

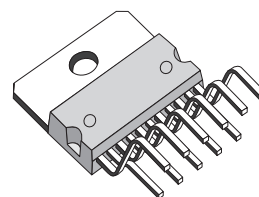
TV VERTICAL DEFLECTION OUTPUT CIRCUIT

The functions incorporated are :

- POWER AMPLIFIER
- FLYBACK GENERATOR
- REFERENCE VOLTAGE
- THERMAL PROTECTION

DESCRIPTION

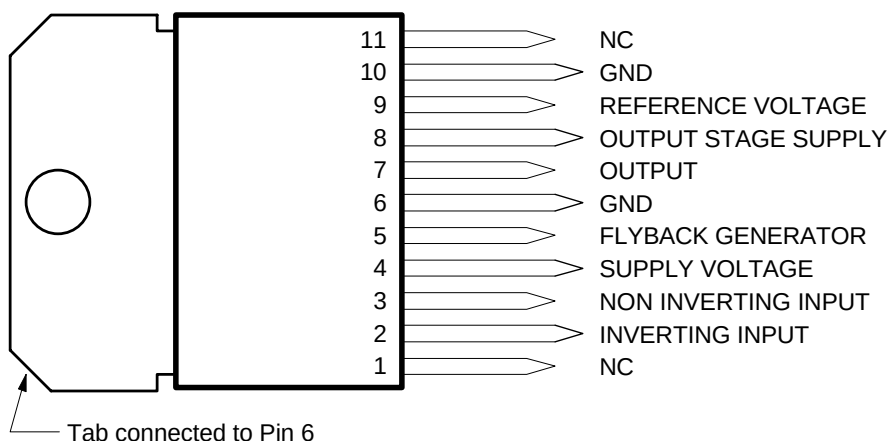
The TDA2170 is a monolithic integrated circuit in 11-lead Multiwatt® package. It is a high efficiency power booster for direct driving of vertical windings of TV yokes. It is intended for use in Colour and B & W television receivers as well as in monitors and displays.



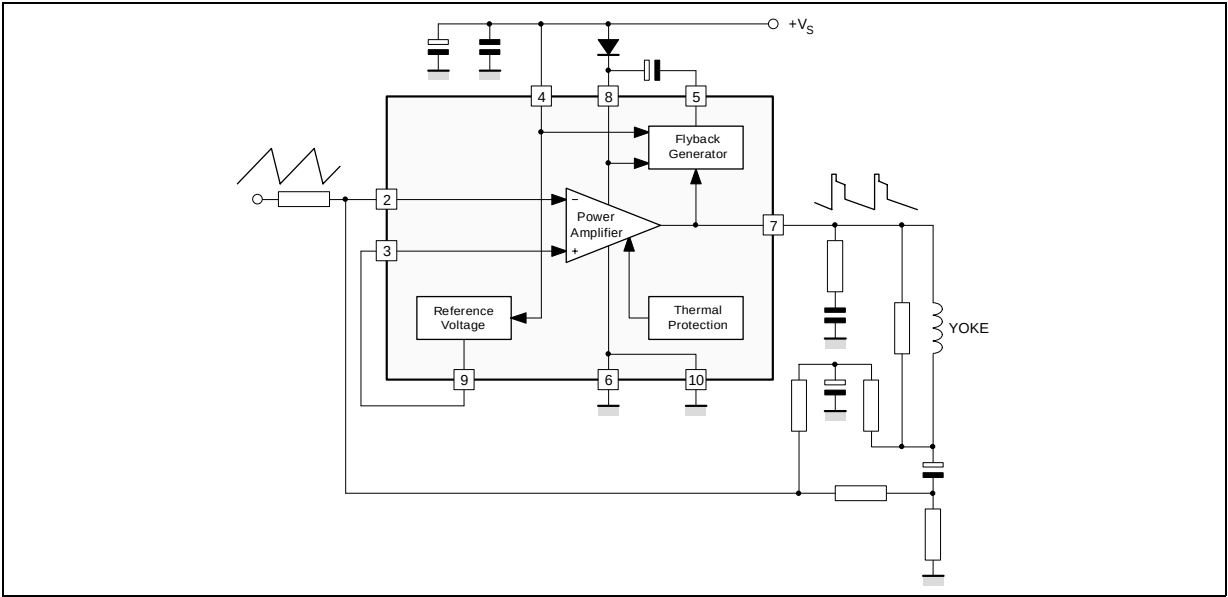
MULTIWATT 11
(Plastic Package)

