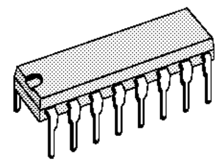
SGS-THOMSON MICROELECTRONICS

TDA2270

TV VERTICAL DEFLECTION OUTPUT CIRCUIT

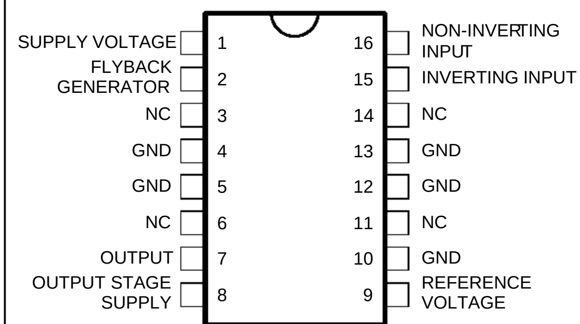
- DRIVES VERTICAL DEFLECTION WINDINGS DIRECTLY
- HIGH EFFICIENCY
- INTERNAL FLYBACK GENERATOR
- THERMAL PROTECTION
- ON-CHIP VOLTAGE REFERENCE
- HIGH OUTPUT CURRENT (2.2 A peak)
- 16-LEAD POWERDIP PLASTIC PACKAGE



DIP16
(Plastic package)

ORDER CODE : TDA2270

PIN CONNECTIONS



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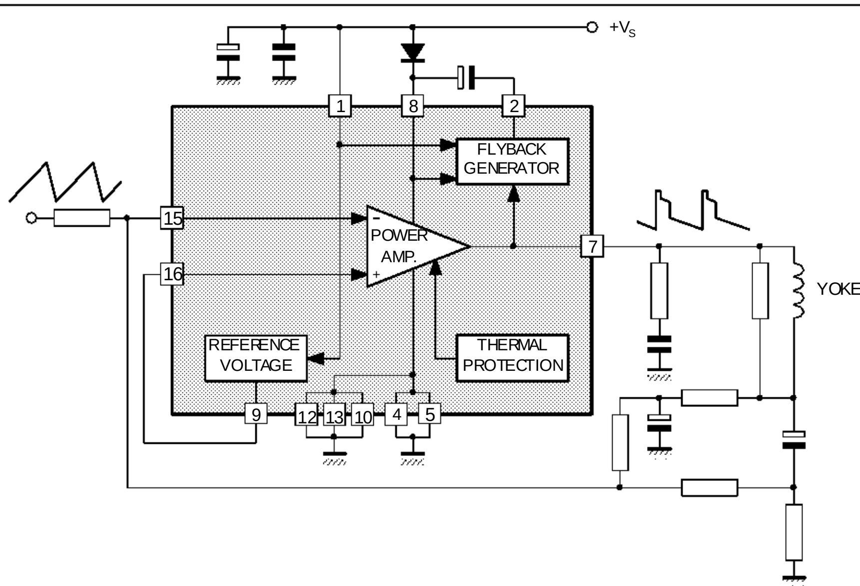
DESCRIPTION

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.

BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_s	Supply Voltage (pin 1)	35	V
V_7, V_8	Flyback Peak Voltage	60	V
V_2	Voltage at Pin 2	+ V_s	
V_{15}, V_{16}	Amplifier Input Voltage	+ V_s, – 0.5	V
I_o	Output Peak Current (non repetitive, t = 2 ms)	2	A
I_o	Output Peak Current at f = 50 Hz, t ≤ 10 µs	2.2	A
I_o	Output Peak Current at f = 50 Hz, t > 10 µs	1.2	A
I_2	Pin 2 DC Current at $V_7 < V_1$	50	mA
I_2	Pin 2 Peak to Peak Flyback Current at f = 50 Hz, $t_{fly} \leq 1.5$ ms	2	A
P_{tot}	Total Power Dissipation at $T_{pins} \leq 90$ °C $T_{amb} = 70$ °C	4.3 1	W W
T_{stg}, T_j	Storage and Junction Temperature	– 40 to 150	°C

