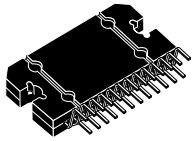
TDA7451

4x7W OR 2x22W CAR RADIO POWER AMPLIFIER PLUS TRIPLE POWER SUPPLY

PRELIMINARY DATA

- HIGH OUTPUT POWER CAPABILITY:
  4 x 9.5W OR 2 x 32W/4Ω MAX
  4 x 8.5W OR 2 x 28W/4Ω EIAJ
  4 x 7W OR 2 x 22W/4Ω @14.4V, 1KHz; 10%
- MINIMIZED EXTERNAL COUNT
  - NO NEED OF DECOUPLING CAPACITORS
  - NO NEED OF BOOTSTRAP CAPACITOR
  - NO NEED OF EXTERNAL COMPENSATION
  - INTERNALLY FIXED GAIN (20dB)
- POP-FREE AUDIO SECTION
- ST-BY FUNCTION (C-MOS)
- MUTE FUNCTION (C-MOS)
- CLIP DETECTOR, THERMAL WARNING, SHORT CIRCUIT DETECTION
- BUILT-IN VOLTAGE REGULATORS:
  - 5V @ 150mA WITH RESET
  - 5V @ 500mA WITH ST-BY
  - 8.5V @ 200mA WITH ST-BY
- REGULATORS DIAGNOSTIC FEATURE: UNDERVOLTAGE, 8.5V DROP SENSE, SHORT CIRCUIT, LOAD DUMP, OVER-TEMPERATURE



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ORDERING NUMBER: TDA7451

PROTECTIONS

General:

- LOAD DUMP
- OVERRATING CHIP TEMPERATURE

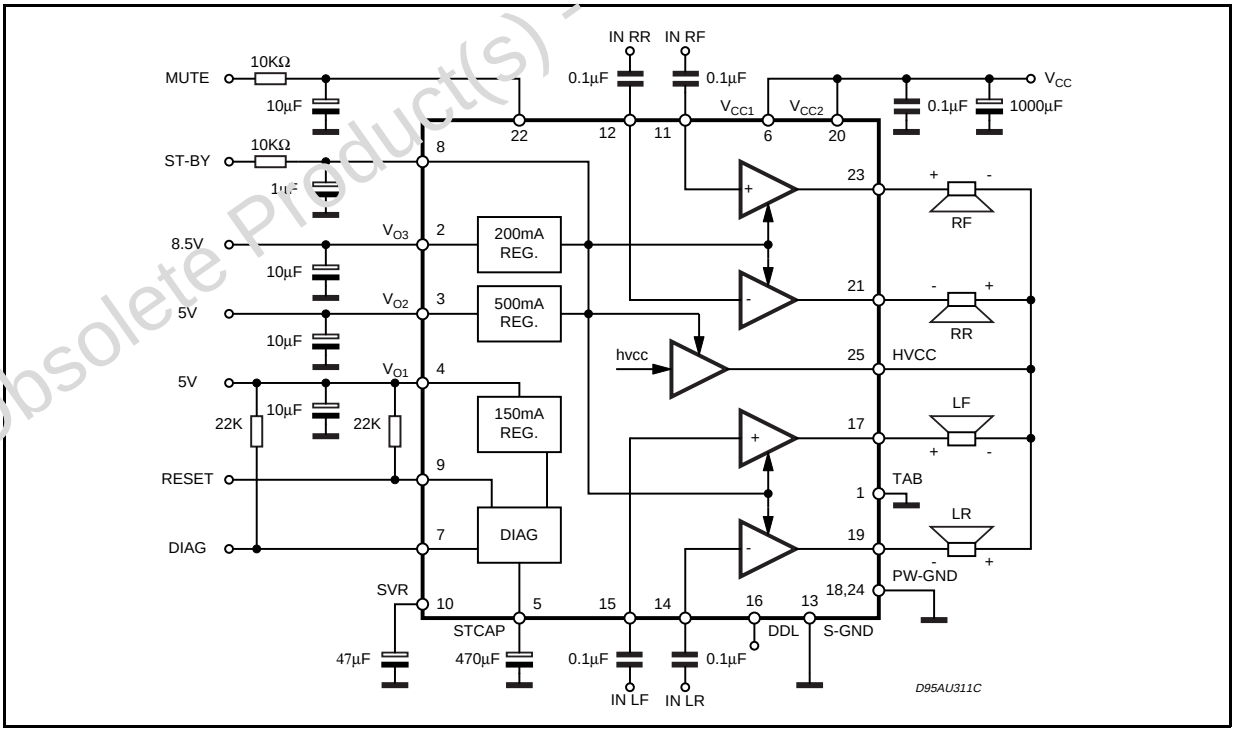
Audio Section:

- OUT SHORT (TO GND, TO Vs AND ACROSS THE LOAD)

Power Supply Section:

- SHORT CIRCUIT PROTECTION (OUT TO GND)

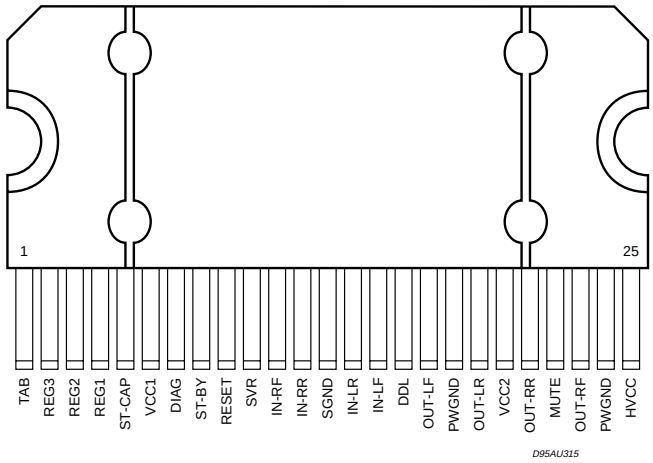
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	Operating Supply Voltage	18	V
V_S	DC Supply Voltage	28	V
V_S	Peak Supply Voltage (t = 50ms)	40	V
I_o	Audio Output Peak Current (non repetitive t = 100µs)	4	A
	Audio Output Peak Current (repetitive f > 10Hz)	3	A
I_o	Voltage Regulators Output Current	internally limited	
P_{tot}	Power Dissipation at T_{case} = 85°C	55	W
T_{stg}, T_j	Storage and Junction Temperature Range	-40 to 150	°C
V_{out}	Output Voltages (DIAG, RESET)	7	V
V_{in}	Input Voltages (ST-BY, MUTE)	18	V
RESR	Output capacitor series resistance	0.2 to 10	Ω

