



SB6542	P.1
LOW FREQUENCY EL DRIVER IC	

GENERAL DESCRIPTION

The SB6542 is specially designed as a low frequency low power Electroluminescent Lamp Driver IC. Built-in RC OSC, transistors and only requires 4~5 external components. It is capable of supplying up to 220V_{PP} signals with 5 μ A low standby current. Two external capacitors are used to select the inductor and the lamp oscillator frequencies.

FEATURE

- * BIPLOR TECHNOLOGY
- * OPERATING VOLTAGE :
2.2V ~ 5.0V DC
- * TOTAL SUPPLY CURRENT :
50mA (at V_{dd} = 3 V)
- * LOW FREQUENCY 150 Hz
- * Built-in RC OSC & TRANSISTORS
- * Dual Oscillator Operation for application flexibility
- * Low Current Standby Mode

APPLICATIONS

- * CELLULAR PHONE LCD BACKLIGHT
- * CORDLESS PHONE (DECT, 900MHz, 46/49MHz ..) LCD BACKLIGHT
- * PDA BACKLIGHT
- * REMOTE CONTROL BACKLIGHT
- * FINANCIAL PAGER LCD BANKLIGHT
- * SMALL SIZE DISPLAY DATABACK BACKLIGHT
- * HANDHELD COMPUTER LCD BACKLIGHT

ABSOLUTE MAXIMUM RATINGS

Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

V _{dd}	7.0V
Input Voltages/Current	
HON (pin 1)	-0.5V to (V _{dd} + 0.5V)
COIL (pin 3)	60mA
Lamp Outputs	230 V _{pp}
Storage Temperature	-65°C to +150°C

SPECIFICATION

($T=25^{\circ}\text{C}$, $V_{\text{dd}}=3.0\text{V}$, Lamp Capacitance=55nF, Coil=5mH($R=18\Omega$), $C_{\text{osc}}=220\text{pF}$, $L_{\text{amposc}}=1500\text{pF}$ unless otherwise noted)

PARAMETER	MIN	TYP	MAX	UNIT	CONDITIONS
Supply Voltage, V_{dd}	2.2	3.0	5.0	V	
Supply Current, $I_{\text{coil}} + I_{\text{dd}}$		35	50	mA	$V_{\text{dd}}=3.0\text{V};$ $V_{\text{HON}}=3.0\text{V}$
Coil Voltage, V_{coil}	V_{dd}	-	5.0	V	
HON Input Voltage, V_{HON} LOW: EL off HIGH: EL on	-0.25 $V_{\text{dd}}-0.25$	0 V_{dd}	0.25 $V_{\text{dd}}+0.25$	V	
HON Current, EL on			10	μA	Internal pulldown, $V_{\text{HON}}=V_{\text{dd}}=3.0\text{V}$
Quiescent Supply Current, $I_{\text{qs}} = I_{\text{coil}} + I_{\text{dd}}$		1	5	μA	$V_{\text{HON}}=0\text{V}$

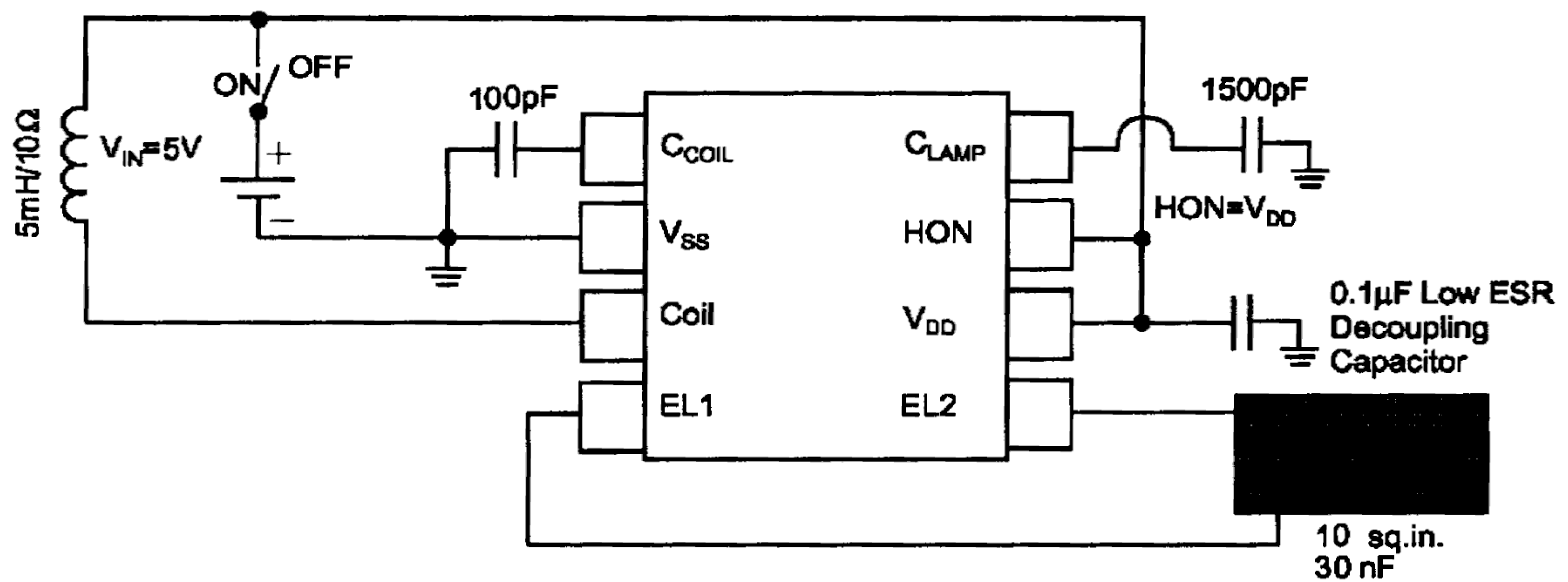
INDUCTOR DRIVE

Coil Frequency, f_{coil}	3	4	6	kHz	
Coil Duty Cycle		75		%	
Peak Coil Current, $I_{\text{pk-coil}}$			60	mA	Guaranteed by design

EL LAMP OUTPUT

EL Lamp Frequency, f_{lamp}	150 100	200	250 400	Hz	$T_{\text{amb}}=+25^{\circ}\text{C}$ $T_{\text{amb}}=-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$
Peak to peak output voltage	60 100 60 120	90 130		V_{pp}	$T_{\text{amb}}=+25^{\circ}\text{C}$, $V_{\text{dd}}=2.2\text{V}$ $T_{\text{amb}}=-25^{\circ}\text{C}$, $V_{\text{dd}}=3.0\text{V}$ $T_{\text{amb}}=-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, $V_{\text{dd}}=3.0\text{V}$ $T_{\text{amb}}=+25^{\circ}\text{C}$, $V_{\text{dd}}=5.0\text{V}$

