PEN dielectric - LDE Series

• General technical data

Plates	Aluminium layer deposited by evaporation under vacuum.
Winding	Non inductive type - Stacked technology.
Termination	Three layers: Aluminium, Brass and Tin alloy.
Marking	On packing only.
Climatic category	55/125/56

• Electrical characteristics

Working temperature	-55 to 125° C
Rated voltage (V_R)	50Vdc - 63Vdc - 100Vdc - 250Vdc - 400Vdc - 630Vdc
Category voltage (V_C)	$V_C = V_R$ up to 105° C Decreasing factor of 1.25% per degree C for temperature from 105 to 125° C
Size range	12.06 to 60.54 (special size upon request)
Capacitance range	1000pF to 4.7μF
Capacitance values	E12 Series
Capacitance tolerance	±5% (J); ±10% (K); ±20% (M)
Dissipation factor (tgδ)	0.8% max. (T=25±5°C; f=1kHz)
Dielectric absorption (%)	0.8%
Insulation resistance	≥ 1GΩ for C≤0.33μF ≥400 s for C>0.33μF Test conditions: Temperature: 25±5°C Voltage charge time: 1min Voltage charge: 10Vdc for V_R <100Vdc 100Vdc for V_R ≥100Vdc
Surge voltage test	1.4 × V_R (2 s at 25±5°C)
Solderability	Coverage ≥75% at each end-termination
Max pulse rise time (dv/dt)	100V/μs*

* Higher values available upon request

• Test method and performance

Damp heat (40°C; 93% R.H.; 56 days)	|ΔC/C| ≤7% Dissipation factor change: $\leq 50 \cdot 10^{-4}$ Insulation resistance: ≥50% of limit value
Endurance (125°C; 2000h; 1.25V_C)	|ΔC/C| ≤5% Dissipation factor change: $\leq 50 \cdot 10^{-4}$ Insulation resistance: ≥50% of limit value
Rapid change of temperature (1h at -55°C; 1h at +125°C; cycles No. =1000)	|ΔC/C| ≤5% Insulation resistance: ≥limit value No mechanical damage Δtgδ: $\leq 50 \cdot 10^{-4}$
Resistance to soldering heat	Method: reflow at 230°C max and 50 s more than 210°C Performance: |ΔC/C| ≤3%; Δtgδ: $\leq 50 \cdot 10^{-4}$; I.R.: ≥limit value
Bending	Deflection: 1 to 6 mm. No visible damage on the terminations (pealing) No damage on the body (cracking) |ΔC/C| ≤1%
Long term stability (after two years)	Capacitance change: |ΔC/C| ≤3% size ≤ 22.20 |ΔC/C| ≤2% size > 22.20
Reliability Ref. MIL HDB 217	Failure rate: ≤1 Fit (1 Fit = 1×10^{-9} failures/components × hour)

