≤ V_{CC} ≤ + 33 V, I_O ≤ 500 mA, T_j ≤ + 150 °C (unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{IO}	Input Offset Voltage	(note 3)	–	2	50	mV
I_{CC}	Power Supply Current	T_{amb} = + 25 °C	–	3	4	mA
I_{IB}	Input Bias Current		–	15	40	µA
V_{ICR}	Common-mode Input Voltage Range	(note4)	1	–	45	V
V_I	Input Voltage Range	V_{ref} ≥ + 1 V, figure 1, note 4	– 25	–	45	V
I_{SC}	Short-Circuit Output Current	V_{CC} = 33 V, t = 10 ms, T_{amb} = 25 °C	–	700	–	mA
V_O	Output Saturation Voltage	– ($V_I^+ - V_I^-$ > 50 mV, I_O = 500 mA	–	1	1.25	V
I_{OL}	Output off Leakage Current	(V_{CC} = + 30 V, V_O = 30 V, T_j = + 85 °C)	–	50	100	µA
I_{sink}	Available Alarm Output Sink Current	V(pin 7) ≤ 2 V	6	15	–	mA
I_L	Alarm Leakage Current		–	–	100	µA
I_{RH}	Reset High Leakage Current		–	15	40	µA
$V_{th(reset)}$	Reset Threshold	(note 5)	–	1.4	–	V
I_{reset}	Reset Output Sink Current (in thermal shut down)	for V(pin8) ≤ + 0.8 V (note 6)	2	–	–	mA
I_{OSH}	Output Status High Leakage Current	(T_{amb} = + 25 °C)	–	15	100	µA
$I_{OS\ sink}$	Available Output Status Sink Current	V (pin 1) ≤ 2 V	6	15	–	mA
V_{THOS}	Output Status Reference Threshold		–	5	6	V
V_L	Alarm Voltage in Thermal Shut down	(I_{AL} = 4 mA)	–	0.7	–	V

Notes : 2. For operating at high temperature, the TDE1799 must be derated based on a + 150 °C maximum junction temperature and a junction-ambient thermal resistance of 70 °C/W.
3. The offset voltage given is the maximum value of input differential voltage required to drive the output voltage within 2 V of the ground of the supply voltage.
4. Input voltage range is independent of the supply voltage.
5. After thermal shut down, voltage required to restart.
6. When in thermal shut down the reset pin 8 draws a current.

Figure 2 : Supply Current / vs. Supply Voltage.

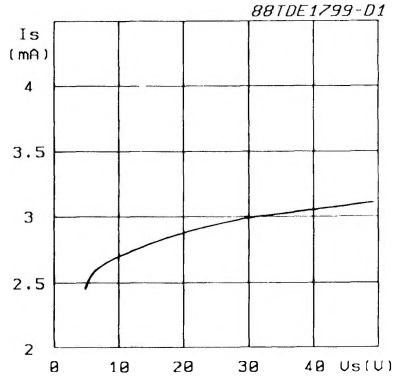


Figure 3 : Alarm Output Current and Voltage.

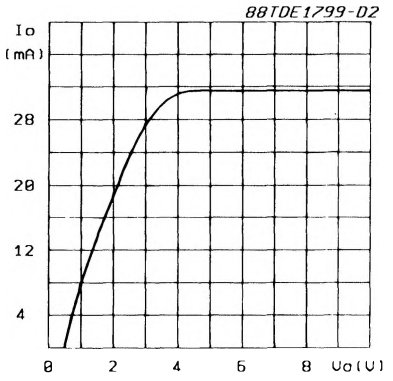


Figure 4 : Saturation Voltage / vs. Output Current.

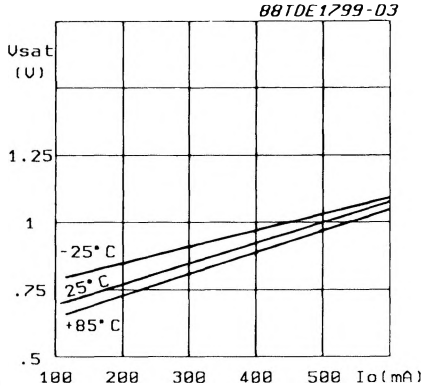


Figure 5 : Typical Application with Automatic Reset.

