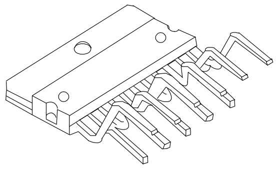
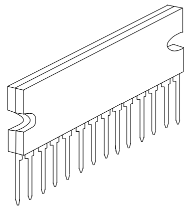
10+10W STEREO AMPLIFIER FOR CAR RADIO



HZIP-11A



HSIP-14B

■ DESCRIPTION

The UTC **TDA2004** is a class B dual audio power amplifier and is designed for car radio applications.

■ FEATURES

* Low distortion.
* Low noise.

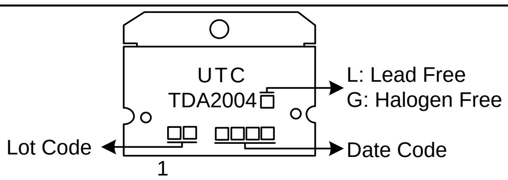
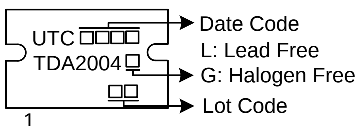
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
TDA2004L-J11-A-T	TDA2004G-J11-A-T	HZIP-11A	Tube
TDA2004-H14-B-T	TDA2004G-H14-B-T	HSIP-14B	Tube

TDA2004G-J11-A-T
(1) Packing Type
(2) Package Type
(3) Green Package

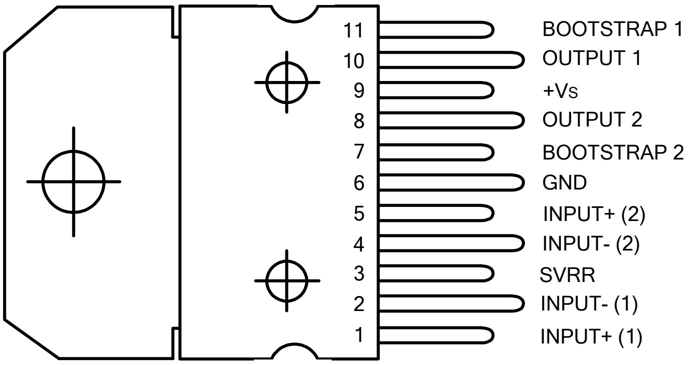
(1) T: Tube
(2) J11-A: HZIP-11A, H14-B: HSIP-14B
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

HZIP-11A	HSIP-14B
	

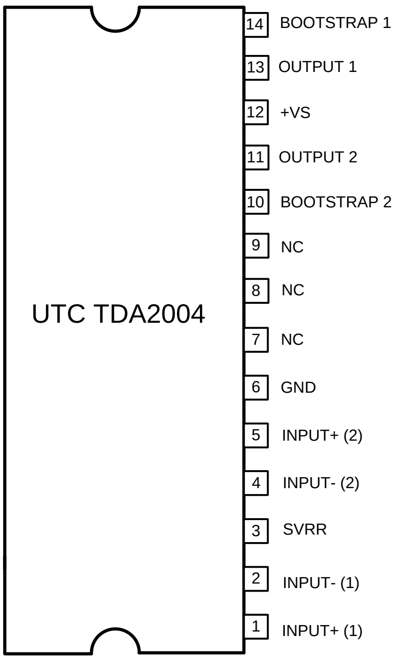
■ PIN CONFIGURATION

HZIP-11A



Note: TAB CONNECTED TO PIN 6

HSIP-14B



■ PIN DESCRIPTION

PIN NO.		PIN NAME
HZIP-11A	HSIP-14B (Note)	
1	1	INPUT+ (1)
2	2	INPUT- (1)
3	3	SVRR
4	4	INPUT- (2)
5	5	INPUT+ (2)
6	6	GND
7	10	BOOTSTRAP 2
8	11	OUTPUT 2
9	12	+VS
10	13	OUTPUT 1
11	14	BOOTSTRAP 1

Note: PIN 7, 8, 9 no connection.

