



TDA2004

LINEAR INTEGRATED CIRCUIT

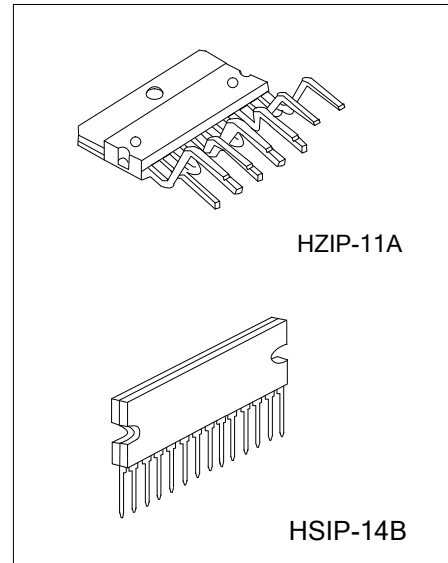
10+10W STEREO AMPLIFIER FOR CAR RADIO

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

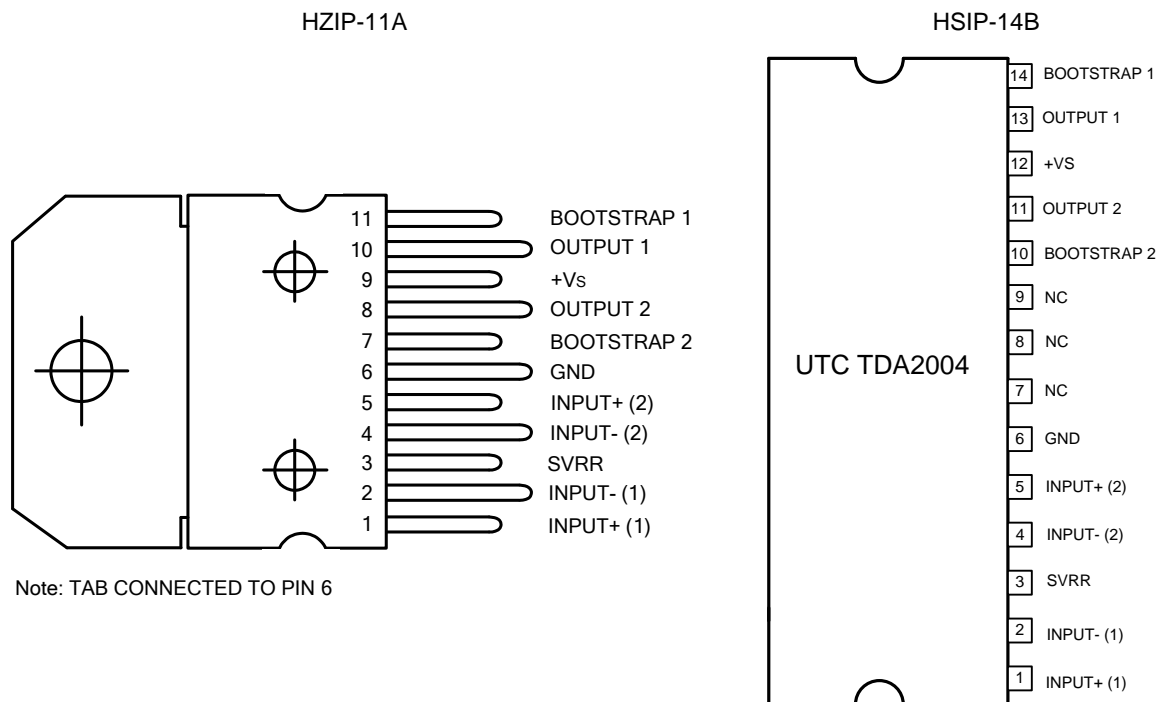
Ordering Number		Package	Packing
Lead Free	Halogen Free		
TDA2004L-J11-A-T	TDA2004G-J11-A-T	HZIP-11A	Tube
TDA2004-H14-B-T	TDA2004G-H14-B-T	HSIP-14B	Tube