PEN dielectric - LDE Series

Capacitance values & Voltage range

STANDARD VERSION

Size table

Rated Cap.	50Vdc/40Vac				63Vdc/40Vac		100Vdc/63Vac				250Vdc/120Vac			
	Size code	Carrier tape code	H max [mm]	Part Number	Part Number		Size code	Carrier tape code	H max [mm]	Part Number	Size code	Carrier tape code	H max [mm]	Part Number
1000 pF	18.12	a	1.7	LDECC1100 - A5- -	LDEDC1100 - A5- -		18.12	a	1.7	LDEEC1100 - A5- -	18.12	a	1.7	LDEIC1100 - A5- -
1200 pF	18.12	a	1.7	LDECC1120 - A5- -	LDEDC1120 - A5- -		18.12	a	1.7	LDEEC1120 - A5- -	18.12	a	1.7	LDEIC1120 - A5- -
1500 pF	18.12	a	1.7	LDECC1150 - A5- -	LDEDC1150 - A5- -		18.12	a	1.7	LDEEC1150 - A5- -	18.12	a	1.7	LDEIC1150 - A5- -
1800 pF	18.12	a	1.7	LDECC1180 - A5- -	LDEDC1180 - A5- -		18.12	a	1.7	LDEEC1180 - A5- -	18.12	a	1.7	LDEIC1180 - A5- -
2200 pF	18.12	a	1.7	LDECC1220 - A5- -	LDEDC1220 - A5- -		18.12	a	1.7	LDEEC1220 - A5- -	18.12	a	1.7	LDEIC1220 - A5- -
2700 pF	18.12	a	1.7	LDECC1270 - A5- -	LDEDC1270 - A5- -		18.12	a	1.7	LDEEC1270 - A5- -	18.12	a	1.7	LDEIC1270 - A5- -
3300 pF	18.12	a	1.7	LDECC1330 - A5- -	LDEDC1330 - A5- -		18.12	a	1.7	LDEEC1330 - A5- -	18.12	a	1.7	LDEIC1330 - A5- -
3900 pF	18.12	a	1.7	LDECC1390 - A5- -	LDEDC1390 - A5- -		18.12	a	1.7	LDEEC1390 - A5- -	18.12	a	1.7	LDEIC1390 - A5- -
4700 pF	18.12	a	1.7	LDECC1470 - A5- -	LDEDC1470 - A5- -		18.12	a	1.7	LDEEC1470 - A5- -	18.12	a	1.7	LDEIC1470 - A5- -
5600 pF	18.12	a	1.7	LDECC1560 - A5- -	LDEDC1560 - A5- -		18.12	a	1.7	LDEEC1560 - A5- -	18.12	a	1.7	LDEIC1560 - A5- -
6800 pF	18.12	a	1.7	LDECC1680 - A5- -	LDEDC1680 - A5- -		18.12	a	1.7	LDEEC1680 - A5- -	18.12	a	1.7	LDEIC1680 - A5- -
8200 pF	18.12	a	1.7	LDECC1820 - A5- -	LDEDC1820 - A5- -		18.12	a	1.7	LDEEC1820 - A5- -	18.12	a	1.7	LDEIC1820 - A5- -
0.010 µF	18.12	a	1.7	LDECC2100 - A5- -	LDEDC2100 - A5- -		18.12	a	1.7	LDEEC2100 - A5- -	18.12	a	1.7	LDEIC2100 - A5- -
0.012 µF	18.12	a	1.7	LDECC2120 - A5- -	LDEDC2120 - A5- -		18.12	a	1.7	LDEEC2120 - A5- -	18.12	a	1.7	LDEIC2120 - A5- -
0.015 µF	18.12	a	1.7	LDECC2150 - A5- -	LDEDC2150 - A5- -		18.12	a	1.7	LDEEC2150 - A5- -	18.12	a	1.7	LDEIC2150 - A5- -
0.018 µF	18.12	a	1.7	LDECC2180 - A5- -	LDEDC2180 - A5- -		18.12	a	1.7	LDEEC2180 - A5- -	22.20	a	2.0	LDEID2180 - A5- -
0.022 µF	18.12	a	1.7	LDECC2220 - A5- -	LDEDC2220 - A5- -		18.12	a	1.7	LDEEC2220 - A5- -	22.20	a	2.3	LDEID2220 - A5- -
0.027 µF	18.12	a	1.7	LDECC2270 - A5- -	LDEDC2270 - A5- -		18.12	a	1.7	LDEEC2270 - A5- -	22.20	a	2.7	LDEID2270 - A5- -
0.033 µF	18.12	a	1.7	LDECC2330 - A5- -	LDEDC2330 - A5- -		18.12	a	1.7	LDEEC2330 - A5- -	22.20	a	1.7	LDEID2330 - A5- -
0.039 µF	18.12	a	1.7	LDECC2390 - A5- -	LDEDC2390 - A5- -		18.12	a	1.7	LDEEC2390 - A5- -	22.20	a	1.8	LDEID2390 - A5- -
0.047 µF	18.12	b	2.3	LDECC2470 - A5- -	LDEDC2470 - A5- -		18.12	b	2.3	LDEEC2470 - A5- -	22.20	a	1.8	LDEID2470 - A5- -
0.056 µF	18.12	b	1.9	LDECC2560 - A5- -	LDEDC2560 - A5- -		18.12	b	1.9	LDEEC2560 - A5- -	22.20	a	2.0	LDEID2560 - A5- -
0.068 µF	18.12	b	1.9	LDECC2680 - A5- -	LDEDC2680 - A5- -		18.12	b	1.9	LDEEC2680 - A5- -	22.20	a	2.4	LDEID2680 - A5- -
0.082 µF	18.12	b	2.1	LDECC2820 - A5- -	LDEDC2820 - A5- -		18.12	b	2.1	LDEEC2820 - A5- -	28.24	a	2.3	LDEIE2820 - A5- -
0.10 µF	18.12	b	2.3	LDECC3100 - A5- -	LDEDC3100 - A5- -		18.12	b	2.3	LDEEC3100 - A5- -	28.24	a	2.4	LDEIE3100 - A5- -
0.12 µF	18.12	a	1.7	LDECC3120 - A5- -	LDEDC3120 - A5- -		22.20	a	2.3	LDEED3120 - A5- -	28.24	a	2.7	LDEIE3120 - A5- -
0.15 µF	18.12	a	1.7	LDECC3150 - A5- -	LDEDC3150 - A5- -		22.20	a	1.9	LDEED3150 - A5- -	28.24	a	3.3	LDEIE3150 - A5- -
0.18 µF	18.12	b	2.2	LDECC3180 - A5- -	LDEDC3180 - A5- -		22.20	a	2.0	LDEED3180 - A5- -	40.30	a	2.5	LDEIF3180 - A5- -
0.22 µF	18.12	b	2.3	LDECC3220 - A5- -	LDEDC3220 - A5- -		22.20	a	2.3	LDEED3220 - A5- -	40.30	a	2.8	LDEIF3220 - A5- -
0.27 µF	22.20	a	1.7	LDECD3270 - A5- -	LDEDD3270 - A5- -		22.20	b	2.7	LDEED3270 - A5- -	40.30	a	3.2	LDEIF3270 - A5- -
0.33 µF	22.20	a	1.8	LDECD3330 - A5- -	LDEDD3330 - A5- -		22.20	b	3.2	LDEED3330 - A5- -	40.30	a	3.5	LDEIF3330 - A5- -
0.39 µF	22.20	a	2.1	LDECD3390 - A5- -	LDEDD3390 - A5- -		28.24	a	2.5	LDEEE3390 - A5- -	50.40	a	2.9	LDEIG3390 - A5- -
0.47 µF	22.20	a	2.3	LDECD3470 - A5- -	LDEDD3470 - A5- -		28.24	a	2.9	LDEEE3470 - A5- -	50.40	a	3.3	LDEIG3470 - A5- -
0.56 µF	22.20	b	2.7	LDECD3560 - A5- -	LDEDD3560 - A5- -		28.24	a	3.4	LDEEE3560 - A5- -	50.40	b	3.9	LDEIG3560 - A5- -
0.68 µF	22.20	b	3.1	LDECD3680 - A5- -	LDEDD3680 - A5- -		28.24	a	3.6	LDEEE3680 - A5- -	60.54	a	3.0	LDEIH3680 - A5- -
0.82 µF	28.24	a	2.6	LDECE3820 - A5- -	LDEDE3820 - A5- -		40.30	a	2.5	LDEEF3820 - A5- -	60.54	a	3.4	LDEIH3820 - A5- -
1.0 µF	28.24	a	3.0	LDECE4100 - A5- -	LDEDE4100 - A5- -		40.30	a	3.0	LDEEF4100 - A5- -	60.54	b	4.1	LDEIH4100 - A5- -
1.2 µF	28.24	a	3.5	LDECE4120 - A5- -	LDEDE4120 - A5- -		50.40	a	2.8	LDEEG4120 - A5- -				
1.5 µF	50.40	a	2.9	LDECG4150 - A5- -	LDEDG4150 - A5- -		50.40	a	2.9	LDEEG4150 - A5- -				
1.8 µF	50.40	a	3.1	LDECG4180 - A5- -	LDEDG4180 - A5- -		50.40	a	3.1	LDEEG4180 - A5- -				
2.2 µF	50.40	a	3.7	LDECG4220 - A5- -	LDEDG4220 - A5- -		50.40	a	3.7	LDEEG4220 - A5- -				
2.7 µF	50.40	b	4.5	LDECG4270 - A5- -	LDEDG4270 - A5- -		60.54	a	3.2	LDEEH4270 - A5- -				
3.3 µF	60.54	a	3.6	LDECH4330 - A5- -	LDEDH4330 - A5- -		60.54	a	3.6	LDEEH4330 - A5- -				
3.9 µF	60.54	a	4.2	LDECH4390 - A5- -	LDEDH4390 - A5- -		60.54	a	4.2	LDEEH4390 - A5- -				
4.7 µF	60.54	b	5.0	LDECH4470 - A5- -	LDEDH4470 - A5- -		60.54	b	5.0	LDEEH4470 - A5- -				

