

CSV-1.0 Series

1A 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 96%
- Non-Isolated Regulator with Very Low Standby Current



PART NUMBER STRUCTURE

CSV**R****1** - **24** **05** **R**
(1) (2) (3) (4) (5)

(1) Series

(2) Output Current
1.0 - 1.0 A

(3) Input Voltage Range

05 - 3-5.5 V
24 - 4.6-36 V
*See Table

(5) Packing Options

Blank - Standard Tube packing
R - for Tape & Reel packing

(4) Output Voltage

1R2 - 1.2 V
1R5 - 1.5 V
1R8 - 1.8 V
2R5 - 2.5 V
3R3 - 3.3 V
05 - 5.0 V
6R5 - 6.5 V
09 - 9.0 V
12 - 12 V
15 - 15 V

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ALL SPECIFICATIONS ARE TYPICAL AT 25°C, NOMINAL INPUT AND FULL LOAD UNLESS OTHERWISE NOTED

Model Number	Input Voltage Range (VDC)	Input Current			Output Voltage (VDC)	Output Current Full Load (mA)	Efficiency Full Load (% , typ.)		Capacitive Load @FL (μF, max.)
		No-Load (mA, typ.)	Full Load (mA, typ.)				@Min. Vin	@Max. Vin	
			@Min. Vin	@Max. Vin					
CSVR1-051R2	5 (3-5.5)	0.5	442	242	1.2	1000	90.5	90.5	330
CSVR1-051R5	5 (3-5.5)	0.5	544	297	1.5	1000	92	92	330
CSVR1-051R8	5 (3-5.5)	0.5	649	354	1.8	1000	92.5	92.5	330
CSVR1-052R5	5 (3.8-5.5)	0.5	697	484	2.5	1000	94.5	94	330
CSVR1-241R2	24 (4.6-36)	1.6	300	47	1.2	1000	87	72	330
CSVR1-241R5	24 (4.6-36)	1.6	367	55	1.5	1000	89	76	330
CSVR1-241R8	24 (4.6-36)	1.6	433	64	1.8	1000	90.5	79	330
CSVR1-242R5	24 (4.6-36)	1.6	588	84	2.5	1000	92.5	83	330
CSVR1-243R3	24 (4.75-36)	1.6	740	106	3.3	1000	94	86.5	330
CSVR1-2405	24 (6.5-36)	1.6	806	156	5	1000	95.5	89.5	330
CSVR1-246R5	24 (9-36)	1.6	765	201	6.5	1000	94.5	90	330
CSVR1-2409	24 (12-36)	1.6	786	272	9	1000	95.5	92	330
CSVR1-2412	24 (15-36)	1.6	843	359	12	1000	95	93	330
CSVR1-2415	24 (18-36)	1.6	869	444	15	1000	96	94	330

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INPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Input Filter			Capacitor			
Input Reflected Ripple Current (1)				35		mApk-pk
Start up Time	Nominal Vin and constant resistive load			5		ms
Remote ON/OFF Control (2)	Module ON (Open Circuit)		2.0		5.5	VDC
	Module OFF (Short circuit pin 10 and -Vin)		0		0.4	
	OFF idle current	05 Series			0.3	mA
		24 Series			0.8	
Recommended input fuse (slow blow)	CSV1-241R2 & CSV1-241R5		0.6			A
	CSV1-241R8 & CSV1-051R2		0.75			
	CSV1-051R5 & CSV1-242R5 & CSV1-051R8		1			
	CSV1-052R5 & CSV1-243R3 & CSV1-246R5 & CSV1-2409		1.25			
	CSV1-2405 & CSV1-2412 & CSV1-2415		1.5			
Note : 1. Measured with a simulated source inductance of 12μH and a source capacitor Cin (10μF, ESR<1.0Ω at 100kHz). 2. The remote ON/OFF control pin is referenced to –Vin.						
OUTPUT SPECIFICATIONS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			-2.0		+2.0	%
Output Voltage Adjustability (Trim) (1)			-10		+10	%
Maximum Output Current					1000	mA
Line Regulation			-0.2		+0.2	%
Load Regulation	From 10% to 100% Load		-0.6		+0.6	%
Ripple & Noise (2)	20MHz bandwidth	Vo < 7.5 V			50	mVpk-pk
		Vo > 7.5 V			75	
Short Circuit Protection			Continuous (Automatic Recovery)			
Temperature Coefficient			-0.02		+0.02	%/°C
Maximum Capacitive Load	Minimum Vin and constant resistive load				330	μF
Transient Recovery Time	Nominal Vin and 50% load step change (75%-50% of Io)	For All models		250		μs
Transient Response Deviation		Vo < 4 V	-5		+5	%
		Vo > 4 V	-3		+3	
Note : 1. The 1.2VDC output model only support Vadj up,do not support Vadj down. 2. Ripple & Noise measured with a 0.1μF MLCC and 10μF electrolytic capacitor.						
ABSOLUTE MAXIMUM RATINGS						
Parameter	Conditions		Min.	Typ.	Max.	Unit
Input Surge Voltage (100 ms)	5V Input				6	VDC
	24V Input				40	
Note : These are stress ratings. Exposure of devices to any of these conditions may adversely affect long-term reliability.						

