35W 5A 60V High Voltage High Power Audio Power Amplifier XL2050A

Features

- Operation Voltage：16V~60V
- Max. Output current capability up to 5A
- Max. Output power up to 35W
- Built in output over power protection
- Built in output short protection function
- Built in output overvoltage protection
- Built in current limit protection function
- Built in thermal shutdown function
- Low quiescent current：30mA
- Low Distortion：0.015%，1KHz，20W
- Open loop gain up to 90dB
- 94dB Ripple Rejection
- Available in TO220B-5L package

Applications

- Car Audio Amplifiers
- Stage Sound
- Multimedia Speakers
- Open Mobile Sound System

General Description

XL2050A is a mono Class AB audio power amplifier optimized for high voltage, high power and high efficiency. XL2050A has low quiescent current and minimizing system power consumption. XL2050A has excellent audio performance and achieved extremely low distortion levels even at 35W power levels.

The XL2050A built-in over power protection, current limit protection, output overvoltage protection, output short protection, and thermal shutdown protection， which greatly improves the reliability and stability of the chip. The XL2050A achieves 20W@THD=0.015% of output power at an input voltage of ±25V and a load impedance of 4Ω or 8Ω, and 35W@THD=1% at an input voltage of ±30V and a load impedance of 4Ω or 8Ω. The highly integrated solution can reduce the printed circuit board space while minimizing external components.

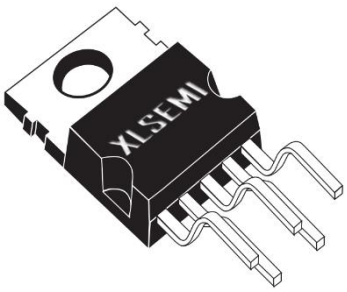


Figure1. Package Type of XL2050A

Pin Configurations

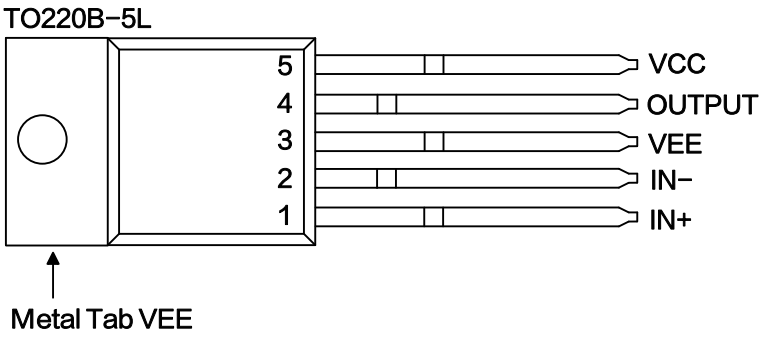


Figure2. Pin Configuration of XL2050A

Table 1 Pin Description

Pin Number	Pin Name	Description
1	IN+	Isotropic terminal, audio signal input.
2	IN−	Reverse terminal, negative feedback input.
3	VEE	Ground/negative power supply side.
4	OUTPUT	Power amplifier output.
5	VCC	Positive power supply side.

