TDE1747
TDF1747

INTERFACE CIRCUIT – RELAY AND LAMP – DRIVER
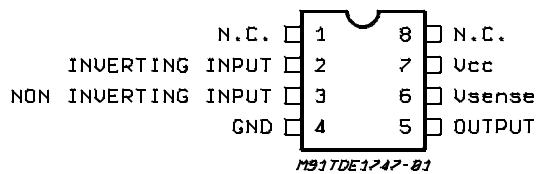
- OPEN GROUND PROTECTION
- HIGH OUTPUT CURRENT
- ADJUSTABLE SHORT-CIRCUIT PROTEC-TION TO GROUND
- THERMAL PROTECTION WITH HYSTERE-SIS TO AVOID THE INTERMEDIATE OUT-PUT LEVELS
- LARGE SUPPLY VOLTAGE RANGE : + 10 V TO + 45 V
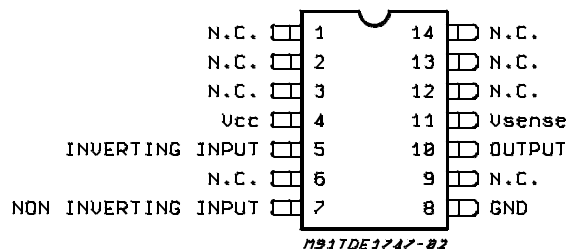- SHORT-CIRCUIT PROTECTION TO V_{CC}

DESCRIPTION

The TDE/TDF1747 is a monolithic comparator de-signed for high current and high voltage applica-tions, specifically to drive lamps, relays, stepping motors.

These device is essentially blow-out proof. Cur-rent limiting is available to limit the peak output current to safe values, the adjustment only re-quires one external resistor. In addition, thermal shut down is provided to keep the I.C. from over-heating. If internals dissipation becomes too great, the driver will shut down to prevent exces-sive heating. TDE1747 has an open ground pro-tection. The output is also protected from short-circuits with the positive power supply.
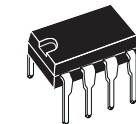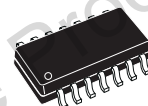
Minidip (DP)

SO14 (FP)

ORDERING NUMBERS:
TDE1747DP
TDE1747FP
TDF1747DP

The device operates over a wide range of supply voltages from standard ± 15 V operational ampli-fier supplies down to the single + 12 V or + 24 used for industrial electronic systems.

