

Introduction



The EL7566 is a high efficiency full-featured synchronous 6A step-down regulator. This document lists the completed schematic diagram and BOM, as well as the layout. With components on one side of the PCB, the complete converter occupies less than 0.72in² of space.

Please refer to the datasheet for the application of features. This demo board is preset to 1.8V for V_O and operates at 500kHz switching frequency. The measured crossover frequencies are around 50kHz with the compensation values.

Circuit Diagram

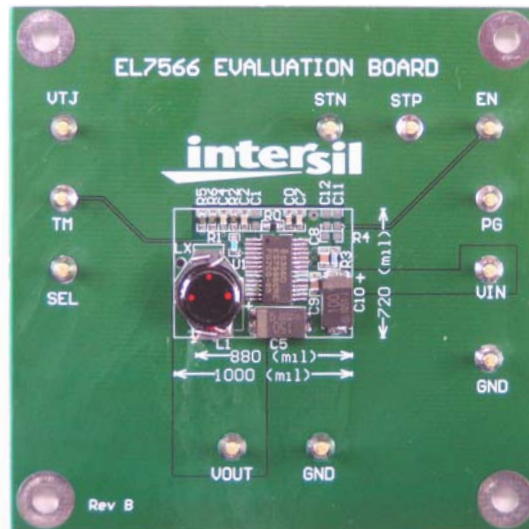
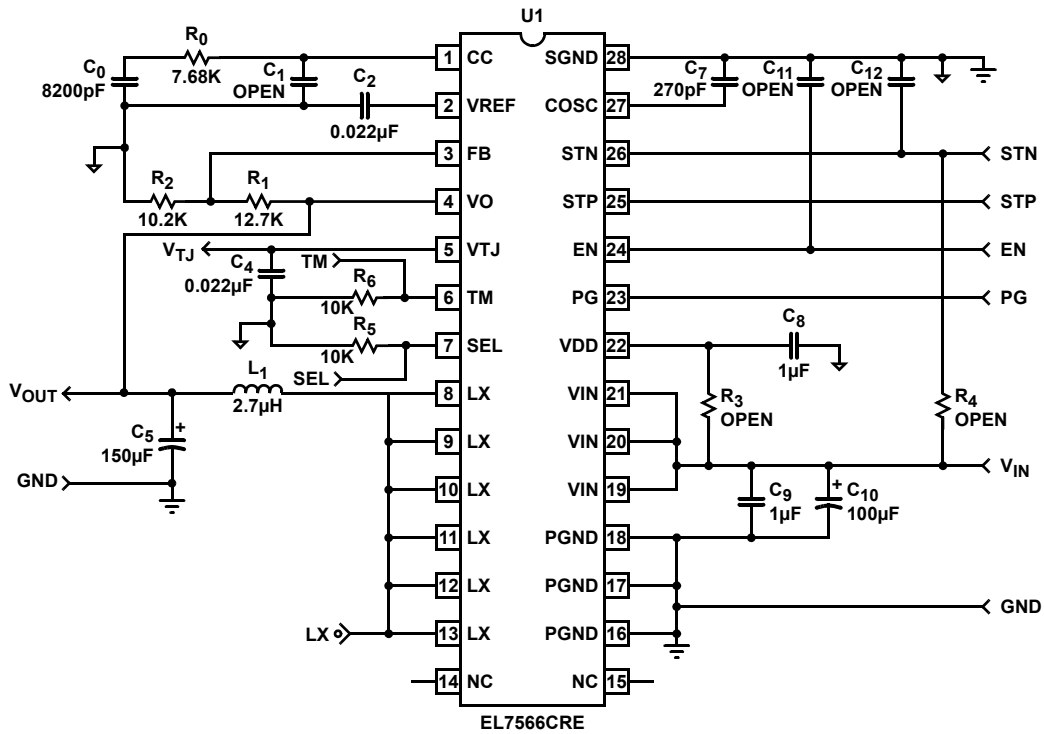


TABLE 1. DEMO BOARD BILL OF MATERIAL WITH SPCAP (V_O = 1.8V)

DESIGNATOR	VALUE	PACKAGE	MANUFACTURER	PHONE #	PART NUMBER
C ₀	8200pF	0603	Any X5R or X7R		
C ₂ , C ₄	0.022μF	0603	Any X5R or X7R		
C ₅ (Note 1)	150μF/4V	D-Size	Panasonic	408-945-5660	EEFUD0G151(X)R
C ₇	270pF 5%	0603	Any		
C ₈	1μF	0603	Any X5R or X7R		
C ₉	1μF	0603	Any X5R or X7R		
C ₁₀ (Note 2)	100μF/6V	D-Size	Panasonic		EEFUD0J101(X)R
R ₀	7.68K/1%	0603	Any		
R ₁	12.7K/1%	0603	Any		
R ₂	10.2K/1%	0603	Any		
R ₅	10K/1%	0603	Any		
R ₆	10K/1%	0603	Any		
L ₁	2.7μH		Coilcraft	847-639-6400	DO3316P-272HC
U1	EL7566DRE	HTSSOP-28	Intersil	888-INTERSIL	EL7566DRE

NOTES:

1. May be substituted by Sanyo (619-661-6835) POSCAP 4TPE150M.
2. May be substituted by Sanyo POSCAP 6TPE100M or higher value.

The output voltage can be as high as the input voltage minus the PMOS and inductor voltage drops. Use R₁ and R₂ to set the output voltage according to the following formula:

$$V_O = V_{FB} \times \left(1 + \frac{R_1}{R_2}\right)$$

Where V_{FB}=0.8V

When the resistors are changed, please change the compensation capacitor C₀ and resistor R₀. For the convenience, standard values of R₁ and R₂ are listed in Table 2.

