

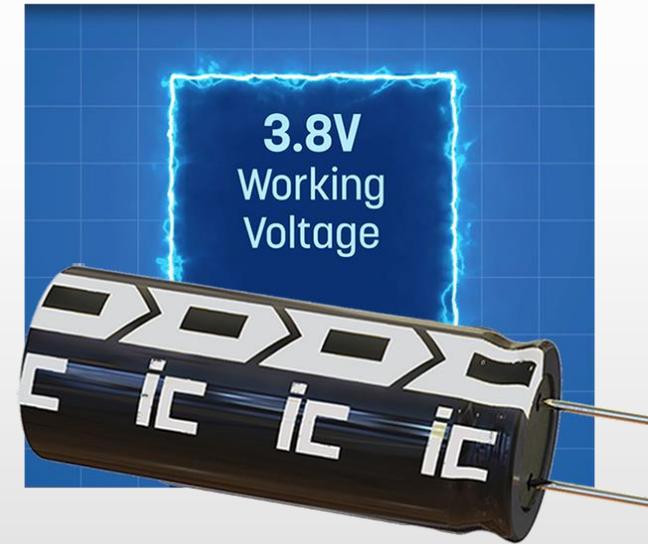
VMF/VPF Series Hybrid LIC Supercapacitors

3.8 Volts for higher energy and space savings



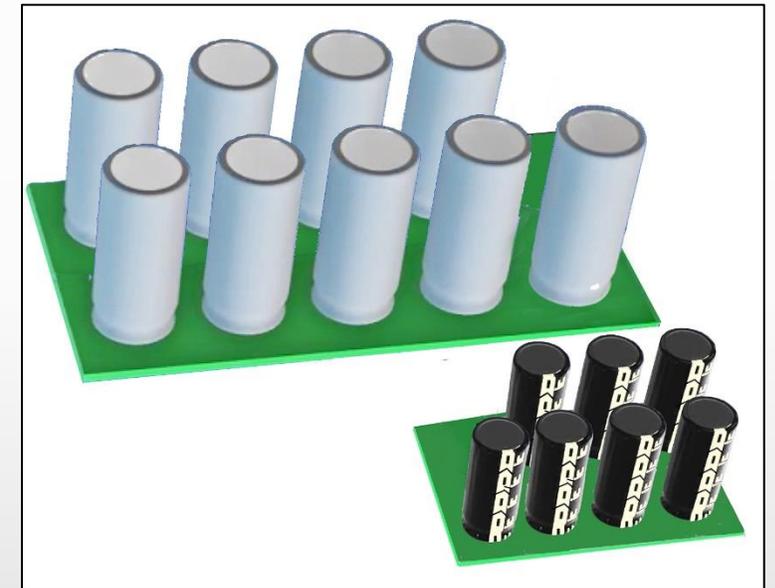
VMF/VPF Series Hybrid LIC Supercapacitors offer higher operating voltage for high energy

- Rated for 3.8V, as compared to typical supercapacitors, which have a single device rating of 2.5V-3.0V.
- Up to 8x the energy density of current 2.7V comparably sized supercapacitor cells.
- Lower self-discharge/leakage than current symmetric supercapacitors.
- Allows designs to be smaller, lighter, more reliable.
- High current handling—up to 20 amps.



Use Fewer Devices to Reach Target Energy Storage

- Higher voltage and energy density, allows for fewer VMF/VPF cells required in modules, saving space and cost.
- Energy storage is up-to 60% greater than 3V devices and nearly double that of 2.7V supercapacitors!
- Improved reliability with fewer cells used .



The VMF/VPF Series offers key benefits of conventional supercapacitors and batteries.

- Combines the long life (calendar and cycle life) characteristics of the EDLC with the high energy density of the Li-Ion battery.
- Broad operating temperature range $-25^{\circ}\text{C} \sim 85^{\circ}\text{C}$
- Safety - Low Self discharge, no thermal runaway – open failure with use of safety vent
- Instant charging, and on-demand discharge.
- No shipping restrictions
- RoHS compliant



VMF-VPF Series Hybrid LIC Supercapacitors offer broad selection, performance and life span.

- Values from 10F to 220F
- Low ESR and high current handling
- Operating Temp: -15 °C to 85 °C for the VMF and -25 °C to 60 °C for the VPF
- Rated up to 500,000 charge/discharge cycles
- Performance does not degrade with each cycle



VMF/VPF Series Key Performance Specifications

Operating Temperature Range		VMF: -15°C to +85°C	VPF: -25°C to +60°C
Storage Temperature		VMF: -40°C to +70°C	VPF: -40°C to +60°C
Capacitance Tolerance @ 25°C		±20%	
Voltage (Vdc) (+70°C/+85°C)	WVDC	3.8	VMF: 3.8V / 3.5V VPF: 3.8V
	SVDC	4.2	
	Minimum	2.2	
Life Time	VMF: 1000 hours with rated voltage applied at 70°C VPF: 60°C		
	Capacitance change	±50% of initially measured values	
	ESR	<1000% of initially specified values	
	Leakage current	≤100% specified maximum value	
Shelf Life	VMF: 1000 hours with no voltage applied at 70°C VPF: 60°C		
	Capacitance change	±30% of initially measured values	
	ESR	<200% of initially specified values	
Life Cycles (25°C) 1 cycle = Charge / Discharge from 3.8~2.5VDC	VMF: 500,000 cycles VPF: 250,000 cycles		
	Capacitance change	±30% of initially measured values	
	ESR change	<200% of initially specified values	



UL810A Recognized



Choose from 13 different SKUs from 10F to 220F.

