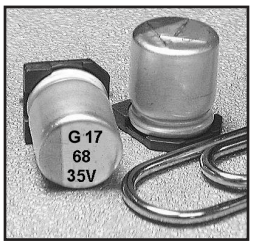
# Hybrid Aluminum Electrolytic Capacitors

NSPE-HF Series

- CYLINDRICAL V-CHIP CONSTRUCTION FOR SURFACE MOUNTING
- EXTENDED LOAD LIFE AT HIGH TEMPERATURE (UP TO 10,000 HOURS @ +105°C)
- HIGH VOLTAGE RATINGS (25 ~ 100VDC)
- HIGH RIPPLE CURRENT RATINGS
- 6.3x6.1mm ~ 10x12.5mm CASE SIZES
- HIGH REFLOW SOLDERING TEMPERATURES (+260°C)
- MEETS THE REQUIREMENTS OF AEC-Q200*

*Contact NIC for supporting test data




## CHARACTERISTICS

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Rated Voltage Range | 25 ~ 100Vdc | | | | | | |
| Rated Capacitance Range | 10 ~ 470µF | | | | | | |
| Operating Temp. Range | -55 ~ +105°C | | | | | | |
| Capacitance Tolerance | ±20% (M) | | | | | | |
| Max. Leakage Current After 2 Minutes @ 20°C | 25V ~ 100V | 0.01CV max. | | | | | |
| Working and Surge Voltage Ratings | W.V. (Vdc) | 25 | 35 | 50 | 63 | 80 | 100 |
| | S.V. (Vdc) | 32 | 44 | 63 | 79 | 100 | 125 |
| Tan δ @ 120Hz/+20°C | | 0.14 | 0.12 | 0.10 | 0.08 | 0.08 | 0.08 |
| Impedance Ratio @ 120Hz | Z -55°C/Z +20°C | 1.0 ~ 2.5 | | | | | |
| | Z +105°C/Z +20°C | 0.6 ~ 1.0 | | | | | |
| Load Life Test @ +105°C and Rated Voltage | 6.3x6.1 | 5,000 hours | | | | | |
| | 6.3x8 ~ ϕ10mm dia. | 10,000 hours | | | | | |
| | Capacitance Change | Within ±30% of initial measured value | | | | | |
| | Tan δ and ESR | Less than 200% of specified max. value | | | | | |
| | Leakage Current | Less than specified max. value | | | | | |

## STANDARD PRODUCTS AND CASE SIZES Dϕ x L (mm)

| PART NUMBER | Cap. (µF) | Working Voltage | Case Size (D X L) mm | Max. ESR (mΩ) AT 100KHz/+20°C | Max. Ripple Current (mA rms) @ 100KHz/+105°C | Load Life Hours @ +105°C |
|---|---|---|---|---|---|---|
| NSPE-HF560M25V6.3X6.1NLBYF | 56 | 25 | 6.3X6.1 | 50 | 1300 | 5000 |
| NSPE-HF101M25V6.3X8NLBYF | 100 | | 6.3X8 | 30 | 2000 | 10000 |
| NSPE-HF221M25V8X10.5NLBYF | 220 | | 8X10.5 | 27 | 2300 | 10000 |
| NSPE-HF331M25V10X10.5NLBYF | 330 | | 10X10.5 | 20 | 2500 | 10000 |
| NSPE-HF471M25V10X12.5NLBYF | 470 | | 10X12.5 | 16 | 2800 | 10000 |
| NSPE-HF470M35V6.3X6.1NLBYF | 47 | 35 | 6.3X6.1 | 60 | 1300 | 5000 |
| NSPE-HF680M35V6.3X8NLBYF | 68 | | 6.3X8 | 35 | 2000 | 10000 |
| NSPE-HF151M35V8X10.5NLBYF | 150 | | 8X10.5 | 27 | 2300 | 10000 |
| NSPE-HF271M35V10X10.5NLBYF | 270 | | 10X10.5 | 20 | 2500 | 10000 |
| NSPE-HF331M35V10X12.5NLBYF | 330 | | 10X12.5 | 17 | 2800 | 10000 |
| NSPE-HF220M50V6.3X6.1NLBYF | 22 | 50 | 6.3X6.1 | 80 | 1100 | 5000 |
| NSPE-HF330M50V6.3X8NLBYF | 33 | | 6.3X8 | 40 | 1600 | 10000 |
| NSPE-HF680M50V8X10.5NLBYF | 68 | | 8X10.5 | 30 | 1800 | 10000 |
| NSPE-HF121M50V10X10.5NLBYF | 120 | | 10X10.5 | 28 | 2000 | 10000 |
| NSPE-HF151M50V10X12.5NLBYF | 150 | | 10X12.5 | 19 | 2300 | 10000 |
| NSPE-HF100M63V6.3X6.1NLBYF | 10 | 63 | 6.3X6.1 | 120 | 1000 | 5000 |
| NSPE-HF150M63V6.3X6.1NLBYF | 15 | | 6.3X6.1 | 120 | 1000 | 5000 |
| NSPE-HF150M63V6.3X8NLBYF | 15 | | 6.3X8 | 80 | 1500 | 10000 |
| NSPE-HF220M63V6.3X8NLBYF | 22 | | 6.3X8 | 80 | 1500 | 10000 |
| NSPE-HF330M63V8X10.5NLBYF | 33 | | 8X10.5 | 40 | 1700 | 10000 |
| NSPE-HF470M63V8X10.5NLBYF | 47 | | 8X10.5 | 40 | 1700 | 10000 |
| NSPE-HF560M63V10X10.5NLBYF | 56 | | 10X10.5 | 30 | 1800 | 10000 |
| NSPE-HF680M63V10X10.5NLBYF | 68 | | 10X10.5 | 30 | 1800 | 10000 |
| NSPE-HF680M63V10X12.5NLBYF | 68 | | 10X12.5 | 22 | 2100 | 10000 |
| NSPE-HF820M63V10X10.5NLBYF | 82 | | 10X10.5 | 30 | 1800 | 10000 |
| NSPE-HF101M63V10X12.5NLBYF | 100 | | 10X12.5 | 22 | 2100 | 10000 |