APPLICATION CIRCUIT

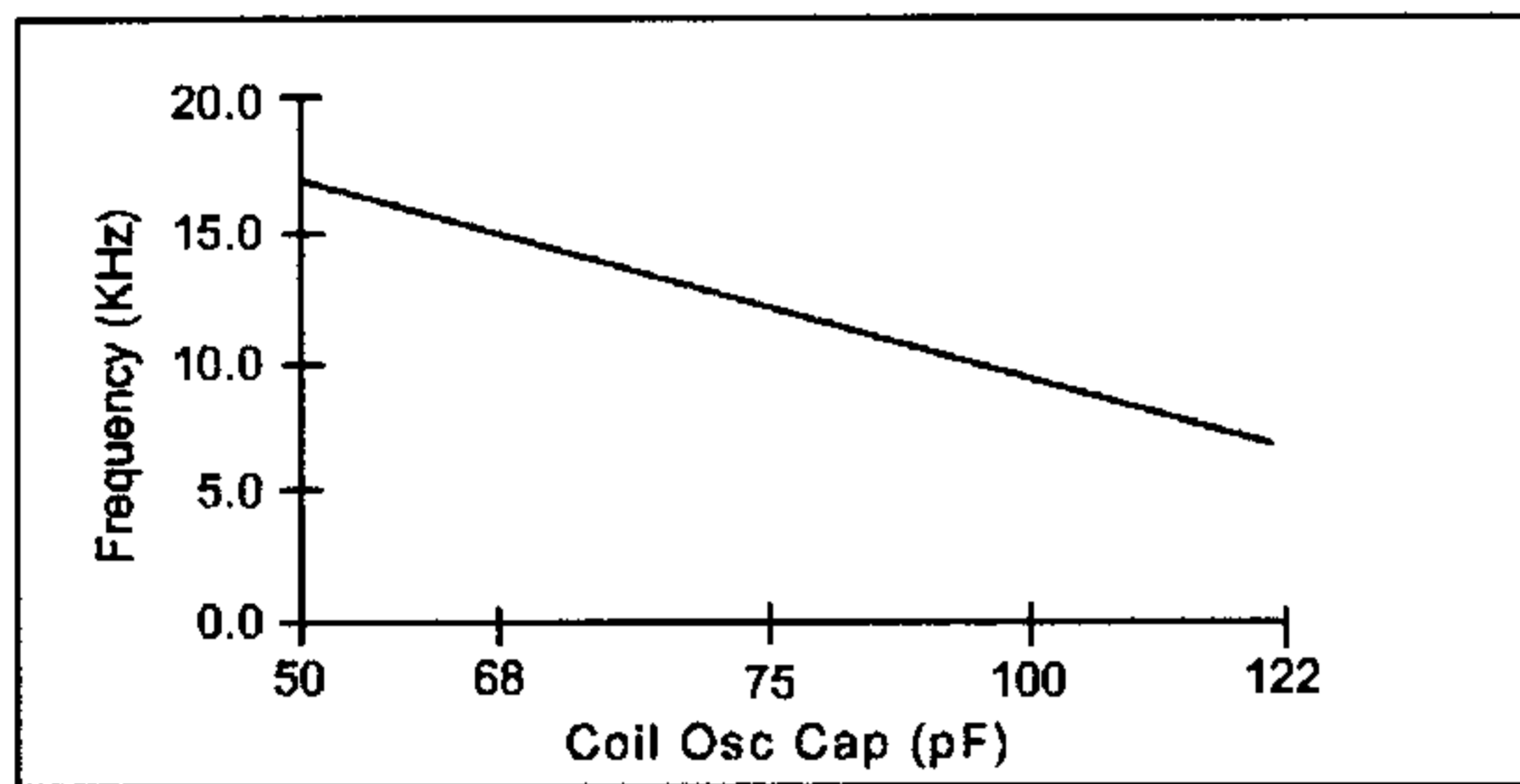


SB6542

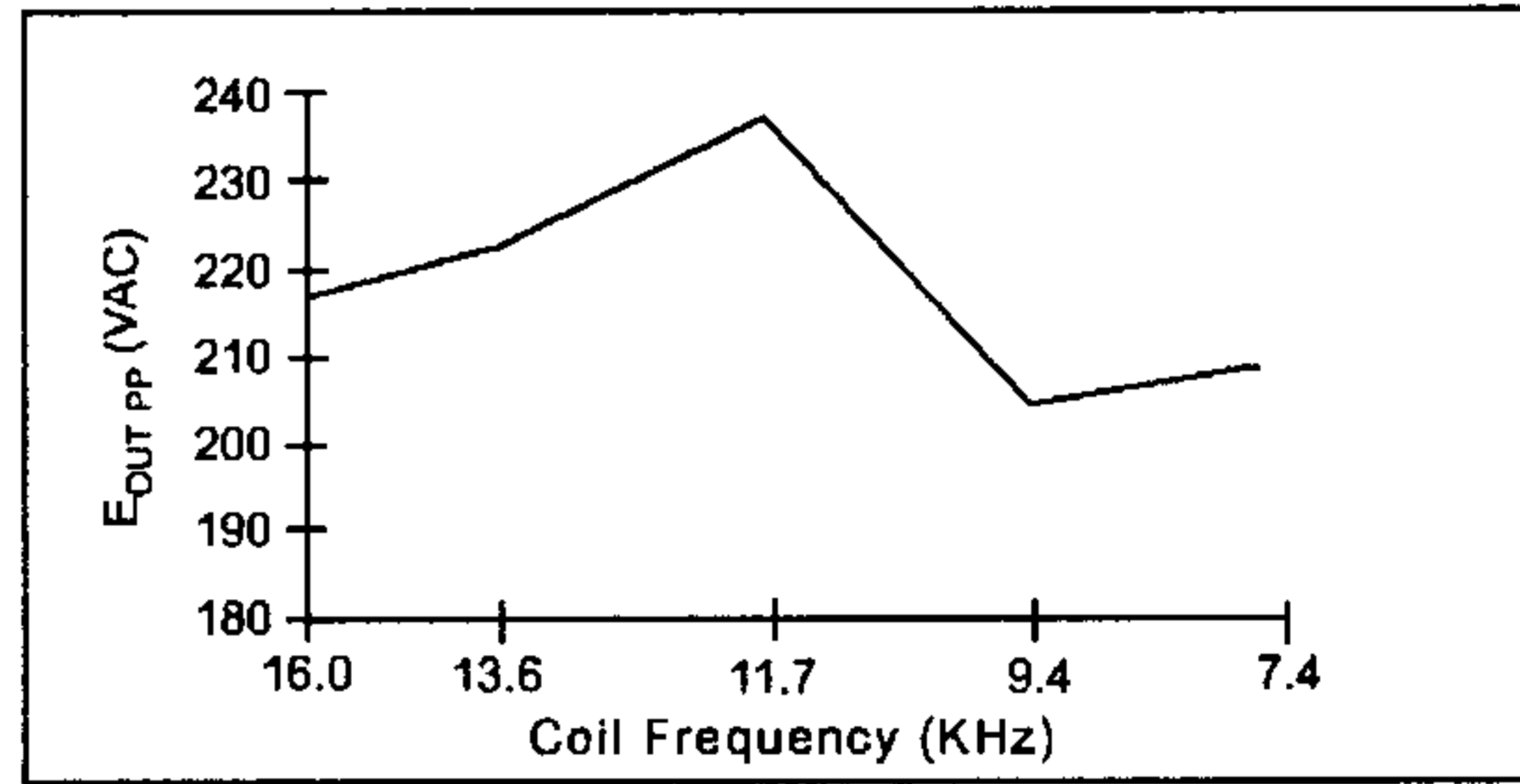
Notes:

1. Lower DCR of inductor can guarantee higher brightness of EL.
2. Choose more accurate C_{LAMP} to avoid losing of optimum brightness because of EL's frequency shift.
3. Higher voltage input (within limit) results in higher brightness of EL.
4. Avoid interference by shorten the separation between inductor and driver IC.
5. Avoid interference by separate the 2 driving wires of EL with the remaining circuitry.
6. Due to stability and power saving issues, SB6542 is triggered on/off by control of the power source.

