



One of the World's Largest
Manufacturers
of Discrete Semiconductors and Passive Components

Military & High Reliability Capacitors Tantalum / MLCC

军用高可靠性钽电容器和MLCC电容器

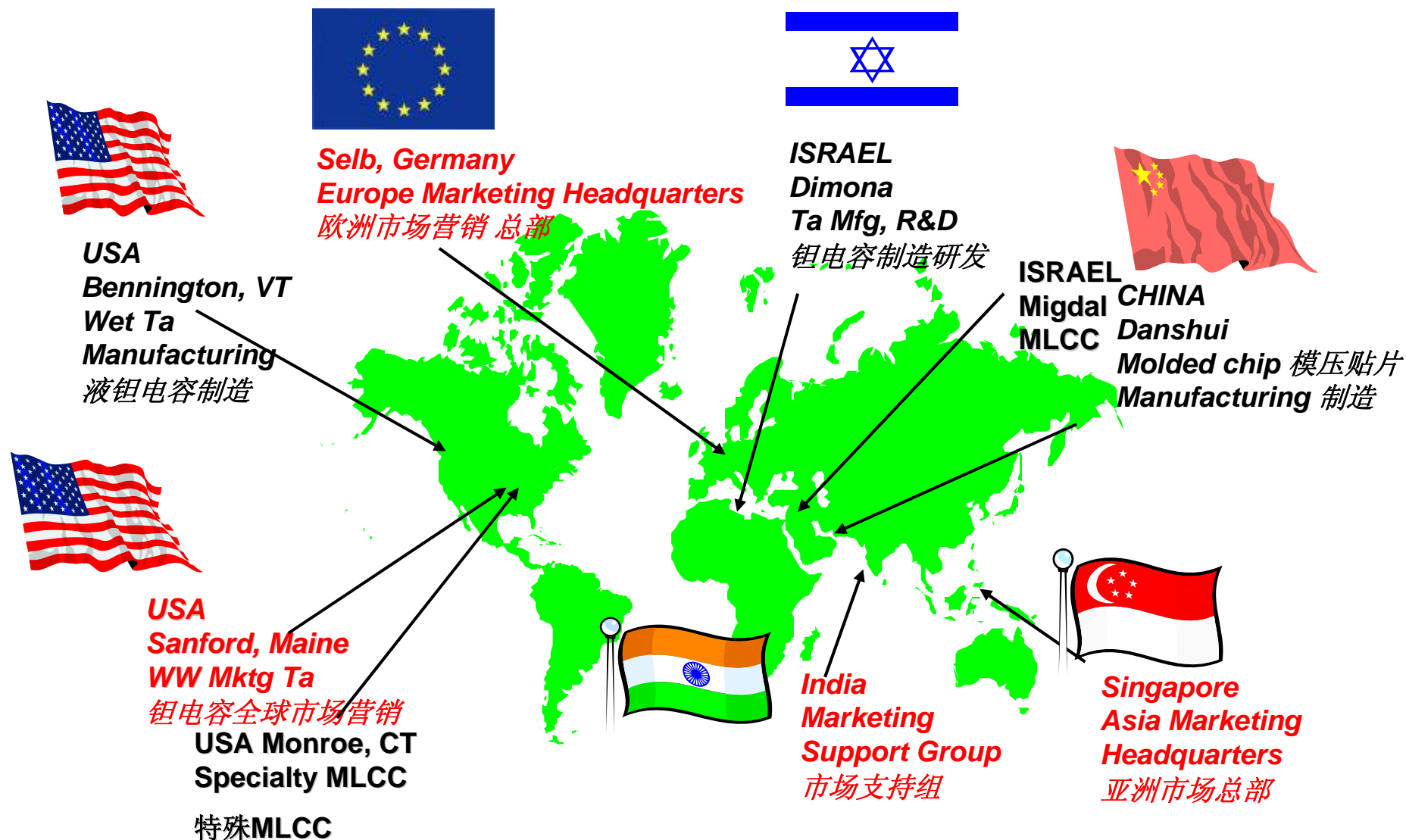


Michael Huang 黄勇
市场部



Vishay Tantalum and MLCC Capacitors

Vishay 钽和MLCC电容器





Military

军用



Military & Aerospace Specification Hierarchy

军工和航天的标准体系

All these products 100% voltage conditioned prior to shipment

所有这些产品在运付前都经过了电压严格测试

•Source Control Drawing- customer

•源头控制-客户

**** DSCC = Defense Supply Center Columbus**

哥伦布国防部供应中心

**SCD*
or DSCC**
(MIL SPEC+)**

MIL-SPEC Verified Reliability
经军用特别认证的可靠性

DSCC- Approved Range Maintenance Tested
经过DSCC认证范围维护测试

High Rel COTS – Broadest offering with reliability history & customer specific tests

High Rel COTS - 在长期使用中表现出了高可靠性，通过了大量的特定测试

Product Range

产品范围



One of the World's Largest
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Tantalum Capacitors 钽电容器



Broadest Line of Tantalum Capacitors

最宽的钽电容器产品线

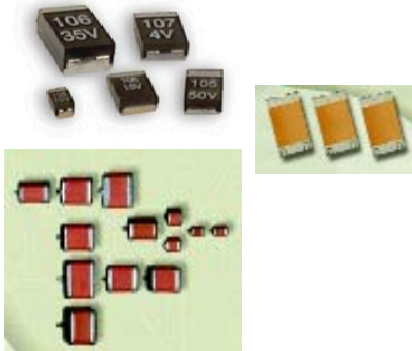
Solid Tantalums

固钽

Surface Mount

表面贴装

Molded Chips 模压贴片
Frameless Molded 无框模压
Conformal Coated 涂层



Leaded

引脚型

Axial Leaded 径向引脚
Hermetic Metal Case 密封的金属外壳
Commercial 商用
MIL-C-39003
CECC



Epoxy Coated 带环氧涂层
Radial Dipped 径向浸渍
Radial Molded 径向模压
Commercial 商用



Wet Tantalums

液钽

Axial Leaded

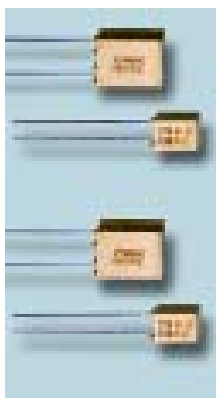
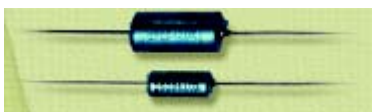
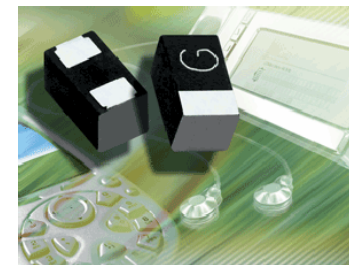
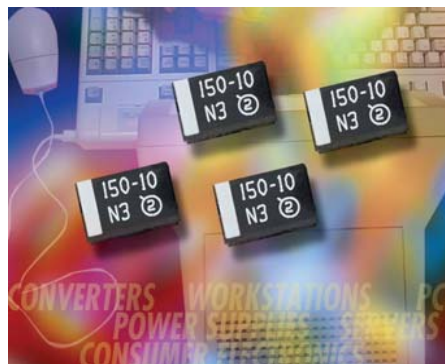
径向引脚

High Rel Applications 高可靠应用
Silver / Tantalum Case 银/钽外壳
Commercial, CECC 商用, CECC
MIL-C-39006
SPRAGUE, TANSITOR, MALLORY



