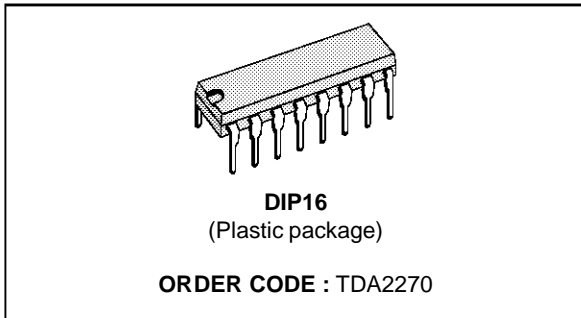


**TV VERTICAL DEFLECTION OUTPUT CIRCUIT**

- DRIVES VERTICAL DEFLECTION WINDINGS DIRECTLY
- HIGH EFFICIENCY
- INTERNAL FLYBACK GENERATOR
- THERMAL PROTECTION
- ON-CHIP VOLTAGE REFERENCE
- HIGH OUTPUT CURRENT (2.2 A peak)
- 16-LEAD POWERDIP PLASTIC PACKAGE

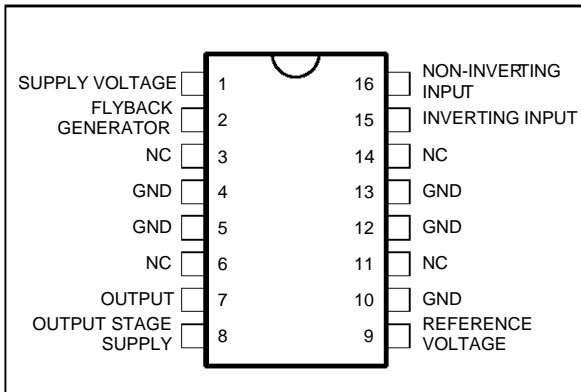


**DESCRIPTION**

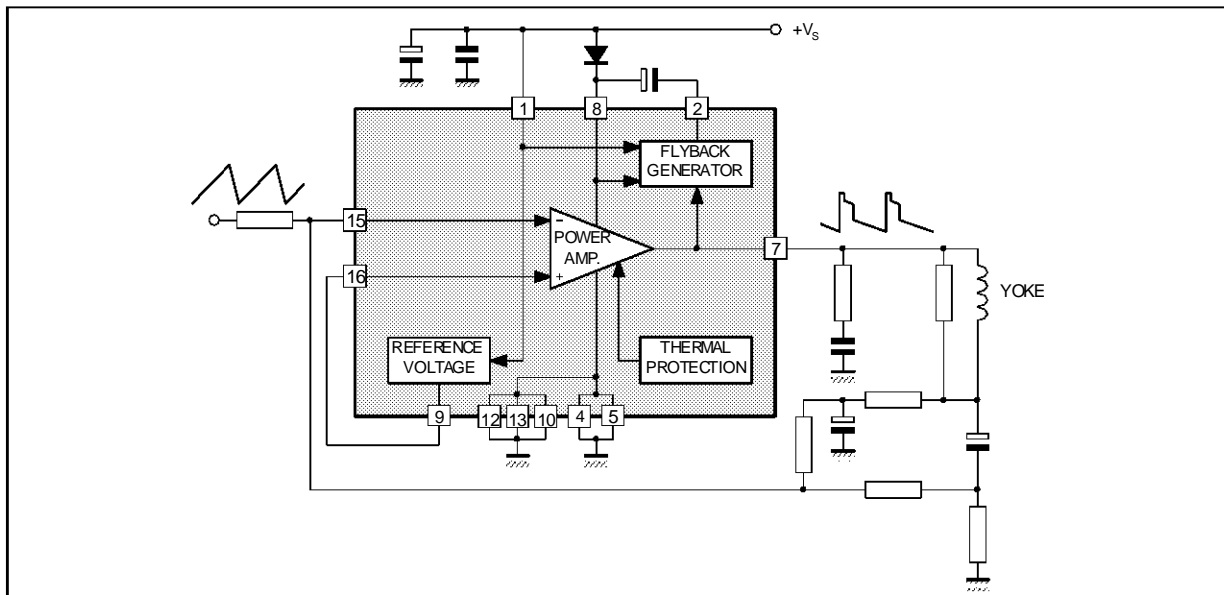
The TDA2270 is a high efficiency monolithic output stage for vertical deflection circuits in TVs and monitors. Driving the vertical windings directly, the device contains a power amplifier, flyback generator, voltage reference and thermal protection circuit.

