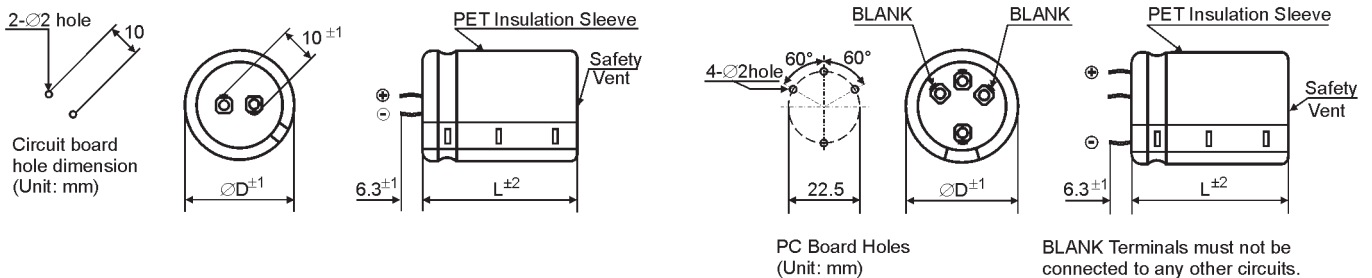


► **Specifications / Spezifikationen**

Items	Characteristics
Temperature range	-40°C ~ + 85°C
Rated voltage	16VDC - 500VDC
Surge voltage	Repetitive max. 30 sec per 6 Minutes
Leakage current at 20°C	0.02 • C • V _r [μA] or 3 mA, which is smaller.
Capacitance tolerance	+/- 20%
Useful life	6000h at 85°C
Field failure rate	0.5 FIT = 0.5 • 10 ⁻⁹ Failures/hour
Failure rate	Less than 0.1% within the useful life



► **Outline Drawing / Bauformen**



Shape / Form: R (Standard)
C (with short pin 4 ± 1mm)

Shape / Form: S (D ≥ 35mm)
X (with short pin 4 ± 1mm)

► **Ripple Current Multiplier / Wechselstrommultiplikator**

Frequency [Hz]	50/60	120	300	1k	≥ 10k	
multiplier	16V – 100V	0.7	1.0	1.1	1.2	1.2
	160V – 500V	0.7	1.0	1.1	1.3	1.4

Forced cooling [m/sec]	v < 1.0	v ≥ 1.0
multiplier	1.0	1.1

Temperature [°C]	40	60	70	85
multiplier	2.0	1.6	1.4	1.0

► **Product Code / Bestellbezeichnung**

Example: **HP3 350V 1200μF ±20% 35x80mm Shape „S“**

HP3	2V	122	M	S	A	S13	WPEC
Type of series	Rated voltage code	Capacitance code	Terminal symbol code	Capacitance tolerance	Diameter code	Length code	Outer design code

Code	Voltage	Code	Voltage	Code	Voltage
1C	16	2A	100	2G	400
1E	25	2C	160	420V	420
1V	35	2P	180	2W	450
1H	50	2D	200	2H	500
1J	63	2E	250		
1K	80	2V	350		

The first two digits are significant. The last digit indicates the number of following zeros in μF.

R: 2-pin terminal
S: 4-pin terminal
C: 2-pin short terminal
X: 4-pin short terminal

M : ± 20%
Q : -10% ~ +30%

Code	∅D
W	20
X	22
Y	25
Z	30
A	35
B	40

Code	L	Code	L	Code	L
S1	20	S8	55	S15	90
S2	25	S9	60	S16	95
S3	30	S10	65	S17	100
S4	35	S11	70	S18	105
S5	40	S12	75	S19	110
S6	45	S13	80		
S7	50	S14	85		

None: PET sleeve and PVC plate
WPEC: PET sleeve without plate

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor $\tan \delta$	Ripple Current at 40°C/120Hz [A RMS]	Ripple Current at 85°C/120Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [m Ω]	DxL [mm]	Product Code
16 1C (20)	6 800	0.50	3.92	1.96	51	22x25	HP31C682M□XS2
	10 000	0.50	4.22	2.11	41	25x25	HP31C103M□YS2
		0.50	4.26	2.13	41	22x30	HP31C103M□XS3
	15 000	0.50	5.54	2.77	28	25x30	HP31C153M□YS3
		0.50	5.54	2.77	28	30x25	HP31C153M□ZS2
		0.50	5.84	2.92	28	22x40	HP31C153M□XS5
	22 000	0.50	7.10	3.55	22	30x30	HP31C223M□ZS3
		0.50	7.10	3.55	22	35x25	HP31C223M□AS2
		0.50	7.74	3.87	22	25x45	HP31C223M□YS6
	33 000	0.50	9.06	4.53	17	35x35	HP31C333M□AS4
		0.50	9.42	4.71	17	30x45	HP31C333M□ZS6
47 000	0.50	11.33	5.66	12	35x40	HP31C473M□AS5	
68 000	0.90	14.24	7.12	12	35x60	HP31C683M□AS9	
100 000	1.20	17.76	8.88	10	40x60	HP31C104M□BS9	
25 1E (32)	4 700	0.40	3.26	1.63	88	22x25	HP31E472M□XS2
	6 800	0.40	4.12	2.06	70	25x25	HP31E682M□YS2
		0.40	4.16	2.08	70	22x30	HP31E682M□XS3
	10 000	0.40	4.54	2.27	48	22x35	HP31E103M□XS4
		0.40	4.54	2.27	48	25x30	HP31E103M□YS3
		0.40	4.54	2.27	48	30x25	HP31E103M□ZS2
	15 000	0.40	5.88	2.94	32	25x35	HP31E153M□YS4
		0.40	5.88	2.94	32	30x30	HP31E153M□ZS3
		0.40	5.88	2.94	32	35x25	HP31E153M□AS2
		0.40	6.12	3.06	32	22x45	HP31E153M□XS6
	22 000	0.40	7.50	3.75	22	30x35	HP31E223M□ZS4
		0.40	7.50	3.75	22	35x30	HP31E223M□AS3
		0.40	7.74	3.87	22	25x45	HP31E223M□YS6
33 000	0.40	9.48	4.74	17	35x40	HP31E333M□AS5	
	0.40	9.78	4.89	17	30x50	HP31E333M□ZS7	
35 1V (44)	3 300	0.35	3.04	1.52	165	22x25	HP31V332M□XS2
	4 700	0.35	3.44	1.72	115	25x25	HP31V472M□YS2
		0.35	3.46	1.73	115	22x30	HP31V472M□XS3
	6 800	0.35	4.42	2.21	80	22x35	HP31V682M□XS4
		0.35	4.42	2.21	80	25x30	HP31V682M□YS3
		0.35	4.42	2.21	80	30x25	HP31V682M□ZS2
	10 000	0.35	4.80	2.40	55	25x35	HP31V103M□YS4
		0.35	4.80	2.40	55	30x30	HP31V103M□ZS3
		0.35	4.80	2.40	55	35x25	HP31V103M□AS2
		0.35	5.00	2.50	55	22x45	HP31V103M□XS6
	15 000	0.35	6.20	3.10	35	30x35	HP31V153M□ZS4
		0.35	6.20	3.10	35	35x30	HP31V153M□AS3
		0.35	6.66	3.33	35	25x50	HP31V153M□YS7
	18 000	0.35	7.10	3.55	30	30x40	HP31V183M□ZS5
	22 000	0.35	8.20	4.10	25	30x45	HP31V223M□ZS6
0.35		8.28	4.14	25	35x40	HP31V223M□AS6	
33 000	0.40	10.28	5.14	20	35x50	HP31V333M□AS7	
50 1H (63)	2 200	0.30	2.48	1.24	108	22x25	HP31H222M□XS2
	3 300	0.30	3.22	1.61	72	25x25	HP31H332M□YS2
		0.30	3.24	1.62	72	22x30	HP31H332M□XS3
	4 700	0.30	3.68	1.84	50	22x35	HP31H472M□XS4
		0.30	3.68	1.84	50	25x30	HP31H472M□YS3
		0.30	3.68	1.84	50	30x25	HP31H472M□ZS2
	6 800	0.30	4.68	2.34	35	30x30	HP31H682M□ZS3
		0.30	4.68	2.34	35	35x25	HP31H682M□AS2
		0.30	4.86	2.43	35	25x40	HP31H682M□YS5
0.30		5.08	2.54	35	22x50	HP31H682M□XS7	

