



THE DATASHEET OF TDA7451



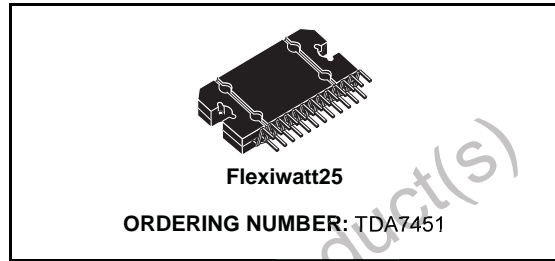


TDA7451

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



TURE

PROTECTIONS

General:

- LOAD DUMP
- OVERRATING CHIP TEMPERATURE

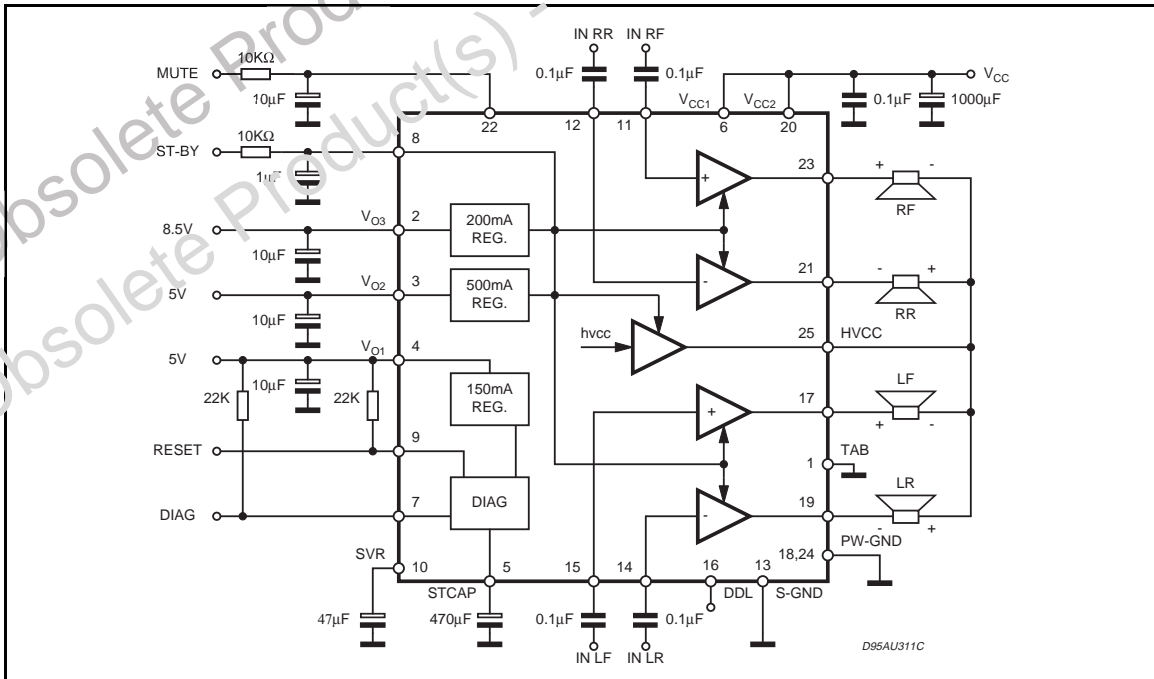
Audio Section:

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

Power Supply Section:

- SHORT CIRCUIT PROTECTION (OUT TO GND)