Function Block

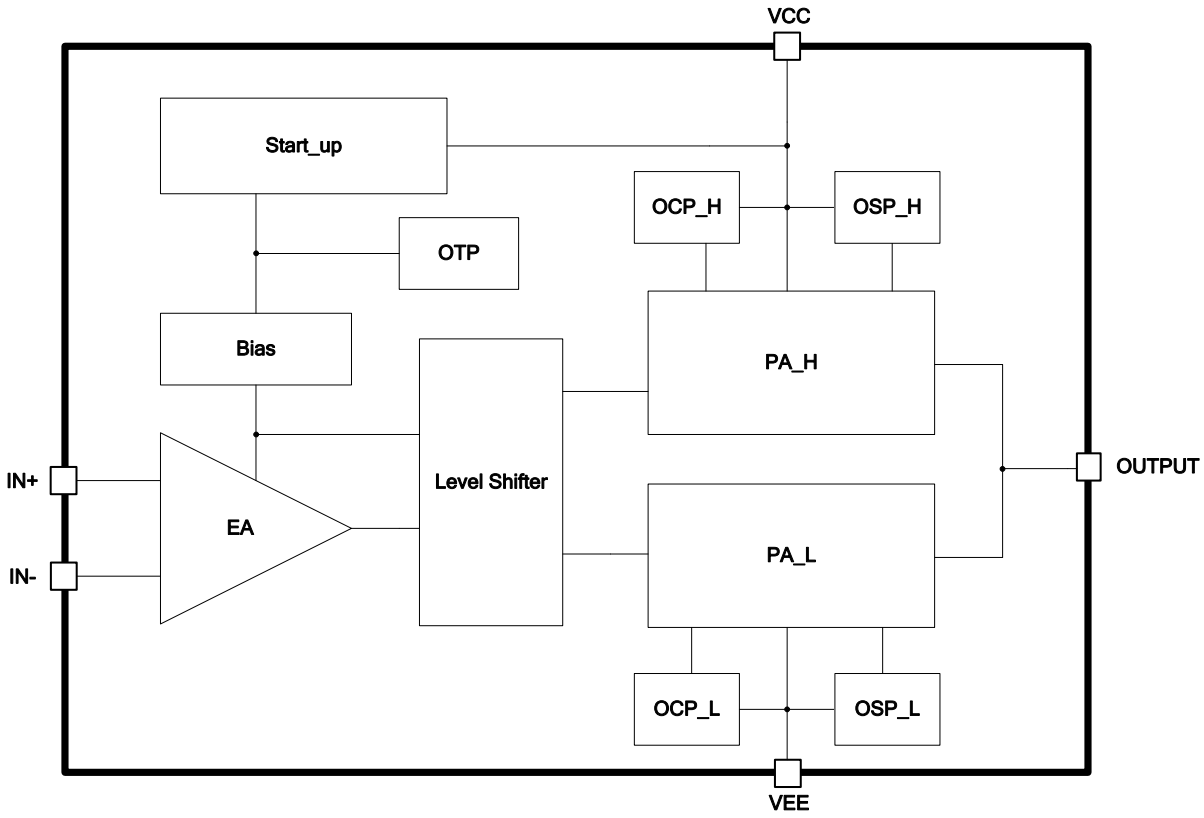
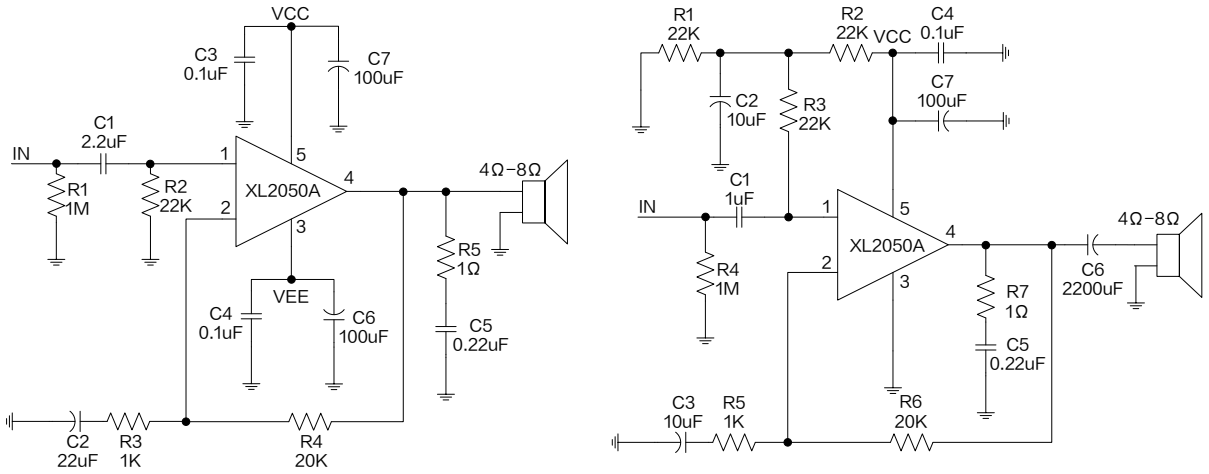


