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):

a. MIL-STD-981 figures 3b, c, and d do not apply to this assembly's build construction

b. MIL-STD-981 5.5.10 & 5.5.11: parts soldered and inspected to J-STD-001S (space addendum)

c. 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)

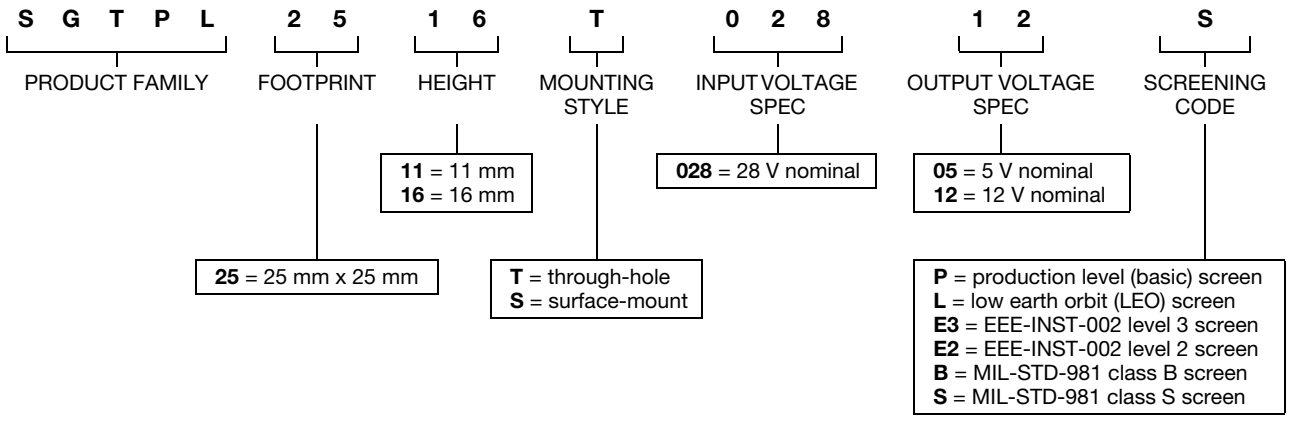
PART NUMBER (1)	PRIMARY INPUT VOLTAGE (V)	SECONDARY OUTPUT VOLTAGE (V)	TURNS RATIO (PRI : SEC) (2)	OPTIMIZED OPERATING FREQ (kHZ)	PRIMARY INDUCTANCE (µH) (3)		LEAKAGE INDUCTANCE MAX. (µH) (3)	DCR MAX. (mΩ)						OUTPUT POWER (TYP.) (W) (4)(5)
					MIN.	MAX.		PRIMARY 1	PRIMARY 2	PRIMARY 3	SECONDARY 1	SECONDARY 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

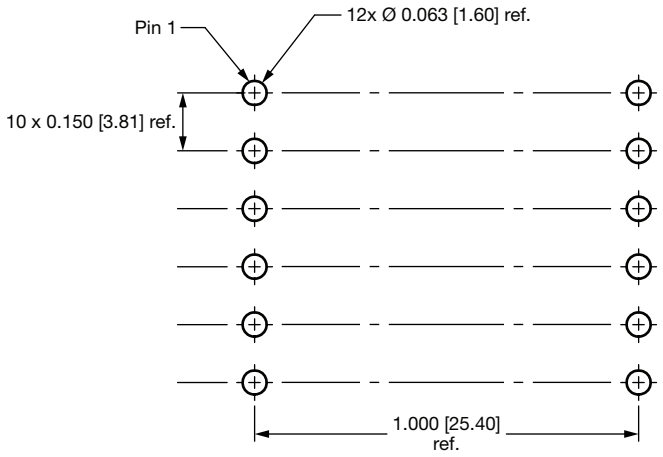
(1) See below sections for screening code options
(2) Turns ratio test condition: ± 3 %, 1 V_{RMS}, 100 kHz
(3) Inductance test condition: 100 mV_{RMS}, 200 kHz
(4) Typical power ratings for a 25 °C temperature rise
(5) Derate maximum output power linearly from +105 °C to +130 °C

GLOBAL PART NUMBER



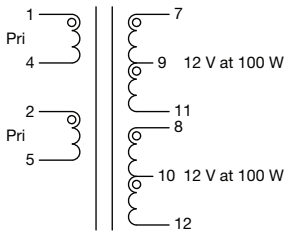
SCREENING BREAKDOWN						
	P = PRODUCTION SCREENED	L = LOW EARTH ORBIT (LEO) SCREENED	E3 = EEE-INST-002 LEVEL 3 SCREENED	E2 = EEE-INST-002 LEVEL 2 SCREENED	B = MIL-STD-981 TABLE VI CLASS B SCREENED	S = MIL-STD-981 TABLE VI AND XII CLASS S SCREENED
PRODUCTION SCREENING (sample size = 100 %)						
Electrical 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