BLOCK DIAGRAM

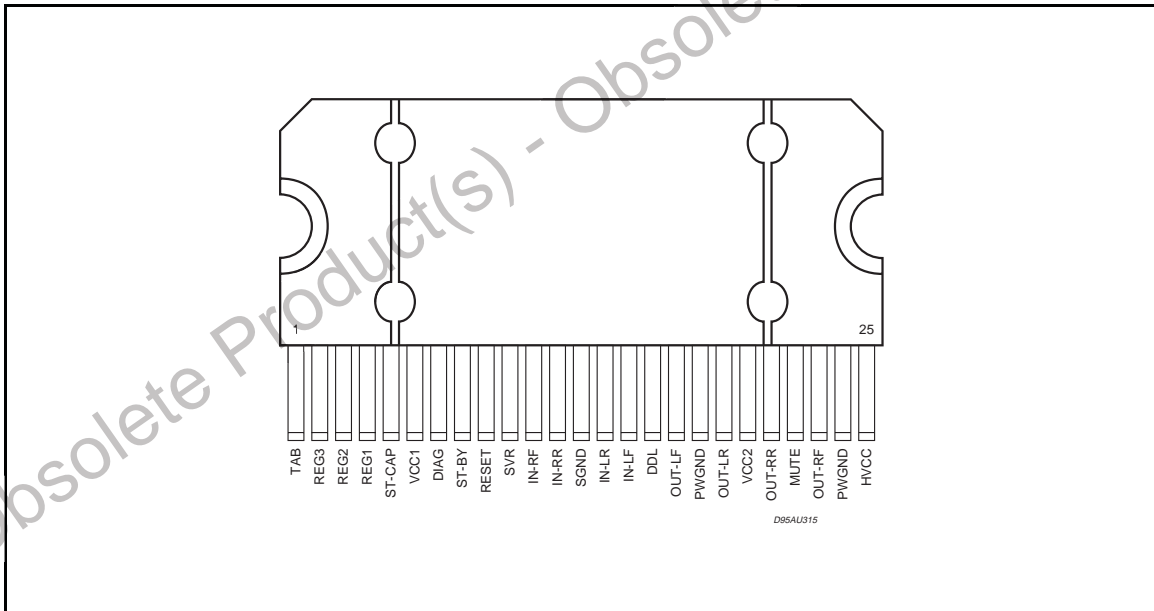


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ABSOLUTE MAXIMUM RATINGS

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 = 100 μ s)	4	A
	Audio Output Peak Current (repetitive f > 10Hz)	3	A
I_o	Voltage Regulators Output Current	internally limited	
P_{tot}	Power Dissipation at $T_{case} = 85^\circ\text{C}$	55	W
T_{stg}, T_j	Storage and Junction Temperature Range	-40 to 150	$^\circ\text{C}$
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