Tolerance: J (±5%); K (±10%); M (±20%)

Packing: N (Tape); M (Loose)

Internal use

Size conversion and tolerances

Size code	12.06	12.10	18.12	22.20	28.24	40.30	50.40	60.54
L (mm)	3.2 ±0.3	3.2 ±0.3	4.5 ±0.5	5.7 ±0.5	7.1 ±0.5	10.2 ±0.6	12.7 ±0.6	15.2 ±0.6
W (mm)	1.6 ±0.3	2.5 ±0.3	3.2 ±0.5	5.1 ±0.5	6.1 ±0.5	7.6 ±0.8	10.2 ±0.8	13.7 ±0.8

PEN dielectric - LDE Series

Capacitance values & Voltage range

MINIATURE VERSION

Size table

Rated Cap.	50Vdc/40Vac				63Vdc/40Vac		100Vdc/63Vac				250Vdc/120Vac			
	Size code	Carrier tape code	H max [mm]	Part Number	Part Number		Size code	Carrier tape code	H max [mm]	Part Number	Size code	Carrier tape code	H max [mm]	Part Number
1000 pF	12.06	-	1.1	LDECA1100 - A0- -	LDEDA1100 - A0- -		12.06	-	1.1	LDEEA1100 - A0- -	12.06	-	1.1	LDEIA1100 - A0- -
1200 pF	12.06	-	1.1	LDECA1120 - A0- -	LDEDA1120 - A0- -		12.06	-	1.1	LDEEA1120 - A0- -	12.06	-	1.1	LDEIA1120 - A0- -
1500 pF	12.06	-	1.1	LDECA1150 - A0- -	LDEDA1150 - A0- -		12.06	-	1.1	LDEEA1150 - A0- -	12.06	-	1.1	LDEIA1150 - A0- -
1800 pF	12.06	-	1.1	LDECA1180 - A0- -	LDEDA1180 - A0- -		12.06	-	1.1	LDEEA1180 - A0- -	12.06	-	1.1	LDEIA1180 - A0- -
2200 pF	12.06	-	1.1	LDECA1220 - A0- -	LDEDA1220 - A0- -		12.06	-	1.1	LDEEA1220 - A0- -	12.06	-	1.1	LDEIA1220 - A0- -
2700 pF	12.06	-	1.1	LDECA1270 - A0- -	LDEDA1270 - A0- -		12.06	-	1.1	LDEEA1270 - A0- -	12.06	-	1.1	LDEIA1270 - A0- -
3300 pF	12.06	-	1.1	LDECA1330 - A0- -	LDEDA1330 - A0- -		12.06	-	1.1	LDEEA1330 - A0- -	12.06	-	1.1	LDEIA1330 - A0- -
3900 pF	12.06	-	1.1	LDECA1390 - A0- -	LDEDA1390 - A0- -		12.06	-	1.1	LDEEA1390 - A0- -	12.06	-	1.1	LDEIA1390 - A0- -
4700 pF	12.06	-	1.2	LDECA1470 - A0- -	LDEDA1470 - A0- -		12.06	-	1.2	LDEEA1470 - A0- -	12.06	-	1.2	LDEIA1470 - A0- -
5600 pF	12.06	-	1.1	LDECA1560 - A0- -	LDEDA1560 - A0- -		12.06	-	1.1	LDEEA1560 - A0- -	12.10	-	1.6	LDEIB1560 - A0- -
6800 pF	12.06	-	1.1	LDECA1680 - A0- -	LDEDA1680 - A0- -		12.06	-	1.1	LDEEA1680 - A0- -	12.10	-	1.6	LDEIB1680 - A0- -
8200 pF	12.06	-	1.1	LDECA1820 - A0- -	LDEDA1820 - A0- -		12.06	-	1.1	LDEEA1820 - A0- -	12.10	-	1.8	LDEIB1820 - A0- -
0.010 µF	12.06	-	1.1	LDECA2100 - A0- -	LDEDA2100 - A0- -		12.06	-	1.1	LDEEA2100 - A0- -	12.10	-	2.0	LDEIB2100 - A0- -
0.012 µF	12.06	-	1.1	LDECA2120 - A0- -	LDEDA2120 - A0- -		12.06	-	1.1	LDEEA2120 - A0- -	12.10	-	2.0	LDEIB2120 - A0- -
0.015 µF	12.06	-	1.2	LDECA2150 - A0- -	LDEDA2150 - A0- -		12.06	-	1.2	LDEEA2150 - A0- -				
0.018 µF	12.06	-	1.1	LDECA2180 - A0- -	LDEDA2180 - A0- -		12.10	-	1.4	LDEEB2180 - A0- -	18.12	a	1.9	LDEIC2180 - A0- -
0.022 µF	12.06	-	1.1	LDECA2220 - A0- -	LDEDA2220 - A0- -		12.10	-	1.5	LDEEB2220 - A0- -	18.12	b	2.2	LDEIC2220 - A0- -
0.027 µF	12.06	-	1.1	LDECA2270 - A0- -	LDEDA2270 - A0- -		12.10	-	1.5	LDEEB2270 - A0- -	18.12	b	2.5	LDEIC2270 - A0- -
0.033 µF	12.06	-	1.2	LDECA2330 - A0- -	LDEDA2330 - A0- -		12.10	-	1.5	LDEEB2330 - A0- -	18.12	b	2.6	LDEIC2330 - A0- -
0.039 µF	12.10	-	2.0	LDECB2390 - A0- -	LDEDB2390 - A0- -		12.10	-	2.0	LDEEB2390 - A0- -				
0.047 µF	12.10	-	2.1	LDECB2470 - A0- -	LDEDB2470 - A0- -		12.10	-	2.1	LDEEB2470 - A0- -				
0.056 µF	12.10	-	1.6	LDECB2560 - A0- -	LDEDB2560 - A0- -									
0.068 µF	12.10	-	1.8	LDECB2680 - A0- -	LDEDB2680 - A0- -									
0.082 µF	12.10	-	2.0	LDECB2820 - A0- -	LDEDB2820 - A0- -						22.20	b	2.8	LDEID2820 - A0- -
0.10 µF	12.10	-	2.1	LDECB3100 - A0- -	LDEDB3100 - A0- -						22.20	b	3.3	LDEID3100 - A0- -
0.12 µF							18.12	b	2.6	LDEEC3120 - A0- -	22.20	c	4.0	LDEID3120 - A0- -
0.15 µF														
0.18 µF											28.24	b	3.9	LDEIE3180 - A0- -
0.22 µF											28.24	b	4.5	LDEIE3220 - A0- -
0.27 µF											28.24	c	5.4	LDEIE3270 - A0- -
0.33 µF														
0.39 µF							22.20	c	3.6	LDEED3390 - A0- -	40.30	b	4.4	LDEIF3390 - A0- -
0.47 µF							22.20	c	4.2	LDEED3470 - A0- -	40.30	c	5.3	LDEIF3470 - A0- -
0.56 µF							22.20	c	4.4	LDEED3560 - A0- -	40.30	c	5.7	LDEIF3560 - A0- -
0.68 µF											50.40	b	4.5	LDEIG3680 - A0- -
0.82 µF	22.20	c	3.7	LDECD3820 - A0- -	LDEDD3820 - A0- -		28.24	b	4.5	LDEEE3820 - A0- -	50.40	c	5.5	LDEIG3820 - A0- -
1.0 µF	22.20	c	4.2	LDECD4100 - A0- -	LDEDD4100 - A0- -		28.24	c	5.4	LDEEE4100 - A0- -				
1.2 µF							40.30	b	3.5	LDEEF4120 - A0- -	60.54	b	4.8	LDEIH4120 - A0- -
1.5 µF	28.24	b	4.1	LDECE4150 - A0- -	LDEDE4150 - A0- -		40.30	b	4.4	LDEEF4150 - A0- -	60.54	c	5.7	LDEIH4150 - A0- -
1.8 µF	28.24	c	4.9	LDECE4180 - A0- -	LDEDE4180 - A0- -		40.30	c	5.2	LDEEF4180 - A0- -				
2.2 µF	28.24	c	5.4	LDECE4220 - A0- -	LDEDE4220 - A0- -		40.30	c	5.6	LDEEF4220 - A0- -				
2.7 µF	40.30	b	3.9	LDECF4270 - A0- -	LDEDF4270 - A0- -		50.40	c	4.5	LDEEG4270 - A0- -				
3.3 µF	40.30	c	4.5	LDECF4330 - A0- -	LDEDF4330 - A0- -		50.40	c	5.5	LDEEG4330 - A0- -				
3.9 µF	40.30	c	5.2	LDECF4390 - A0- -	LDEDF4390 - A0- -		50.40	c	5.7	LDEEG4390 - A0- -				
4.7 µF	50.40	b	3.8	LDECG4470 - A0- -	LDEDG4470 - A0- -									

