

Space Grade Planar Transformers With Multiple Output Secondaries for 150 W / 28 V Input Forward Converters



LINKS TO ADDITIONAL RESOURCES


[Product Page](#)

APPLICATIONS

- High reliability Space Grade switch mode power supplies
- 28 V primary input voltage forward converters
- Active clamp or dual switch forward converters up to 150 W

FEATURES

- Input voltage range: 18 V to 36 V
- Multiple secondaries can power up to two 12 V channels or up to four 5 V channels with center tap
- Higher power density levels versus traditional planar designs
- Optimized for 150 W forward converter topologies using 28 V input and 200 kHz operation
- Over-molded windings for environmental protection in ruggedized applications
- MIL-PRF-27 grade 5, product level T, temperature class S
- MIL-STD-981 family 03 power transformer, class S compliant ⁽¹⁾⁽²⁾
- ASTM-E595 outgassing compliant ⁽³⁾
- Tin-lead (Sn63Pb37) coated terminations (does not contain tin composition percentages greater than 97 %)
- Customization available (e.g., pinouts, temperature class, screening, etc.)
- SGTPL design; PATENT(S): www.vishay.com/patents

Notes

⁽¹⁾ Screening codes S and B only

⁽²⁾ Clarifications to MIL-STD-981 (1):

- MIL-STD-981 figures 3b, c, and d do not apply to this assembly's build construction
- MIL-STD-981 5.5.10 & 5.5.11: parts soldered and inspected to J-STD-001S (space addendum)
- Corona discharge is not applicable

⁽³⁾ Applies to all external materials

ABSOLUTE MAXIMUM RATINGS			
PARAMETER	CONDITIONS	LIMITS	UNITS
Dielectric withstand voltage (DWV) ⁽¹⁾	Primary to secondary, windings to core	1250	V _{DC}
	Primary to primary, secondary to secondary	500	V _{DC}
Insulation resistance ⁽²⁾	Windings to windings and core, 10 GΩ min.	500	V _{DC}
Power		150	W
Operating temperature	Continuous	-55 to +130	°C
Storage temperature	Continuous	-65 to +155	°C
Frequency		100 to 500	kHz

Notes

⁽¹⁾ Test conditions adjusted per MIL-STD-981 and MIL-PRF-27 4.7.9.1 during group A and B testing; tested at equivalent DC test voltage

⁽²⁾ Test conditions adjusted per MIL-STD-981 and MIL-PRF-27 4.7.11 during group A and B testing

**STANDARD ELECTRICAL SPECIFICATIONS** (part number specific)

PART NUMBER ⁽¹⁾	PRIMARY INPUT VOLTAGE (V)	SECONDARY OUTPUT VOLTAGE (V)	TURNS RATIO (PRI : SEC) ⁽²⁾	OPTIMIZED OPERATING FREQ (kHz)	PRIMARY INDUCTANCE (μ H) ⁽³⁾		LEAKAGE INDUCTANCE MAX. (μ H) ⁽³⁾	DCR MAX. (m Ω)						OUTPUT POWER (TYP.) (W) ⁽⁴⁾⁽⁵⁾
					MIN.	MAX.		PRIMARY 1	PRIMARY 2	PRIMARY 3	SECONDARY 1	SECONDARY 2	SECONDARY 3	
SGTPL2516T02812_	18 to 36	12	0.600 : 1	200	38	65	0.5	7	7	n/a	10	20	n/a	150
SGTPL2516T02805_	18 to 36	5	1.500 : 1	200	38	65	0.5	10	10	10	7	7	n/a	150
SGTPL2511T02812_	18 to 36	12	0.600 : 1	200	38	65	0.5	15	15	15	20	20	n/a	100
SGTPL2511T02805_	18 to 36	5	1.500 : 1	200	38	65	0.5	15	15	15	10	10	10	100

Notes

- All test data is referenced to 25 °C ambient unless otherwise specified
- (1) See below sections for screening code options
- (2) Turns ratio test condition: $\pm 3\%$, 1 V_{RMS}, 100 kHz
- (3) Inductance test condition: 100 mV_{RMS}, 200 kHz
- (4) Typical power ratings for a 25 °C temperature rise
- (5) Derate maximum output power linearly from +105 °C to +130 °C