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	RATINGS	UNIT
Opearting Supply Voltage		V_{SS}	18	V
DC Supply Voltage		V_{SS}	28	V
Peak Supply Voltage (for 50ms)		V_{SS}	40	V
Output Peak Current (Note)	non repetitive t=0.1ms	I_O	4.5	A
	repetitive f ≥10Hz	I_O	3.5	A
Power Dissipation at T_C=60°C		P_D	30	W
Junction Temperature		T_J	+125	°C
Storage Temperature		T_{STG}	-40 ~ 150	°C

Note: The max. output current is internally limited.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Thermal Resistance Junction-Case	θ_{JC}	3.0	°C/W

■ ELECTRICAL CHARACTERISTICS

(Refer to the test circuit, T_A=25°C, G_V=50Db, Rth(heatsink)=4°C /W, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITONS		MIN	TYP	MAX	UNIT
Supply Voltage	V_{SS}			8		18	V
Quiescent Output Voltage	V_{OUT}	V_{SS}=14.4V		6.6	7.2	7.8	V
		V_{SS}=13.2V		6.0	6.6	7.2	V
Total Quiescent Drain Current	I_D	V_{SS}=14.4V			65	120	mA
		V_{SS}=13.2V			62	120	mA
Stand-by Current	I_{STAY-B}	Pin 3 grounded			5		mA
Output Power (each channel) f=1KHz, THD=10%	P_{OUT}	V_{SS}=14.4V	R_L=4Ω	6	6.5		W
			R_L=3.2Ω	7	8		W
			R_L=2Ω	9	10 (Note 1)		W
			R_L=1.6Ω	10	11		W
		V_{SS}=13.2V	R_L=3.2Ω	6	6.5		W
			R_L=1.6Ω	9	10		W
		V_{SS}=16V, R_L=2Ω			12		W
Total Harmonic Distortion (each channel) f=1KHz	THD	V_{SS}=14.4V, R_L=4Ω P_{OUT}=50mW ~ 4W			0.2	1	%
		V_{SS}=14.4V, R_L=2Ω P_{OUT}=50mW ~ 6W			0.3	1	%
		V_{SS}=13.2V, R_L=3.2Ω P_{OUT}=50mW ~ 3W			0.2	1	%
		V_S=13.2V, R_L=1.6Ω P_{OUT}=50mW ~ 6W			0.3	1	%
Cross Talk	C_T	V_{SS}=14.4V V_{OUT}=4Vrms, R_L=4Ω	f=1KHz	50	60		dB
			f=10kHz, R_G=5KΩ	40	45		dB
Input Saturation Voltage	V_{IN}			300			mV
Input Resistance (non inverting input)	R_{IN}	f=1kHz		70	200		kΩ
Low Frequency Roll Off (-3dB)	f_L	R_L=4Ω				35	Hz
		R_L=2Ω				50	Hz
		R_L=3.2Ω				40	Hz
		R_L=1.6Ω				55	Hz
High Frequency Roll Off (-3dB)	f_H	R_L=1.6Ω ~ 4Ω		15			kHz