<p>TDA2004G-J11-A-T</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Green Package 	<ul style="list-style-type: none"> (1) T: Tube (2) J11-A: HZIP-11A, H14-B: HSIP-14B (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

HZIP-11A	HSIP-14B
<p>UTC TDA2004</p> <p>L: Lead Free G: Halogen Free</p> <p>Lot Code ← 1 → Date Code</p>	<p>UTC □□□□ → Date Code TDA2004 □ → L: Lead Free □ → G: Halogen Free □ → Lot Code</p> <p>1</p>

■ PIN CONFIGURATION



■ 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	
Operating 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 $t=0.1\text{ms}$	I_o	4.5	A
	repetitive $f \geq 10\text{Hz}$	I_o	3.5	A
Power Dissipation at $T_C=60^\circ\text{C}$	P_D	30	W	
Junction Temperature	T_J	+125	$^\circ\text{C}$	
Storage Temperature	T_{STG}	-40 ~ 150	$^\circ\text{C}$	

Note: The max. output current is internally limited.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Thermal Resistance Junction-Case	θ_{JC}	3.0	$^\circ\text{C/W}$

■ ELECTRICAL CHARACTERISTICS

(Refer to the test circuit, $T_A=25^\circ\text{C}$, $G_V=50\text{Db}$, $R_{th}(\text{heatsink})=4^\circ\text{C/W}$, unless otherwise specified.)

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

Notes: 1. 9.3W without Bootstrap

2. Bandwith Filter: 22Hz ~ 22KHz.

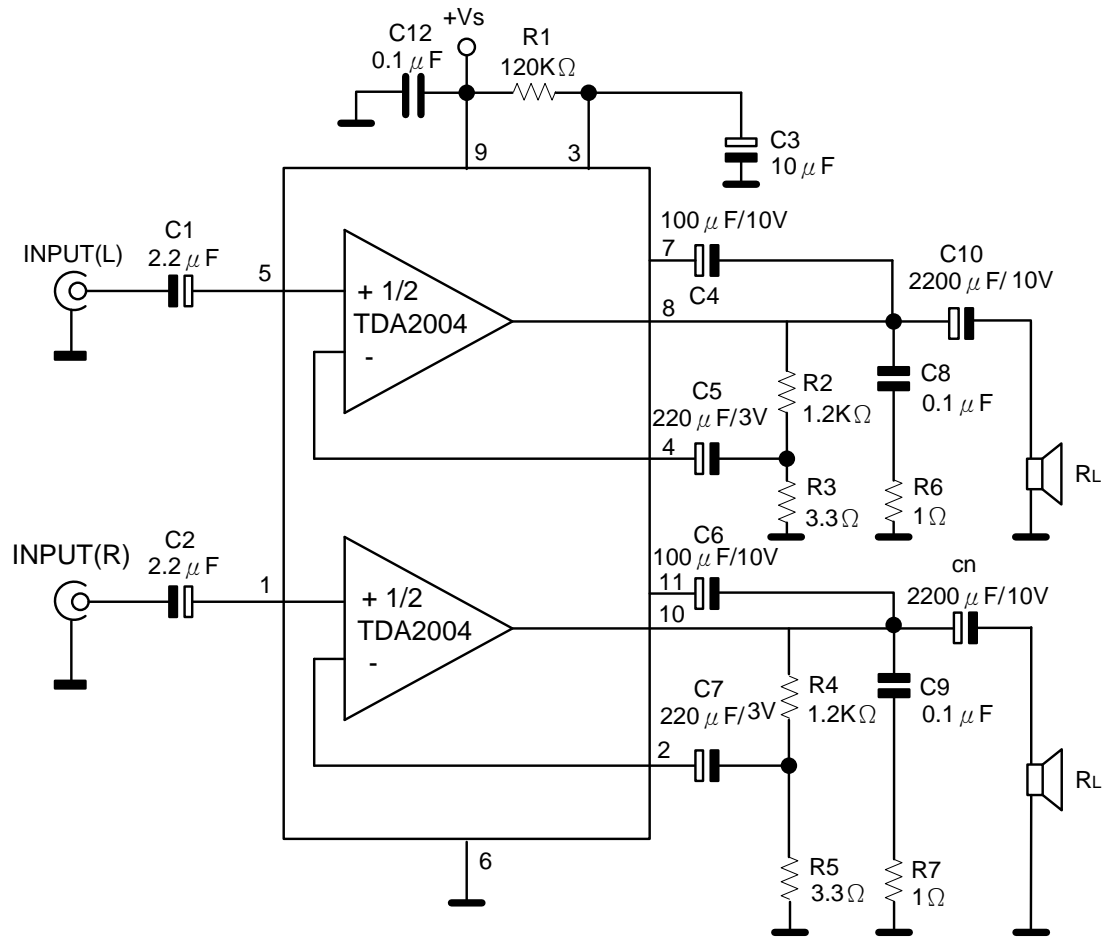
■ ELECTRICAL CHARACTERISTICS (Cont.)