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GENERAL SPECIFICATIONS

Parameter	Conditions		Min.	Typ.	Max.	Unit
Switching Frequency	5 V Input			1200		kHz
	24 V Input			410		
MTBF	MIL-HDBK-217 F @ 25°C	5 V Input	35			M hours
		24 V Input	4.7			
Safety Standard	IEC / EN / UL 62368-1		Design to meet			
Environmental compliance			RoHS			

ENVIRONMENT SPECIFICATIONS

Parameter		Conditions	Min.	Typ.	Max.	Unit
Operating Ambient Temperature		See the Derating Curve	-40		105	°C
Over Temperature Protection		Internal IC junction		150		°C
Storage Humidity					95	% rel. H
Storage Temperature			-55		125	°C
Thermal Impedance	Mounting at FR4 (3.74*0.98 inch) PCB	CSV1-051R2 & CSV1-051R5 & CSV1-051R8 & CSV1-052R5	24.63			°C/W
		CSV1-241R2 & CSV1-241R5	54.76			
		CSV1-241R8 & CSV1-242R5 & CSV1-243R3 & CSV1-2405	34.96			
		CSV1-246R5 & CSV1-2409	35.97			
		CSV1-2412 & CSV1-2415	44.49			
Cooling		Natural Convection	30-65 LFM			
Lead-free Reflow Solder Process		IPC/JEDEC J-STD-020D.1				
Moisture Sensitivity Level (MSL)			Level 1			
Reflow Temperature			Peak 245°C (10 sec) ,max.			
Vibration			MIL-STD-810F			

EMC SPECIFICATIONS

Parameter	Standard	Condition	Criterion
Conducted Emissions	EN55032	with external components	B
Radiated Emissions	EN55032	with external components	B
ESD	IEC 61000-4-2	Air: ± 4kV	A
RS	IEC 61000-4-3	10V/m	A
EFT	IEC 61000-4-4	±1kV with external components	A
Surge	IEC 61000-4-5	±1kV with external components	A
CS	IEC 61000-4-6	3Vrms	A
PFMF	IEC 61000-4-8	100A/m	A

PHYSICAL SPECIFICATIONS

Parameter	Value
Weight	1.4 g, typ.
Dimensions	0.60" x 0.47" x 0.15"

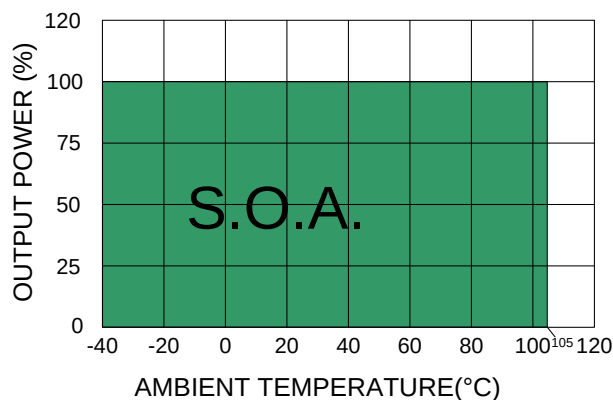
CSV-1.0 Series

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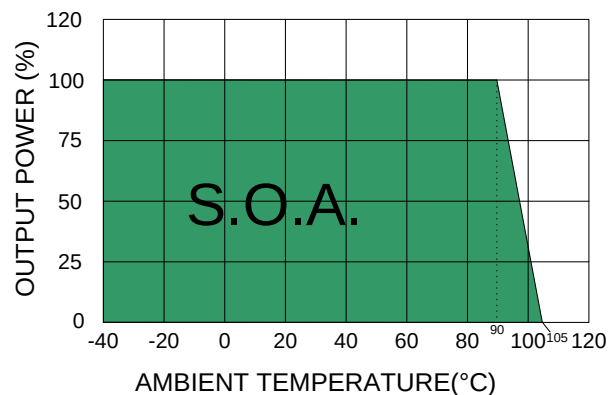
ELECTRICAL CHARACTERISTIC CURVES

