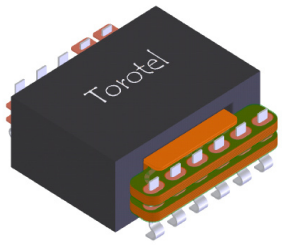
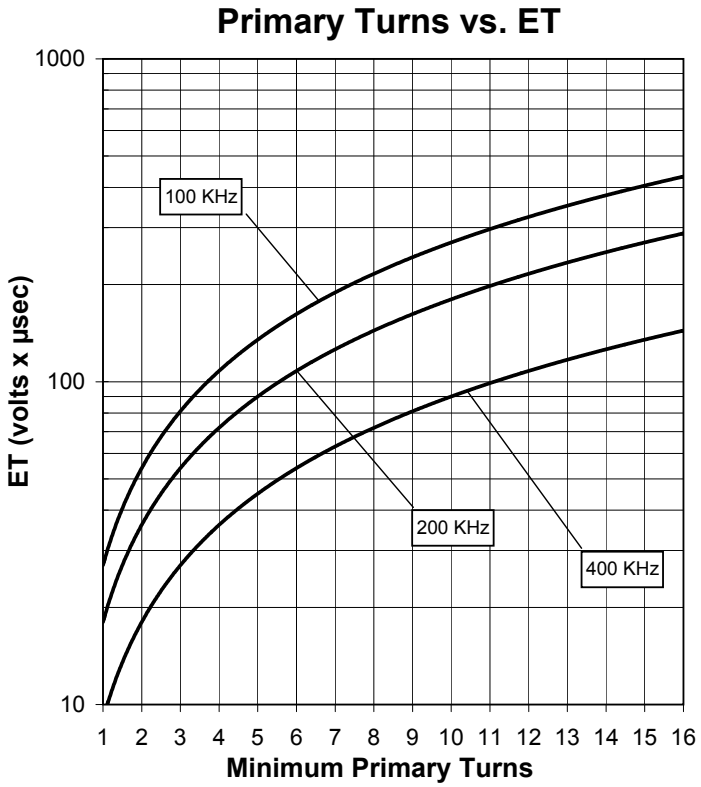
HIGH FREQUENCY PLANAR TRANSFORMERS

SPT Series (up to 250W)



- **Power Rating:** Up to 250W
- **Frequency Range:** 100 KHz to 400 KHz
- **Construction:** IPC J-STD 001 Class 3 Soldering Compatibility
- **Isolation (Primary to Secondary):** 1500 VRMS

Part number	Schematic figure	Pri. A turns	Pri. B turns	Total Pri. turns	Aux. turns	Sec. A turns	Sec. B turns	Primary Inductance (Min. µH)		Pri. DCR Max. milliohms		Sec. DCR Max. milliohms		Aux. DCR Max. milliohms
								A only	A+B	A only	A+B	Sec. A	Sec. B	
Step Down	**Operating temperature -55 °C to 130 °C**							**All electrical measurements specified at 20 °C**						
SPT344110	A	4	4	8	0	1	1	53	211	9.6	19.2	0.42	0.42	
SPT355115	A	5	5	10	5	1	1	83	330	12	24	0.42	0.42	42
SPT366114	A	6	6	12	4	1	1	119	475	14	29	0.42	0.42	24
SPT377113	A	7	7	14	3	1	1	162	647	17	34	0.42	0.42	13
SPT388110	A	8	8	16	0	1	1	211	845	19	38	0.42	0.42	
SPT344210	B	4	4	8	0	2	1	53	211	9.6	19.2	1.68	0.42	
SPT355215	B	5	5	10	5	2	1	83	330	12	24	1.68	0.42	42
SPT366214	B	6	6	12	4	2	1	119	475	14	29	1.68	0.42	24
SPT377213	B	7	7	14	3	2	1	162	647	17	34	1.68	0.42	13
SPT388210	B	8	8	16	0	2	1	211	845	19	38	1.68	0.42	
SPT344300	C	4	4	8	0	3	0	53	211	9.6	19.2	2.52		
SPT355305	C	5	5	10	5	3	0	83	330	12	24	2.52		42
SPT366304	C	6	6	12	4	3	0	119	475	14	29	2.52		24
SPT377303	C	7	7	14	3	3	0	162	647	17	34	2.52		13
SPT388300	C	8	8	16	0	3	0	211	845	19	38	2.52		
SPT344400	D	4	4	8	0	4	0	53	211	9.6	19.2	3.36		
SPT355405	D	5	5	10	5	4	0	83	330	12	24	3.36		42
SPT366404	D	6	6	12	4	4	0	119	475	14	29	3.36		24
SPT377403	D	7	7	14	3	4	0	162	647	17	34	3.36		13
SPT388400	D	8	8	16	0	4	0	211	845	19	38	3.36		
Step Up														
SPT311440	E	1	1	2	0	4	4	3.3	13.2	0.42	0.84	9.6	9.6	
SPT311555	E	1	1	2	5	5	5	3.3	13.2	0.42	0.84	12	12	42
SPT311664	E	1	1	2	4	6	6	3.3	13.2	0.42	0.84	14	14	24
SPT311773	E	1	1	2	3	7	7	3.3	13.2	0.42	0.84	17	17	13
SPT311880	E	1	1	2	0	8	8	3.3	13.2	0.42	0.84	19	19	
SPT322440	F	2	2	4	0	4	4	13	53	0.84	1.68	9.6	9.6	
SPT322555	F	2	2	4	5	5	5	13	53	0.84	1.68	12	12	42
SPT322664	F	2	2	4	4	6	6	13	53	0.84	1.68	14	14	24
SPT322773	F	2	2	4	3	7	7	13	53	0.84	1.68	17	17	13
SPT322880	F	2	2	4	0	8	8	13	53	0.84	1.68	19	19	
SPT330440	G	3	0	3	0	4	4	30	119	1.26		9.6	9.6	
SPT330555	G	3	0	3	5	5	5	30	119	1.26		12	12	42
SPT330664	G	3	0	3	4	6	6	30	119	1.26		14	14	24
SPT330773	G	3	0	3	3	7	7	30	119	1.26		17	17	13
SPT330880	G	3	0	3	0	8	8	30	119	1.26		19	19	