Figure3. Function Block Diagram of XL2050A

Typical Application Circuit



(Dual Supply) (Single Supply)

Figure 4. XL2050A Typical Application Circuit

Ordering Information

Order Information	Marking ID	Package Type	Eco Plan	Packing Type Supplied As
XL2050A	XL2050A	TO220B-5L	RoHS & HF	50 Units Per Tube/ 1000Units Per Box

Absolute Maximum Ratings（Note1）

Parameter	Symbol	Value	Unit
Supply Voltage (Single Supply)	V_{CC}	80	V
Supply Voltage (Dual Supply)	V_S	±40	V
Input Signal Voltage	V_{IN}	V_{EE}~V_{CC}	V
Thermal Resistance (TO220B-5L) (Junction to Ambient, No Heatsink, Free Air)	R_{JA}	73	℃/W
Thermal Resistance (TO220B-5L) (Junction to Case)	R_{JC}	3	℃/W
Power Dissipation (T_C=75℃) (Note 2)	P_D	22	W
Operating Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-65~150	℃
Lead Temperature (Soldering, 10 sec)	T_{LEAD}	260	℃

Note1: Stresses greater than those listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Note2: For operation at case temperatures above 25℃, derating is performed based on a maximum junction temperature of 75℃ and a thermal resistance of R_{JC}=3.0℃/W (junction to case).

XL2050A Electrical Characteristics

T_A = 25℃, V_{CC}=25V, V_{EE}=−25V, R_L=8Ω, A_V=21 (26dB), f_0=1KHz; system parameters test circuit figure4, unless otherwise specified.

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Supply Voltage (Single Supply)	V_{CC}	–	16	–	60	V
Supply Voltage (Dual Supply)	V_S	–	±8	–	±30	V
Quiescent Supply Current	I_Q	P_O=0W	–	30	–	mA
Output Power (Note3)	P_O	THD=1%	–	35	–	W
Total Harmonic Distortion	THD	P_O=20W,f_0=1KHz	–	0.015	0.4	%
		P_O=20W,f_0=20KHz	–	0.05	0.4	%
Offset Voltage	V_{OS}	–	–	±3	±15	mV
Input Bias Current	I_B	–	–	±0.2	±2	uA
Input Offset Current	I_{OS}	–	–	0	±0.5	uA
Gain−Bandwidth Product	GBW	–	–	5.5	–	MHz
Open Loop Gain	A_{VO}	DC	–	90	–	dB
Power Supply Rejection Ratio	PSRR	V_{CC}, 1KHz,1Vrms	52	95	–	dB
		V_{EE}, 1KHz,1Vrms	52	83	–	dB
Max Slew Rate	SR	P_O=20W 70KHz BW	–	8	–	V/us
Current Limit	I_L	V_{OUT}=V_S−10V	–	–	5	A
Equivalent Input Noise Voltage	V_N	R_S=600Ω, CCIR	–	3	–	uV rms
Thermal Shutdown Temperature	T_{SD}	–	–	150	–	℃
Thermal Shutdown Hysteresis	T_D	–	–	40	–	℃

Note3: Assumes the use of a heat sink having a thermal resistance of 1℃/W and no insulator with an ambient temperature of 25℃. Because the output limiting circuitry has a negative temperature coefficient, the maximum output power delivered to a 4Ω load may be slightly reduced when the tab temperature exceeds 55℃.