PIN CONNECTIONS (Top view)

```
              N.C. [ 1    8 ] N.C.
  INVERTING INPUT [ 2    7 ] Vcc
NON INVERTING INPUT [ 3    6 ] Vsense
              GND [ 4    5 ] OUTPUT
              M91TDE1747-81
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Minidip

```
         N.C. [ 1   14 ] N.C.
         N.C. [ 2   13 ] N.C.
         N.C. [ 3   12 ] N.C.
         Vcc [ 4   11 ] Vsense
INVERTING INPUT [ 5   10 ] OUTPUT
         N.C. [ 6    9 ] N.C.
NON INVERTING INPUT [ 7    8 ] GND
              M91TDE1747-82
```

SO14

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	50 *	V
V_{ID}	Differantial Input Voltage	50	V
V_I	Input Voltage	50	V
I_O	Output Current	1	A
P_{tot}	Power Dissipation (T_{amb} = + 25 °C)	Internally Limited	W
T_{stg}	Storage Temperature Range	− 65 to + 150	°C
T_{oper}	Operating Ambient Temperature Range TDE1747 TDF1747	− 25 to + 85 − 40 to + 85	°C °C

(*) 60V, t â 10ms

THERMAL CHARACTERISTICS

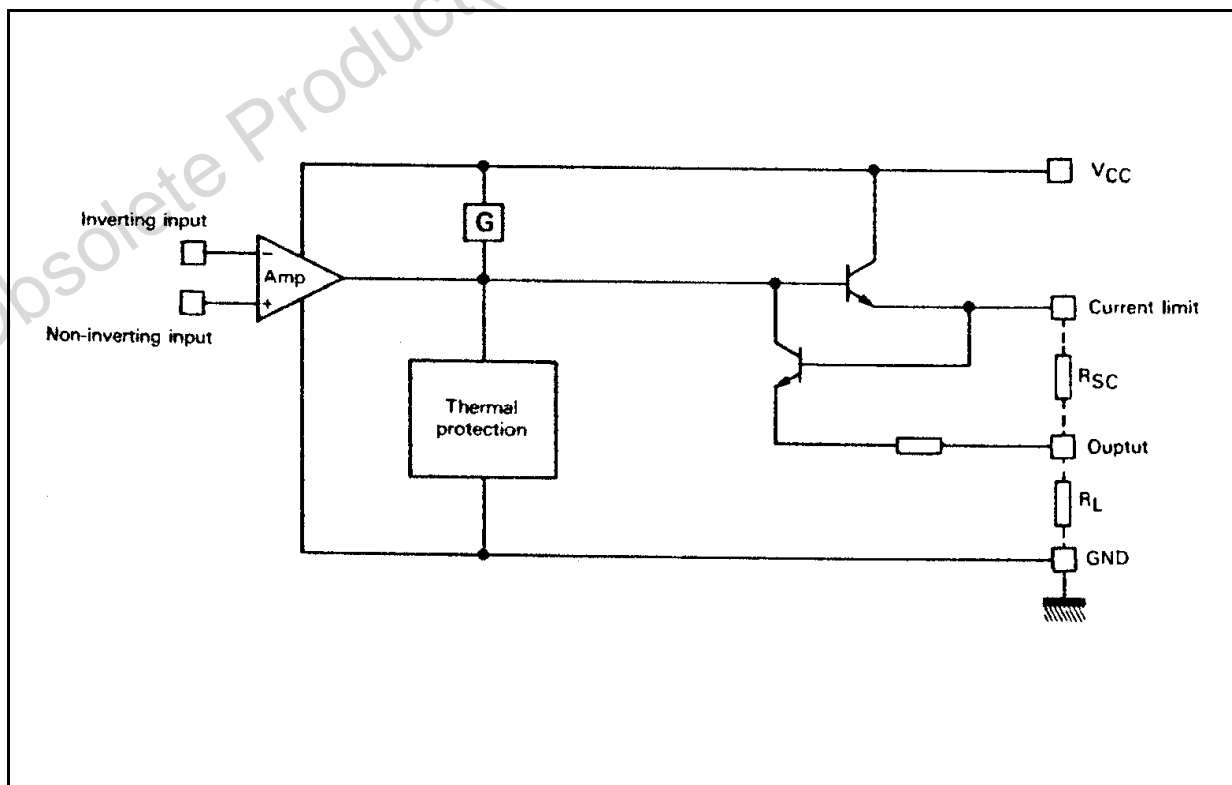| Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Maximum Junction-case Thermal Resistance		50	°C/W
$R_{th(j-a)}$	Maximum Junction-ambient Thermal Resistance		120	°C/W
R_{th}	Junction-ceramic Substrate (case glued to substrate)	SO14	90	°C/W
R_{th}	Junction-ceramic Substrate (case glued to substrate, substrate temperature maintened constant) SO14		65	°C/W