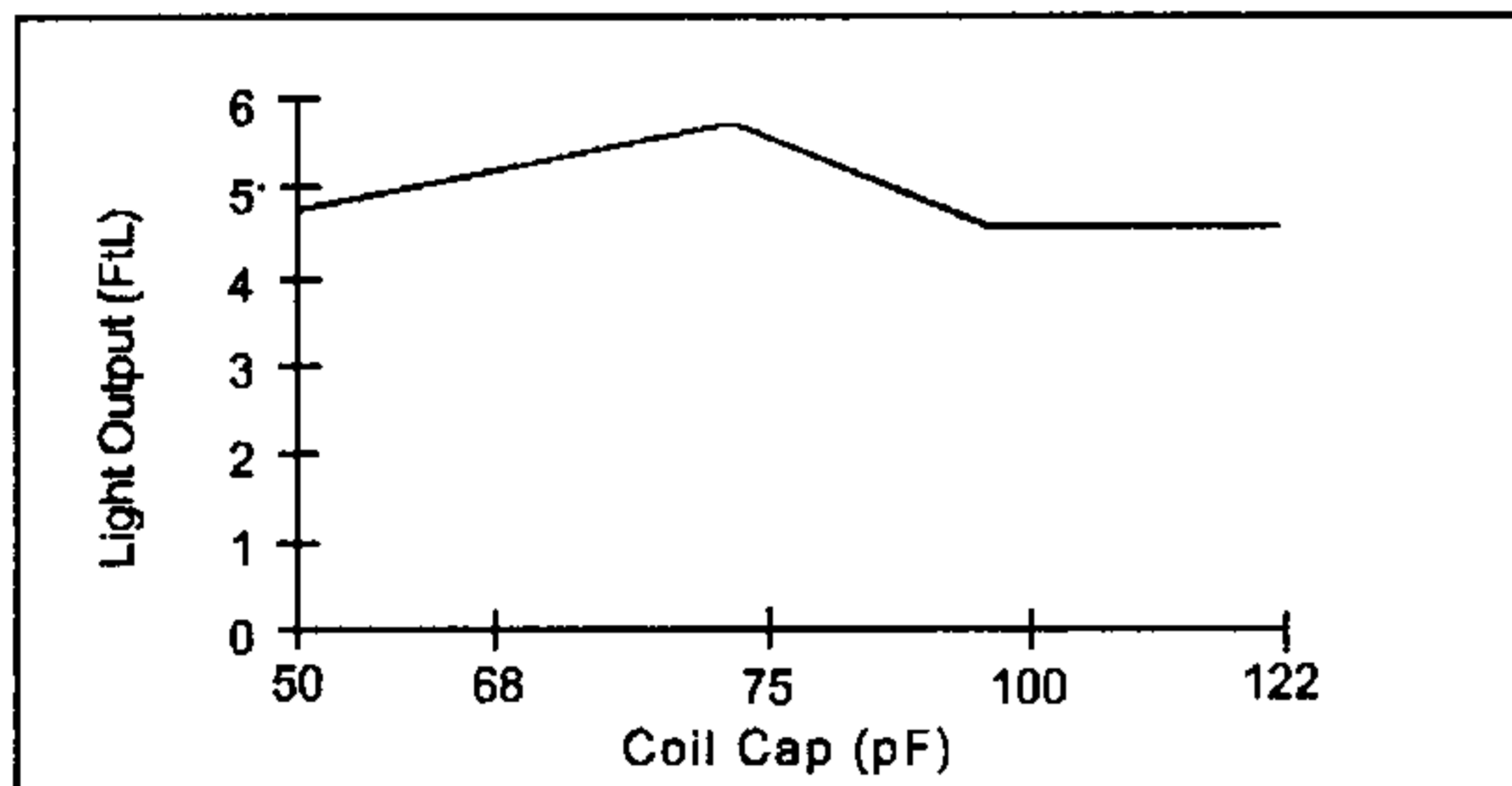
The following performance curves are intended to give the designer a relative scale from which to optimize specific applications. Absolute measurements may vary depending upon the brand of components chosen.



