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Product Specification

XBLW TDA2050

32W Hi-Fi AUDIO POWER AMPLIFIER

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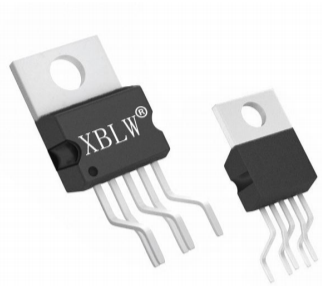
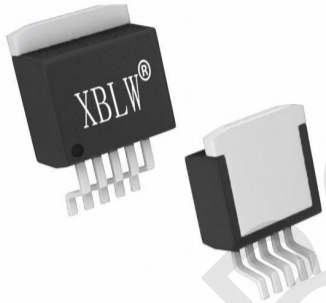
Descriptions

The TDA2050 is a monolithic integrated circuit with high power capability and is designed to use as an class AB audio amplifier.
It can deliver typically 50W music power into 4Ω load over 1 sec at VS=22.5V, f = 1KHz. The device is most suitable for both Hi-Fi and high class TV sets on the strength of its high supply voltage and very low harmonic and crossover distortion.



T0-220B-5



TO-263-5L

Features

- High Output Power(40W Music Power Iec 268.3 Rules)
- High Operating Supply Voltage (50V)
- Single Or Split Supply Operations
- Very Low Distortion
- Short Circuit Protection (Out To Gnd)
- Thermal Shutdown
- Available in T0-220B-5 package and TO263-5L package.

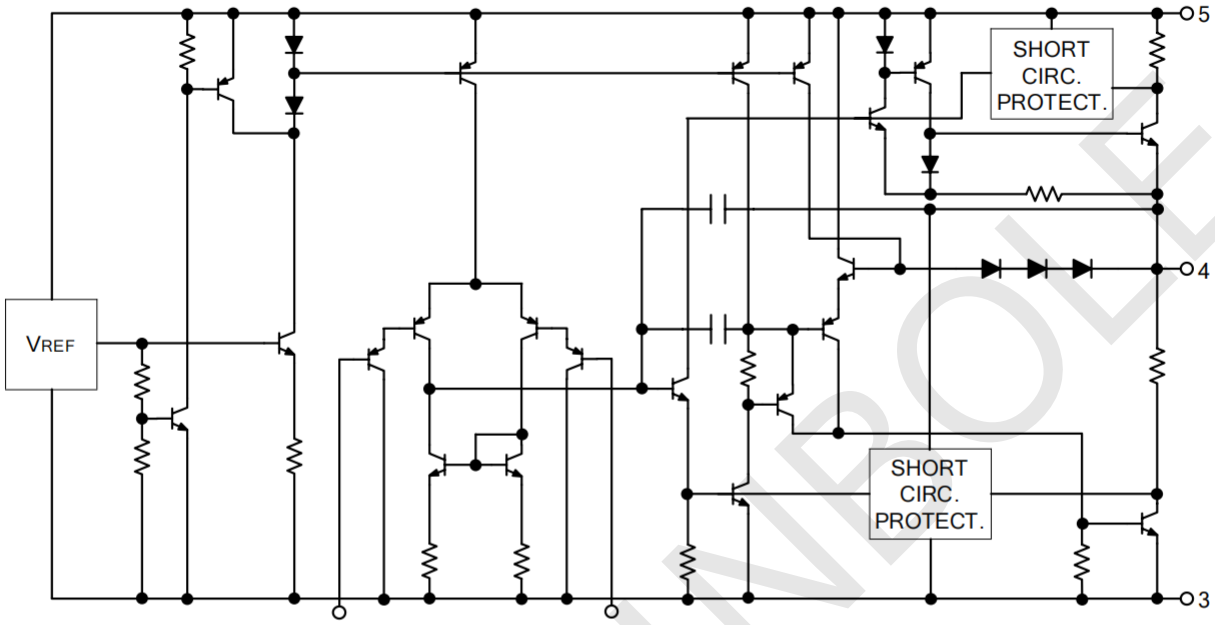
Applications

- Home audio system
- Public Address System
- Multimedia equipment
- Sound amplification equipment