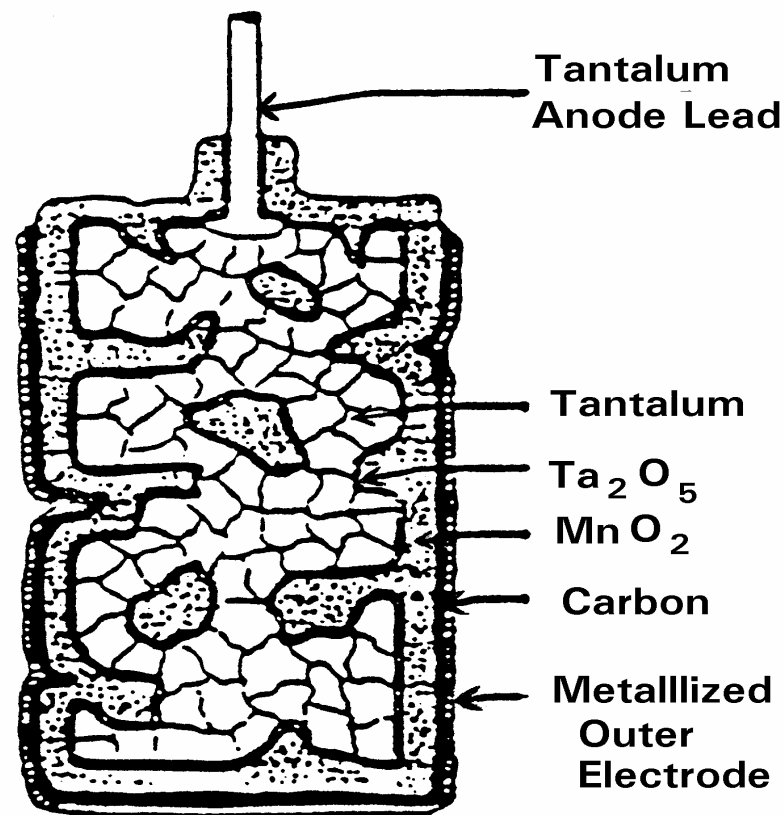
Solid Tantalum

固钽电容器



Solid Tantalum Construction

固钽芯子的结构





Description: Solid Tantalum Hermetic

说明：密封的固态钽电容器

Hermetically Sealed, Solid Tantalum, Metal Case Axial Leaded

严格密封，固钽，径向引脚的金属外壳

MIL-PRF-39003/01 Style CSR13 (standard)

MIL-PRF-39003/03 Style CSR23 (extended)

MIL-PRF-39003/09 Style CSR21 (low ESR)

Hermetically Sealed Solid Tantalum

严格密封的固态钽

Metal Case Axial Leaded

带径向引线的金属外壳

Capacitance range 容值范围: .027 to 1000 μ F

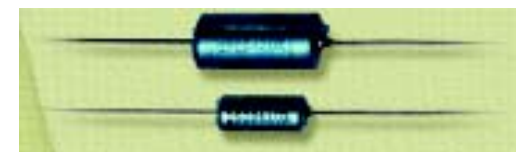
Voltage rating 电压等级: 6 to 100 wvdc

Operating Temp 工作温度: -55°C to +125°C

Case sizes 外壳尺寸: A,B,C,D

Failure Rates 失效率: M,P,R,S

Weibull 等级: B,C,D



Description 说明

Molded Solid Tantalum Chip

模压固钽贴片电容

MIL-PRF-55365/08 Style CWR11

Capacitance range 容值范围: .1 ~ 100 μ F

Voltage rating 电压等级: 4 ~ 50 wvdc

Operating Temp 工作温度: -55°C ~ +125°C

Case sizes 外壳尺寸: A,B,C,D

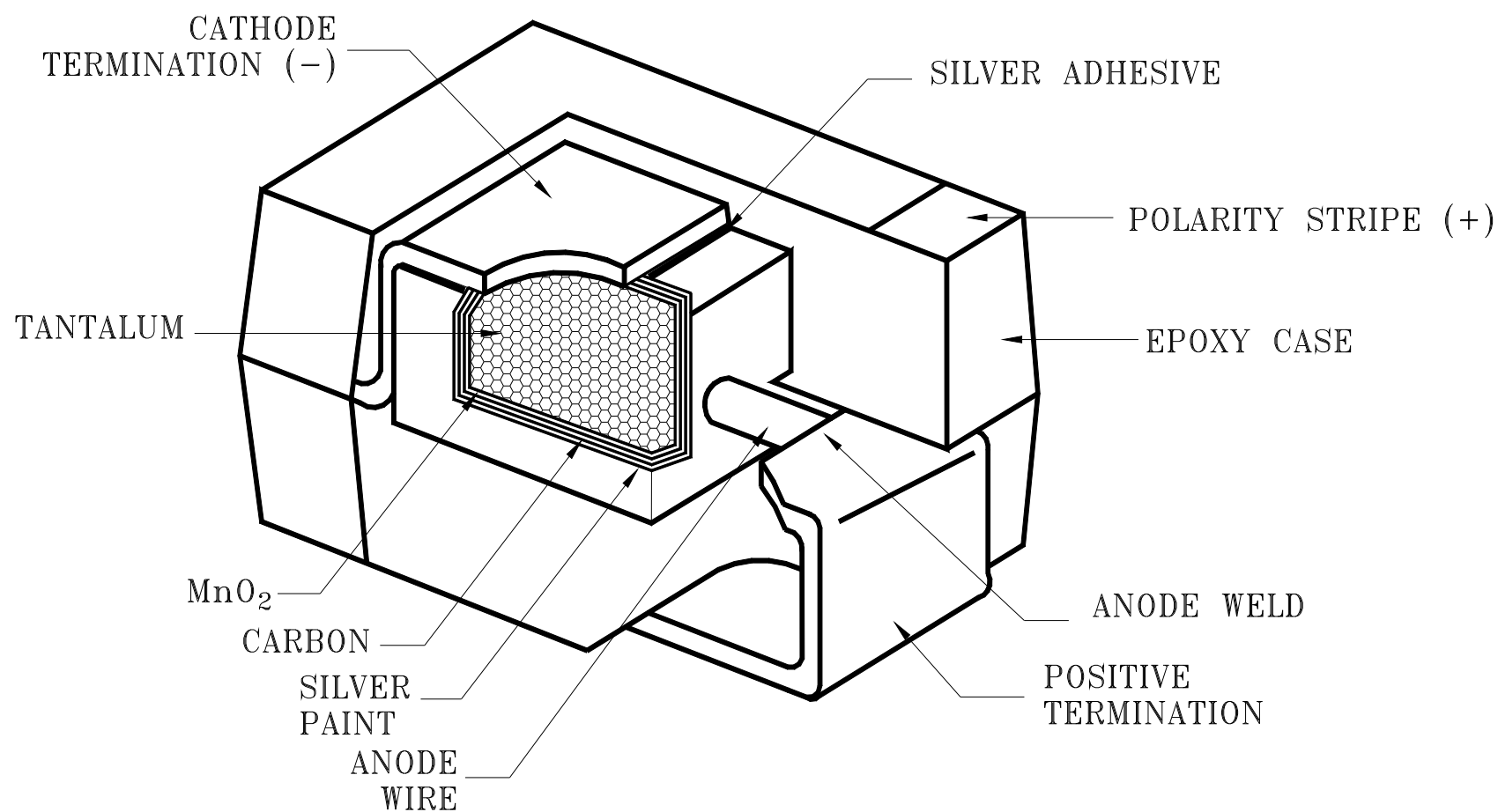
Weibull Failure Rates 失效率: B , C, D

Terminations 端接: (H) solder plate 焊盘



Molded Tantalum Chip CWR 11

模压贴片钽电容 CWR 11



Description 说明

Conformal Coated Solid Tantalum Chip 涂层的固钽贴片电容

MIL-PRF-55365/04 Style CWR06

Capacitance range 容值范围: .1 ~ 100 μ F

Voltage rating 电压等级: 4 ~ 50 wvdc

Operating Temperature 工作温度: -55°C ~ +125°C

Weibull Failure Rates 失效率: B & C

Case sizes 外壳尺寸: A,B,C,D,E,F,G,H

Terminations: (B) Gold – standard 端接: (B)金-标准

(H) solder plate (H)焊盘

(C) solder dipped (C)浸焊

Surge Current 涌流:

(A) +25C, post Weibull 处理

(B) -55C & +85C, post Weibull 处理

(C) -55C & +85C, pre-Weibull 处理





Description 说明

Conformal Coated Solid Tantalum Chip 涂层固钽贴

MIL-PRF-55365/13 Style CWR16

Capacitance range 容值范围: .33 ~ 330 μ F

Voltage rating 电压等级: 4 ~ 50 wvdc

Operating Temperature 工作温度: -55°C ~ +125°C

Weibull Failure Rates 失效率: B & C

Case sizes 外壳尺寸: A,B,C,D,E,F,G,H

Terminations: (B) Gold – standard 端接: (B)金-标准

(H) solder plate (H) 焊盘

(C) solder dipped (C) 浸焊

Surge Current 涌流:

(A) +25C

(B) -55C & +85C, post Weibull 处理

(C) -55C & +85C, pre-Weibull 处理





New Products Update
新产品速递
Solid Tantalum Chip Capacitors
固钽贴片电容器

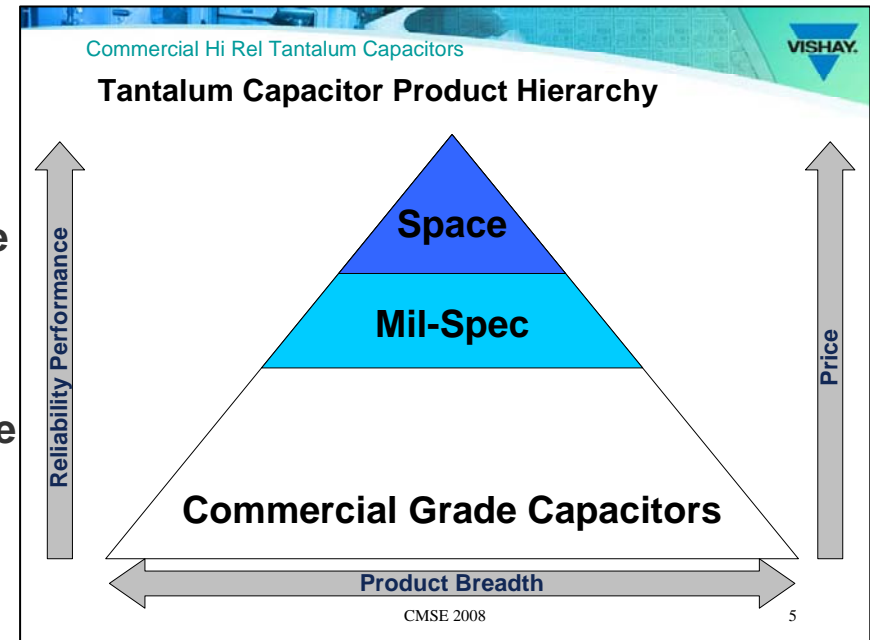


Hi-Rel COTS

Introduction 介绍

Overview 概览:

- **Commercial industry drives new capacitor technology development**
商用行业推动电容器技术的发展
- **Military qualified capacitor offerings have not kept pace with technology advancements**
符合军标的电容器落后于技术的进步
- **Defense electronics designers require the latest in technology**
国防电子设备的设计者需要最新的技术



- **Lacking alternatives, designers will often select standard commercial products without screening – This may lead to Reliability Problems**
由于缺少替代产品，设计者常常选用未经筛选的商用产品，这可能导致可靠性问题

A gap exists between what is available commercially and what is available in Mil-Spec

商用产品和符合军标的产品之间存在差距

Bridging the Gap 消除差距

- **Historical Stop-Gap Solutions: 以往消除差距的权宜之计**
 - **Customer Developed Source Control Drawings**
客户自己开发的源头控制图纸
 - **Customer Specific Part Numbers (Supplier Drawings)**
客户特定的型号（供应商图纸）
 - **Defense Supply Center Columbus (DSCC) Drawings**
哥伦布国防部供应中心(DSCC)图纸

- **Limitations: 局限性**
 - **Lacks Consistency**
缺乏连贯性
 - **Available on a “Pull” Basis (by Customer Request)**
有推动力时才进行开发(客户提出需求)
 - **Often Developed as a Solution to Existing Reliability Problem (too late!)**
所开发的产品常常只是解决现存的可靠性问题(太迟了)



DSCC Drawings

DSCC图纸

DSCC Drawing	Key Characteristics	Processing Requirements	Approval Status
95158	<ul style="list-style-type: none">- Molded Construction- Low ESR- Standard CWR11 Cases Sizes- CWR11 Ratings Extension	10 Hour Burn-In at 85°C & Rated Voltage, Surge Current Test at 25°C	Approved
04053	<ul style="list-style-type: none">- Integrated Fuse- Molded Construction- Standard CWR11 Cases Sizes	10 Hour Burn-In at 85°C, Accelerated Voltage, Surge Current Test at 25°C	ECD: Early 2008
07016	<ul style="list-style-type: none">- Molded Construction- Low ESR- Standard CWR11 Cases Sizes- CWR11 Ratings Extension	Weibull Grading and MIL-PRF-55365 Surge Current Options	ECD: Early 2008
TBA	<ul style="list-style-type: none">- Molded MicroTan™ Construction- Standard and Low ESR- CWR15 and CWR06 Case Sizes	Weibull Grading and MIL-PRF-55365 Surge Current Options	ECD: Early 2008
02002	<ul style="list-style-type: none">- Conformal Construction- Low ESR- Mil-Spec Ratings Extension- CWR10 Case Sizes	MIL-PRF-55365 Group A screening and Group C Periodic Inspection	Approved
02006	<ul style="list-style-type: none">- Molded Construction- Adding Conformal Construction- Mil-Spec Ratings Extension	MIL-PRF-55365 Group A screening and Group C Periodic Inspection	Vishay Invited to Participate ECD: Early 2008

What are Hi-Rel COTS Capacitors?

