NLVR Series

High Current Power Inductor For TLVR

ROHS/REACH COMPLIANT HALOGEN FREE

9001:2015 CERTIFIED

NIC Components Corp.

SERIES FEATURES

- NEXT GENERATION TLVR APPLICATION SUPPPORT
- LOW DCR AND LEAKAGE INDUCTANCE
- LOW LOSS CONSTRUCTION
- HIGH CURRENT RATINGS
- INDUCTANCE UP TO 220nH

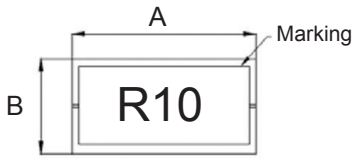
CHARACTERISTICS

Case Size / Family	NLVR9664	NLVR1005	NLVR1105
Inductance Range	100 ~ 220 nH	70 ~ 170 nH	70 ~ 200 nH
Inductance Tolerance	±10% (K), ±15% (L),		
Operating Temperature Range	-40°C ~ +125°C (including self-heating)		
Maximum Temperature Rise at Irms	+40°C		

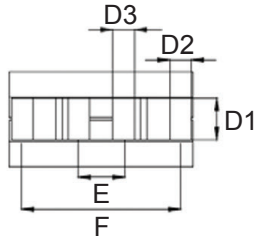
SIZES & DIMENSIONS (mm)

Case Size	A (mm)	B (mm)	C (mm)	D1 (mm)	D2(mm)	D3 (mm)	E (mm)	F (mm)
NLVR9664	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
NLVR1005	10.0 max	5.0 max	12.00 max	2.30 typ	1.10 typ	0.86 typ	1.96 typ	8.60 typ
NLVR1105	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

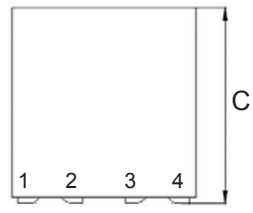
Top View



Bottom View



Front View



Side View

PART NUMBER SYSTEM

NLVR 1005 L R15 TR F

- F — RoHS compliant
- TR — Packaging: TR = Tape & Reel
- R15 — Packaging: Inductance Code N = decimal point (nH), R = decimal point (uH) Ex. 2N2 = 2.2nH, 33N = 33nH, R10 = 100nH = 0.1uH
- L — Inductance Tolerance: ±10% (K), ±15% (L)
- 1005 — Case Size Code
- NLVR — Series

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NLVR9664 Values (9.3 x 6.1 x 10.2 mm size)

NIC Part Number	Inductance 1-4 / 2-3 (nH)*1	Inductance (nH)*2	Inductance Tolerance	DCR 1-4 (mΩ) *3	DCR 2-3 (mΩ) *3	Isat (A) 25°C*5	Isat (A) 100°C*6	Isat (A) 125°C*7	Irms (1-4) (A)*4	Irms (2-3) (A)*4
NLVR9664LR10TRF	100	64	±15%	0.125 ± 10%	0.33 ±10%	98	83	78	75	40
NLVR9664LR12TRF	120	77				79	67	63		
NLVR9664LR15TRF	150	96				62	53	49		
NLVR9664LR18TRF	180	115				54	46	43		
NLVR9664LR22TRF	220	140				50	-	-		

NLVR1005 Values (10 x 5 x 12 mm size)

NIC Part Number	Inductance 1-4 / 2-3 (nH)*1	Inductance (nH)*2	Inductance Tolerance	DCR 1-4 (mΩ) *3	DCR 2-3 (mΩ) *3	Isat (A) 25°C*5	Isat (A) 100°C*6	Isat (A) 125°C*7	Irms (1-4) (A)*4	Irms (2-3) (A)*4
NLVR1005K70NTRF	70	50	±10%	0.125 ±10%	0.45 ± 10%	127	110	100	75	35
NLVR1005KR80NTRF	80	57				111	96	87		
NLVR1005KR90NTRF	90	64				98	85	77		
NLVR1005KR10TRF	100	72				89	77	70		
NLVR1005KR12TRF	120	86				74	64	58		
NLVR1005KR15TRF	150	108				59	51	46		
NLVR1005KR17TRF	170	122				52	45	41		