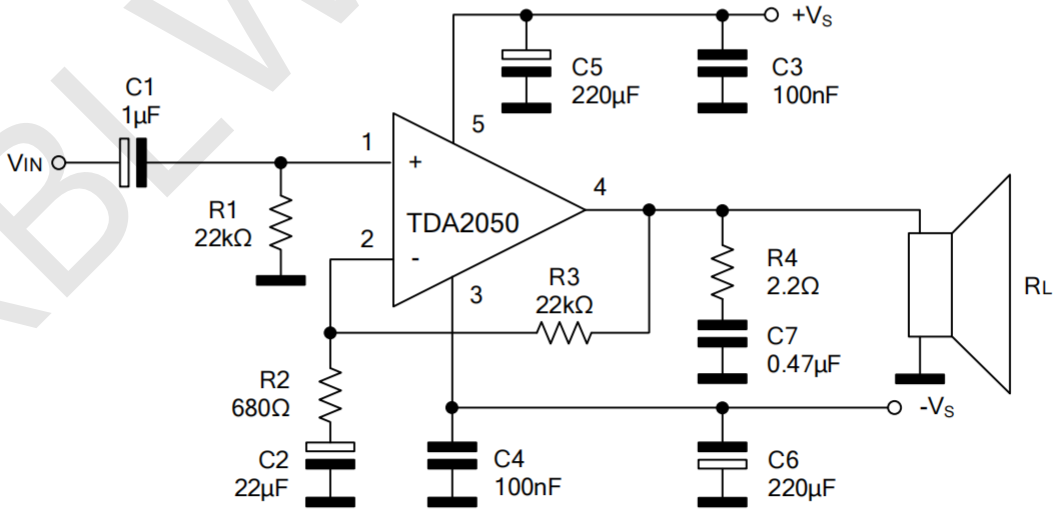
Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW TDA2050A	TO-220B-5	TDA2050A	Tube	1000Pcs/Box
XBLW TDA2050ADTR	TO-263-5L	TDA2050A	Tape	500Pcs/Reel

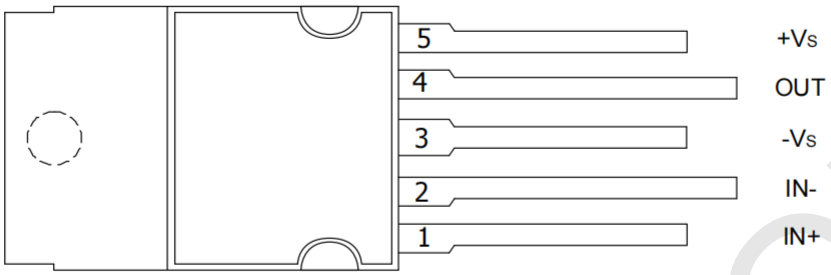
Schematic Diagram



Test And Application Circuit



Pin Configurations



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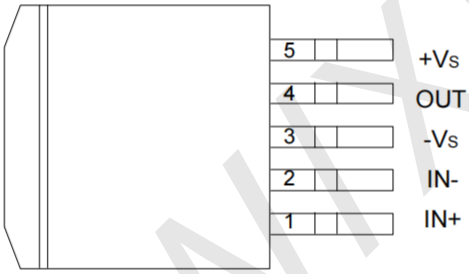


TO-263-5L

Pin Description

Pin No.	Pin Name	Function
1	IN+	Non inverting input
2	IN-	Inverting input
3	-Vs	Negative of power supply
4	OUT	Amplifier output
5	+Vs	Positive of power supply

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
VS	Supply Voltage	±25	V
Vi	Input Voltage	Vs	
Vi	Differential Input Voltage	15	V
IO	Output Peak Current (internally limited)	5	A
Ptot	Power Dissipation TCASE = 90°C	±25	W
Tstg, Tj	Storage and Junction Temperature	-40 to 150	℃
T_L	Lead Temperature (Soldering, 10 seconds)	245	℃

