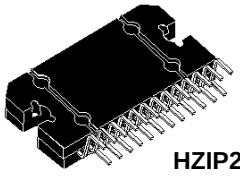
4 x 45 W quad bridge car radio amplifier

Description

The HT7388A is an AB class audio power amplifier, packaged in Flexiwatt 25 and designed for high end car radio applications. Based on a fully complementary PNP/NPN configuration, the HT7388A allows a rail to rail output voltage swing with no need of bootstrap capacitors. The extremely reduced boundary components count allows very compact sets.

Features

- High output power capability:
  - 4 x 45 W / 4 Ω max.
  - 4 x 26 W / 4 Ω @ 14.4 V, 1 kHz, 10 %
- Low distortion
- Low output noise
- Standby function
- Mute function
- Automute at min. supply voltage detection
- Low external component count:
  - Internally fixed gain (26 dB)
  - No external compensation
  - No bootstrap capacitors



HZIP25

IC marking in package
HT7388AHZ HZIP25
T_A= from -40 to 85 °C

Protections:

- Output short circuit to gnd, to V_S, across the load
- Very inductive loads
- Overrating chip temperature with soft thermal limiter
- Load dump voltage
- Fortuitous open GND
- Reversed battery
- ESD

Pin connection and test/application diagrams

Figure 1. Pin connection (top view)

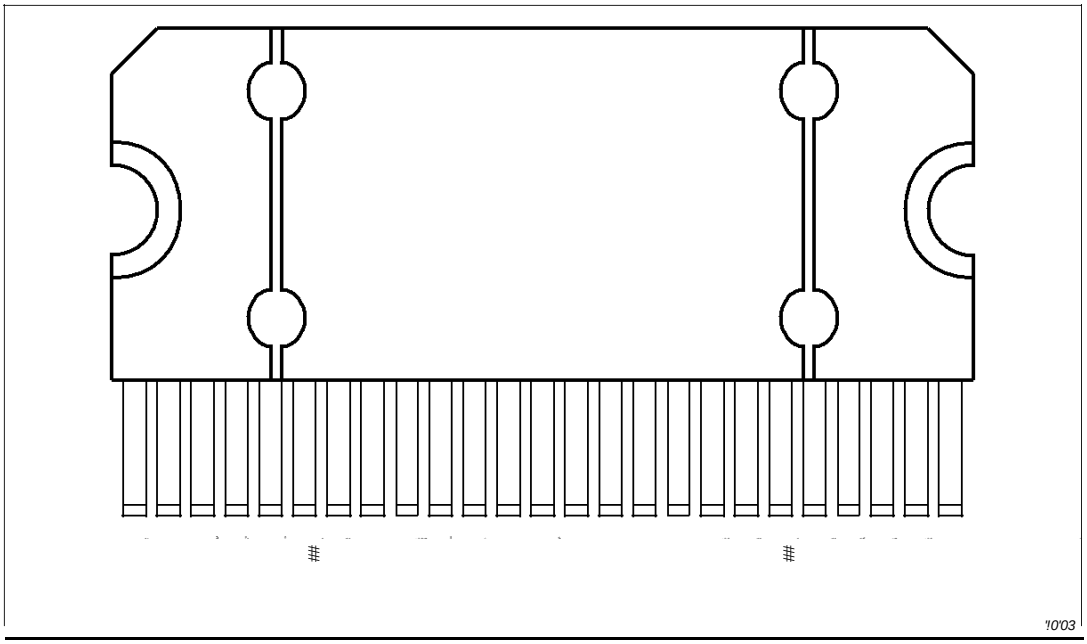
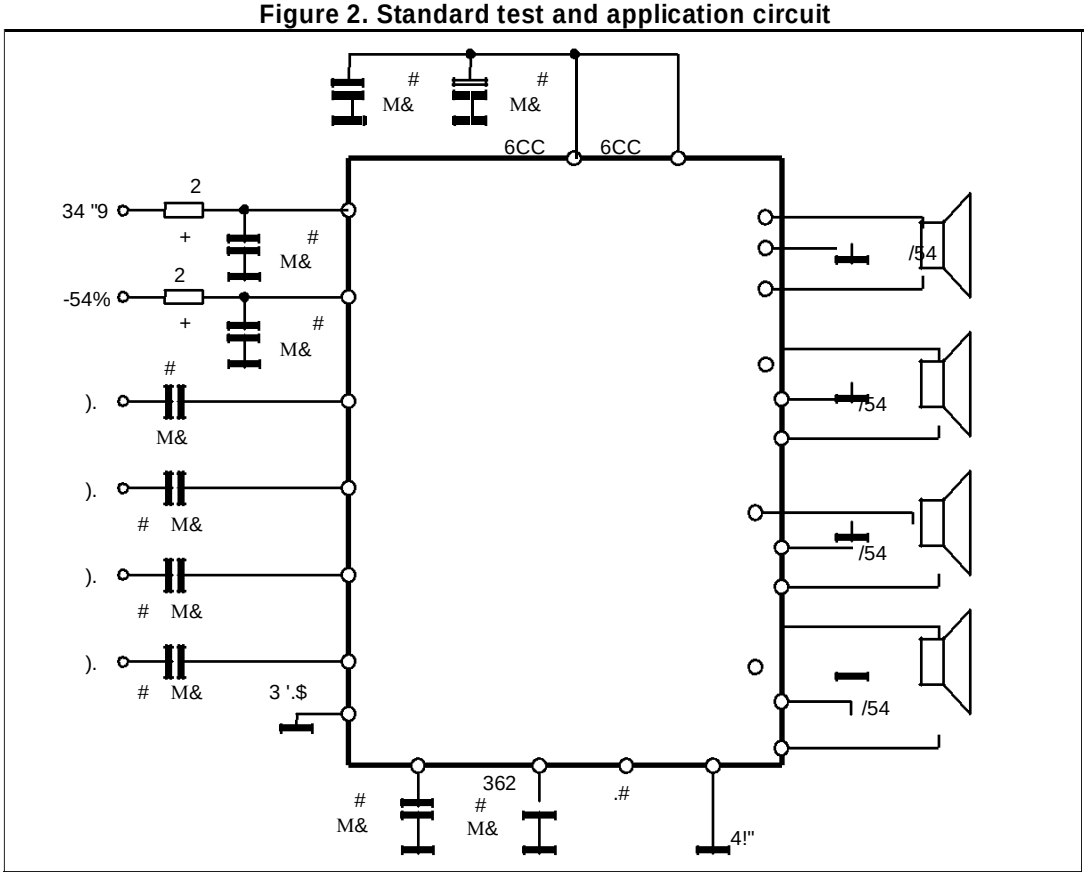