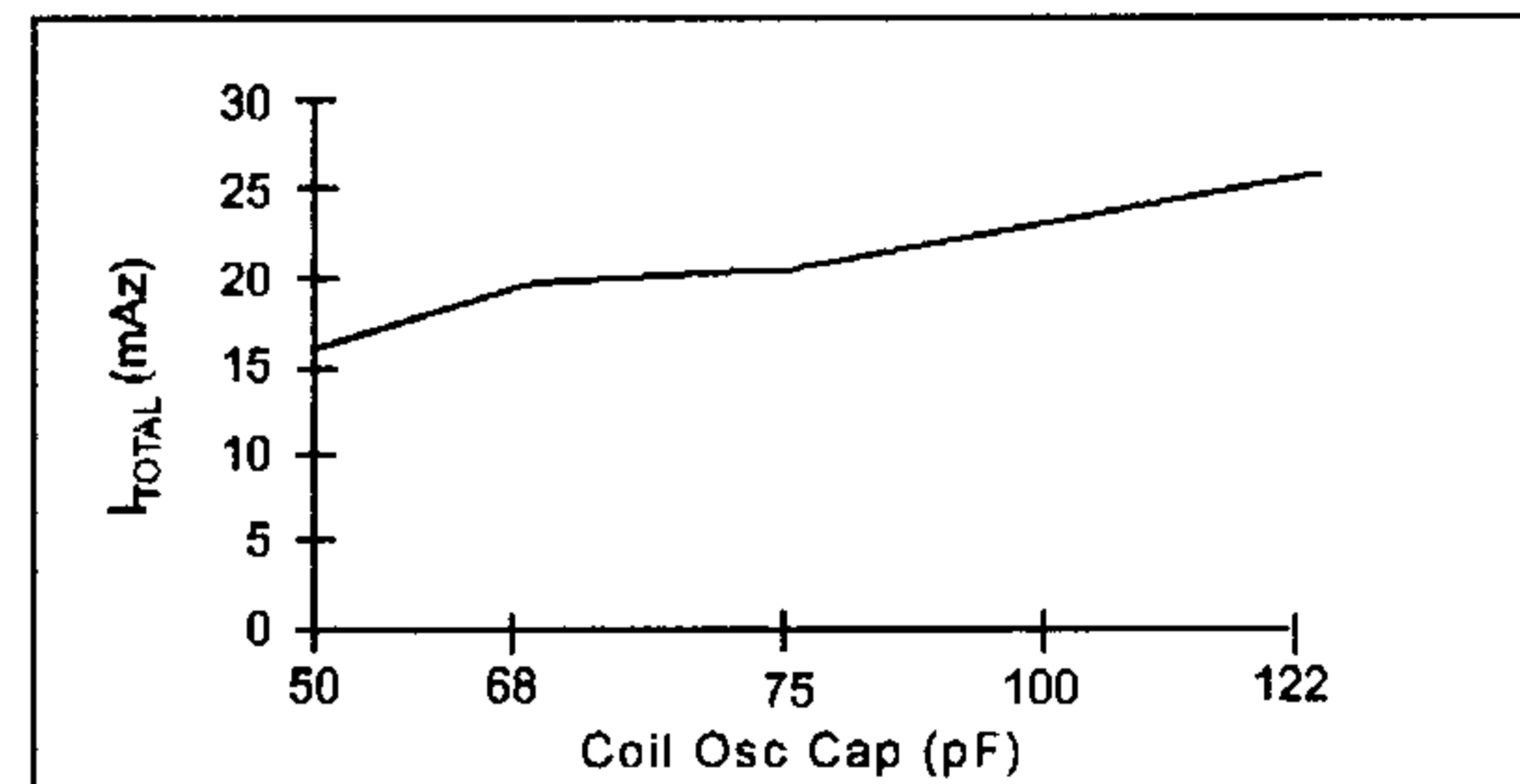
Coil Frequency vs. Coil Osc Cap Value



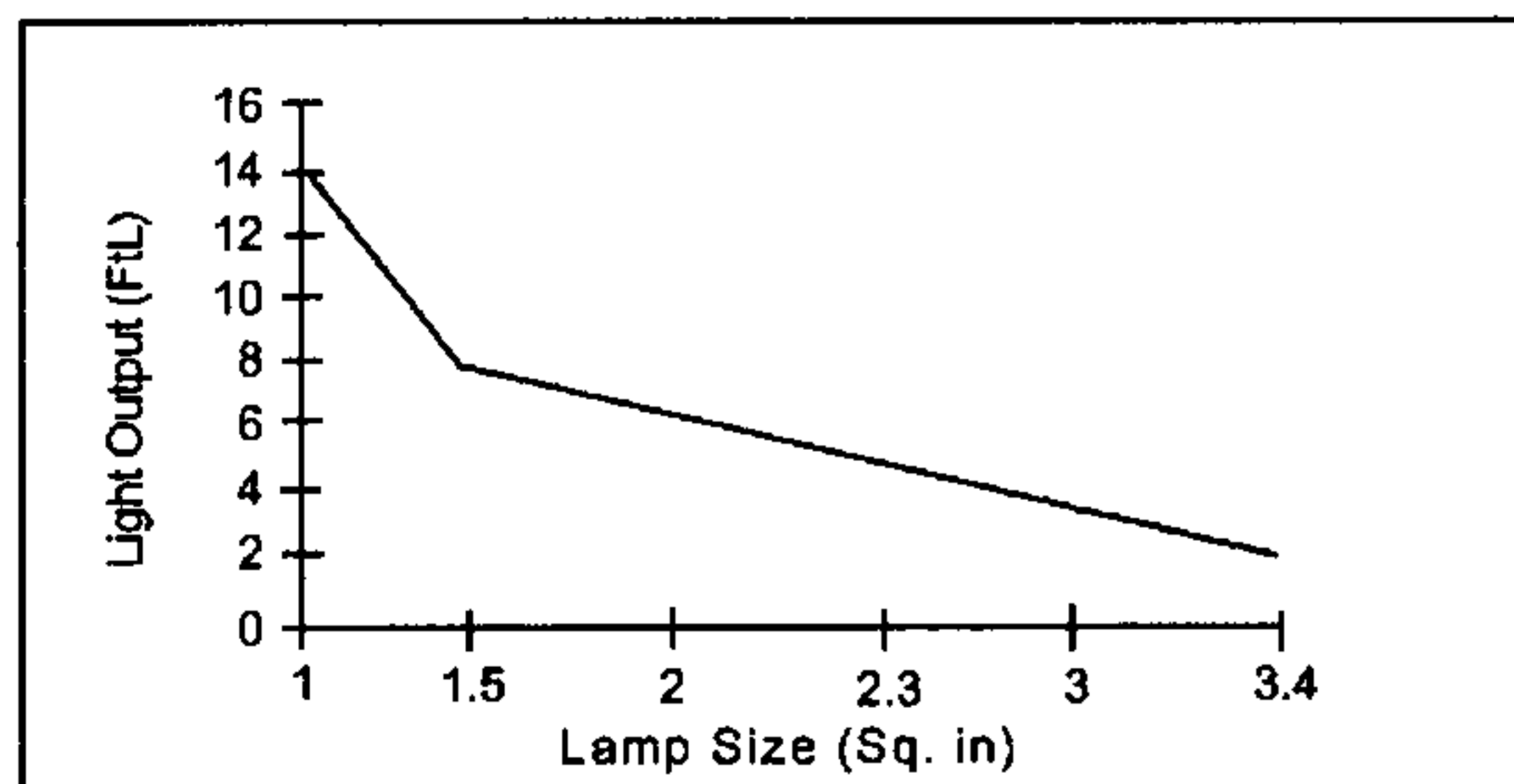
Coil Frequency vs. E_OUT_PP



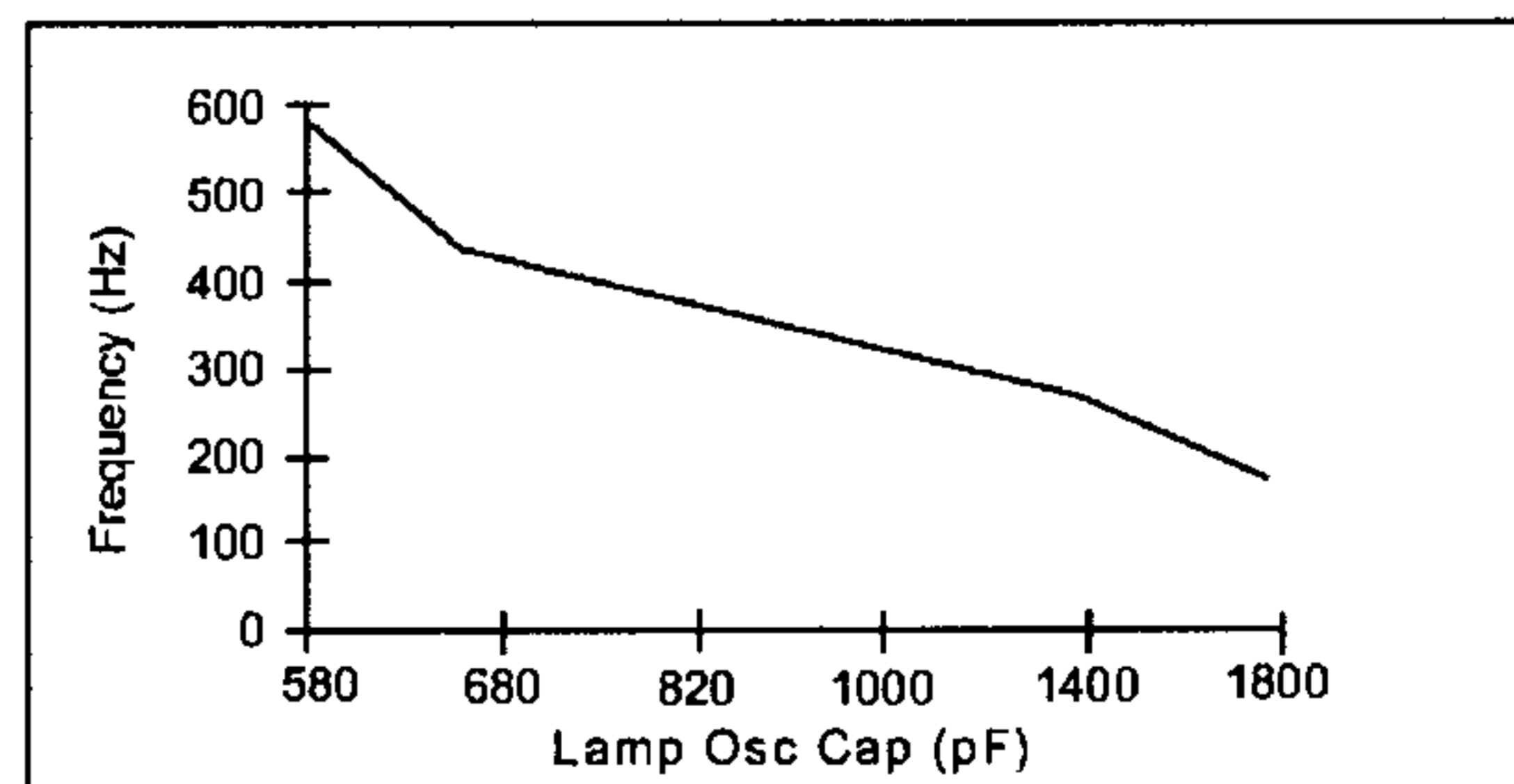
