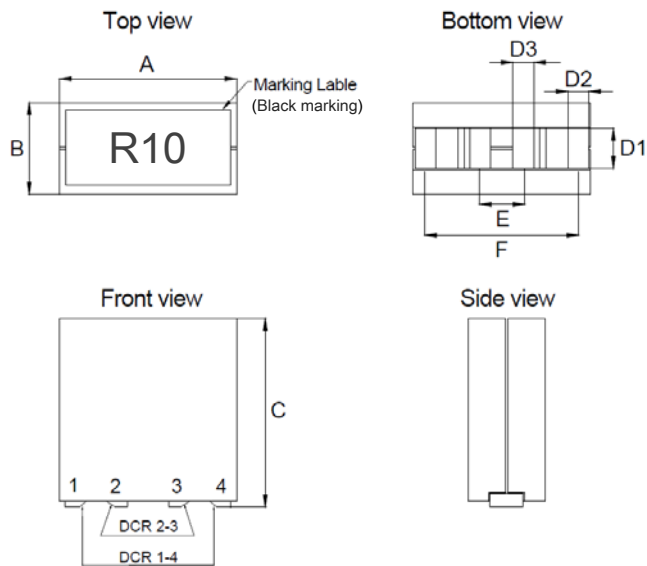


Trans-Inductor Voltage Regulator TLVR-Series-D01

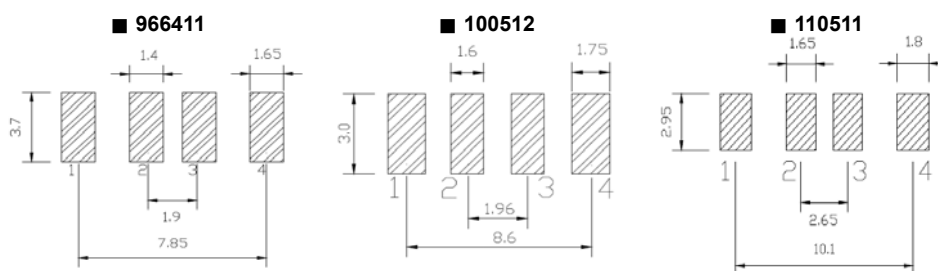
1. Dimension



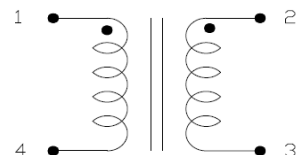
Series	A(mm)	B(mm)	C(mm)	D1mm)	D2(mm)	D3(mm)	E(mm)	F(mm)
TLVR966411	9.30±0.3	6.10±0.3	10.20±0.3	3.20±0.3	1.15±0.3	0.60±0.3	2.20±0.3	7.85±0.3
TLVR100512	10.00max	5.00max	12.00max	2.30typ	1.10typ	0.86typ	1.96typ	8.60typ
TLVR110511	11.70±0.3	5.70±0.3	11.00±0.2	2.45±0.3	1.30±0.3	1.15±0.3	2.65±0.5	10.10±0.5

PAD surface flatness 0.1mm max

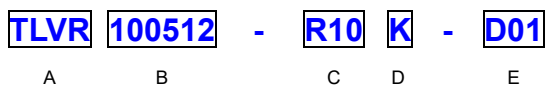
Recommend PC Board Pattern



Schematic Diagram



2. Part Numbering



- A: Series
- B: Dimension
- C: Inductance R10=100nH
- D: Inductance Tolerance K=±10%
- E: Inner Code

3. Specification

TAI-TECH Part Number	L (nH) 1-4/2-3 ±15%	Li (nH) Min	DCR (mΩ) ±10%		Isat1 (A) Note b	Isat2 (A) Note b	Isat3 (A) Note b	Irms (A) 1-4 Note a	Irms (A) 2-3 Note a	Marking Code
			1-4	2-3	@25°C	@100°C	@125°C			
TLVR966411-R10L-D01	100	64	0.125	0.330	98	83	78	75	40	R10
TLVR966411-R12L-D01	120	77	0.125	0.330	79	67	63	75	40	R12
TLVR966411-R15L-D01	150	96	0.125	0.330	62	53	49	75	40	R15
TLVR966411-R18L-D01	180	115	0.125	0.330	54	46	43	75	40	R18
TLVR966411-R22L-D01	220	140	0.125	0.330	50	-	-	75	40	R22

Note:

1. L1@ 100kHz, 1.0Vrms, 0A, 25°C.
2. Li @ 100kHz, 1.0Vrms, IsAT.
3. DCR @ 25°C, test DCR1-4 & DCR2-3 which was shown on dimension page.
4. Operating Temperature: -40°C~ +125°C(Including self-temperature rise).
 - a. Irms: Irms is the DC current which causes the surface temperature of the part increase approximately 40°C.
 - b. IsAT1: is the DC current which causes the inductance drop to Li at +25°C
 - b. IsAT2: is the DC current which causes the inductance drop to Li at +100°C
 - b. IsAT3: is the DC current which causes the inductance drop to Li at +125°C

TAI-TECH Part Number	L (nH) 1-4/2-3 ±10%	L2 (nH)@Isat1 Min 1-4	DCR (mΩ) ±10%		Isat1 (A) Note b	Isat2 (A) Note b	Isat3 (A) Note b	Irms (A) 1-4 Note a	Irms (A) 2-3 Note a	Marking Code
			1-4	2-3	@25°C	@100°C	@125°C			
TLVR100512-R07K-D01	70	50	0.125	0.450	127	110	100	75	35	70N
TLVR100512-R08K-D01	80	57	0.125	0.450	111	96	87	75	35	80N
TLVR100512-R09K-D01	90	64	0.125	0.450	98	85	77	75	35	90N
TLVR100512-R10K-D01	100	72	0.125	0.450	89	77	70	75	35	R10
TLVR100512-R12K-D01	120	86	0.125	0.450	74	64	58	75	35	R12
TLVR100512-R15K-D01	150	108	0.125	0.450	59	51	46	75	35	R15
TLVR100512-R17K-D01	170	122	0.125	0.450	52	45	41	75	35	R17

Note:

1. L@ 100kHz, 1.0Vrms, 0A, 25°C.
2. L2 @ 100kHz, 1.0Vrms, IsAT.
3. DCR @ 25°C, test DCR1-4 & DCR2-3 which was shown on dimension page.
4. Operating Temperature: -40°C~ +125°C(Including self-temperature rise).
 - a. Irms: Irms is the DC current which causes the surface temperature of the part increase approximately 40°C.
 - b. IsAT1: Peak current for approximately 20% rolloff at +25°C
 - b. IsAT2: Peak current for approximately 20% rolloff at +100°C
 - b. IsAT3: Peak current for approximately 20% rolloff at +125°C

TAI-TECH Part Number	L (nH) 1-4/2-3 ±15%	L2 (nH) Min 1-4	DCR (mΩ) ±10%		Isat1 (A) Note b	Isat2 (A) Note b	Isat3 (A) Note b	Irms (A) 1-4 Note a	Irms (A) 2-3 Note a	Marking Code
			1-4	2-3	@25°C	@100°C	@125°C			
TLVR110511-R07L-D01	70	47.6	0.125	0.370	160	140	130	77	45	70N
TLVR110511-R08L-D01	80	54.4	0.125	0.370	150	120	110	77	45	80N
TLVR110511-R09L-D01	90	61.2	0.125	0.370	135	115	105	77	45	90N
TLVR110511-R10L-D01	105	71.4	0.125	0.370	125	106	98	77	45	R10
TLVR110511-R12L-D01	120	81.6	0.125	0.370	102	87	80	77	45	R12
TLVR110511-R15L-D01	150	102.0	0.125	0.370	84	71	58	77	45	R15
TLVR110511-R17L-D01	170	115.6	0.125	0.370	70	60	53	77	45	R17
TLVR110511-R20L-D01	200	136.0	0.125	0.370	58	50	43	77	45	R20

Note:

1. L@ 100kHz, 1.0Vrms, 0A, 25°C.
2. L2 @ 100kHz, 1.0Vrms, IsAT.
3. DCR @ 25°C, test DCR1-4 & DCR2-3 which was shown on dimension page.
4. Operating Temperature: -40°C~ +125°C(Including self-temperature rise).
 - a. Irms: Irms is the DC current which causes the surface temperature of the part increase approximately 40°C.
 - b. IsAT1: Peak current for approximately 20% rolloff at +25°C
 - b. IsAT2: Peak current for approximately 20% rolloff at +100°C
 - b. IsAT3: Peak current for approximately 20% rolloff at +125°C

4. Applications

1. Portable electronics
2. Servers and workstations
3. Data networking and storage systems
4. Notebook and desktop computers
5. Graphics cards and battery power systems
6. Multi-phase regulators
7. Voltage Regulator Module (VRM)
8. DCR sensing