ORDER CODE : TDA2170

PIN CONNECTIONS

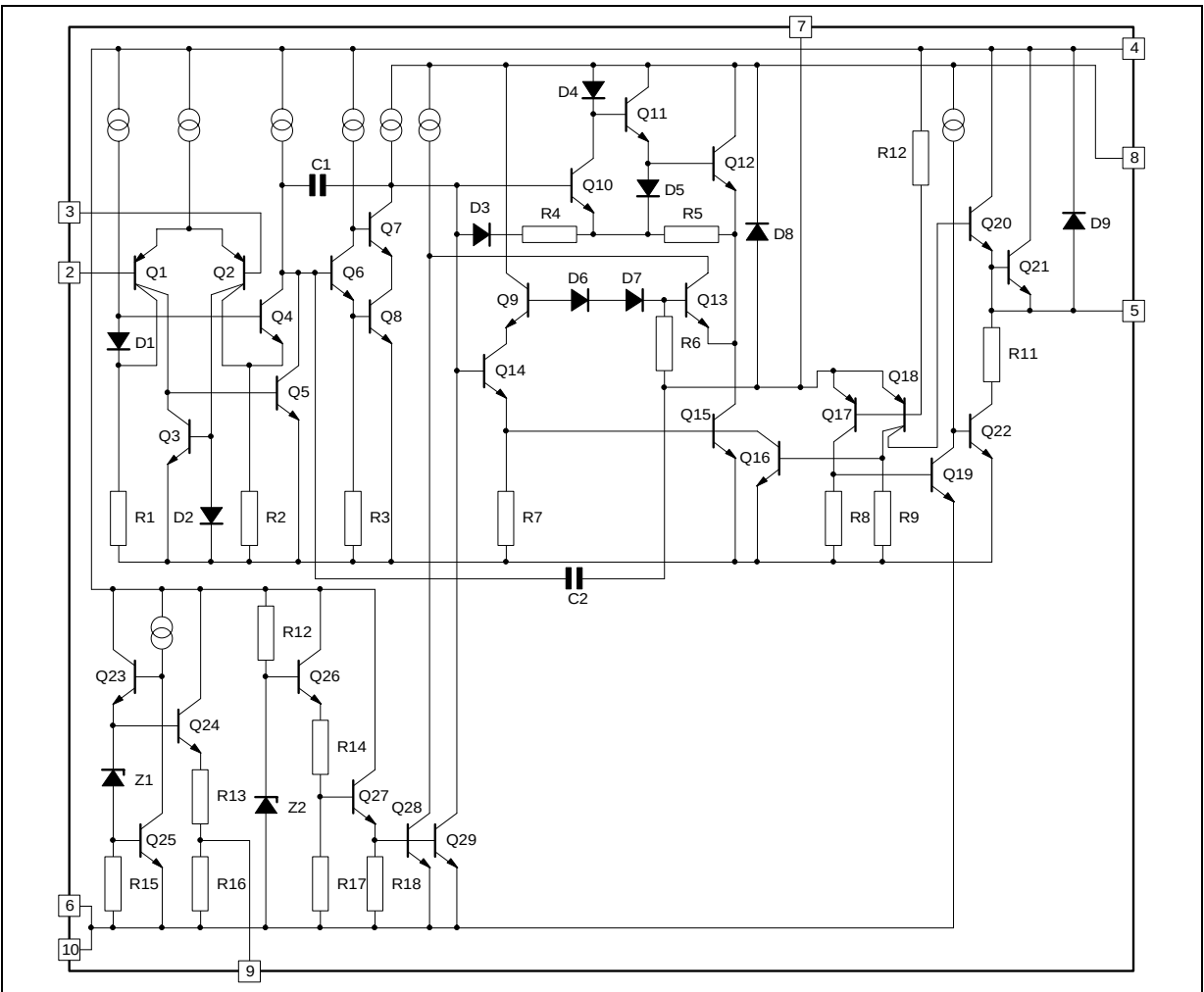


BLOCK DIAGRAM



2170-02.EPS

SCHEMATIC DIAGRAM



2170-03.EPS

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	Supply Voltage (pin 4)	35	V
V_7, V_8	Flyback Peak Voltage	60	V
V_5	Voltage at Pin 5	$+V_S$	
V_2, V_3	Amplifier Input Voltage	$+V_S - 0.5$	V
I_O	Output Peak Current (non repetitive, $t = 2$ msec)	2.5	A
I_O	Output Peak Current at $f = 50$ Hz, $t \leq 10$ μ sec	3	A
I_O	Output Peak Current at $f = 50$ Hz, $t > 10$ μ sec	2	A
I_5	Pin 5 DC Current at $V_7 < V_4$	100	mA
I_5	Pin 5 Peak to Peak Flyback Current at $f = 50$ Hz, $t_{fly} \leq 1.5$ msec	3	A
P_{tot}	Total Power Dissipation at $T_{case} = 60$ °C	30	W
T_{stg}, T_j	Storage and Junction Temperature	-40 to 150	°C

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THERMAL DATA

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

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ELECTRICAL CHARACTERISTICS

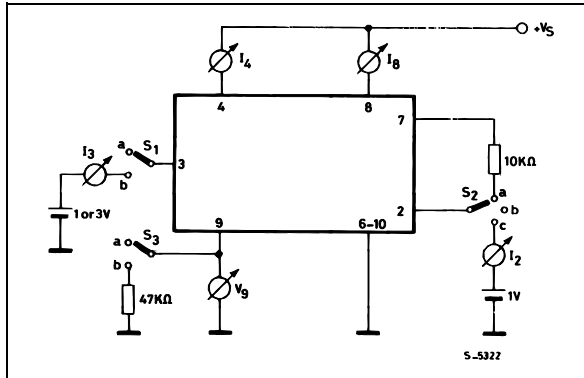
(refer to the test circuits, $V_S = 35$ V, $T_{amb} = 25$ °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	Fig.
I_4	Pin 4 Quiescent Current	$I_5 = 0$; $I_7 = 0$; $V_3 = 3$ V		8	16	mA	1a