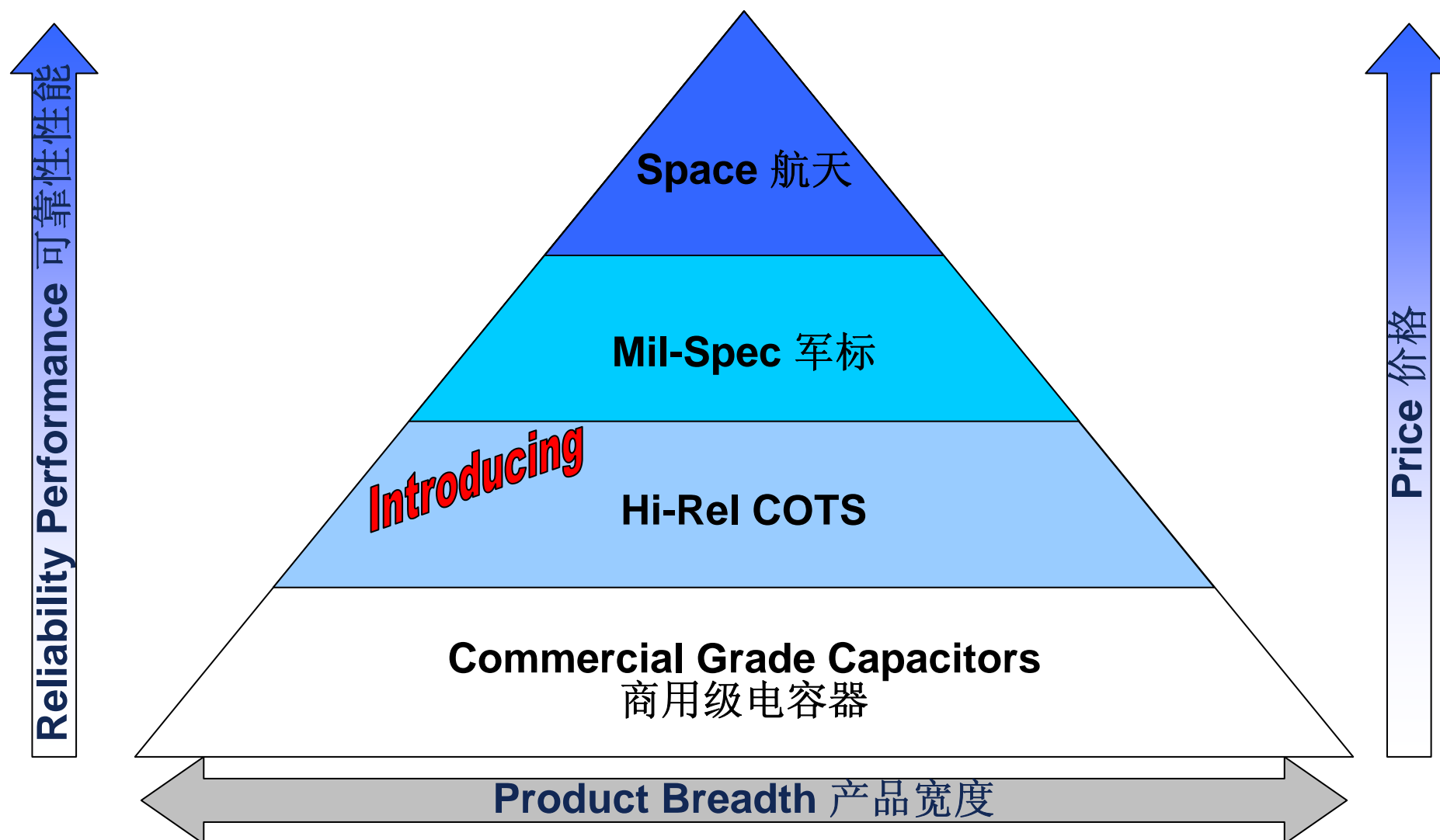
什么是Hi-Rel COTS 电容器

- **Selection of “Robust” Commercial Designs**
选用稳固的商用设计
 - **Redesign for Improved Reliability Where Necessary**
必要时进行重新设计，以提高可靠性
- **Hi-Rel Qualification (Beyond Standard Commercial Grade)**
Hi-Rel认证(超出标准的商用等级)
- **100% Screening per MIL-PRF-55365**
根据MIL-PRF-55365 标准，100%地进行逐项筛选
(MIL-PRF-55365 covers Surface Mount Solid Tantalum Capacitors)
MIL-PRF-55365包括表面贴装固态钽电容器
 - **Reflow Conditioning** 回流焊调整
 - **Thermal Shock** 热冲击
 - **Surge Current Options** 涌流选项
 - **Reliability Screening Options (Accelerated Voltage Aging)**
可靠性筛选选项（加速的电压老化）



Tantalum Capacitor Product Hierarchy

钽电容器产品的性能分级

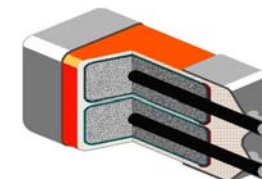
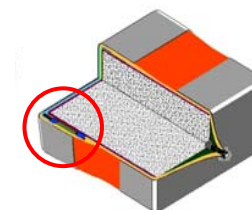
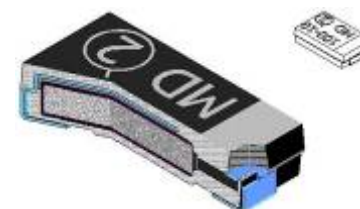




Hi-Rel COTS Products Available

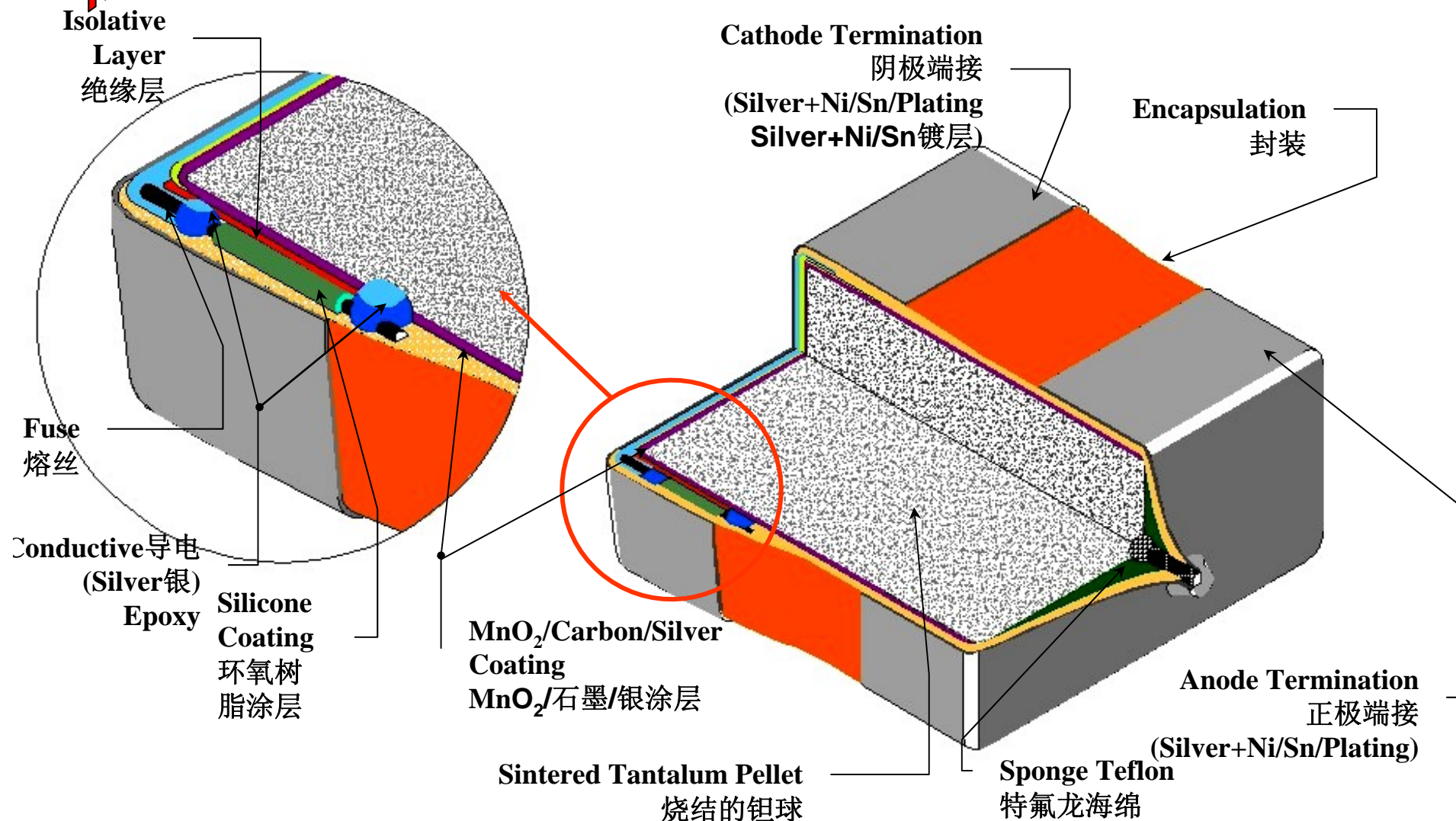
已上市的 Hi-Rel COTS 产品

- ✓ **T83: Molded Construction T83:模压结构**
 - **Includes CWR11 (MIL-PRF-55365/8) values.** 包括CWR11(MIL-PRF-55365/8)容值
 - **Includes 293D (Standard) & 593D (Low ESR)** 包括293D(标准)&593D(低ESR) values and case sizes not available in MIL-PRF-55365 提供MIL-PRF-55365中没有的容值和尺寸
 - **Advantage: Common case sizes and values** 优势: 通用尺寸和容值
- ✓ **T95: Conformal Coated Construction T95:涂层结构**
 - **Includes 195D (formerly CWR10, MIL-PRF-55365/7) values** 包括195D(以前的CWR10, MIL-PRF-55365/7)容值
 - **Includes 595D (Standard) & 594D (Low ESR) values, case sizes and construction not available in MIL-PRF-55365** 包括MIL-PRF-55365 中没有的595D(标准) 和594D(低ESR)容值, 外壳尺寸和结构
 - **Advantage: Low ESR, ESL & High Cap/Voltage** 优势:低ESR, ESL和高容值/电压
- ✓ **T96: Conformal Construction with Built-In Fuse T96:带有内置熔丝的涂层结构**
 - **Advantage: Fail-Safe Operation for Safety Critical Applications** 优势: 为涉及安全的关键应用提供故障保护操作
- ✓ **T97: Multi-Anode Conformal Coated Construction T97:多极涂层结构**
 - **Advantages: 优势:**
 - **Lowest ESR Available in a Hi-REL COTS series** 具有Hi-Rel COTS系列中最低的ESR
 - **Voltage Ratings to 63V!** 额定电压可达63V



New!

T96 Fused Hi-Rel COTS Series Architecture



T97 Hi-Rel COTS Roadmap

Ultra Low ESR

Introducing 63V Ratings!