Coil Cap vs. Light Output



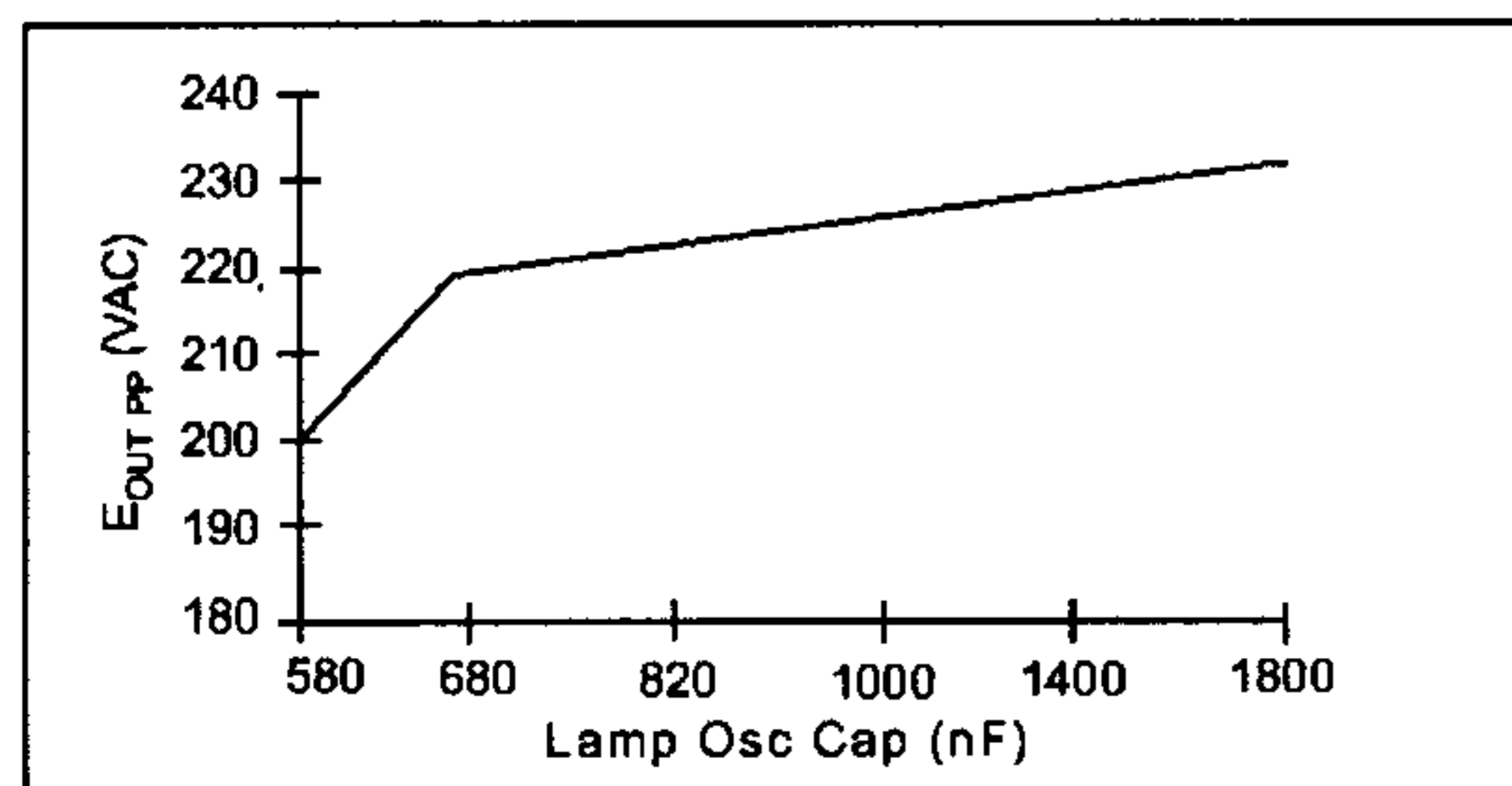
I_TOTAL vs. Coil Osc Cap



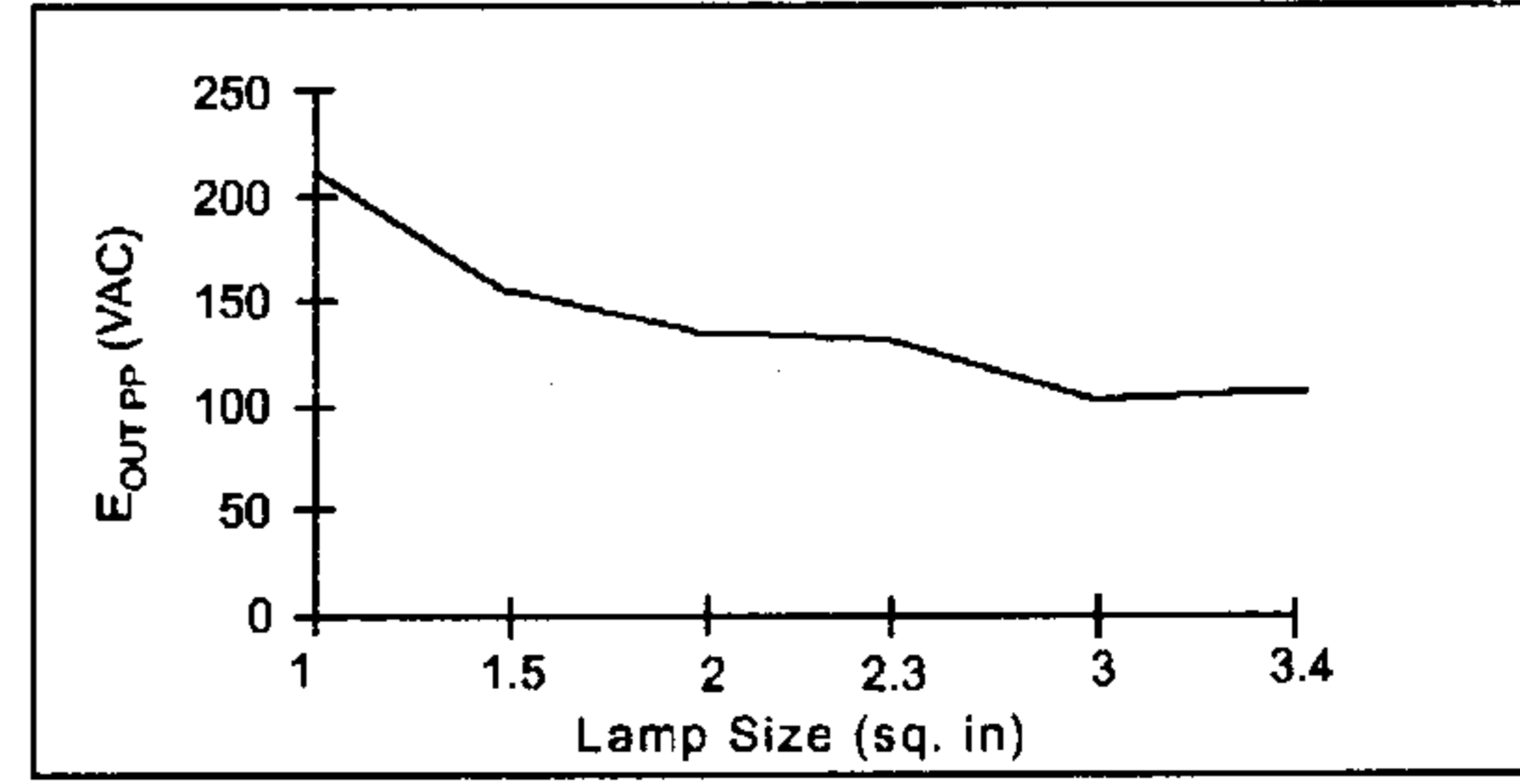
Lamp Size vs. Light Output



