SGS-THOMSON MICROELECTRONICS

TDA7255

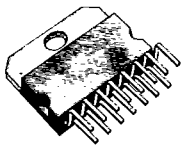
22W FRONT REAR OR BRIDGE FULLY PROTECTED CAR RADIO AMPLIFIER

- HIGH OUTPUT POWER
- POP FREE SWITCHING
- SHORT CIRCUIT PROTECTIONS: R_L SHORT - OUT TO GROUND - OUT TO V_S
- MUTING μP COMPATIBLE
- VERY LOW CONSUMTION STANDBY
- PROGRAMMABLE TURN ON DELAY
- LOW DISTORTION AND LOW NOISE
- DIFFERENTIAL INPUT

Other Protections:

- LOAD DUMP VOLTAGE SURGE
- LOUDSPEAKER DC CURRENT
- VERY INDUCTIVE LOAD
- OVERRATING TEMPERATURE
- OPEN GROUND

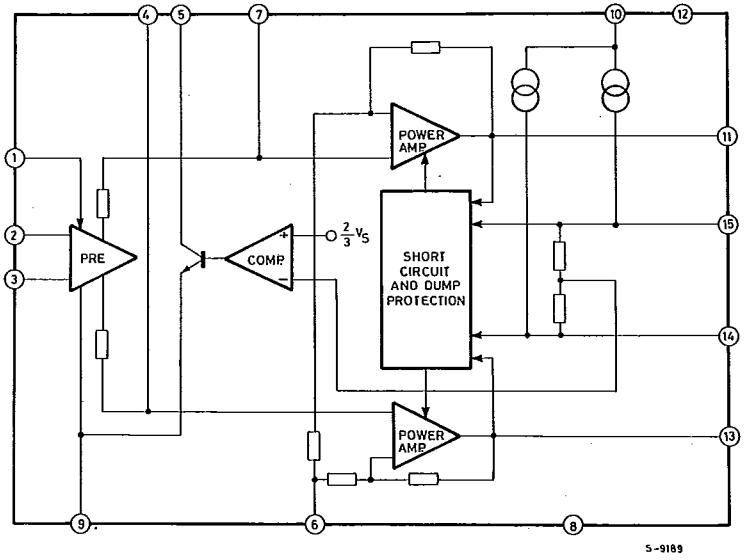
The TDA7255 a class B dual fully protected power amplifier designed for car radio applications. The device can be switched from Front-Rear to Bridge configuration by changing only the loudspeaker connection. An input fader for Front-Rear control is available. A high current capability allows to drive low impedance loads (up to 1.6Ω).



Multiwatt-15

ORDER CODE: TDA7255

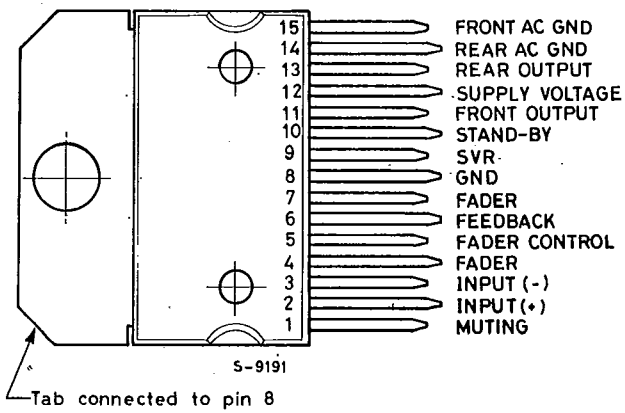
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

V_s	Operating supply voltage	18	V
V_s	DC supply voltage	28	V
V_s	Peak supply voltage (for 50ms)	40	V
I_o	Output peak current (non repetitive t = 0.1ms)	4.5	A
I_o	Output peak current (repetitive f ⩾ 10Hz)	4	A
P_{tot}	Power dissipation at T_{case} = 60°C	30	W
T_{stg}, T_j	Storage and junction temperature	-40 to 150	°C

CONNECTION DIAGRAM
(Top view)



THERMAL DATA

$R_{th\ j\text{-}case}$	Thermal resistance junction-case	max	3	°C/W
$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	40	°C/W

ELECTRICAL CHARACTERISTICS (V_s = 14.4V, R_L = 4Ω, f = 1KHz, T_{amb} = 25°C unless otherwise specified)

Paremeter		Test Conditions	Min.	Typ.	Max.	Unit
V_s	Supply voltage		8		18	V
I_d	Total quiescent drain current			80		mA
R_I	Input resistance			70		KΩ
V_i	Input saturation voltage		300			mV
T_J	Thermal shut down junction temperature			145		°C

FRONT REAR APPLICATIONS (Fig. 2)

P_o	Output power	THD = 10% R_L = 4Ω R_L = 2Ω R_L = 1.6Ω	5.5	6.5 11 12.5		W W W
d	Distortion	P_o = 0.1W to 4W		0.05	0.5	%
G_v	Voltage gain			28		dB
e_N	Input noise voltage	R_G = 10KΩ		2.5(**) 2 (*)		μV μV
SVR	Supply voltage rejection	R_G = 100KΩ V_r = 1V f = 300Hz	36	45		dB
CMR	Common mode rejection			55		dB
η	Efficiency	P_o = 6.5W + 6.5W		70		%

