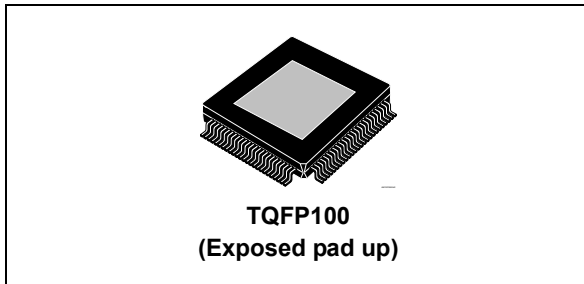


4 x 50 W PWM digital input power amplifier with built-in diagnostics features and low voltage operation

Data brief - production data



Features

- Integrated 108 dB D/A conversion
- I²S and TDM digital input (3.3/1.8 V)
- Input sampling frequency: 44.1 kHz, 48 kHz, 96 kHz, 192 kHz
- MOSFET power outputs
- EMI control for FM/AM compatibility
- EMI compliance at the CEI EN 55025 (2009-10)
- Dithering possibility
- Very low external component count filter
- Output lowpass filter included in the feedback
- Low radiation function (LRF)
- Max. output power
 - 4 x 50 W/4 Ω @ 15.2 V, 1 kHz
- High output power capability
 - 28 W/4 Ω 10 % THD, V_d = 14.4 V
- Full I²C bus driving (3.3/1.8 V):
 - Independent front/rear soft play/ mute
 - I²C bus diagnostics (including DC and AC load detection, test signal internally generated)
- Very flexible fault detection though integrated diagnostic
- Offset detector (play or mute mode)
- Four independent short circuit protection
- Clipping detector

- C-MOS compatible enable pin (3.3/5 V)
- ESD protection
- 6 V operation (“Start - Stop”)

Description

The FDA450LV is a new BCD- SOI (silicon on insulation) technology QUAD BRIDGE class D amplifier, specially intended for car radio applications.

Thanks to the technology used, it is possible to integrate a high performance D/A converter together with powerful MOSFET outputs in class D, to get an outstanding efficiency compared with the standard class AB.

The integrated D/A converter allows to reach outstanding performances (110 dB S/N ratio with 108 dB of dynamic range). The feedback loop includes the output L-C low-pass filter, allowing superior frequency response linearity and lower distortion independently of the inductor and capacitor quality.

FDA450LV is fully configurable through I²C bus interface and integrates a full diagnostics array specially intended for automotive applications.

Thanks to the solutions implemented to solve the EMI problems, the device is conceived to be used in the standard single DIN car-radio box together with the tuner.

The possibility to parallelize the outputs allows to drive both 2 Ω and 1 Ω speakers.

Moreover FDA450LV is able to work with power supply as low as 6 V, thus supporting the most recent low voltage ('start-stop') car-makers specification.

Table 1. Device summary

Order code	Package	Packing
FDA450LV	TQFP100 (exp. pad up)	Tray

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1 Block diagram and pins description