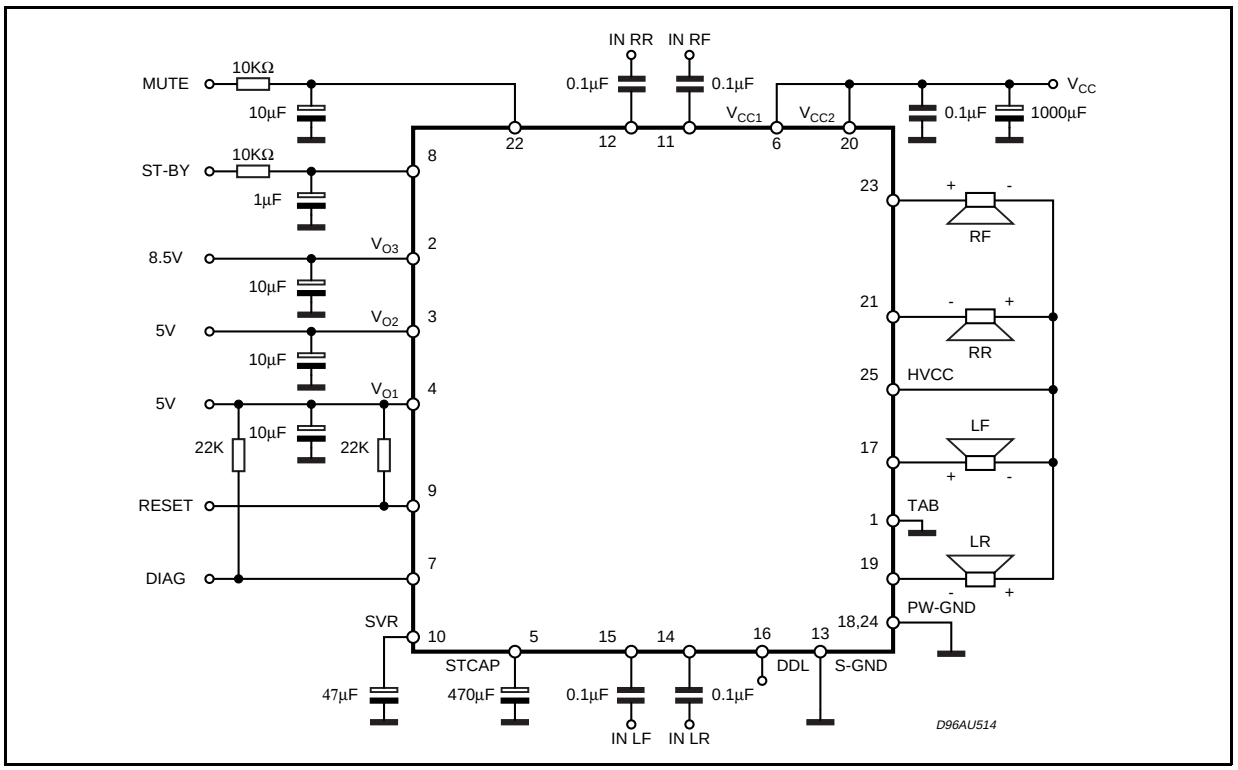
PIN CONNECTION



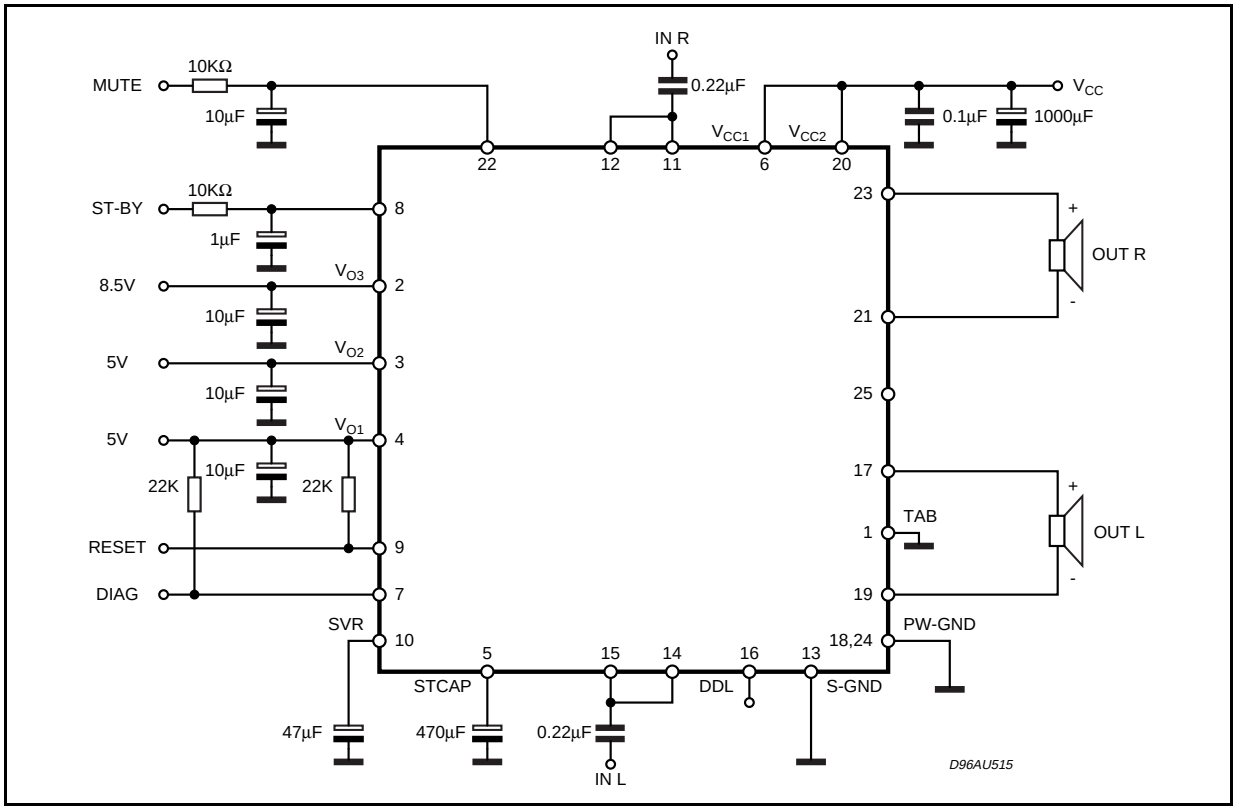
THERMAL DATA

Symbol	Parameter		Unit
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	1.2	°C/W