引入了63V电压等级

- **Perfect for +28V Applications**

是+28V应用的绝佳选择

Industry's Highest Capacitance in SMD Package!

在业内采用SMD封装的产品中具有最高的容值

Dual Anode for Ultra-Low ESR

双电极实现了超低ESR

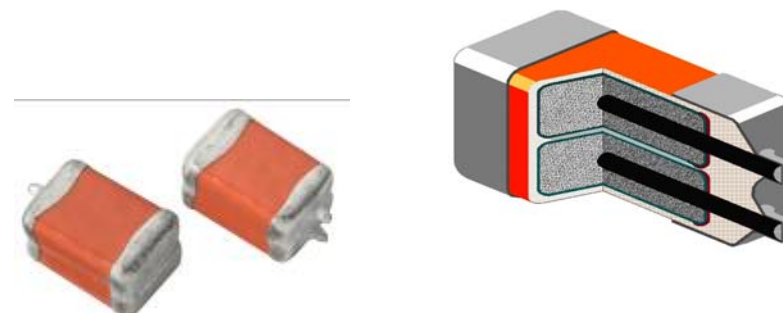
- **Lowest ESR in Hi-Rel COTS Series**在Hi-Rel COTS系列中最低的ESR

Conformal Construction for low ESL

为达到低ESR采用了保形结构

Ratings and Case Codes

Cap (uF)	4V	6.3V	10V	16V	20V	25V	35V	50V	63V
10									
15								E	
22								R	F
33								F	
47							R	Z	
68						R			
150						F			
220				E	R				
330		V	E		F				
470	V	E	E	F					
680	E	E	R						
1000	E/R	R							
1500	R								
2200									



Wet Tantalum 液钽电容器



Why Wet Tantalum??? 为什么采用液钽?

- **Voltage – 6V to 125V standard** 电压: 6V~125V的标准电压
 - **Little or no de-rating required** 很少或不需要降额
- **Temperature 温度**
 - **-55C to +200C -55℃~+200℃**
- **High Vibration & Shock 高振动和冲击**
 - **80g sine vibration** (80g的周期振动)
 - **52g random** (52g 随机振动)
 - **500g shock** (500g冲击)
- **Long life 长寿命**
 - **MIL R failure rate (10,000 hr.+)** MILR级故障率(10,000小时以上)
 - **No wear-out mechanism** 无疲劳机制
 - **No re-age needed** 无需再次老化



• Product Range 产品范围

Silver case cells enclosed in nickel plated steel case

在镀镍钢外壳内银质框架格

Military: DSCC Drawing 04022 (replaced M39006/10/14/17)

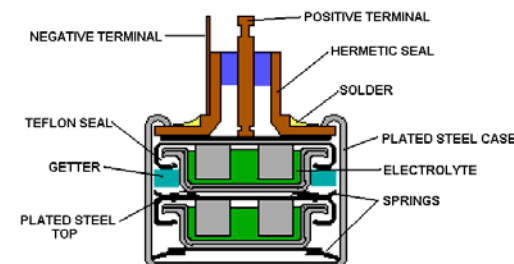
军标: DSCC图纸 04022(替换M39006/10/14/17)

Commercial 商用: XT

Operating temperature 工作温度: $-55^{\circ}\text{C} \sim +175^{\circ}\text{C}$

Capacitance range 容值范围: $2\ \mu\text{F} \sim 2200\ \mu\text{F}$

Voltage range 电压范围: $8 \sim 680\text{Vdc}$ @ 85°C





Hermetic Sealed, Wet Tantalum, Silver Case,

严密封装, 液钽, 银外壳

Axial Leaded, Tantalum/Glass Cover

径向引线, 钽/玻璃护套

Commercial Type: 138D 商用型: 138D

CECC Approved Type/CECC批准的类型: CT9

MIL Approved Type/MIL批准的类型:

CLR65 (M39006/09) – standard ratings 标准等级

CLR69(M39006/21) – extended ratings 扩展等级

Operating temperature 工作温度:

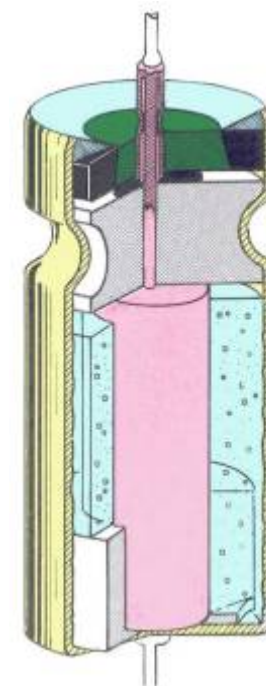
-55° C ~ +125° C

Capacitance range 容值范围: 1.7 μ F ~ 2200 μ F

Voltage range 电压范围: 6 ~ 125 Vdc

Case sizes 外壳尺寸: 1,2,3,4

Failure Rates 失效率: M,P,R





Hermetic Sealed, Wet Tantalum, Tantalum Case

严密封装，液钽，钽外壳

Axial Leaded, Tantalum/Glass Cover

径向引线，钽/玻璃护套

Commercial Type 商用型: 135D

CECC Approved Type: CT79 & 735D

CECC批准的类型: CT79和735D

MIL Approved Type: CLR79 (M39006/22) – standard ratings

MIL批准的类型: CLR79(M39006/22)-标准等级

CLR81(M39006/25) – extended ratings 扩展等级

CLR90(M39006/30) – low ESR, standard 低ESR, 标准

CLR91(M39006/31) – low ESR, extended 低ESR, 扩展等级

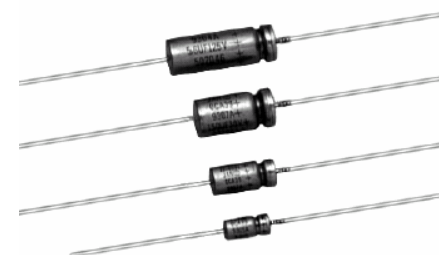
Operating temperature 工作温度: $-55^{\circ}\text{C} \sim +200^{\circ}\text{C}$

Capacitance range 容值范围: $1.7\mu\text{F} \sim 2200\mu\text{F}$

Voltage range 电压范围: 6 ~ 125 Vdc

Case sizes 外壳尺寸: 1,2,3,4

Failure Rates 失效率: M,P,R





Hermetic Sealed, Wet Tantalum, Tantalum Case

严密封装, 液钽, 钽外壳

Axial Leaded, Tantalum/Glass Cover

径向引线, 钽/玻璃护套

High Reliability for Space Applications

航天应用, 高可靠性

DSCC Styles: 06103 [CLR79 (M39006/22)]

06014 [CLR81 (M39006/25)]

06015 [CLR90 (M39006/30)]

06016 [CLR91 (M39006/31)]

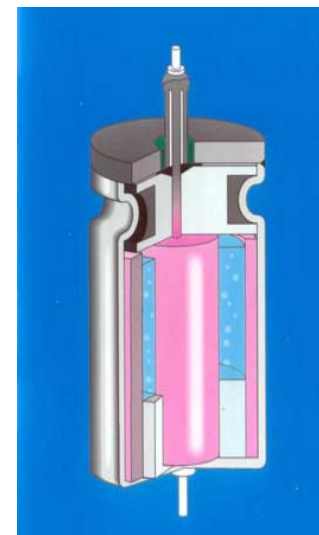
Failure Rate 失效率: R

Characteristic H: 80g sine vibration

H特性: 80g 周期振动

54g random 54g随机振动

500g shock 500g冲击





Hermetic Sealed, Wet Tantalum

严密封装，液钽

Tantalum Case, Axial Leaded

钽外壳，径向引线

Commercial 商用: ST

DSCC Drawing/DSCC图纸: 93026

Operating temperature 工作温度:

-55° C ~ +125° C

Capacitance range 容值范围:

10 μ F ~ 1800 μ F

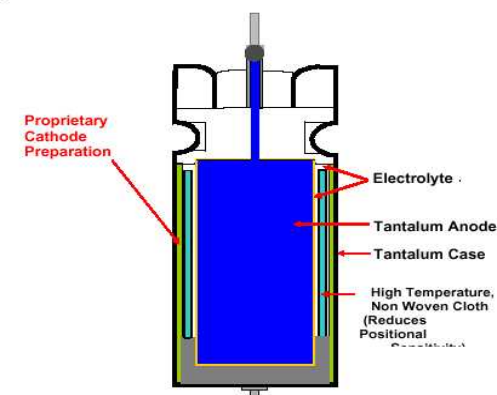
Voltage range 电压范围: 25 to 125 Vdc

Case sizes 外壳尺寸: T1,T2,L2,T3,T4

Failure Rate 失效率: non-ER

TANSITOR
ELECTRONICS, INC.

