Type 944U Polypropylene, DC Filter Capacitors

High Current, Low Profile for Inverter Applications

Type 944U is specifically designed for use in high power DC filtering applications. The low inductance internal construction utilizes low loss metallized polypropylene for high ripple current capability. Male or female terminal options offer design flexibility in a rugged UL 94VO rated flame retardant plastic case and resin fill. High current ratings and robust mounting flanges make the 944U suited for inverter applications in electric vehicle power inverters, wind power inverters and motor drives.

Highlights

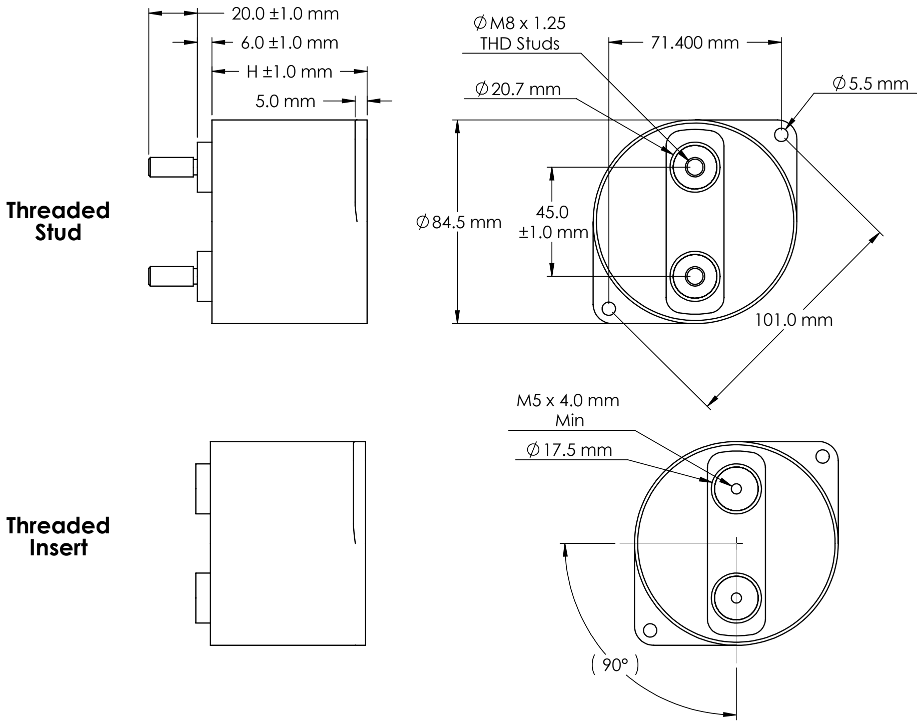
- Low Inductance
- Low Profile
- Low ESR
- High Ripple Current
- High Voltage Ratings

Specifications

Capacitance Range	33 to 220 µF
Capacitance Tolerance	±10% standard
Rated Voltage	800 to 1400 Vdc
Operating Temperature Range with Ripple	-40 ºC to 85 ºC
Maximum rms Current	74A @ 55 ºC
Maximum rms Voltage	230 Vac
Test Voltage between Terminal @ 25ºC	150% rated DC voltage for 10 s
Test Voltage between Terminals & Case @ 25ºC	4 kVac @ 50/60 Hz for 60 s
Life Test	5000 h @ 85 ºC, rated voltage
RoHS Compliant	

Dimensions

Construction Details	
Case Material	Plastic UL94V-0
Resin Material	Dry Resin UL94V-0
Terminal Material	Tin Plated Brass



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Part Numbering System

944U	101	K	801	A	A	M
Type	**Capacitance**	**Tolerance**	**Voltage**	**Diameter D (mm)**	**Height H (mm)**	**Terminal**
944U	101 = 100 µF	K = ±10%	801 = 800 Vdc	A = 84.5	A = 40	M = M8 Thd Stud
	700 = 70 µF		102 = 1000 Vdc		B = 51	I = M5 Thd Insert
	470 = 47 µF		122 = 1200 Vdc		C = 64	
			142 = 1400 Vdc			