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THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ j\text{–}case}$	Thermal Resistance Junction-case	Max	14	°C/W
$R_{th\ j\text{–}amb}$	Thermal Resistance Junction–ambient	Max	80	°C/W

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

ELECTRICAL CHARACTERISTICS

(refer to the test circuits, V_S = 35 V, T_{amb} = 25^{o}C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	Fig.
I_1	Pin 1 Quiescent Current	I_2 = o, I_7 = 0, V_{16} = 3 V		8	16	mA	1a
I_8	Pin 8 Quiescent Current	I_2 = 0, I_7 = 0, V_{16} = 3 V		16	36	mA	1a
I_{15}	Amplifier Input Bias Current	V_{15} = 1 V		– 0.1	– 1	µA	1a
I_{16}	Amplifier Input Bias Current	V_{16} = 1 V		– 0.1	– 1	µA	1a
V_{2L}	Pin 2 Saturation Voltage to GND	I_2 = 20 mA		1		V	1c
V_7	Quiescent Output Voltage	V_s = 35 V, R_a = 39 kΩ V_s = 15 V, R_a = 13 kΩ		18 7.5		V V	1d 1d
V_{7L}	Output Saturation Voltage to GND	I_7 = 0.7 A		0.7	1	V	1c
V_{7H}	Output Saturation Voltage to Supply	– I_7 = 0.7 A		1.3	1.8	V	1b
V_9	Reference Voltage	I_9 = 0		2.2		V	1a
$\frac{\Delta V_9}{\Delta V_S}$	Reference Voltage Drift versus Supply Voltage	V_s = 15 to 30 V		1	2	mV/V	1a
R_9	Reference Voltage Output Resistance			2.1		kΩ	
T_j	Junction Temperature for Thermal Shut Down			140		°C	

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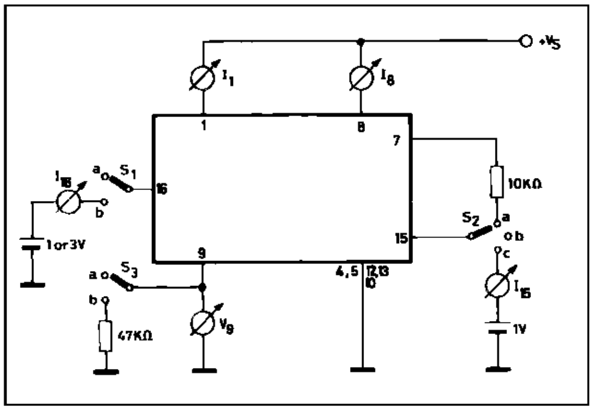
Figure 1 : DC Test Circuits

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



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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}

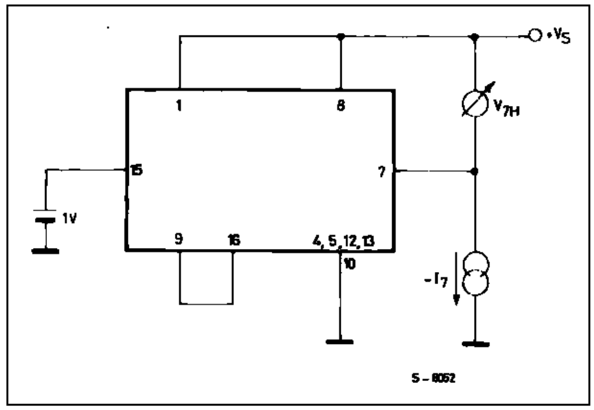

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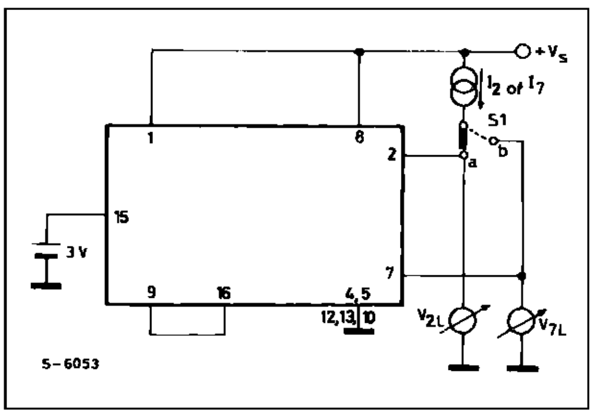
Figure 1c : Measurement of V_{2L} ; V_{7L}