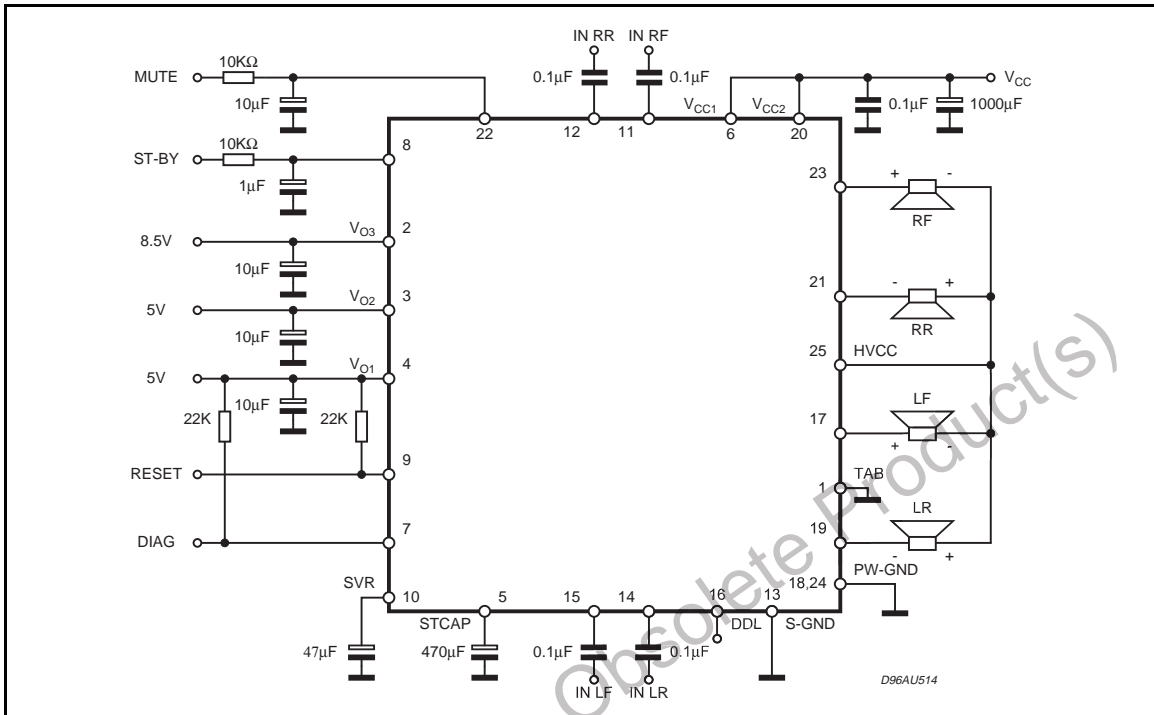
PIN CONNECTION



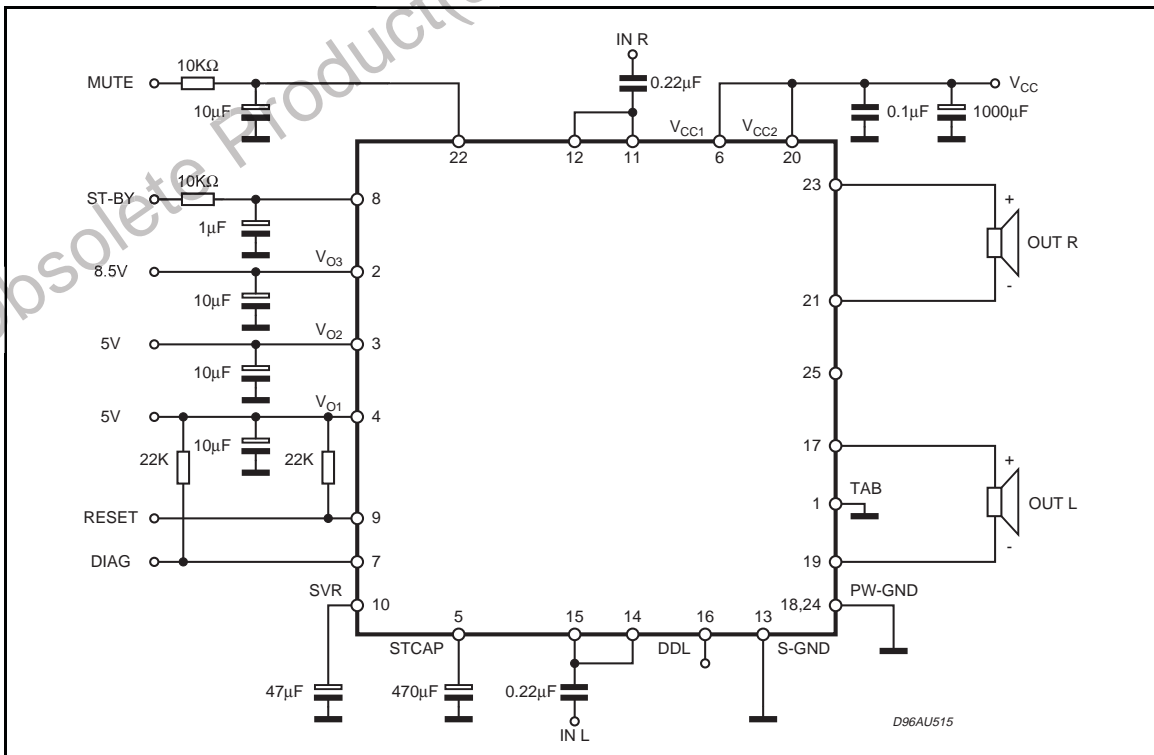
THERMAL DATA

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

P_O = 4 X 7W S.E. APPLICATION



P_O = 2 X 22W BTL APPLICATION



TDA7451

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

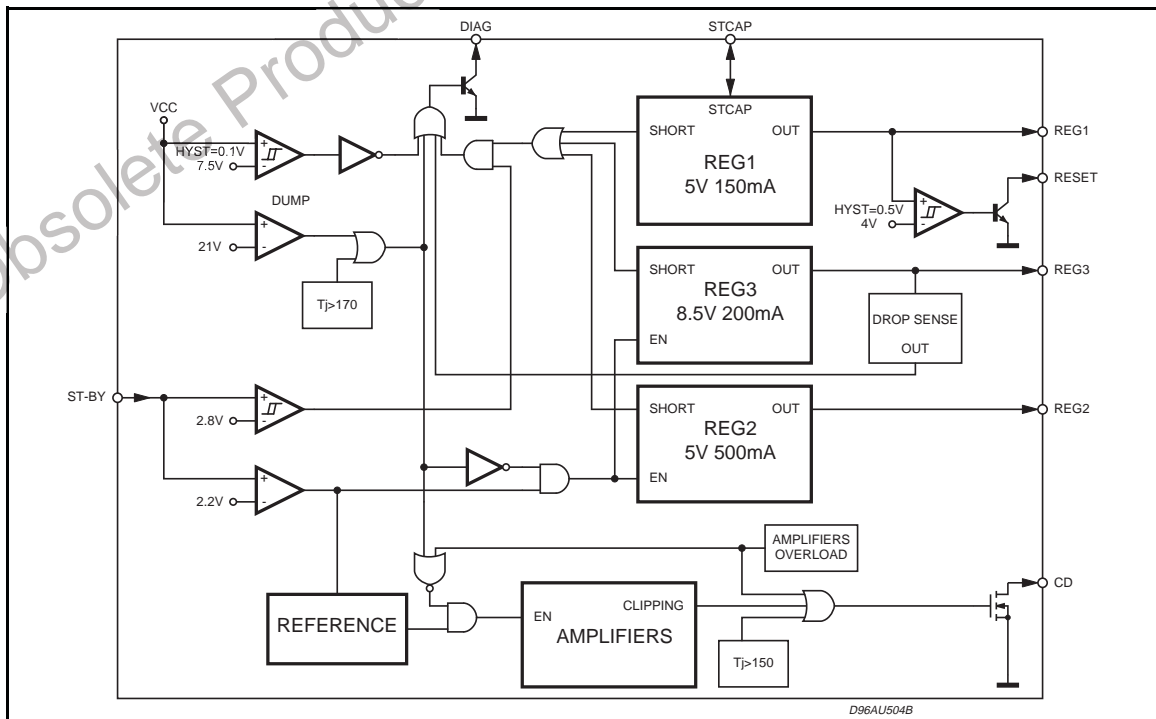
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
GENERAL						
I_q	Total Quiescent Current	$I_{L01}, I_{L02}, I_{L03} = 5mA$		80	150	mA
$V_{SB\ IN}$	ST-BY IN Threshold Voltage				1.5	V
$V_{SB\ OUT}$	ST-BY OUT Threshold Voltage		3.5			V
I_{ST-BY}	Stand-by Current Consumption	$I_{L01} = 2mA$			0.5	mA
AUDIO SECTION						
P_O	Output Power	$R_L = 4\Omega$; THD = 10% Bridge Single Ended	19 6	22 7		W W
$P_{O\ EIAJ}$	EIAJ Output Power (**)	$V_S = 13.7V$ Bridge Single Ended	26 7.5	28 8.5		W W
$P_{O\ max.}$	Max. Output Power (**)	$V_S = 14.4V$ Bridge Single Ended	30 8	32 9.5		W W
d	Distortion	$R_L = 4\Omega$; 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	$K\Omega$ $K\Omega$
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; $V_{pin8} = 5V$	-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 10K Ω)	CDoff: $P_{Omin} = 3.5W$ CDon: THD = 5%			5	μA
			50	190	280	μA
POWER SUPPLY SECTION						
V_{O1}	Output Voltages	$I_{O1} = 5mA$	4.85	5	5.15	V
ΔV_{O1}	Load Regulation 1	$I_{O1} = 5$ to 150mA			80	mV
I_{L01}	Current Limit	$V_{O1} = 0V$	250	350	600	mA
ΔV_{O1}	Dropout Voltages	$I_{O1} = 150mA$			700	mV
SVR	Ripple Rejection	$V_{ripple} = 1V_{pp}$; $I_{O1} = 50mA$ $f = 100Hz$ $f = 10KHz$	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 $R(Reset\ to\ V_{Reg1}) \geq 15K$			1.5	V