SCHEMATIC DIAGRAM
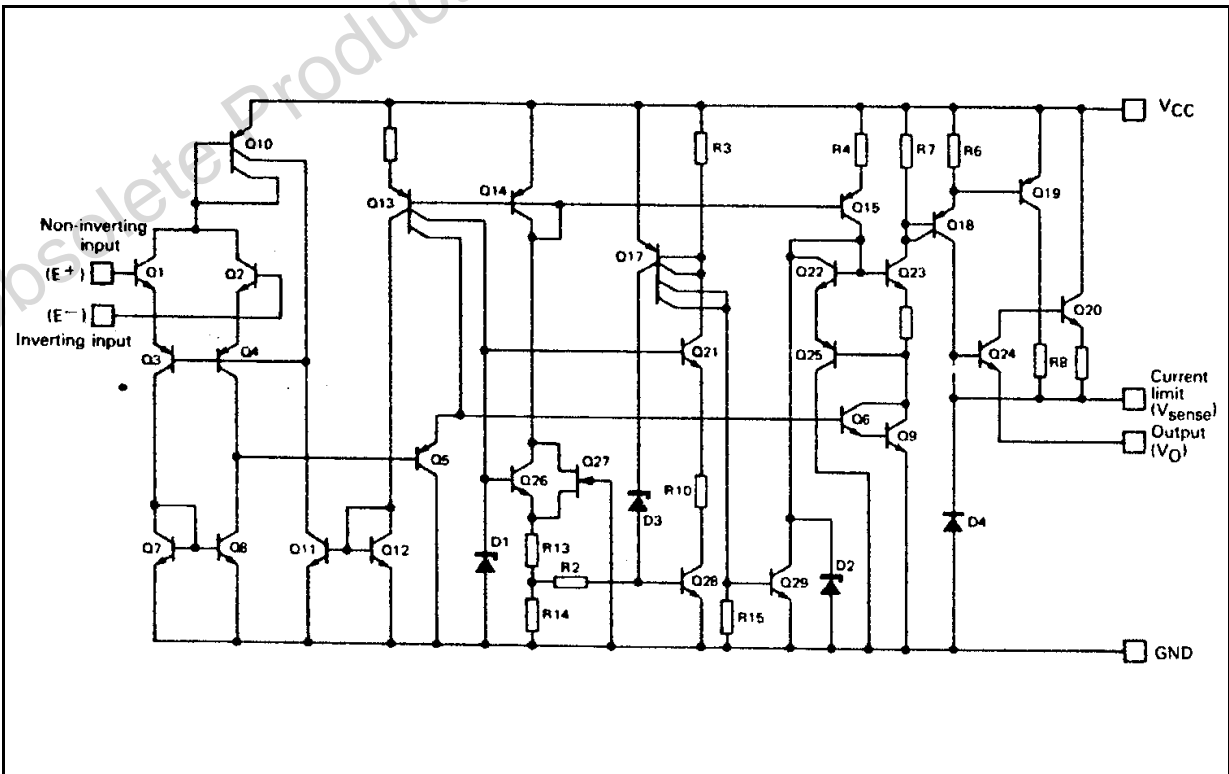
TEST CIRCUIT
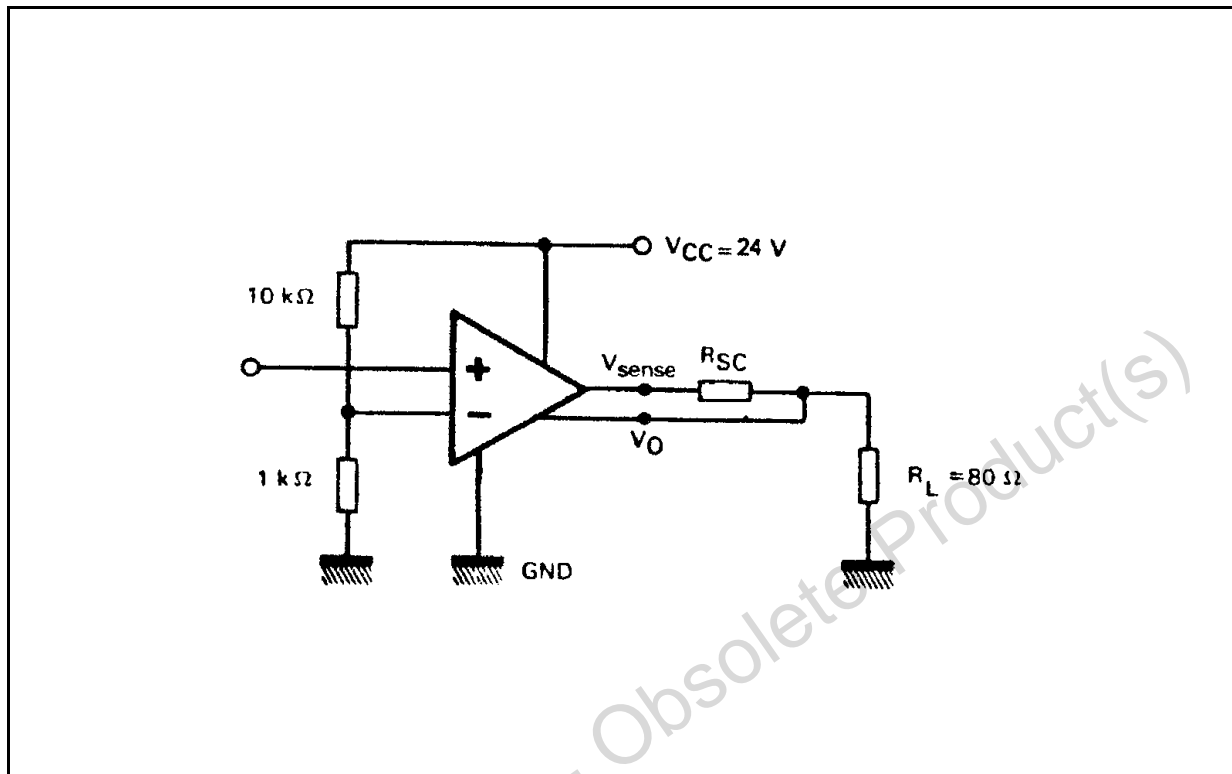
SIMPLIFIED CIRCUIT

ELECTRICAL CHARACTERISTICS $T_j = -25$ to $+85$ °C, $V_{CC} = 8$ to 45 V, unless otherwise specified (note 1).

| Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{IO}	Input Offset Voltage - (note 2)	–	2	50	mV
I_{IB}	Input Bias Current	–	0.1	1.5	mA
I_{CC}	Supply Current ($V_{CC} = +24$ V, $I_O = 0$) High Level Low Level	– –	4 2	6 4	mA mA
$V_{I(max)}$	Common-mode Input Voltage Range	2	–	$V_{CC}-2$	V
I_{SC}	Short-circuit Current Limit ($T_{amb} = +25$ °C, $V_{CC} = +24$) $R_{SC} = 1.5$ Ω TDE1747 $R_{SC} = \infty$	– –	480 35	– 50	mA mA
$V_{CC}-V_O$	Output Saturation Voltage (output high) ($R_{SC} = 0$, $V_I+-V_I- \geq 50$ mV) $I_O = 300$ mA, $T_j = +25$ °C $T_j = +150$ °C	– –	1.15 1.05	1.4 1.3	V V
I_{OL}	Low Level Output Current ($V_O = 0$, $V_{CC} = +24$ V) $T_j = +25$ °C	–	0.01	10	µA

Notes :

1) For operating at high temperature, the TDE/TDF1747, must be derated based on a + 150 C maximum junction temperature and a junction-ambient thermal resistance of 120 °C/W for Minidip and 100 °C/W for the SO14.

2) The offset voltage given is the maximum value of input voltage required to drive the output voltage within 2 V of the ground or the supply voltage.