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor $\tan \delta$	Ripple Current	Ripple Current	ESR (typ) at 20°C/100Hz [m Ω]	DxL [mm]	Product Code
			at 40°C/120Hz [A RMS]	at 85°C/120Hz I_r [A RMS]			
50 1H (63)	10 000	0.35	5.06	2.53	32	30x35	HP31H103M□ZS4
		0.35	5.06	2.53	32	35x30	HP31H103M□AS3
		0.35	5.46	2.73	32	25x50	HP31H103M□YS7
	15 000	0.35	6.82	3.41	25	35x40	HP31H153M□AS5
		0.35	7.06	3.53	25	30x50	HP31H153M□ZS7
63 1J (79)	1 500	0.25	2.38	1.19	159	22x25	HP31J152M□XS2
	2 200	0.25	2.62	1.31	108	25x25	HP31J222M□YS2
		0.25	2.64	1.32	108	22x30	HP31J222M□XS3
	3 300	0.25	3.44	1.72	80	22x35	HP31J332M□XS4
		0.25	3.44	1.72	80	25x30	HP31J332M□YS3
		0.25	3.44	1.72	80	30x25	HP31J332M□ZS2
	4 700	0.25	3.90	1.95	60	25x35	HP31J472M□YS4
		0.25	3.90	1.95	60	30x30	HP31J472M□ZS3
		0.25	3.90	1.95	60	35x25	HP31J472M□AS2
		0.25	4.04	2.02	60	22x45	HP31J472M□XS6
	6 800	0.25	4.96	2.48	40	30x35	HP31J682M□ZS4
		0.25	4.96	2.48	40	35x30	HP31J682M□AS3
		0.25	5.32	2.66	40	25x50	HP31J682M□YS7
	8 200	0.25	5.36	2.68	42	35x30	HP31J822M□AS3
	10 000	0.35	5.54	2.77	42	30x45	HP31J103M□ZS6
0.35		5.56	2.78	35	35x40	HP31J103M□AS5	
15 000	0.35	7.40	3.70	35	35x50	HP31J153M□AS7	
80 1K (100)	1 000	0.20	1.94	0.97	230	22x25	HP31K102M□XS2
	1 200	0.20	2.12	1.06	155	22x25	HP31K122M□XS2
	1 500	0.20	2.48	1.24	105	25x25	HP31K152M□YS2
		0.20	2.52	1.26	155	22x30	HP31K152M□XS3
	2 200	0.20	2.82	1.41	105	25x30	HP31K222M□YS3
		0.20	2.82	1.41	70	30x25	HP31K222M□ZS2
		0.20	2.94	1.47	105	22x40	HP31K222M□XS5
	3 300	0.25	3.64	1.82	70	30x30	HP31K332M□ZS3
		0.25	3.64	1.82	50	35x25	HP31K332M□AS2
		0.25	3.78	1.89	70	25x40	HP31K332M□YS5
		0.25	3.96	1.98	70	22x50	HP31K332M□XS7
	4 700	0.25	4.12	2.06	50	35x30	HP31K472M□AS3
		0.25	4.32	2.16	50	30x40	HP31K472M□ZS5
		0.25	4.42	2.21	50	25x50	HP31K472M□YS7
	6 800	0.25	5.44	2.72	35	35x40	HP31K682M□AS5
		0.25	5.64	2.82	35	30x50	HP31K682M□ZS7
	8 200	0.30	6.64	3.32	30	30x60	HP31K822M□ZS9
10 000	0.30	7.48	3.74	25	41x50	HP31K103M□BS7	
12 000	0.30	15.40	7.70	25	35x60	HP31K123M□AS9	
100 2A (125)	1 000	0.20	2.04	1.02	180	25x25	HP32A102M□YS2
		0.20	2.06	1.03	180	22x30	HP32A102M□XS3
	1 500	0.20	2.68	1.34	120	22x35	HP32A152M□XS4
		0.20	2.68	1.34	120	25x30	HP32A152M□YS3
		0.20	2.68	1.34	120	30x25	HP32A152M□ZS2
	2 200	0.20	2.96	1.48	82	30x30	HP32A222M□ZS3
		0.20	2.96	1.48	82	35x25	HP32A222M□AS2
		0.20	3.10	1.55	82	25x40	HP32A222M□YS5
		0.20	3.24	1.62	82	22x50	HP32A222M□XS7
	3 300	0.20	3.84	1.92	60	35x30	HP32A332M□AS3
		0.20	4.02	2.01	60	30x40	HP32A332M□ZS5
		0.20	4.14	2.07	60	25x50	HP32A332M□YS7
	4 700	0.25	4.52	2.26	45	35x40	HP32A472M□AS5
		0.25	4.66	2.33	45	30x50	HP32A472M□ZS7
	5 600	0.25	4.91	2.45	40	35x40	HP32A562M□AS5
0.25		5.14	2.57	40	35x45	HP32A562M□AS6	
6 800	0.25	5.90	2.95	35	35x50	HP32A682M□AS7	