P_O = 4 X 7W S.E. APPLICATION



P_O = 2 X 22W BTL APPLICATION



ELECTRICAL CHARACTERISTICS (Refer to the test circuit; V_S = 14.4V; R_L = 4Ω, T_{amb} = 25°C, f = 1kHz, unless otherwise specified)

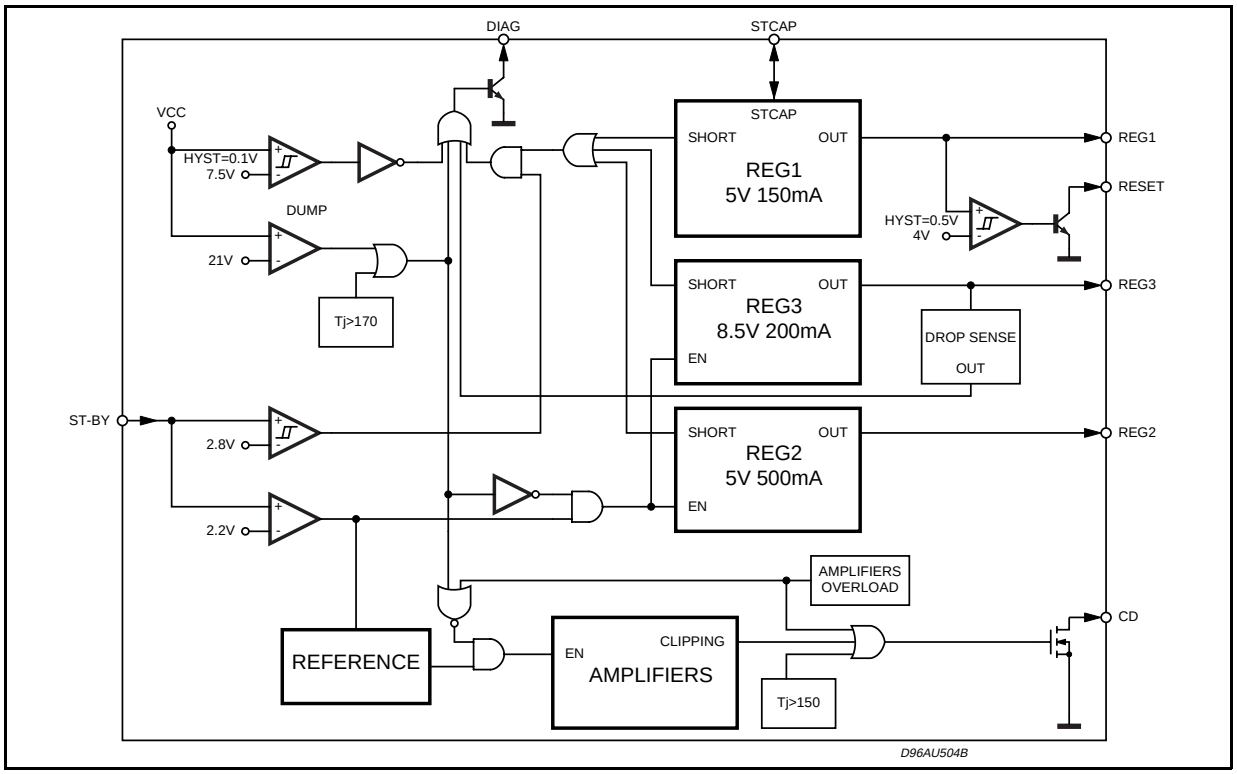
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
GENERAL						
I_q	Total Quiescent Current	I_{L01}, I_{L02}, I_{L03} = 5mA		80	150	mA
$V_{SB\ IN}$	ST-BY IN Threshold Voltage				1.5	V
$V_{SB\ OUT}$	ST-BY OUT Threshold Voltage		3.5			V
I_{ST-BY}	Stand-by Current Consumption	I_{L01} = 2mA			0.5	mA
AUDIO SECTION						
P_O	Output Power	R_L = 4Ω; THD = 10% Bridge Single Ended	 19 6	 22 7		 W W
$P_{o\ EIAJ}$	EIAJ Output Power (**)	VS = 13.7V Bridge Single Ended	 26 7.5	 28 8.5		 W W
$P_{o\ max.}$	Max. Output Power (**)	VS = 14.4V Bridge Single Ended	 30 8	 32 9.5		 W W
d	Distortion	R_L = 4Ω; Single Ended, P_O = 0.1 to 3W Bridge, P_O = 0.1 to 8W		 0.04 0.06	 0.3 0.3	 % %
CT	Cross Talk	f = 1kHz; R_g = 0 f = 10kHz; R_g = 0	50	60 55		dB dB
R_{IN}	Input Impedance	Single Ended Bridge	70 35	100 50	130 65	KΩ KΩ
G_V	Voltage Gain	Single Ended Bridge	19 25	20 26	21 27	dB dB
G_V	Voltage Gain Match.				1	dB