Figure 2. Standard test and application circuit



Absolute maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_S	Operating supply voltage	18	V
$V_{S(DC)}$	DC supply voltage	28	V
$V_{S(pk)}$	Peak supply voltage (t = 50 ms)	50	V
I_O	Output peak current: Repetitive (duty cycle 10 % at f = 10 Hz) Non repetitive (t = 100 µs)	 4.5 5.5	A
P_{tot}	Power dissipation, (T_{case} = 70 °C)	80	W
T_j	Junction temperature	150	°C
T_{stg}	Storage temperature	– 55 to 150	°C

Thermal data

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{th\ j\text{-}case}$	Thermal resistance junction-to-case max.	1	°C/W

Electrical characteristics

V_S = 14.4 V; f = 1 kHz; R_g = 600 Ω; R_L = 4 Ω; T_{amb} = 25 °C; Refer to the test and application diagram, unless otherwise specified.

Table 4. Electrical characteristics

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Unit
I_{q1}	Quiescent current	$R_L = \infty$	120	190	350	mA
V_{OS}	Output offset voltage	Play mode	-	-	±100	mV
dV_{OS}	During mute ON/OFF output offset voltage	ITU R-ARM weighted see	-80	-	+80	mV
G_v	Voltage gain	-	25	26	27	dB
P_o	Output power	THD = 10 %; V_S = 14.4 V	22	26	-	W
$P_{o\,max}$	Max.output power(1)	V_S = 14.4 V	37	41	-	W
		V_S = 15.2 V	-	45	-	
THD	Distortion	P_o = 4 W	-	0.04	0.15	%
e_{No}	Output noise	"A" Weighted	-	50	70	µV
		Bw = 20 Hz to 20 kHz	-	70	100	µV
SVR	Supply voltage rejection	f = 100 Hz; V_r = 1 Vrms	50	65	-	dB
I_{ch}	High cut-off frequency	P_o = 0.5 W	100	200	-	kHz
R_i	Input Impedance	-	70	100	-	kΩ
C_T	Cross talk	f = 1 kHz; P_o = 4 W	60	70	-	dB
		f = 10 kHz; P_o = 4 W	-	60	-	dB
I_{SB}	Standby current consumption	$V_{St\text{-}by}$ = 0V	-	-	20	µA
$V_{SB\,out}$	Standby OUT threshold voltage	(Amp: ON)	3.5	-	-	V
$V_{SB\,IN}$	Standby IN threshold voltage	(Amp: OFF)	-	-	1.5	V
A_M	Mute attenuation	P_{Oref} = 4 W	80	90	-	dB
$V_{M\,out}$	Mute OUT threshold voltage	(Amp: play)	3.5	-	-	V
$V_{M\,in}$	Mute IN threshold voltage	(Amp: mute)	-	-	1.5	V
$V_{AM\,in}$	V_S automute threshold	(Amp: mute); Att. ≥ 80 dB; P_{Oref} = 4 W	-		6.5	V
		(Amp: play); Att. < 0.1 dB; P_O = 0.5 W		7.6	8.5	
I_{pin22}	Muting pin current	V_{MUTE} = 1.2 V (Source current)	5	11	20	µA

1. Saturated square wave output.

Electrical characteristic curves

Figure 3. Quiescent current vs. supply voltage

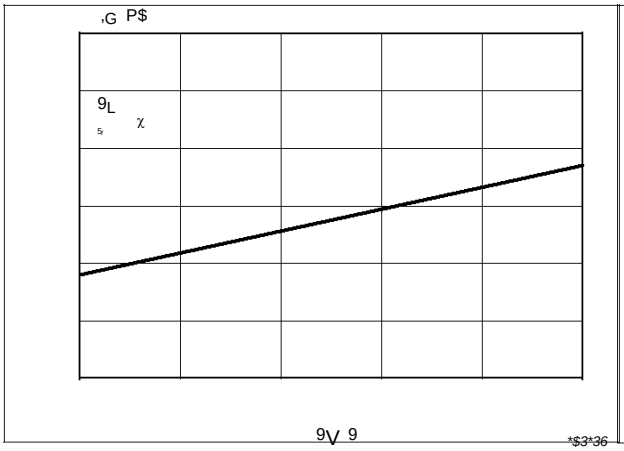


Figure 4. Output power vs. supply voltage (4 Ohm)

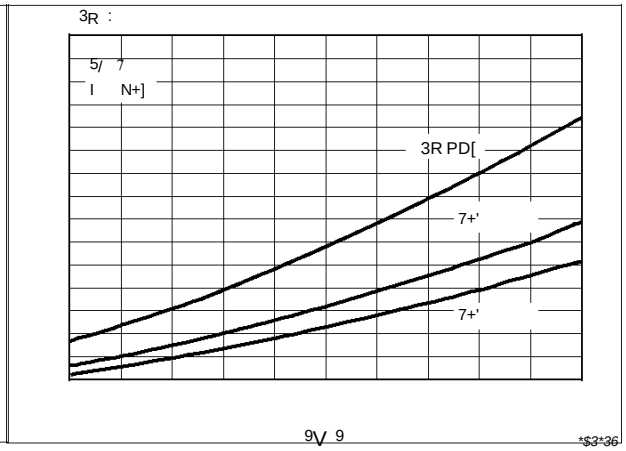


Figure 5. Distortion vs. output power (4 Ohm)

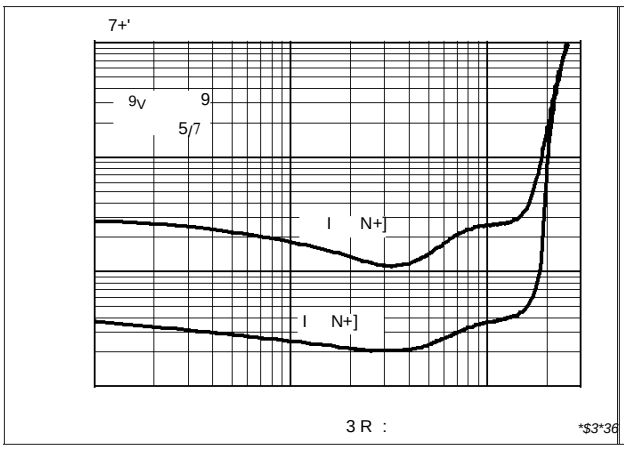


Figure 6. Distortion vs. frequency (4 Ohm)