The TDA2270 is supplied in a 16-pin DIP with the four center pins connected together and used for heatsinking.

**PIN CONNECTIONS**



**BLOCK DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
V <sub>s</sub>	Supply Voltage (pin 1)	35	V
V <sub>7</sub> , V <sub>8</sub>	Flyback Peak Voltage	60	V
V <sub>2</sub>	Voltage at Pin 2	+ V <sub>s</sub>	
V <sub>15</sub> , V <sub>16</sub>	Amplifier Input Voltage	+ V <sub>s</sub> , - 0.5	V
I <sub>o</sub>	Output Peak Current (non repetitive, t = 2 ms)	2	A
I <sub>o</sub>	Output Peak Current at f = 50 Hz, t ≤ 10 μs	2.2	A
I <sub>o</sub>	Output Peak Current at f = 50 Hz, t > 10 μs	1.2	A
I <sub>2</sub>	Pin 2 DC Current at V <sub>7</sub> < V <sub>1</sub>	50	mA
I <sub>2</sub>	Pin 2 Peak to Peak Flyback Current at f = 50 Hz, t <sub>fly</sub> ≤ 1.5 ms	2	A
P <sub>tot</sub>	Total Power Dissipation at T <sub>pins</sub> ≤ 90 °C T <sub>amb</sub> = 70 °C	4.3 1	W W
T <sub>stg</sub> , T <sub>j</sub>	Storage and Junction Temperature	- 40 to 150	°C

2270-01.TBL

**THERMAL DATA**

Symbol	Parameter	Value	Unit
R <sub>th j-case</sub>	Thermal Resistance Junction-case	Max 14	°C/W
R <sub>th j-amb</sub>	Thermal Resistance Junction-ambient	Max 80	°C/W

2270-02.TBL

\* Obtained with the GND pins soldered to printed circuit with minimized copper area.