Tolerance: J (±5%); K (±10%); M (±20%)

Packing: N (Tape); M (Loose)

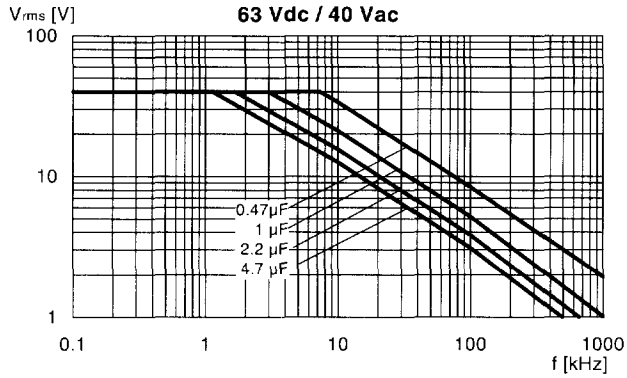
Internal use

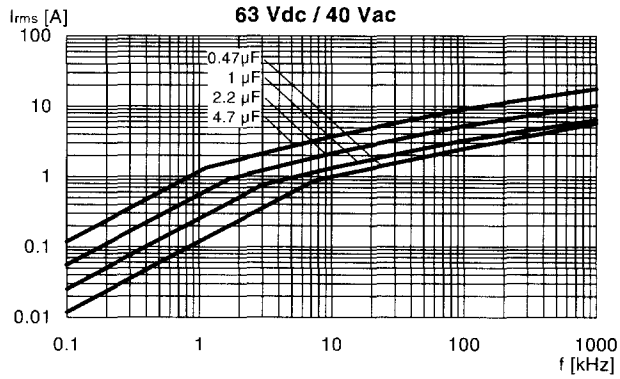
Size conversion and tolerances

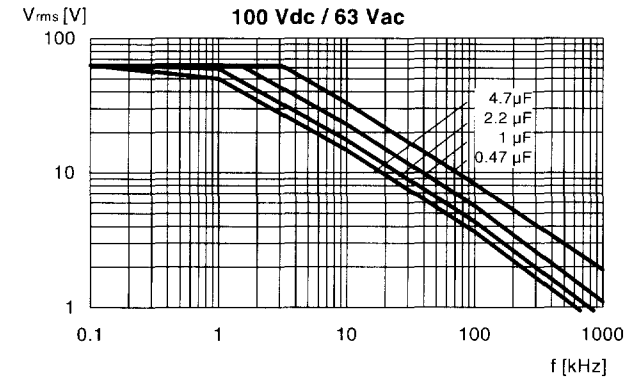
Size code	12.06	12.10	18.12	22.20	28.24	40.30	50.40	60.54
L (mm)	3.2 ±0.3	3.2 ±0.3	4.5 ±0.5	5.7 ±0.5	7.1 ±0.5	10.2 ±0.6	12.7 ±0.6	15.2 ±0.6
W (mm)	1.6 ±0.3	2.5 ±0.3	3.2 ±0.5	5.1 ±0.5	6.1 ±0.5	7.6 ±0.8	10.2 ±0.8	13.7 ±0.8