I_8	Pin 8 Quiescent Current	$I_5 = 0$; $I_7 = 0$; $V_3 = 3$ V		16	36	mA	1a
I_3	Amplifier Input Bias Current	$V_3 = 1$ V		-0.1	-1	μ A	1a
I_2	Amplifier Input Bias Current	$V_2 = 1$ V		-0.1	-1	μ A	1a
V_9	Reference Voltage	$I_9 = 0$		2.2		V	1a
$\frac{\Delta V_9}{\Delta V_S}$	Reference Voltage Drift vs. Supply Voltage	$V_S = 15$ to 30 V		1	2	mV/V	1a
V_{5L}	Pin 5 Saturation Voltage to GND	$I_5 = 20$ mA		1		V	1c
V_7	Quiescent Output Voltage	$V_S = 35$ V; $R_a = 13$ k Ω		18		V	1d
		$V_S = 15$ V; $R_a = 13$ k Ω		7.5		V	1d
V_{7L}	Output Saturation Voltage to GND	$I_7 = 1.2$ A		1	1.4	V	1c
		$I_7 = 0.7$ A		0.7	1	V	1c
V_{7H}	Output Saturation Voltage to Supply	$-I_7 = 1.2$ A		1.6	2.2	V	1b
		$-I_7 = 0.7$ A		1.3	1.8	V	1b
R_9	Reference Voltage Output Resistance			2.1		k Ω	
T_j	Junction Temperature for Thermal Shut Down			140		°C	

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Figure 1 : DC Test Circuits

Figure 1a : Measurement of I_2 ; I_3 ; I_4 ; I_8 ; I_9 ; $\Delta V_9/\Delta V_S$; R_9



S1 : (a) I_2 ; (b) I_3 , I_4 and I_8 .
S2 : (a) I_4 and I_8 ; (b) I_3 ; (c) I_2 .
S3 : (a) I_2 , I_3 , I_4 , I_8 , I_9 and V_9 ; (b) R_9 .