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 CHARACTERISTICS

Figure 1. Quiescent Output Voltage vs. Supply Voltage

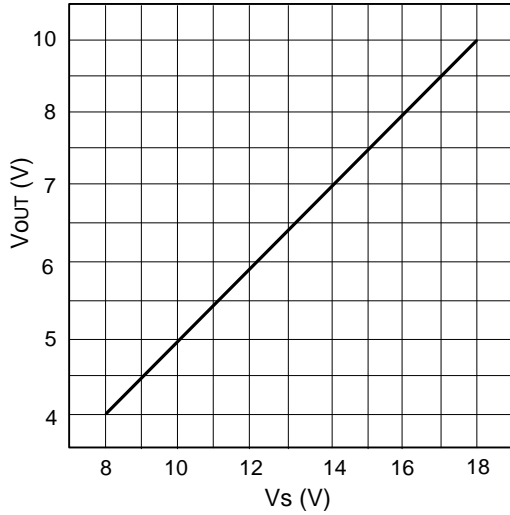


Figure 2. Quiescent Drain Current vs. Supply Voltage

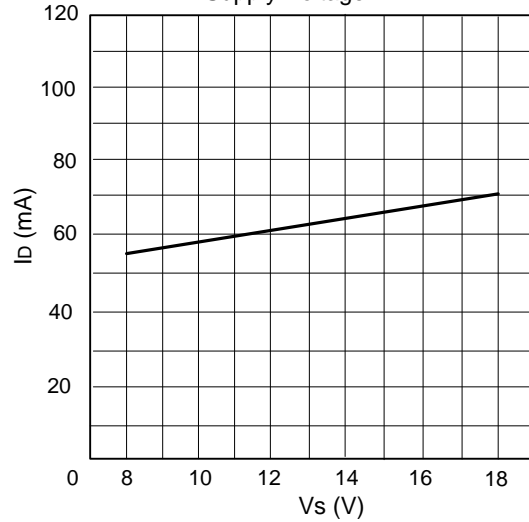


Figure 3. Distortion vs. Output Power

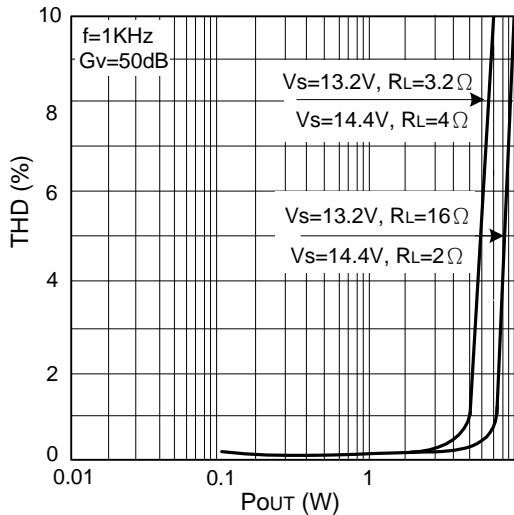