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor $\tan \delta$	Ripple Current at 40°C/120Hz [A RMS]	Ripple Current at 85°C/120Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [m Ω]	DxL [mm]	Product Code
160 2C (200)	390	0.15	3.30	1.65	365	22x25	HP32C391M□XS2
	470	0.15	3.82	1.91	305	25x25	HP32C471M□YS2
		0.15	3.88	1.94	305	22x30	HP32C471M□XS3
	560	0.15	4.44	2.22	255	25x30	HP32C561M□YS3
		0.15	4.46	2.23	255	22x35	HP32C561M□XS4
	680	0.15	4.92	2.46	210	25x30	HP32C681M□YS3
		0.15	4.92	2.46	210	30x25	HP32C681M□ZS2
		0.15	5.20	2.60	210	22x40	HP32C681M□XS5
	820	0.15	5.74	2.87	175	25x35	HP32C821M□YS4
		0.15	5.74	2.87	175	30x30	HP32C821M□ZS3
		0.15	5.98	2.99	175	22x45	HP32C821M□XS6
	1 000	0.15	6.34	3.17	145	30x30	HP32C102M□ZS3
		0.15	6.34	3.17	145	35x25	HP32C102M□AS2
		0.15	6.60	3.30	145	25x40	HP32C102M□YS5
		0.15	6.88	3.44	145	22x50	HP32C102M□XS7
	1 200	0.15	7.34	3.67	120	30x35	HP32C122M□ZS4
		0.15	7.34	3.67	120	35x30	HP32C122M□AS3
		0.15	7.56	3.78	120	25x45	HP32C122M□YS6
	1 500	0.15	8.60	4.30	95	30x40	HP32C152M□ZS5
		0.15	8.72	4.36	95	35x35	HP32C152M□AS4
1 800	0.15	9.54	4.77	80	35x35	HP32C182M□AS4	
	0.15	9.84	4.92	80	30x45	HP32C182M□ZS6	
3 300	0.20	16.22	8.11	45	41x61	HP32C332M□BS9	
180 2P (225)	330	0.15	3.04	1.52	375	22x25	HP32P331M□XS2
	390	0.15	3.48	1.74	320	25x25	HP32P391M□YS2
		0.15	3.52	1.76	320	22x30	HP32P391M□XS3
	470	0.15	3.82	1.91	265	25x25	HP32P471M□YS2
		0.15	3.88	1.94	265	22x30	HP32P471M□XS3
	560	0.15	4.46	2.23	225	22x35	HP32P561M□XS4
		0.15	4.46	2.23	225	25x30	HP32P561M□YS3
		0.15	4.46	2.23	225	30x25	HP32P561M□ZS2
	680	0.15	4.92	2.46	185	30x25	HP32P681M□ZS2
		0.15	5.16	2.58	185	25x35	HP32P681M□YS4
		0.15	5.20	2.60	185	22x40	HP32P681M□XS5
	820	0.15	5.74	2.87	155	30x30	HP32P821M□ZS3
		0.15	5.74	2.87	155	35x25	HP32P821M□AS2
		0.15	5.98	2.99	155	22x45	HP32P821M□XS6
		0.15	5.98	2.99	155	25x40	HP32P821M□YS5
	1 000	0.15	6.34	3.17	125	35x25	HP32P102M□AS2
		0.15	6.68	3.34	125	30x35	HP32P102M□ZS4
		0.15	6.90	3.45	125	25x45	HP32P102M□YS6
	1 200	0.15	7.34	3.67	105	35x30	HP32P122M□AS3
		0.15	7.68	3.84	105	30x40	HP32P122M□ZS5
0.15		7.90	3.95	105	25x50	HP32P122M□YS7	
1 500	0.15	8.72	4.36	85	35x35	HP32P152M□AS4	
	0.15	8.98	4.49	85	30x45	HP32P152M□ZS6	
1 800	0.15	9.90	4.95	70	35x40	HP32P182M□AS5	
	0.15	10.04	5.02	70	40x36	HP32P182M□BS4	
200 2D (250)	220	0.15	3.00	1.50	485	22x25	HP32D221M□XS2
	270	0.15	3.30	1.65	395	22x25	HP32D271M□XS2
	330	0.15	3.63	1.82	325	22x25	HP32D331M□XS2
		0.15	3.86	1.93	325	25x25	HP32D331M□YS2
	390	0.15	3.88	1.94	325	22x30	HP32D331M□XS3
		0.15	4.18	2.09	275	25x25	HP32D391M□YS2
	470	0.15	4.22	2.11	275	22x30	HP32D391M□XS3
		0.15	4.90	2.45	230	22x35	HP32D471M□XS4
		0.15	4.90	2.45	230	25x30	HP32D471M□YS3
		0.15	4.90	2.45	230	30x25	HP32D471M□ZS2

