
WIDE BANDWIDTH TOROIDAL STEP-UP TRANSFORMER FOR ELECTROSTATIC LOUDSPEAKERS

TYPE & APPLICATION	:	VDVST106PP; ESL step-up	
Step-Up Ratio (= N_s / N_p)	:	Ratio = 75.07	[]
Nominal Power	:	$P_{nom} = 50$	[Watt] (1)
Nominal Power to be delivered in	:	$Z_{out} = 4$	[Ω] (1)
Secondary Inductance (maximum value)	:	$L_s = 1.7 \cdot 10^3$	[H] (2)
Effective Secondary Leakage Inductance	:	$L_{sse} = 26$	[mH]
Primary DC Resistance	:	$R_{ip} = 0.138$	[Ω]
Secondary DC Resistance	:	$R_{is} = 248$	[Ω]
Effective Secondary Internal Capacitance	:	$C_{is} = 3.21 \cdot 10^{-10}$	[F]

LOW FREQUENCY INFORMATION:

-3dB Power Bandwidth starting at	:	$f_u = 35.355$	[Hz] (3)
Tuning Resistor in series with Primary	:	$R_{ep} = 1.05$	[Ω] (4)
-3dB Bandwidth (with R_{ep}) starting at	:	$f_{3L} = 0.627$	[Hz] (5)
Primary Impedance at 10 Hz (with R_{ep})	:	$Z_{10} = 19.16$	[Ω] (6)

HIGH FREQUENCY INFORMATION (with C_{es} & R_{ep})

Capacitance of Electrostatic Loudspeaker	:	$C_{es} = 1 \cdot 10^{-9}$	[F]
2-nd order Resonance Frequency	:	$F_o = 27.157$	[kHz] (7)
Q-factor 2-nd order HF filter section	:	$Q = 0.639$	[] (8)
-3dB High Frequency Bandwidth	:	$f_{3H} = 24.295$	[kHz] (8)
Effective Primary Impedance at 20 kHz	:	$Z_{20k} = 1.326$	[Ω]

-
- (1): A step-up transformer transforms Voltages; $V_{\text{primary}} = (P_{nom} \cdot Z_{out})^{0.5}$
(2): L_s is not constant; see M. van der Veen, Glass Audio 5/97 starting pp.20
(3): -3dB means $1/2 \cdot P_{nom}$ at f_u ; P_{nom} at $1.4 \cdot f_u$; $2 \cdot P_{nom}$ at $2 \cdot f_u$; etc.
(4): R_{ep} (= series resistor with primary) stops High Frequency ringing.
This resistor is an important external High Frequency tuning device.
(5): With $L_{s,max}$ (see (2)) and R_{ep} ; values upto $6 \cdot f_{3L}$ can be met in practice.
(6): This impedance is based on $L_{s,max}$ (see (2)) and R_{ep} .
At small primary Voltages values of $1/6 \cdot Z_{10}$ can be measured.
(7): This fundamental frequency is determined by L_{ss} and $C_{is} + C_{es}$.
(8): R_{ep} influences Q , f_{3H} , Z_p ; Select R_{ep} for $0.50 < Q < 0.74$
-

WIDE BANDWIDTH TOROIDAL STEP-UP TRANSFORMER VDVST106PP

