

SVRH-0.5 Series

0.5A Output Current, Non-Isolated DC/DC converter



Features

- SMD-Package, Full SMD Technology
- Adjustable Output Voltage
- Continuous Short Circuit Protection
- Remote ON/OFF Control
- Excellent Line / Load Regulation
- Efficiency Up to 92%
- High Voltage Input range, up to 72V



The SVRH-0.5 series is a family of cost effective 1.65~6.0W single output buck DC-DC converters. These converters achieve low cost and small SMD package, output voltage adjustment, remote ON/OFF control, continuous short circuit protection with automatic restart, good line / load regulation and ultra low quiescence current. Input voltages of 9~72, 14~72, 17~72 and 21~72 with output voltage of 3.3, 5, 6.5, 7.2, 9, 12 and 15Vdc. High performance features include high efficiency operation up to 92%.

All specifications typical at Ta=25°C, nominal input voltage and full load unless otherwise specified.

OUTPUT SPECIFICATIONS		GENERAL SPECIFICATIONS	
Voltage Accuracy	±2%, max.	Efficiency	See table, typ.
Output voltage adjustability (Trim)	±10%, max.	Switching Frequency(7)	150k~550kHz, typ.
Output Current (Full Load)	See table, max.	(See the Curve)	
Line regulation	±1%, max.	Humidity	95% rel H
Load regulation	±1%, max.	Reliability Calculated MTBF(MIL-HDBK-217 F)	>4.8Mhrs
Ripple & Noise (1)	75mVpk-pk, max.	Safety Standard (design to meet)	IEC/EN 60950-1, 62368-1
Short Circuit Protection	Continuous (Automatic Recovery)		
Temperature coefficient	±0.02%/°C		
Capacitor Load(2)	See table, max.		
Transient Recovery Time(3)	250µs, typ.		
Transient Response Deviation(3)	±3%, max.		
INPUT SPECIFICATIONS		ENVIRONMENT SPECIFICATIONS	
Input Voltage Range	See table	Operating Temperature	-40°C ~ +105°C (See Derating Curve)
Start up Time	10mS, typ.		-40°C ~ +60°C (For 100% Load)
(Nominal Vin and constant resistive load)		Storage Temperature	-55°C ~ +125°C
Input Current (No-Load)	See table, typ.	Cooling(8)	Nature Convection
Input Current (Full-Load)	See table, typ.	Lead-free Reflow Solder Process	IPC/JEDEC J-STD-020D.1
Input Filter	Capacitors	Reflow Temperature	Peak 245°C (10 sec), max.
Input Reflected Ripple Current(4)	35mApk-pk, typ.	Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1 Level 1
Remote ON/OFF CTRL (pin10)(5)		Vibration	MIL-STD-810F
ON:	open circuit		
OFF:	short circuit CTRL(pin10) and GND		
OFF Idle current:	1mA, max.		
ABSOLUTE MAXIMUM RATINGS(6)		PHYSICAL SPECIFICATIONS	
These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.		Weight	1.8g, typ.
Input Surge Voltage (100mS)	75Vdc, max.	Dimensions	0.77"x0.47"x0.20"
Soldering Temperature	260°C, max.		
(1.5mm from case 10sec max.)			
CTRL (pin10) to GND	5V, max.		
EMC CHARACTERISTICS			
Radiated Emissions(9)	EN55032		CLASS B
Conducted Emissions(9)	EN55032		CLASS B
ESD	IEC61000-4-2		Perf. Criteria A
RS	IEC61000-4-3		Perf. Criteria A
EFT(10)	IEC61000-4-4		Perf. Criteria A
Surge(10)	IEC61000-4-5		Perf. Criteria A
CS	IEC61000-4-6		Perf. Criteria A
PFMF	IEC61000-4-8		Perf. Criteria A

NOTE

1. Measured with a 0.1µF ceramic capacitor & 10µF electrolytic capacitor. The Scope measurement bandwidth is 0-20MHz.
2. Tested by Input Vin Range and constant resistive load.
Operation under no-load & light load may not meet all specifications.
3. Tested by normal Vin and 25% load step change (100%-75% of Iout).
4. Input reflected ripple current is measured through a source inductor L1(12µH) and a source capacitor C1=10µF at nominal input and full load.
5. The remote on/off control pin is referenced to GND.
6. Do not operate the unit(s) exceeding the absolute maximum rating, over rating causes damage to the units.
7. The switching frequency is different according to output voltage models.
8. "Nature Convection" is usually about 30-65 LFM but is not equal to still air (0 LFM).
9. The SVRH-0.5 series can meet EN55032 Class B with an external filter in parallel with the input pins.
10. An external filter capacitor and TVS is required if the module has to meet IEC61000-4-4 & IEC61000-4-5.
The filter capacitor and TVS suggest: Nippon - chemi - con KY series , 330uF/100V and TVS , 3KW , 70V.

