T370 & T378 Micron MIL-PRF-49137/6 (CX06 Style)

Overview

The KEMET T370 and T378 Micron MIL-PRF-49137/6 (CX06 Style) capacitors are available in a variety of case styles and sizes. These capacitors are designed to operate from −55°C to +85°C at full voltage and to +125°C with derating. Typical applications include use in bypass coupling, filtering and timing circuits. The KEMET Micron is qualified under MIL-PRF-49137/6 as military styles CX06 (T378).

[illegible] epoxy. This encasement technique allows maximum utilization of circuit board real estate, with precisely

[illegible] packages also provide significant improvements in overall dimensional consistency, as well as lead wires precisely [illegible] packaging design, these capacitors can now be marked [illegible] system ensures legibility and permanency while offering a [illegible]

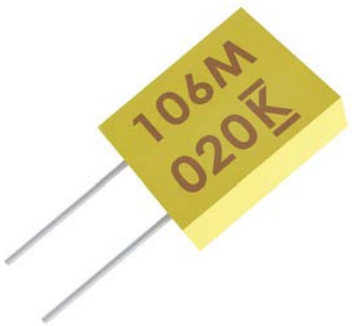
Benefits

- Taped and reeled per EIA Specification RS-468 [illegible]
- Qualified to MIL-PRF-49137/6, Style CX06 (T378 only)
- T370 capacitance values of 0.68 to 220 µF
- T378 capacitance values of 2.2 to 220 µF
- Tolerances of +40% −20%, ±5%, ±10% and ±20% standard [illegible]
- Operating temperature range of −55°C to +85°C at rated voltage and up to 125°C with derating
- Case sizes: C, D, E, F

Applications

Typical applications include use in bypass, coupling, filtering [illegible]

[illegible]



[illegible]

Ordering Information – T370/T378

T	37X	D	475	M	035	A	S	
[illegible]	[illegible]	[illegible]	[illegible] (pF)	[illegible]	[illegible]	Failure Rate	Termination Finish	[illegible]
[illegible]	[illegible]	[illegible] F	First two digits [illegible] significant figures. Third digit specifies number [illegible]	M = ±20% K = ±10% J = ±5% L = 40%, -20%	[illegible]	Not Applicable	[illegible]	[illegible]

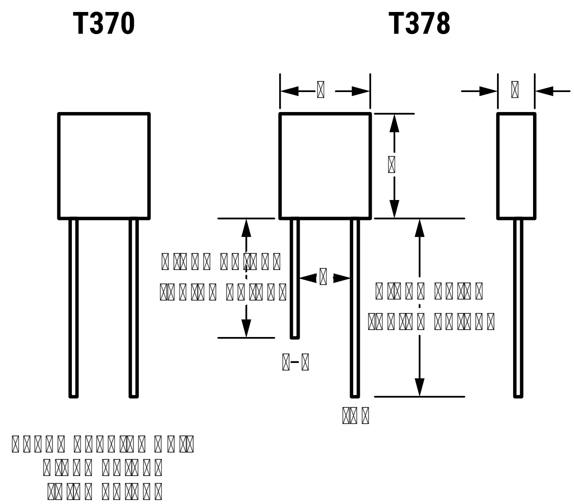
Ordering Information – Defense MIL-PRF-49137/6 (CX06 Style)

CX	06	D	335	K
Type	Style	[illegible]	[illegible] (pF)	[illegible]
Fixed, solid [illegible] nonhermetically [illegible]	[illegible]	[illegible] F = 10 V [illegible]	First two digits [illegible] significant figures. Third digit specifies number of [illegible]	M = ±20% K = ±10%

Performance Characteristics

Item	Performance Characteristics
[illegible]	-55°C to 125°C
[illegible]	T370: 0.68 – 220 µF at 120 Hz/25°C; T378: 2.2 – 220 µF at 120 Hz/25°C
[illegible]	M tolerance ±20% standard, L tolerance + 40%/-20%, J tolerance ±5%, K tolerance ±10%
[illegible]	[illegible]
DF (120 Hz at 25°C)	Refer to Part Number Electrical Specification Table
[illegible]	Refer to Part Number Electrical Specification Table (at rated voltage up to +85°C and 2/3 of rated voltage applied at 125°C)