Notes: 1. 9.3W without Bootstrap

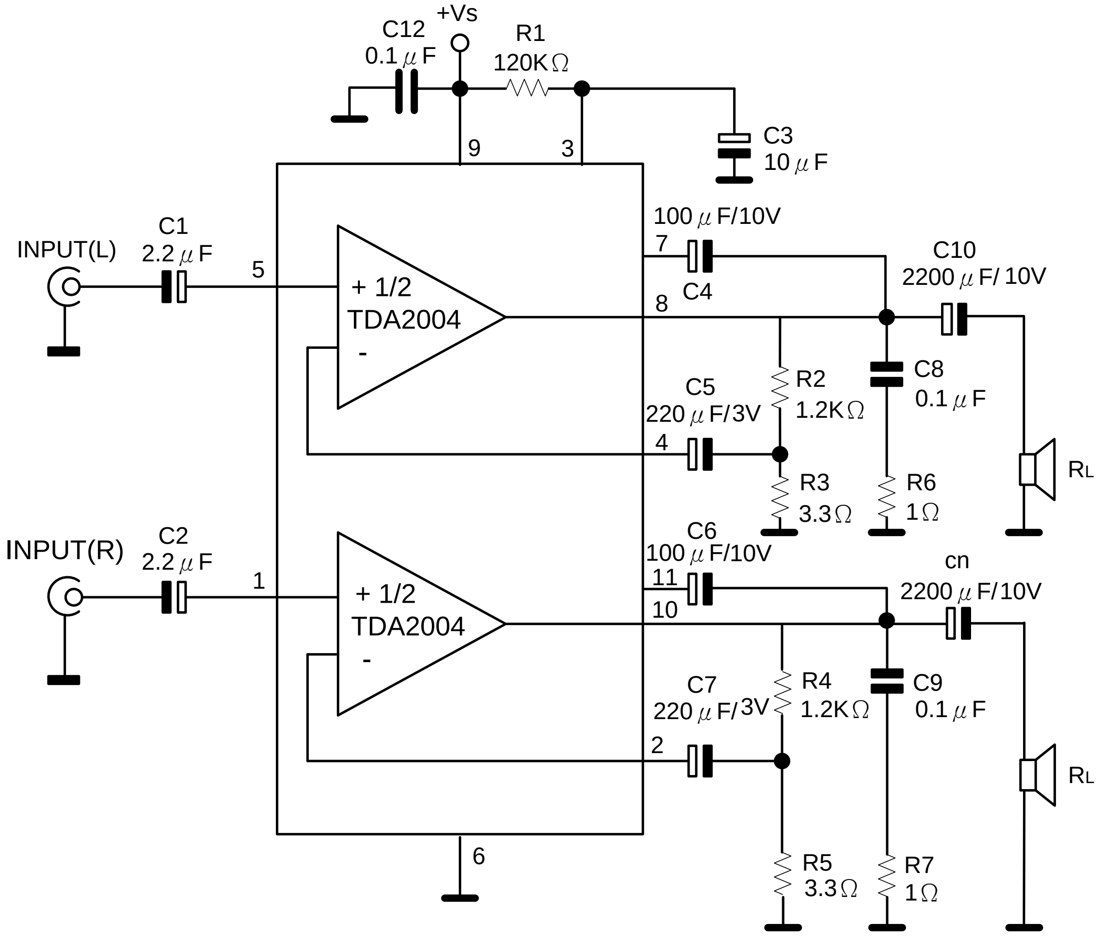
2. Bandwith Filter: 22Hz ~ 22KHz.

■ ELECTRICAL CHARACTERISTICS (Cont.)

PARAMETER	SYMBOL	TEST CONDITONS		MIN	TYP	MAX	UNIT
Voltage Gain (open loop)	G_V	f=1kHz			90		dB
Voltage Gain (closed loop)		f=1KHz		48	50	51	dB
Closed Loop Gain Matching					0.5		dB
Total Input Noise Voltage	e_N	R_G=10KΩ (Note 2)			1.5	5	μV
Supply Voltage Rejection	SVR	f_{RIPPLE}=100Hz, R_G=10kΩ C3=10μF, V_{RIPPLE}=0.5Vrms		35	45		dB
Efficiency	η	V_{SS}=14.4V, f=1kHz	R_L=4Ω, P_O=6.5W		70		%
			R_L=2Ω, P_O=10W		60		%
		V_{SS}=13.2V, f=1kHz	R_L=3.2Ω, P_O=6.5W		70		%
			R_L=1.6Ω, P_O=10W		60		%
Thermal Shut-down Junction Temperature	T_J				145		°C

Notes: 1. 9.3W without Bootstrap
2. Bandwith Filter: 22Hz ~ 22KHz.