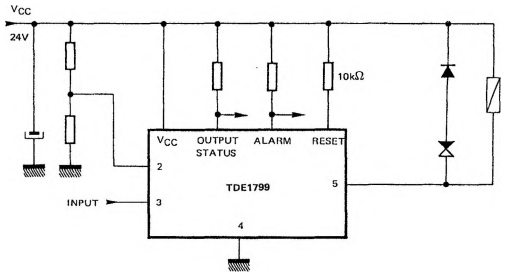


Figure 6 : Short-Circuit and Over loads Conditions Waveforms.

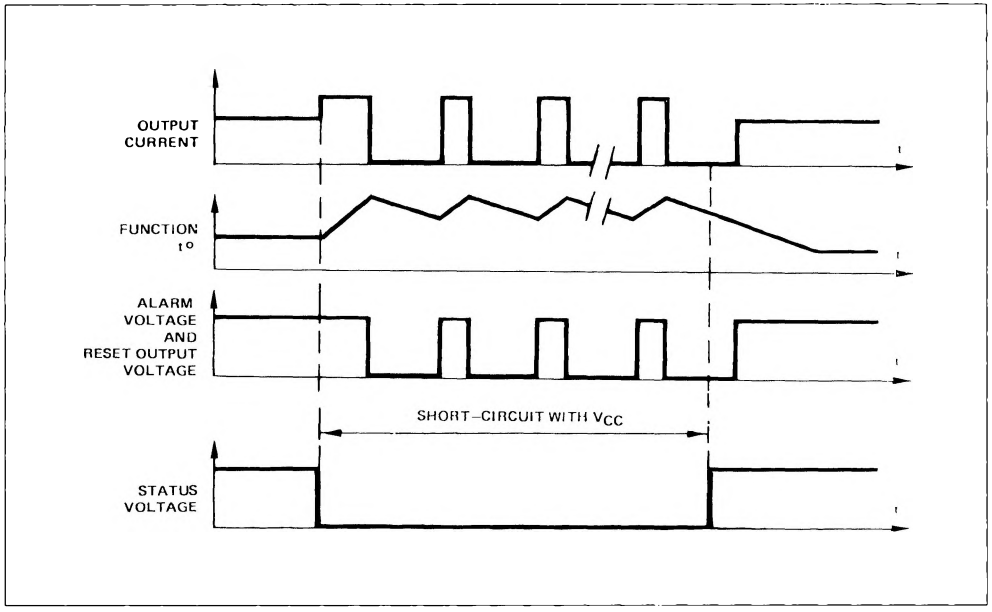


Figure 7 : Typical Application with Controlled Reset.