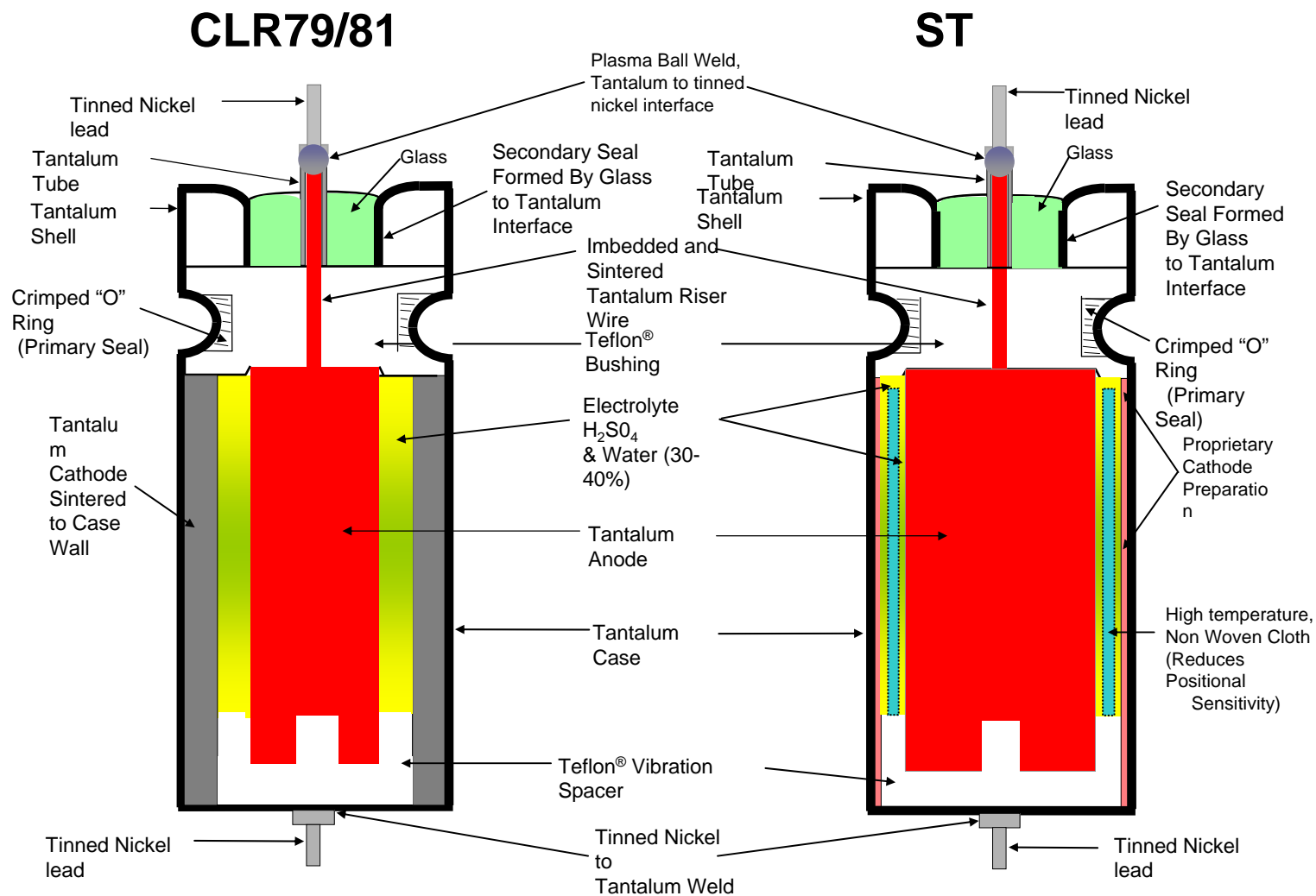
SuperTan®
DESC 93026
Internal Capacitor
System



"SuperTan's" high performance is a result of an improved "cathode" technique. The use of an upgraded cathode in place of a formed cathode is a viable trade-off as very few applications require a continuous reverse voltage capability.

ST Construction

ST 结构





STE Capacitors

"SuperTan® Extended Ratings"

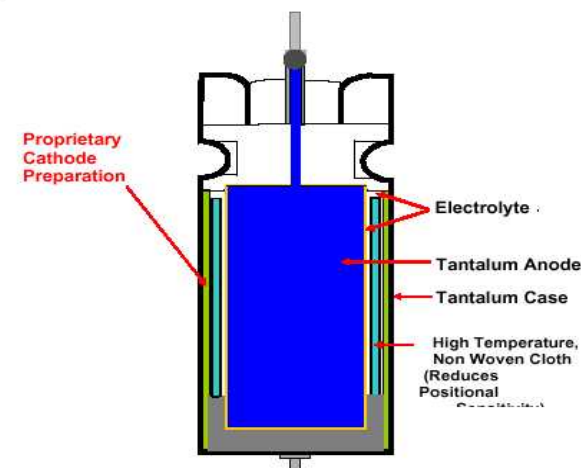
- **STE Capacitance** 容值: 22uF ~ 10000uF
- **Op. Voltage Range** 工作电压范围: 10V ~ 125V
- **Op. Temperature Range** 温度: -55°C ~ +125°C
- **Good Reliability, Long Shelf Life**
- **Small Package Size** 封装: T1, T2, T3, & T4
- **Present available ratings**

提供的规格:

- 750 uF / 75V T4
- 1000 uF / 60V T4
- 3300 uF / 16V T3
- 6000 uF / 16V T4
- 4700 uF / 10V T3
- 10000 uF / 10V T4

TANSITOR
ELECTRONICS, INC.

SuperTan®
DESC 93026
Internal Capacitor
System



"SuperTan's" high performance is a result of an improved "cathode" technique. The use of an upgraded cathode in place of a formed cathode is a viable trade-off as very few applications require a continuous reverse voltage capability.



STE

Vishay Sprague



SuperTan® Extended (STE) Capacitors Wet Tantalum Capacitors with Hermetic Seal

STANDARD/EXTENDED RATINGS											
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	Max. ESR at + 25 °C 120 Hz (Ω)	Typ. ESR at + 25 °C 1 kHz (Ω)	Max. DCL at + 85 °C, + 25 °C + 125 °C (μ A) (μ A)		Max. CAPACITANCE CHANGE at - 55 °C, + 85 °C + 125 °C (%) (%) (%)			Max. IMP. at - 55 °C 120 Hz (Ω)	AC Ripple 85 °C 40 kHz mA rms
10 WVDC at + 85 °C. . .											
4700	T3	STE4700-10T3MI	0.35	< 0.2	16	100	- 80 %	+ 10 %	+ 20 %	3.50	4000
10 000	T4	STE10000-10T4MI	0.25	< 0.1	25	150	- 85 %	+ 20 %	+ 35 %	3.00	5000
16 WVDC at + 85 °C. . . 11 WVDC at + 125 °C											
3300	T3	STE3300-16T3MI	0.35	< 0.2	16	100	- 80 %	+ 10 %	+ 15 %	3.50	4000
6000	T4	STE6000-16T4MI	0.3	< 0.15	25	150	- 80 %	+ 15 %	+ 20 %	3.00	4500
60 WVDC at + 85 °C. . . 40 WVDC at + 125 °C											
1000	T4	STE1000-60T4MI	0.5	< 0.3	20	120	- 40 %	+ 10 %	+ 15 %	5.50	3500
75 WVDC at + 85 °C. . . 50 WVDC at + 125 °C											
750	T4	STE750-75T4MI	0.5	< 0.4	20	120	- 35 %	+ 10 %	+ 15 %	6.50	3500

Product Range 产品范围

- Description 说明

Wet tantalum silver cased capacitor assemblies

液钽银制外壳的电容器组件

Military: DSCC Drawing 04021 (replaced MIL CL55 type)