Thermal Data

Symbol	Description		Value	Unit
Rth j- case	Thermal Resistance junction-case	Max	3	°C/W
Toj	Operation Temperature		- 20 to +125	°C

Electrical Characteristics

(Refer to the Test Circuit, VS = ±18V, Tamb = 25°C, f= 1 kHz; un-less otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Supply Voltage		V_S			±4.5		±25	V
Quiescent Drain Current		I_D	V_S=±4.5V			26	50	mA
			V_S=±25V			45	90	
Input Bias Current		I_B	V_S=±22V			0.4	0.5	μA
Input Offset Voltage		$V_{IN(OS)}$	V_S=±22V				±15	mV
Input Offset Current		$I_{IN(OS)}$	V_S=±22V				±200	nA
RMS Output Power	D = 0.5%	P_O	R_L=4Ω		24	27		W
			R_L=8Ω			18		
			R_L=8Ω, V_S=±22V		22	25		
	D = 10%		R_L=4Ω			35		
			R_L=8Ω			22		
			R_L=8Ω, V_S=±22V			32		
Music Power IEC268.3 RULES			D=10%, T= 1s, V_S=±22.5V, R_L=4Ω			50		
Total Harmonic Distortion		THD	R_L=4Ω	f=1kHz, P_O=0.1~24W		0.03	0.5	%
				f =100Hz~10kHz,P_O=0.1~18 W			0.5	
			R_L=8Ω, V_S=±22V	f=1kHz, P_O=0.1~20W		0.02		
				f=100Hz~10kHz,P_O=0.1~15W			0.5	
Slew Rate		SR			5	8		V/μs
Open Loop Voltage Gain C		G_V				80		dB
losed Loop Voltage Gain P		G_V			30	30.5	31	dB
ower Bandwidth (-3dB)		B_W	R_L=4Ω, V_{IN}=200mV		20 ~ 80000			Hz
Total Input Noise		e_N	Curve A B=22Hz~22kHz			4 5	10	μV
Input Resistance (pin 1) S		R_{IN}			500			kΩ
upply Voltage Rejection		SVR	Rs=22K, f=100Hz, V_{RIPPLE}=0.5Vrms			45		dB
Efficiency		η	P_O=28W, R_L=4Ω			65		%
			P_O=25W, R_L=8Ω, V_S=±22V			67		