Figure 4. Output Power vs. Supply Voltage

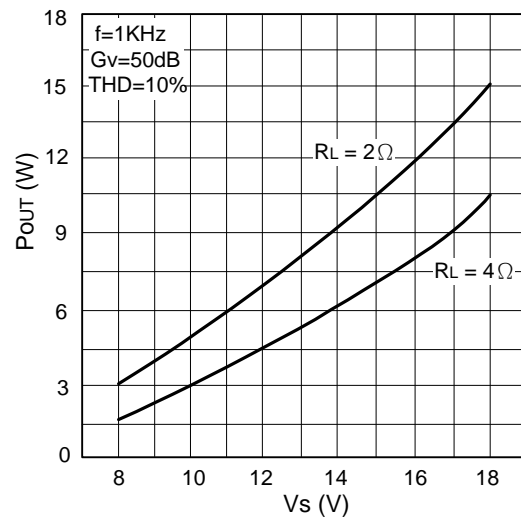


Figure 5. Output Power vs. Supply Voltage

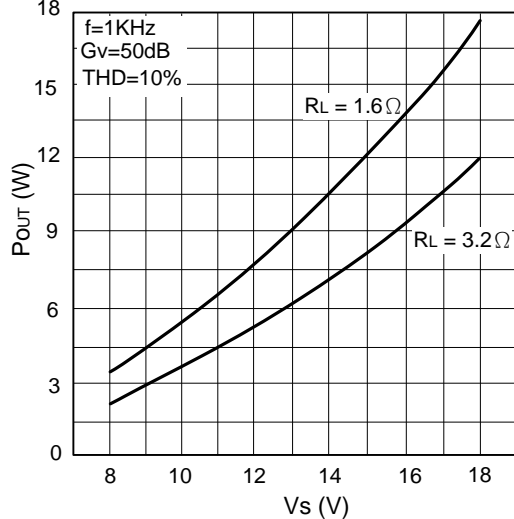
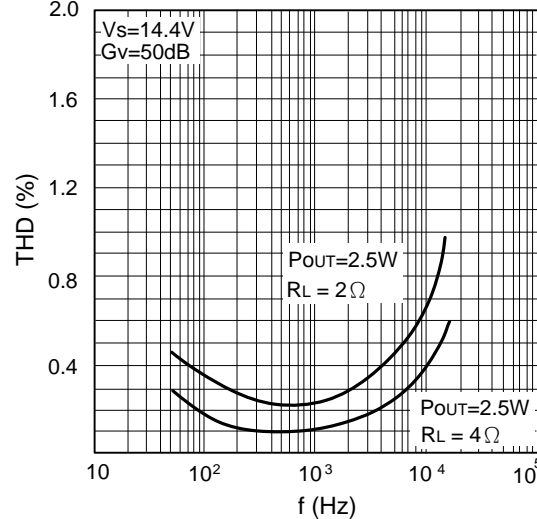


Figure 6. Distortion vs Frequency



■ TYPICAL CHARACTERISTICS (cont.)

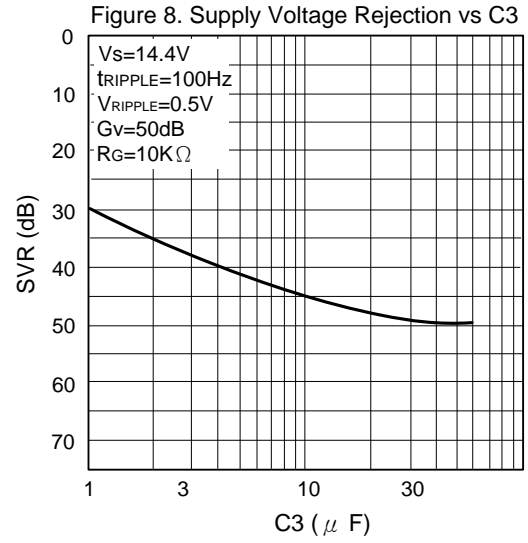
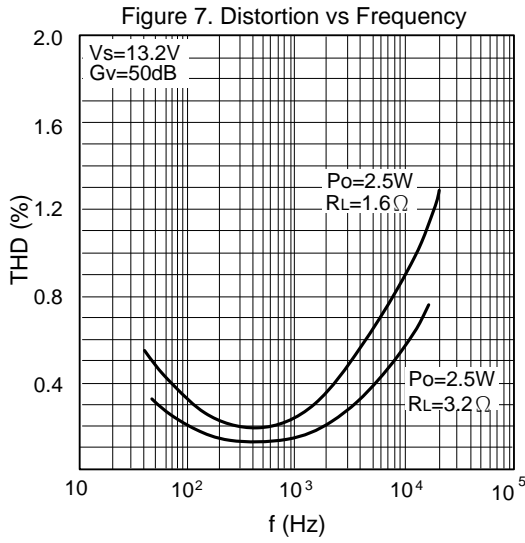