Dimensions – Millimeters (Inches)



Case Size	H (MAXIMUM)	W (MAXIMUM)	T (MAXIMUM)	S Lead Spacing ±0.010 (±0.25)	D Lead Diameter ±0.001 (±0.03)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
F	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

** C case size T370 style only.*

Table 1 – Ratings & Part Number Reference

Rated Voltage	Rated Capacitance	Case Code Case Size	KEMET Part Number	DC Leakage	DF % at 25°C	CX06 CAPACITORS PER MIL-PRF-49137/6	
						CX06 MILITARY PART NUMBER	KEMET MILITARY PART NUMBER
(V) 85°C	µF			µA at 25°C Maximum/5 Minutes	120 Hz Maximum		
[illegible]	[illegible]	F	T370F227(1)003AS	[illegible]	[illegible]	CX06B227(2)	T378F227(3)003AS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06C156(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06C476(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06C686(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06D106(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06D336(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06D476(2)	[illegible]
[illegible]	[illegible]	F	T370F157(1)006AS	[illegible]	[illegible]	CX06D157(2)	T378F157(3)006AS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06F685(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06F226(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06F336(2)	[illegible]
[illegible]	[illegible]	F	T370F107(1)010AS	[illegible]	[illegible]	CX06F107(2)	T378F107(3)010AS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06H156(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06H226(2)	[illegible]
[illegible]	[illegible]	F	T370F686(1)015AS	[illegible]	[illegible]	CX06H686(2)	T378F686(3)015AS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06J335(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06J475(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06J106(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06J156(2)	[illegible]
[illegible]	[illegible]	F	T370F476(1)020AS	[illegible]	[illegible]	CX06J476(2)	T378F476(3)020AS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06K225(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06K685(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06K106(2)	[illegible]
[illegible]	[illegible]	F	T370F336(1)025AS	[illegible]	[illegible]	CX06K336(2)	T378F336(3)025AS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06M684(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06M105(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06M155(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06M225(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06M335(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06M475(2)	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CX06M685(2)	[illegible]
[illegible]	[illegible]	F	T370F106(1)035AS	[illegible]	[illegible]	CX06M106(2)	T378F106(3)035AS
[illegible]	[illegible]	F	T370F156(1)035AS	[illegible]	[illegible]	CX06M156(2)	T378F156(3)035AS
[illegible]	[illegible]	F	T370F226(1)035AS	[illegible]	[illegible]	CX06M226(2)	T378F3226(3)035AS
(V) 85°C	µF	Case Size Code	µA at 25°C Maximum/5 Minutes	120 Hz Maximum	Ω at25°C 100 kHz Max	B (0.1)	C (0.01)
Rated Voltage	Rated Capacitance		DC Leakage	DF % at 25°C	ESR	MIL–PRF–39003 (CSS13 Style)	

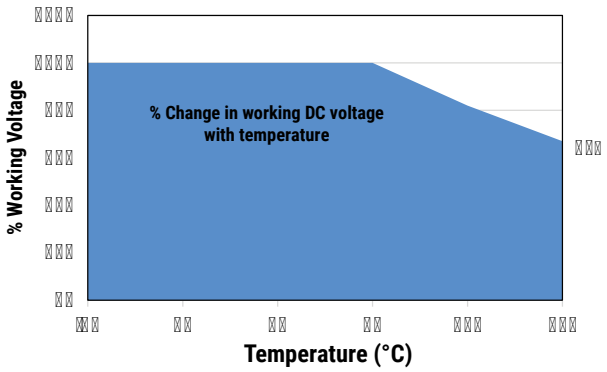
(1) To complete KEMET part number, insert L - +40%, –20%; M - 20%; K - ±10%; J - ±5%. Designates Capacitance tolerance.

(2) To complete miitary part number, insert M - 20%, K - ±10%. Designates Capacitance tolerance.

(3) To complete KEMET part number, insert M - 20%, K - ±10%. Designates Capacitance tolerance.