**STANDARD PRODUCT TABLE CONTINUES ON NEXT PAGE**

## STANDARD PRODUCTS AND CASE SIZES Dϕ x L (mm)

| PART NUMBER | Cap. (μF) | Working Voltage | Case Size (D X L) mm | Max. ESR (mΩ) AT 100KHz/+20°C | Max. Ripple Current (mA rms) @ 100KHz/+105°C | Load Life Hours @ +105°C |
|---|---|---|---|---|---|---|
| NSPE-HF220M80V8X10.5NLBYF | 22 | 80 | 8X10.5 | 45 | 1550 | 10000 |
| NSPE-HF270M80V8X10.5NLBYF | 27 | | 8X10.5 | 45 | 1550 | 10000 |
| NSPE-HF330M80V10X10.5NLBYF | 33 | | 10X10.5 | 36 | 1700 | 10000 |
| NSPE-HF390M80V10X12.5NLBYF | 39 | | 10X12.5 | 32 | 1800 | 10000 |
| NSPE-HF470M80V10X10.5NLBYF | 47 | | 10X10.5 | 36 | 1700 | 10000 |
| NSPE-HF560M80V10X12.5NLBYF | 56 | | 10X12.5 | 32 | 1800 | 10000 |
| NSPE-HF100M100V8X10.5NLBYF | 10 | 100 | 8X10.5 | 60 | 1400 | 10000 |
| NSPE-HF150M100V10X10.5NLBYF | 15 | | 10X10.5 | 45 | 1500 | 10000 |
| NSPE-HF180M100V10X12.5NLBYF | 18 | | 10X12.5 | 40 | 1580 | 10000 |

## RIPPLE CURRENT FREQUENCY CORRECTION FACTORS

| Cap. μF | 100Hz ≤ F < 1KHz | 1KHz ≤ F < 10KHz | 10KHz ≤ F < 100KHz | 100KHz ≤ F < 500KHz |
|---|---|---|---|---|
| C ≤ 33 | 0.05 | 0.32 | 0.67 | 1.00 |
| 33 < C | 0.10 | 0.35 | 0.70 | 1.00 |