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PART NUMBER STRUCTURE

SVRH-4805-0.5R

Series Name
High Voltage input range

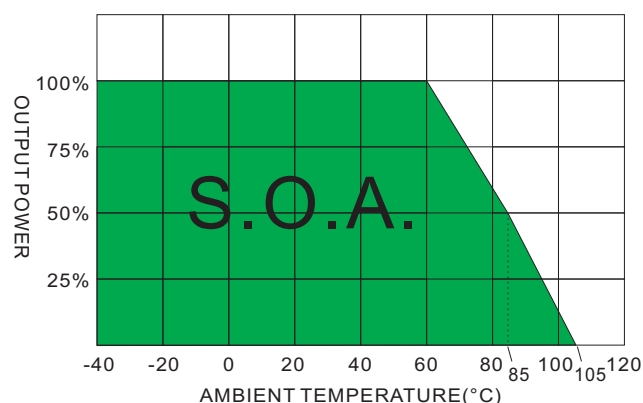
Input Voltage Range
48 - 9~72V
- 14~72V
- 17~72V
- 21~72V

Output Current
0.5 - 0.5A

Output Voltage
3R3 - 3.3V
05 - 5V
6R5 - 6.5V
7R2 - 7.2V
09 - 9V
12 - 12V
15 - 15V

Packing Options
"blank" - standard Tube packing
R - for tape & reel packing

Derating Curve



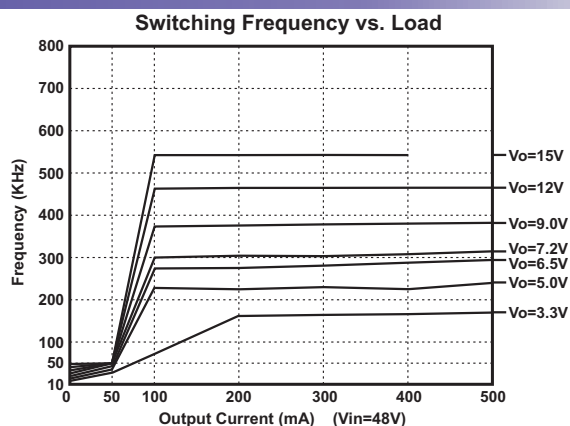
MODEL SELECTION GUIDE

MODEL NUMBER	INPUT Voltage Range (Vdc)	INPUT Current (mA)			OUTPUT Voltage Current (Vdc) (mA)		EFFICIENCY		Capacitor Load (μF, max.)
		No-Load (max.)	Full Load Vin(min.) Vin(max.)				Vin (min.) @FL(%)	Vin (max.) @FL(%)	
SVRH-483R3-0.5	48 (9 - 72)	3	232	33	3.3	500	79	70	100
SVRH-4805-0.5	48 (9 - 72)	3	323	47	5	500	86	74	100
SVRH-486R5-0.5	48 (9 - 72)	3	406	58	6.5	500	89	78	100
SVRH-487R2-0.5	48 (14 - 72)	3	289	62	7.2	500	89	81	100
SVRH-4809-0.5	48 (14 - 72)	3	357	74	9	500	90	84	100
SVRH-4812-0.5	48 (17 - 72)	3	384	97	12	500	92	86	100
SVRH-4815-0.5	48 (21 - 72)	3	311	99	15	400	92	84	100

TYPICAL OPERATING CONDITIONS

Switching Frequency

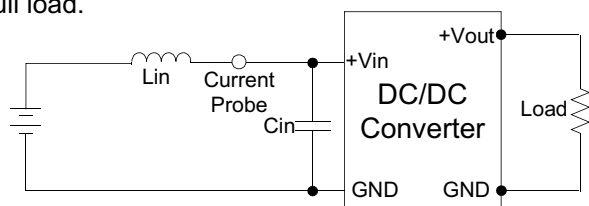
The switching frequency is different according to output voltage models.