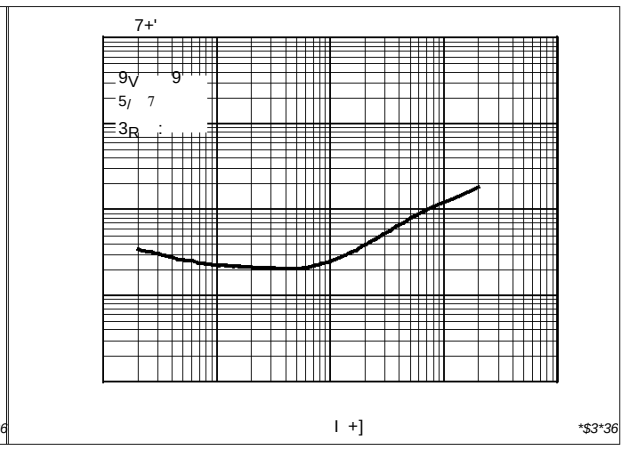


Figure 7. Supply voltage rejection vs. frequency

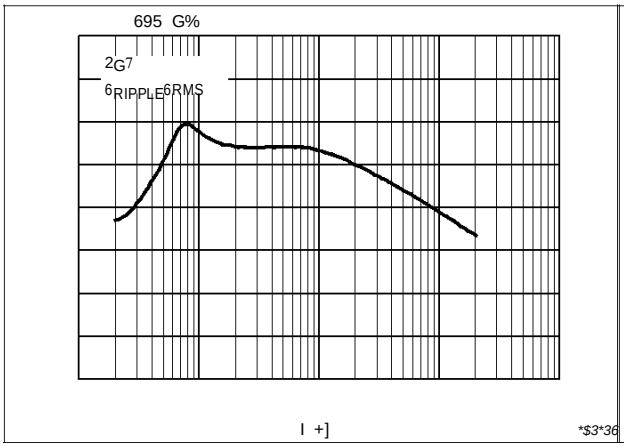


Figure 8. Crosstalk vs. frequency

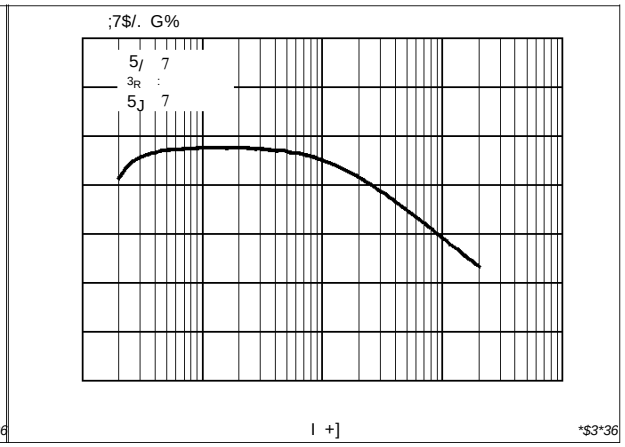


Figure 9. Output noise vs. source resistance

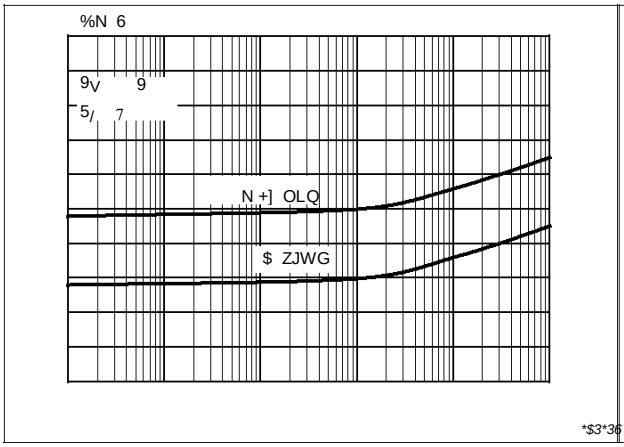


Figure 10. Total power disipation & efficiency (4 Ohm, sine)