Typical Applications

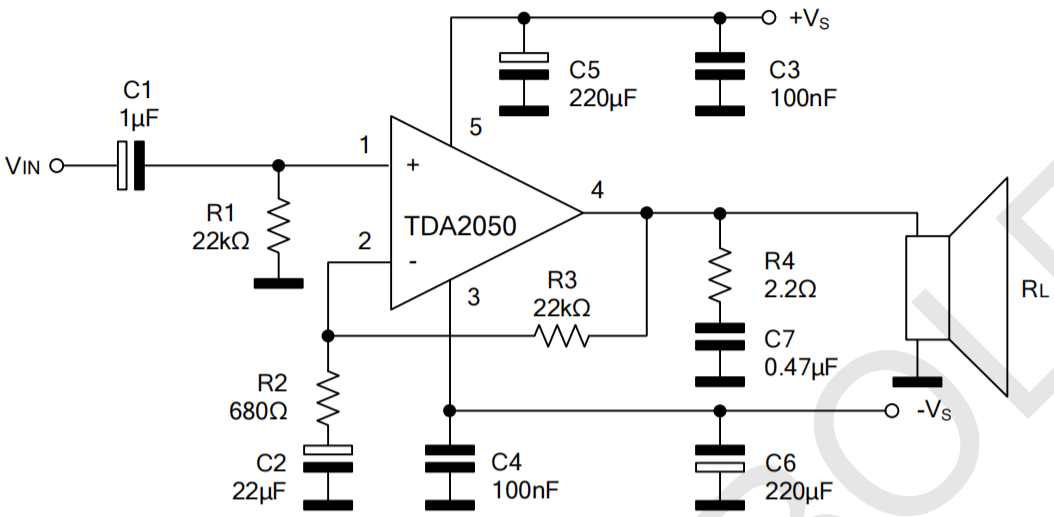


Figure 1: Split Supply Typical Application Circuit

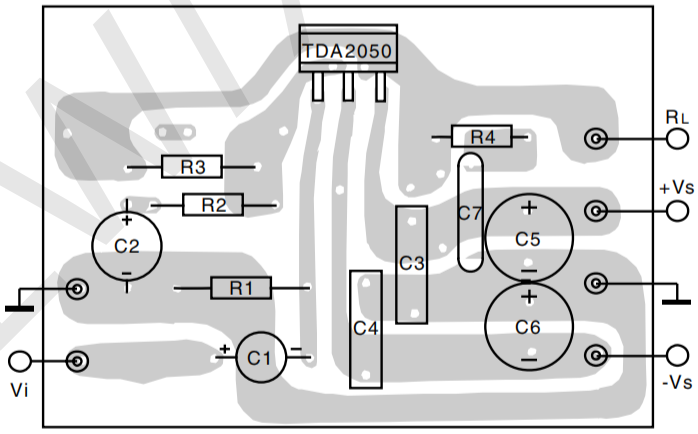


Figure 2: P.C. Board and ComponentsLayout of the Circuit of Fig. 1 (1:1)

Split Supply Application Suggestions

The recommended values of the external components are those shown on the application circuit of figure. 2. Different values can be used. The following table can help the designer.

Component	Recommended Value	Purpose	Larger than Recommended Value	Smaller than Recommended Value
R1	22kΩ	Input Impedance	Increase of Input Impedance	Decrease of Input Impedance
R2	680Ω	Feedback Resistor	Decrease of Gain (*)	Increase of Gain
R3	22kΩ		Increase of Gain	Decrease of Gain (*)
R4	2.2Ω	Frequency Stability	Danger of Oscillations	
C1	1μF	Input Decoupling DC		Higher Low-frequency cut-off
C2	22μF	Inverting Input DC Decoupling	Increase of Switch ON/OFF Noise	Higher Low-frequency cut-off
C3 C4	100nF	Supply Voltage Bypass		Danger of Oscillations
C5 C6	220μF	Supply Voltage Bypass		Danger of Oscillations
C7	0.47μF	Frequency Stability		Danger of Oscillations

(*) The gain must be higher than 24dB

Printed Circuit Board

The layout shown in figure. 2 should be adopted by the designers. If different layouts are used, the ground points of input 1 and input 2 must be well decoupled from the ground return of the output in which a high current flows.