Figure 1b : Measurement of V_{7H}

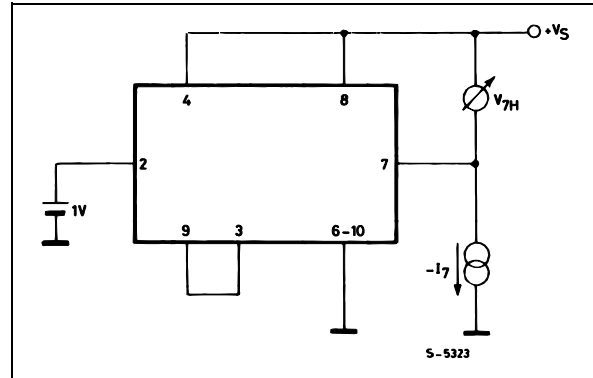
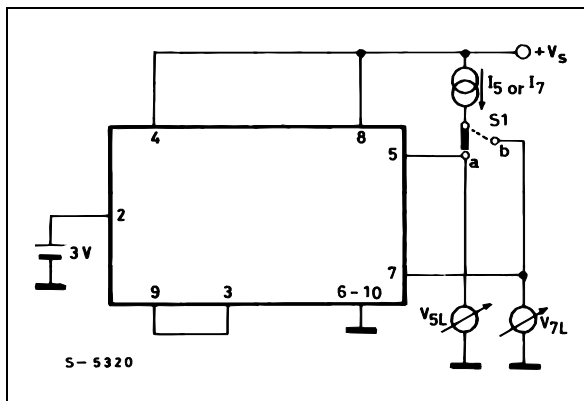


Figure 1c : Measurement of V_{5L} , V_{7L} .



S1 : (a) V_{5L} ; (b) V_{7L} .

Figure 1d : Measurement of V_7 .