Figure 1. Block diagram

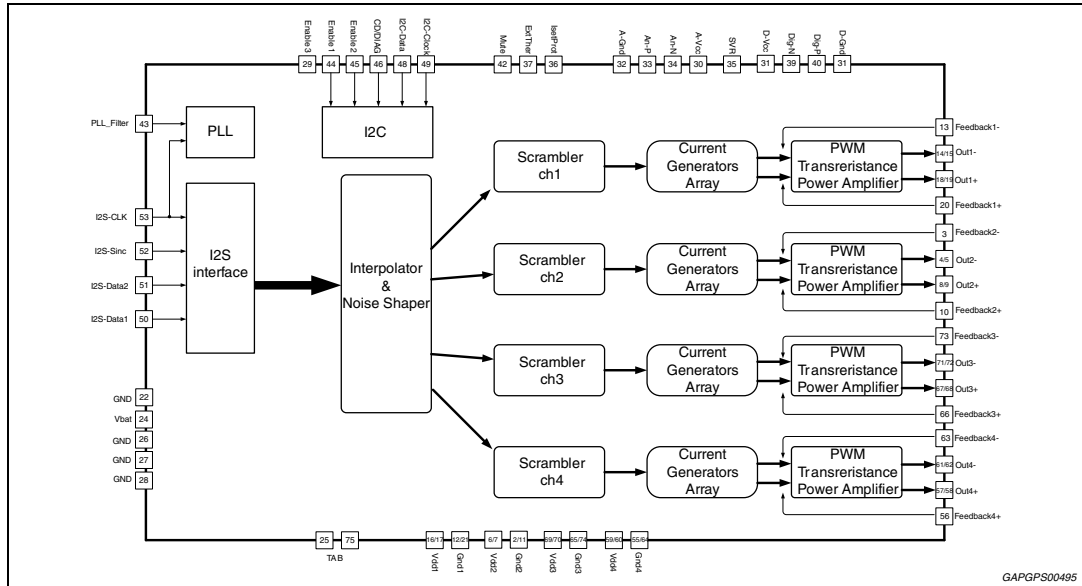


Figure 2. Pins connection diagram (top view)