GLOBAL PART NUMBER

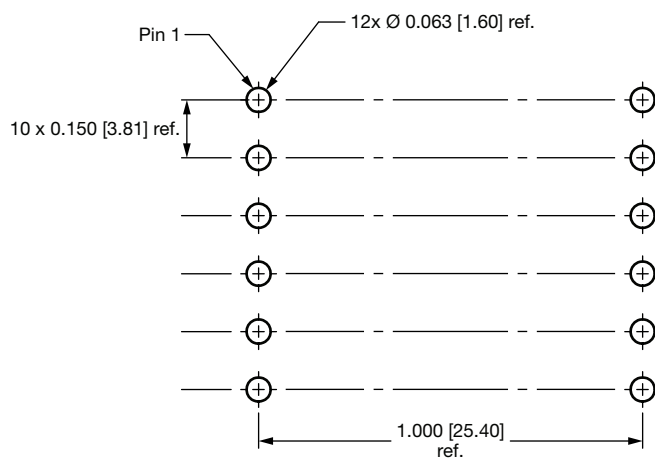
S	G	T	P	L	2	5	1	6	T	0	2	8	1	2	S
PRODUCT FAMILY					FOOTPRINT		HEIGHT		MOUNTING STYLE	INPUT VOLTAGE SPEC			OUTPUT VOLTAGE SPEC		SCREENING CODE
					25 = 25 mm x 25 mm		11 = 11 mm 16 = 16 mm		T = through-hole S = surface-mount	028 = 28 V nominal			05 = 5 V nominal 12 = 12 V nominal		P = production level (basic) screen L = low earth orbit (LEO) screen E3 = EEE-INST-002 level 3 screen E2 = EEE-INST-002 level 2 screen B = MIL-STD-981 class B screen S = MIL-STD-981 class S screen



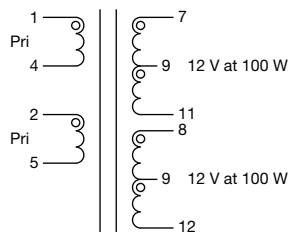
SCREENING BREAKDOWN						
	P = PRODUCTION SCREENED	L = LOW EARTH ORBIT (LEO) SCREENED	E3 = EEE-INST-002 LEVEL 3 SCREENED	E2 = EEE-INST-002 LEVEL 2 SCREENED	B = MIL-STD-981 TABLE VI CLASS B SCREENED	S = MIL-STD-981 TABLE VI AND XII CLASS S SCREENED
PRODUCTION SCREENING (sample size = 100 %)						
Electrical characteristics (continuity, inductance (L _S), turns ratio (TR), phase, leakage inductance, DWV, insulation resistance, DCR)	✓	✓	✓	✓	✓	✓
Mechanical inspection	✓	✓	✓	✓	✓	✓
Visual inspection	✓	✓	✓	✓	✓	✓
QUALITY CONFORMANCE SCREENING (group A) (sample size = 100 %)						
5 cycle thermal shock (-55 °C to +130 °C)	n/a	n/a	✓	n/a	n/a	n/a
10 cycle thermal shock (-55 °C to +130 °C)	n/a	✓	n/a	✓	n/a	n/a
96 hour burn-in at 130 °C (unpowered)	n/a	✓	n/a	n/a	n/a	n/a
25 cycle thermal shock (-55 °C to +130 °C)	n/a	n/a	n/a	n/a	✓	✓
96 hour burn-in at 130 °C (powered) (130 °C = ambient temperature + temperature rise)	n/a	n/a	n/a	✓	✓	✓
Induced voltage	n/a	n/a	✓	✓	✓	✓
Dielectric withstanding voltage (DWV)	n/a	✓	✓	✓	✓	✓
Dielectric withstanding voltage (DWV) at altitude	n/a	n/a	✓	✓	n/a	n/a
Insulation resistance (IR)	n/a	✓	✓	✓	✓	✓
Electrical characteristics (continuity, L _S , TR, phase, leakage inductance, DCR)	n/a	✓	✓	✓	✓	✓
Radiographic inspection	n/a	n/a	n/a	n/a	n/a	✓
Mechanical inspection (sampled per table V; MIL-STD-981)	n/a	✓	n/a	n/a	✓	✓
Visual inspection (100 %)	n/a	✓	✓	✓	✓	✓
QUALIFICATION INSPECTION (group B) (lot sampling)						
MIL-STD-981 table XII	n/a	n/a	n/a	n/a	n/a	✓
EEE-INST-002 Table 3	n/a	n/a	n/a	Optional	n/a	n/a