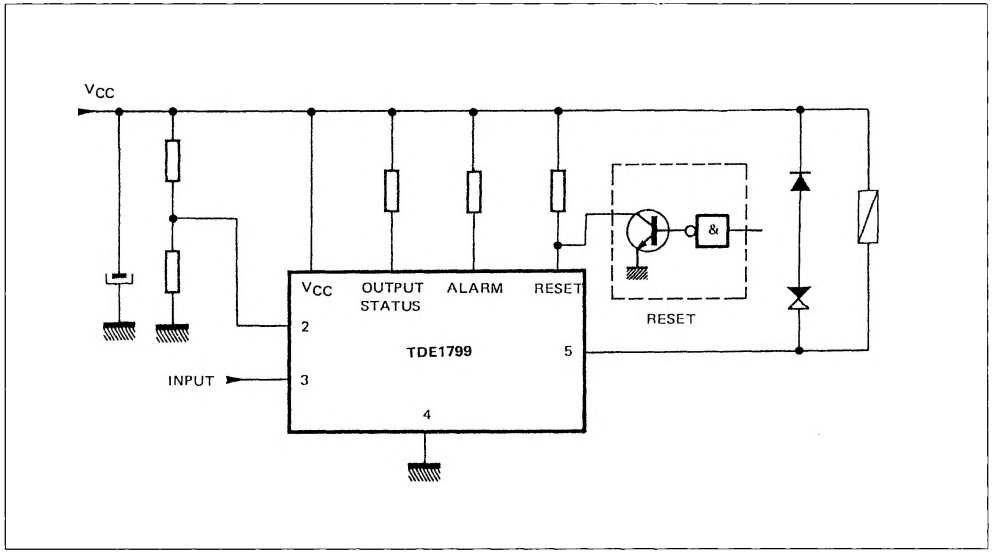


Figure 8 : Short-Circuit and Over loads Conditions Waveforms.

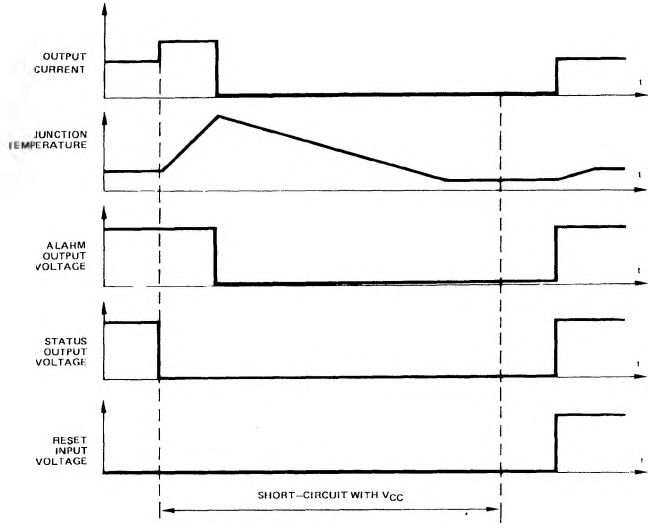
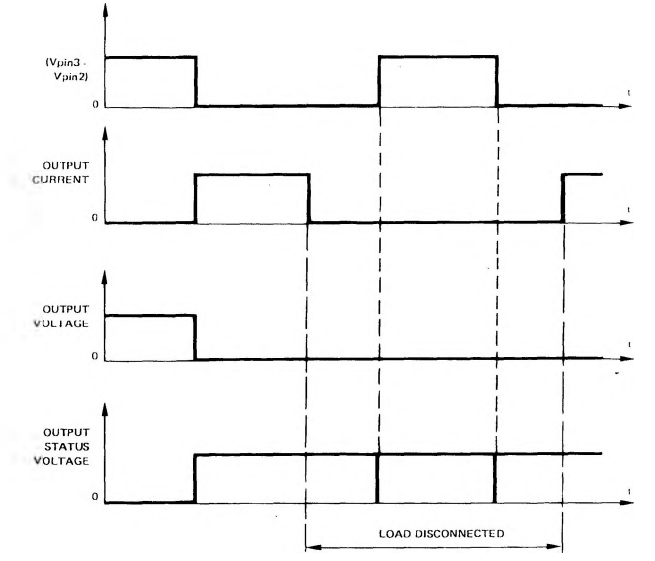
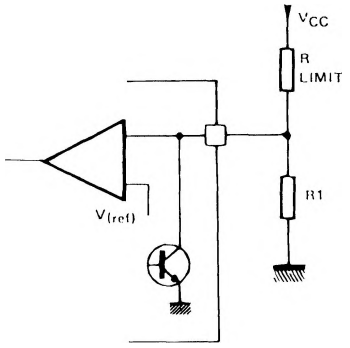


Figure 9 : Output Status Function : Open Load Detection.



Open load detection is possible during the hachured area when (Vpin 3 - Vpin 2) (Output status) 1.