R₅ and R₆ can be eliminated if voltage margin feature is not used. Connect TM and SEL pins directly to ground.

1206, 1210, 1812, and D-size can be placed at C₅ and C₁₀ positions.

TABLE 2. FEEDBACK RESISTER AND COMPENSATION VALUES (SPCAP)

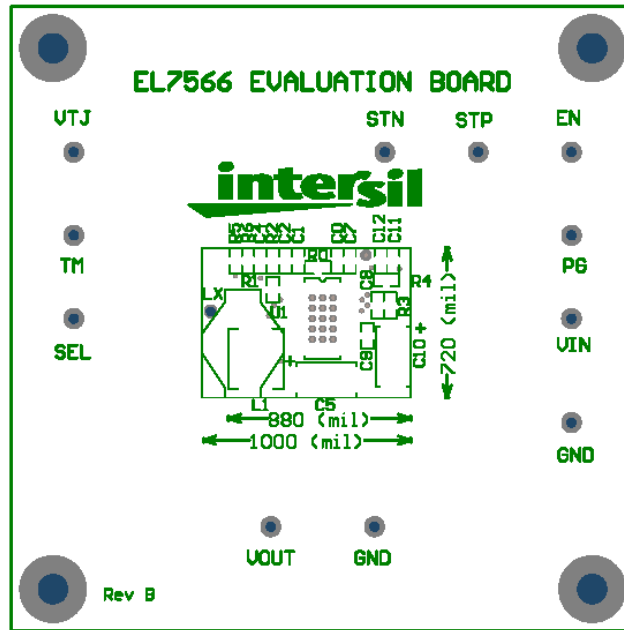
V _O (V)	C ₀ (pF)	R ₀ (kΩ)	R ₁ (kΩ)	R ₂ (kΩ)
0.8	8200	3.57	0	Open
1	8200	4.42	2.49	10
1.2	8200	5.23	4.99	10
1.5	8200	6.49	10	11.5
1.8	8200	7.68	12.7	10.2
2.5	8200	10.5	21.5	10
3.3	8200	13.7	36	11.5

Ceramic capacitors (X5R or X7R types only) can be use for the input and output with equivalent capacitance for C₅ and C₁₀. Different R₀ and C₀ are required. Table 3 lists the compensation values with MLCC capacitors.

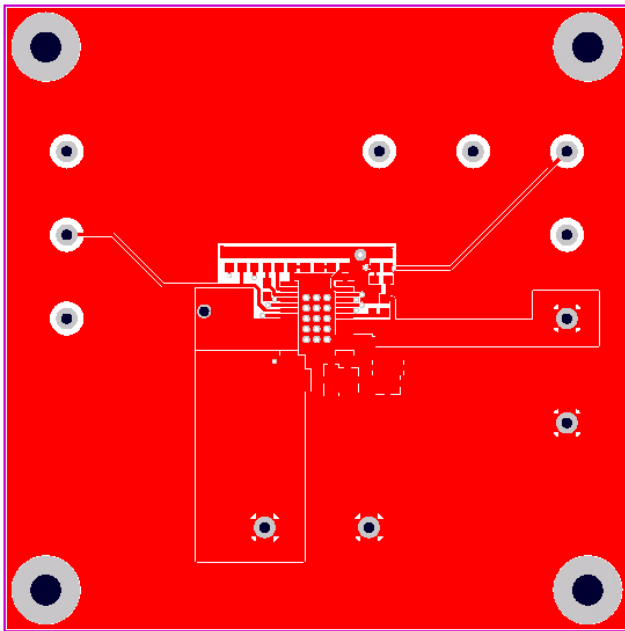
TABLE 3. FEEDBACK RESISTER AND COMPENSATION VALUES WITH MLCC CAPACITORS

V _O (V)	C ₀ (μF)	R ₀ (kΩ)	R ₁ (kΩ)	R ₂ (kΩ)
0.8	0.012	3.09	0	Open
1	0.012	3.57	2.49	10
1.2	0.012	4.42	4.99	10
1.5	0.012	5.23	10	11.5
1.8	0.012	6.49	12.7	10.2
2.5	0.012	7.68	21.5	10
3.3	0.012	10.5	36	11.5

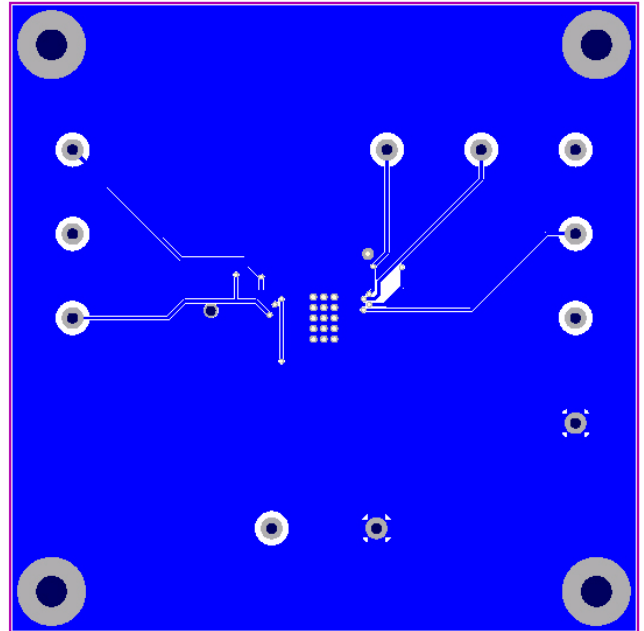
Demo Board Layout



TOP SILKSCREEN



TOP LAYER



BOTTOM LAYER

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