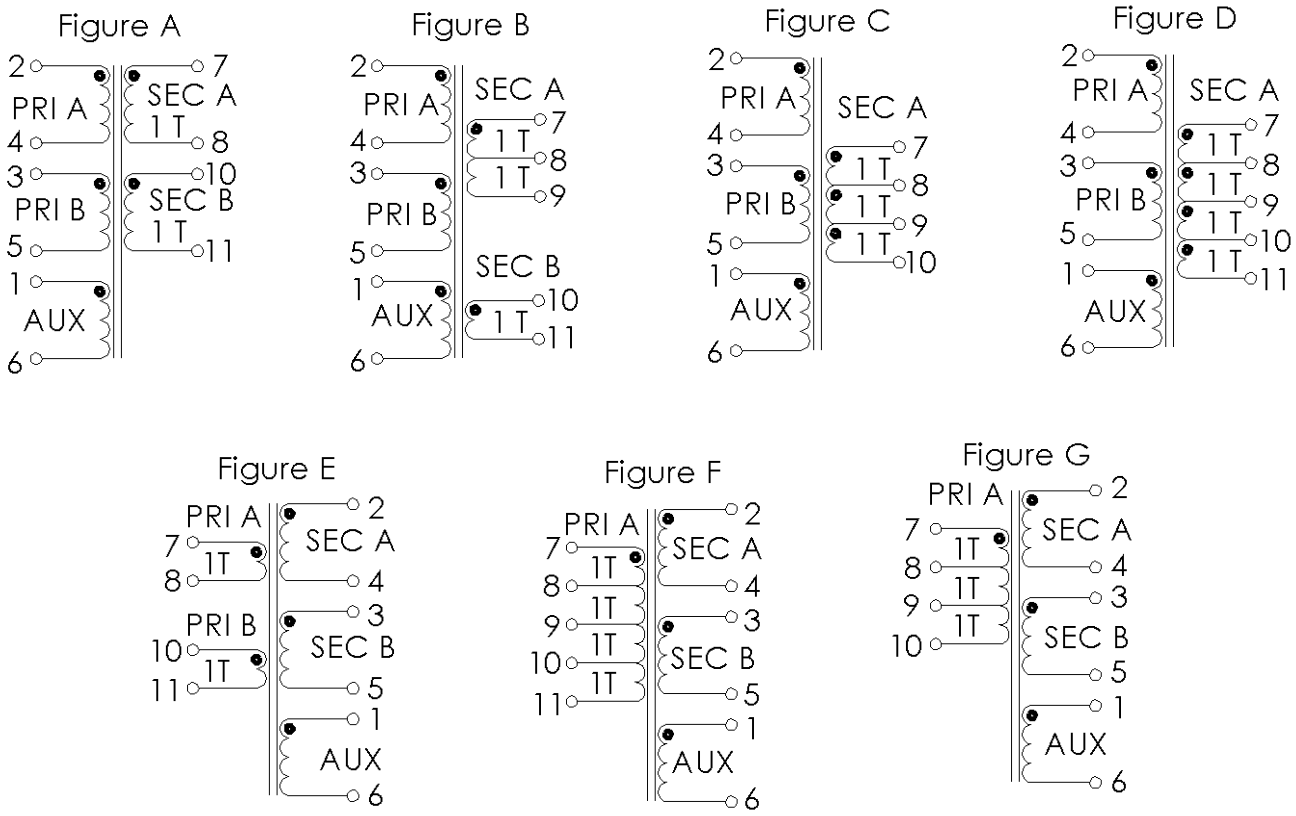
Transformer Selection Procedure

1. Calculate ET: ET = Vin (min) * t (max µsec)
2. Find the intersection of the ET value (Y axis) and the minimum primary turns (X axis) at the switching frequency. The selected primary turns will result in a core loss of approximately 0.63 W, which is ¼ of the total transformer loss that will result in a temperature rise of 40 °C.
3. Select turns ratio: Select the schematic representing desired configuration, and locate this group on the table on sheet 1. Select a turns ratio that will produce the desired output voltage.
4. Calculate secondary copper loss (Pst): Pst = I^2*DCR (add each secondary).
5. Calculate output power (Pout): Pout = E*I (add each secondary)
6. Calculate total maximum primary copper loss (Ppt):
   Ppt = (Pout / Vin)^2 * (DCR Pri)
7. Calculate total power loss: PLt = Pst + Ppt + 0.63 = 2.5 W maximum.

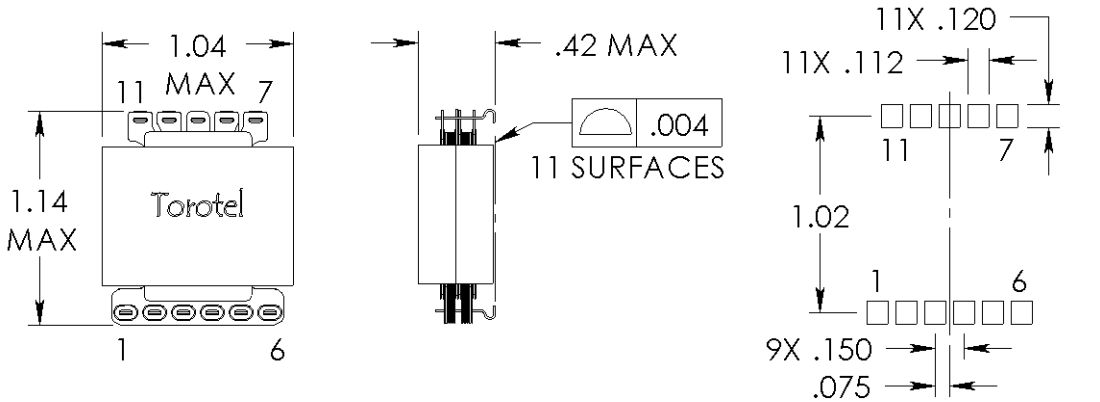
Example: Half bridge, Fsw = 200 KHz
Vin = 28 Vdc ± 20%
Vout = 10.5 Vdc, 10 Adc and 5.5 V, 20 Adc
Operating Temperature (ambient + temperature rise) = 100 °C

1. ET = 22.4 Vdc * 2.5 µsec = 56
2. ET and Fsw intersect at 3, but output requires schematic B. The closest turn count with the correct schematic is p/n SPT344210. Therefore, core loss will be lower than 0.63 W.
3. NP:NS:NS = 4:2:1 Pst at 100 °C; Sec A = .0022 ohm, and Sec B = .00055 ohm
4. Pst = [20^2 * .00055] + [10^2 * .0022] = .44 W
5. Pout = [(22.4 * (1/4)* 20] + [(22.4 * (2/4* 10] = 224 W
6. Ppt at 100 °C (Primary A and B in parallel); DCR = .0063 ohm
   Ppt = (224 / 22.4)^2 * .0063 = .63 W
7. PLt = .44+.63+.63 = 1.7 W

Schematic



Mechanical



Recommended Pad Layout

NOTES:

1. The footprint shown includes all eleven terminals. Configurations without an aux winding or all five secondary terminals will not have terminals in these positions.
2. Custom configurations and sizes are available.

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