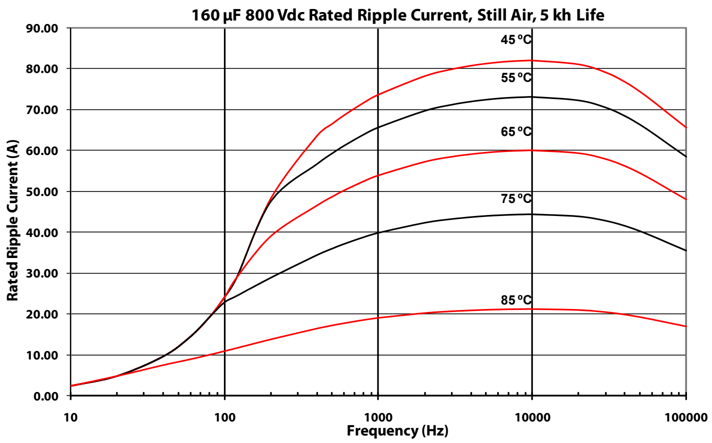
Ratings

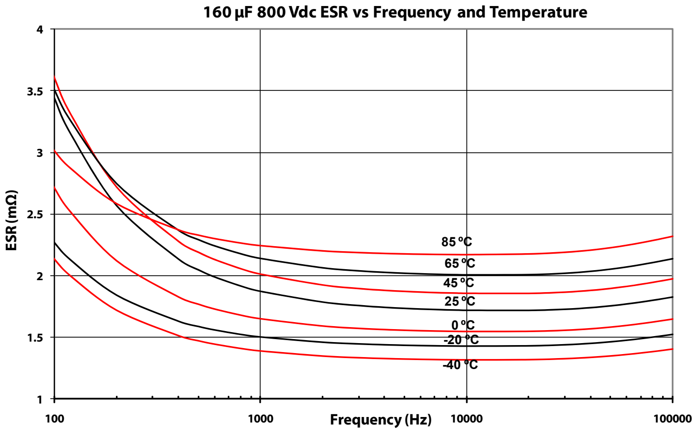
NOTE: Other ratings, sizes and performance specifications are available. Contact us.

Catalog Part Number	Cap (µF)	Rated Voltage (Vdc)	H Height mm	Max ESR 10kHz (mΩ)	Typical ESL (nH)	Max Irms 55ºC (A)	Thermal Resistance ϴcc (ºC/W)	ϴca (ºC/W)
944U101K801AA*	100	800	40	0.5	20	74	2.8	5.2
944U161K801AB*	160	800	51	0.8	30	73	3.0	4.5
944U221K801AC*	220	800	64	1.0	40	72	3.1	4.0
944U660K102AA*	66	1000	40	0.6	20	70	2.8	5.2
944U101K102AB*	100	1000	51	0.8	30	68	3.0	4.5
944U141K102AC*	140	1000	64	1.0	40	65	3.1	4.0
944U470K122AA*	47	1200	40	0.7	20	67	2.8	5.2
944U700K122AB*	70	1200	51	1.0	30	65	3.0	4.5
944U101K122AC*	100	1200	64	1.3	40	64	3.1	4.0
944U330K142AA*	33	1400	40	0.8	20	64	2.8	5.2
944U520K142AB*	52	1400	51	1.1	30	60	3.0	4.5
944U700K142AC*	70	1400	64	1.4	40	59	3.1	4.0

*** M = M8 Stud   I = M5 Insert**

Typical Performance Curves





Expected Lifetime Predictions

To use the Expected Lifetime curves calculate Va/Vr and core temperature T. Start by estimating:

Applied dc voltage Va
Ripple Current I
Ripple Frequency f
Ambient Temperature Ta
Airflow speed v

Units:

A=m^2
C=μF
ESR=mΩ
f=kHz
I=A
T, Ta & Tc=°C
θ, θca & θcc =°C/W
v=m/s
Va &Vr=Vdc

NOTE: The temperature rise in the 944U is I^2(ESR) times the thermal resistance θ. The ESR is mainly the metal resistance; the metal resistance is the 10 kHz ESR. For operation below 10kHz add the dielectric resistance. It is the dielectric dissipation factor—no more than 0.0002—times the capacitive reactance, i.e., 0.0002 /(2πfC). That's equal to 31.83/(fC).

1. Start with the 10 kHz ESR from the Ratings table. If frequency is less than 10 kHz, add 31.83/(fC).

2. Compute total thermal resistance θ as the sum of core-to-case thermal resistance θcc and case-to-ambient thermal resistance θca. Both are in the Ratings table but θca is for still air and θcc is for 10 kHz or less. For frequency > 10 kHz multiply θcc by [1+(f –10)/100], e.g., for 75 kHz multiply θcc by 1.65. For moving air use the capacitor surface area A and airflow speed v to calculate $\theta ca = 1/[A(5+17.5(v+0.1)^{0.66})]$.

3. Compute Va/Vr and the core temperature T.
$T = Ta + I^2(ESR)\theta$

4. Look up estimated lifetime from the Expected Lifetime curves.

5. If you want a longer expected lifetime, choose a capacitor with higher voltage rating or consider using multiple capacitors in parallel to share the ripple current.

The expected lifetime predictions assume no exposure to overvoltage transients. Expected lifetime can be calculated for varying exposure to overvoltage transients. As an illustration at 50 °C the expected lifetime is 100,000 h with the 24-hour Va/Vr profile below:

Va / Vr	Duration
1.67	100 ms
1.50	5 minutes
1.30	2.5 hours
1.10	9.6 hours
1.00	11.9 hours

For applications with more severe 24-hour profiles, contact us.

Expected Lifetime vs Hot Spot Temperature and Applied DC Voltage