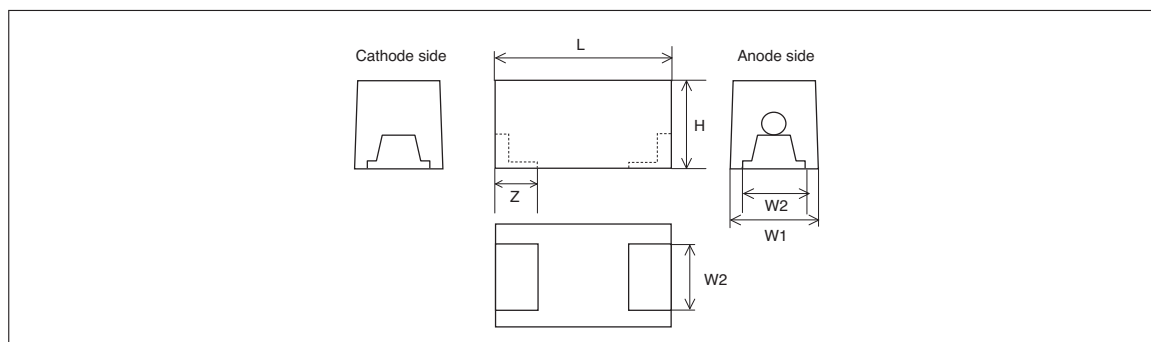


■ FEATURE

- Lead-free type. RoHS Compliant.
- Face down terminal.
- The low-profile of height 0.9mm Max and large capacitance of 47 μ F available in 1608 size.
- Enable fillet bonding.
- Halogen free, Antimony free and Red Phosphorous free resin is applied to the exterior mold resin.

■ DIMENSIONS



(Unit: mm)

Case Code	L	W1	W2	H	Z
J	1.6 ± 0.1	0.85 ± 0.1	0.65 ± 0.1	0.8 ± 0.1	0.5 ± 0.1
P2	2.0 ± 0.1	1.25 ± 0.1	0.9 ± 0.1	0.9 ± 0.1	0.55 ± 0.1
A3	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	0.9 ± 0.1	0.8 ± 0.2

■ STANDARD C-V VALUE REFERENCE BY CASE CODE

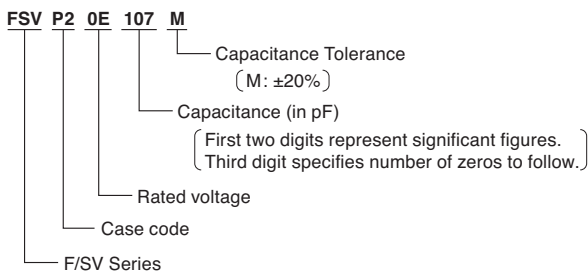
Ur :Rated Voltage

μ F	Ur	2.5V	4V	6.3V	10V	16V	20V	25V
		0E	0G	0J	1A	1C	1D	1E
2.2	225							
3.3	335							
4.7	475							
6.8	685							A3
10	106					A3		
15	156							
22	226			J				
33	336		J		A3			
47	476	J						
68	686		P2	A3				
100	107	P2						
220	227	A3						

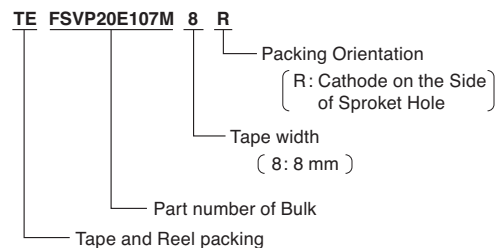


■ PART NUMBER SYSTEM

[Bulk]

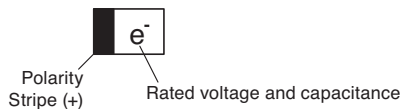


[Tape and Reel]

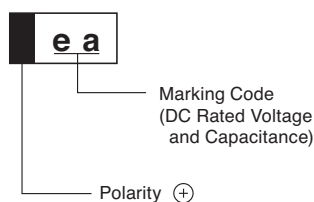


■ MARKINGS

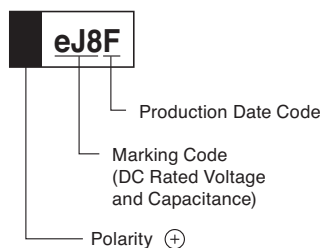
[J case] (ex. 47 μF / 2.5 V)