(*) 22Hz to 22KHz

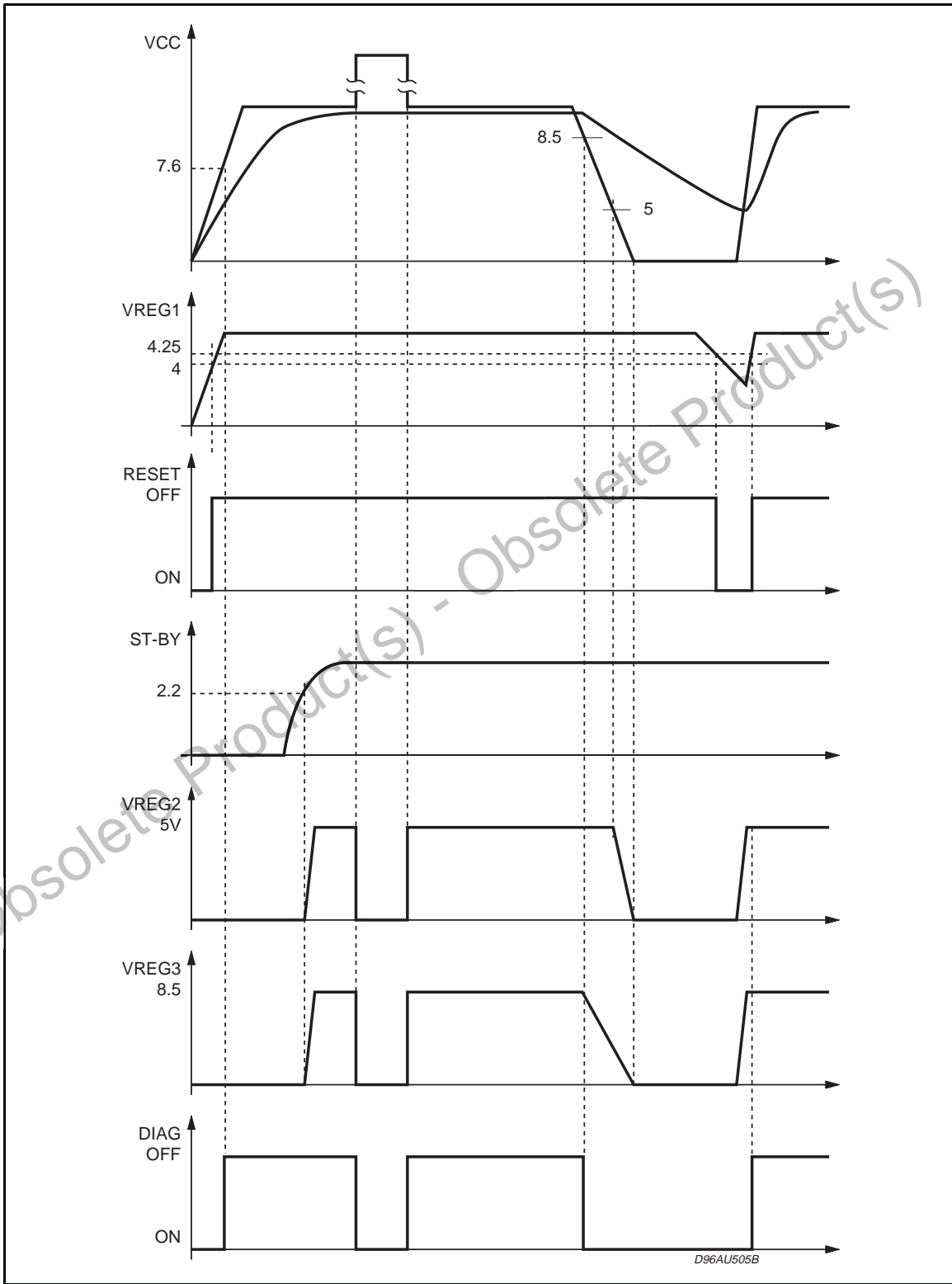
ELECTRICAL CHARACTERISTICS (continued)