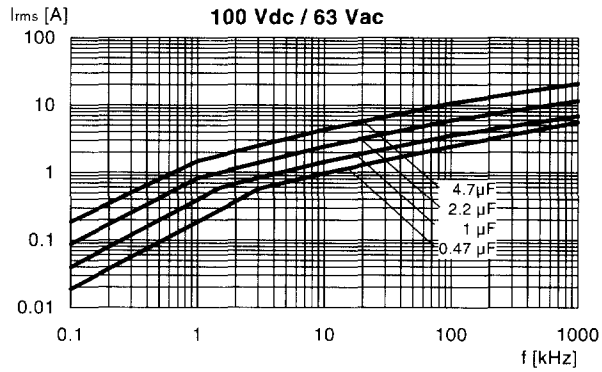
PEN dielectric - LDE Series

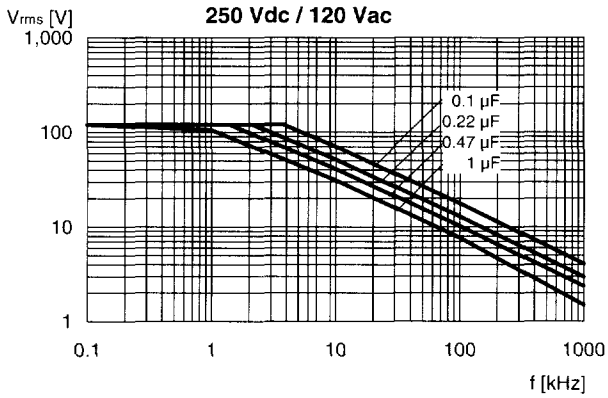
MAX. VOLTAGE (Vr.m.s.) AND CURRENT (Ir.m.s.) VERSUS FREQUENCY
(sinusoidal wave-form / *$T_h \leq 85°C$)

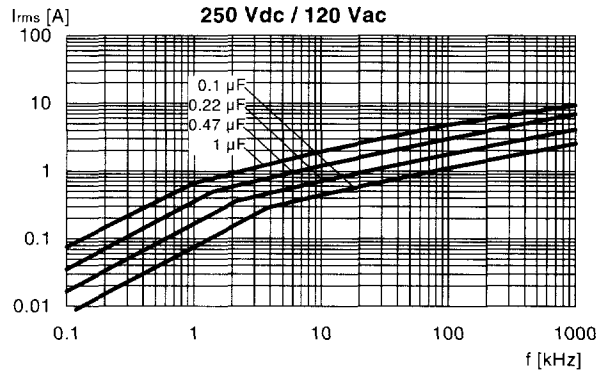












Measure carried out in free air condition.

Note: *T_h = max. ambient temperature surrounding the capacitor or hottest contact point (i.e. tracks), whichever is higher, in the worst operation conditions in °C.

PEN dielectric - LDE Series

High Voltage Series

- **Capacitance values & Voltage range**

Rated Cap.	400Vdc/160Vac Size code	Carrier tape code	H max [mm]	Part Number	630Vdc/200Vac size code	Carrier tape code	H max [mm]	Part Number
1000 pF					22.20	a	1.7	LDEPD1100 - A5- -
1200 pF					22.20	a	1.7	LDEPD1120 - A5- -
1500 pF					22.20	a	2.0	LDEPD1150 - A5- -
1800 pF					22.20	a	2.3	LDEPD1180 - A5- -
2200 pF					22.20	a	1.8	LDEPD1220 - A5- -
2700 pF					22.20	a	2.0	LDEPD1270 - A5- -
3300 pF					22.20	a	2.3	LDEPD1330 - A5- -
3900 pF					22.20	a	1.7	LDEPD1390 - A5- -
4700 pF					22.20	a	1.7	LDEPD1470 - A5- -
5600 pF					22.20	a	1.8	LDEPD1560 - A5- -
6800 pF					22.20	a	2.0	LDEPD1680 - A5- -
8200 pF					22.20	a	2.3	LDEPD1820 - A5- -
0.010 µF					22.20	a	2.7	LDEPD2100 - A5- -
0.012 µF					22.20	b	3.1	LDEPD2120 - A5- -
0.015 µF	22.20	a	1.8	LDEMD2150 - A5- -	22.20	c	3.8	LDEPD2150 - A5- -
0.018 µF	22.20	a	1.9	LDEMD2180 - A5- -	22.20	c	4.3	LDEPD2180 - A5- -
0.022 µF	22.20	a	2.3	LDEMD2220 - A5- -	28.24	a	3.1	LDEPE2220 - A5- -
0.027 µF	22.20	a	2.7	LDEMD2270 - A5- -	28.24	a	3.5	LDEPE2270 - A5- -
0.033 µF	22.20	b	3.1	LDEMD2330 - A5- -	28.24	b	4.4	LDEPE2330 - A5- -
0.039 µF	22.20	c	3.6	LDEMD2390 - A5- -	28.24	c	5.1	LDEPE2390 - A5- -
0.047 µF	22.20	c	4.2	LDEMD2470 - A5- -	40.30	a	3.1	LDEPF2470 - A5- -
0.056 µF	28.24	a	3.1	LDEME2560 - A5- -	40.30	a	3.6	LDEPF2560 - A5- -
0.068 µF	28.24	a	3.5	LDEME2680 - A5- -	40.30	b	4.3	LDEPF2680 - A5- -
0.082 µF	28.24	b	4.3	LDEME2820 - A5- -	40.30	c	5.0	LDEPF2820 - A5- -
0.10 µF	28.24	c	5.1	LDEME3100 - A5- -	40.30	c	5.5	LDEPF3100 - A5- -
0.12 µF	40.30	a	3.4	LDEMF3120 - A5- -	50.40	b	4.3	LDEPG3120 - A5- -
0.15 µF	40.30	b	4.2	LDEMF3150 - A5- -	50.40	c	5.2	LDEPG3150 - A5- -
0.18 µF	40.30	c	4.9	LDEMF3180 - A5- -	50.40	c	5.7	LDEPG3180 - A5- -
0.22 µF	50.40	a	3.5	LDEMG3220 - A5- -	60.54	b	4.8	LDEPH3220 - A5- -
0.27 µF	50.40	b	4.4	LDEMG3270 - A5- -	60.54	c	5.5	LDEPH3270 - A5- -
0.33 µF	50.40	c	5.2	LDEMG3330 - A5- -				
0.39 µF	60.54	a	3.9	LDEMH3390 - A5- -				
0.47 µF	60.54	b	4.5	LDEMH3470 - A5- -				
0.56 µF	60.54	c	5.3	LDEMH3560 - A5- -				