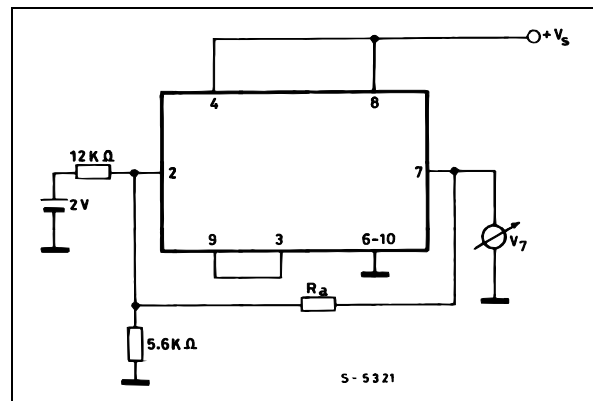


Figure 2 : Application Circuit

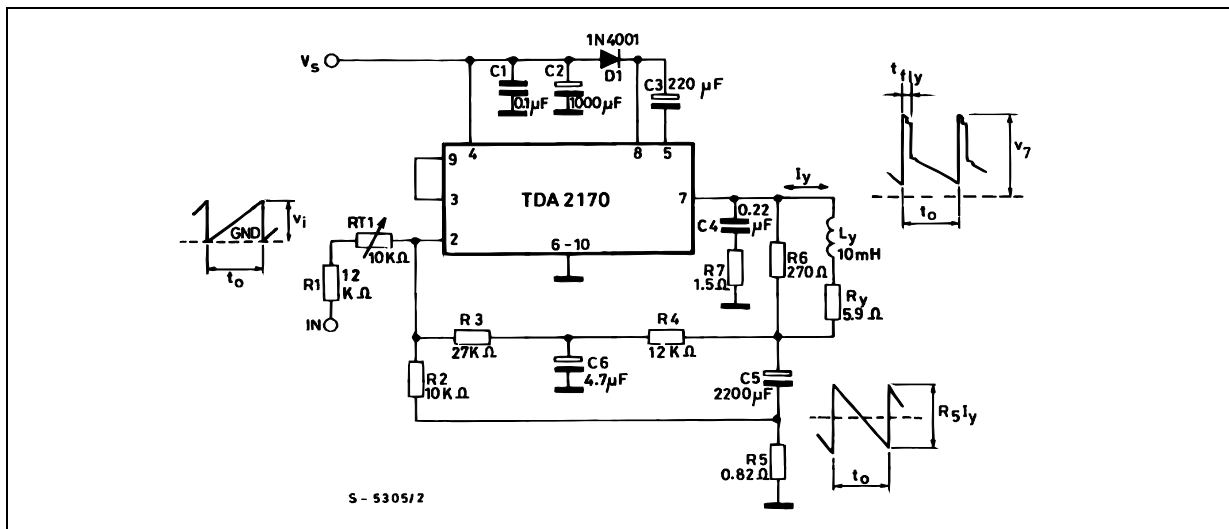
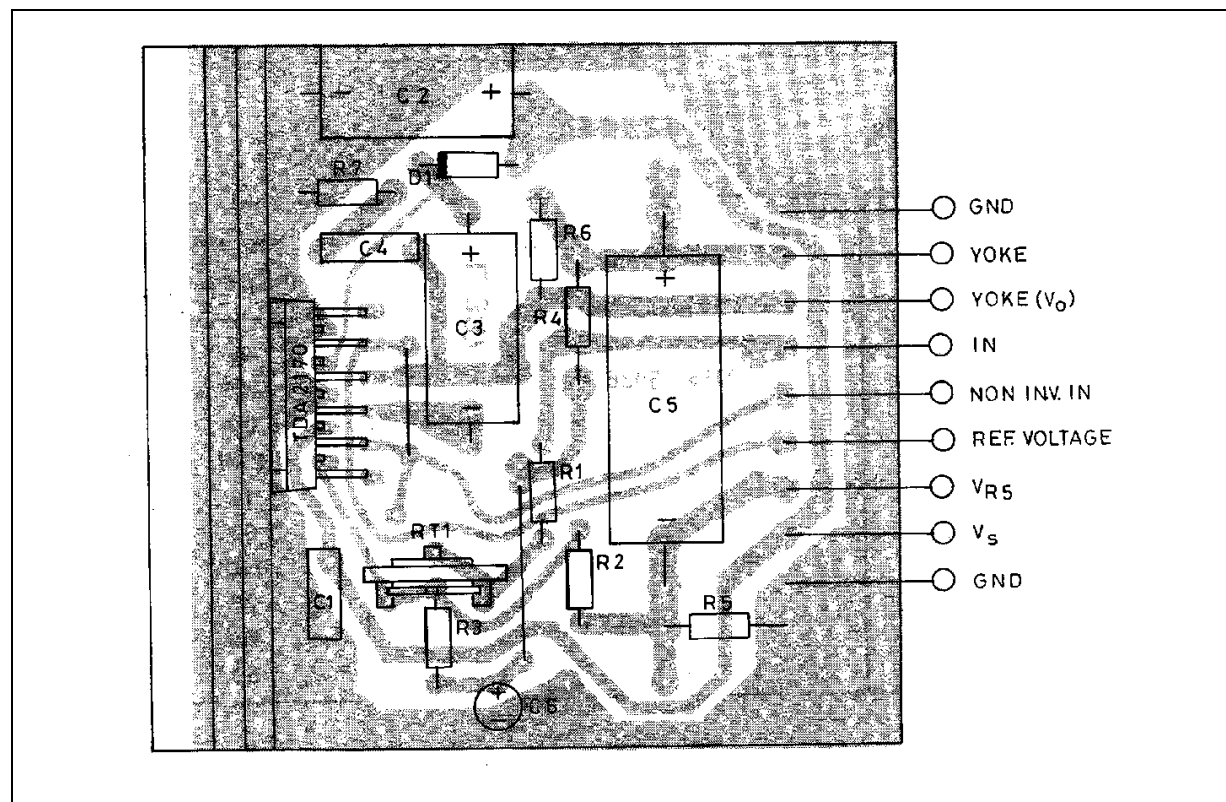