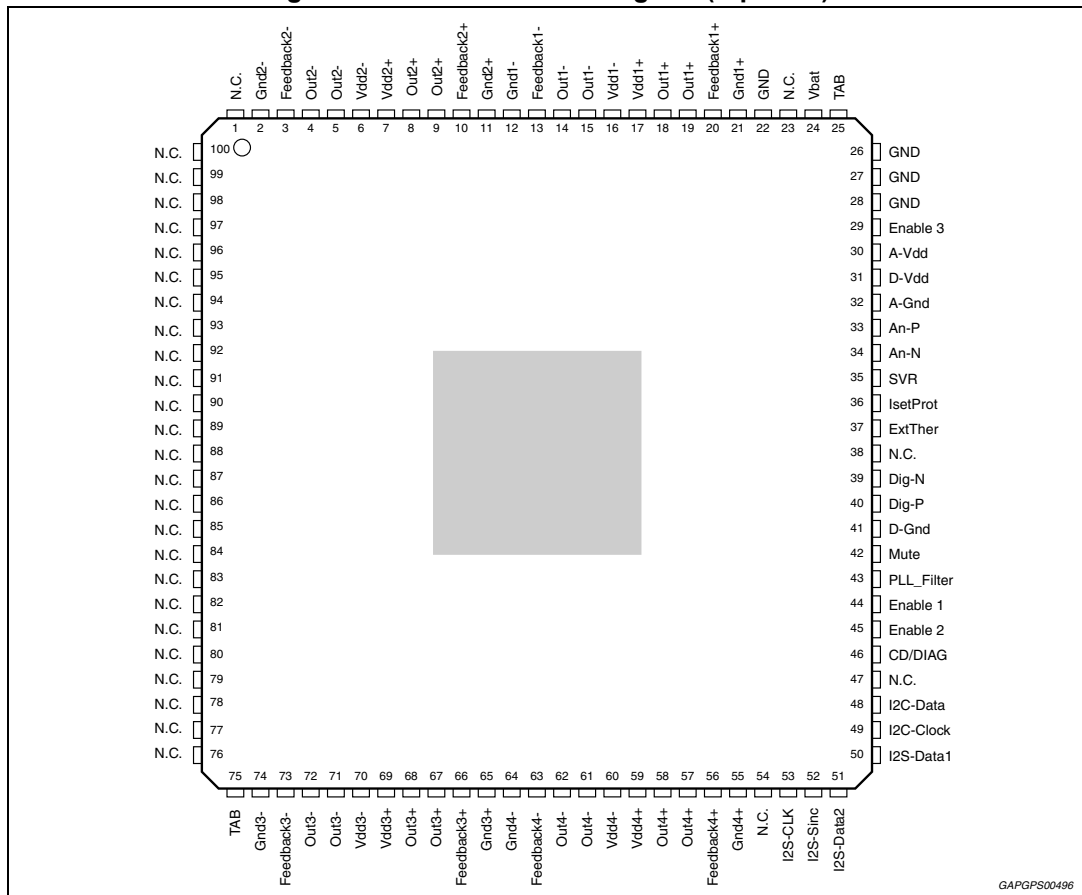


Table 2. Pins list description

N#	Pin	Function
1	N.C.	Not connected
2	Gnd2-	Channel 2, half bridge a Power Ground
3	Feedback2-	Channel 2 half bridge a Feedback
4	Out2-	Channel 2 half bridge a Output
5	Out2-	Channel 2 half bridge a Output
6	Vdd2-	Channel 2 half bridge a Power Supply
7	Vdd2+	Channel 2 half bridge b Power Supply
8	Out2+	Channel 2 half bridge b Output
9	Out2+	Channel 2 half bridge b Output
10	Feedback2+	Channel 2 half bridge b Feedback
11	Gnd2+	Channel 2, half bridge b Power Ground
12	Gnd1-	Channel 1, half bridge a Power Ground
13	Feedback1-	Channel 1 half bridge a Feedback
14	Out1-	Channel 1 half bridge a Output
15	Out1-	Channel 1 half bridge a Output
16	Vdd1-	Channel 1 half bridge a Power Supply
17	Vdd1+	Channel 1 half bridge b Power Supply
18	Out1+	Channel 1 half bridge b Output
19	Out1+	Channel 1 half bridge b Output
20	Feedback1+	Channel 1 half bridge b Feedback
21	Gnd1+	Channel 1, half bridge b Power Ground
22	Gnd	Ground
23	N.C.	Not connected
24	Vbat	Power supply
25	TAB	-
26	GND	Ground
27	GND	Ground
28	GND	Ground
29	Enable 3	Chip Enable 3
30	A-Vdd	Analog Power Supply
31	D-Vdd	Digital Power Supply
32	A-Gnd	Analog Ground
33	An-P	Positive Analog Supply V(svr)+1.65 (Internally generated)
34	An-N	Negative Analog Supply V(svr)-1.65 (Internally generated)
35	SVR	Supply Voltage Ripple Rejection Capacitor
36	IsetProt	Current Protection Resistor Setting
37	ExtTher	External Thermal Protection Input
38	N.C.	Not connected
39	Dig-N	Negative Digital Supply V(svr)-1.65 (Internally generated)

Table 2. Pins list description (continued)