BW	Bandwidth	-3dB	100			KHz
E_{NO}	Output Noise Voltage (*)	R_g = 0; Single Ended		100		µV
SVR	Supply Voltage Rejection	R_g = 0; f = 100Hz; Single Ended	48	55		dB
ASB	Stand-by Attenuation		90	100		dB
$I_{PIN\ 8}$	ST-BY Pin Current	Play mode; Vpin8 = 5V	-10		30	µA
A_M	MUTE Attenuation		80	90		dB
$V_{M\ IN}$	MUTE IN Threshold Voltage				1.5	V
$V_{M\ OUT}$	MUTE OUT Threshold Voltage		3.5			V
I_{CD}	Clipping Detector Current (Pull up to 5V with 10KΩ)	CDoff: P_{omin} = 3.5W			5	µA
		CDon: THD = 5%	50	190	280	µA
POWER SUPPLY SECTION						
V_{O1}	Output Voltages	I_{01} = 5mA	4.85	5	5.15	V
ΔV_{O1}	Load Regulation 1	I_{01} = 5 to 150mA			80	mV
I_{LO1}	Current Limit	V_{01} = 0V	250	350	600	mA
ΔV_{O1}	Dropout Voltages	I_{01} = 150mA			700	mV
SVR	Ripple Rejection	V_{ripple} = 1Vpp; I_{01} = 50mA f = 100Hz f = 10KHz	 60 50			 dB dB
ΔV_{O1}	Line Regulation 1	V_S = 8 to 18V; I_{O1} = 5mA		10	40	mV
RESET						
Reset On	Low V_{REG1} Reset On Threshold		3.5	4.0	4.7	V
Reset Off	Low V_{REG1} Reset Off Threshold			4.25		V
Reset Hyst	Reset Threshold Hysteresis vs Reg 1			250	500	mV
V_{out} on Reset	Reset Output Voltage	Reset activated R(Reset to V_{Reg1}) ≥ 15K			1.5	V