Figure 3 : PC Board and Component Layout (1:1 scale)



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COMPONENTS LIST FOR TYPICAL APPLICATIONS

Component	110° TVC 5.9 Ω / 10 mH 1.95 App	110° TVC 9.6 Ω / 24.6 mH 1.2 App	90° TVC 15 Ω / 30 mH 0.82 App	Unit
RT1	10	4.7	10	k Ω
R1	12	10	12	k Ω
R2	10	5.6	5.6	k Ω
R3	27	12	18	k Ω
R4	12	8.2	5.6	k Ω
R5	0.82	1	1	Ω
R6	270	330	330	Ω
R7	1.5	1.5	1.5	Ω
D1	1N 4001	1N 4001	1N 4001	—
C1	0.1	0.1	0.1	μ F
C2 el.	1000/25 V	470/25 V	470/25 V	μ F
C3 el.	220/25 V	220/25 V	220/25 V	μ F
C4	0.22	0.22	0.22	μ F
C5 el.	2200/25 V	2200/25 V	1000/16 V	μ F
C6 el.	4.7/16 V	4.7/16 V	10/16 V	μ F

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TYPICAL PERFORMANCES

Parameter	110° TVC 5.9 Ω / 10 mH	110° TVC 9.6 Ω / 27 mH	90° TVC 15 Ω / 30 mH	Unit
V _s – Supply Voltage	24	22.5	25	V
I _s – Current	280	175	125	mA
t _{fly} – Flyback Time	0.6	1	0.7	ms
* P _{tot} – Power Dissipation	4.2	2.5	2.05	W
* R _{th c-a} – Heatsink	7	13	16	°C/W
T _{amb}	60	60	60	°C
T _{j max}	110	110	110	°C
t _o	20	20	20	ms
V _i	2.5	2.5	2.5	V _{PP}
V ₇	50	47	52	V _P

* Worst case condition.

MOUNTING INSTRUCTIONS

The power dissipated in the circuit must be removed by adding an external heatsink.

Thanks to the MULTIWATT® package attaching the heatsink is very simple, a screw or a compression spring (clip) being sufficient.

Between the heatsink and the package it is better to insert a layer of silicon grease, to optimize the thermal contact ; no electrical isolation is needed between the two surfaces.