■ TEST AND APPLICATION CIRCUIT



■ TYPICAL CHARACTORISTICS

Figure 1. Quiescent Output Voltage vs. Supply Voltage

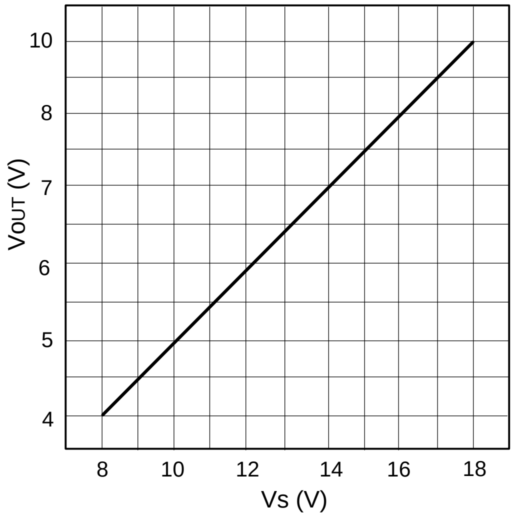


Figure 2. Quiescent Drain Current vs. Supply Voltage

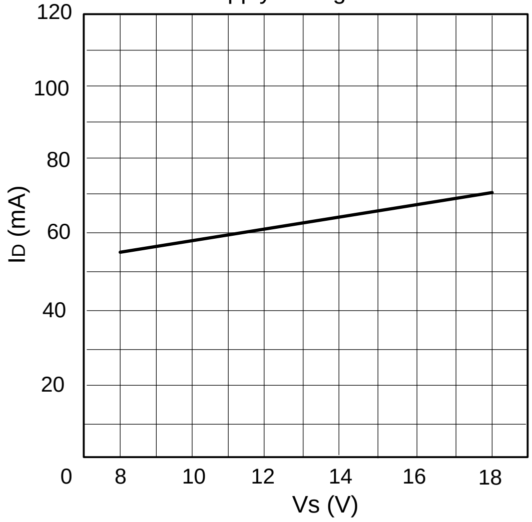


Figure 3. Distortion vs. Output Power

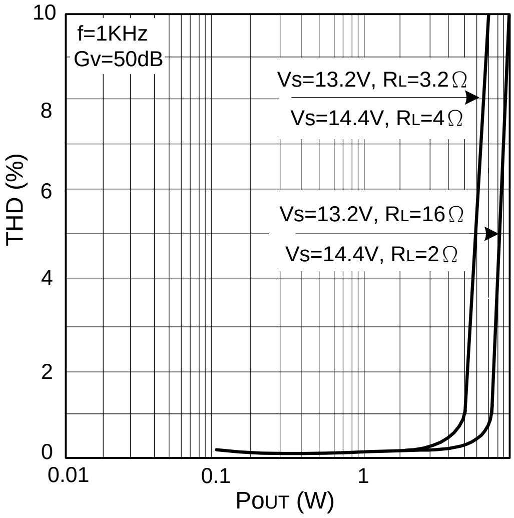


Figure 4. Output Power vs. Supply Voltage

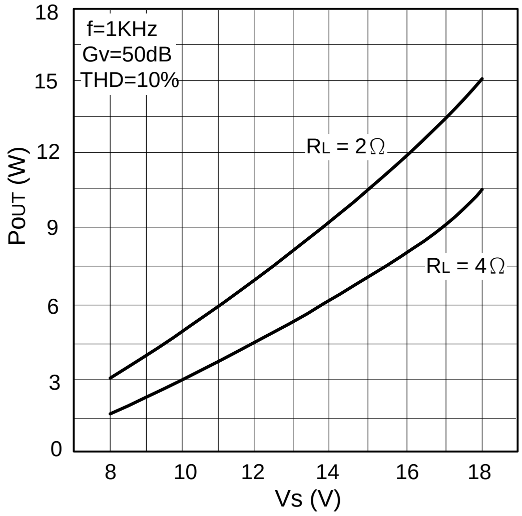


Figure 5. Output Power vs. SupplyVoltage

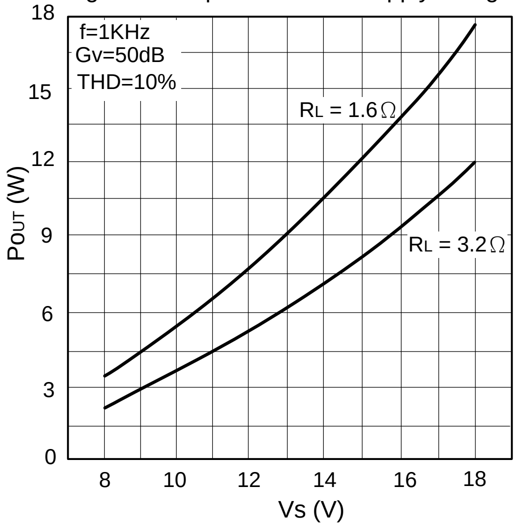
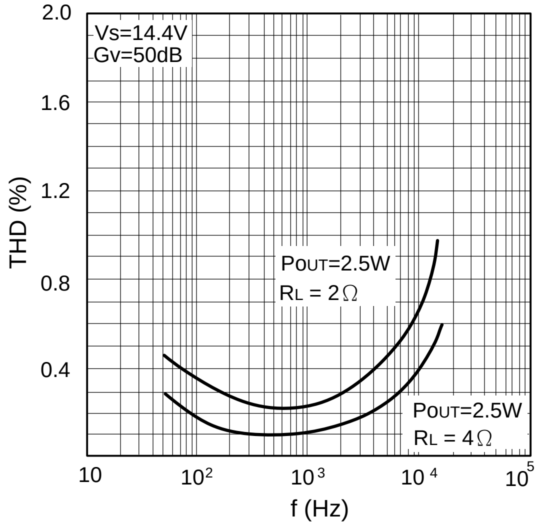


Figure 6. Distortion vs Frequency



■ TYPICAL CHARACTORISTICS (cont.)

