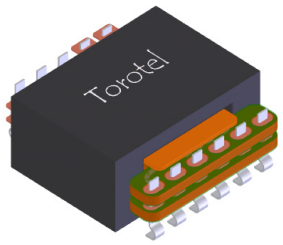
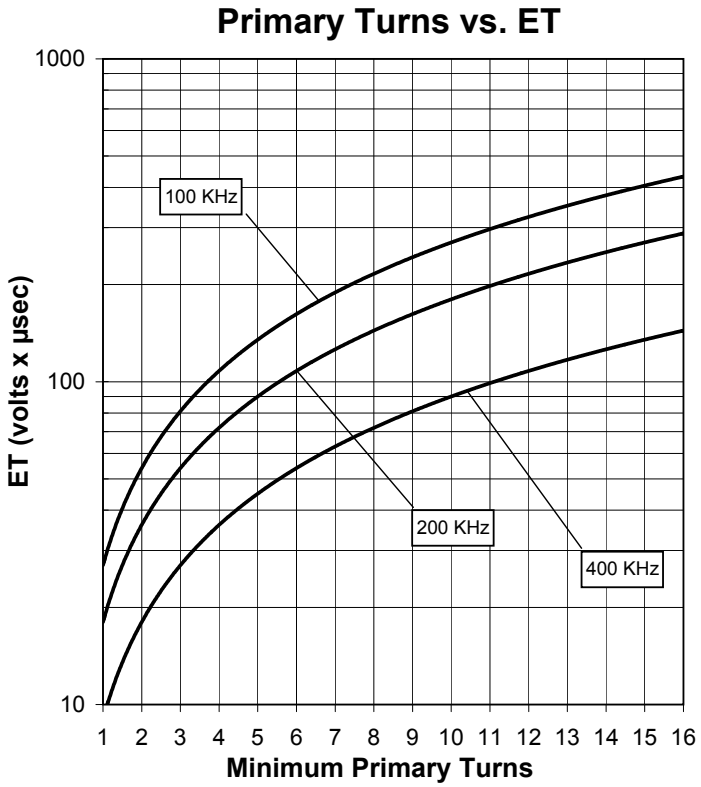
HIGH FREQUENCY PLANAR TRANSFORMERS

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):** 500 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	11.1	22.2	1.03	1.03	
SPT355115	A	5	5	10	5	1	1	83	330	16.3	32.6	1.03	1.03	39.4
SPT366114	A	6	6	12	4	1	1	119	475	23.4	46.8	1.03	1.03	24.7
SPT377113	A	7	7	14	3	1	1	162	647	30.5	61.0	1.03	1.03	16
SPT388110	A	8	8	16	0	1	1	211	845	32.7	65.4	1.03	1.03	
SPT344210	B	4	4	8	0	2	1	53	211	11.1	22.2	2.80	1.03	
SPT355215	B	5	5	10	5	2	1	83	330	16.3	32.6	2.80	1.03	39.4
SPT366214	B	6	6	12	4	2	1	119	475	23.4	46.8	2.80	1.03	24.7
SPT377213	B	7	7	14	3	2	1	162	647	30.5	61.0	2.80	1.03	16
SPT388210	B	8	8	16	0	2	1	211	845	32.7	65.4	2.80	1.03	
SPT344300	C	4	4	8	0	3	0	53	211	11.1	22.2	4.17		
SPT355305	C	5	5	10	5	3	0	83	330	16.3	32.6	4.17		39.4
SPT366304	C	6	6	12	4	3	0	119	475	23.4	46.8	4.17		24.7
SPT377303	C	7	7	14	3	3	0	162	647	30.5	61.0	4.17		16
SPT388300	C	8	8	16	0	3	0	211	845	32.7	65.4	4.17		
SPT344400	D	4	4	8	0	4	0	53	211	11.1	22.2	5.20		
SPT355405	D	5	5	10	5	4	0	83	330	16.3	32.6	5.20		39.4
SPT366404	D	6	6	12	4	4	0	119	475	23.4	46.8	5.20		24.7
SPT377403	D	7	7	14	3	4	0	162	647	30.5	61.0	5.20		16
SPT388400	D	8	8	16	0	4	0	211	845	32.7	65.4	5.20		
Step Up														
SPT311440	E	1	1	2	0	4	4	3.3	13.2	1.03	2.06	11.1	11.1	
SPT311555	E	1	1	2	5	5	5	3.3	13.2	1.03	2.06	16.3	16.3	39.4
SPT311664	E	1	1	2	4	6	6	3.3	13.2	1.03	2.06	23.4	23.4	24.7
SPT311773	E	1	1	2	3	7	7	3.3	13.2	1.03	2.06	30.5	30.5	16
SPT311880	E	1	1	2	0	8	8	3.3	13.2	1.03	2.06	32.7	32.7	
SPT322440	F	2	2	4	0	4	4	13	53	2.80	5.20	11.1	11.1	
SPT322555	F	2	2	4	5	5	5	13	53	2.80	5.20	16.3	16.3	39.4
SPT322664	F	2	2	4	4	6	6	13	53	2.80	5.20	23.4	23.4	24.7
SPT322773	F	2	2	4	3	7	7	13	53	2.80	5.20	30.5	30.5	16
SPT322880	F	2	2	4	0	8	8	13	53	2.80	5.20	32.7	32.7	
SPT330440	G	3	0	3	0	4	4	30		4.17		11.1	11.1	
SPT330555	G	3	0	3	5	5	5	30		4.17		16.3	16.3	39.4
SPT330664	G	3	0	3	4	6	6	30		4.17		23.4	23.4	24.7
SPT330773	G	3	0	3	3	7	7	30		4.17		30.5	30.5	16
SPT330880	G	3	0	3	0	8	8	30		4.17		32.7	32.7	