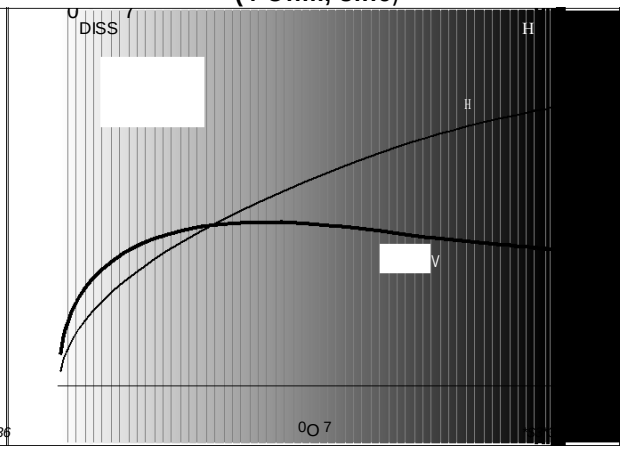


Figure 11. Power dissipation vs. average output power (4 Ohm, audio program simulation)

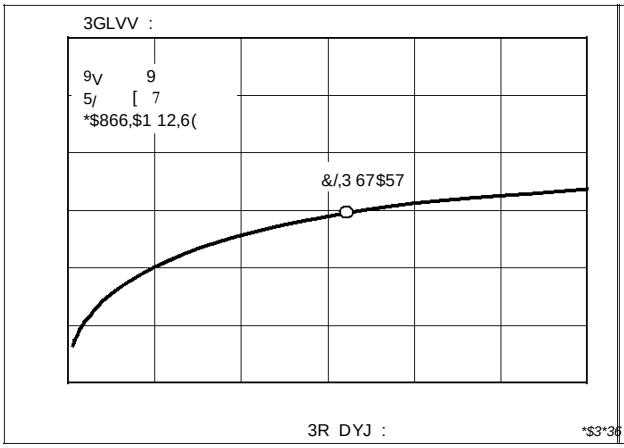
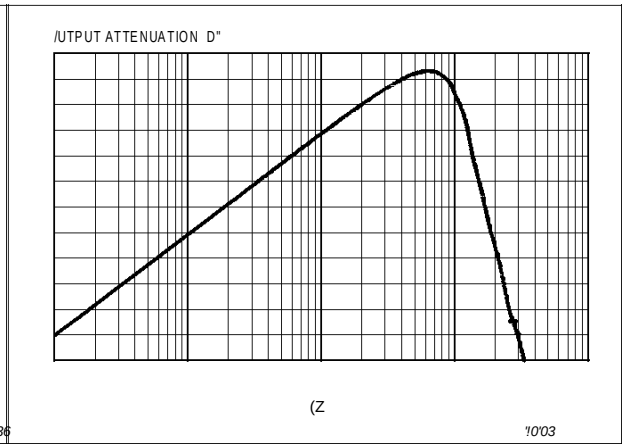