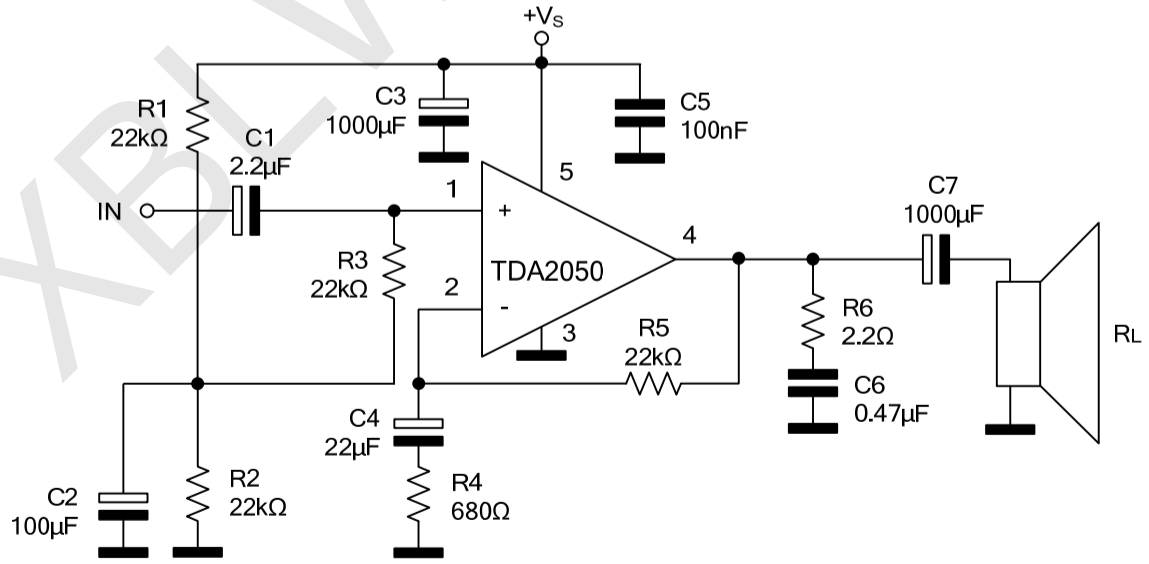


Figure 3 : Single Supply Typical Application Circuit

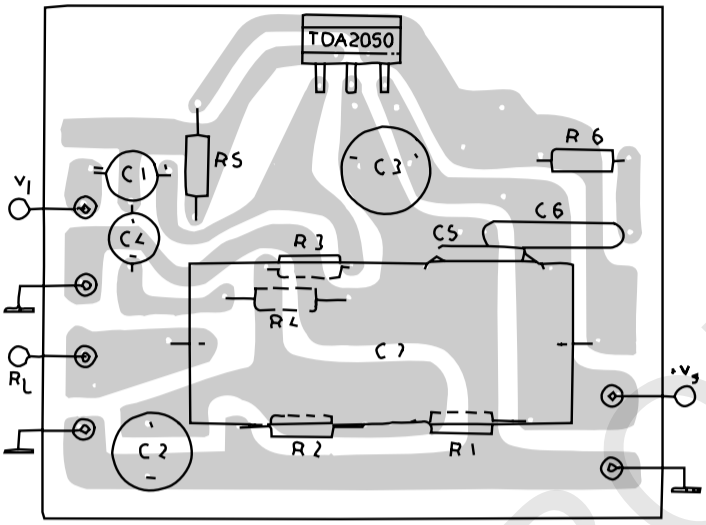


Figure 4: p.c. Board And Componentslayout Of The Circuit Of Fig. 3

Single Supply Application Suggestions

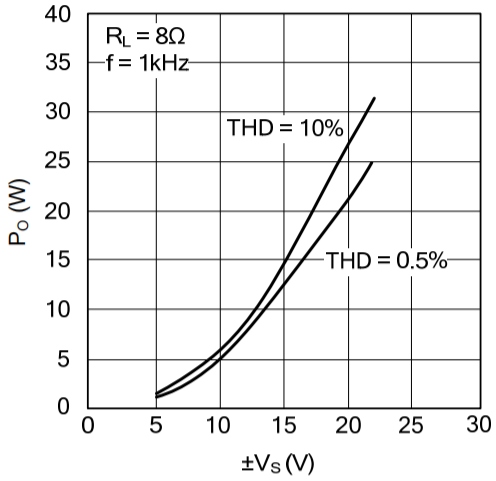
The recommended values of the external components are those shown on the application circuit of figure. 3. Different values can be used. The following table can help the designer.

Component	Recommended Value	Purpose	Larger than Recommended Value	Smaller than Recommended Value
R1,R2,R3	22KΩ	Biasing Resistor		
R5	22KΩ	Feedback Resistors	Increase of Gain	Decrease of Gain (*)
R4	680Ω		Decrease of Gain (*)	Increase of Gain
R6	2.2Ω	Frequency Stability	Danger of Oscillations	
C1	2.2μF	Non-Inverting Input Decoupling DC		Higher Low-frequency cut-off
C2	100μF	Supply Voltage Rejection	Worse Turn-off Transient Worse Turn-on Delay	
C3	1000μF	Supply Voltage Bypass		Danger of Oscillations Worse of Turn-off Transient
C4	22μF	Inverting Input DC Decoupling	Increase of Switching ON/OFF	Higher Low-frequency cut-off
C5	100nF	Supply Voltage Bypass		Danger of Oscillations
C6	0.47μF	Frequency Stability		Danger of Oscillations
C7	1000μF	Output DC Decoupling		Higher Low-frequency cut-off