TEST CONFIGURATIONS

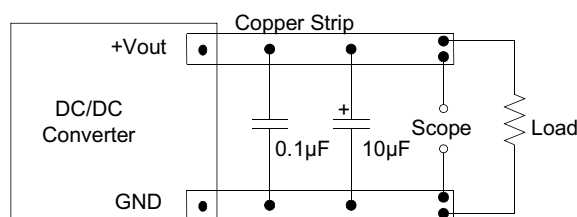
Input Reflected Ripple Current Test Step

Input reflected ripple current is measured through a source inductor L_{in} (12μH) and a source capacitor C_{in} (10μF, ESR<1.0Ω at 100kHz) at nominal input and full load.



Output Ripple & Noise Measurement Test

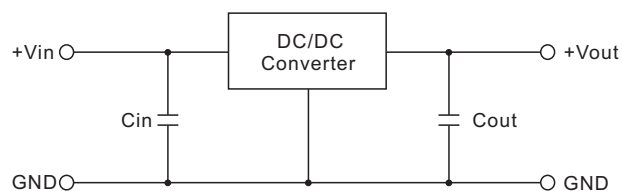
Measured with a 0.1μF ceramic capacitor & 10μF electrolytic capacitor. The Scope measurement bandwidth is 0-20MHz.



DESIGN CONFIGURATIONS

Standard Application Circuit

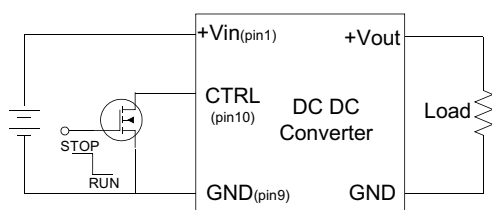
1. C_{in} is required and must be connected close to the pin terminal of the module. ($C_{in}=10\mu F$)
2. $C_{out}=10\mu F$ (Optional)



Remote ON / OFF Test Step

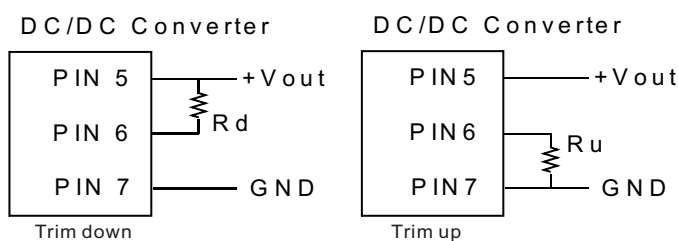
Open circuit, Converter ON.
Short circuit CTRL(pin10) and GND, Converter OFF.

Typical Application Circuit MOTIEN suggest :



Output Voltage Adjustment

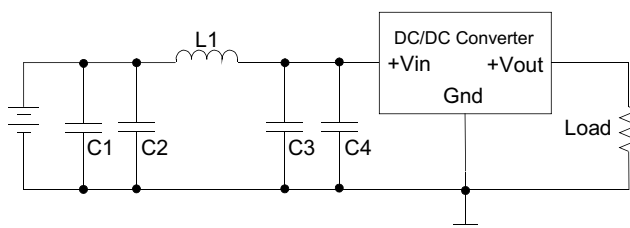
Pin 6 via a resistor to +Vout(pin5), V_o trim down.
Pin 6 via a resistor to GND(pin7), V_o trim up.



EMC COUNTERMEASURES

EMI Countermeasures

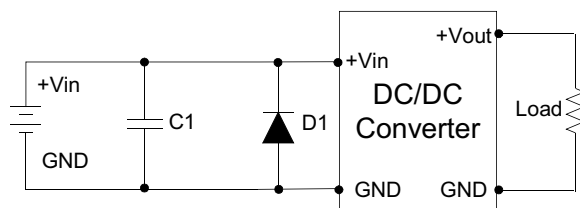
Input filter components ($C1$, $C2$, $L1$, $C3$, $C4$) are used to help meet EMI requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.