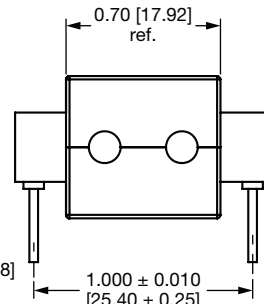
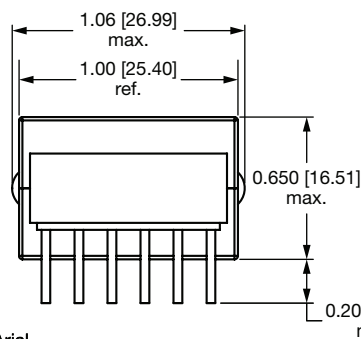
TYPICAL BOARD PIN LAYOUT



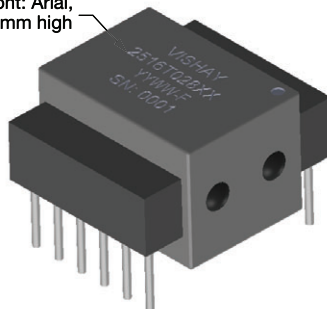
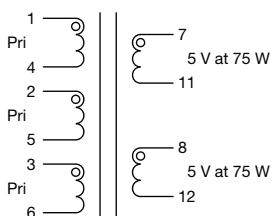
DIMENSIONS in inches [millimeters]

SGTPL2516T02812x


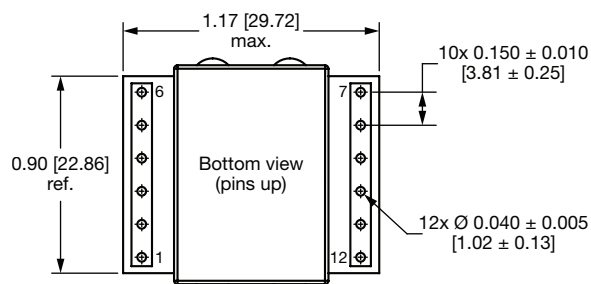
Primary pins 1, 2 and 4, 5 should be tied for proper operation



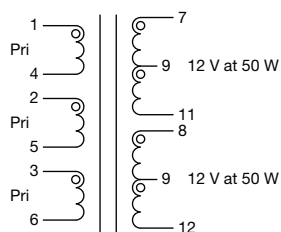
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SGTPL2516T02805x


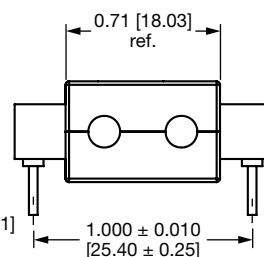
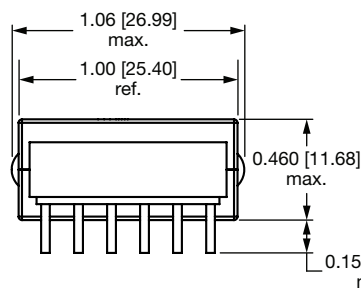
Primary pins 1, 2, 3 and 4, 5, 6 should be tied for proper operation



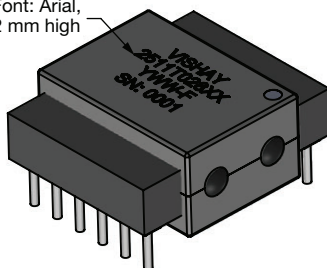
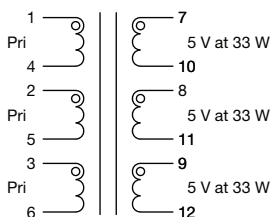
Maximum weight of 40 grams

SGTPL2511T02812x


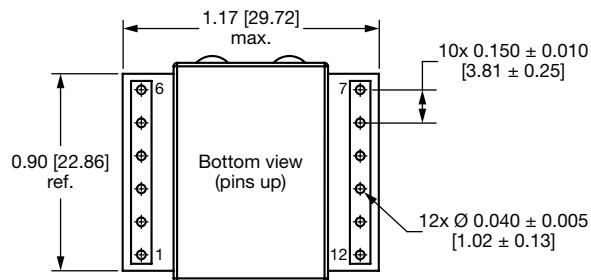
Primary pins 1, 2, 3 and 4, 5, 6 should be tied for proper operation



Font: Arial,
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SGTPL2511T02805x


Primary pins 1, 2, 3 and 4, 5, 6 should be tied for proper operation



Maximum weight of 28 grams



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