

**TYP 299**

200.000 Std. 60°C / 5.000 Std. 105°C

PARAMETERÜBERSICHT	
DESCRIPTION	VALUE
Nominal case size (D x L in mm)	35 x 50 to 45 x 100
Rated capacitance range C <sub>R</sub>	470 µF to 2200 µF
Tolerance on C <sub>R</sub>	± 20 %
Rated voltage range, U <sub>R</sub>	400 V to 450 V
Category temperature range	-40 °C to +105 °C
Endurance test at 105 °C	2000 h
Useful life at 105 °C	5000 h
Shelf life at 0 V, 105 °C	1000 h
Based on sectional specification	IEC 60384-4 / EN 130300
Climatic category IEC 60068	40 / 105 / 56



**Aluminium Elko für die Leistungselektronik**

- Hohe Strombelastbarkeit, vibrations sichere Multipin-Montage.
- Geringer ESR. Kompakte Bauform.
- 4-Pin „Snap-In“ Sockel, 4T-SI.
- Long Life; 105°C Technik.
- Flexible Leistungsanpassung durch erweiterbare Parallel-Schaltung mehrerer Kondensatoren.
- Vereinfachte Lagerhaltung.

**Dimensions in millimeters and available forms**

4-Terminal Snap-In

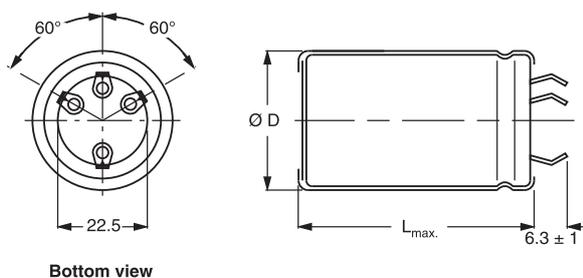


Fig. 2 - 4-Terminal snap-in

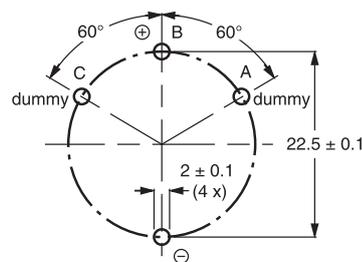


Fig. 3 - Mounting hole diagram

Dummy terminals (A and C) must be free from the electrical circuit.

ELEKTRISCHE KENNWERTE		
PARAMETER	CONDITIONS	VALUE
<b>Voltage</b>		
Surge voltage	≥ 400 V versions	$U_s = 1.1 \times U_R$
Reverse voltage		$U_{rev} \leq 1 \text{ V}$
<b>Current</b>		
Leakage current	After 1 min at U <sub>R</sub>	$I_{L1} \leq 0.006 C_R \times U_R + 4 \mu\text{A}$
	After 5 min at U <sub>R</sub>	$I_{L5} \leq 0.002 C_R \times U_R + 4 \mu\text{A}$
<b>Inductance</b>		
Equivalent series inductance (ESL)	All case sizes	Ca. 20 nH