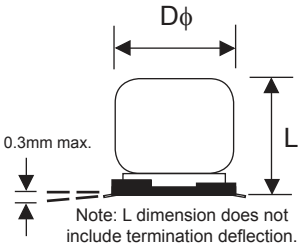
## PART NUMBER SYSTEM

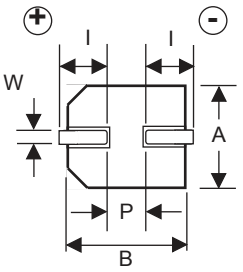
NSPE-HF 151 M 35V 8x10.5 N LB W Y F

- F — RoHS Compliant
- Y — Suitable for automotive equipment, sourced to special production and inspection at IATF-16949 certified production site
- W — Wide Termination Option (6.3x8mm, ≥8mm diameter)
- LB — LB = Sn-Bi Finish and 15" Reel
- N — Reflow Temp. Code (N=+260°C)
- 8x10.5 — Size in mm
- 35V — Working Voltage
- M — Tolerance Code M=20%
- 151 — Capacitance Code in μF, first 2 digits are significant. Third digit is no. of zeros, "R" indicates decimal for values under 10μF
- NSPE-HF — Series

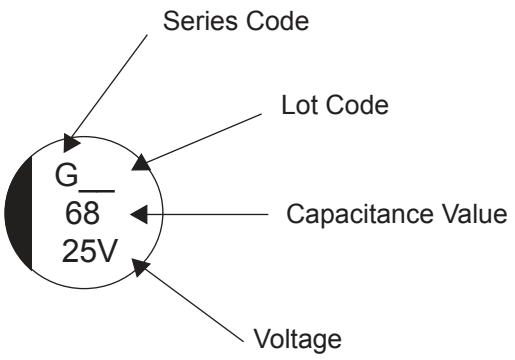
## DIMENSIONS (mm)

| Case Size | Dϕ ±0.5 | L max. | A, B ±0.2 | W | I ±0.3 | (P) |
|---|---|---|---|---|---|---|
| 6.3X6.1 | 6.3 | 6.1 | 6.6 | 0.5 ~ 0.8 | 2.5 | 2.2 |
| 6.3X8 | 6.3 | 8.0 | 6.6 | 0.5 ~ 0.8 | 2.5 | 2.2 |
| 8X10.5 | 8.0 | 10.5 | 8.3 | 0.7 ~ 1.0 | 2.9 | 3.2 |
| 10X10.5 | 10 | 10.5 | 10.3 | 1.0 ~ 1.4 | 3.2 | 4.6 |
| 10X12.5 | 10 | 12.5 | 10.3 | 1.0 ~ 1.4 | 3.2 | 4.6 |




### Part Marking

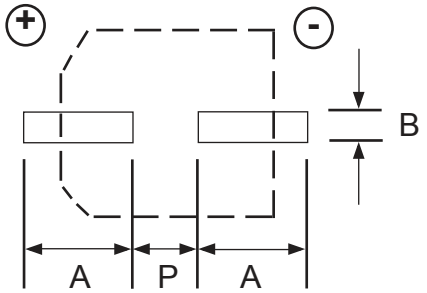



**PRECAUTIONS**

Please review the notes on correct use, safety and precautions found at
**https://www.niccomp.com/resource/files/aluminum/AlumApplInfoCautions.pdf**
If in doubt or uncertainty, please review your specific application - process details with NIC's technical support personnel: **tpmg@niccomp.com**

### STANDARD TERMINATION LAND PATTERN DIM. (mm)

| Case Dia. | A | B | P |
|---|---|---|---|
| 6.3 | 3.6 | 1.8 | 1.8 |
| 8 | 4.1 | 2.1 | 2.8 |
| 10 | 4.4 | 2.5 | 4.3 |