Derating Curve



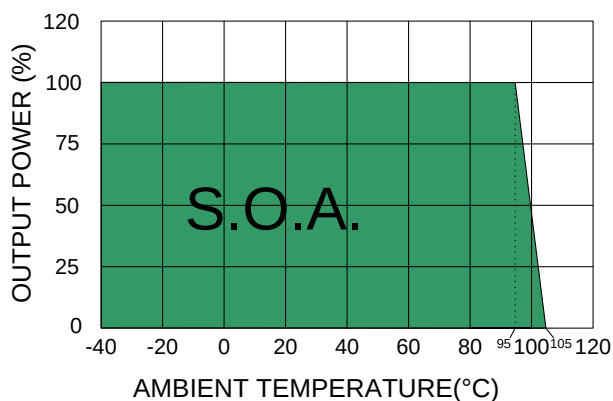
CSV1-051R2 & CSV1-051R5 &
CSV1-051R8 & CSV1-052R5

Derating Curve



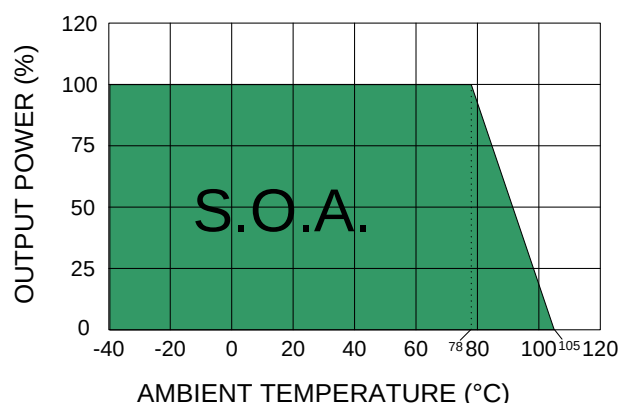
CSV1-241R2 & CSV1-241R5 &
CSV1-246R5 & CSV1-2409

Derating Curve



CSV1-241R8 & CSV1-242R5 &
CSV1-243R3 & CSV1-2405

Derating Curve

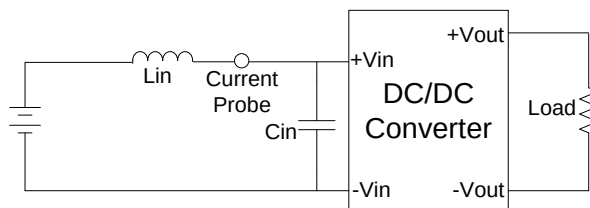


CSV1-2412 & CSV1-2415

TEST CONFIGURATIONS

Input Reflected Ripple Current Test Step

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



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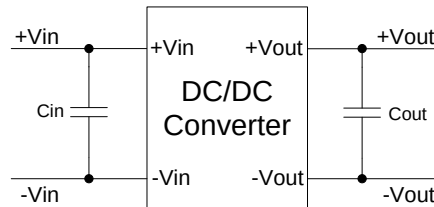


DESIGN CONFIGURATIONS

Standard Application Circuit

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

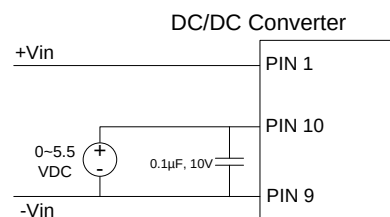
2. $C_{out}=47\mu F$ (Optional)



Remote ON / OFF Test Step

Input voltage (2~5.5VDC) connect to Pin10 or open, converter ON.