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

Figure 1d : Measurement of V_7

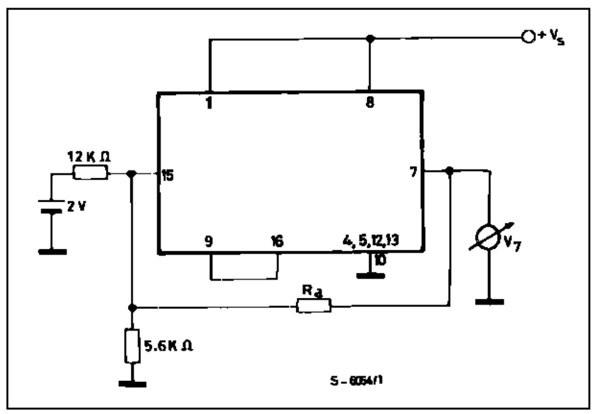

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Figure 2 : Application Circuit

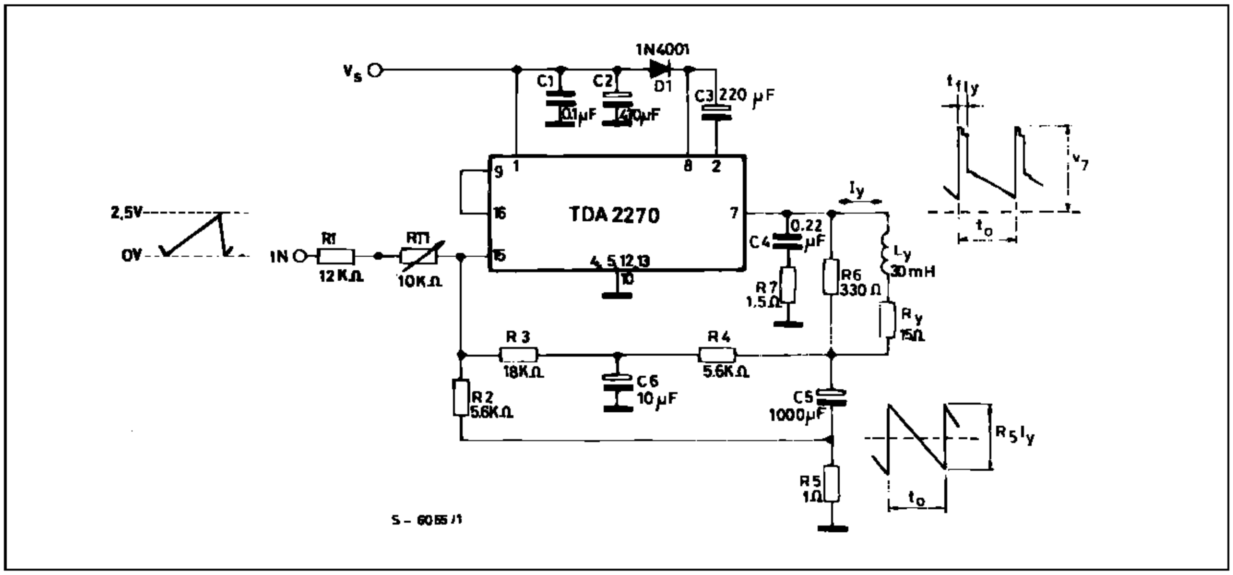

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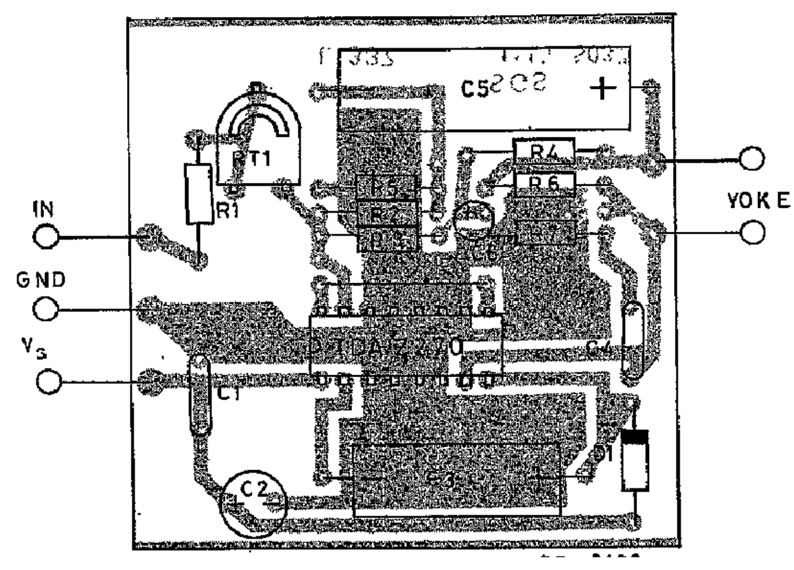
Figure 3 : PC Board and Component Layout (1 : 1 scale)



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

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

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TYPICAL PERFORMANCE

Parameter	B/W TV 10 Ω / 20 mH / 1 App	90° TVC 15 Ω / 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	°C/W
T_{amb}	60	60	°C