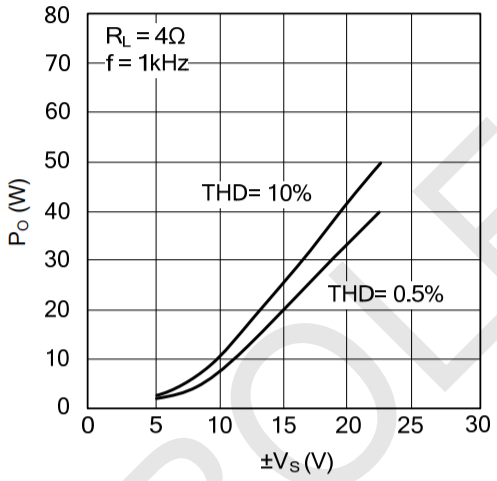
NOTE

If the supply voltage is lower than 40V and the load is 8ohm (or more) a lower value of C2 can be used (i.e. 22μF).
C7 can be larger than 1000uF only if the supply voltage does not exceed 40V.

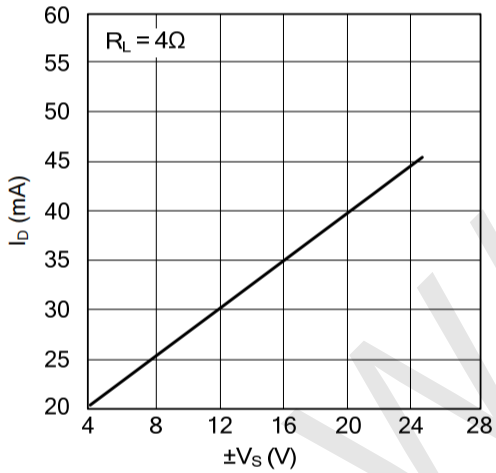
Typical Characteristics



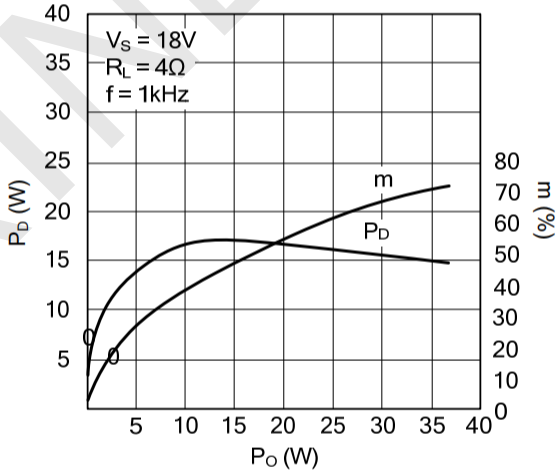