(*) 22Hz to 22KHz

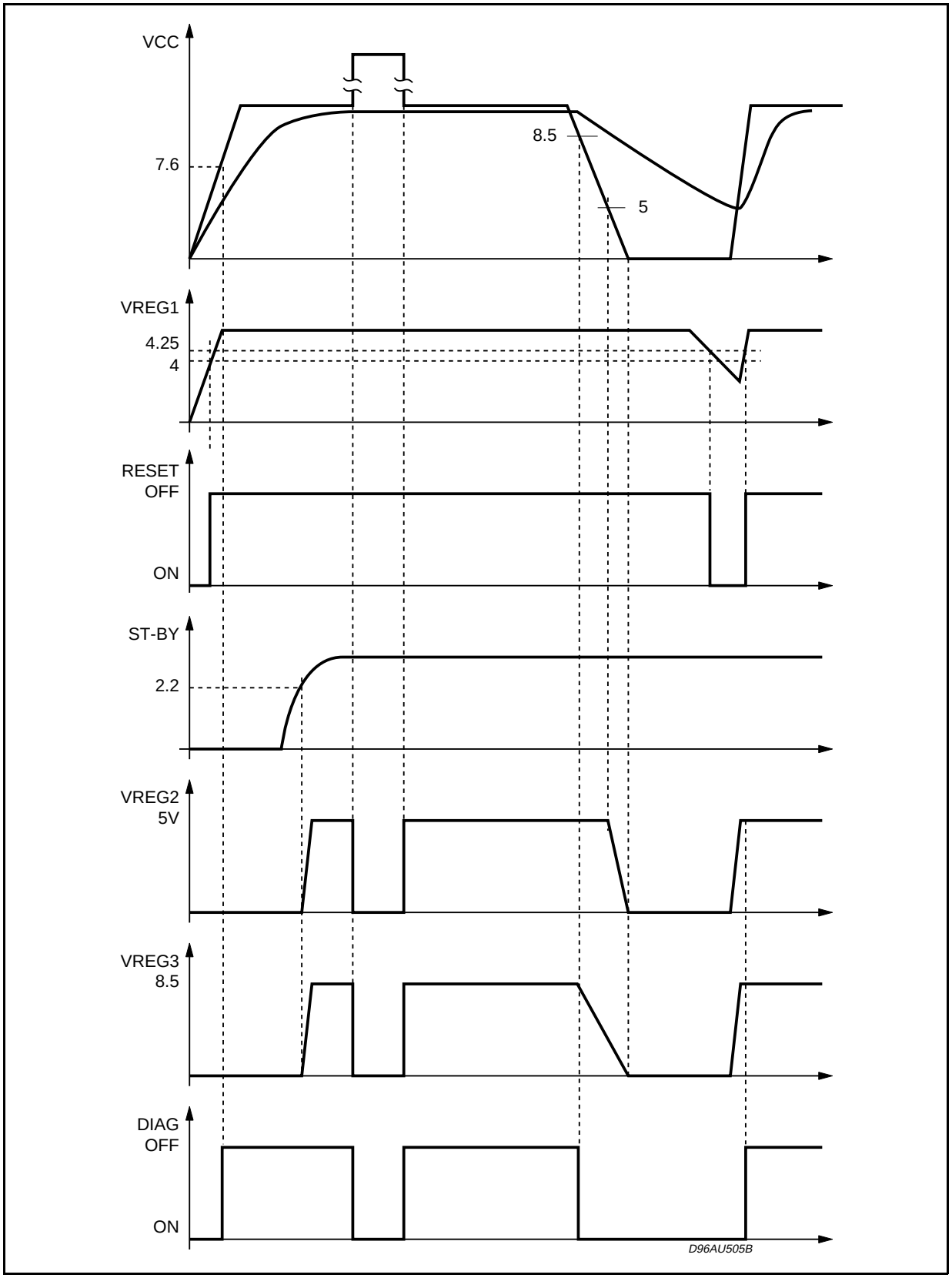
ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
DIAGNOSTIC OUTPUT						
Diag On Vs	Low Vs Diag. ON Threshold		7	7.5	8	V
Diag Off Vs	Low Vs Diag. OFF Thrershold			7.6		V
Diag Hyst Vs	Low Vs Diag. Hysteresis			100	150	mV
Diag Dump	Diag. Threshold vs Overvoltage		20	21	22	V
Diag On Drop	V_{REG3} Output Voltage Drop Before Diag. Activation	I_{O3} = 100mA		90	200	mV
V_{out} On Diag	Diag. Output Voltage	Diag activated R (Diag to V_{REG1}) ≥ 15K			1.5	V
V_{O2}	Output Voltage 2	I_{O2} = 5mA	4.85	5	5.15	V
ΔV_{O2}	Load Regulation 2	I_{O2} = 5 to 500mA			100	mV
I_{L02}	Current Limit 2	V_{O2} = 0V	0.8	1	1.5	A
ΔV_{O2}	Dropout Voltage	I_{O2} = 500mA		1	1.5	V
SVR	Ripple Rejection	V_{ripple} = 1Vpp; I_{02} = 100mA f = 100Hz f = 10KHz	 60 50			 dB dB
ΔV_{O2}	Line Regulation	V_S = 8 to 18V, I_{O2} = 5mA		10	40	mV
V_{O3}	Output Voltage 3	I_{O3} = 5mA	8.25	8.5	8.75	V
ΔV_{O3}	Load Regulation 3	I_{O3} = 5 to 200mA			80	mV
I_{L03}	Current Limit 3		300	400	800	mA
ΔV_{O3}	Dropout Voltage	I_{O3} = 200mA			1	V
SVR	Ripple Rejection	V_{ripple} = 1Vpp; I_{03} = 100mA f = 100Hz f = 10KHz	 60 50			 dB dB
ΔV_{O3}	Line Regulation 3	V_S = 11 to 18V, I_{O3} = 5mA		10	40	mV