	C1 & C2	L1	C3 & C4
SVRH-X Y-0.5 R	1206 2.2uF/100V	56uH	1206 2.2uF/100V

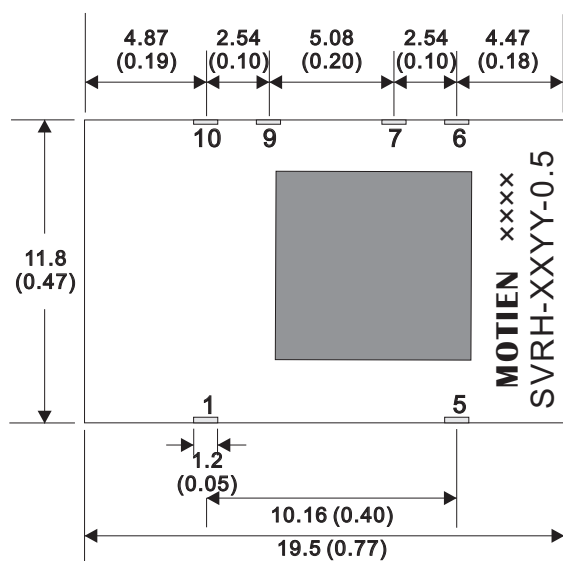
EFT & Surge Test Countermeasures

The filter MOTIEN suggest : Nippon - chemi - con KY series , 330uF/100V and TVS , 3KW , 70V