Typical Performance Characteristics

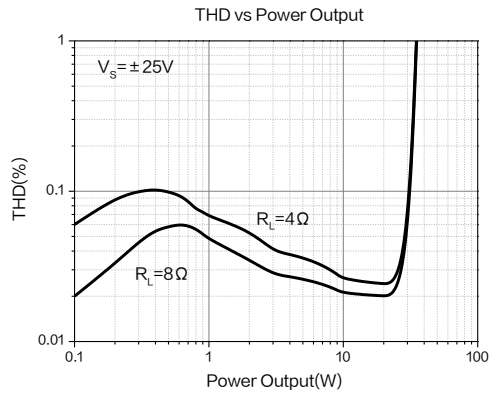


Figure 5.THD vs Power Output

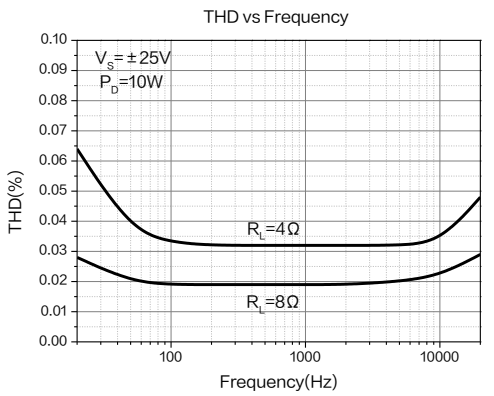


Figure 6.THD vs Frequency

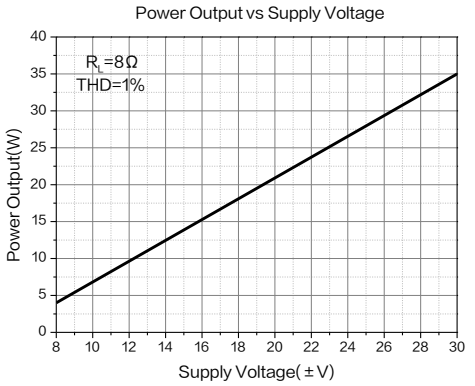


Figure 7.Power Output vs Supply Voltage

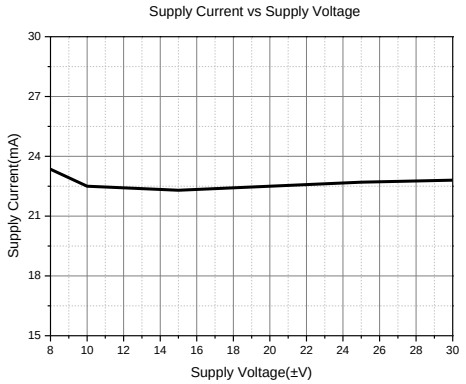


Figure 8.Quiescent Current

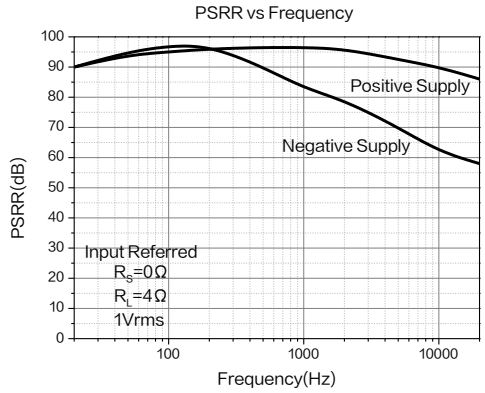


Figure 9.PSRR vs Frequency

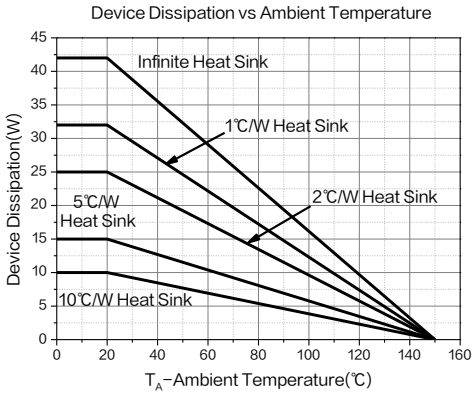


Figure 10.Device Dissipation vs Ambient Temperature

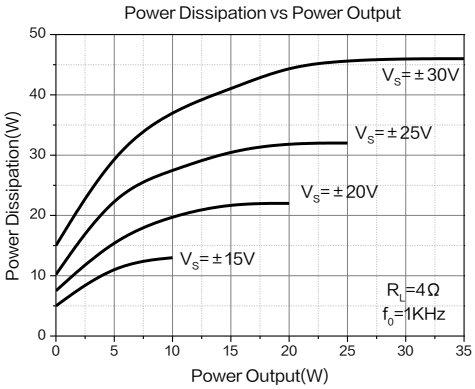


Figure 11.Power Dissipation vs Power Output (4Ω)