**ELECTRICAL CHARACTERISTICS**

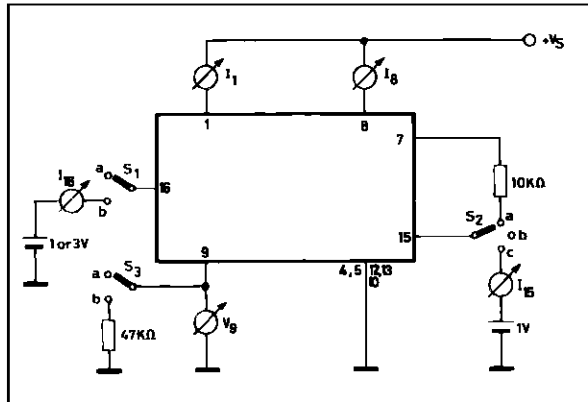
(refer to the test circuits, V<sub>s</sub> = 35 V, T<sub>amb</sub> = 25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	Fig.
I <sub>1</sub>	Pin 1 Quiescent Current	I <sub>2</sub> = 0, I <sub>7</sub> = 0, V <sub>16</sub> = 3 V		8	16	mA	1a
I <sub>8</sub>	Pin 8 Quiescent Current	I <sub>2</sub> = 0, I <sub>7</sub> = 0, V <sub>16</sub> = 3 V		16	36	mA	1a
I <sub>15</sub>	Amplifier Input Bias Current	V <sub>15</sub> = 1 V		- 0.1	- 1	μA	1a
I <sub>16</sub>	Amplifier Input Bias Current	V <sub>16</sub> = 1 V		- 0.1	- 1	μA	1a
V <sub>2L</sub>	Pin 2 Saturation Voltage to GND	I <sub>2</sub> = 20 mA		1		V	1c
V <sub>7</sub>	Quiescent Output Voltage	V <sub>s</sub> = 35 V, R <sub>a</sub> = 39 kΩ V <sub>s</sub> = 15 V, R <sub>a</sub> = 13 kΩ		18 7.5		V V	1d 1d
V <sub>7L</sub>	Output Saturation Voltage to GND	I <sub>7</sub> = 0.7 A		0.7	1	V	1c
V <sub>7H</sub>	Output Saturation Voltage to Supply	- I <sub>7</sub> = 0.7 A		1.3	1.8	V	1b
V <sub>9</sub>	Reference Voltage	I <sub>9</sub> = 0		2.2		V	1a
$\frac{\Delta V_9}{\Delta V_s}$	Reference Voltage Drift versus Supply Voltage	V <sub>s</sub> = 15 to 30 V		1	2	mV/V	1a
R <sub>9</sub>	Reference Voltage Output Resistance			2.1		kΩ	
T <sub>j</sub>	Junction Temperature for Thermal Shut Down			140		°C	

2270-03.TBL

Figure 1 : DC Test Circuits

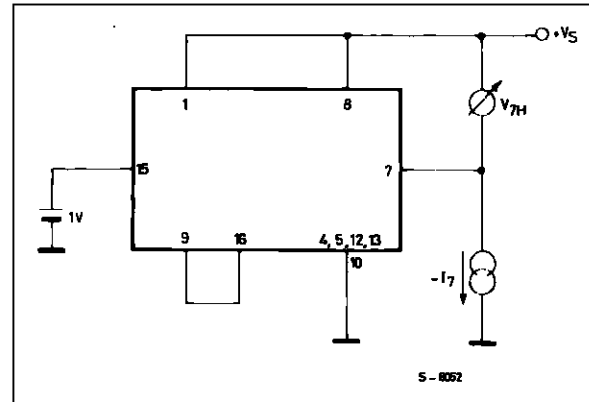
Figure 1a : Measurement of  $I_1$  ;  $I_8$  ;  $I_{15}$  ;  $I_{16}$  ;  $V_9$  ;  $\Delta V_9/\Delta V_S$  ;  $R_9$



2270-03.EPS

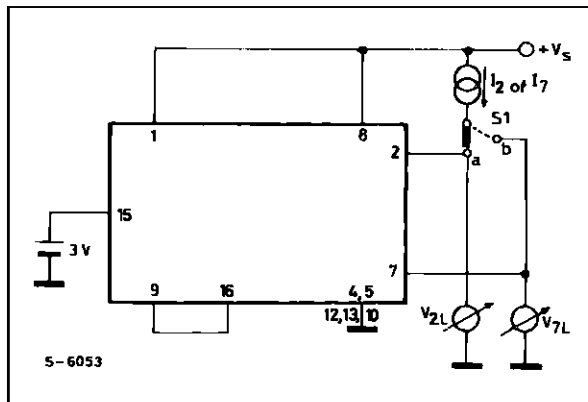
S1 : (a)  $I_{15}$  ; (b)  $I_{16}$ ,  $I_7$  and  $I_8$ .  
 S2 : (a)  $I_7$  and  $I_8$  ; (b)  $I_{16}$ , (c)  $I_{15}$ .  
 S3 : (a)  $I_{15}$ ,  $I_{16}$ ,  $I_7$ ,  $I_8$ ,  $I_9$  and  $V_9$  ; (b)  $R_9$