[P2 case] (ex. 100 μF / 2.5 V)



[A3 case] (ex. 220 μF / 2.5 V)



[J case Marking code]

U_R : Rated Voltage

μF \ U_R	2.5	4	6.3	10	16	20
4.7						
6.8						
10						
15						
22			J ⁻			
33		G ⁻				
47	e ⁻					

[P2 case Making code]

μF \ U_R	2.5	4	6.3	10	16	20	25
10							
15							
22							
33							
47							
68		GW					
100	ea						

[A3 case Making code]

μF \ U_R		2.5V	4V	6.3V	10V	16V	20V	25V
		e	g	j	A	C	D	E
6.8	W6							EW6
10	A7					CA7		
15	E7							
22	J7							
33	N7				AN7			
47	S7							
68	W7			jW7				
100	A8							
150	E8							
220	J8	eJ8						

[A3 case production date code]

y \ M	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
2011	a	b	c	d	e	f	g	h	j	k	l	m
2012	n	p	q	r	s	t	u	v	w	x	y	z
2013	A	B	C	D	E	F	G	H	J	K	L	M
2014	N	P	Q	R	S	T	U	V	W	X	Y	Z

NOTE: Production date code will resume beginning in 2015.

Manganese dioxide type



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PERFORMANCE CHARACTERISTICS

Test Conditions : Conform to IEC 60384-1

ITEM		PERFORMANCE					TEST CONDITION	
Operating temperature		-55°C to +125°C					Derated voltage at 85°C at more	
Rated voltage (V.dc)		2.5V	4V	6.3V	10V	16V	25V	at 85°C
Derated voltage (V.dc)		1.6V	2.5V	4V	6.3V	10V	16V	at 125°C
Surge voltage (V.dc)		3.3V	5.2V	8V	13V	20V	33V	at 85°C
Capacitance		6.8 μF to 220 μF					at 120 Hz	
Capacitance tolerance		±20%						
DC Leakage Current (L.C)		0.01C • V(μA) or 0.5μA , whichever is greater					Voltage: Rated voltage for 5min.	
Dissipation Factor		Refer to Standard Ratings					at 120 Hz	
Equivalent Series Resistance		Refer to Standard Ratings					at 100 kHz	
		Capacitance change		DF(%)		L.C		
Surge voltage test		Refer to Standard Ratings		Lower than initial specification		Lower than initial specification		Temperature : 85±2°C Applied voltage : Surge voltage Series resistance : 33 ohm Duration of surge : 30±5 sec Time between surge : 5.5min. Number of cycle : 1000
Characteristic at high and low temperature	-55°C	Not to exceed -20%		Refer to Standard Ratings		————		Step 1: 25±2°C Step 2: -55 $\frac{3}{5}$ °C Step 3: 25±2°C Step 4: 125 $\frac{3}{5}$ °C
	+85°C	Not to exceed +20%		Lower than initial specification		0.1C•V(μA) or 5 μA, which ever is greater		
	+125°C	Not to exceed +20%		Refer to Standard Ratings		0.125C•V(μA) or 6.25 μA, which ever is greater		
Rapid change of temperature		Refer to Standard Ratings		Lower than initial specification		Lower than initial specification		Parts shall be temperature cycled over a temperature range of -55 to +125°C, five times continuously as follow. Step 1: -55 $\frac{3}{5}$ °C, 30±3min. Step 2: room temp. , 10 to 15min. Step 3: 125 $\frac{3}{5}$ °C, 30±3min. Step 4: room temp, 10 to 15min.
Resistance to Soldering heat		Refer to Standard Ratings		Lower than initial specification		Lower than initial specification		solder dip : 260°C, 5sec solder reflow : 260°C, 10sec
Damp heat		Refer to Standard Ratings		Lower than 1.5 times initial specification		Lower than initial specification		at 40°C at 90 to 95% RH 500 hour
Endurance		Refer to Standard Ratings		Lower than initial specification		Lower than 2 times initial specification		at 85°C : Rated voltage at 125°C : Derated voltage 2000 hour
Failure Rate		λ ₀ =1% / 1000 hour					at 85°C: Rated voltage at 125°C: Derated voltage 2000 hour	
Terminal Strength		Visual: There shall be no evidence of mechanical damage					Strength : 4.9N Time : 10±0.5sec. (two directions)	
Others		Conform to IEC60384–1					Conform to IEC60384–1	