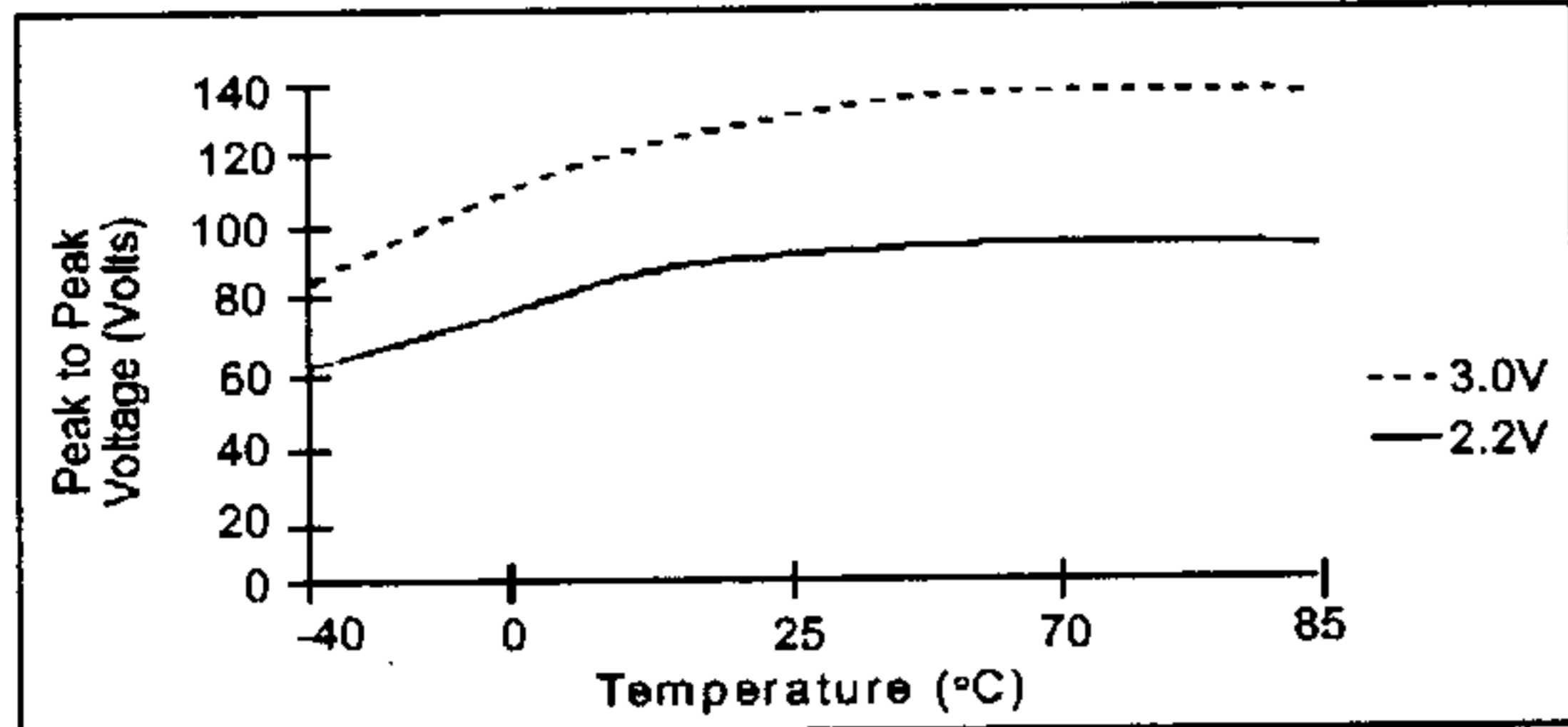
Lamp Frequency vs. Lamp Osc Cap Value



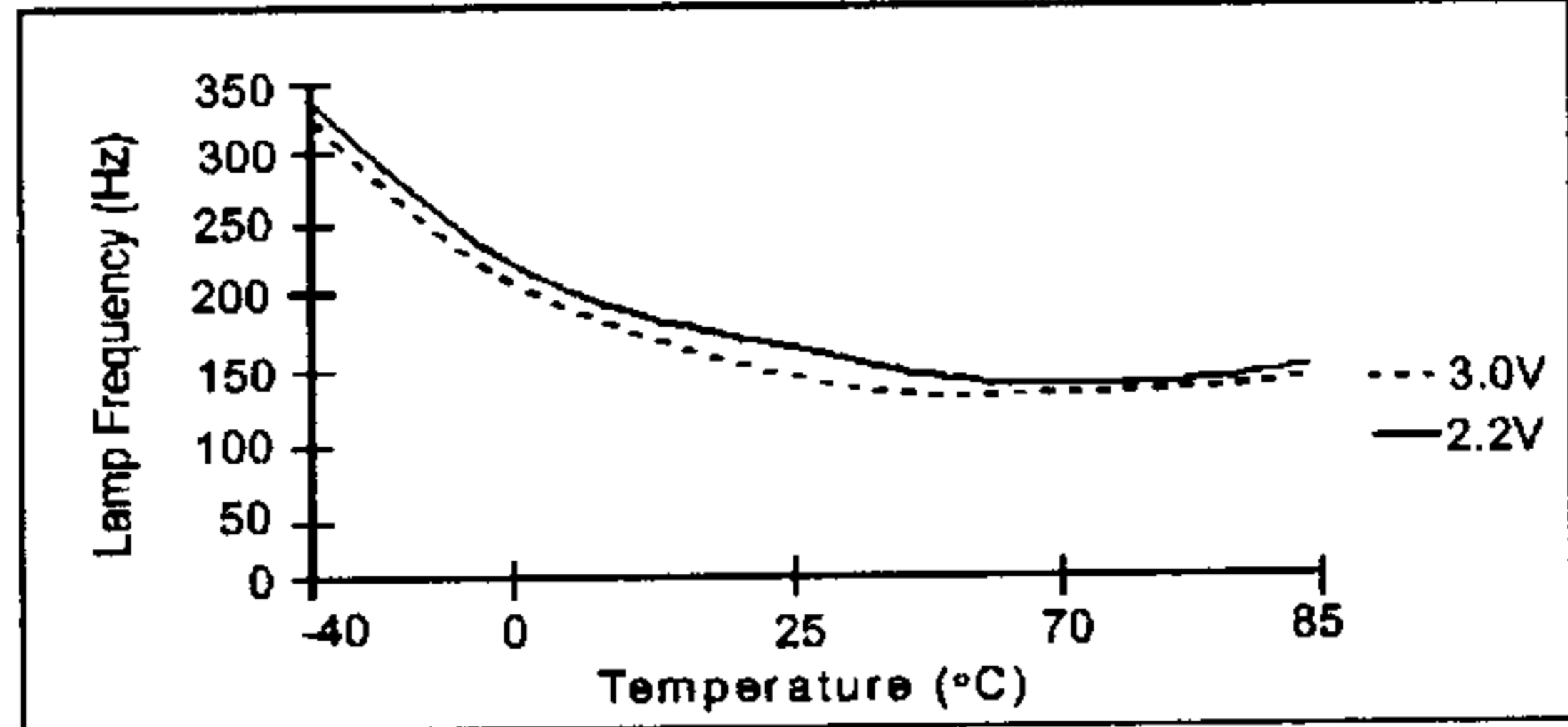
Lamp Osc Cap vs. E_OUT_PP