Output Power vs. Supply Voltage



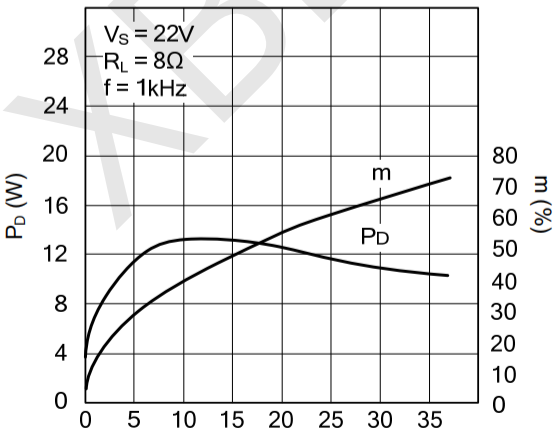
Output Power vs. Supply Voltage



Quiescent Current vs. Supply Voltage



Total Power Dissipation and Efficiency vs Output Power

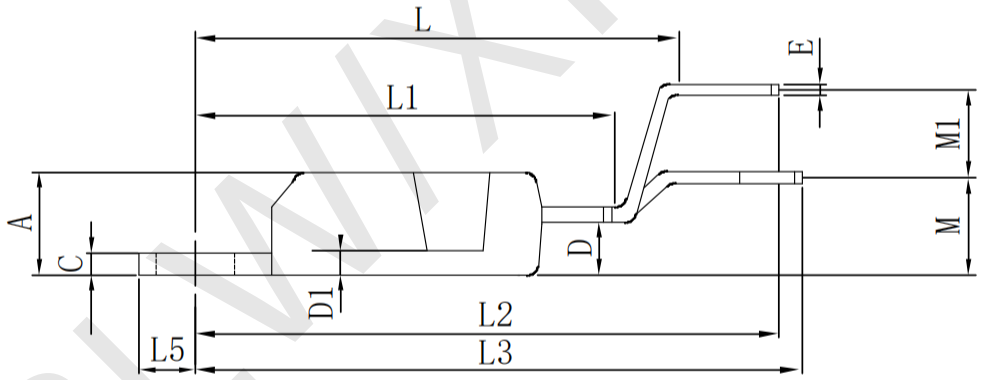


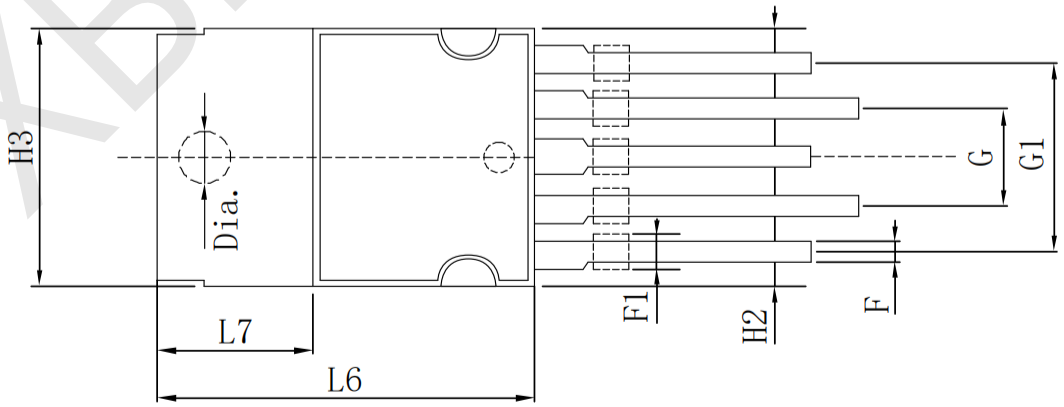
Total Power Dissipation and Efficiency vs Output Power