PRELIMINARY

Tolerance: J (±5%); K (±10%); M (±20%)
Packing: N (Tape); M (Loose)
Internal use

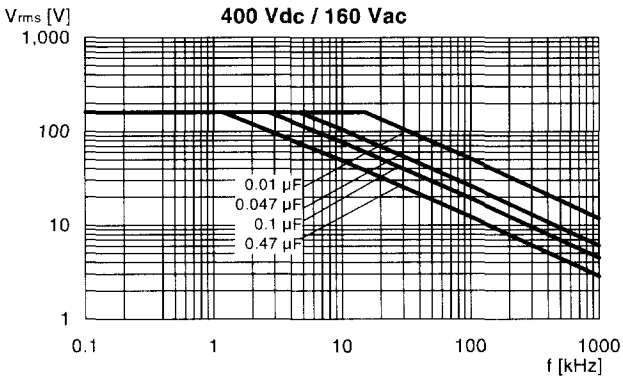
Special for xDSL

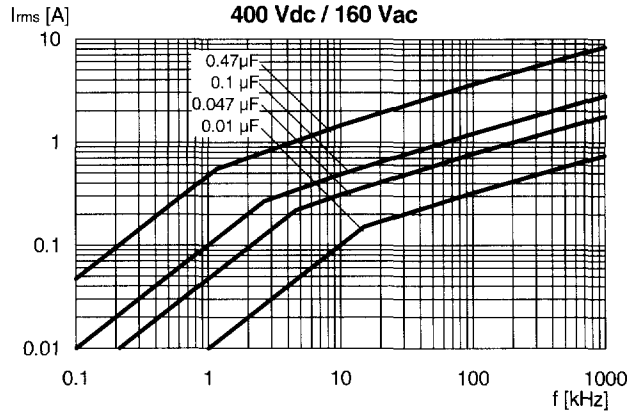
Size conversion and tolerances

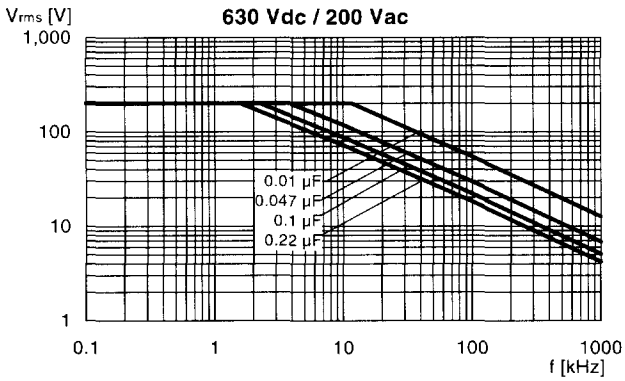
Size code	22.20	28.24	40.30	50.40	60.54
L (mm)	5.7 ±0.5	7.1 ±0.5	10.2 ±0.6	12.7 ±0.6	15.2 ±0.6
W (mm)	5.1 ±0.5	6.1 ±0.5	7.6 ±0.8	10.2 ±0.8	13.7 ±0.8

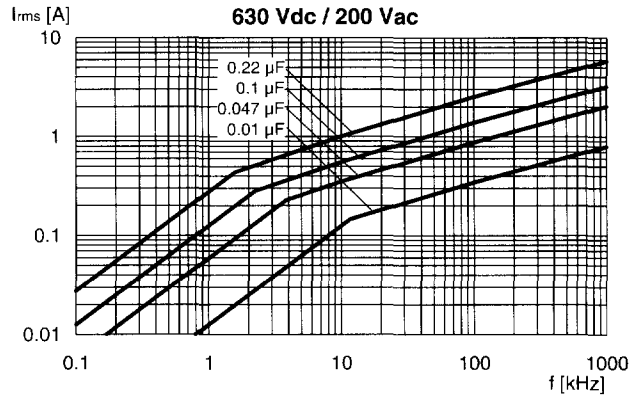
PEN dielectric - LDE Series

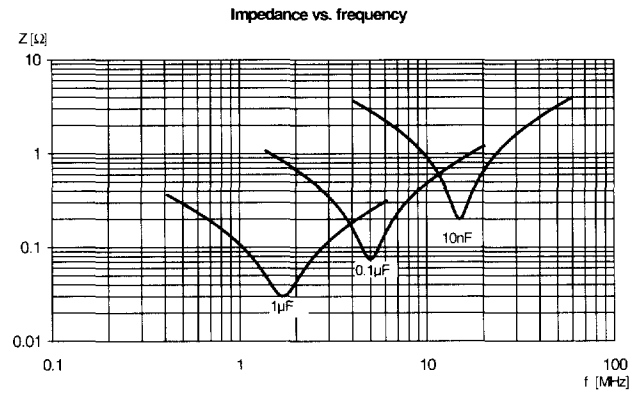
MAX. VOLTAGE (Vr.m.s.) AND CURRENT (Ir.m.s.) VERSUS FREQUENCY
(sinusoidal wave-form / *$T_h \leq 85°C$)











Measure carried out in free air condition.

Note: *T_h = max. ambient temperature surrounding the capacitor or hottest contact point (i.e. tracks), whichever is higher, in the worst operation conditions in °C.

PET H.T. dielectric - LDE Series

• General technical data

Plates	Aluminium layer deposited by evaporation under vacuum.
Winding	Non inductive type - Stacked technology.
Termination	Three layers: Aluminium, Brass and Tin alloy.
Marking	On packing only.
Climatic category	55/125/56

• Electrical characteristics

Working temperature	-55 to 125° C
Rated voltage (V_R)	100Vdc
Category voltage (V_C)	$V_C = V_R$ up to 105° C Decreasing factor of 1.25% per degree C for temperature from 105 to 125° C
Size range	28.24 to 60.54
Capacitance range	1μF to 6.8μF
Capacitance values	E6 Series
Capacitance tolerance	±5% (J); ±10% (K); ±20% (M)
Dissipation factor (tgδ)	0.8% max. (T=25±5°C; f=1kHz)
Dielectric absorption (%)	0.5%
Insulation resistance	≥400 s Test conditions: Temperature: 25±5°C Voltage charge time: 1min Voltage charge: 100Vdc
Surge voltage test	140Vdc (2 s at 25±5°C)
Solderability	Coverage ≥75% at each end-termination
Max pulse rise time (dv/dt)	50V/μs*

* Higher values available upon request.