Figure 1: Available Output Current vs. Limiting Resistor
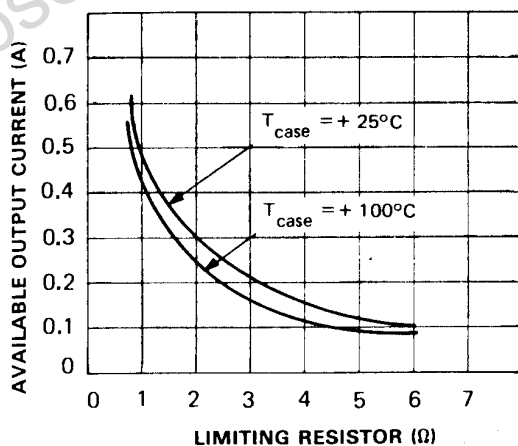
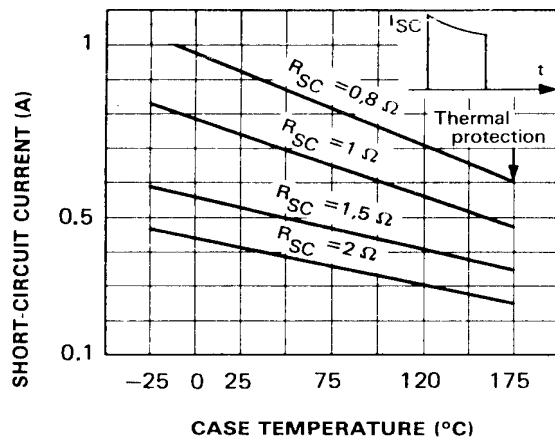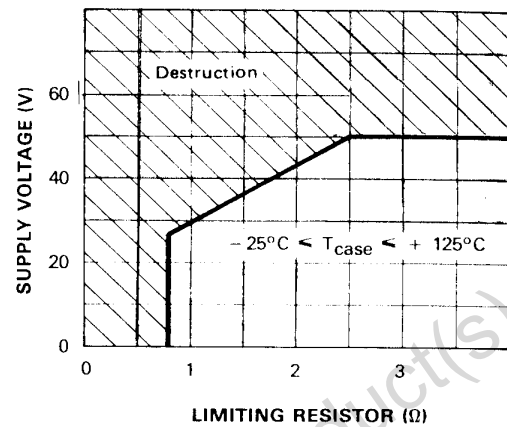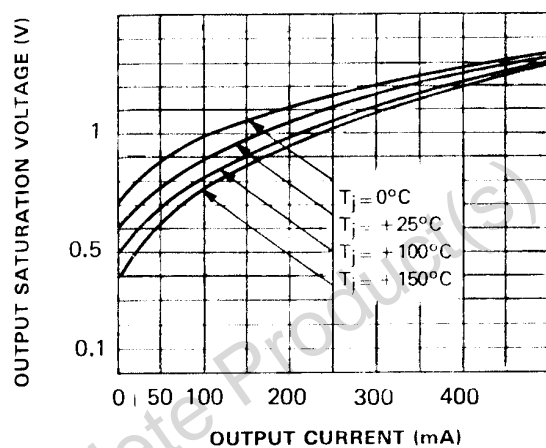**Figure 2:** Peak Short-circuit Output Current vs. Limiting Resistor
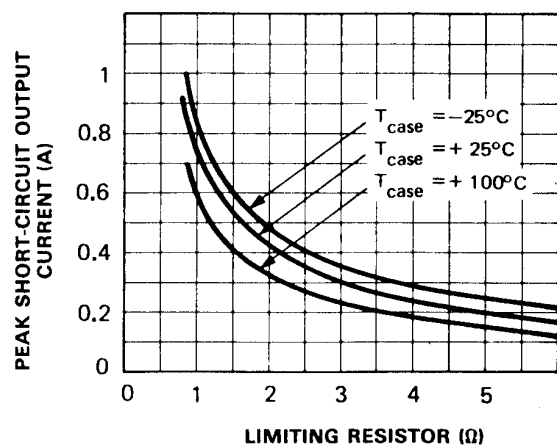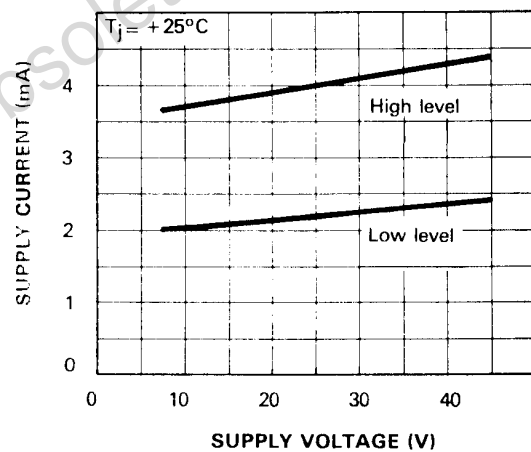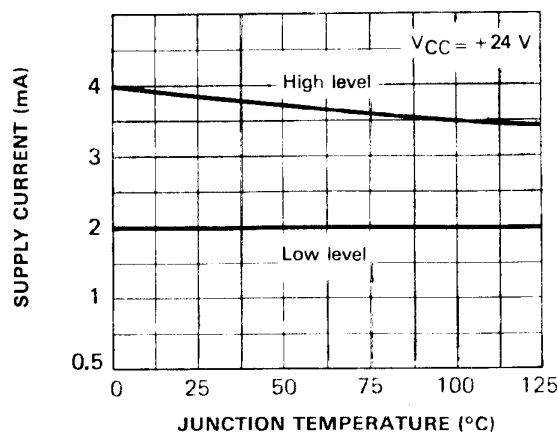