NLVR1105 Values (11.7 x 5.7 x 11 mm size)

NIC Part Number	Inductance 1-4 / 2-3 (nH)*1	Inductance (nH)*2	Inductance Tolerance	DCR 1-4 (mΩ) *3	DCR 2-3 (mΩ) *3	Isat (A) 25°C*5	Isat (A) 100°C*6	Isat (A) 125°C*7	Irms (1-4) (A)*4	Irms (2-3) (A)*4
NLVR1105LR70NTRF	70	47.6	±15%	0.125 ± 10%	0.370 ± 10%	160	140	130	77	45
NLVR1105LR80NTRF	80	54.4				150	120	110		
NLVR1105LR90NTRF	90	61.2				135	115	105		
NLVR1105LR10TRF	105	71.4				125	106	98		
NLVR1105LR12TRF	120	81.6				102	87	80		
NLVR1105LR15TRF	150	102				84	71	58		
NLVR1105LR17TRF	170	115.6				70	60	53		
NLVR1105LR20TRF	200	136				58	50	43		

Notes

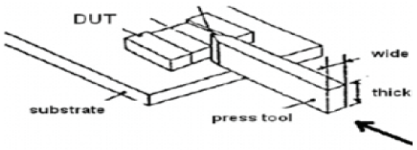
1. L1@ 100kHz, 1.0Vrms, 0A, 25°C.
2. Li @ 100kHz, 1.0Vrms, ISAT.
3. DCR @ 25°C, test DCR1-4 & DCR2-3 which was shown on dimension page 1.
4. IRMS: Irms is the DC current which causes the surface temperature of the part increase approximately 40°C.
5. ISAT1: is the DC current which causes the inductance drop to Li at +25°C
6. ISAT2: is the DC current which causes the inductance drop to Li at +100°C
7. ISAT3: is the DC current which causes the inductance drop to Li at +125°C

RELIABILITY TEST

Item	Performance	Test Condition
Life Test	Appearance: No damage. Inductance: within±10% of initial value Q: Shall not exceed the specification value. RDC: within ±15% of initial value and shall not exceed the specification value	Preconditioning: Run through IR reflow 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 IR reflow for 3times. (IPC/JEDECJ-STD-020E Classification Reflow Profiles) Humidity: 85±2%R.H, Temperature: 85°C±2°C Duration: 1000hrs Min. Bead:with 100% rated current, Bead: with 100% rated current Inductance: with 10% rated current. Measured at room temperature after placing for 24±2 hrs.
Moisture Resistance		Preconditioning: Run through IR reflow 3 times.(IPC/ JEDEC J-STD-020E Classification Reflow Profiles) 1. Baked at 50°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.
Thermal Shock		Preconditioning: Run through IR reflow 3 times.(IPC/ JEDEC J-STD-020E Classification Reflow Profiles) 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±2 hrs.
Vibration		Preconditioning: Run through IR reflow for 3 times. (IPC/JEDECJ-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 IR reflow for 3 times. (IPC/JEDECJ-STD-020E Classification Reflow Profiles): Test condition: 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 3 Shocks in each direction along 3 perpendicular axes. (18 shocks)