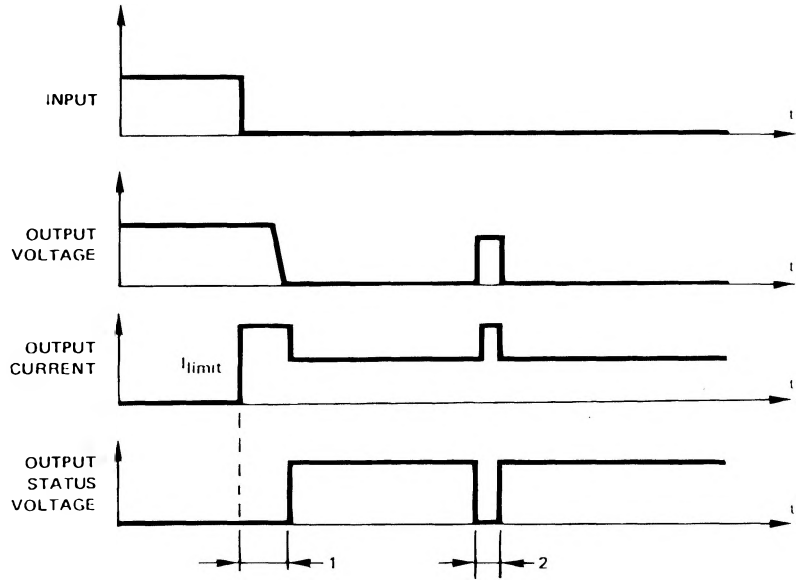
Figure 10.



$$R_1 = \frac{R_{limit} \cdot V_{ref}}{V_{CC} - V_{ref}}$$

REMARK : sometimes the user considers as an open load a load greater than R limit. In this case a resistor R1 must be connected between the output and ground.

Figure 11 : Output Status Function Short Duration / Short Circuit Detection.



(INPUT) OSV 1 → CURRENT LIMITATION

REMARK : long duration short circuit are detected by the thermal shut down.

RESET AND SYNCHRONIZATION

Recommended diagram when the outputs are in parallel. After thermal disjunction a restart is possible when all the circuits are returned in operating conditions.

Figure 12 : Synchronous Automatic Reset (Parallel or Independent Outputs).

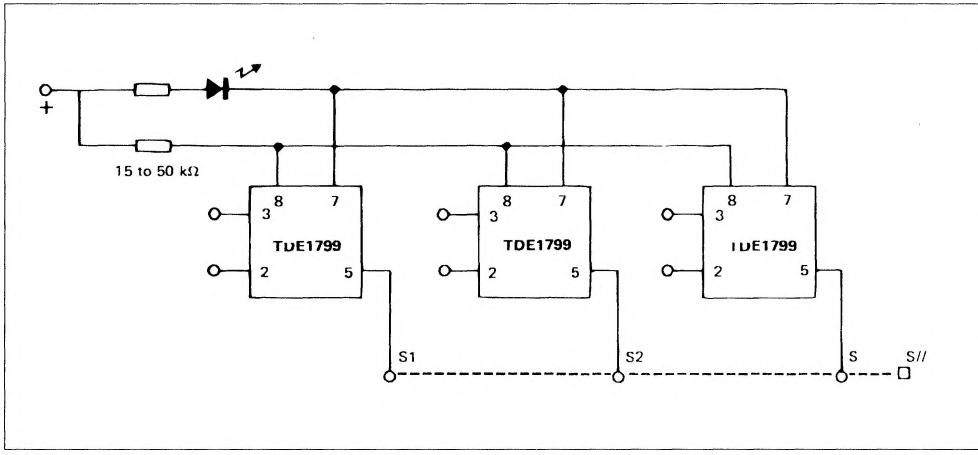
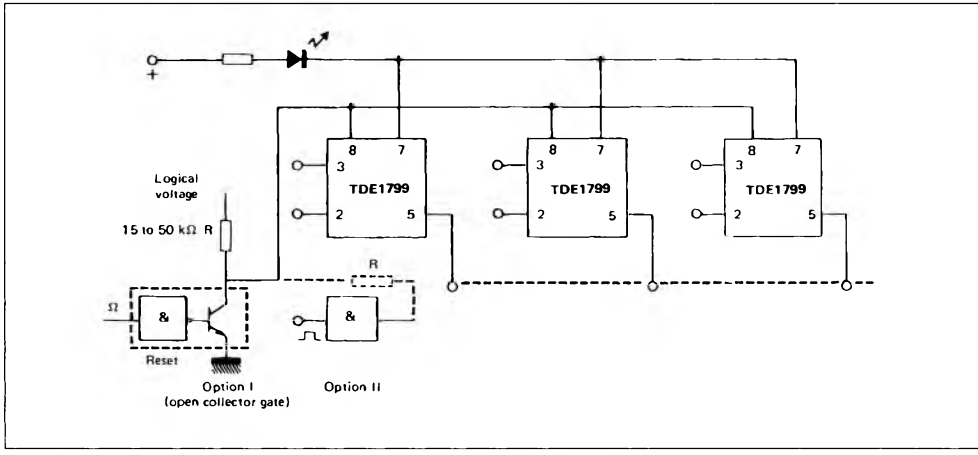