军标: DSCC图纸04021(替换MIL CL55型)

Commercial : 200D, 202D

商用: 200D, 202D

Operating temperature: -55°C to +125°C

工作温度: -55°C ~ +125°C

Capacitance range: 70 μ F to 10000 μ F

容值范围: 70 μ F to 10000 μ F

Voltage range: 15 to 150Vdc @ 85°C

电压范围: 15 ~ 150Vdc @ 85°C



Product Range 产品范围

- Description 说明

Tantalum cased capacitor assemblies

钽外壳的电容器组件

Military: DSCC Drawing (none at this time) **

军标: DSCC图纸(暂时不提供)

Commercial : 211D

商用: 211D

Operating temperature: -55°C to +125°C

工作温度: -55°C ~ +125°C

Capacitance range: 70 μ F to 10000 μ F

容值范围: 70 μ F ~ 10000 μ F

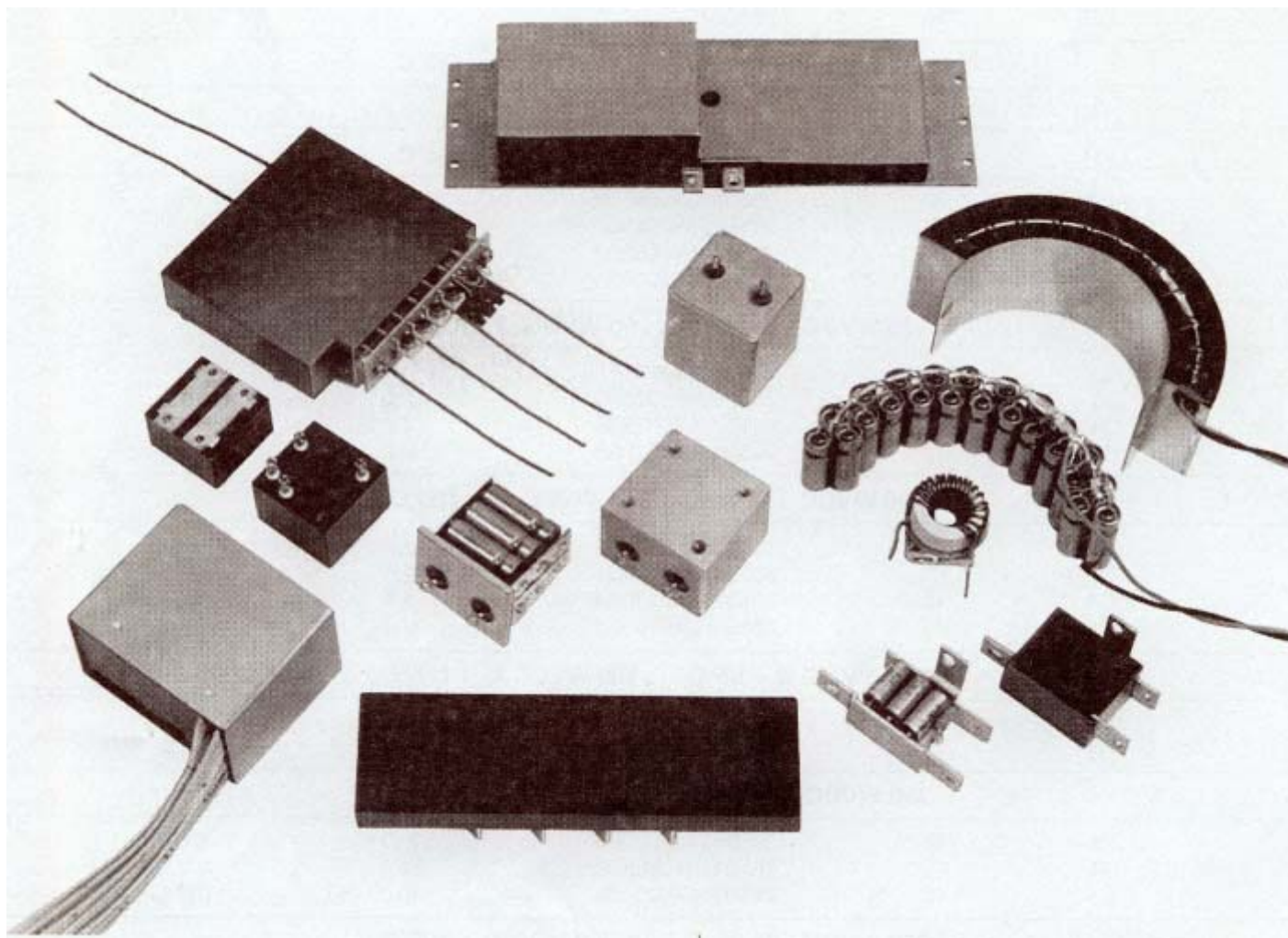
Voltage range: 15 to 150Vdc @ 85°C

电压范围: 15 ~ 150Vdc @ 85°C



CUSTOM DESIGN COMPONENT ASSEMBLIES

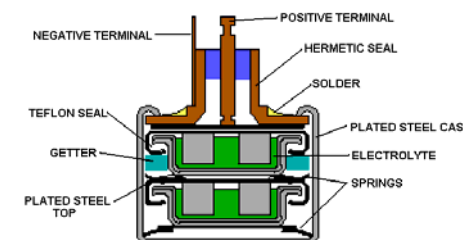
定制设计的元器件组件



HE3 High Energy Capacitor

HE3 高能电容器

- **Voltage Range: 10V to 125V**
电压范围: 10V~125V
- **Cap. Range: 3,300uF to 150,000uF**
容值范围: 3,300uF~150,000uF
- **Op. Temperature Range: -55C to +85C**
工作温度范围: -55℃~+85℃
- **Case Size: A/B/C (35.56mm D)**
外壳尺寸: A/B/C (35.56mm 直径)
- **Ratings 等级**
 - 54000 uF / 25V
 - 72,000uF / 25V
- **24,000uF/ 50V**
 - 8,200uF/ 80V
 - 3,300uF/125V





Wet Tantalum Capacitors Tantalum-Case with Glass-to-Tantalum Hermetic Seal for - 55 °C to + 125 °C Operation



FEATURES

Vishay HE3 represents a major breakthrough in wet tantalum capacitor technology for high-energy applications. The unique case design provides for the highest capacitance per unit volume. The HE3 also utilizes the proven hybrid technology of our SuperTan® product.



RoHS*
COMPLIANT

The HE3 is housed in an all tantalum, hermetically sealed case, and is manufactured to withstand high stress and hazardous environments. The design provides a unique double seal for improved reliability and performance.

PERFORMANCE CHARACTERISTICS

Operating Temperature:

- 55 °C to + 85 °C (to + 125 °C with voltage derating)

Capacitance Tolerance:

At 120 Hz, + 25 °C ± 20 % standard

± 10 % available as special

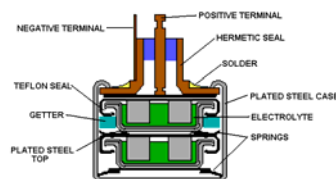
Contact Marketing for Availability of 10 % Tolerance

DC Leakage Current (DCL Max.):

At + 25 °C: Leakage current shall not exceed the values listed in the Standard Ratings tables.

Life Test:

Capacitors are capable of withstanding a 1000 h life test at a temperature of + 85 °C at the applicable rated DC working voltage.