Figure 2 : Application Circuit

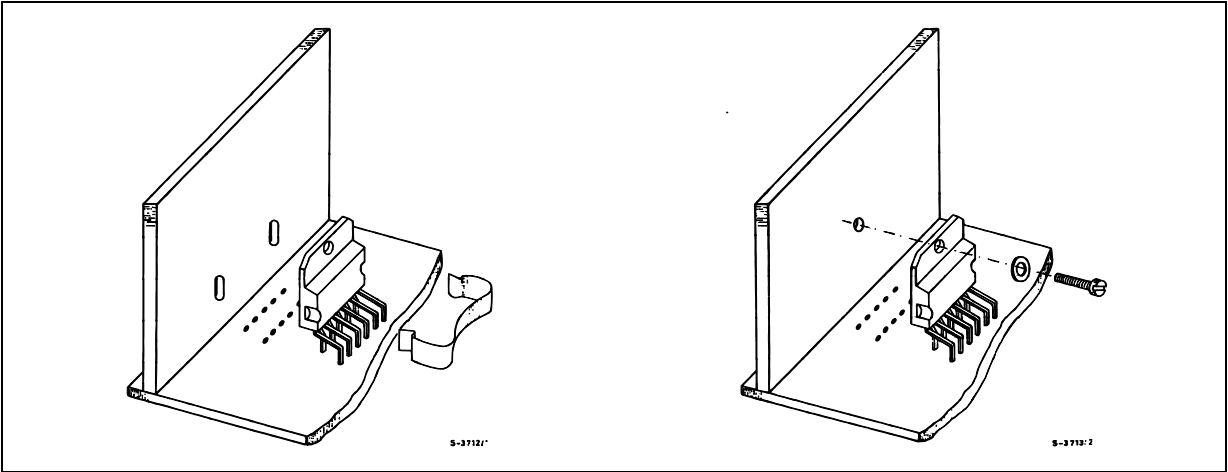
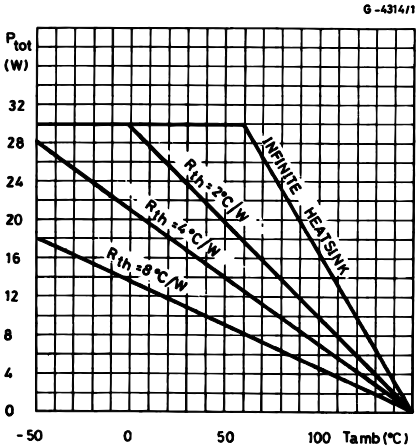
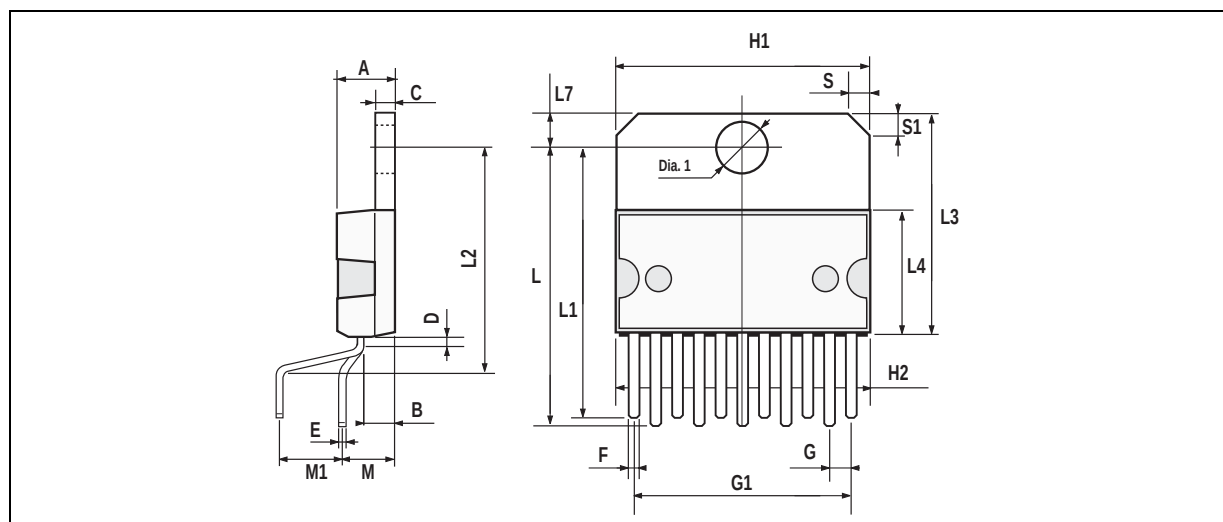


Figure 5 : Maximum Allowable Power Dissipation versus Ambient Temperature



PACKAGE MECHANICAL DATA

11 PINS - PLASTIC MULTIWATT



PMMUL11V/EP5

Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5			0.197
B			2.65			0.104
C			1.6			0.063
E	0.49		0.55	0.019		0.022
F	0.88		0.95	0.035		0.037
G	1.57	1.7	1.83	0.062	0.067	0.072
G1	16.87	17	17.13	0.664	0.669	0.674
H1	19.6			0.772		
H2			20.2			0.795
L	21.5		22.3	0.846		0.878
L1	21.4		22.2	0.843		0.874
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	4.1	4.3	4.5	0.161	0.169	0.177
M1	4.88	5.08	5.3	0.192	0.200	0.209
S	1.9		2.6	0.075		0.102
S1	1.9		2.6	0.075		0.102
Dia. 1	3.65		3.85	0.144		0.152

MUL11V/TBL

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