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor	Ripple Current at 40°C/120Hz	Ripple Current at 85°C/120Hz I_r	ESR (typ) at 20°C/100Hz	DxL	Product Code
		$\tan \delta$	[A RMS]	[A RMS]	[m Ω]	[mm]	
200 2D (250)	560	0.15	5.36	2.68	190	30x25	HP32D561M□ZS2
		0.15	5.66	2.83	190	22x40	HP32D561M□XS5
		0.15	5.66	2.83	190	25x35	HP32D561M□YS4
	680	0.15	6.30	3.15	160	25x35	HP32D681M□YS4
		0.15	6.30	3.15	160	30x30	HP32D681M□ZS3
		0.15	6.30	3.15	160	35x25	HP32D681M□AS2
		0.15	6.56	3.28	160	22x45	HP32D681M□XS6
	820	0.15	6.88	3.44	130	30x30	HP32D821M□ZS3
		0.15	6.88	3.44	130	35x25	HP32D821M□AS2
		0.15	7.18	3.59	130	25x40	HP32D821M□YS5
	1 000	0.15	8.00	4.00	110	30x35	HP32D102M□ZS4
		0.15	8.06	4.03	110	35x30	HP32D102M□AS3
		0.15	8.62	4.31	110	25x50	HP32D102M□YS7
	1 200	0.15	9.22	4.61	90	30x40	HP32D122M□ZS5
		0.15	9.36	4.68	90	35x35	HP32D122M□AS4
	1 500	0.15	10.84	5.42	75	35x40	HP32D152M□AS5
		0.15	10.98	5.49	75	40x36	HP32D152M□BS4
	1 800	0.15	12.46	6.23	60	40x41	HP32D182M□BS5
		0.15	12.84	6.42	60	35x50	HP32D182M□AS7
	2 200	0.15	13.36	6.68	50	35x50	HP32D222M□AS7
2 700	0.15	13.11	6.56	50	35x50	HP32D272M□AS7	
250 2E (300)	220	0.15	3.00	1.50	485	22x25	HP32E221M□XS2
	270	0.15	3.48	1.74	395	25x25	HP32E271M□YS2
		0.15	3.52	1.76	395	22x30	HP32E271M□XS3
	330	0.15	4.10	2.05	325	25x30	HP32E331M□YS3
		0.15	4.12	2.06	325	22x35	HP32E331M□XS4
	390	0.15	4.48	2.24	275	22x35	HP32E391M□XS4
		0.15	4.48	2.24	275	25x30	HP32E391M□YS3
		0.15	4.48	2.24	275	30x25	HP32E391M□ZS2
	470	0.15	4.92	2.46	230	30x25	HP32E471M□ZS2
		0.15	5.16	2.58	230	22x40	HP32E471M□XS5
		0.15	5.16	2.58	230	25x35	HP32E471M□YS4
		0.15	5.24	2.62	230	35x25	HP32E471M□AS2
	560	0.15	5.64	2.82	190	25x35	HP32E561M□YS4
		0.15	5.70	2.85	190	30x30	HP32E561M□ZS3
		0.15	5.70	2.85	190	35x25	HP32E561M□AS2
		0.15	5.92	2.96	190	25x40	HP32E561M□YS5
		0.15	6.18	3.09	190	22x50	HP32E561M□XS7
	680	0.15	6.62	3.31	160	30x35	HP32E681M□ZS4
		0.15	6.62	3.31	160	35x30	HP32E681M□AS3
		0.15	6.80	3.40	160	22x50	HP32E681M□XS7
		0.15	6.84	3.42	160	25x45	HP32E681M□YS6
	820	0.15	7.28	3.64	130	35x30	HP32E821M□AS3
		0.15	7.64	3.82	130	30x40	HP32E821M□ZS5
		0.15	7.80	3.90	130	25x50	HP32E821M□YS7
	1 000	0.15	8.43	4.21	110	30x40	HP32E102M□ZS5
		0.15	8.54	4.27	110	35x35	HP32E102M□AS4
		0.15	8.80	4.40	110	30x45	HP32E102M□ZS6
		0.15	8.93	4.47	110	35x40	HP32E102M□AS5
	1 200	0.15	9.68	4.84	90	35x40	HP32E122M□AS5
		0.15	9.82	4.91	90	40x36	HP32E122M□BS4
		0.15	10.00	5.00	90	30x50	HP32E122M□ZS7
	1 500	0.15	11.31	5.65	75	35x45	HP32E152M□AS6
		0.15	11.64	5.82	75	40x41	HP32E152M□BS5
0.15		11.74	5.87	75	35x50	HP32E152M□AS7	
1 800	0.15	12.85	6.42	60	35x50	HP32E182M□AS7	
	0.15	13.44	6.72	60	40x51	HP32E182M□BS7	
2 200	0.15	12.96	6.48	50	35x60	HP32E222M□AS9	

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor $\tan \delta$	Ripple Current at 40°C/120Hz [A RMS]	Ripple Current at 85°C/120Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [m Ω]	DxL [mm]	Product Code
350 2V (400)	100	0.15	1.68	0.84	1065	22x25	HP32V101M□XS2
		0.15	1.94	0.97	885	25x25	HP32V121M□YS2
	120	0.15	1.96	0.98	885	22x30	HP32V121M□XS3
		0.15	2.16	1.08	710	25x25	HP32V151M□YS2
	150	0.15	2.18	1.09	710	22x30	HP32V151M□XS3
		0.15	2.52	1.26	590	22x35	HP32V181M□XS4
		0.15	2.52	1.26	590	25x30	HP32V181M□YS3
	180	0.15	2.52	1.26	590	30x25	HP32V181M□ZS2
		0.15	2.76	1.38	485	35x25	HP32V221M□AS2
		0.15	2.82	1.41	485	30x25	HP32V221M□ZS2
	220	0.15	2.94	1.47	485	22x40	HP32V221M□XS5
		0.15	2.94	1.47	485	25x35	HP32V221M□YS4
		0.15	3.30	1.65	395	30x30	HP32V271M□ZS3
		0.15	3.30	1.65	395	35x25	HP32V271M□AS2
	270	0.15	3.44	1.72	395	25x40	HP32V271M□YS5
		0.15	3.58	1.79	395	22x50	HP32V271M□XS7
		0.15	3.84	1.92	325	30x35	HP32V331M□ZS4
	330	0.15	3.84	1.92	325	35x30	HP32V331M□AS3
		0.15	3.96	1.98	325	25x45	HP32V331M□YS6
		0.15	4.18	2.09	275	35x30	HP32V391M□AS3
	390	0.15	4.38	2.19	275	30x40	HP32V391M□ZS5
		0.15	4.48	2.24	275	25x50	HP32V391M□YS7
		0.15	4.82	2.41	230	30x40	HP32V471M□ZS5
	470	0.15	4.88	2.44	230	35x35	HP32V471M□AS4
		0.15	5.58	2.79	190	35x40	HP32V561M□AS5
	560	0.15	5.58	2.79	190	40x36	HP32V561M□BS4
		0.15	5.70	2.85	190	30x50	HP32V561M□ZS7
		0.15	6.34	3.17	160	35x45	HP32V681M□AS6
680	0.15	6.38	3.19	160	40x41	HP32V681M□BS5	
	0.15	8.36	4.18	110	40x51	HP32V102M□BS7	
1 000	0.15	8.56	4.28	110	35x60	HP32V102M□AS9	
	0.15	9.72	4.86	90	35x75	HP32V122M□AS12	
1 200	0.15	9.76	4.88	90	35x80	HP32V122M□AS13	
	0.15	9.76	4.88	90	40x61	HP32V122M□BS9	
1 500	0.15	11.04	5.52	78	40x71	HP32V152M□BS11	
	0.15	11.15	5.58	78	35x80	HP32V152M□AS13	
2 200	0.15	15.90	7.95	50	40x110	HP32V222M□BS19	
400 2G (450)	82	0.20	1.78	0.89	1259	20x25	HP32G820M□WS2
		0.20	1.82	0.91	1259	22x25	HP32G820M□XS2
	100	0.20	1.96	0.98	1065	20x25	HP32G101M□WS2
		0.20	2.02	1.01	1065	22x25	HP32G101M□XS2
		0.20	2.08	1.04	1065	20x30	HP32G101M□WS3
		0.20	2.12	1.06	1065	25x25	HP32G101M□YS2
		0.20	2.14	1.07	1065	22x30	HP32G101M□XS3
	120	0.20	2.20	1.10	885	22x25	HP32G121M□XS2
		0.20	2.28	1.14	885	20x30	HP32G121M□WS3
		0.20	2.34	1.17	885	25x25	HP32G121M□YS2
		0.20	2.36	1.18	885	22x30	HP32G121M□XS3
	150	0.20	2.60	1.30	710	25x25	HP32G151M□YS2
		0.20	2.64	1.32	710	22x30	HP32G151M□XS3
		0.20	2.72	1.36	710	20x35	HP32G151M□WS4
		0.20	2.78	1.39	710	22x35	HP32G151M□XS4
		0.20	2.78	1.39	710	25x30	HP32G151M□YS3
		0.20	2.78	1.39	710	30x25	HP32G151M□ZS2
	180	0.20	3.04	1.52	590	22x35	HP32G181M□XS4
		0.20	3.04	1.52	590	25x30	HP32G181M□YS3
		0.20	3.04	1.52	590	30x25	HP32G181M□ZS2
0.20		3.20	1.60	590	25x35	HP32G181M□YS4	
0.20		3.22	1.61	590	22x40	HP32G181M□XS5	