Figure 7. Distortion vs Frequency

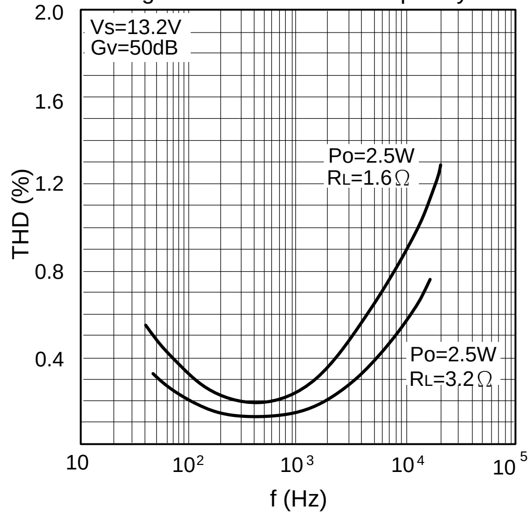


Figure 8. Supply Voltage Rejection vs C3

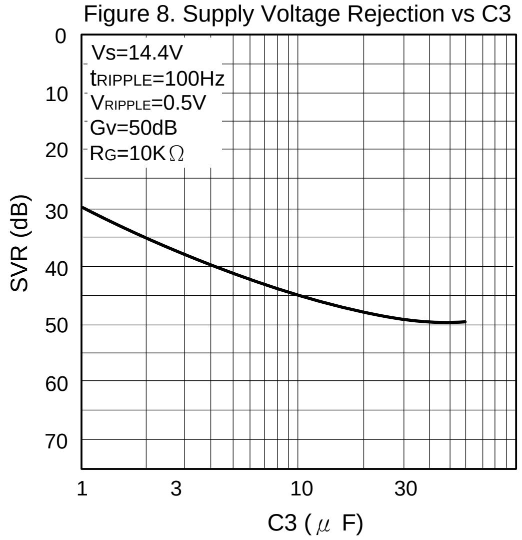


Figure 9. Supply Voltage Rejection vs. Frequency.