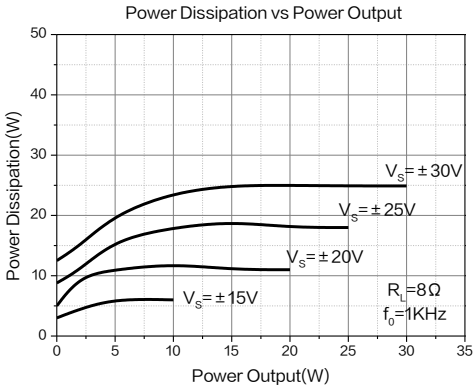
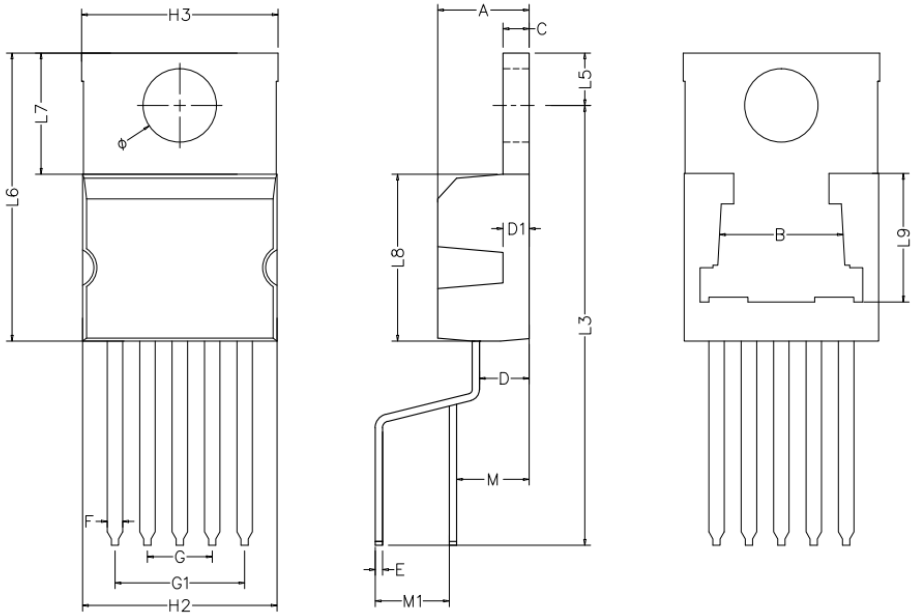


Figure 12. Power Dissipation vs Power Output (8Ω)

Package Information

TO220B-5L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.20	–	4.80	0.165	–	0.189
B	6.50	–	–	0.255	–	–
C	1.20	–	1.37	0.047	–	0.054
D	2.40	–	2.80	0.094	–	0.110
D1	1.20	–	1.35	0.047	–	0.053
E	0.35	0.38	0.55	0.013	0.015	0.022
F	0.75	0.80	0.85	0.029	0.031	0.033
G	3.20	3.40	3.60	0.126	0.134	0.142
G1	6.60	6.80	7.00	0.260	0.268	0.276
H2	9.80	–	10.20	0.385	–	0.402
H3	10.05	–	10.40	0.395	–	0.409
L3	22.50	–	23.50	0.885	–	0.925
L5	2.60	–	3.00	0.102	–	0.118
L6	15.10	–	15.80	0.594	–	0.622
L7	5.60	–	6.20	0.220	–	0.244
L8	9.20	–	9.40	0.362	–	0.370
L9	6.50	–	–	0.256	–	–
M	3.05	3.30	3.55	0.120	0.130	0.140
M1	3.40	3.90	4.40	0.133	0.153	0.173
ϕ	3.80	–	3.90	0.149	–	0.154

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