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor	Ripple Current at 40°C/120Hz	Ripple Current at 85°C/120Hz	ESR (typ) at 20°C/100Hz	DxL	Product Code
		$\tan \delta$	[A RMS]	[A RMS]	[m Ω]	[mm]	
400 2G (450)	220	0.20	3.34	1.67	485	25x30	HP32G221M□YS3
		0.20	3.34	1.67	485	30x25	HP32G221M□ZS2
		0.20	3.56	1.78	485	22x40	HP32G221M□XS5
		0.20	3.56	1.78	485	25x35	HP32G221M□YS4
		0.20	3.56	1.78	485	30x30	HP32G221M□ZS3
		0.20	3.56	1.78	485	35x25	HP32G221M□AS2
		0.20	3.72	1.86	485	25x40	HP32G221M□YS5
	270	0.20	3.88	1.94	485	22x50	HP32G221M□XS7
		0.20	3.92	1.96	395	25x35	HP32G271M□YS4
		0.20	3.94	1.97	395	30x30	HP32G271M□ZS3
		0.20	3.94	1.97	395	35x25	HP32G271M□AS2
		0.20	4.14	2.07	395	22x45	HP32G271M□XS6
		0.20	4.14	2.07	395	25x40	HP32G271M□YS5
		0.20	4.18	2.09	395	30x35	HP32G271M□ZS4
	330	0.20	4.18	2.09	395	35x30	HP32G271M□AS3
		0.20	4.32	2.16	395	25x45	HP32G271M□YS6
		0.20	4.36	2.18	325	30x30	HP32G331M□ZS3
		0.20	4.36	2.18	325	35x25	HP32G331M□AS2
		0.20	4.56	2.28	325	25x40	HP32G331M□YS5
		0.20	4.58	2.29	325	30x35	HP32G331M□ZS4
		0.20	4.62	2.31	325	35x30	HP32G331M□AS3
	390	0.20	4.78	2.39	325	22x50	HP32G331M□XS7
		0.20	4.78	2.39	325	25x45	HP32G331M□YS6
		0.20	4.82	2.41	325	30x40	HP32G331M□ZS5
		0.20	4.98	2.49	325	25x50	HP32G331M□YS7
		0.20	5.00	2.50	275	30x35	HP32G391M□ZS4
		0.20	5.02	2.51	275	35x30	HP32G391M□AS3
		0.20	5.20	2.60	275	25x45	HP32G391M□YS6
	470	0.20	5.24	2.62	275	30x40	HP32G391M□ZS5
		0.20	5.32	2.66	275	35x35	HP32G391M□AS4
		0.20	5.42	2.71	275	25x50	HP32G391M□YS7
		0.20	5.50	2.75	275	30x45	HP32G391M□ZS6
		0.20	5.74	2.87	230	30x40	HP32G471M□ZS5
		0.20	5.78	2.89	230	35x35	HP32G471M□AS4
		0.20	6.00	3.00	230	30x45	HP32G471M□ZS6
	560	0.20	6.08	3.04	230	35x40	HP32G471M□AS5
		0.20	6.16	3.08	230	40x36	HP32G471M□BS4
		0.20	6.36	3.18	230	30x50	HP32G471M□ZS7
		0.20	6.31	3.16	190	35x35	HP32G561M□AS4
		0.20	6.56	3.28	190	30x45	HP32G561M□ZS6
		0.20	6.62	3.31	190	35x40	HP32G561M□AS5
		0.20	6.82	3.41	190	30x50	HP32G561M□ZS7
	680	0.20	6.88	3.44	190	35x45	HP32G561M□AS6
		0.20	6.96	3.48	190	40x41	HP32G561M□BS5
		0.20	7.28	3.64	160	35x40	HP32G681M□AS5
		0.20	7.50	3.75	160	30x50	HP32G681M□ZS7
		0.20	7.60	3.80	160	35x45	HP32G681M□AS6
		0.20	7.90	3.95	160	35x50	HP32G681M□AS7
		0.20	8.10	4.05	160	40x35	HP32G681M□BS4
	820	0.20	8.47	4.24	160	35x60	HP32G681M□AS9
		0.20	8.66	4.33	130	35x50	HP32G821M□AS7
		0.20	9.06	4.53	130	40x51	HP32G821M□BS7
	1 000	0.20	9.28	4.64	130	35x60	HP32G821M□AS9
		0.20	10.16	5.08	110	40x61	HP32G102M□BS9
0.20		10.26	5.13	110	35x60	HP32G102M□AS9	
1 200	0.20	10.48	5.24	90	40x81	HP32G122M□BS13	
	0.20	11.77	5.88	90	40x60	HP32G122M□BS9	
	0.20	12.14	6.07	90	40x76	HP32G122M□BS12	
1 500	0.20	13.16	6.58	75	40x81	HP32G152M□BS13	