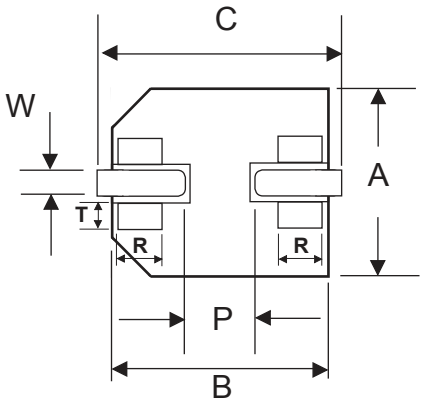


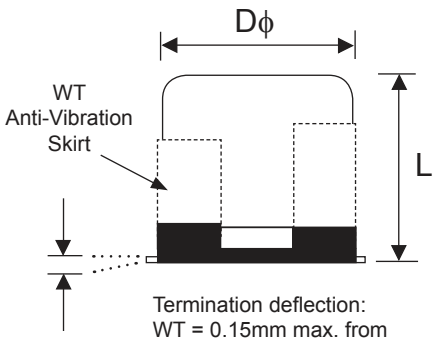

### WIDE TERMINATION DIM. (mm)

| Case Size | Dϕ ±0.5 | L max. | A, B | C ±0.2 | P | W | R | T |
|---|---|---|---|---|---|---|---|---|
| 6.3X8WT | 6.3 | 8.2 | 6.6 ± 0.2 | 7.3 | (2.2) | 0.5 ~ 0.8 | (1.7) | (0.7) |
| 8 x 10.5WT | 8.0 | 11.2 | 8.3 ± 0.2 | 9.0 | (3.2) | 0.7 ~ 1.0 | (0.7) | (1.3) |
| 10 x 10.5WT | 10.0 | 11.2 | 10.3 ± 0.2 | 11.0 | (4.6) | 1.0 ~ 1.4 | (0.7) | (1.3) |
| 10 x 12.5WT | 10.0 | 13.5 | 10.3 ± 0.2 | 11.0 | (4.6) | 1.0 ~ 1.4 | (0.7) | (1.3) |

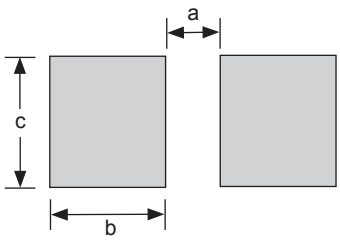
### WIDE TERMINATION LAND PATTERN DIM. (mm)

| Case Size | a | b | c |
|---|---|---|---|
| 6.3X8 | 1.6 | 4.0 | 3.0 |
| 8x10.5 | 2.5 | 4.5 | 4.7 |
| 10x10.5 | 3.8 | 4.8 | 4.7 |
| 10x12.5 | 3.8 | 4.8 | 4.7 |



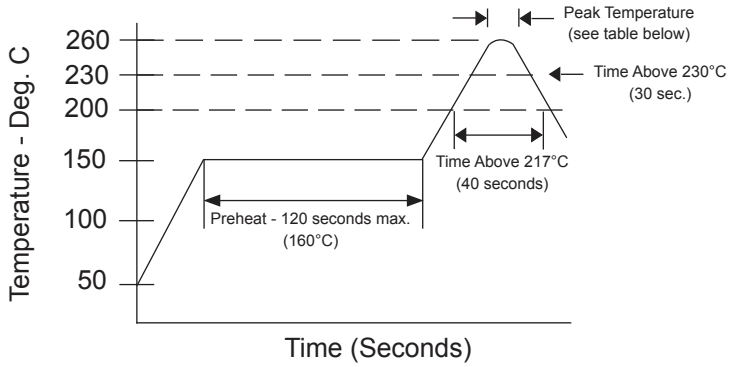

Termination deflection:
WT = 0.15mm max. from
bottom of support terminals




| W (Wide Terminations) Anti-Vibration Test | |
|---|---|
| Test Method | Direction: X, Y, Z axis<br>Frequency & Duration: 5 to 2000Hz reciprocation for 20 minutes, 2 hours each direction<br>Peak to Peak Amplitude: 5mm<br>Peak Acceleration: 30G<br>Sweep Type: Log |
| Δ Capacitance | Within ± 10% of initial value |
| Tangent of Loss | ≤ Specified value |
| Leakage Current | ≤ Specified value |

Review & Compare Reflow Soldering Heat Limits
V-chip SMT Aluminum Electrolytic Capacitors
www.niccomp.com/RSL

RECOMMENDED REFLOW SOLDERING PROFILE*




## PEAK TEMPERATURE AND DURATION RATED VOLTAGE: 25 ~ 50Vdc

| Diameter | Time above 200°C | Time above 217°C | Time above 230°C | Peak Temperature | Number of reflow passes allowed |
|---|---|---|---|---|---|
| 6.3mm | 70 sec. max. | 40 sec. max. | 30 sec. max. | 260°C | 2* |
| 8mm & 10mm | 70 sec. max. | 40 sec. max. | 30 sec. max. | 260°C | 1 |
| | 70 sec. max. | 50 sec. max. | 40 sec. max. | 245°C | 2* |

## PEAK TEMPERATURE AND DURATION RATED VOLTAGE: 63 ~ 100Vdc

| Diameter | Time above 200°C | Time above 217°C | Time above 230°C | Peak Temperature | Number of reflow passes allowed |
|---|---|---|---|---|---|
| 6.3 ~ 10mm | 70 sec. max. | 40 sec. max. | 30 sec. max. | 260°C | 1 |
| | 70 sec. max. | 40 sec. max. | 30 sec. max. | 245°C | 2* |