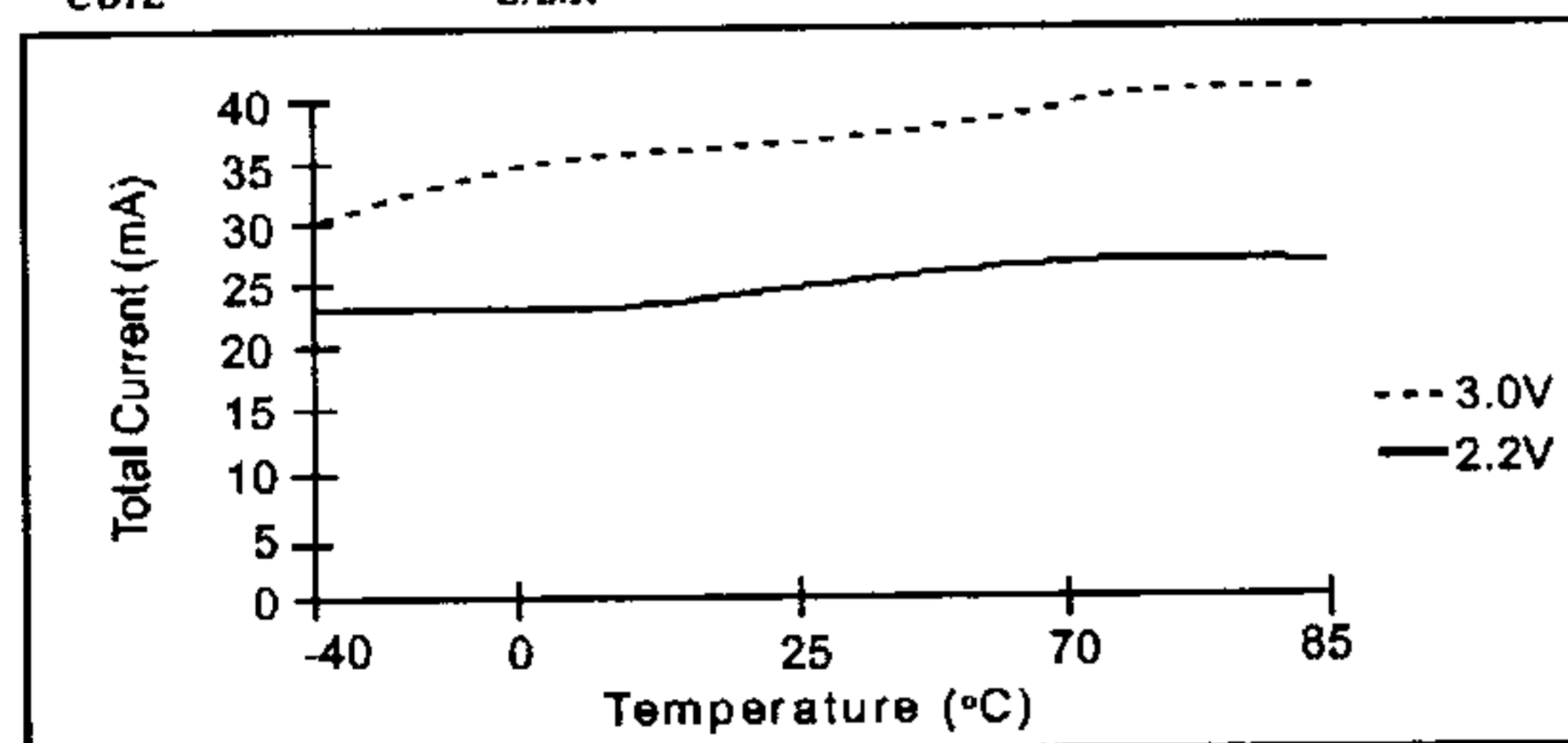
Lamp Size vs. E_OUT_PP



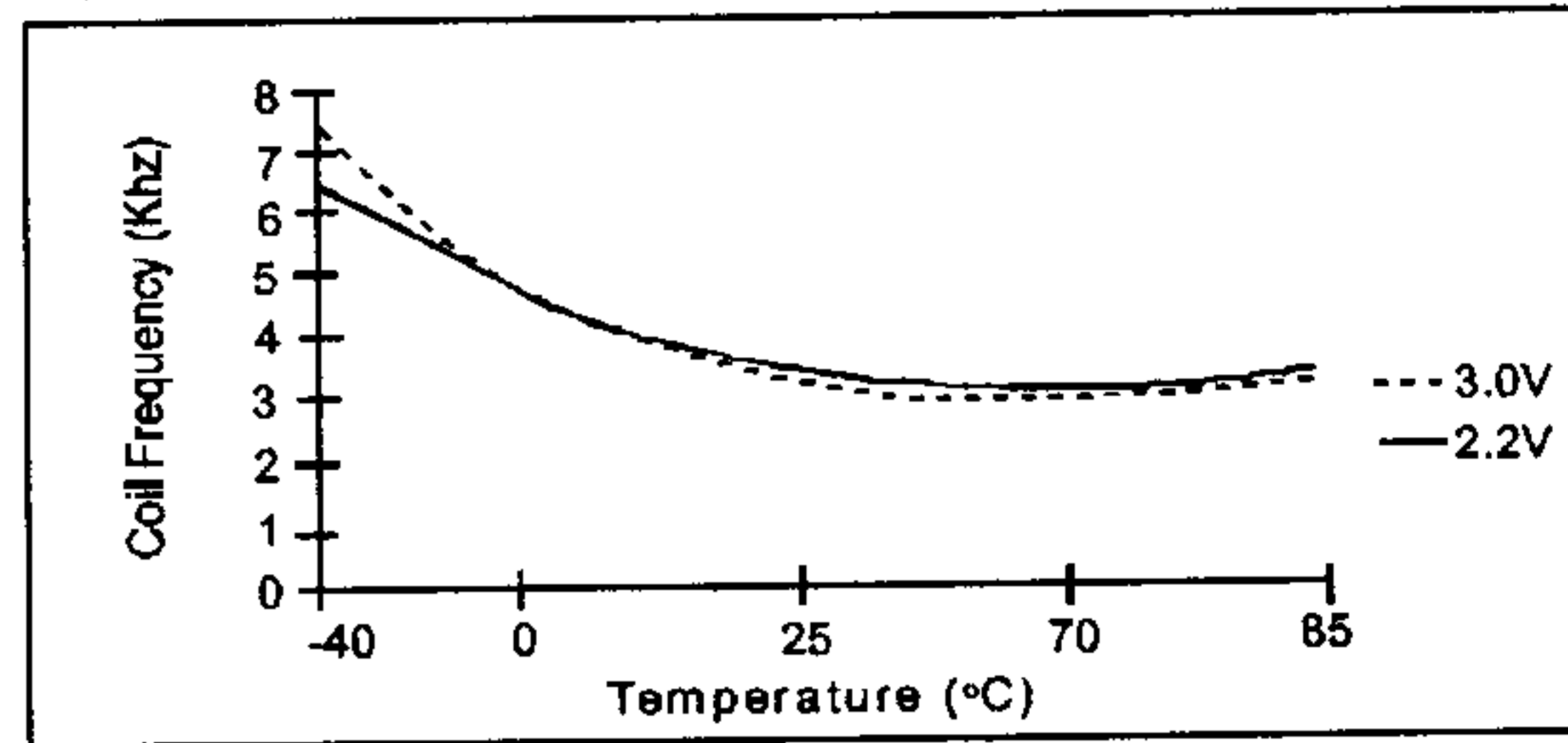
Peak to Peak Voltage vs. Temperature
 $C_{COIL}=220pF; C_{LAMP}=1500pF; Load=55nF$