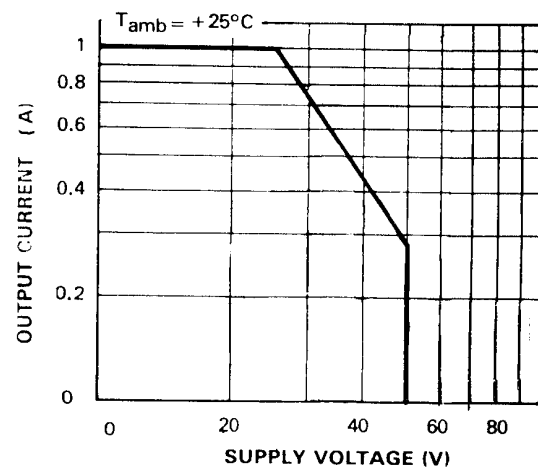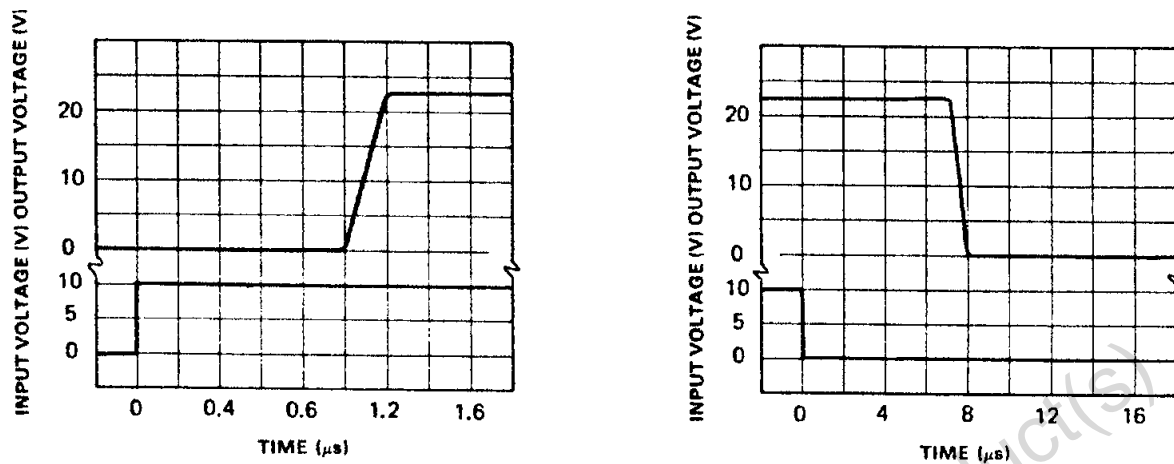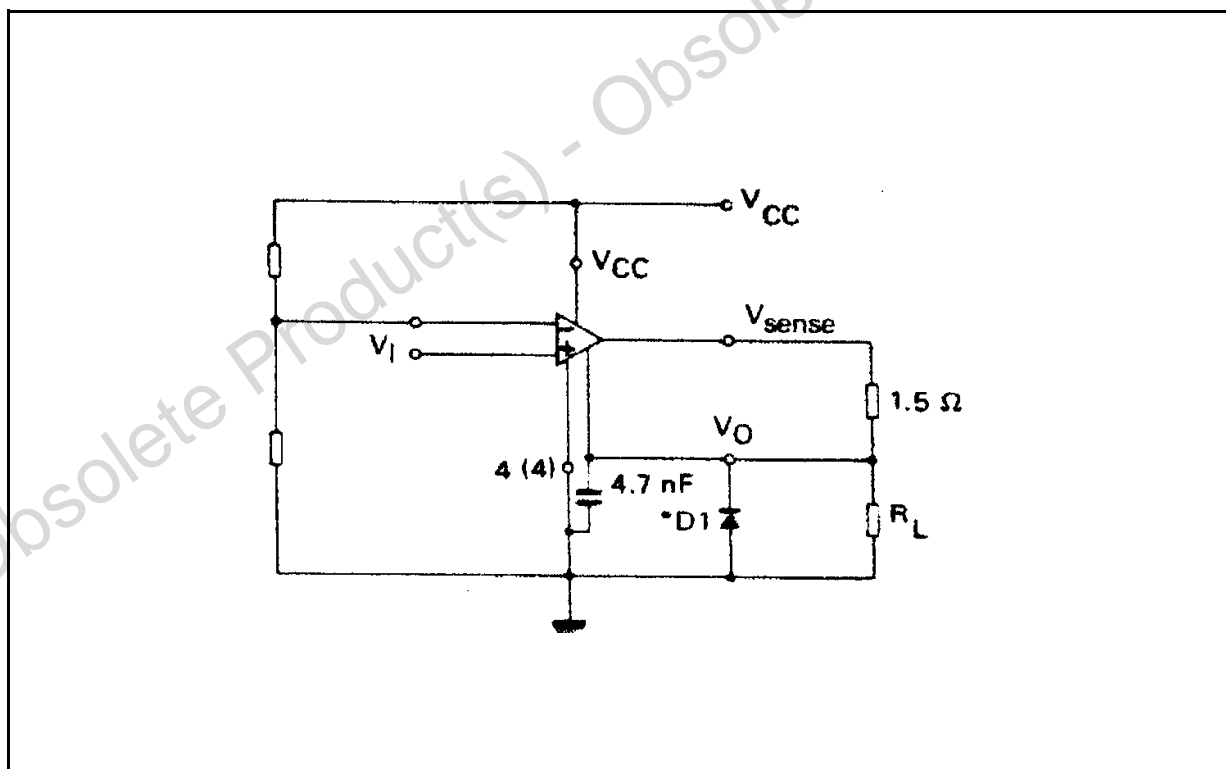
Figure 3: Short-circuit Current vs. Case Temperature

Figure 4: Minimum Limiting Resistor Value vs. Supply Voltage

Figure 5: Output Current vs. Output Saturation Voltage

Figure 6: Supply Current vs. Supply Voltage

Figure 7: Supply Current vs. Junction Temperature