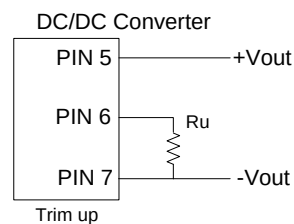
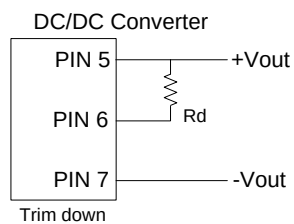
Input voltage (0~0.4VDC) connect to Pin10 or short, converter OFF.



Output Voltage Adjustment

Pin 6 via a resistor to Pin 5 (+Vout), V_o trim down.

Pin 6 via a resistor to Pin 7 (-Vout), V_o trim up.



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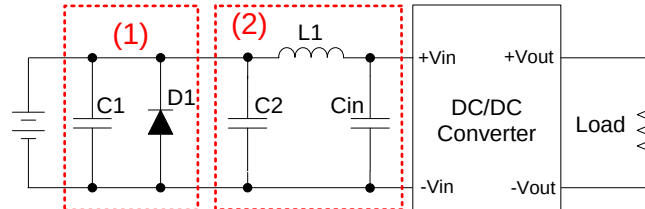
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DESIGN & FEATURE CONFIGURATIONS

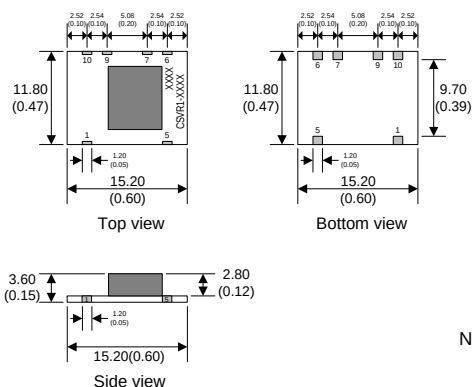
EMC Filter

The part (1) Circuit is used to meet Surge & EFT test, and the part (2) Circuit is used to meet EMI test.



	C1	D1	C2	L1	Cin
CSV1-05XX	NIPPON Chemi-con KY Series 2200 μ F, 50V	SMDJ6.0A	MLCC 10 μ F, 50V	6.8 μ H	MLCC 10 μ F, 50V
CSV1-24XX	NIPPON Chemi-con KY Series 330 μ F, 100V	SMDJ36A	MLCC 4.7 μ F, 50V	33 μ H	

MECHANICAL SPECIFICATIONS



SMD 10Pin Package

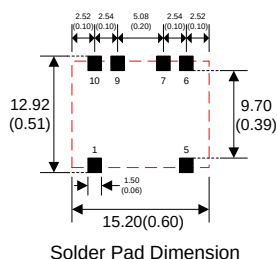
Notes : All dimensions are typical in millimeters (inches).