$T_{j\ max}$	130	130	°C
t_o	20	20	ms
V_i	2.5	2.5	Vpp
V_7 – Flyback Voltage	42	52	Vp

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MOUNTING INSTRUCTIONS

The $R_{th\ j\text{-}amb}$ 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 dissipable power P_{tot} and the $R_{th\ j\text{-}amb}$ as a function of the side "l" of two equal square copper areas having a thickness of 35 μ (1.4 mils).

During soldering the pins temperature must not exceed 260 °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

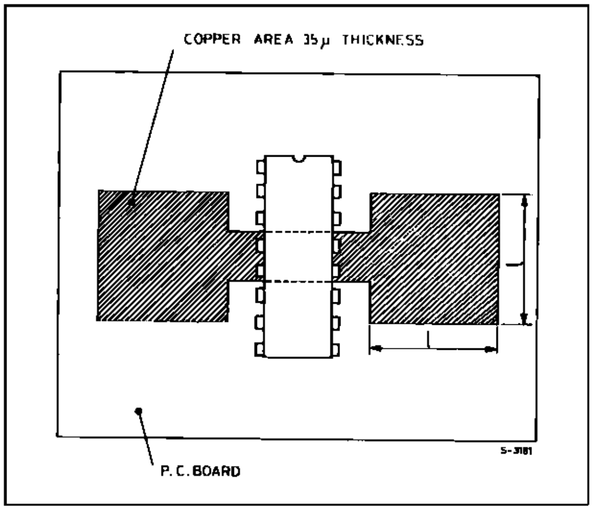


Figure 5 : External Heatsink Mounting Example

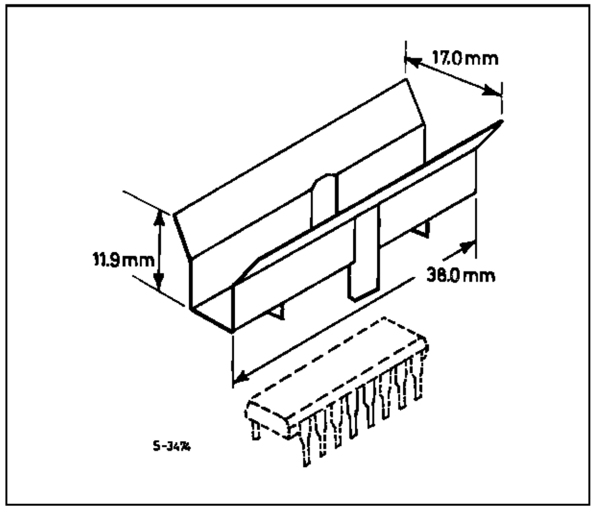


Figure 6 : Maximum Dissipable Power and Junction to Ambient Thermal Resistance versus Side "l"