VMF Series

WVDC	Capacitance (F)	IC PART NUMBER	MAX Current (A) (1 Sec.)	Maximum Continuous Current (A) ($\Delta T=15^{\circ}\text{C}$)	Short Circuit Current (A)	ESR AC 1 kHz (m Ω)	DC ESR (m Ω) 20 $^{\circ}\text{C}$	Max stored energy (mWh)	LC (mA), (72 hrs)
3.8	10.0	VMF106M3R8	0.5	0.05	2.53	500	1500	13.33	2
3.8	25.0	VMF256M3R8	0.8	0.125	5.85	300	650	33.33	2.5
3.8	30.0	VMF306M3R8	0.9	0.15	5.43	250	700	40	3
3.8	40.0	VMF406M3R8	1	0.15	6.91	250	550	53.33	3
3.8	50.0	VMF506M3R8	1.5	0.2	8.44	200	450	66.67	4
3.8	70.0	VMF706M3R8	3	0.35	8.44	100	250	93.33	5
3.8	120.0	VMF127M3R8	5	0.6	19	80	200	160	7
3.8	220.0	VMF227M3R8	8	1.1	38	60	100	293.3	12

VPF Series

WVDC	Capacitance (F)	IC PART NUMBER	MAX Current (A) (1 Sec.)	Maximum Continuous Current (A) ($\Delta T=15^{\circ}\text{C}$)	Short Circuit Current (A)	ESR AC 1 kHz (m Ω)	DC ESR (m Ω) 20 $^{\circ}\text{C}$	Max stored energy (mWh)	LC (mA), (72 hrs)
3.8	40.0	VPF406M3R8	1	0.15	6.9	250	550	53	4
3.8	50.0	VPF506M3R8	2.8	0.5	8.4	200	450	57	6
3.8	70.0	VPF706M3R8	4.9	0.7	15.2	100	250	80	8
3.8	120.0	VPF127M3R8	6.2	1.2	19	80	200	137	12
3.8	220.0	VPF227M3R8	12.4	2.2	38	60	100	253	25



VMF and VPF Series have size and weight advantages over conventional supercapacitors.

Compare volume and weight of VMF/VPF devices. Especially important for modules.

VMF Series

WVDC	Capacitance (F)	IC PART NUMBER	Weight (grams)	Volume (mL)	Dims DxL LxHxT (mm)	Lead Spacing S (mm)	Lead Diameter d (mm)
3.8	10.0	VMF106M3R8	1.4	0.703	8x14	3.5	0.6
3.8	25.0	VMF256M3R8	1.8	2.51	8x20	3.5	0.6
3.8	30.0	VMF306M3R8	2.2	1.26	8x25	3.5	0.6
3.8	40.0	VMF406M3R8	2.5	1.26	10x16	5	0.6
3.8	50.0	VMF506M3R8	3.2	1.57	10x20	5	0.6
3.8	70.0	VMF706M3R8	3.8	1.96	10x25	5	0.6
3.8	120.0	VMF127M3R8	5.4	3.07	12.5x25	5	0.6
3.8	220.0	VMF227M3R8	9.4	5.03	16x25	7.5	0.8

VPF Series

WVDC	Capacitance (F)	IC PART NUMBER	Weight (grams)	Volume (mL)	Dims DxL LxHxT (mm)	Lead Spacing S (mm)	Lead Diameter d (mm)
3.8	40.0	VPF406M3R8	2.5	1.26	10x16	5	0.6
3.8	50.0	VPF506M3R8	2.1	1.57	10x20	5	0.6
3.8	70.0	VPF706M3R8	2.3	1.96	10x25	5	0.6
3.8	120.0	VPF127M3R8	3.91	3.07	12.5x25	5	0.6
3.8	220.0	VPF227M3R8	7	5.03	16x25	7.5	0.8

*As an example...
A 50F VPF Series device is nearly 80% smaller and lighter in weight than a conventional 3V supercapacitor of same value!*



High-Voltage, High-Capacity Custom Module Example

VMF/VPF Series Applications

- Industrial
 - Factory automation and robotic
 - Mechanical actuator or valve power
- Transportation
 - Forklift trucks and personal electric vehicles
- Energy/Lighting
 - Smart utility meters (electric, water, gas)
 - UPS systems and emergency lighting
 - Solar lights and energy storage
 - Power conversion
- IoT
 - Energy harvesting/storage
- Memory backup circuits
- Enterprise server back-up
- RAID storage systems



VMF/VPF Series Performance Summary

VMF-VPF Hybrid LIC Supercapacitors provide very high capacitance and energy storage, higher operating voltages, high current and low cost.

- Standard values from 10F to 220F at 3.8 WVDC
- Operating temperature ranges from -25 °C to 85 °C
- Low ESR with high current handling.
- Up to 500,000 cycle life for VMF Series, 250,000 cycles for VPF.
- Performance does not degrade with each charge/discharge cycle.
- Very low self-discharge...a fraction of conventional supercapacitors.
- Ultra compact size, light weight and high energy density aids product design flexibility.
- Bank in series or parallel for higher capacitance or voltage.



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