Figure 1b : Measurement of  $V_{7H}$



2270-04.EPS

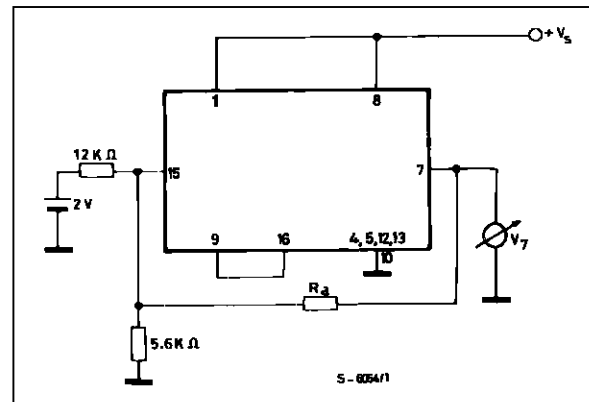
Figure 1c : Measurement of  $V_{2L}$  ;  $V_{7L}$



2270-05.EPS

S1 : (a)  $V_{2L}$  ; (b)  $V_{7L}$

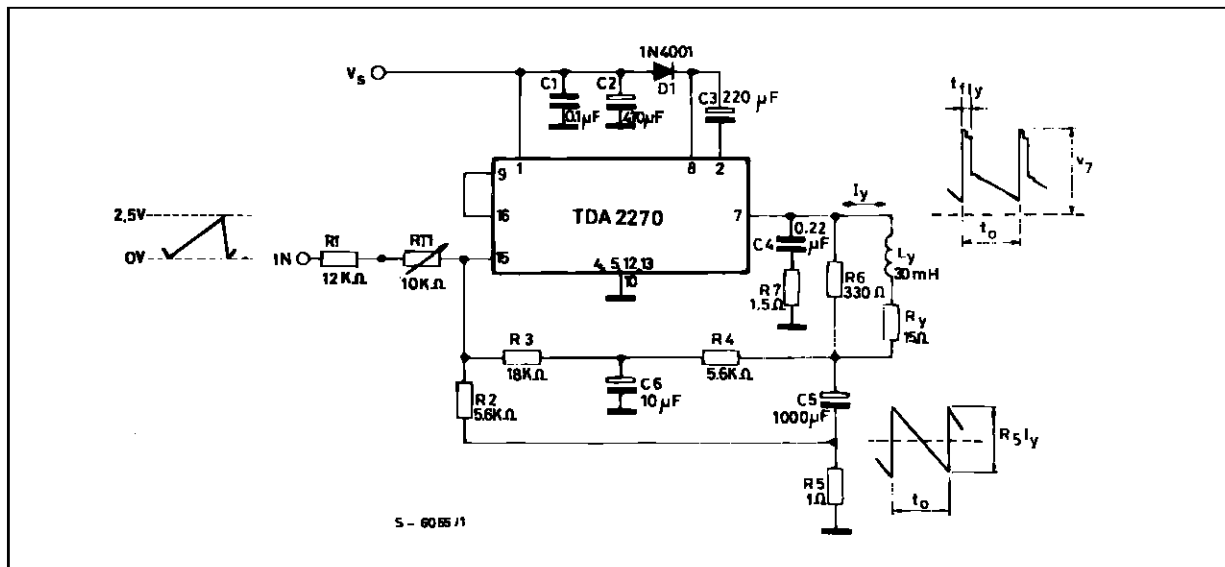
Figure 1d : Measurement of  $V_7$



2270-06.EPS

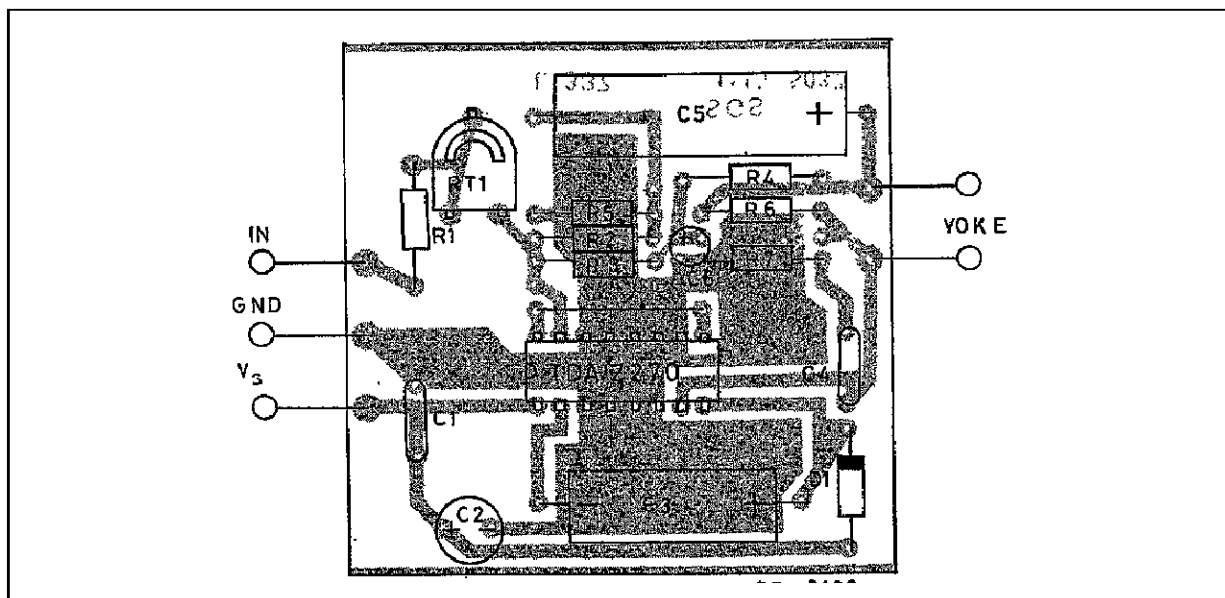
# TDA2270

Figure 2 : Application Circuit



2270-07.EPS

Figure 3 : PC Board and Component Layout (1 : 1 scale)



2270-08.TIF

## COMPONENTS LIST FOR TYPICAL APPLICATIONS (refer to the fig. 2)

Component	B/W TV 10 $\Omega$ / 20 mH / 1 App	90° TVC 15 $\Omega$ / 30 mH / 0.82 App	Unit
RT1	10	10	k $\Omega$
R1	10	12	k $\Omega$
R2	5.6	5.6	k $\Omega$
R3	15	18	k $\Omega$
R4	6.8	5.6	k $\Omega$
R5	1	1	$\Omega$
R6	330	330	$\Omega$
R7	1.5	1.5	$\Omega$
D1	1N 4001	1N 4001	–
C1	0.1	0.1	$\mu$ F