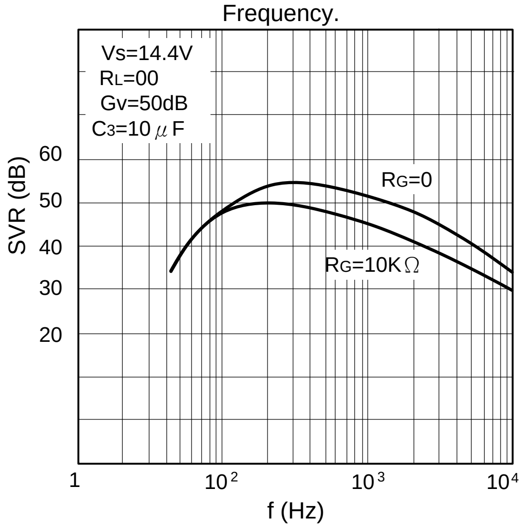


Figure 10. Supply Voltage Rejection vs. Values of Capacitors C2 and C3

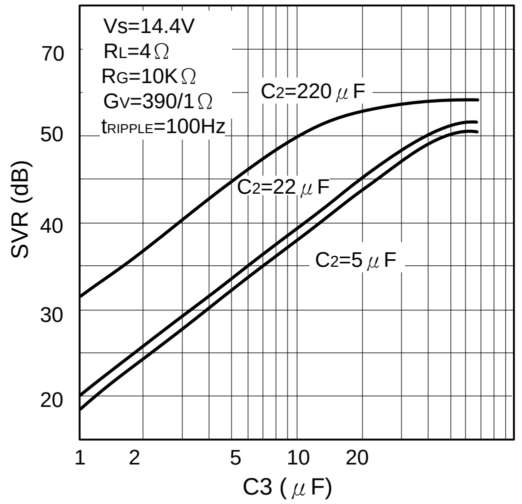


Figure 11. Supply Voltage Rejection vs. Values of Capacitors C2 and C3

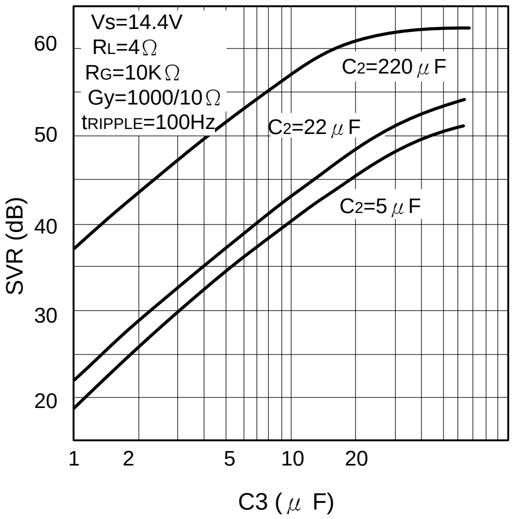
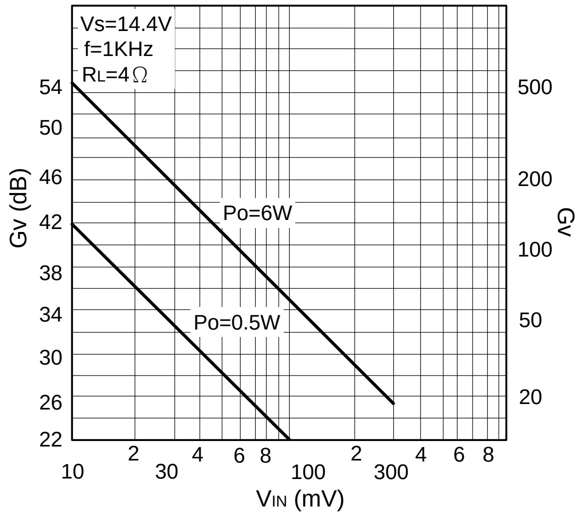


Figure 12. Gain vs. Input Sensitivity



■ TYPICAL CHARACTORISTICS (cont.)

Figure 13. Maximum Allowable Power Dissipation vs. Ambient Temperature

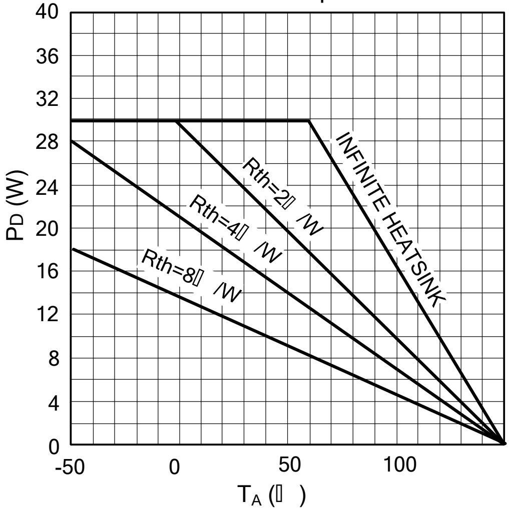


Figure 14. Total Power Dissipation and Efficiency vs. Output Power

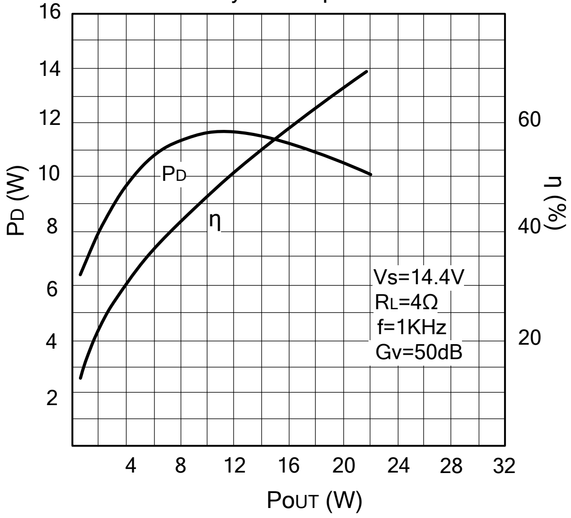


Figure 15. Total Power Dissipation and Efficiency vs. Output Power