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor $\tan \delta$	Ripple Current at 40°C/120Hz [A RMS]	Ripple Current at 85°C/120Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [m Ω]	DxL [mm]	Product Code
420 420V (470)	68	0.20	1.60	0.80	1620	20x25	HP3420V680M□WS2
		0.20	1.68	0.84	1620	22x25	HP3420V680M□XS2
	82	0.20	1.78	0.89	1340	20x25	HP3420V820M□WS2
		0.20	1.90	0.95	1340	22x30	HP3420V820M□XS3
	100	0.20	2.02	1.01	1100	22x25	HP3420V101M□XS2
		0.20	2.08	1.04	1100	20x30	HP3420V101M□WS3
		0.20	2.14	1.07	1100	25x25	HP3420V101M□YS2
		0.20	2.16	1.08	1100	22x30	HP3420V101M□XS3
	120	0.20	2.29	1.14	915	20x30	HP3420V121M□WS3
		0.20	2.34	1.17	915	25x25	HP3420V121M□YS2
		0.20	2.36	1.18	915	22x30	HP3420V121M□XS3
		0.20	2.44	1.22	915	20x35	HP3420V121M□WS4
		0.20	2.46	1.23	915	25x30	HP3420V121M□YS3
		0.20	2.48	1.24	915	22x35	HP3420V121M□XS4
	150	0.20	2.60	1.30	735	25x25	HP3420V151M□YS2
		0.20	2.64	1.32	735	22x30	HP3420V151M□XS3
		0.20	2.73	1.36	735	20x35	HP3420V151M□WS4
		0.20	2.78	1.39	735	22x35	HP3420V151M□XS4
		0.20	2.78	1.39	735	25x30	HP3420V151M□YS3
		0.20	2.78	1.39	735	30x25	HP3420V151M□ZS2
		0.20	2.90	1.45	735	25x35	HP3420V151M□YS4
		0.20	2.92	1.46	735	22x40	HP3420V151M□XS5
	180	0.20	3.04	1.52	610	25x30	HP3420V181M□YS3
		0.20	3.04	1.52	610	30x25	HP3420V181M□ZS2
		0.20	3.06	1.53	610	22x35	HP3420V181M□XS4
		0.20	3.22	1.61	610	22x40	HP3420V181M□XS5
		0.20	3.22	1.61	610	35x25	HP3420V181M□AS2
		0.20	3.24	1.62	610	30x30	HP3420V181M□ZS3
		0.20	3.34	1.67	610	22x45	HP3420V181M□XS6
		0.20	3.34	1.67	610	25x40	HP3420V181M□YS5
	220	0.20	3.34	1.67	500	30x25	HP3420V221M□ZS2
		0.20	3.54	1.77	500	25x35	HP3420V221M□YS4
		0.20	3.56	1.78	500	22x40	HP3420V221M□XS5
		0.20	3.56	1.78	500	30x30	HP3420V221M□ZS3
		0.20	3.56	1.78	500	35x25	HP3420V221M□AS2
		0.20	3.74	1.87	500	22x45	HP3420V221M□XS6
		0.20	3.76	1.88	500	30x35	HP3420V221M□ZS4
		0.20	3.78	1.89	500	35x30	HP3420V221M□AS3
	270	0.20	3.88	1.94	500	25x45	HP3420V221M□YS6
		0.20	3.90	1.95	407	25x35	HP3420V271M□YS4
		0.20	3.94	1.97	407	30x30	HP3420V271M□ZS3
		0.20	4.00	2.00	407	35x25	HP3420V271M□AS2
		0.20	4.12	2.06	407	25x40	HP3420V271M□YS5
		0.20	4.18	2.09	407	30x35	HP3420V271M□ZS4
		0.20	4.18	2.09	407	35x30	HP3420V271M□AS3
		0.20	4.32	2.16	407	22x50	HP3420V271M□XS7
	330	0.20	4.46	2.23	407	25x50	HP3420V271M□YS7
		0.20	4.58	2.29	335	30x35	HP3420V331M□ZS4
		0.20	4.62	2.31	335	35x30	HP3420V331M□AS3
		0.20	4.78	2.39	335	25x45	HP3420V331M□YS6
		0.20	4.84	2.42	335	30x40	HP3420V331M□ZS5
	390	0.20	4.90	2.45	335	35x35	HP3420V331M□AS4
		0.20	5.02	2.51	283	35x30	HP3420V391M□AS3
		0.20	5.24	2.62	283	30x40	HP3420V391M□ZS5
		0.20	5.28	2.64	283	35x35	HP3420V391M□AS4
		0.20	5.42	2.71	283	25x50	HP3420V391M□YS7
0.20		5.52	2.76	283	35x40	HP3420V391M□AS5	
0.20		5.58	2.79	283	40x36	HP3420V391M□BS4	
		0.20	5.70	2.85	283	30x50	HP3420V391M□ZS7

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor $\tan \delta$	Ripple Current at 40°C/120Hz [A RMS]	Ripple Current at 85°C/120Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [m Ω]	DxL [mm]	Product Code
420 420V (470)	470	0.20	5.79	2.89	235	35x35	HP3420V471M□AS4
		0.20	6.00	3.00	235	30x45	HP3420V471M□ZS6
		0.20	6.04	3.02	235	35x40	HP3420V471M□AS5
		0.20	6.34	3.17	235	35x45	HP3420V471M□AS6
		0.20	6.36	3.18	235	40x41	HP3420V471M□BS5
		0.20	6.56	3.28	235	35x50	HP3420V471M□AS7
	560	0.20	6.62	3.31	200	35x40	HP3420V561M□AS5
		0.20	6.82	3.41	200	30x50	HP3420V561M□ZS7
		0.20	6.88	3.44	200	35x45	HP3420V561M□AS6
		0.20	7.20	3.60	200	35x50	HP3420V561M□AS7
	680	0.20	7.59	3.80	165	35x45	HP3420V681M□AS6
		0.20	7.90	3.95	165	35x50	HP3420V681M□AS7
	820	0.20	8.67	4.33	135	35x50	HP3420V821M□AS7
	1 000	0.20	8.95	4.48	112	40x61	HP3420V102M□BS9
1 500	0.20	11.92	5.96	75	40x86	HP3420V152M□BS14	
450 2W (500)	56	0.20	1.48	0.74	1965	20x25	HP32W560M□WS2
	68	0.20	1.60	0.80	1620	20x25	HP32W680M□WS2
	82	0.20	1.78	0.89	1340	20x25	HP32W820M□WS2
		0.20	1.82	0.91	1340	22x25	HP32W820M□XS2
		0.20	1.90	0.95	1340	20x30	HP32W820M□WS3
		0.20	1.94	0.97	1340	25x25	HP32W820M□YS2
		0.20	1.96	0.98	1340	22x30	HP32W820M□XS3
		0.20	2.02	1.01	1100	22x25	HP32W101M□XS2
	100	0.20	2.08	1.04	1100	20x30	HP32W101M□WS3
		0.20	2.12	1.06	1100	25x25	HP32W101M□YS2
		0.20	2.16	1.08	1100	22x30	HP32W101M□XS3
		0.20	2.22	1.11	1100	20x35	HP32W101M□WS4
		0.20	2.26	1.13	1100	22x35	HP32W101M□XS4
		0.20	2.26	1.13	1100	25x30	HP32W101M□YS3
		0.20	2.26	1.13	1100	30x25	HP32W101M□ZS2
		0.20	2.34	1.17	915	25x25	HP32W121M□YS2
	120	0.20	2.36	1.18	915	22x30	HP32W121M□XS3
		0.20	2.44	1.22	915	20x35	HP32W121M□WS4
		0.20	2.48	1.24	915	25x30	HP32W121M□YS3
		0.20	2.48	1.24	915	30x25	HP32W121M□ZS2
		0.20	2.62	1.31	915	22x40	HP32W121M□XS5
		0.20	2.78	1.39	735	22x35	HP32W151M□XS4
	150	0.20	2.78	1.39	735	25x30	HP32W151M□YS3
		0.20	2.78	1.39	735	30x25	HP32W151M□ZS2
		0.20	2.94	1.47	735	25x35	HP32W151M□YS4
		0.20	2.94	1.47	735	30x30	HP32W151M□ZS3
		0.20	3.06	1.53	735	22x45	HP32W151M□XS6
		0.20	3.04	1.52	610	25x30	HP32W181M□YS3
	180	0.20	3.04	1.52	610	30x25	HP32W181M□ZS2
		0.20	3.22	1.61	610	22x40	HP32W181M□XS5
		0.20	3.22	1.61	610	25x35	HP32W181M□YS4
		0.20	3.22	1.61	610	30x30	HP32W181M□ZS3
		0.20	3.22	1.61	610	35x25	HP32W181M□AS2
		0.20	3.34	1.67	610	25x40	HP32W181M□YS5
0.20		3.52	1.76	610	22x50	HP32W181M□XS7	
0.20		3.54	1.77	500	25x35	HP32W221M□YS4	
220	0.20	3.56	1.78	500	30x30	HP32W221M□ZS3	
	0.20	3.56	1.78	500	35x25	HP32W221M□AS2	
	0.20	3.74	1.87	500	22x45	HP32W221M□XS6	
	0.20	3.74	1.87	500	25x40	HP32W221M□YS5	
	0.20	3.78	1.89	500	30x35	HP32W221M□ZS4	
	0.20	3.88	1.94	500	25x45	HP32W221M□YS6	
0.20	3.90	1.95	500	22x50	HP32W221M□XS7		