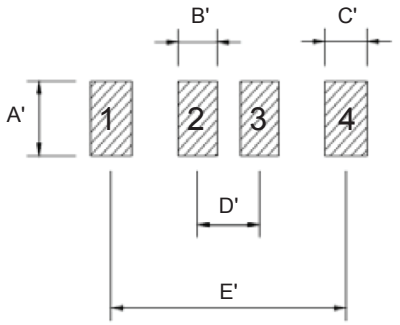
RELIABILITY TEST CONT'D

<table>
<tr><th>Item</th><th>Performance</th><th>Test Condition</th></tr>
<tr><td>Solderability</td><td rowspan="2">Appearance: No damage.
Inductance: within±10% of initial value
Q: Shall not exceed the specification value.
RDC: within ±15% of initial value and shall not exceed the specification value</td><td>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.</td></tr>
<tr><td>Resistance to Soldering Heat</td><td>Depth: completely cover the termination
<table>
<tr><th>Temperature(°C)</th><th>Time(s)</th><th>Temperature ramp/immersion and emersion rate</th><th>Number of heat cycles</th></tr>
<tr><td>260 ±5 (solder temp)</td><td>10 ±1</td><td>25mm/s ±6 mm/s</td><td>1</td></tr>
</table></td></tr>
<tr><td>Terminal Strength</td><td>Preconditioning: Run through IR reflow 3 times.(IPC/JEDEC J-STD-020E Classification Reflow Profiles)
With the component mounted on a PCB with the device to betested, apply a force(>0805:1kg , <=0805:0.3kg)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.
 
</td></tr>
</table>

Recommended Land Pattern (mm)

Case Size	A'	B'	C'	D'	E'
NLVR9664	3.7	1.4	1.65	1.9	7.85
NLVR1005	3.0	1.6	1.75	1.96	8.6
NLVR1105	2.95	1.65	1.8	2.65	10.1



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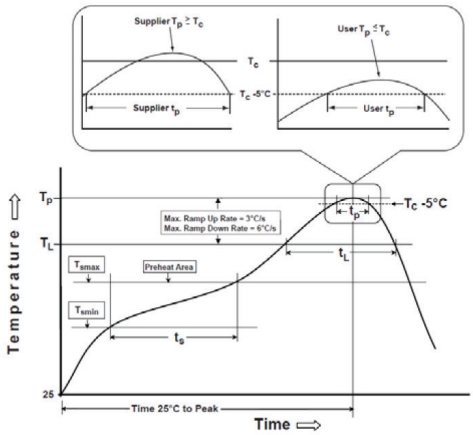
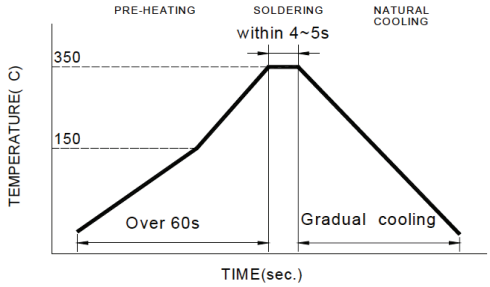
Reflow Soldering



Reflow times: 3 times max

Soldering Iron



Iron Soldering times：1 times max

Recommended temperature profiles for lead free re-flow soldering in reflow profile table & package thickness table (J-STD-020E)

Reflow Profiles

Profile Type	Pb-Free Assembly
Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(ts)from(Tsmin to Tsmax)	 150°C 200°C 60-120seconds
Ramp-up rate(TLto Tp)	3°C/second max.
Liquidus temperature(TL) Time(tL)maintained above TL	217°C 60-150 seconds
Classification temperature(Tc)	See Table (1.2)
Time(tp) at Tc- 5°C (Tp should be equal to or less than Tc.)	< 30 seconds
Ramp-down rate(Tp to TL)	6°C /second max.
Time 25°C to peak temperature	8 minutes

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

Package Thickness/Volume and Classification Temperature (Tc)

	Package Thickness	Volume mm3 <350	Volume mm3 350-2000	Volume mm3 >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