C2 el.	470/25 V	470/25 V	$\mu$ F
C3 el.	220/25 V	220/25 V	$\mu$ F
C4	0.22	0.22	$\mu$ F
C5 el.	1000/25 V	1000/16 V	$\mu$ F
C6 el.	10/16 V	10/16 V	$\mu$ F

2270-04.TBL

## TYPICAL PERFORMANCE

Parameter	B/W TV 10 $\Omega$ / 20 mH / 1 App	90° TVC 15 $\Omega$ / 30 mH	Unit
$V_s$ – Supply Voltage	20	25	V
$I_s$ – Current	145	125	mA
$t_{fly}$ – Flyback Time	0.75	0.7	ms
* $P_{tot}$ – Power Dissipation	1.8	2.05	W
* $R_{th\ c-a}$ – Heatsink	14	12	$^{\circ}$ C/W
$T_{amb}$	60	60	$^{\circ}$ C
$T_{j\ max}$	130	130	$^{\circ}$ C
$t_o$	20	20	ms
$V_i$	2.5	2.5	Vpp
$V_7$ – Flyback Voltage	42	52	Vp

2270-05.TBL

**MOUNTING INSTRUCTIONS**

The  $R_{th\ j-amb}$  of the TDA 2270 can be reduced by soldering the GND pins to a suitable copper area of the printed circuit board (fig. 4) or to an external heatsink (fig. 5).