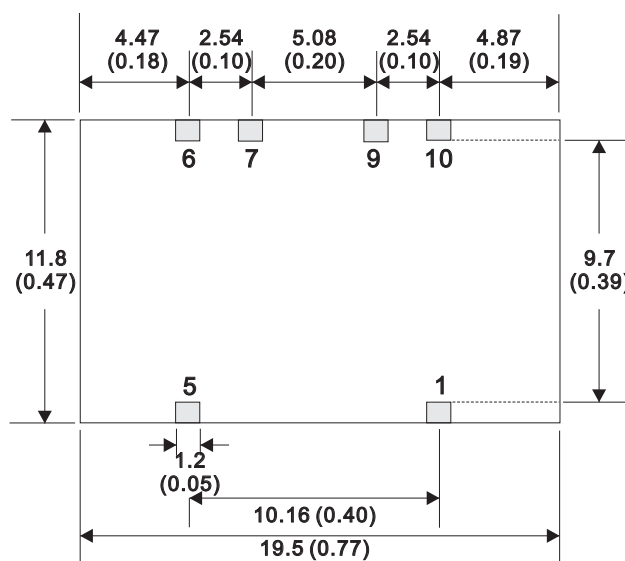


	C1	D1
SVRH-X Y-0.5 R	330uF/100V	SMDJ70A

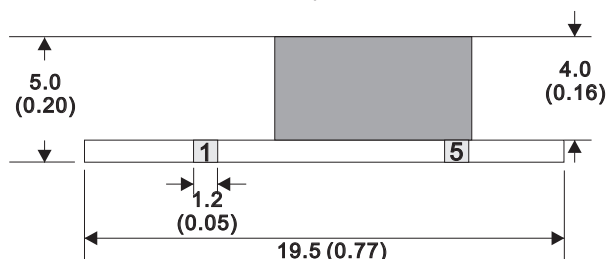
MECHANICAL SPECIFICATIONS



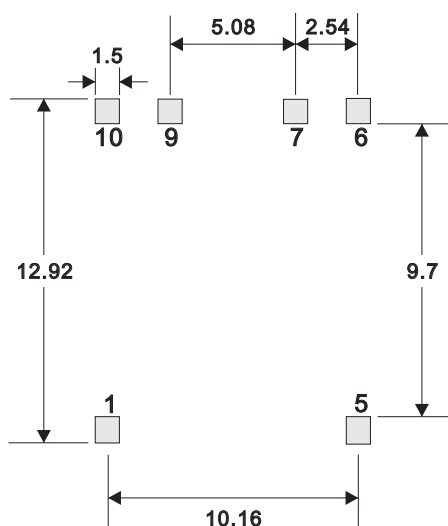
Top view



Bottom view



Side view



Solder Pad Dimension

PIN CONNECTIONS

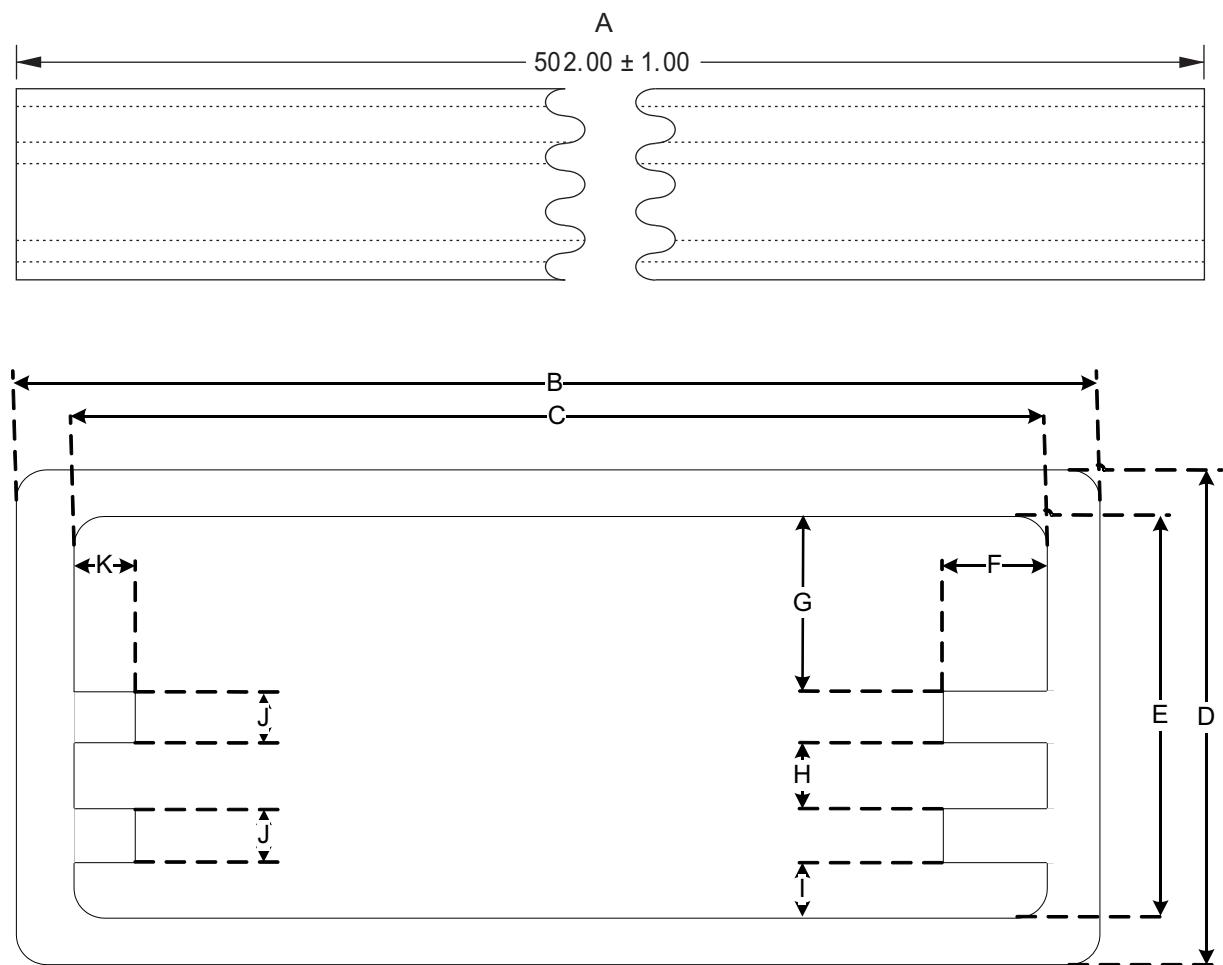
PIN NUMBER	SINGLE
1	+ V Input
5	+V Output
6	Trim
7	GND
9	GND
10	CTRL

SMD 10Pin Package

Notes : All dimensions are typical in millimeters (inches).
 1. Pin pitch tolerances: ± 0.25 (± 0.01)
 2. Pin profile tolerance: ± 0.1 (± 0.004)
 3. Other tolerances: ± 0.5 (± 0.02)

Tube dimension

Standard packing - Tube
■ 1 Tube contains 40 converters



dimensions in [mm]

