

MAXIM

150 μ F Low-ESR Aluminum Electrolytic Capacitor

MAXC001

General Description

The MAXC001 is a 150 μ F capacitor designed for filtering and bypassing in DC-DC converters, low-dropout linear regulators, and other circuits requiring miniaturization in conjunction with low cost and low Equivalent Series Resistance (ESR). The MAXC001 has excellent impedance characteristics, particularly at the 20kHz to 200kHz switching frequencies which are common to low-power switching-regulator circuits. The MAXC001 is ideal for use in distributed power supplies and portable equipment.

Features

- ◆ 0.2 Ω Max ESR at 100kHz
- ◆ Miniature 10mm x 12.5mm Can Size
- ◆ 35V Continuous DC Rating
- ◆ Radial Printed-Circuit (PC) Board Mounting
- ◆ Excellent High-Frequency Performance

Applications

Switching Regulators
 DC-DC Converters
 Charge Pumps
 Low-Dropout Linear Regulators

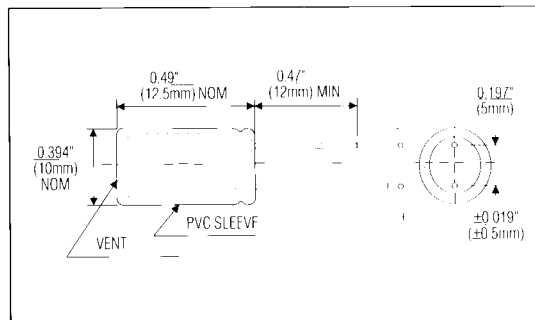
Ordering Information

PART	TEMP. RANGE	VALUE
MAXC001	-25 $^{\circ}$ C to +105 $^{\circ}$ C	150 μ F \pm 20%

Physical Characteristics

Diameter	0.394" (10mm) Nominal 0.421" (10.7mm) Max
Length	0.492" (12.5mm) Nominal 0.551" (14mm) Max
Casing	Solvent-Proof Type
Lead Spacing	0.197" (5mm) Nominal
Lead Length	0.472" (12mm) Min 26 AWG
Lead Finish	Tin-Lead Solder

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Maxim Integrated Products 1

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ABSOLUTE MAXIMUM RATINGS

Ripple Current (100kHz, +105°C)	625mA	Operating Temperature Range	-25°C to +105°C
Ripple Current (120Hz, +105°C)	435mA	Storage Temperature Range	-40°C to +105°C

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the capacitor. These are stress ratings only, and functional operation at these conditions is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

(T_A = +25°C, Note 1.)

PARAMETERS	CONDITIONS	MIN	TYP	MAX	UNITS
Capacitance	120Hz	120	150	180	μ F
ESR	100kHz		0.10	0.2	Ω
Applied Voltage		35			V
Leakage Current	V = 35V			5	μ A

Note 1: Maxim sample tests these parameters to an LTPD = 10.

Applications Information

DC-DC Converter Filtering

While designed specifically for the MAX743 dual-output current-mode +5V to \pm 15V or \pm 12V converter (Figure 1), the MAXC001 works well for many low-power DC-DC converter and charge-pump applications. For best filtering action, place a 0.1 μ F monolithic ceramic capacitor in parallel with the MAXC001.

MAXC001 Compatible Power-Supply ICs

STEP UP	INVERTING	STEP DOWN	LOW VOLTAGE	DUAL OUTPUT
MAX630	MAX634	MAX638	MAX654	MAX742
MAX631	MAX635		MAX655	MAX743
MAX632	MAX636		MAX656	
MAX633	MAX637		MAX657	
MAX4193	MAX4391		MAX658	
MAX641			MAX659	
MAX642				
MAX643				
LOW-DROPOUT LINEAR			CHARGE PUMP	
MAX667			ICL7660	
			ICL7662	
			MAX680	

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Eliminating Noise Spikes

Large noise spikes, hundreds of millivolts or even volts in amplitude, often threaten to upset sensitive circuits. These noise spikes are sometimes eliminated by replacing existing general-purpose capacitors with high-quality, low-ESR capacitors such as the MAXC001. In other cases, the measurement technique may introduce apparent noise.

Long-scope probe ground leads often cause measurement-related noise problems. Electromagnetic Interference (EMI) radiating from PC traces or unshielded inductors can be picked up by the scope ground lead and appear as transient spikes. With many types of probes, this problem can be distinguished from real noise by disconnecting the ground lead, removing the probe tip cover, and touching the ground ring near the tip directly to the filter-cap ground lead (Figure 2).

If induced ground noise is the problem, protect sensitive circuitry by locating it physically distant from the DC-DC converter and placing a 0.1 μ F to 1 μ F ceramic capacitor across the supply leads close to the sensitive circuitry. That way, the long PC traces carrying power will exhibit some inductance, and the combination of the main capacitor, local bypass capacitor, and lead inductance act as a pi filter.

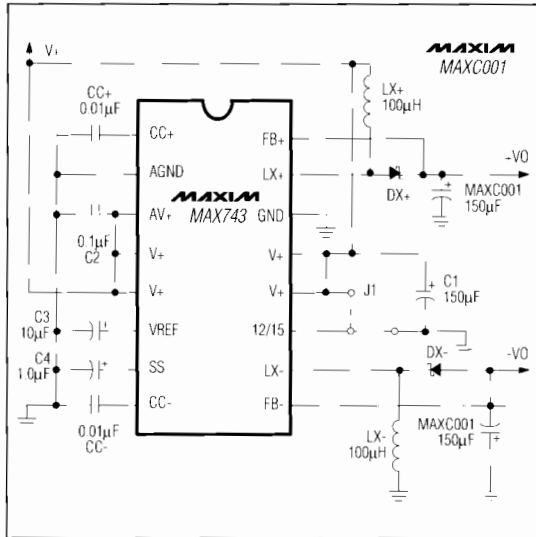


Figure 1. Bypass and Filter Capacitor Application (MAX743 +5V to \pm 15V Converter)

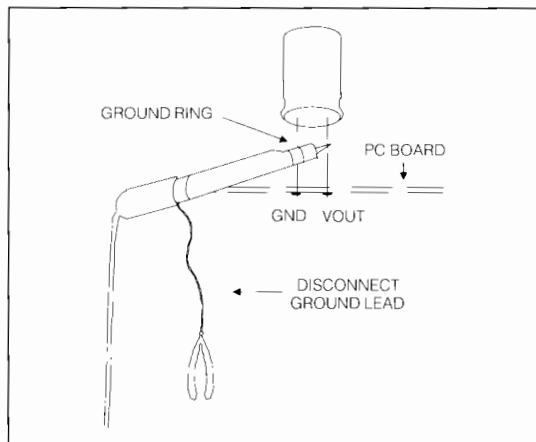


Figure 2. Noise Measurement