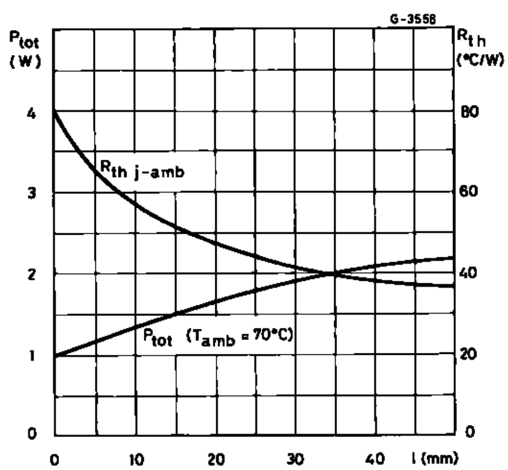
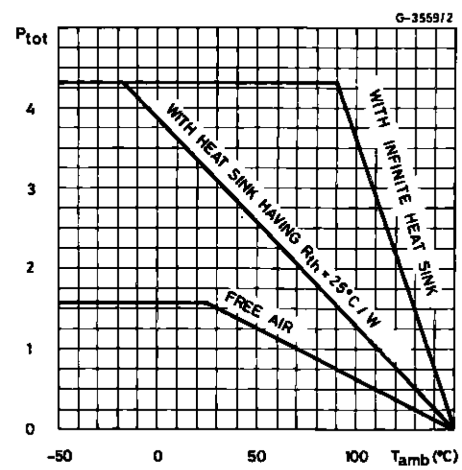
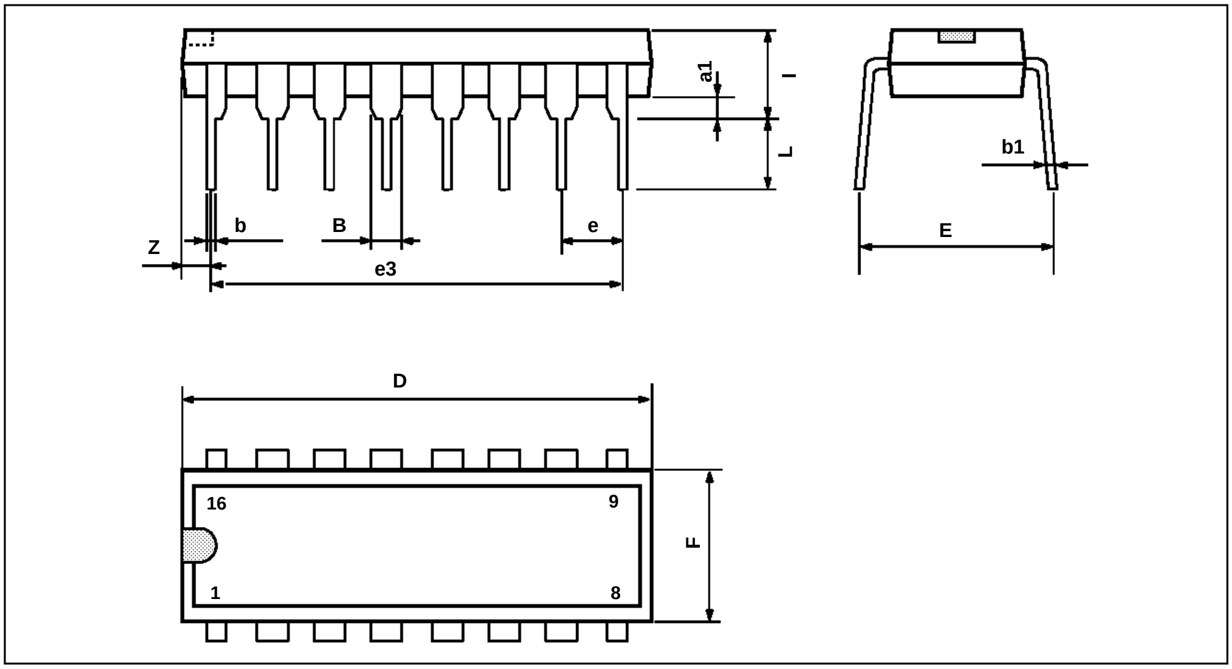


Figure 7 : Maximum Allowable Power Dissipation versus Ambient Temperature



PACKAGE MECHANICAL DATA

16 PINS - PLASTIC DIP



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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

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