Figure 9. Supply Voltage Rejection vs. Frequency.

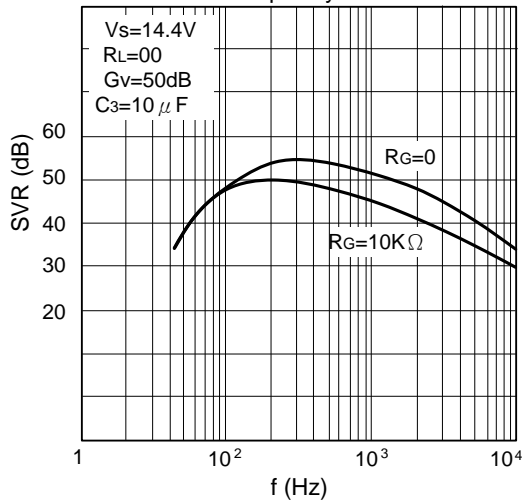


Figure 10. Supply Voltage Rejection vs. Values of Capacitors C2 and C3

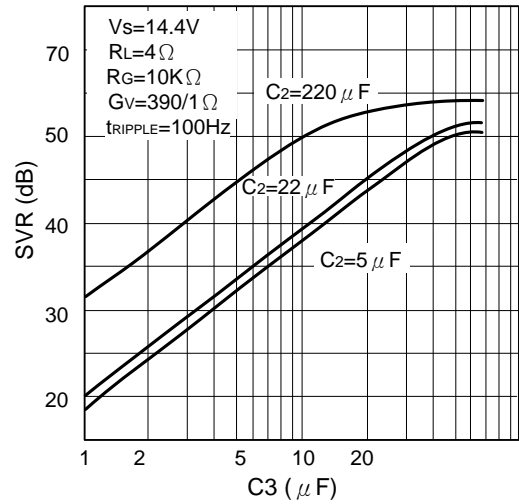


Figure 11. Supply Voltage Rejection vs. Values of Capacitors C2 and C3

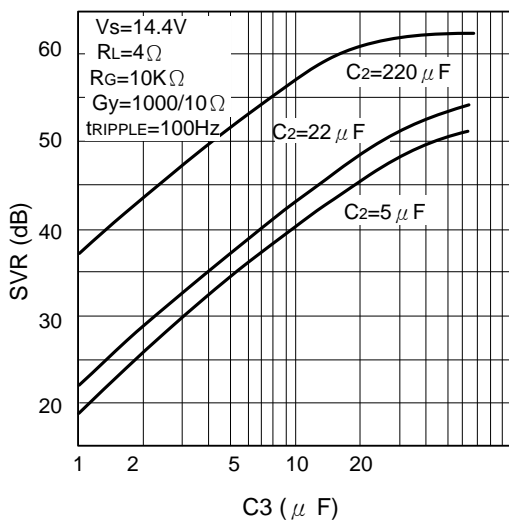
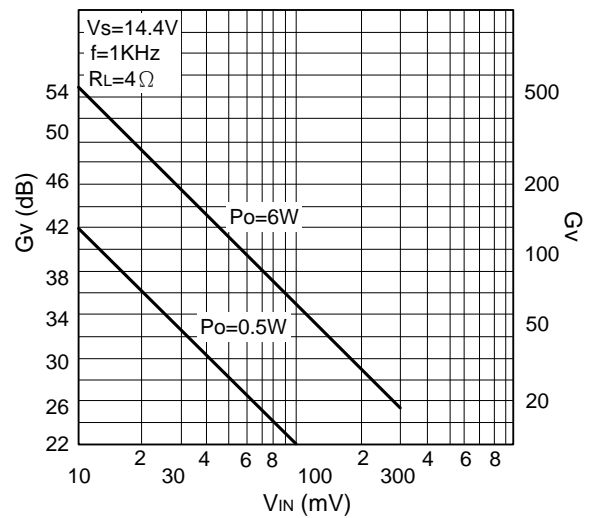