$$[U_T] = [U_R] - \frac{[U_R] - [U_C]}{40} (T - 85)$$

[U_T] : Derated voltage at operating temperature

[U_R] : Rated voltage

[U_C] : Derated voltage at 125°C

T : Operating temperature



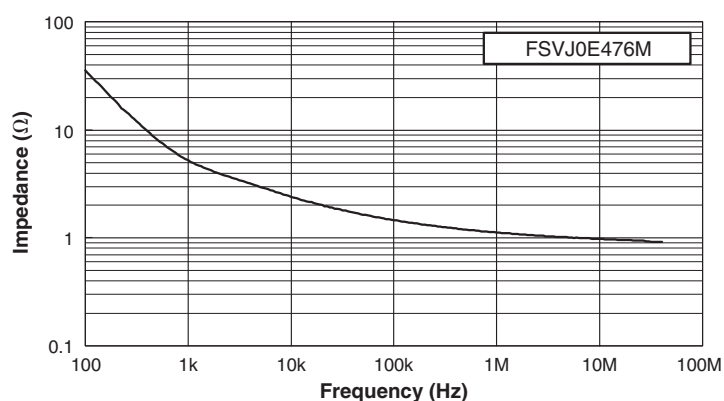
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■ RATINGS

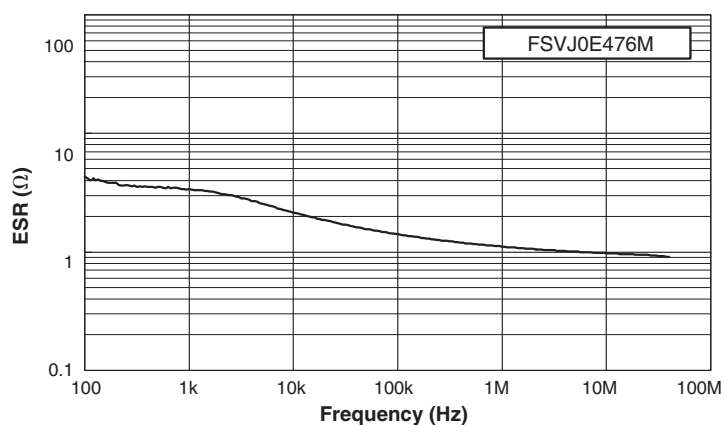
Rated Voltage (V)	Capacitance (μF)	Case Code	Part Number (Bulk)	Leakage Current (μA) Max	DF (%) Max	ESR (Ω) Max	DF (%) Max		Capacitance Change	
							-55°C	+125°C	at Surge Voltage at Damp Heat at Resistance to Soldering Heat	at Endurance
2.5	47	J	FSVJ0E476M	1.1	30	4	60	40	±20%	±20%
	100	P2	FSVP20E107M	2.5	35	3	60	40	±20%	±20%
	220	A3	FSVA30E227M	5.5	20	1	40	30	±20%	±20%
4	33	J	FSVJ0G336M	1.3	30	4	60	30	±20%	±20%
	68	P2	FSVP20G686M	2.7	18	2.5	34	20	±20%	±20%
6.3	22	J	FSVJ0J226M	1.3	20	4	38	22	±20%	±20%
	68	A3	FSVA30J686M	4.2	20	2	38	22	±20%	±20%
10	33	A3	FSVA31A336M	3.3	12	1	22	14	±20%	±20%
16	10	A3	FSVA31C106M	1.6	8	3	12	10	±20%	±20%
25	6.8	A3	FSVA31E685M	1.7	15	3	30	20	±20%	±20%

■ CHARACTERISTICS (reference)

Impedance-frequency characteristics



ESR-frequency characteristics



Manganese dioxide type



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