BRIDGE APPLICATION (Fig. 1)

V_{os}	Output offset voltage				250	mV
P_o	Output power	THD = 10% R_L = 4Ω R_L = 3.2Ω	18	22 25		W W
d	Distortion	P_o = 0.1W to 2W		0.05		%
G_v	Voltage gain (C_L)			36		dB
e_N	Total input noise voltage	R_G = 10KΩ		2.5(**) 2.0 (*)	10	μV μV
η	Efficiency	P_o = 20W		66		%
SVR	Supply voltage rejection	R_G = 10KΩ, V_r = 1V, f = 300Hz	45	58		dB

MUTING AND STAND-BY FUNCTIONS

	Muting attenuation	V_{ref} = 1W f = 100Hz to 10KHz	60			dB
	Muting-on threshold voltage	Pin. 1	2.4			V
	Muting-off threshold voltage	Pin. 1			0.8	V
	Stand-by attenuation	V_{ref} = 1V f = 100Hz to 10KHz	60			dB
	Stand-by quiescent drain current				100	μA

(**) B = 22Hz to 22KHz
(*) B = curve A

Fig. 1 - Test and application circuit (Bridge amplifier)

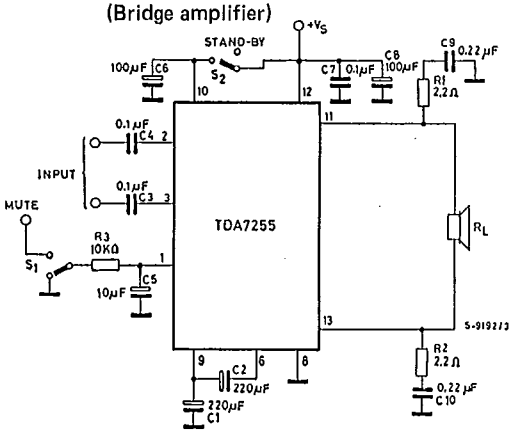
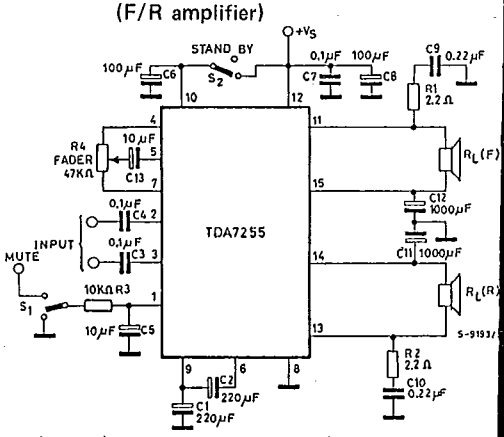
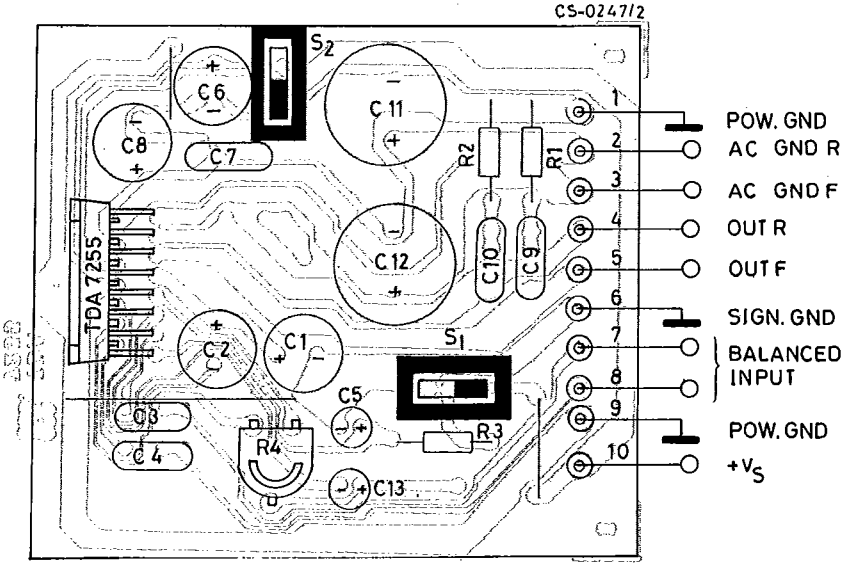


Fig. 2 - Test and application circuit (F/R amplifier)



- Two high impedance inputs available for balanced or unbalanced operation.
- The fader function is automatically inserted in front/rear configuration and allows the distribution of the power between the front and the rear. An external potentiometer must be connected between pins 4 and 7 with the control terminal connected to pin 5 through a decoupling capacitor. In bridge applications the pins 4-5-7 must be left open.
- Turn on delay. The output stages are muted during the turn on transient and start rising after the charge of the capacitor connected between pin 9 and ground. The capacitor also avoids pops during bridge F/R switching.