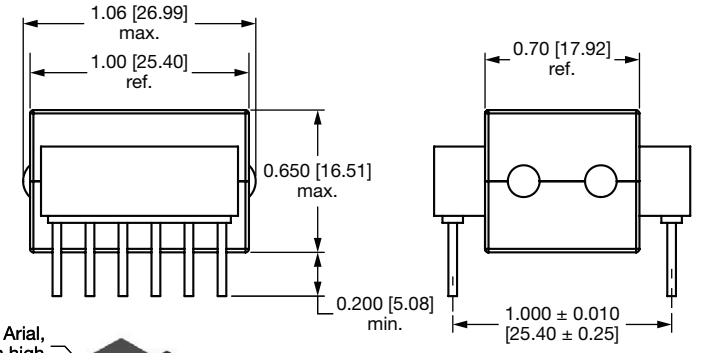


DIMENSIONS in inches [millimeters]

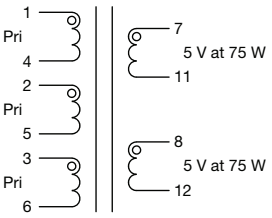
SGTPL2516T02812x



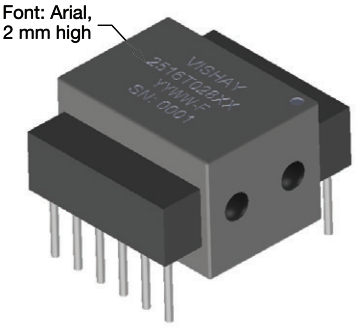
Primary pins 1, 2 and 4, 5
should be tied for proper operation

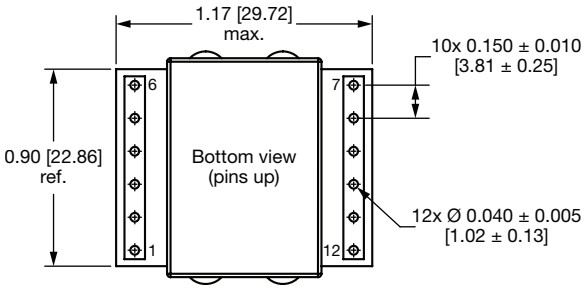


SGTPL2516T02805x



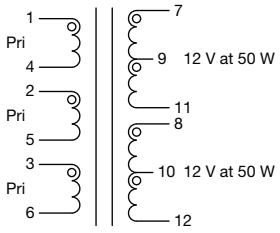
Primary pins 1, 2, 3 and 4, 5, 6
should be tied for proper operation





Maximum weight of 40 grams

SGTPL2511T02812x



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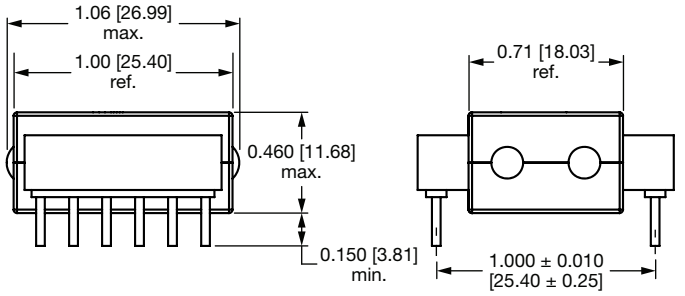

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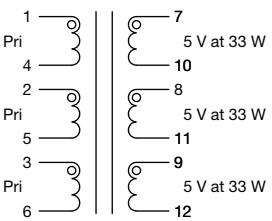

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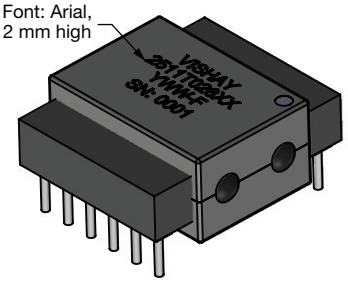

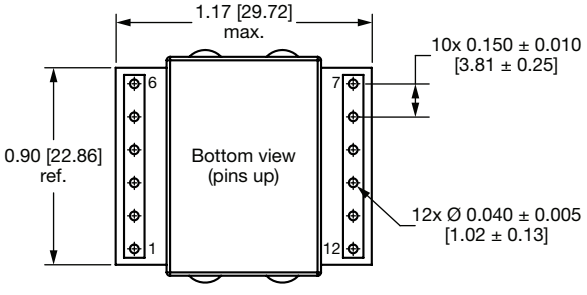

Maximum weight of 28 grams

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