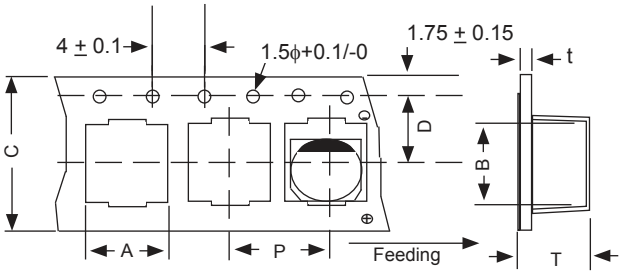
*Two reflow passes are permissible with a cool down to room temperature required between the first and second pass.

## TAPING SPECIFICATIONS (mm)

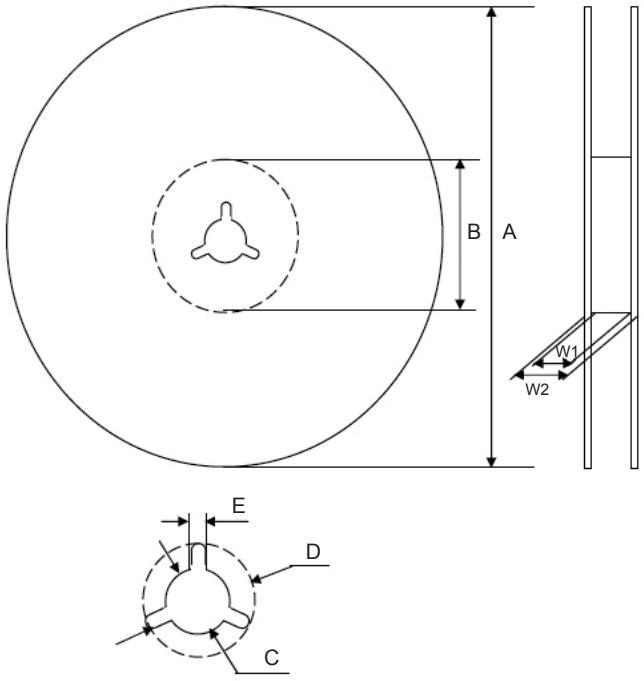
1. Both Leader and Trailer tape: Minimum 40mm (1.57") empty carrier tape pockets.
2. Leader tape: Approximately 20cm of cover tape at leader.
3. Connection: Maximum 3 connections (slices) per reel.

## CARRIER DIMENSIONS (mm)

| Case Size | A ±0.2 | B ±0.2 | C ±0.3 | D ±0.1 | P ±0.1 | T ±0.2 | t max. |
|---|---|---|---|---|---|---|---|
| 6.3X6.1 | 7.0 | 7.0 | 16.0 | 7.5 | 12.0 | 6.5 | 0.6 |
| 6.3X8 | 7.0 | 7.0 | 16.0 | 7.5 | 12.0 | 8.2 | 0.6 |
| 8X10.5 | 8.7 | 8.7 | 24.0 | 11.5 | 16.0 | 11.1 | 0.6 |
| 10X10.5 | 10.7 | 10.7 | 24.0 | 11.5 | 16.0 | 11.2 | 0.6 |
| 10X12.5 | 10.7 | 10.7 | 24.0 | 11.5 | 16.0 | 13.3 | 0.6 |



V-Chip 15" (380mm) Reels (LB suffix)




Dimensions (mm)

| Case Size | Tape Width | W1 | W2 |
|---|---|---|---|
| 6.3x6.1, 6.3x8 | 16.0 | 16.5 ~ 18.5 | 19.5 ~ 24.0 |
| 8x10.5, 10x10.5, 10x12.5 | 24.0 | 24.5 ~ 26.5 | 27.5 ~ 32.0 |

| Case Size | Tape Width | A | B | C | D | E |
|---|---|---|---|---|---|---|
| 6.3x6.1, 6.3x8 | 16.0 | ϕ380 ±2 | ϕ80~105 | ϕ13 ±0.5 | ϕ21 ±1.0 | 2.0 ±0.5 |
| 8x10.5, 10x10.5, 10x12.5 | 24.0 | | | | | |

| Color |
|---|
| Black |

| Case Size | Qty per Reel |
|---|---|
| | 15" (380mm) |
| 6.3X6.1 | 1000 |
| 6.3X8 | 900 |
| 8X10.5 | 500 |
| 10X10.5 | 500 |
| 10X12.5 | 400 |