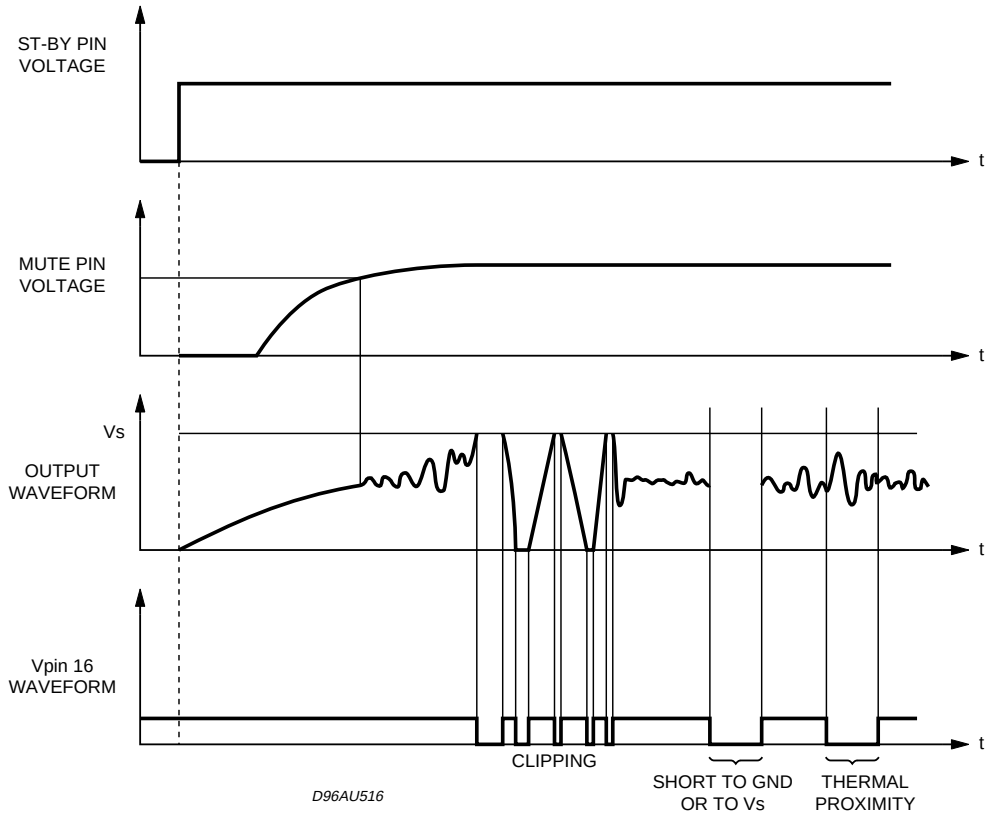
DIAGNOSTIC DIAGRAM



VOLTAGE SUPPLY SECTION WAVEFORMS



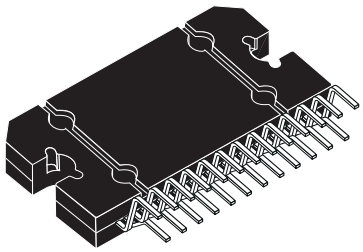
AUDIO SECTION WAVEFORMS



DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.45	4.50	4.65	0.175	0.177	0.183
B	1.80	1.90	2.00	0.070	0.074	0.079
C		1.40			0.055	
D	0.75	0.90	1.05	0.029	0.035	0.041
E	0.37	0.39	0.42	0.014	0.015	0.016
F (1)			0.57			0.022
G	0.80	1.00	1.20	0.031	0.040	0.047
G1	23.75	24.00	24.25	0.935	0.945	0.955
H (2)	28.90	29.23	29.30	1.138	1.150	1.153
H1		17.00			0.669	
H2		12.80			0.503	
H3		0.80			0.031	
L (2)	22.07	22.47	22.87	0.869	0.884	0.904
L1	18.57	18.97	19.37	0.731	0.747	0.762
L2 (2)	15.50	15.70	15.90	0.610	0.618	0.626
L3	7.70	7.85	7.95	0.303	0.309	0.313
L4		5			0.197	
L5		3.5			0.138	
M	3.70	4.00	4.30	0.145	0.157	0.169
M1	3.60	4.00	4.40	0.142	0.157	0.173
N		2.20			0.086	
O		2			0.079	
R		1.70			0.067	
R1		0.5			0.02	
R2		0.3			0.12	
R3		1.25			0.049	
R4		0.50			0.019	
V	5° (Typ.)					
V1	3° (Typ.)					
V2	20° (Typ.)					
V3	45° (Typ.)					

(1): dam-bar protusion not included
(2): molding protusion included

OUTLINE AND MECHANICAL DATA



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