Figure 8: Safe Operating Area (non repetitive surge)

Figure 9: Response Time

TYPICAL APPLICATIONS
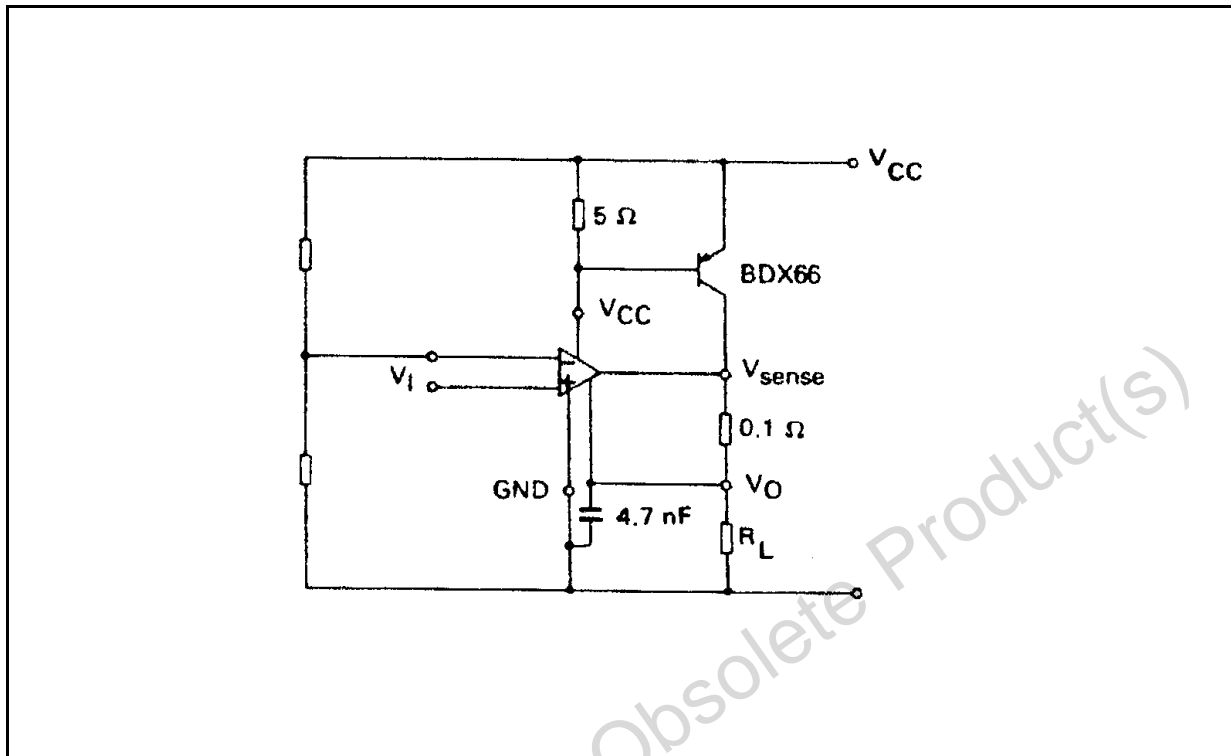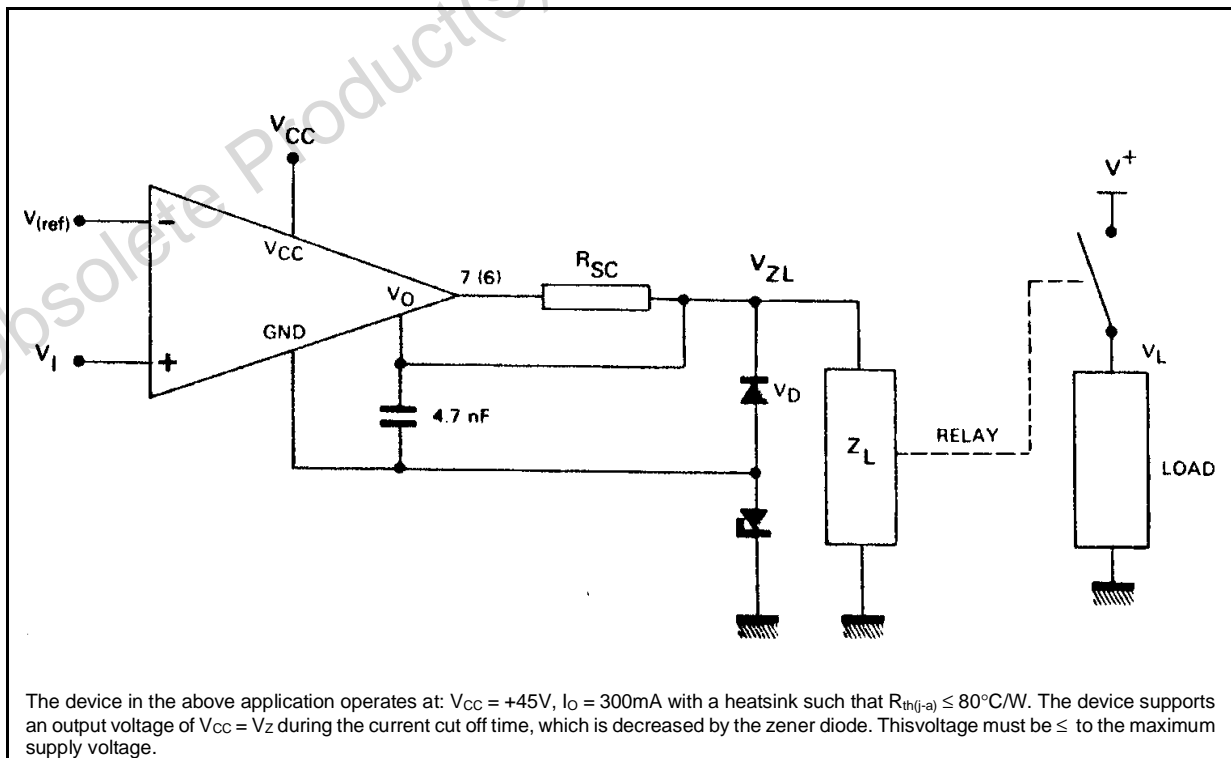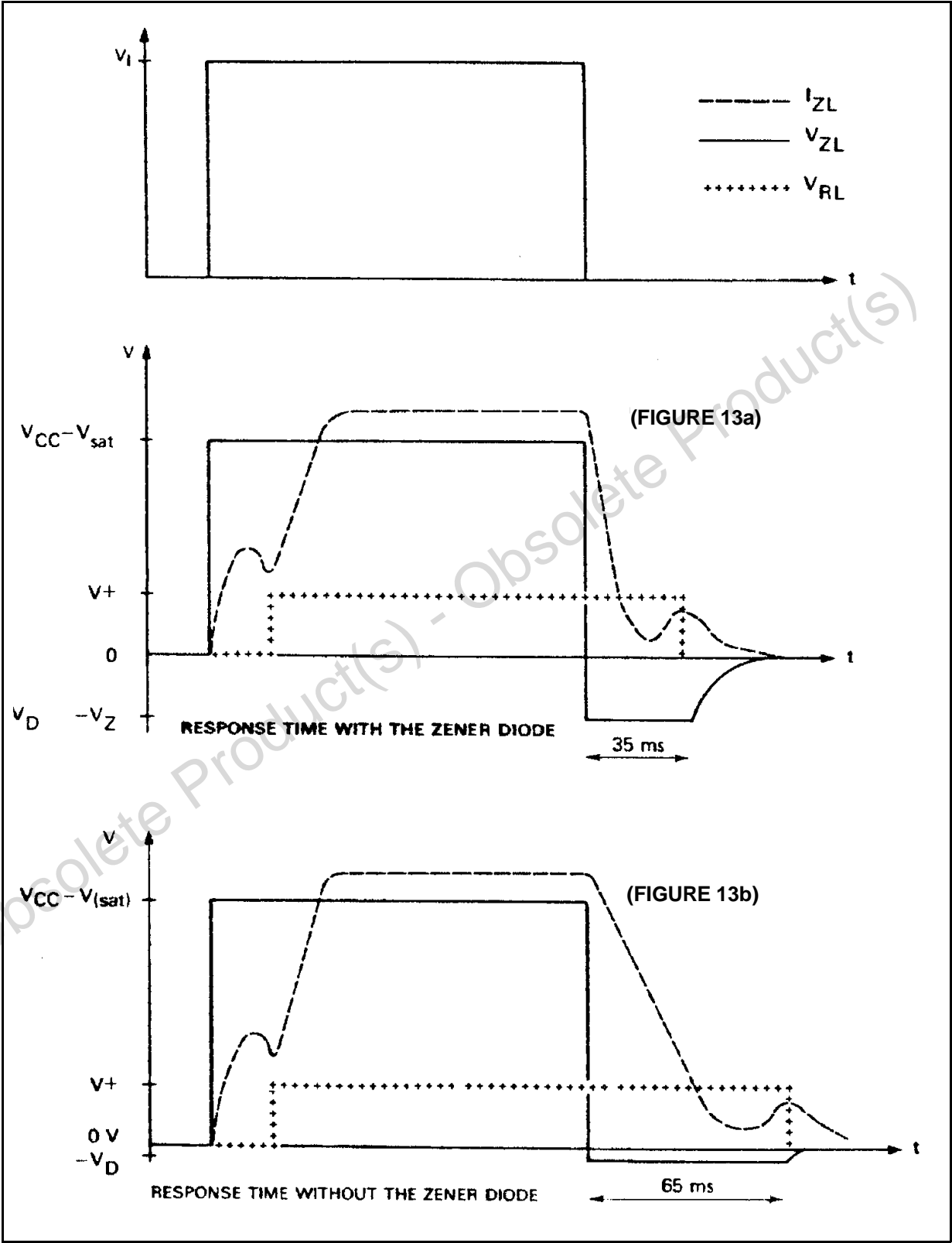
Figure 10: Base Circuit

Figure 11: Output Current Extension (5A)

Figure 12: Driving Low Impedance Relays (I_O = 300mA)

The device in the above application operates at: V_{CC} = +45V, I_O = 