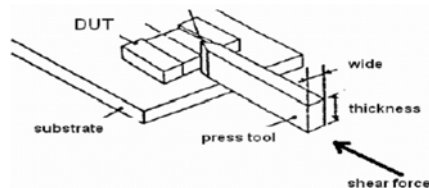
5. Material List

No	Item
1	CORE
2	CLIP
3	WIRE
4	TAPE
5	Glue

6. Reliability and Test Condition

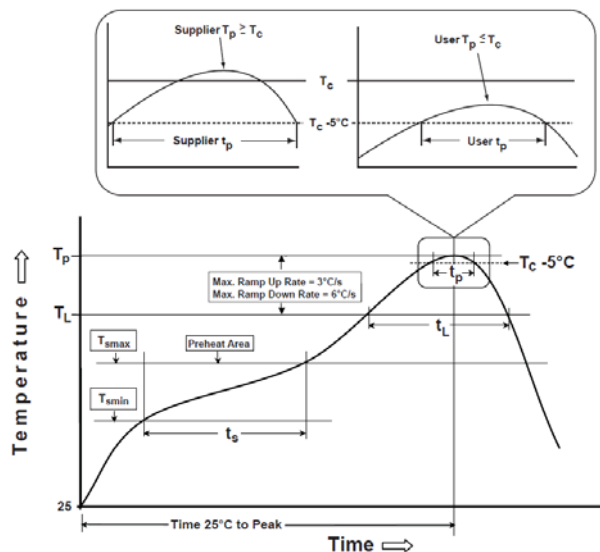
Item	Performance	Test Condition
Operating temperature	-40~+125°C (Including self - temperature rise)	
Storage temperature	-40~+125°C (on board)	
Reliability Test		
Life Test	Appearance : No damage. Inductance : within±10% of initial value RDC : within ±15% of initial value and shall not exceed the specification value	Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020E Classification Reflow Profiles) Temperature : 125±2°C Applied current : rated current Duration : 1000±12hrs Measured at room temperature after placing for 24 hrs..
Load Humidity		Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020E Classification Reflow Profiles) Humidity : 85±3% R.H, Temperature : 85°C±2°C Duration : 1000hrs Min. Bead: with 100% rated current. Inductance: with 10% rated current. Measured at room temperature after placing for 24 hrs.
Moisture Resistance		Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020E Classification Reflow Profiles) 1. Baked at50°C for 25hrs, measured at room temperature after placing for 4 hrs. 2. Raise temperature to 65±2°C 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25°C in 2.5hrs. 3. Raise temperature to 65±2°C 90-100%RH in 2.5hrs, and keep 3 hours, cool down to 25°C in 2.5hrs,keep at 25°C for 2 hrs then keep at -10°C for 3 hrs 4. Keep at 25°C 80-100%RH for 15min and vibrate at the frequency of 10 to 55 Hz to 10 Hz, measure at room temperature after placing for 1~2 hrs.