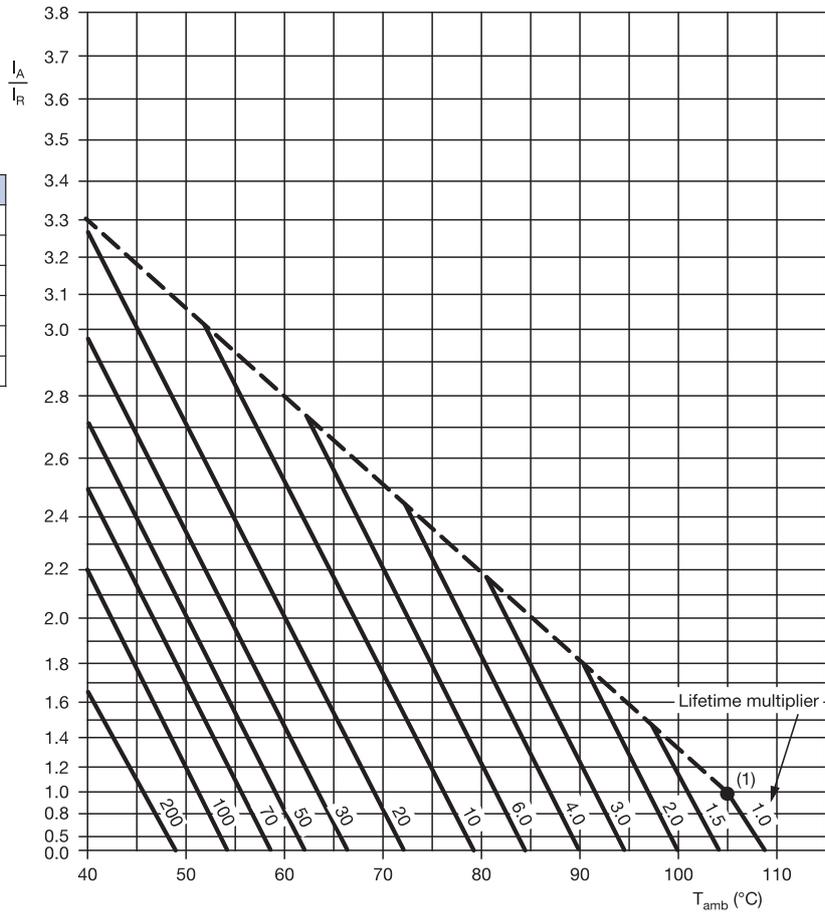
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ELECTRICAL DATA AND ORDERING INFORMATION / WERTETABELLE								
U <sub>R</sub> (V)	C <sub>R</sub> (μF)	NOMINAL CASE SIZE Ø D x L (mm)	I <sub>R</sub> 100 Hz 105 °C (A)	I <sub>L5</sub> 5 min (mA)	TYP. ESR 100 Hz (mΩ)	MAX. ESR 100 Hz (mΩ)	TYP. Z 10 kHz (mΩ)	MAX. Z 10 kHz (mΩ)
400	560	35 x 50	2.70	0.452	170	220	130	160
	680	40 x 40	2.79	0.548	150	190	110	140
	820	35 x 60	3.44	0.660	120	150	90	110
	820	40 x 50	3.51	0.660	120	160	90	110
	1000	35 x 70	3.88	0.804	100	130	70	90
	1200	35 x 80	4.34	0.964	90	110	60	80
	1200	40 x 70	4.50	0.964	90	110	60	80
	1200	45 x 60	4.61	0.964	90	110	60	80
	1500	35 x 100	5.54	1.204	70	90	50	60
	1500	45 x 70	5.20	1.204	70	90	60	70
	1800	40 x 100	6.02	1.444	50	70	40	50
	1800	45 x 80	5.74	1.444	60	80	50	60
	2200	45 x 100	6.77	1.764	50	60	40	50
450	470	35 x 50	2.54	0.427	190	240	130	160
	470	40 x 40	2.45	0.427	190	240	140	170
	560	35 x 60	2.96	0.508	160	200	100	130
	560	40 x 50	3.05	0.508	160	200	110	140
	680	35 x 70	3.34	0.616	120	160	90	110
	820	35 x 80	3.76	0.742	110	140	70	90
	820	40 x 60	3.73	0.742	110	140	80	100
	1000	35 x 100	4.74	0.904	90	110	60	80
	1000	40 x 80	4.41	0.904	90	110	60	80
	1000	45 x 60	4.34	0.904	90	120	60	80
	1200	45 x 70	4.84	1.084	80	100	60	70
	1500	40 x 100	5.67	1.354	60	80	40	50
	1500	45 x 80	5.39	1.354	60	80	50	60
	1800	45 x 100	6.36	1.624	50	70	40	50

GENORMTE PRÜFPARAMETER			
TEST		PROCEDURE (quick reference)	REQUIREMENTS
NAME OF TEST	REFERENCE		
Endurance	IEC 60384-4 / EN130300 subclause 4.13	T <sub>amb</sub> = 105 °C; U <sub>R</sub> applied 2000 h	ΔC/C: ± 10 % ESR ≤ 1.3 x spec. limit Z ≤ 2 x spec. limit I <sub>L5</sub> ≤ spec. limit
Useful life	CECC 30301 subclause 4.13	T <sub>amb</sub> = 105 °C; U <sub>R</sub> and I <sub>R</sub> applied; 5000 h	ΔC/C: ± 30 % ESR ≤ 3 x spec. limit Z ≤ 3 x spec. limit I <sub>L5</sub> ≤ spec. limit no short or open circuit, no visible damage total failure percentage: ≤ 3 %
Shelf life	IEC 60384-4 / EN130300 subclause 4.17	T <sub>amb</sub> = 105 °C; no voltage applied; 1000 h  After test: U <sub>R</sub> to be applied for 30 min 24 h to 48 h before measurement	ΔC/C: ± 10 % ESR ≤ 1.2 x spec. limit I <sub>L5</sub> ≤ 2 x spec. limit

**Brauchbarkeitsdauer in Abhängigkeit von Temperatur, Frequenz und Strombelastung**

FREQUENCY (Hz)	I <sub>R</sub> MULTIPLIER
50	0.9
100	1.0
200	1.2
400	1.3
1000	1.4
10 000	1.5



I<sub>A</sub> = Actual ripple current at 100 Hz  
 I<sub>R</sub> = Actual ripple current at 100 Hz and 105 °C

(1) Useful life at 105 °C and I<sub>R</sub> applied: 5000 h