Figure 12. ITU R-ARM frequency response, weighting filter for transient pop



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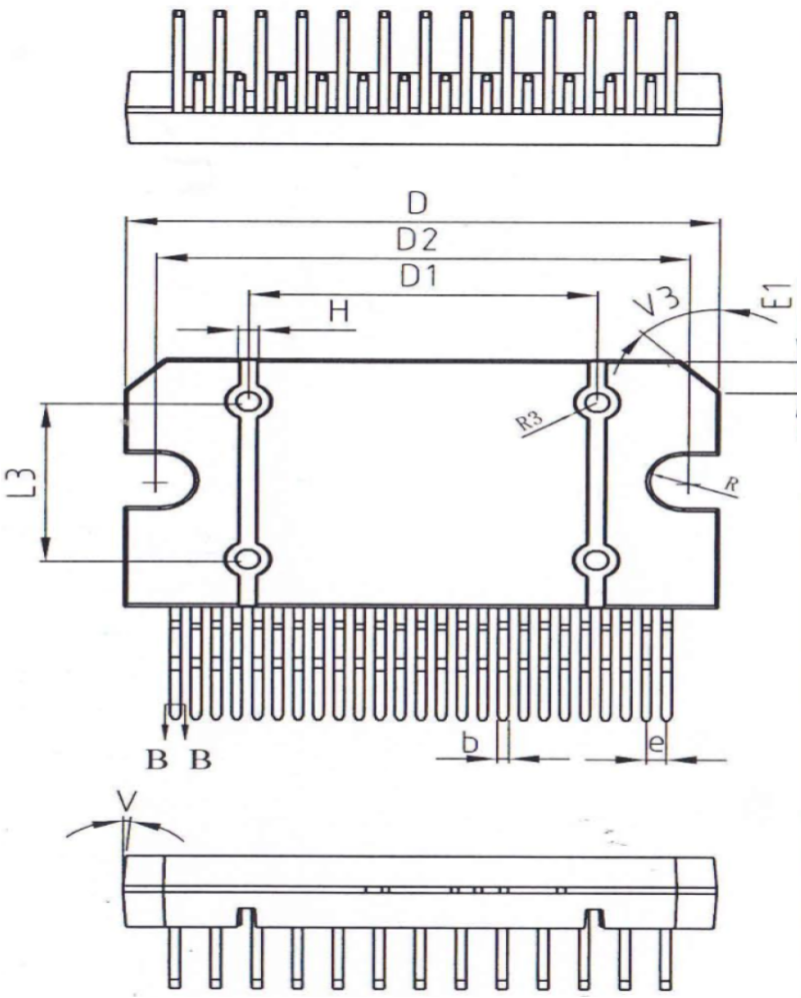
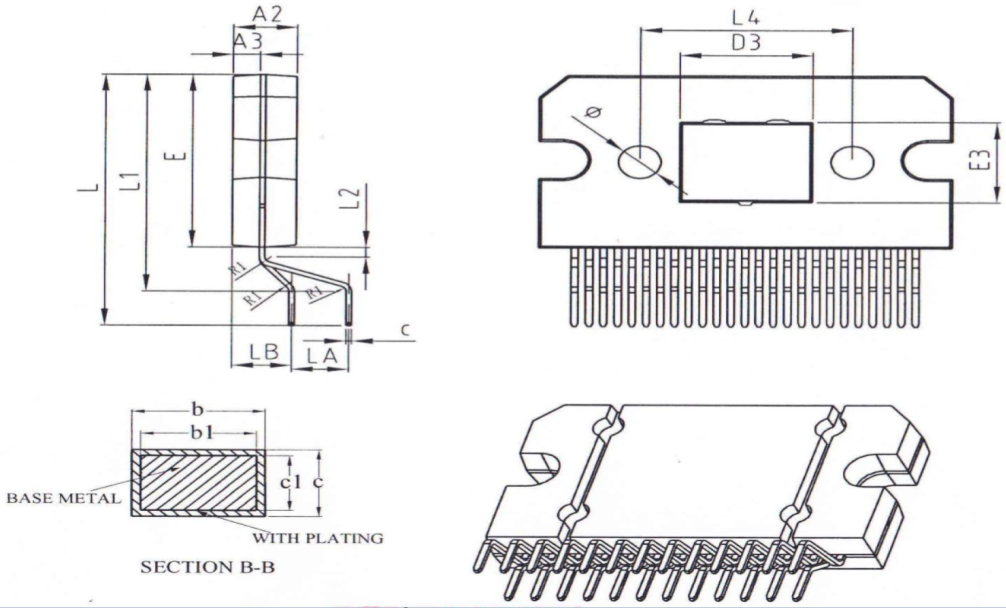


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A2	4.40	4.50	4.65
A3	1.80	1.90	2.00
b	0.48	—	0.57
b1	0.47	0.50	0.53
c	0.36	—	0.46
c1	0.35	0. 38	0.41
D	28. 90	29. 10	29. 30
D1	17.00REF		
D2	25.60REF		
D3	9.4REF		
E	15.50	15.70	15.90
E1	1.90	2.00	2.10
E3	7. 3REF		
H	0. 80REF		
e	1.00BSC		
L	22.07	22.47	22.87
L1	18.60	19.00	19.40
L2	0.75	0.90	1.05
L3	10.00REF		
L4	15.00REF		
LA	3.60	4.00	4.40
LB	3.90	4.20	4.50
R	1.60	1.70	1.80
R1	0.40	0.50	0.60
R3	1.20	1.25	1.30
V	11°	12°	13°
V3	44°	45°	46°
Φ	3.00		



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