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor $\tan \delta$	Ripple Current at 40°C/120Hz [A RMS]	Ripple Current at 85°C/120Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [m Ω]	DxL [mm]	Product Code	
450 2W (500)	270	0.20	3.94	1.97	407	35x25	HP32W271M□AS2	
		0.20	3.94	1.97	407	30x30	HP32W271M□ZS3	
		0.20	4.11	2.06	407	25x40	HP32W271M□YS5	
		0.20	4.18	2.09	407	30x35	HP32W271M□ZS4	
		0.20	4.18	2.09	407	35x30	HP32W271M□AS3	
		0.20	4.31	2.16	407	22x50	HP32W271M□XS7	
		0.20	4.32	2.16	407	25x45	HP32W271M□YS6	
		0.20	4.38	2.19	407	30x40	HP32W271M□ZS5	
	330	0.20	4.44	2.22	407	35x35	HP32W271M□AS4	
		0.20	4.44	2.22	335	25x45	HP32W331M□YS6	
		0.20	4.58	2.29	335	30x35	HP32W331M□ZS4	
		0.20	4.82	2.41	335	30x40	HP32W331M□ZS5	
		0.20	4.90	2.45	335	35x35	HP32W331M□AS4	
		0.20	4.98	2.49	335	25x50	HP32W331M□YS7	
	390	0.20	5.04	2.52	335	30x45	HP32W331M□ZS6	
		0.20	5.02	2.51	283	35x30	HP32W391M□AS3	
		0.20	5.24	2.62	283	30x40	HP32W391M□ZS5	
		0.20	5.28	2.64	283	35x35	HP32W391M□AS4	
		0.20	5.46	2.73	283	30x45	HP32W391M□ZS6	
		0.20	5.52	2.76	283	35x40	HP32W391M□AS5	
	470	0.20	5.58	2.79	283	40x36	HP32W391M□BS4	
		0.20	5.79	2.89	235	35x35	HP32W471M□AS4	
		0.20	6.00	3.00	235	30x45	HP32W471M□ZS6	
		0.20	6.04	3.02	235	35x40	HP32W471M□AS5	
		0.20	6.24	3.12	235	30x50	HP32W471M□ZS7	
		0.20	6.34	3.17	235	35x45	HP32W471M□AS6	
	560	0.20	6.36	3.18	235	40x41	HP32W471M□BS5	
		0.20	6.62	3.31	200	35x40	HP32W561M□AS5	
		0.20	6.82	3.41	200	35x50	HP32W561M□ZS7	
		0.20	6.88	3.44	200	35x45	HP32W561M□AS6	
	680	0.20	7.50	3.75	200	40x51	HP32W561M□BS7	
		0.20	7.59	3.80	165	35x45	HP32W681M□AS6	
		0.20	7.88	3.94	165	35x50	HP32W681M□AS7	
		0.20	8.24	4.12	165	40x51	HP32W681M□BS7	
		0.20	8.38	4.19	165	30x75	HP32W681M□ZS12	
	820	0.20	8.48	4.24	165	35x60	HP32W681M□AS9	
		0.20	9.28	4.64	135	35x60	HP32W821M□AS9	
		0.20	9.70	4.85	135	40x61	HP32W821M□BS9	
		0.20	9.90	4.95	135	35x80	HP32W821M□AS13	
	1 000	0.20	10.74	5.37	110	40x60	HP32W102M□BS9	
		0.20	11.12	5.56	110	40x76	HP32W102M□BS12	
		0.20	11.40	5.70	110	40x81	HP32W102M□BS13	
	1 100	0.20	9.42	4.71	100	40x75	HP32W112M□BS12	
	1 300	0.20	11.70	5.85	85	40x96	HP32W132M□BS16	
	1 500	0.20	12.68	6.34	75	40x100	HP32W152M□BS17	
	1 600	0.20	13.10	6.55	70	40x100	HP32W162M□BS17	
	500 2H (550)	56	0.20	1.30	0.65	2135	25x25	HP32H560M□YS2
			0.20	1.36	0.68	2135	22x30	HP32H560M□XS3
68		0.20	1.58	0.79	1758	22x35	HP32H680M□XS4	
		0.20	1.69	0.85	1458	25x30	HP32H820M□YS3	
82		0.20	1.85	0.92	1458	22x40	HP32H820M□XS5	
		0.20	1.90	0.95	960	30x25	HP32H101M□ZS2	
100		0.20	1.96	0.98	960	25x35	HP32H101M□YS4	
		0.20	2.13	1.07	960	22x45	HP32H101M□XS6	
		0.20	2.20	1.10	800	30x30	HP32H121M□ZS3	
120		0.20	2.20	1.10	800	35x25	HP32H121M□AS2	
		0.20	2.27	1.13	800	25x40	HP32H121M□YS5	
		0.20	2.44	1.22	800	22x50	HP32H121M□XS7	