Fig. 3 - P.C. board and component layout of the circuits of Fig. 1 and 2 (1 : 1 scale)



FRONT/REAR CHARACTERISTICS

Fig. 4 - Quiescent drain current vs. supply voltage

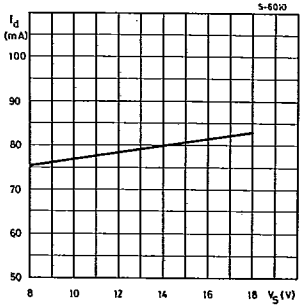


Fig. 5 - Quiescent output voltage vs. supply voltage

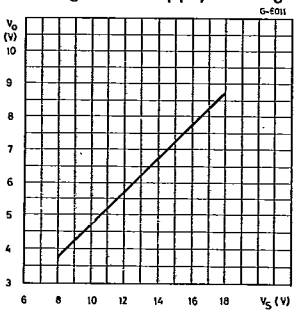


Fig. 6 - Output power vs. supply voltage

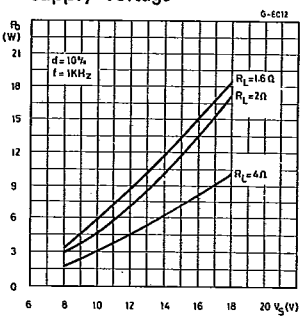


Fig. 7 - Distortion vs. frequency

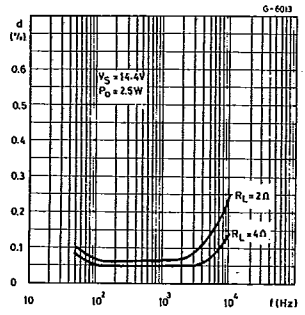


Fig. 8 - Supply voltage rejection vs. capacitor values (C2)

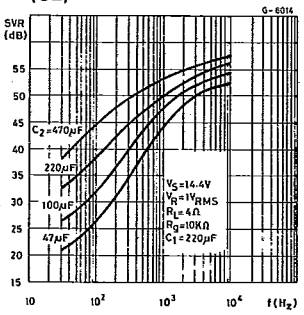


Fig. 9 - Supply voltage rejection vs. capacitor values (C1)

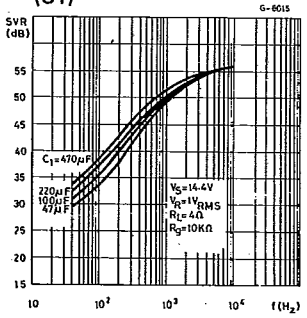


Fig. 10 - Output signal vs. fader control position

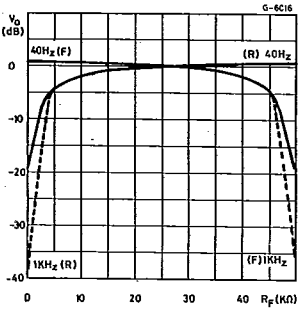


Fig. 11 - Power dissipation and efficiency vs. output power

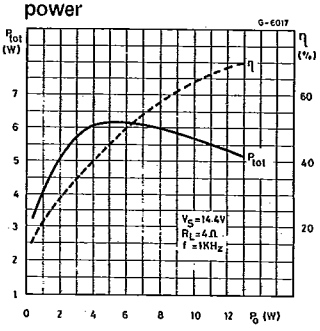
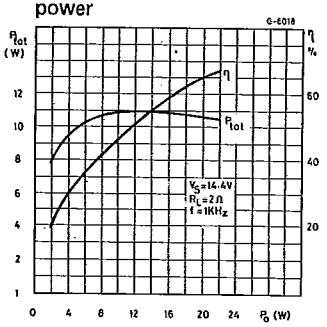


Fig. 12 - Power dissipation and efficiency vs. output power



BRIDGE CHARACTERISTICS

Fig. 13 -- Output power vs. supply voltage

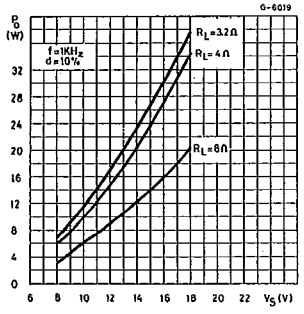


Fig. 14 - Distortion vs. frequency

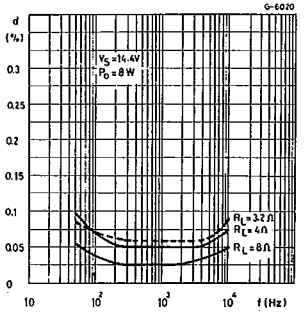


Fig. 15 - Supply voltage rejection vs. frequency

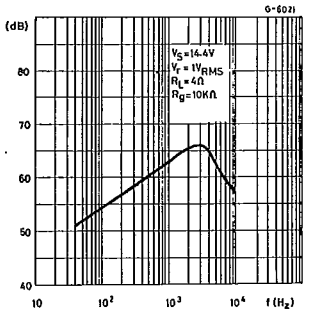


Fig. 16 - Power dissipation and efficiency vs. output power