• Test method and performance

Damp heat (40°C; 93% R.H.; 56 days)	$\lvert\Delta C/C\rvert \leq 7\%$ Dissipation factor change: $\leq 50 \cdot 10^{-4}$ Insulation resistance: ≥50% of limit value
Endurance (125°C; 2000h; 1.25V_C)	$\lvert\Delta C/C\rvert \leq 5\%$ Dissipation factor change: $\leq 50 \cdot 10^{-4}$ Insulation resistance: ≥50% of limit value
Rapid change of temperature (1h at -55°C; 1h at +125°C; cycles No. =1000)	$\lvert\Delta C/C\rvert \leq 5\%$ Insulation resistance: ≥limit value No mechanical damage $\Delta tg\delta$: $\leq 50 \cdot 10^{-4}$
Resistance to soldering heat	Method: reflow at 225°C max and 50 s more than 210°C Performance: $\lvert\Delta C/C\rvert \leq 3\%$; $\Delta tg\delta$: $\leq 50 \cdot 10^{-4}$; I.R.: ≥limit value
Bending	Deflection: 1 to 6 mm. No visible damage on the terminations (pealing) No damage on the body (cracking) $\lvert\Delta C/C\rvert \leq 1\%$
Long term stability (after two years)	Capacitance change: $\lvert\Delta C/C\rvert \leq 2\%$
Reliability Ref. MIL HDB 217	Failure rate: ≤1 Fit (1 Fit = 1×10^{-9} failures/components × hour)

PET H.T. dielectric - LDE Series

• Capacitance values & Voltage range

Rated Cap.	63Vdc/40Vac size code	63Vdc/40Vac H max [mm]	63Vdc/40Vac Part Number	100Vdc/63Vac size code	100Vdc/63Vac H max [mm]	100Vdc/63Vac Carrier tape code	100Vdc/63Vac Part Number	250Vdc/120Vac size code	250Vdc/120Vac H max [mm]	250Vdc/120Vac Part Number
0.018 µF								22.20	1.7	
0.022 µF								22.20	1.7	
0.027 µF								22.20	1.9	
0.033 µF								22.20	2.3	
0.039 µF								22.20	1.7	
0.047 µF								22.20	1.7	
0.056 µF								22.20	1.7	
0.068 µF								22.20	1.9	
0.082 µF								22.20	2.2	
0.10 µF								22.20	2.7	
0.12 µF				22.20	1.6	-		28.24	1.9	
0.15 µF				22.20	1.7	-		28.24	2.3	
0.18 µF				22.20	1.8	-		28.24	2.8	
0.22 µF				22.20	1.9	-		28.24	3.3	
0.27 µF				22.20	2.1	-		40.30	2.3	
0.33 µF	22.20	1.6		22.20	2.4	-		40.30	2.7	
0.39 µF	22.20	1.7		22.20	2.8	-		40.30	3.2	
0.47 µF	22.20	2.0		22.20	3.3	-		40.30	3.8	
0.56 µF	22.20	2.2		28.24	2.3	a	LDEEE3560 - B0- -	50.40	2.7	
0.68 µF	22.20	2.6		28.24	2.8	a	LDEEE3680 - B0- -	50.40	3.3	
0.82 µF	22.20	3.1		28.24	3.3	a	LDEEE3820 - B0- -	60.54	2.4	
1.0 µF	22.20	3.7		28.24	4.0	b	LDEEE4100 - B0- -	60.54	2.9	
1.2 µF	28.24	2.6		28.24	4.8	c	LDEEE4120 - B0- -	60.54	3.5	
1.5 µF	28.24	3.2		40.30	3.3	a	LDEEF4150 - B0- -	60.54	4.3	
1.8 µF	28.24	3.9		40.30	3.8	b	LDEEE4180 - B0- -			
2.2 µF	28.24	4.7		40.30	4.7	c	LDEEF4220 - B0- -			
2.7 µF	40.30	3.2		50.40	3.4	a	LDEEE4270 - B0- -			
3.3 µF	40.30	3.8		50.40	4.2	b	LDEEG4330 - B0- -			
3.9 µF	40.30	4.5		50.40	4.9	c	LDEEE4390 - B0- -			
4.7 µF	50.40	3.2		60.54	3.7	a	LDEEH4470 - B0- -			
5.6 µF	50.40	3.8		60.54	4.4	b	LDEEE4560 - B0- -			
6.8 µF	50.40	4.6		60.54	5.3	c	LDEEH4680 - B0- -			
8.2 µF	60.54	3.4								
10.0 µF	60.54	4.1								

In progress

In progress

In progress

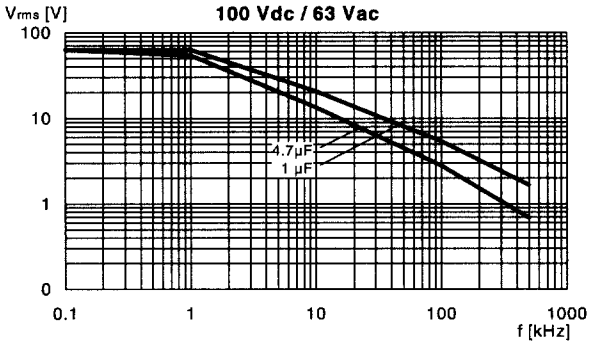
Tolerance: J (±5%); K (±10%); M (±20%)
Packing: N (Tape); M (Loose)
Internal use

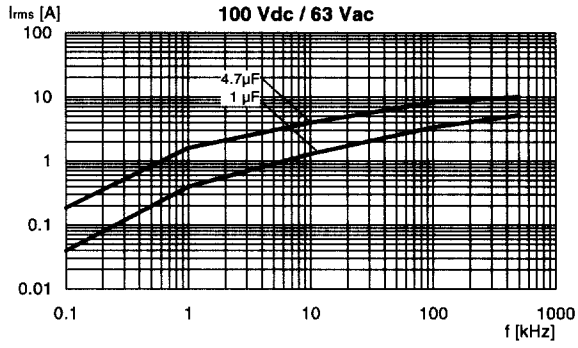
Size conversion and tolerances

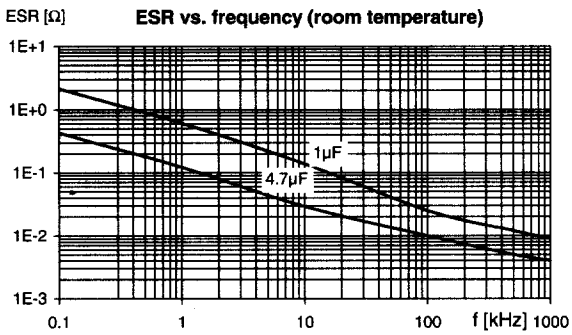
Size code	28.24	40.30	50.40	60.54
L (mm)	7.1 ±0.5	10.2 ±0.6	12.7 ±0.6	15.2 ±0.6
W (mm)	6.1 ±0.5	7.6 ±0.8	10.2 ±0.8	13.7 ±0.8