Package Information

· TO-220B-5

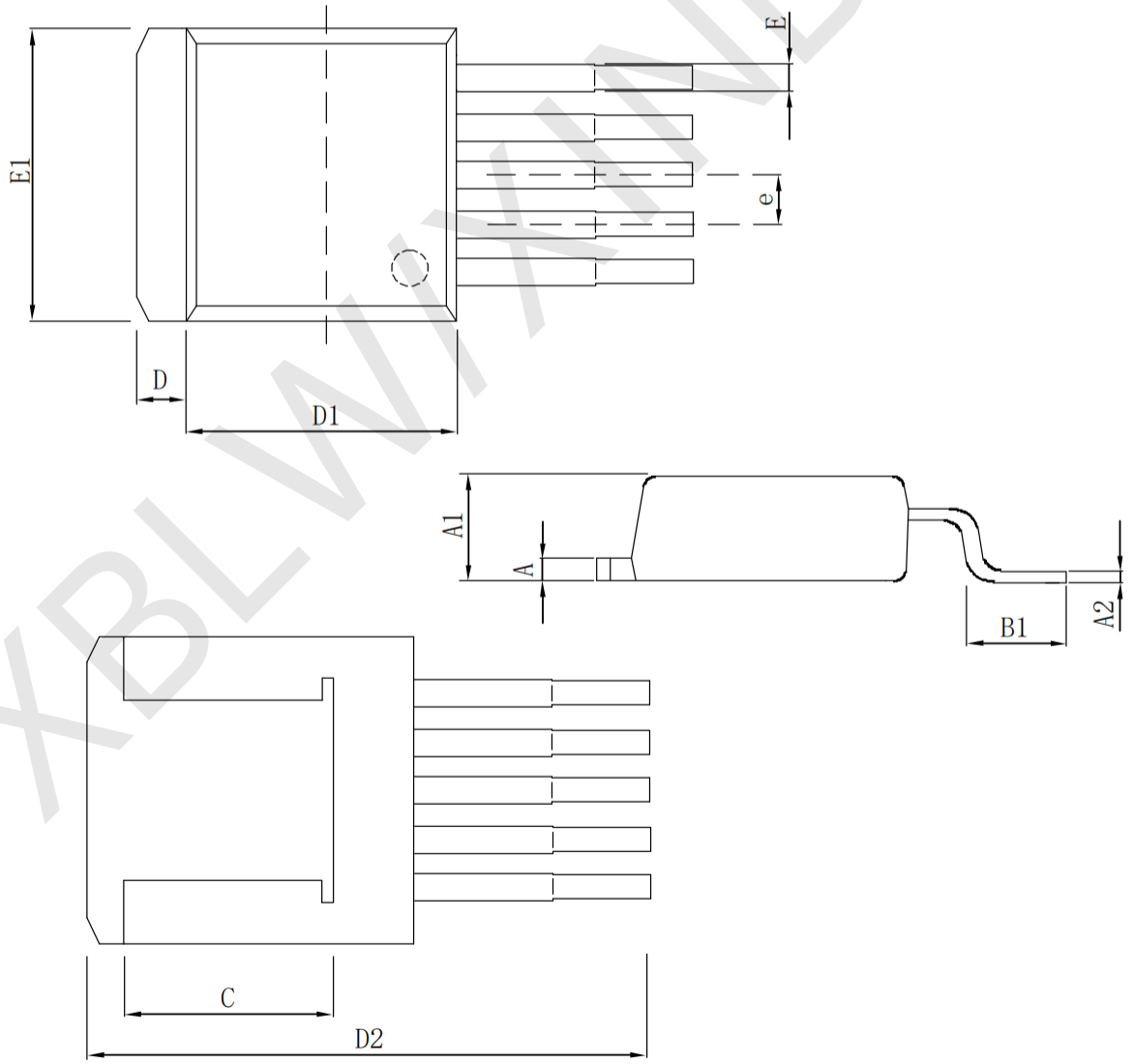
Size / Symbol	Dimensions In Millimeters		Size / Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A		4.800	A		0.189
C		1.370	C		0.054
D	2.400	2.800	D	0.094	0.110
D1	1.200	1.350	D1	0.047	0.053
E	0.350	0.550	E	0.014	0.022
F	0.800	1.050	F	0.031	0.041
F1	1.000	1.400	F1	0.039	0.055
G	3.400		G	0.126	0.142
G1	6.800		G1	0.260	0.276
H2		10.40	H2		0.409
H3	10.05	10.40	H3	0.396	0.409
L	17.85		L	0.703	
L1	15.75		L1	0.620	
L2	21.40		L2	0.843	
L3	22.50		L3	0.886	
L5	2.600	3.000	L5	0.102	0.118
L6	15.10	15.80	L6	0.594	0.622
L7	6.000	6.600	L7	0.236	0.260
M	4.500		M	0.177	
M1	4.000		M1	0.157	
Dia	3.650	3.850	Dia	0.144	0.152





· TO-263-5L

Size / Symbol	Dimensions In Millimeters		Size / Symbol	Dimensions In Inches	
	Min(mm)	Max(mm)		Min(in)	Max(in)
A	1.170	1.370	A	0.046	0.054
A1	4.470	4.670	A1	0.176	0.184
A2	0.310	0.530	A2	0.012	0.021
B1	2.340	2.740	B1	0.092	0.108
C	5.080(REF)		C	0.200(REF)	
D	1.170	1.370	D	0.046	0.054
D1	8.500	8.900	D1	0.335	0.350
D2	14.55	15.55	D2	0.572	0.612
E	0.660	0.860	E	0.025	0.034
E1	10.01	10.31	E1	0.394	0.406
e	1.700(BSC)		e	0.067(BSC)	



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