1. Pin pitch tolerance: ± 0.25 (± 0.01)
2. Pin profile tolerance: ± 0.1 (± 0.004)
3. Other tolerance: ± 0.5 (± 0.02)

PIN CONNECTIONS

PIN NUMBER	SINGLE
1	+Vin
5	+Vout
6	Trim
7	-Vout
9	-Vin
10	CTRL

RECOMMENDED FOOTPRINT DETAILS



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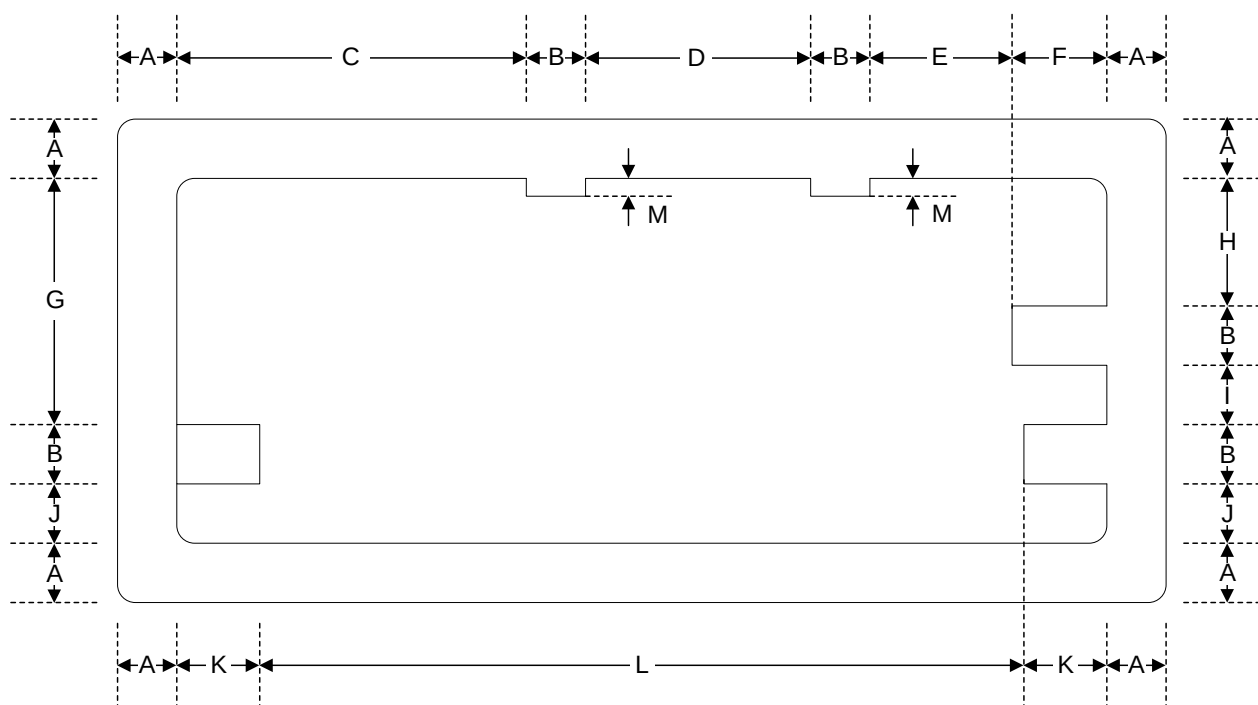
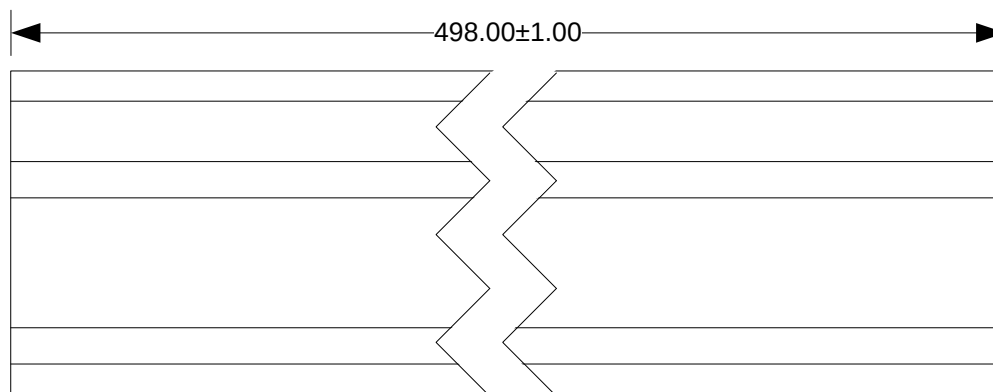
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TUBE DIMENSION

Standard packing – Tube

■ 1 Tube contains 40 converters



Dimensions in [mm]

Tube Length: 498 ± 1.0 mm													
ITEM	A	B	C	D	E	F	G	H	I	J	K	L	M
DIM	1.0 ^{+0.2} _{-0.2}	1.0 ^{+0.2} _{-0.2}	5.9 ^{+0.2} _{-0.2}	3.8 ^{+0.2} _{-0.2}	2.4 ^{+0.2} _{-0.2}	1.6 ^{+0.1} _{-0.2}	4.15 ^{+0.2} _{-0.1}	2.15 ^{+0.2} _{-0.1}	1.0 ^{+0.2} _{-0.1}	1.0 ^{+0.2} _{-0.2}	1.4 ^{+0.2} _{-0.2}	12.9 ^{+0.2} _{-0.2}	0.3 ^{+0.1} _{-0.1}