Figure 12. Gain vs. Input Sensitivity



■ TYPICAL CHARACTERISTICS (cont.)

Figure 13. Maximum Allowable Power Dissipation vs. Ambient Temperature

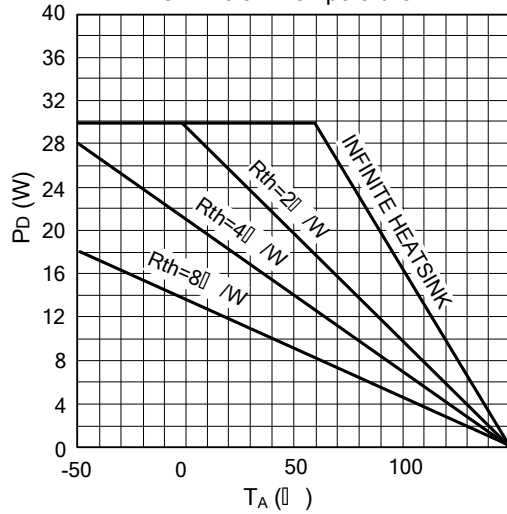


Figure 14. Total Power Dissipation and Efficiency vs. Output Power

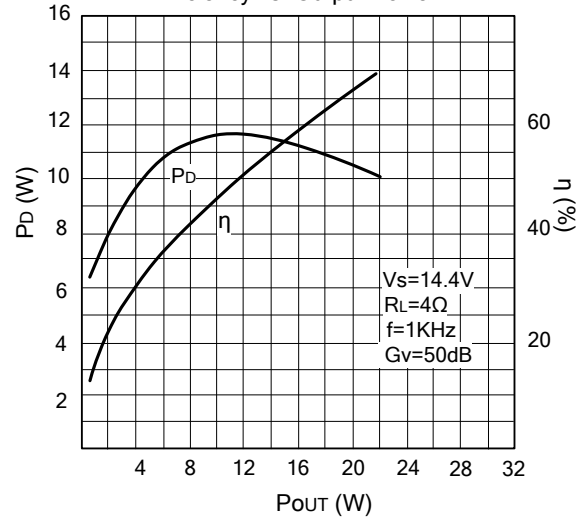
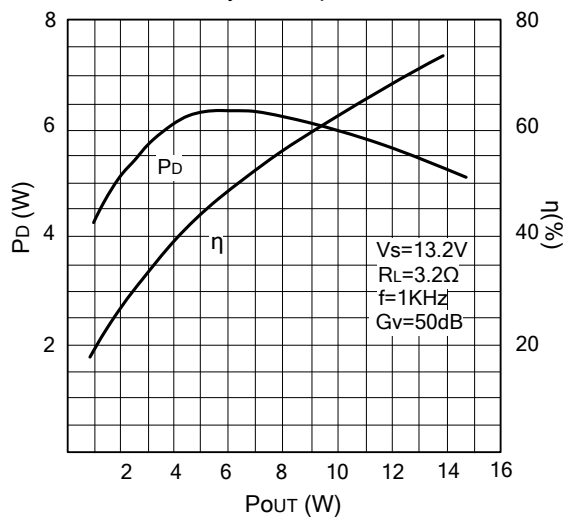


Figure 15. Total Power Dissipation and Efficiency vs. Output Power



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