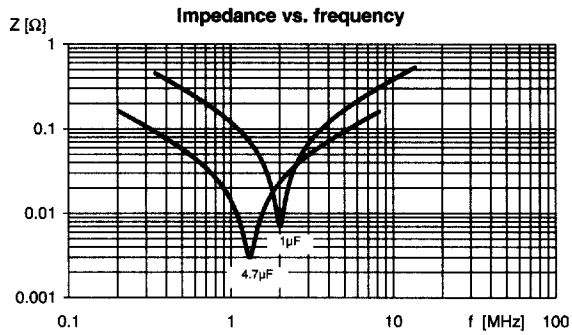
MAX. VOLTAGE (Vr.m.s.) AND CURRENT (Ir.m.s.) VERSUS FREQUENCY

(sinusoidal wave-form / *$T_h \leq 85°C$)









PEN & PET H.T. dielectric - LDE Series

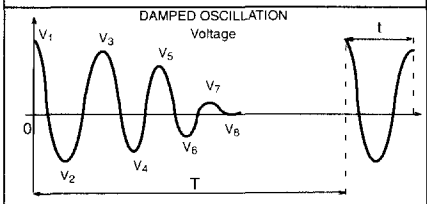
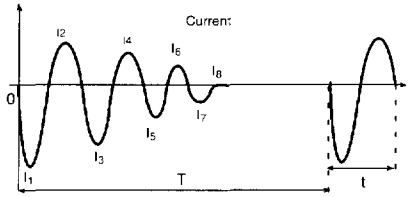
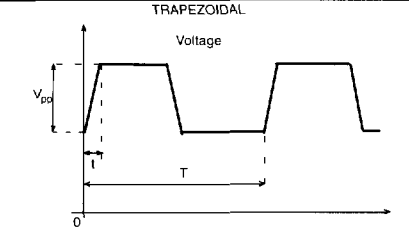
Dissipation (A.C. applications)
When a capacitor is used in A.C. applications at high frequency, internal heating of the capacitor may follow with a possible risk of smoke or fire. This is caused by the heating effect of the current flowing through the internal resistance of the capacitor.The formula used to calculate the max power dissipated by the capacitor is the following:

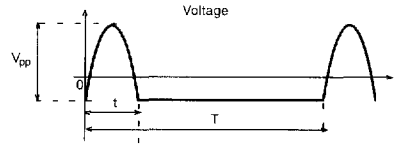
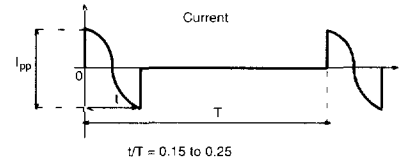
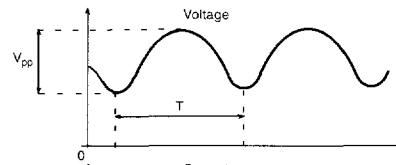
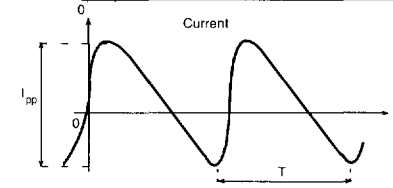
$$P_{cmax} = \sum_{1}^{N}{}_i\, V^2rmsc_i \times 2\pi f_i \times C \times tg\delta_{max}\,(f_i) = \frac{\sum_{1}^{N}{}_i\, I^2rmsc_i}{2\pi f_i \times C} \times tg\delta_{max}\,(f_i)$$

The formula used to calculate the max. power that may be dissipated by the capacitor is:

$$P_{clim} = \frac{\Delta T_{lim}}{R_{th}}$$

It must be $P_{cmax} \leq P_{clim}$

WAVE-FORM	ELECTRICAL PARAMETERS
DAMPED OSCILLATION Voltage  Current 	$V_{rmsc} = \sqrt{\sum_{i=1}^{8} \frac{V_i^2}{2} \frac{t}{2T}}$ $I_{rmsc} = \sqrt{\sum_{i=1}^{8} \frac{I_i^2}{2} \frac{t}{2T}}$ $f = \frac{1}{t}$ $tg\delta_{max}$ at $f = \frac{1}{t}$
TRAPEZOIDAL Voltage 	$V_{rmsc} = V_{pp}\sqrt{\frac{3T-4t}{12T}}$ $f = \frac{1}{T}$ $tg\delta_{max}$ at $f = \frac{1}{4t}$

WAVE-FORM	ELECTRICAL PARAMETERS
Voltage  Current  t/T = 0.15 to 0.25	$V_{rmsc} = \frac{V_{pp}}{1.04}\sqrt{\frac{t}{2T}}$ $I_{rmsc} = \frac{I_{pp/2}}{1.04}\sqrt{\frac{t}{2T}}$ $f = \frac{1}{2t}$ $tg\delta_{max}$ at $f = \frac{1}{2t}$
Voltage  Current 	$V_{rmsc} = \frac{V_{pp}}{2\sqrt{2}}$ $I_{rmsc} = \frac{I_{pp}}{2\sqrt{2}}$ $f = \frac{1}{T}$ $tg\delta_{max}$ at $f = \frac{1}{T}$

Size	H max (mm)	R_{th} (°C/W)
12.06	1.1	175
12.10	2.0	165
18.12	1.7 2.6	157 151
22.20	2.3 3.3 4.2	135 128 122
28.24	3.5 4.5 5.4	114 108 103
40.30	3.6 4.5 5.4	93 88 84
50.40	3.6 4.5 5.4	75 70 66
60.54	3.6 4.5 5.4	58 55 52

Max. overtemperature ΔT_{lim} vs. Th