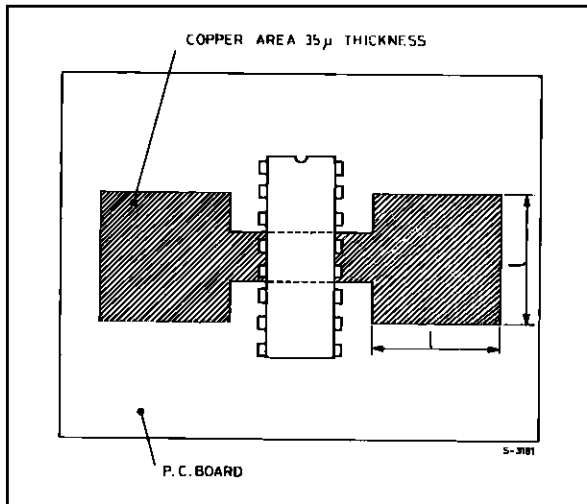
The diagram of figure 6 shows the maximum dissippable power  $P_{tot}$  and the  $R_{th\ j-amb}$  as a function of the side "l" of two equal square copper areas having

a thickness of  $35\ \mu$  (1.4 mils).

During soldering the pins temperature must not exceed  $260\ ^\circ\text{C}$  and the soldering time must not be longer than 12 seconds.

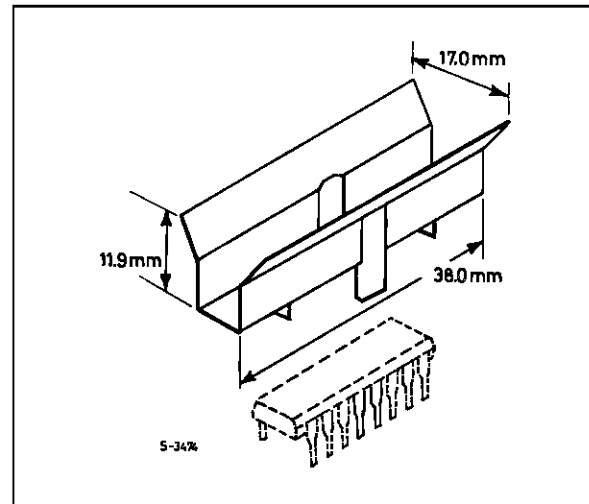
The external heatsink or printed circuit copper area must be connected to electrical ground.