300mA with a heatsink such that $R_{th(j-a)} \leq$ 80°C/W. The device supports an output voltage of $V_{CC} = V_Z$ during the current cut off time, which is decreased by the zener diode. This voltage must be $\leq$ to the maximum supply voltage.

Figure 13: Waveforms

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	1.39		1.65	0.055		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		15.24			0.600	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z	1.27		2.54	0.050		0.100

OUTLINE AND MECHANICAL DATA
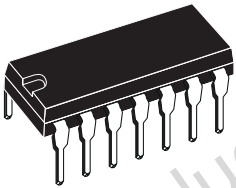
DIP14
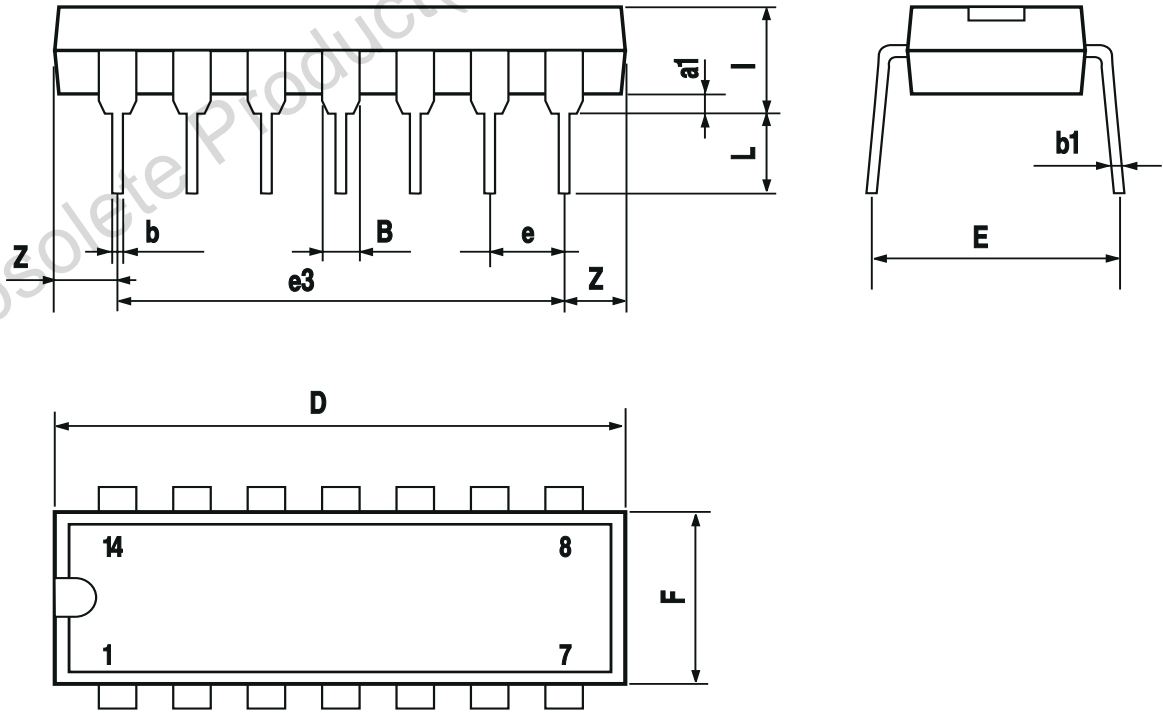
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
I			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

OUTLINE AND MECHANICAL DATA

Minidip

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