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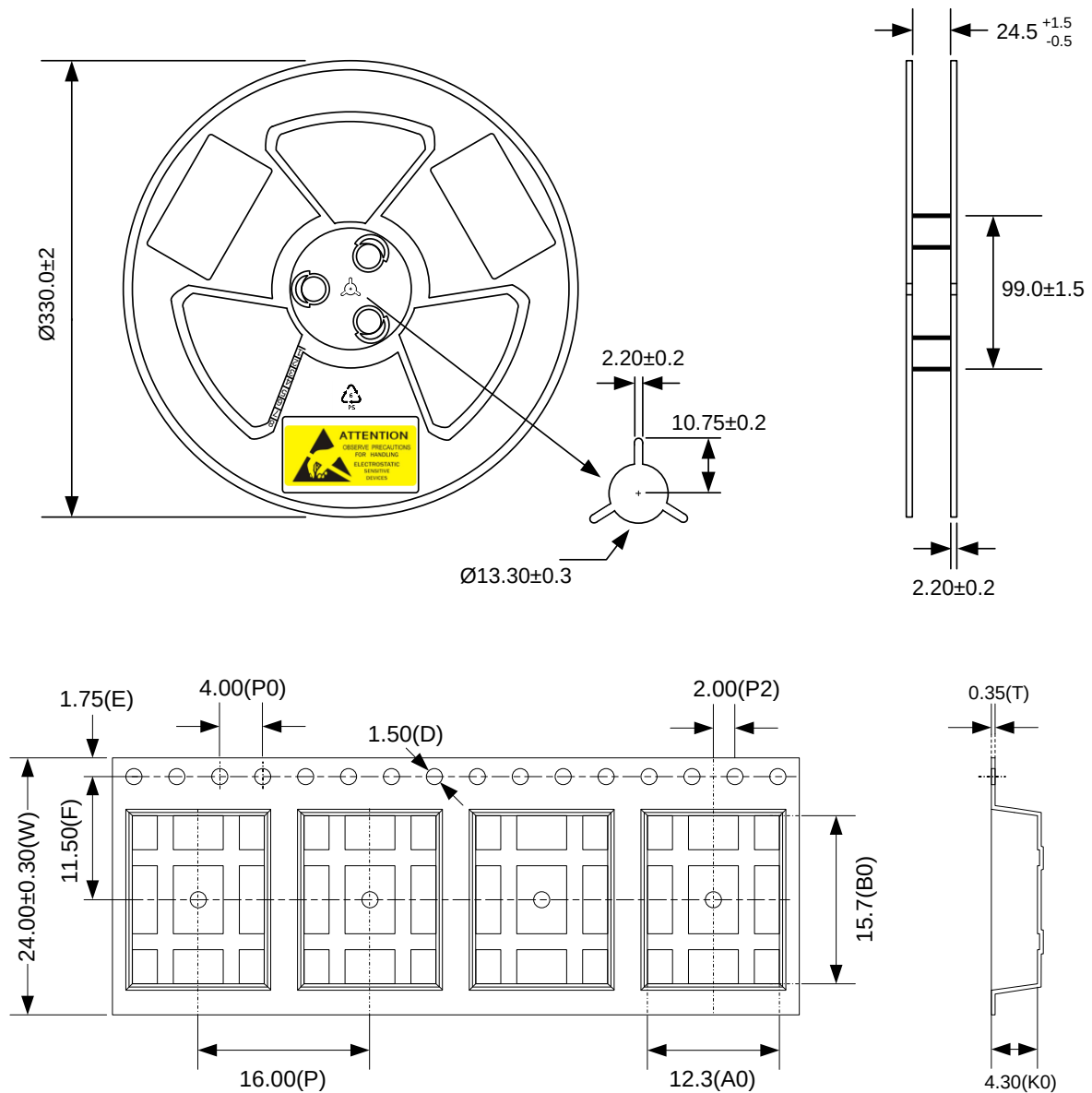
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TAPE & REEL DIMENSION - SINGLE OUTPUT MODELS

Optional packing – Tape & Reel

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



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

Dimensions in [mm]

Carrier Length: 30M / 22" reel, Q'ty= 500 pcs/13"reel						
ITEM	W	A0	B0	K0	T	P
DIM	24.0 ^{+0.30} _{-0.30}	12.3 ^{+0.20} _{-0.10}	15.7 ^{+0.20} _{-0.10}	4.30 ^{+0.20} _{-0.10}	0.35 ^{+0.05} _{-0.05}	16.0 ^{+0.10} _{-0.10}
ITEM	F	E	D	P0	P2	
DIM	11.5 ^{+0.15} _{-0.15}	1.75 ^{+0.10} _{-0.10}	1.50 ^{+0.10} _{-0.00}	4.00 ^{+0.10} _{-0.10}	2.00 ^{+0.10} _{-0.10}	