Recommended Voltage Derating Guidelines

	−55°C to 85°C	85°C to 125°C



Ripple Current/Ripple Voltage

Permissible AC ripple voltage and current are related to capabilities of the device. Permissible AC ripple voltage that may be applied is limited by following criteria:

1. Dissipated power must not exceed the limits specified
2. The positive peak AC voltage plus the DC bias voltage, if any, must not exceed the DC voltage rating of the
3. The negative peak AC voltage in combination with bias voltage, if any, must not exceed the allowable limits specified for reverse voltage.

Thermal capacities for the various case sizes have been determined empirically and are listed below. The “ripple voltage” permissible may be calculated from the impedance

Case Size	Maximum Power Dissipation (Pmax) Watts at 25°C
F	

Using the P max of the device, the maximum allowable rms ripple current or voltage may be determined.

$I(max) = \sqrt{P\ max/R}$
$E(max) = Z\sqrt{P\ max/R}$

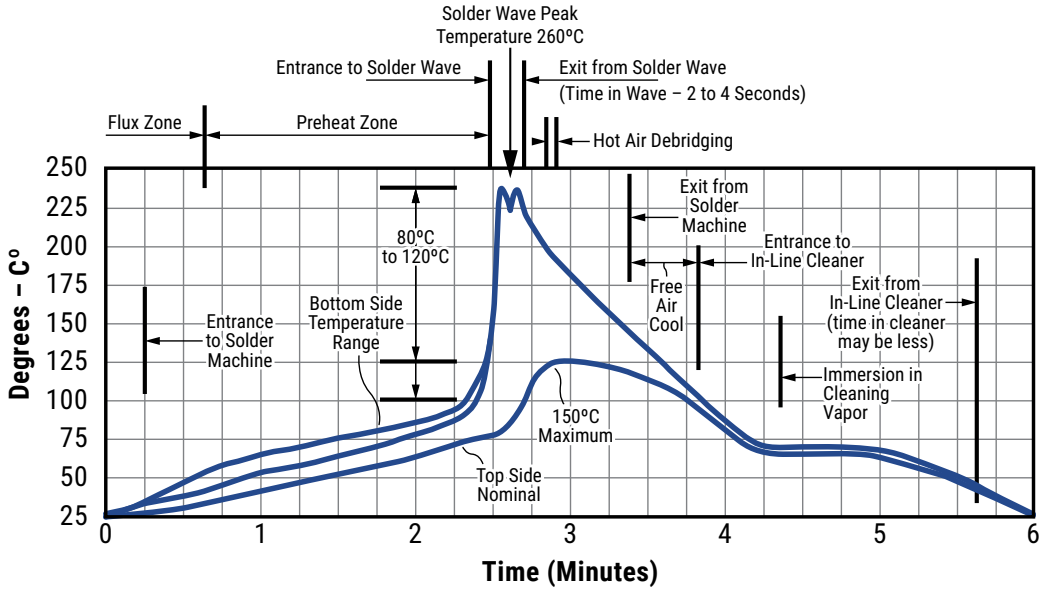
I = rms ripple current (amperes)
E = rms ripple voltage (volts)
P max = maximum power dissipation (watts)
R = ESR at specified frequency (ohms)
Z = Impedance at specified frequency (ohms)

Temperature Compensation Multipliers for Maximum Power Dissipation		
T ≤ 25°C	T ≤ 85°C	T ≤ 125°C

T= Environmental Temperature

The maximum power dissipation rating must be reduced with increasing environmental operating temperatures. Refer to the Temperature Compensation Multiplier table for details.

Optimum Solder Wave Profile



Reverse Voltage

Although these are polar capacitors, some degree of transient voltage reversal is permissible, as seen below. The capacitors should not be operated continuously in reverse mode, even within these limits.