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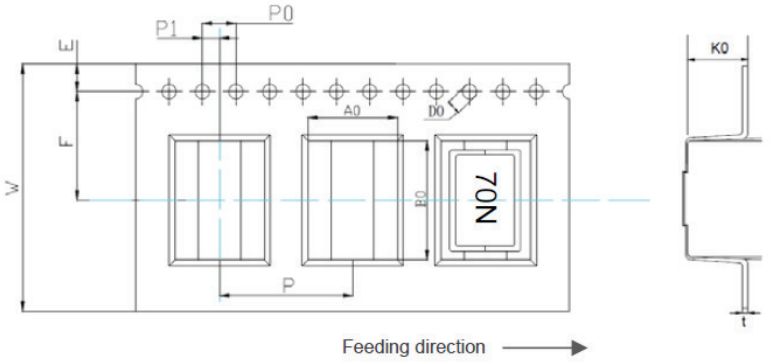
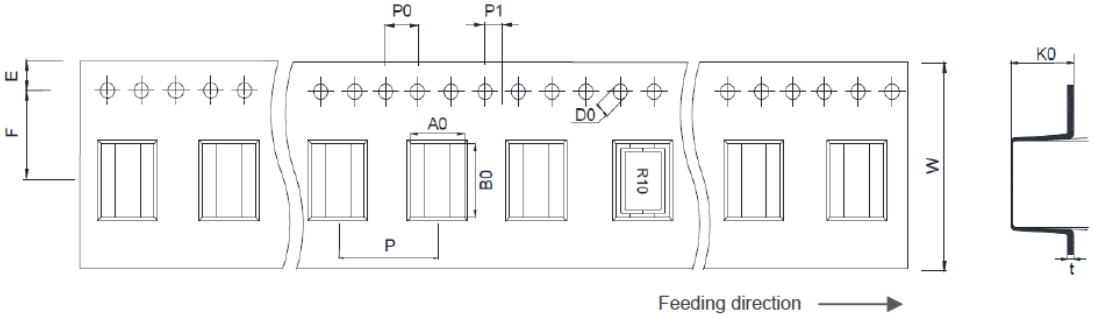
CARRIER DIMENSIONS & REEL QUANTITY (mm)

TYPE	A0	B0	W	E	F	P	P0	P1	D0	t	K0	Reel Qty
NLVR9664	6.6±0.3	9.8±0.3	24.0±0.3	1.75±0.1	11.5±0.1	12.0±0.1	4.0±0.1	2.0±0.1	1.5±0.1	0.5 ± 0.05	10.7±0.3	500
NLVR1005	5.2±0.1	10.2±0.1	24.0±0.3	1.75±0.1	11.5±0.1	16.0±0.1	4.0±0.1	2.0±0.1	1.5±0.1	0.4 ± 0.05	12.2±0.1	300
NLVR1105	6.2±0.1	12.2±0.1	24.0±0.3	1.75±0.1	11.5 ± 0.1	12.0±0.1	4.0±0.1	2.0±0.1	1.5±0.1	0.5±0.05	11.3±0.1	400

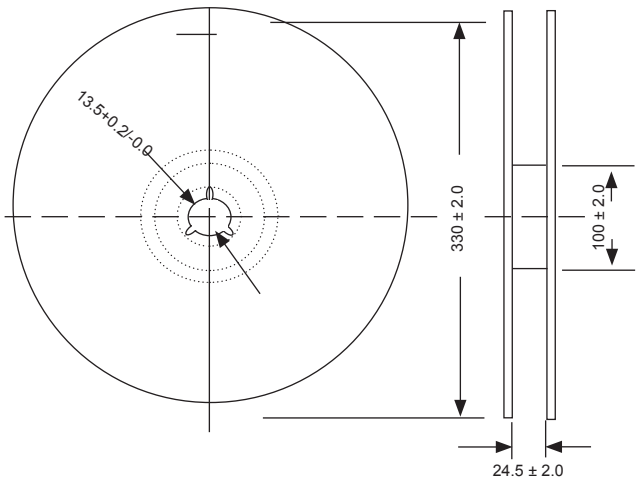
NLVR1005



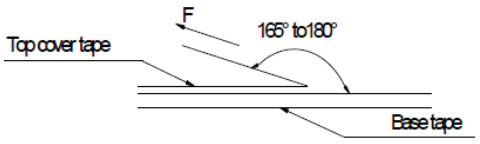
NLVR9664 & NLVR1105



REEL DIMENSIONS (mm)



Tearing off Force



Tearing Speed	Room Temp (°C)	Room Humidity (%)	Room Atm (hPa)
300±10%	5~35	100±2	860~1060