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 Threshold			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 _{O2} = 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 _{O3} = 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

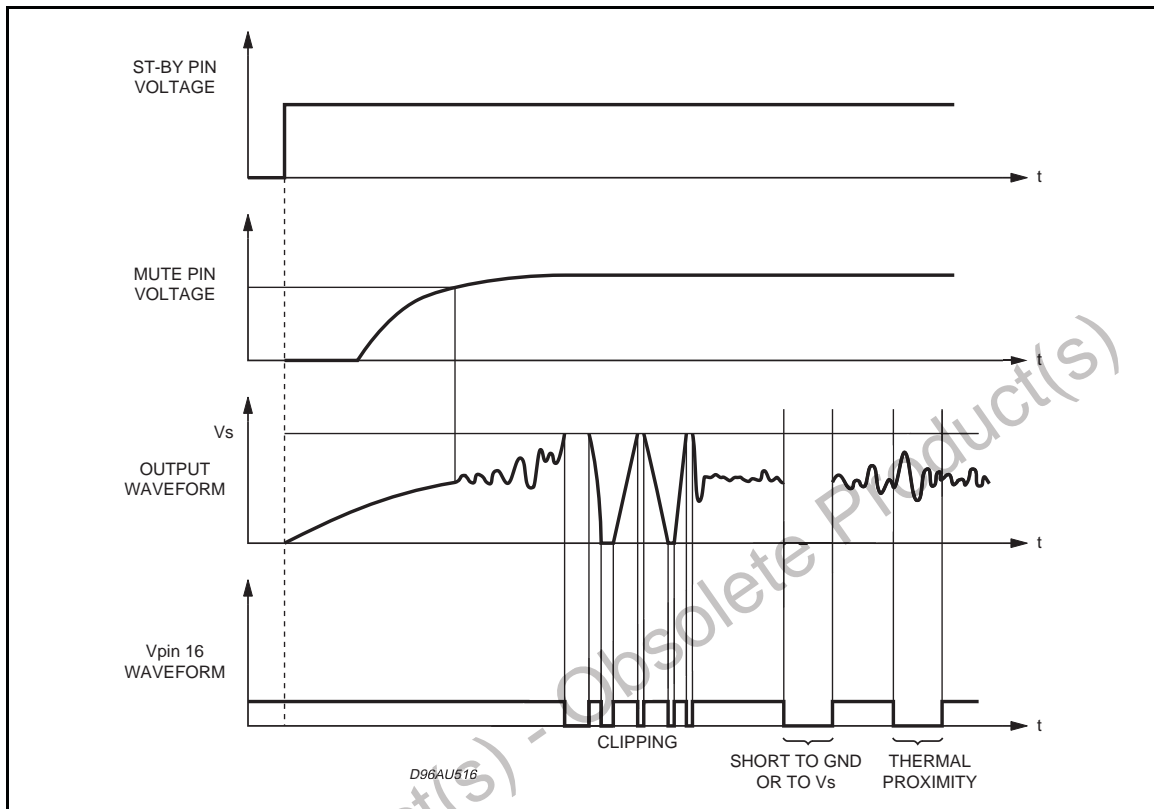
DIAGNOSTIC DIAGRAM



VOLTAGE SUPPLY SECTION WAVEFORMS



AUDIO SECTION WAVEFORMS

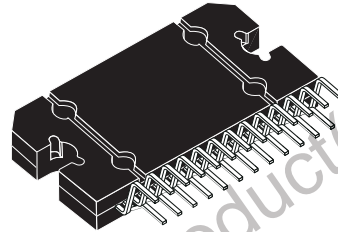


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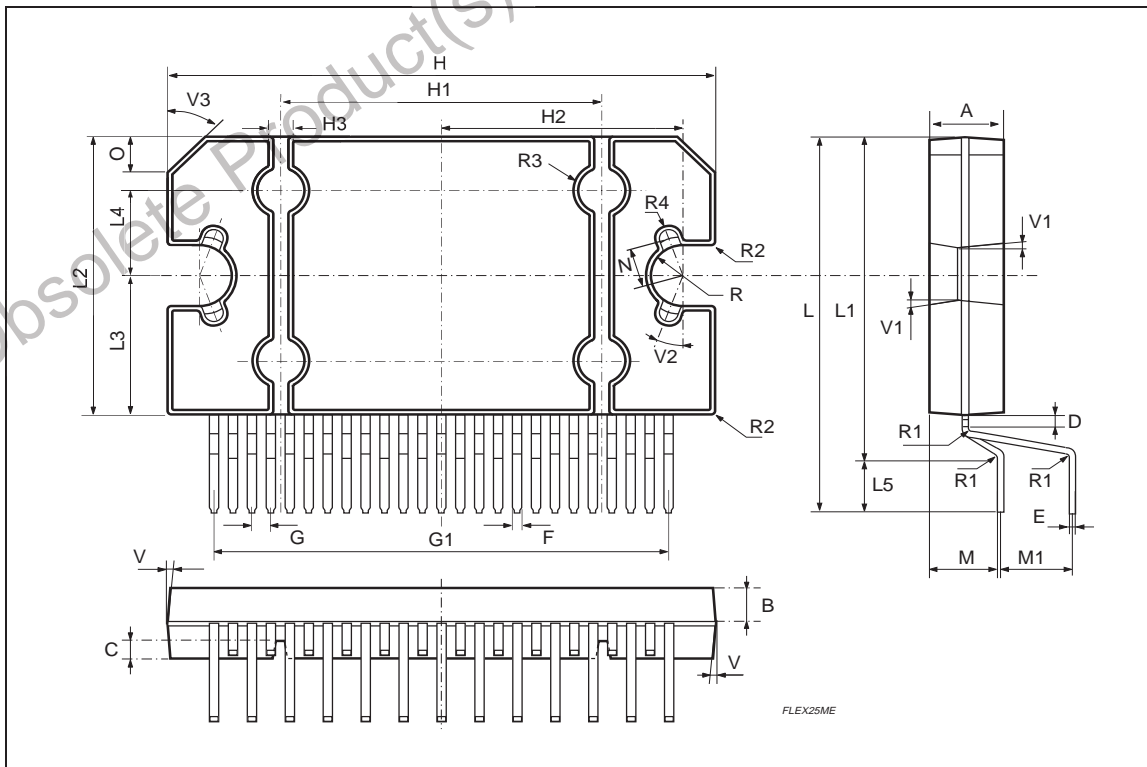
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.45	4.50	4.65	0.175	0.177	0.183
B	1.80	1.90	2.00	0.070	0.074	0.079
C		1.40			0.055	
D	0.75	0.90	1.05	0.029	0.035	0.041
E	0.37	0.39	0.42	0.014	0.015	0.016
F (1)			0.57			0.022
G	0.80	1.00	1.20	0.031	0.040	0.047
G1	23.75	24.00	24.25	0.935	0.945	0.955
H (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



Flexiwatt25



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