**Figure 4 :** Example of P.C. Board Copper Area which is Used as Heatsink



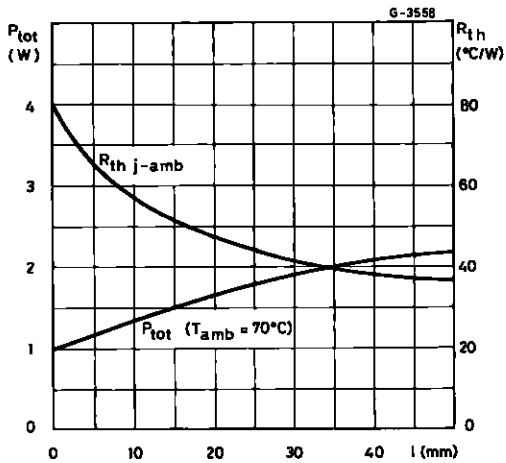
2270-09.EPS

**Figure 5 :** External Heatsink Mounting Example



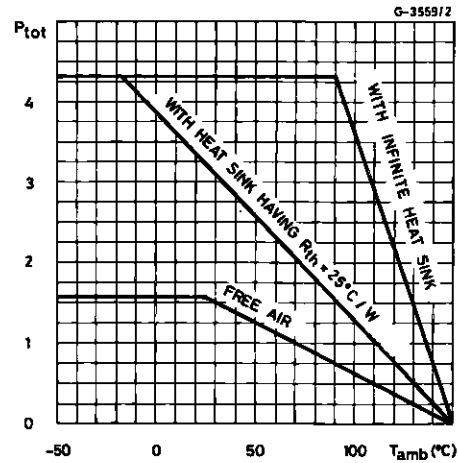
2270-10.EPS

**Figure 6 :** Maximum Dissippable Power and Junction to Ambient Thermal Resistance versus Side "l"



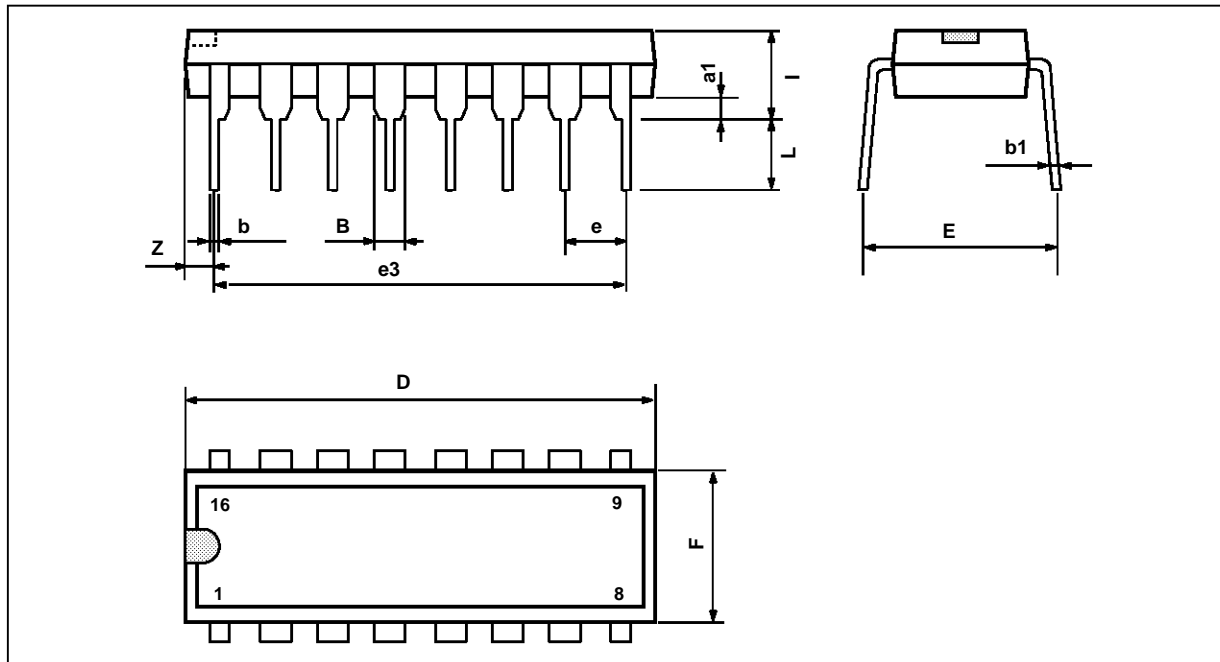
2270-11.EPS

**Figure 7 :** Maximum Allowable Power Dissipation versus Ambient Temperature



2270-12.EPS

**PACKAGE MECHANICAL DATA**  
16 PINS - PLASTIC DIP



PM-DIP16.EPS

Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
a1	0.51			0.020		
B	0.77		1.65	0.030		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		17.78			0.700	
F			7.1			0.280
i			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050

DIP16.TBL

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