Item	Performance	Test Condition															
Thermal shock	Appearance : No damage. Inductance : within±10% of initial value RDC : within ±15% of initial value and shall not exceed the specification value	Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020E Classification Reflow Profiles) Condition for 1 cycle Step1 : -40±2°C 30±5min Step2 : 125±2°C ≤0.5min Step3 : 125±2°C 30±5min Number of cycles : 500 Measured at room temperature after placing for 24 hrs.															
Vibration		Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020E Classification Reflow Profiles) Oscillation Frequency: 10Hz~2KHz~10Hz for 20 minutes Equipment : Vibration checker Total Amplitude:10g Testing Time : 12 hours(20 minutes, 12 cycles each of 3 orientations)															
Bending		Shall be mounted on a FR4 substrate of the following dimensions: >=0805 inch(2012mm):40x100x1.2mm <0805 inch(2012mm):40x100x0.8mm Bending depth: >=0805 inch(2012mm):1.2mm <0805 inch(2012mm):0.8mm duration of 10 sec.															
Shock		Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020E Classification Reflow Profiles) Test condition: <table border="1"> <thead> <tr> <th>Type</th> <th>Peak value (g's)</th> <th>Normal duration (D) (ms)</th> <th>Wave form</th> <th>Velocity change (Vi)ft/sec</th> </tr> </thead> <tbody> <tr> <td>SMD</td> <td>50</td> <td>11</td> <td>Half-sine</td> <td>11.3</td> </tr> <tr> <td>Lead</td> <td>50</td> <td>11</td> <td>Half-sine</td> <td>11.3</td> </tr> </tbody> </table> 3 shocks in each direction along 3 perpendicular axes (18 shocks).	Type	Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec	SMD	50	11	Half-sine	11.3	Lead	50	11	Half-sine	11.3
Type		Peak value (g's)	Normal duration (D) (ms)	Wave form	Velocity change (Vi)ft/sec												
SMD	50	11	Half-sine	11.3													
Lead	50	11	Half-sine	11.3													
Solder ability	More than 95% of the terminal electrode should be covered with solder.	a. Method B, 4 hrs @155°C dry heat @235°C±5°C Test time:5 +0/-0.5 seconds. b. Method D category 3. (steam aging 8hours ± 15 min)@ 260°C±5°C Test time: 30 +0/-0.5 seconds.															
Resistance to Soldering Heat	Appearance : No damage. Inductance : within±10% of initial value RDC : within ±15% of initial value and shall not exceed the specification value	Depth: completely cover the termination <table border="1"> <thead> <tr> <th>Temperature(°C)</th> <th>Time(s)</th> <th>Temperature ramp/immersion and emersion rate</th> <th>Number of heat cycles</th> </tr> </thead> <tbody> <tr> <td>260 ±5 (solder temp)</td> <td>10 ±1</td> <td>25mm/s ±6 mm/s</td> <td>1</td> </tr> </tbody> </table>	Temperature(°C)	Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles	260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1							
Temperature(°C)		Time(s)	Temperature ramp/immersion and emersion rate	Number of heat cycles													
260 ±5 (solder temp)	10 ±1	25mm/s ±6 mm/s	1														
Terminal Strength	Preconditioning: Run through reflow for 3 times. (IPC/JEDEC J-STD-020E Classification Reflow Profiles) With the component mounted on a PCB with the device to be tested, apply a force (>0805inch(2012mm):1kg , <=0805 inch(2012mm):0.5kg)to the side of a device being tested. This force shall be applied for 60 +1 seconds. Also the force shall be applied gradually as not to apply a shock to the component being tested.																



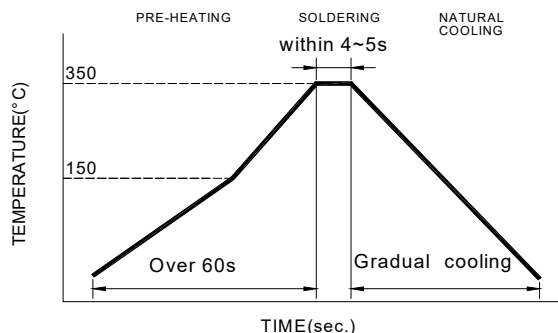
7. Soldering

Soldering Reflow



Reflow times: 3 times max

Iron Soldering



Iron Soldering times : 1 times max

Table (1.1): Reflow Profiles

Profile Type:	Pb-Free Assembly
Preheat	
-Temperature Min(T_{smin})	150°C
-Temperature Max(T_{smax})	200°C
-Time(t_s)from(T_{smin} to T_{smax})	60-120seconds
Ramp-up rate(T_L to T_p)	3°C/second max.
Liquidus temperature(T_L)	217°C
Time(t_L)maintained above T_L	60-150 seconds
Classification temperature(T_c)	See Table (1.2)
Time(t_p) at $T_c - 5^\circ C$ (T_p should be equal to or less than T_c .)	< 30 seconds
Ramp-down rate(T_p to T_L)	6°C /second max.
Time 25°C to peak temperature	8 minutes max.

T_p: maximum peak package body temperature, **T_c**: the classification temperature.
 For user (customer) **T_p** should be equal to or less than **T_c**.

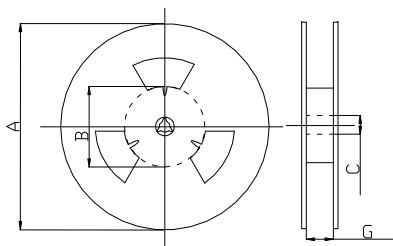
Table (1.2) Package Thickness/Volume and Classification Temperature (T_c)

	Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
PB-Free Assembly	<1.6mm	260°C	260°C	260°C
	1.6-2.5mm	260°C	250°C	245°C
	≥2.5mm	250°C	245°C	245°C