Lamp Frequency vs. Temperature
 $C_{COIL}=220pF; C_{LAMP}=1500pF; Load=55nF$



Total Current vs. Temperature
 $C_{COIL}=220pF; C_{LAMP}=1500pF; Load=55nF$



Coil Frequency vs. Temperature
 $C_{COIL}=220pF; C_{LAMP}=1500pF; Load=55nF$

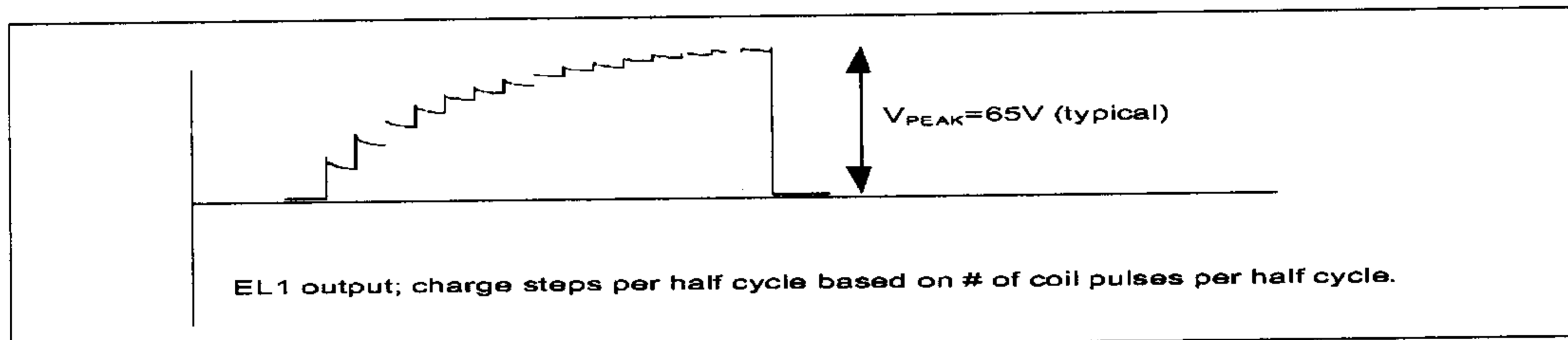


Figure 1. EL output voltage in discrete steps at EL1 output

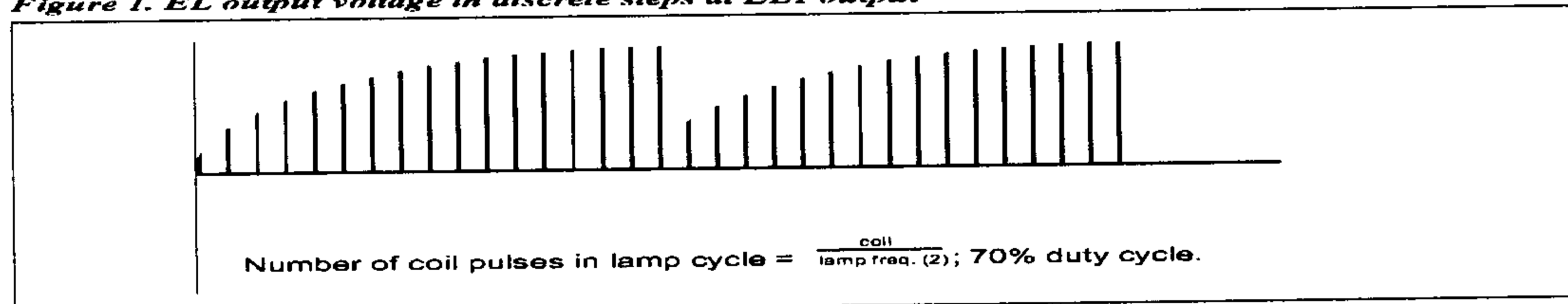


Figure 2. Voltage pulses released from the coil to the EL driver circuitry

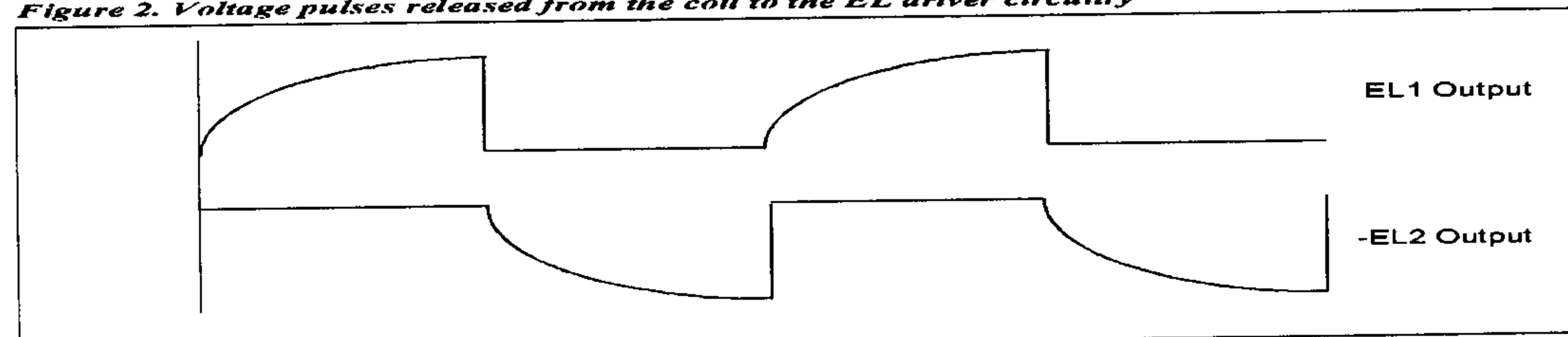


Figure 3. EL voltage waveforms from the EL1 and EL2 outputs

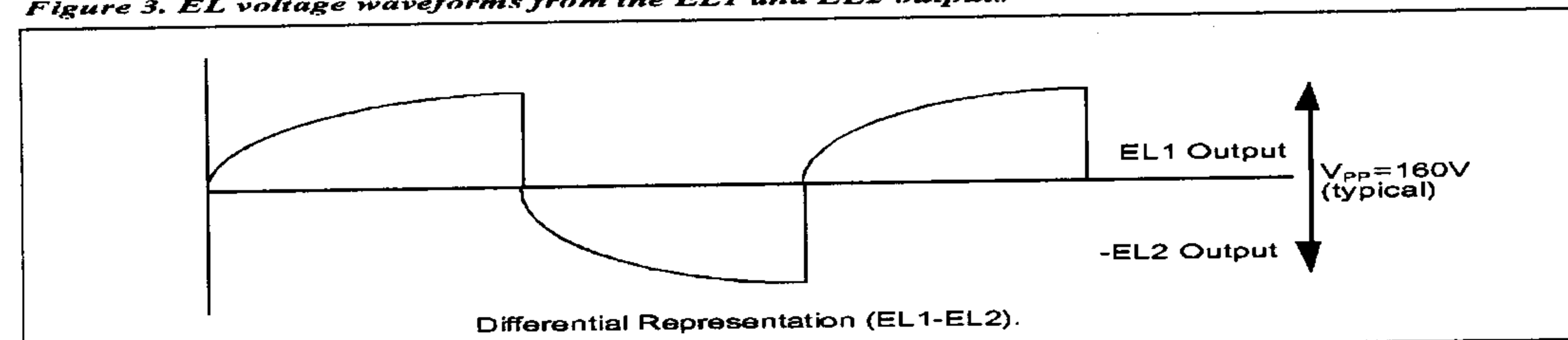


Figure 4. EL differential output waveform of the EL1 and EL2 outputs

EL DRIVER: SB6542 TESTING

TEST CONDITIONS: EL PAPER - 94mm x 43mm (BLUE)
 Clamp: 680pF (Lamp Frequency: 410Hz)
 INDUCTOR: 5mH (R=10 ohms)

Cosc	Light Output (lux)	Current Total (mA)	Voltage p-p (V)
47pF	29.3	27.2	152.8
50pF	29.4	28.0	153.6
68pF	31.0	29.6	159.2
82pF	32.2	32.0	164
100pF	31.8	38.0	164.8
150pF	26.9	44.0	164
180pF	24.9	48.0	157.6
220pF	20.7	56.0	146.4
300pF	15.4	57.0	132.8
330pF	12.9	58.0	128
470pF	6.7	66.0	98.4

EL DRIVER: SB6542 TESTING

TEST CONDITIONS: EL PAPER - 94mm x 43mm (BLUE)
 Cosc: 82pF
 INDUCTOR: 5mH (R=10 ohms)

Clamp	Light Output (lux)	Current Total (mA)	Voltage p-p (V)	Lamp Frequency (Hz)
300pF	16.2	39.0	106.4	925
330pF	19.3	38.0	121.6	767
470pF	25.9	37.0	144.0	540
560pF	26.5	37.0	145.6	513
680pF	31.4	36.0	165.6	403
820pF	37.8	36.0	188.0	319
1000pF	41.1	36.0	200.0	263
1500pF	45.0	34.0	226.0	180