Figure 13 : Synchronous Controlled Reset (Parallel or Independent Outputs).



MAIN FEATURES

- V_{CC}^{*} V_{CC} 50 V
- Maximum output current 0.5 A
- Full protection against overloads and short circuits
- No need of deadtime during rotation reversing
- TTL compatible inputs
- TDE1799 and TDE1798 input signals have the same reference
- No automatic restart after disjunction

CW/CCW	ON OFF	1798	1799
0	0	OFF	OFF
0	1	ON	OFF
1	1	OFF	ON
1	0	OFF	OFF

Figure 14 : Two Quadrants D.C. Motor Drive.

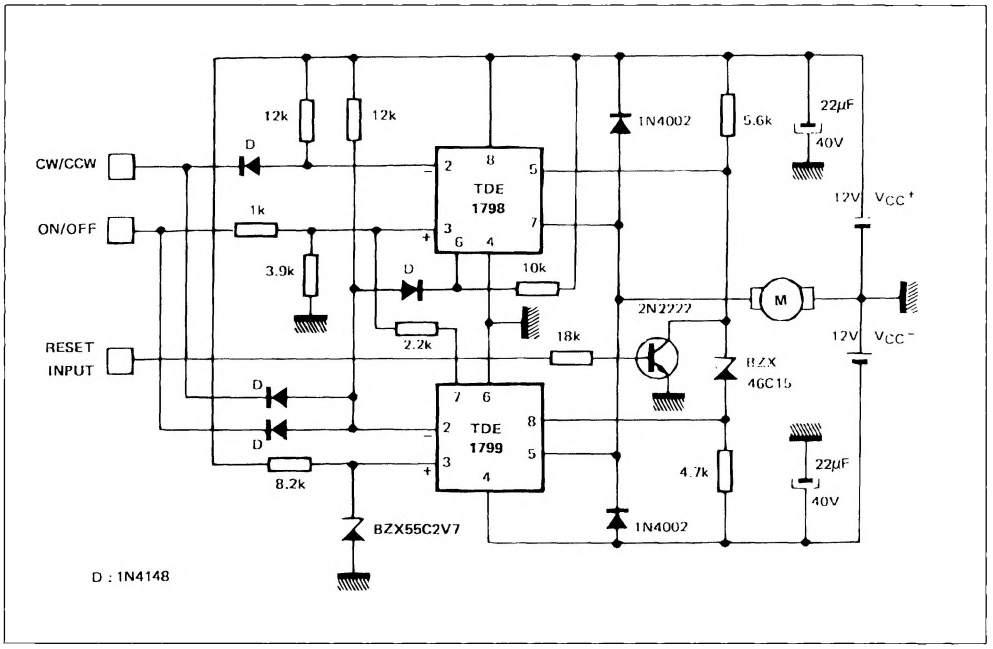
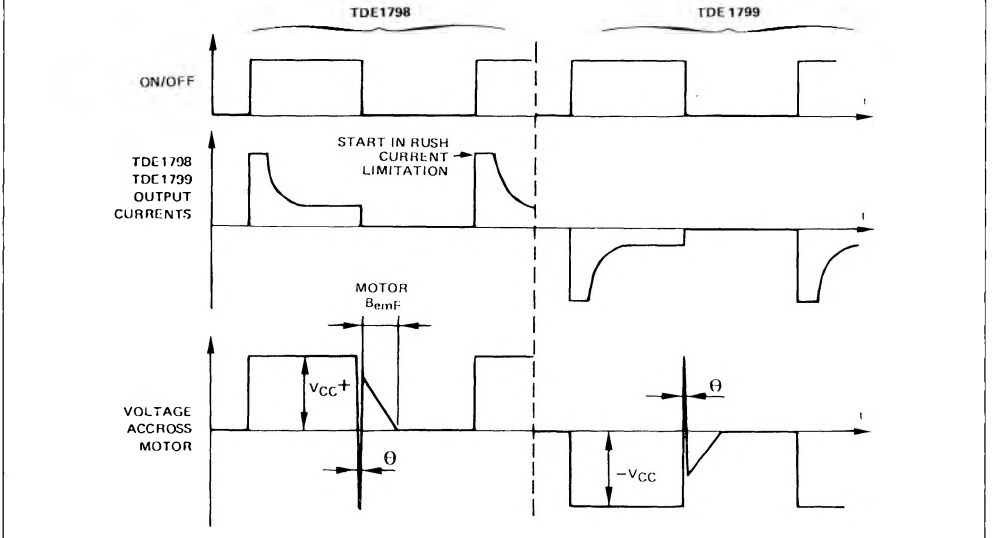