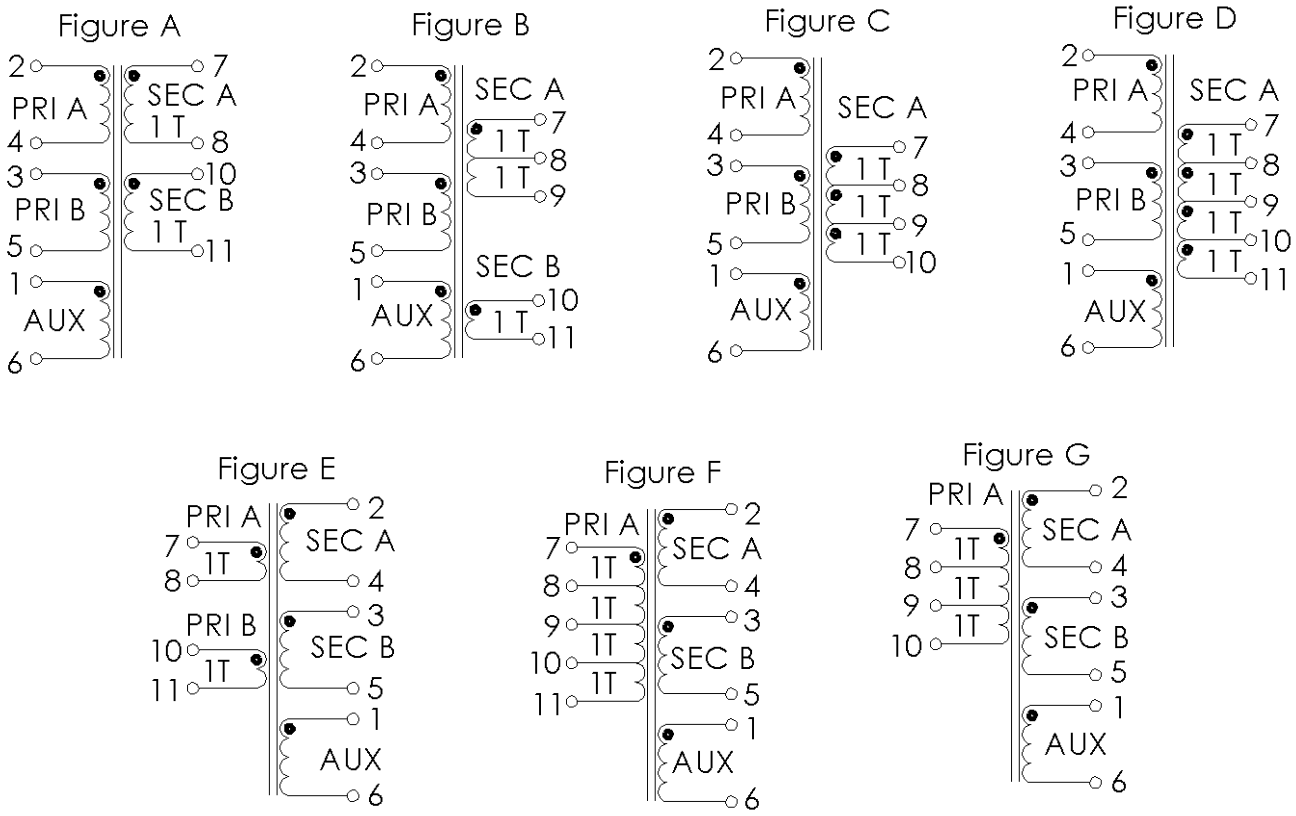
Transformer Selection Procedure

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.

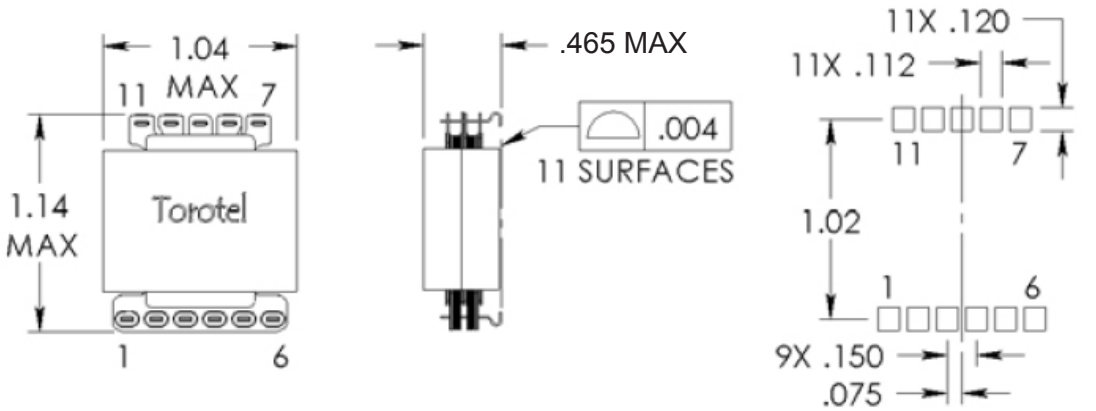
Example: Half bridge, Fsw = 200 KHz
Vin = 28 Vdc ± 20%
Vout = 10.5 Vdc, 10 Adc and 5.5 V, 20 Adc
Operating Temperature (ambient + temperature rise) = 100 °C

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 a winding termination will not have terminals in these positions.
2. Custom configurations and sizes are available.

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