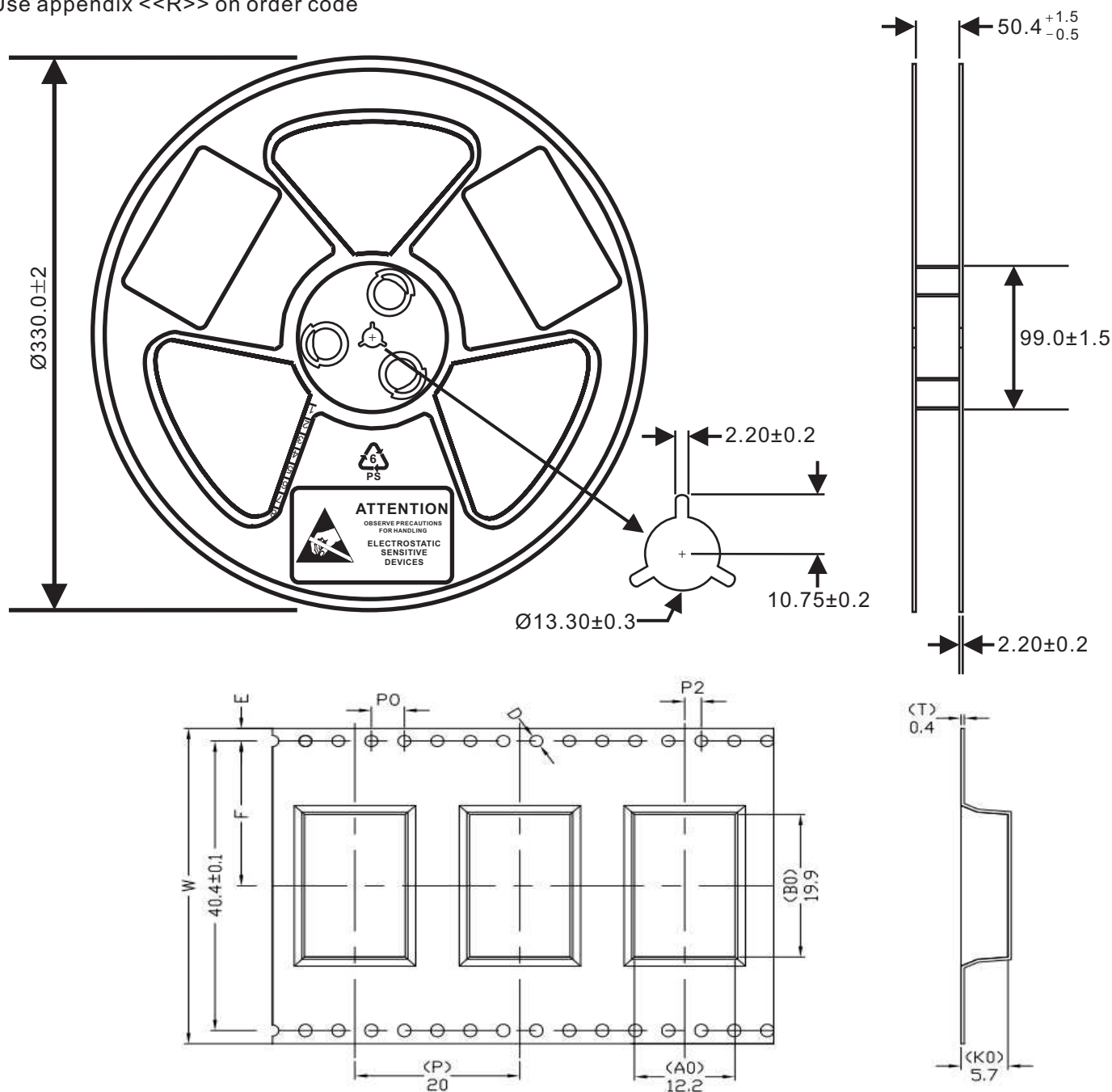
Tube Length : 502 ± 1.0 mm														
ITEM	A		B		C		D		E		F		G	
DIM	502	+1.0	22	+0.25	20	+0.25	9.7	+0.25	7.9	+0.25	2	+0.1	3.5	+0.1
		-1.0		-0.25		-0.25		-0.25		-0.25		-0.1		-0.1
ITEM	H		I		J		K							
DIM	1.3	+0.1	1.1	+0.1	1.0	+0.1	1.2	+0.1						
		-0.1		-0.1		-0.1								

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Tape & Reel dimension

Optional packing - Tape & Reel

- Specifications shall conform with current EIA-481 standard
- 1 Reel contains 500 converters
- Use appendix <<R>> on order code



dimensions in [mm]

NOTE:

1. Material: Black Polystyrene.
2. Camber not to exceed 1mm in 100mm.
3. 10 sprocket hole pitch cumulative tolerance ± 0.2
4. A0 and B0 measured on a plane 0.3mm above the bottom of the pocket.
5. K0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Carrier Length: 36M / 22" reel,Q'ty= 500 pcs/13"reel																				
ITEM	W		A0		B0		K0		P		F		E		D		P0		P2	
DIM	44.0	+0.30 -0.30	12.2	+0.30 -0.10	20.0	+0.30 -0.10	5.70	+0.30 -0.10	20.0	+0.10 -0.10	20.2	+0.15 -0.15	1.75	+0.10 -0.10	1.50	+0.10 -0.00	4.00	+0.10 -0.10	2.00	+0.15 -0.15

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