Temperature	Pecentage of Rated Voltage
+25°C	[illegible]
+85°C	[illegible]
+125°C	[illegible]

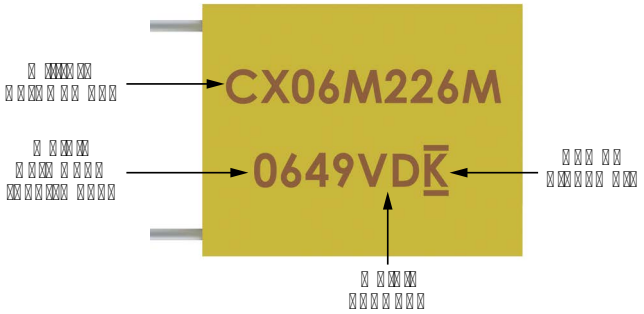
Mounting

[illegible] simulates wave solder of topside board mount product. This demonstration of resistance to solder heat is in accordance with what is believed to be the industry standard. More severe treatment must be considered reflective of an improper soldering process. The above figure is a recommended solder wave profile for both axial and radial leaded solid tantalum [illegible]

Capacitor Marking

T370

T378



Storage

Tantalum molded radial/axial capacitors should be stored in normal working environments. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 60°C RH. Storage at high temperature may cause a small, temporary increase in leakage current (measured under standard conditions), but the original value is usually restored within a few minutes after application of rated voltage. Storage at high humidity may increase capacitance and dissipation factor. Solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. For optimized solderability capacitors stock should be used promptly, preferably within three years of receipt.

Tape & Reel Packaging Information

KEMET offers Solid Tantalum Capacitors fully compatible for use with automatic insertion machines for radial-lead ARIS Reel Package. ARIS Ammo Package is also available.

Table 2 – Packaging Quantity

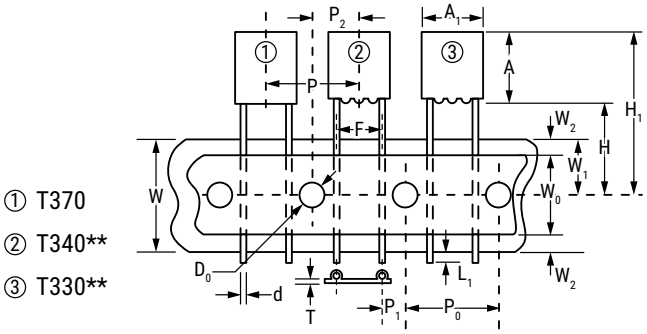
T370

Case Size	Standard Bulk Quantity	**Standard Reel Quantity**	**Reel C-Spec**
F			

T378

Case Size	Standard Bulk Quantity	**Standard Reel Quantity**	**Reel C-Spec**
F			

Figure 1



Dimension	Symbol	Nominal mm (inch)		Tolerance mm (inch)	
Body Height (1)	[illegible]	[illegible]		±0.38 (±0.015) Maximum	
Body Width (1)	[illegible]	[illegible]		±0.38 (±0.015) Maximum	
[illegible]	[illegible]	[illegible]		±0.3 (±0.012)	
[illegible]	[illegible]	[illegible]	[illegible]	±0.05 (±0.001)	±0.03
[illegible]	F	[illegible]	[illegible]	[illegible]	−0.2 (−0.008)
[illegible]	[illegible]	[illegible]		Reference Only	
[illegible]	[illegible]	[illegible]			
Component Height Above Tape Center	[illegible]	[illegible]		[illegible]	
Component Alignment Front to Rear	ΔH	[illegible]		±2.0 (±0.079)	
[illegible]	[illegible]	[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]		[illegible]	
[illegible]	[illegible]	[illegible]		±1.0 (±0.039)	
[illegible]	[illegible]	[illegible]		±0.03 (±0.012)	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	±0.7 (±0.028)
[illegible]	[illegible]	[illegible]		±1.31 (±0.051)	
Body Thickness	[illegible]	[illegible]		±1.3 Maximum	
[illegible]	[illegible]	[illegible]		±0.02 (±0.008)	
[illegible]	[illegible]	[illegible]		+1.0/−0.5 (+0.039/−0.020)	
[illegible]	[illegible]	[illegible]	[illegible]	+1.0/−0.8 (+0.039/−0.031	
[illegible]	[illegible]	[illegible]		+0.075/−0.5 (+0.030/−0.020)	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Notes:

(1) See Dimensions table for specifc values per case size
(2) Reference only
(3) Cumulative pitch error ±1.0 mm (0.039") maximum in 20 consecutive sprocket hole locations.
(4) Measured at bottom of standoff.
(5) P, P1 and F measured at egress from carrier tape.
(6) H dimensions for T370 D and E 16.5mm ±0.5 mm (0.650" ±0.020")

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