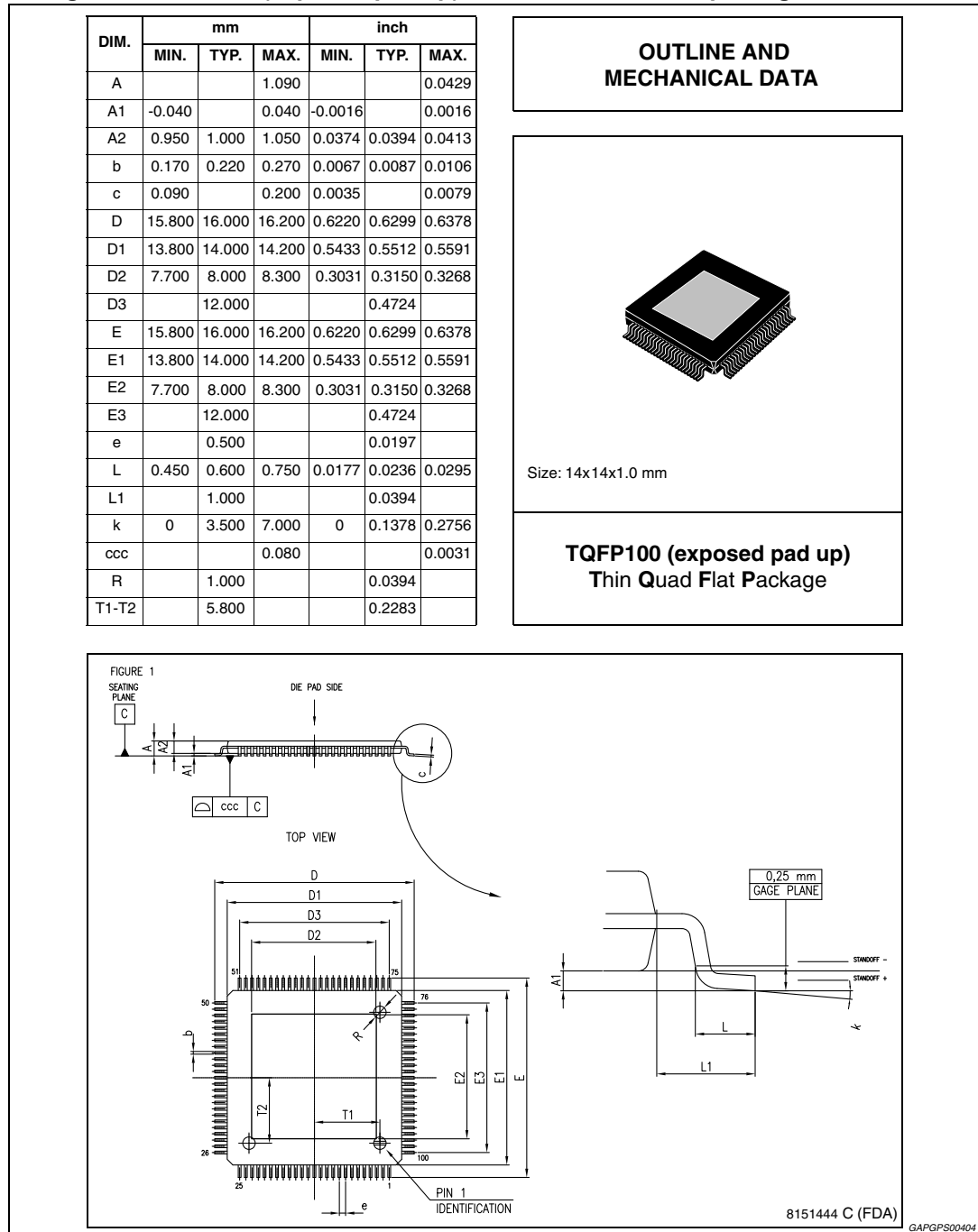
N#	Pin	Function
40	Dig-P	Positive Digital Supply V(svr)+1.65 (Internally generated)
41	D-Gnd	Digital Ground
42	Mute	Mute Input (10uA source current)
43	PLL_Filter	PLL Filter Network
44	Enable 1	Chip Enable 1
45	Enable 2	Chip Enable 2
46	CD/DIAG	Clip detector and diagnostic output: Overcurrent protection intervention Thermal warning Offset detection
47	N.C.	Not connected
48	I2C-Data	I2C Data Input
49	I2C-Clock	I2C Data Clock
50	I2S-Data1	I2S/TDM Data 1 Input
51	I2S Data 2	I2S/TDM Data 2 Input
52	I2S-Sinc	I2S/TDM Sinc Input
53	I2S-CLK	I2S/TDM Clock Input
54	N.C.	Not connected
55	Gnd4+	Channel 4, half bridge + Power Ground
56	Feedback4+	Channel 4 half bridge + Feedback
57	Out4+	Channel 4 half bridge + Output
58	Out4+	Channel 4 half bridge + Output
59	Vdd4+	Channel 4 half bridge + Power Supply
60	Vdd4-	Channel 4 half bridge - Power Supply
61	Out4-	Channel 4 half bridge - Output
62	Out4-	Channel 4 half bridge - Output
63	Feedback4-	Channel 4 half bridge - Feedback
64	Gnd4-	Channel 4, half bridge - Power Ground
65	Gnd3+	Channel 3, half bridge + Power Ground
66	Feedback3+	Channel 3 half bridge + Feedback
67	Out3+	Channel 3 half bridge + Output
68	Out3+	Channel 3 half bridge + Output
69	Vdd3+	Channel 3 half bridge + Power Supply
70	Vdd3-	Channel 3 half bridge - Power Supply
71	Ou3-	Channel 3 half bridge - Output
72	Out3-	Channel 3 half bridge - Output
73	Feedback3-	Channel 3 half bridge - Feedback
74	Gnd3-	Channel 3, half bridge - Power Ground
75	TAB	-
76 to 100	N.C.	Not connected

2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK[®] packages, depending on their level of environmental compliance. ECOPACK[®] specifications, grade definitions and product status are available at: www.st.com.

ECOPACK[®] is an ST trademark.

Figure 3. TQFP100 (exposed pad up) mechanical data and package dimensions



3 Revision history

Table 3. Document revision history

Date	Revision	Changes
18-Jul-2013	1	Initial release.
18-Sep-2013	2	Updated Disclaimer.

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