Rated Voltage Code (Surge Voltage) V_r [V DC]	Capacitance C_r [μ F]	Dissipation factor $\tan \delta$	Ripple Current at 40°C/120Hz [A RMS]	Ripple Current at 85°C/120Hz I_r [A RMS]	ESR (typ) at 20°C/100Hz [m Ω]	DxL [mm]	Product Code
500 2H (550)	150	0.20	2.60	1.30	640	30x35	HP32H151M□ZS4
		0.20	2.64	1.32	640	25x45	HP32H151M□YS6
		0.20	2.86	1.43	640	35x30	HP32H151M□AS3
	180	0.20	2.86	1.43	535	35x30	HP32H181M□AS3
		0.20	3.00	1.50	535	30x40	HP32H181M□ZS5
		0.20	3.04	1.52	535	25x50	HP32H181M□YS7
	220	0.20	3.32	1.66	434	35x35	HP32H221M□AS4
		0.20	3.46	1.73	434	30x45	HP32H221M□ZS6
	270	0.20	3.84	1.92	360	35x40	HP32H271M□AS5
		0.20	3.98	1.99	360	30x50	HP32H271M□ZS7
	330	0.20	4.24	2.12	365	35x40	HP32H331M□AS5
		0.20	4.42	2.21	290	35x45	HP32H331M□AS6
	390	0.20	4.80	2.40	308	35x45	HP32H391M□AS6
		0.20	5.00	2.50	245	35x50	HP32H391M□AS7
	470	0.20	5.88	2.94	210	35x60	HP32H471M□AS9
		0.20	6.20	3.10	210	40x50	HP32H471M□BS7
		0.20	6.28	3.14	210	35x80	HP32H471M□AS13
	560	0.20	7.30	3.65	170	40x76	HP32H561M□BS12
	680	0.20	9.06	4.53	140	40x100	HP32H681M□BS17
	820	0.20	9.38	4.69	140	40x100	HP32H821M□BS17
1 000	0.20	10.36	5.18	100	40x100	HP32H102M□BS17	
1 200	0.20	11.81	5.91	90	40x110	HP32H122M□BS19	

► Life Time Table / Brauchbarkeitsdauer – Tabelle

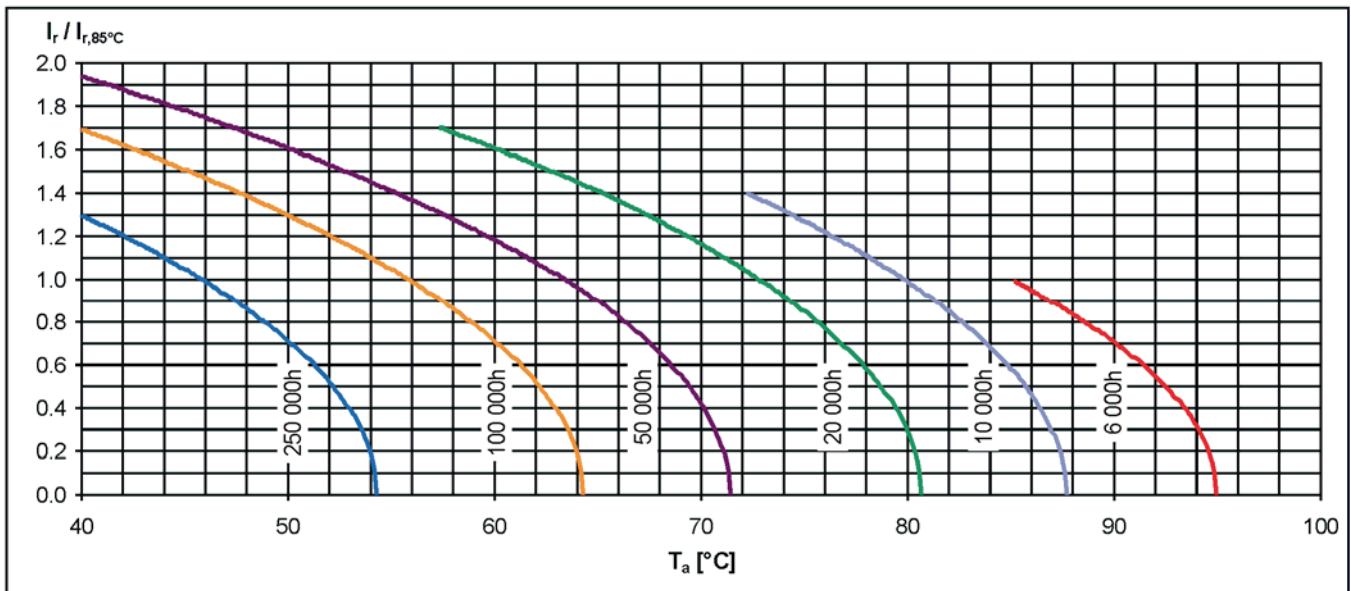
HP3	Useful life as function of ambient temperature and ripple current										
I_r at 85°C	x 1.0	x 1.1	x 1.2	x 1.3	x 1.4	x 1.5	x 1.6	x 1.7	x 1.8	x 1.9	x 2.0
$T_a = 40°C$	250	250	250	250	202	162	127	98	75	56	42
$T_a = 45°C$	250	229	192	158	128	102	80	62	47	36	
$T_a = 50°C$	171	145	121	100	81	65	51	39	30		
$T_a = 55°C$	108	92	77	63	51	41	32	25			
$T_a = 60°C$	68	58	48	40	32	26	20				
$T_a = 65°C$	43	37	31	25	20	16					
$T_a = 70°C$	26	23	19	16	13						
$T_a = 75°C$	16	15	12	10							
$T_a = 80°C$	10	9	8								
$T_a = 85°C$	6										

khrs Max. value limited to 250 000 hours.

► Life Time Graph / Brauchbarkeitsdauer – Diagramm

Useful life depending on ambient temperature T_a and ripple current operating conditions I_r versus rated ripple current at the upper category temperature $I_{r,85°C,120Hz}$

Brauchbarkeitsdauer in Abhängigkeit von Umgebungstemperatur T_u und Wechselstrombelastung I_r im Verhältnis zur max. Wechselstrombelastung bei oberer Kategorietemperatur $I_{r,85°C,120Hz}$



► Life Time Tests and Requirements / Anforderungen Brauchbarkeitsdauer

Life time test	Reference	Test procedure	Life time criteria
Endurance test	JIS-C-5101-4 JIS-C-5102 IEC 60384-4	$T_a = 85°C$; V_r, I_r applied 4000 hours	$\Delta C/C < 15\%$ $\text{Tan}\delta < 175\%$ (of initial value) $I_L = \text{spec. value}$
Useful life	JIS-C-5104-4 IEC 60384-4	$T_a = 85°C$; V_r, I_r applied 6000 hours	$\Delta C/C < 20\%$ $\text{Tan}\delta < 200\%$ (of initial value) $I_L = \text{spec. value}$