



# HIGH RELIABILITY TESTING



NOVACAP has the ability to test High Reliability COG, BX, X7R and other dielectric types in surface mount or leaded versions in accordance with MIL-PRF-55681, MIL-PRF-123, MIL-PRF-49467, MIL-PRF-49470 (DSCC 87106), MIL-PRF-39014, and MIL-PRF-38534 or customer SCD. Product is designed for optimum reliability, burned in at elevated voltage and temperature, and 100% electrically inspected to ascertain conformance to strict performance criteria. Applications for High Reliability products include medical implanted devices, aerospace, airborne and various military applications, and consumer uses requiring safety margins not attainable with conventional product. Please refer to the NOVACAP High Reliability product offering on the following pages.

Military performance specifications are designed and written for the voltage/capacitance ratings of the individual product slash numbers associated with the specification. Some of the requirements of the military document may not apply to the NOVACAP High Reliability product. The following details the intent of the individual military specifications available for test and the deviations that may apply. Product voltage ratings outside of the intended military specification will follow the NOVACAP voltage test potential outlined on the following page. Contact the factory with any requirements or deviations that are not covered below.

## MILITARY PERFORMANCE SPECIFICATIONS

**MIL-PRF-55681** General purpose military high reliability specification for surface mount sizes 0805 through 2225 in 50V and 100V.

**MIL-PRF-123** The specification affords an increased reliability level over MIL-PRF-55681 for space, missile and other high reliability applications such as medical implantable or life support equipment. The specification covers surface mount sizes 0805 through 2225 in 50V rating and various radial / axial leaded products in 50V, 100V, and 200V ratings.

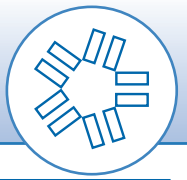
**MIL-PRF-39014** The specification covers general military purpose radial / axial leaded and encapsulated product in 50V, 100V, and 200V ratings.

**MIL-PRF-49467** General purpose military high reliability specification for radial leaded epoxy coated. The specification covers sizes 1515 through 13060 with 600V, 1000V, 2000V, 3000V, 4000V, and 5000V ratings.

**MIL-PRF-49470 (DSCC 87106)** General purpose military high reliability specification for stacked and leaded capacitors for switch mode power supplies. The specification covers sizes 2225 through 120200 in 50V, 100V, 200V, and 500V ratings.

**MIL-PRF-38534** Specification for Hybrid Microcircuits with a section for Element Evaluation on passive components. There are two classification levels of reliability. Class H is for a standard military quality level. Class K is for the highest reliability level intended for space application. NOVACAP will perform a 100-hour burn-in on all Class K products. NOVACAP assumes Class K Subgroup 3 samples will be unmounted and Subgroup 4 (wirebond) shall not apply unless otherwise stated.

# MIL-PRF SCREENING FLOWCHARTS



## MIL-PRF-55681 (GROUP A)

VOLTAGE CONDITIONING  
100 HRS, 2X VDCW, 125°C  
DWV, IR, 125°C IR, CAP, DF TEST  
VISUAL & MECH. INSPECTION  
(AQL SAMPLE PLAN)  
SOLDERABILITY, SAMPLE 13(0)  
8% PDA MAXIMUM

## MIL-PRF-123 (GROUP A)

THERMAL SHOCK, 5 CYCLES  
VOLTAGE CONDITIONING  
168/264 HRS, 2X VDCW, 125°C  
DWV, IR, 125°C IR, CAP, DF TEST  
VISUAL & MECH. INSPECTION  
SAMPLE 20(0)  
DPA<sup>1</sup>  
PDA, 3% (0.1%), 5% (0.2%) MAX<sup>2</sup>

## MIL-PRF-39014 (GROUP A)

THERMAL SHOCK, 5 CYCLES  
VOLTAGE CONDITIONING  
96 HRS, 2X VDCW, 125°C  
DWV, IR, 125°C IR, CAP, DF TEST  
VISUAL & MECH. INSPECTION  
(AQL SAMPLE PLAN)  
SOLDERABILITY, SAMPLE 13(0)  
8% PDA MAXIMUM

## MIL-PRF-49467 (GROUP A)

THERMAL SHOCK, 5 CYCLES  
VOLTAGE CONDITIONING  
96 HRS, RATED VDCW, 125°C  
PARTIAL DISCHARGE (OPTION)<sup>3</sup>  
DWV, IR, 125°C IR, CAP, DF TEST  
VISUAL & MECH. INSPECTION  
SAMPLE 13(0)  
SOLDERABILITY, SAMPLE 5(0)  
10% PDA MAXIMUM

## MIL-PRF-49470 (DSCC 87106) (GROUP A)

THERMAL SHOCK, 5 CYCLES  
VOLTAGE CONDITIONING  
96 HRS, 2X VDCW<sup>4</sup>, 125°C  
DWV, IR, 125°C IR, CAP, DF TEST  
VISUAL & MECH. INSPECTION  
SAMPLE 13(0)  
SOLDERABILITY, SAMPLE 5(0)  
10% PDA MAXIMUM

## NOVACAP TEST VOLTAGE (VDC)

WVDC	DWV	V/C*
≤200	2.5X Rated	2.0X Rated
250	500V	400V
300	500V	400V
400	600V	500V
500	750V	600V
600	750V	600V
≥700	1.2X Rated	1.0X Rated

The above test potential shall be used on all High Reliability Testing unless otherwise specified.

\*V/C Is Voltage Conditioning

- 1) MIL-PRF-123 DPA shall be per TABLE XIV AQL requirements unless otherwise specified.
- 2) MIL-PRF-123 allowable PDA shall be 3% overall and 0.1% in the last 48 hours for capacitance/voltage values listed in MIL-PRF-123. The allowable PDA shall be 5% overall and 0.2% in the last 48 hours for capacitance/voltage values beyond MIL-PRF-123.
- 3) MIL-PRF-49467 standard Group A is without Partial Discharge. Partial Discharge test is optional and must be specified.
- 4) MIL-PRF-49470 (DSCC 87106) 500V rated product has Voltage Conditioning at 1.2X VDCW.

## ENVIRONMENTAL

NOVACAP has the capability to perform all the Environmental Group B, Group C, and Qualification testing to the above reference military specifications. Contact the factory for any specialty testing not covered by the military specifications. Testing abilities include the following:

Nondestructive internal examination  
Terminal strength  
Temperature coefficient  
Vibration  
Thermal shock and immersion  
Shock, specified pulse  
Wire bond evaluation

Destructive physical analysis  
Resistance to soldering heat  
Moisture resistance  
Resistance to solvents  
Low temperature storage  
Mechanical shock  
Partial discharge (corona)

Radiographic inspection  
Voltage-temperature limits  
Humidity, steady state, low voltage  
Life  
Barometric pressure  
Constant acceleration  
200°C Voltage Conditioning