Reflow is referred to standard IPC/JEDEC J-STD-020E ◦

8. Packaging Information

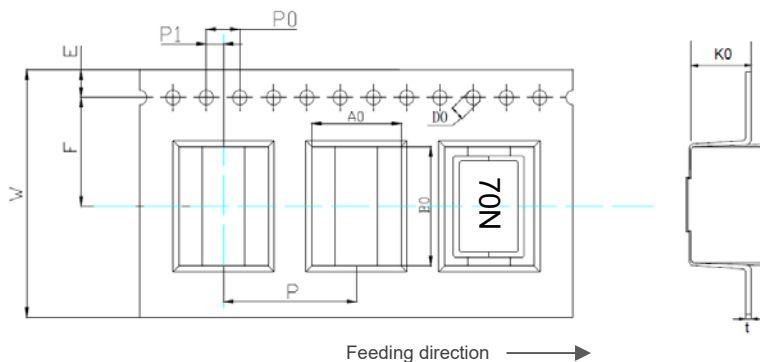
8.1 Reel Dimension



Type	A(mm)	B(mm)	C(mm)	G(mm)
13"x24mm	330	100	13.5	24.5

8.2 Tape Dimension

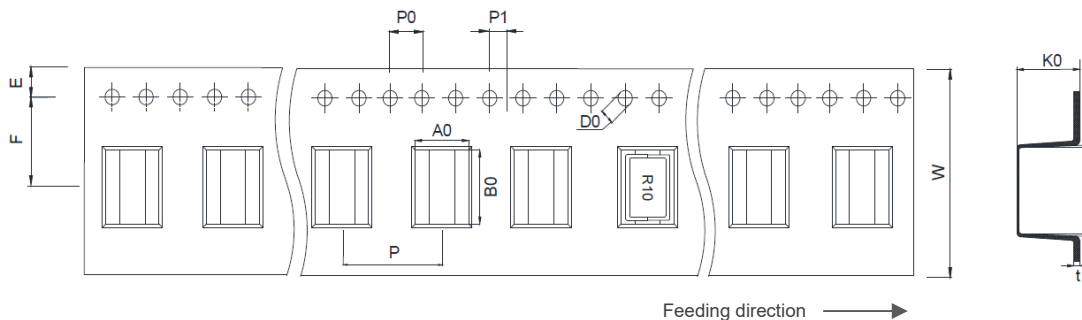
■ 100512 Type



Series	B0	A0	K0	P	P0	P1	W	F	E	D0	t
TLVR100512	10.2±0.1	5.2±0.1	12.2±0.1	16.0±0.1	4.0±0.1	2.0±0.1	24.0±0.3	11.5±0.1	1.75±0.1	1.5±0.1	0.4±0.05

Units: mm

■ 966411/110511 Type



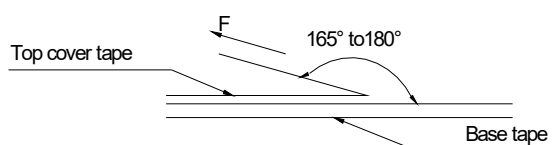
Series	B0	A0	K0	P	P0	P1	W	F	E	D0	t
TLVR966411	9.8±0.3	6.6±0.3	10.7±0.3	12.0±0.1	4.0±0.1	2.0±0.1	24.0±0.3	11.5±0.1	1.75±0.1	1.5±0.1	0.5±0.05
TLVR110511	12.2±0.1	6.2±0.1	11.3±0.1	12.0±0.1	4.0±0.1	2.0±0.1	24.0±0.3	11.5±0.1	1.75±0.1	1.5±0.1	0.5±0.05

Units: mm

8.3 Packaging Quantity

TLVR	966411	100512	110511
Reel (Pcs)	500	300	400

8.4 Tearing Off Force



The force for tearing off cover tape is 10 to 130 grams in the arrow direction under the following conditions.

Room Temp. (°C)	Room Humidity (%)	Room atm (hPa)	Tearing Speed mm/min
5~35	45~85	860~1060	300

Application Notice

- Storage Conditions (component level)
 - To maintain the solderability of terminal electrodes:
 1. TAI-TECH products meet IPC/JEDEC J-STD-020E standard-MSL, level 1.
 2. Temperature and humidity conditions: Less than 40°C and 60% RH.
 3. Recommended products should be used within 12 months form the time of delivery.
 4. The packaging material should be kept where no chlorine or sulfur exists in the air.
- Transportation
 1. Products should be handled with care to avoid damage or contamination from perspiration and skin oils.
 2. The use of tweezers or vacuum pick up is strongly recommended for individual components.
 3. Bulk handling should ensure that abrasion and mechanical shock are minimized.