Figure 15 : ON OFF Cycles.



() Motor inductance demagnetization.

Figure 16 : Rotation Reversing.

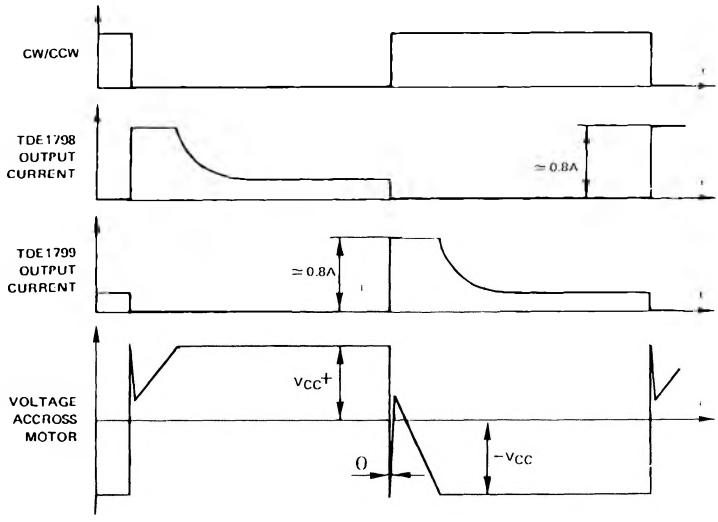
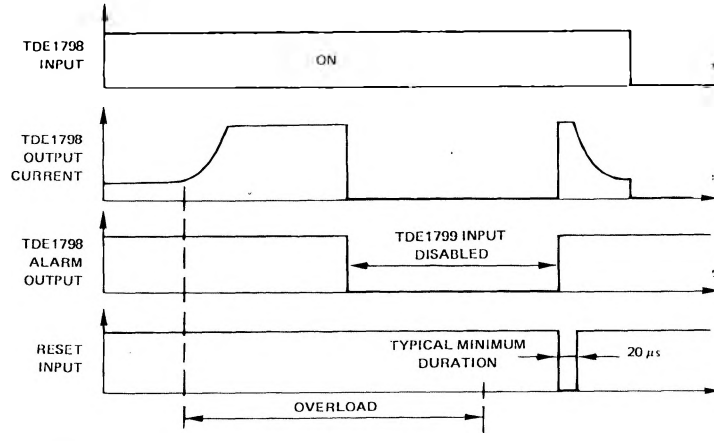


Figure 17 : Overload Conditions.



*** For instance overload during TDE1798 operation.**