ORDERING INFORMATION

HE3	C	543	K	025	B	Z	S	S
TYPE	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	TERMINATION AND PACKAGING	RELIABILITY LEVEL	TEMPERATURE	ESR
	See Ratings and Case Code Table	This is expressed in microfarads. The first two digits are the significant figures. The third is the number of zeros to follow.	K = 10 % (!) M = 20 %	This is expressed in V. To complete the three-digit block, zeros precede the voltage rating. A decimal point is indicated by an "R" (6R3 = 6.3 V)	A = 100 % Tin (RoHS compliant) B = Tin/lead and bulk	Z = Non-ER	S = Standard (- 55 °C to + 85 °C)	S = Standard

STANDARD RATINGS

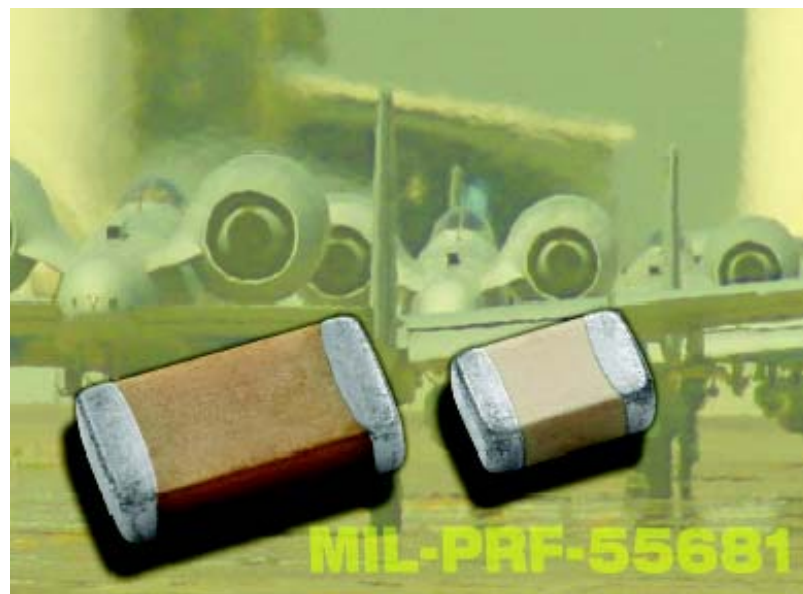
CAPACITANCE (μ F)	CASE CODE	PART NUMBER*	MAX. ESR AT + 25 °C, 1 kHz (Ω)	MAX. DCL AT + 25 °C
25 WVDC AT + 85 °C ... 15 WVDC AT + 125 °C				
18 000	A	HE3A183(1)025(2)(3)(4)(5)	0.060	150 μ A
24 000**	A	HE3A243(1)025(2)(3)(4)(5)	0.060	150 μ A
36 000**	B	HE3B363(1)025(2)(3)(4)(5)	0.045	200 μ A
48 000**	B	HE3B483(1)025(2)(3)(4)(5)	0.045	200 μ A
54 000	C	HE3C543(1)025(2)(3)(4)(5)	0.035	300 μ A
72 000	C	HE3C723(1)025(2)(3)(4)(5)	0.035	350 μ A
50 WVDC AT + 85 °C ... 30 WVDC AT + 125 °C				
8000	A	HE3A802(1)050(2)(3)(4)(5)	0.060	170 μ A
16 000	B	HE3B163(1)050(2)(3)(4)(5)	0.045	270 μ A
24 000	C	HE3C243(1)050(2)(3)(4)(5)	0.035	400 μ A
63 WVDC AT + 85 °C ... 40 WVDC AT + 125 °C				
4000	A	HE3A402(1)063(2)(3)(4)(5)	0.060	170 μ A
8000	B	HE3B802(1)063(2)(3)(4)(5)	0.045	270 μ A
12 000	C	HE3C123(1)063(2)(3)(4)(5)	0.035	400 μ A
80 WVDC AT + 85 °C ... 50 WVDC AT + 125 °C				
2800**	A	HE3A282(1)080(2)(3)(4)(5)	0.075	300 μ A
5500**	B	HE3B552(1)080(2)(3)(4)(5)	0.060	400 μ A
8200	C	HE3C822(1)080(2)(3)(4)(5)	0.040	500 μ A
100 WVDC AT + 85 °C ... 65 WVDC AT + 125 °C				
1900**	A	HE3A192(1)100(2)(3)(4)(5)	0.075	300 μ A
3800**	B	HE3B382(1)100(2)(3)(4)(5)	0.060	400 μ A
5700**	C	HE3C572(1)100(2)(3)(4)(5)	0.050	500 μ A
125 WVDC AT + 85 °C ... 85 WVDC AT + 125 °C				
1100**	A	HE3A112(1)125(2)(3)(4)(5)	0.100	300 μ A
2200**	B	HE3B222(1)125(2)(3)(4)(5)	0.085	400 μ A
3300**	C	HE3C332(1)125(2)(3)(4)(5)	0.075	500 μ A

*Notes:



One of the World's Largest
Manufacturers
of Discrete Semiconductors and Passive Components

(MLCC)
Multi-layer Ceramic Chip Capacitors
多层陶瓷贴片电容器



WET VS. DRY PROCESS

液态工艺与干式工艺的比较

VITRAMON WET PROCESS VITRAMON 液态钽工艺

The Ceramic flows in all "corners" and is forming a homogenous monolithic body
陶瓷粉末填满了所有边角，形成了同质的一体结构

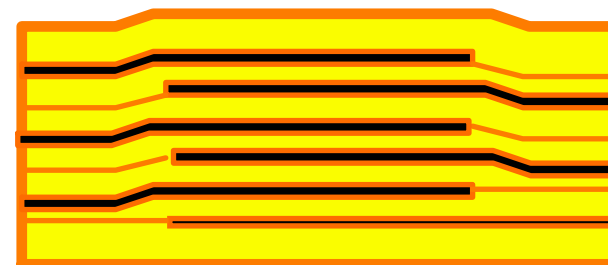


BC Components DRY SHEET PROCESS BC的干片工艺

Before Lamination 迭片前



After Lamination 迭片后





Ceramic Product Summary 陶瓷电容器总结

- Multi-layer Ceramic Chip Capacitors (MLCC) 多层陶瓷贴片电容器(MLCC)
 - MIL-PRF-556871
 - CDR01
 - CDR02
 - CDR03
 - CDR04
 - CDR06
 - CDR31
 - CDR32
 - CDR33
 - CDR34
 - CDR35
 - DSCC (Defense Supply Center-Columbus)
 - DSCC03028
 - DSCC03029
 - DSCC05001
 - DSCC05002
 - DSCC05003
 - DSCC05006
 - DSCC05007
 - Hi-REL COTS
 - COG
 - X7R



Description – CDR

Multi-layer Ceramic Chip Capacitor

多层陶瓷贴片电容器

MIL-PRF-55681/01 Style CDR01-04

MIL-PRF-55681/03 Style CDR06

MIL-PRF-55681/07-11 Style CDR31-35

Capacitance range 容值范围: .1pF ~ 0.47μF

Voltage rating 电压等级: 50 & 100 wvdc

Operating Temperature 工作温度: -55°C ~ +125°C

Failure Rates 失效率: M, P, R & S

Case size: 1 per each MIL style

0805, 1206, 1210, 1812, 1825

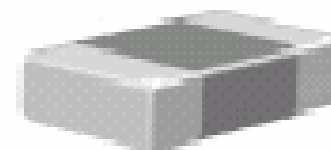
Terminations: (M) Palladium silver (M) 钯银

(U) Tin/lead solder coated (M) 锡/铅焊料涂层

(W) Nickel barrier w/tin plate (W) 带锡板的镍栅栏

(Y) Nickel barrier w/100% tin plate (Y) 带完整锡板的镍栅栏

(Z) Nickel barrier w/tin-lead plate 带镀锡板的镍栅栏



CDR Styles vs. Sizes CDR类型与尺寸

- CDR31 = 0805
- CDR32 = 1206
- CDR33 = 1210
- CDR34 = 1812
- CDR35 = 1825
- BX= X7R BP= NPO



New Ceramic Products

新款陶瓷电容产品

- **Seven (7) US Defense Supply Center (DSCC) Drawings have been issued for BP, BX, BR dielectrics**

第七版美国国防供应中心(DSCC)图纸中引入了BP、BX和BR电介质

- **DSCC 03028 - 0603 size**
- **DSCC 03029 - 0402 size**
- **DSCC 05006 - 0805 size, extended capacitance values**
- **DSCC 05007 - 1206 size, extended capacitance values**

- **DSCC 05001 - 0805, high frequency, BP**
- **DSCC 05002 - 0603, high frequency, BP**
- **DSCC 05003 - 0402, high frequency, BP**

- **Two Vishay HiRel COTS series have been introduced**

Vishay推出了两个HiRel COTS系列

- **Hi Rel COTS COG**
- **Hi Rel COTS X7R**



QUESTIONS 问答时间



Vishay Component Technology

Vishay的元器件技术

Leading the Industry in Design Innovation

创新的设计，行业的先锋