SMD Power Inductors
CCM 4 1W High Reliability Applications

- Energy storage, smoothing, filtering
- Applied standards: ECSS-Q-70-02, MIL-STD-202, DO-160
- Compliant with esa ESCC 3201/011
- Materials meet UL94-V0 rating
- Suited for I_R and vapor reflow soldering
- Frequency range up to 1 MHz
- Operating temperature range: –55°C to +125°C
- Weight: 5 grams

Electrical Data (25°C)

ID Code	L[1] no load ±5% (µH)	I[2] rated max (A)	I[3] peak max (A)	L[4] at I peak ±10% (µH)	Rdc ±10% (mΩ)
CCM 4 1K0 1W	1.01	8,8	11	0,958	4,58
CCM 4 1K6 1W	1.58	7,3	9,12	1,50	6,62
CCM 4 2K3 1W	2.27	6,2	7,75	2,15	9,23
CCM 4 3K3 1W	3.28	5,8	7,25	3,12	9,2
CCM 4 4K8 1W	4.78	4,4	5,5	4,54	18
CCM 4 6K7 1W	6.70	3,7	4,62	6,37	24
CCM 4 10K 1W	9.97	3,2	4	9,47	37
CCM 4 15K 1W	15.1	2,7	3,37	14,3	42
CCM 4 23K 1W	22.7	2	2,5	21,6	82
CCM 4 33K 1W	33.3	1,87	2,34	31,7	95
CCM 4 46K 1W	45.9	1,51	1,89	43,6	148
CCM 4 69K 1W	68.6	1,28	1,6	65,2	200
CCM 4 M10 1W	101	1,04	1,3	95,8	302
CCM 4 M15 1W	149	0,81	1,01	141	540
CCM 4 M22 1W	219	0,69	0,862	208	700
CCM 4 M33 1W	327	0,59	0,737	310	932
CCM 4 M47 1W	466	0,46	0,575	443	1600
CCM 4 M68 1W	681	0,39	0,487	647	2172
CCM 4 1M0 1W	1000	0,33	0,412	950	3015

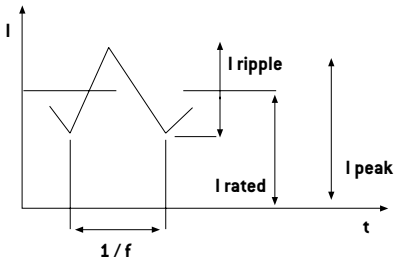
Notes

1. Inductance at 0.25 V, 100 kHz
2. I rated (permanent DC) without heatsink
3. I peak = I rated + I ripple = 150% I rated
   I ripple = 50% I rated at F=500 kHz
4. I peak defined at T env = +85°C and T internal max < +125°C

Iron losses calculated with converter duty cycle $\alpha = 0.25$

Dielectric withstanding 500 Vrms (winding/magnetic core)

Isolation resistance > 1 GΩ (winding/magnetic core)

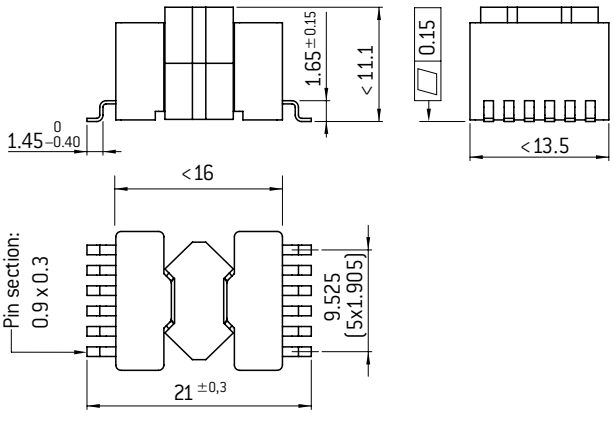


To Order

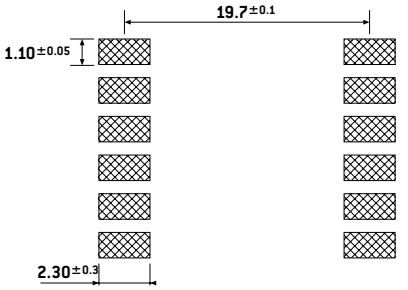
CCM 6 ### #W

CCM	4	###	#	W
SMD Energy Storage Inductor	Size	Value code 1K0 = 1 µH M10 = 100 µH 1M0 = 1000 µH	Version	GW Terminals

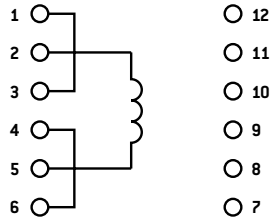
Dimensions
(mm, top view)



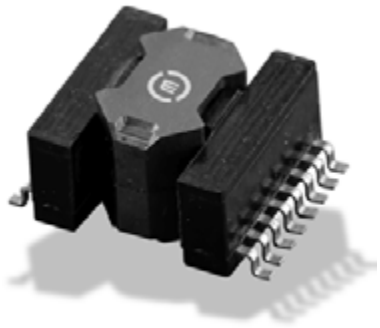
PCB Layout (suggested)



Connections



SMD Power Inductors
CCM 5 1W High Reliability Applications



- Energy storage, smoothing, filtering
- Applied standards: ECSS-Q-70-02, MIL-STD-202, DO-160
- Compliant with esa ESCC 3201/011
- Materials meet UL94-V0 rating
- Suited for I_R and vapor reflow soldering
- Frequency range up to 1 MHz
- Operating temperature range: –55°C to +125°C
- Weight: 7.5 grams

Electrical Data (25°C)

ID Code	L[1] no load ±5% (µH)	I[2] rated max (A)	I[3] peak max (A)	L[4] at I peak ±10% (µH)	Rdc ±10% (mΩ)
CCM 5 1K5 1W	1,50	10,4	13	1,4288	3,46
CCM 5 2K2 1W	2,20	8,9	11,1	2,09	4,66
CCM 5 3K4 1W	3,38	7,6	9,5	3,2148	5,84
CCM 5 4K6 1W	4,61	6,7	8,37	4,3757	7,45
CCM 5 6K8 1W	6,78	5,5	6,87	6,4448	10
CCM 5 10K 1W	10	4,3	5,37	9,5	15
CCM 5 14K 1W	14,4	3,6	4,5	13,68	22
CCM 5 22K 1W	22,5	2,9	3,62	21,375	37
CCM 5 32K 1W	32,4	2,4	3	30,78	50
CCM 5 48K 1W	48,4	1,97	2,46	45,98	69
CCM 5 68K 1W	67,6	1,64	2,05	64,22	101
CCM 5 M10 1W	102	1,35	1,69	97,28	137
CCM 5 M15 1W	152	1,1	1,37	144,495	233
CCM 5 M22 1W	221	0,92	1,15	209,855	348
CCM 5 M33 1W	325	0,76	0,95	308,655	432
CCM 5 M48 1W	476	0,62	0,775	452,295	715
CCM 5 M67 1W	672	0,52	0,650	638,78	966
CCM 5 1M0 1W	1000	0,43	0,537	950	1404
CCM 5 1M5 1W	1490	0,35	0,437	1413,98	2226

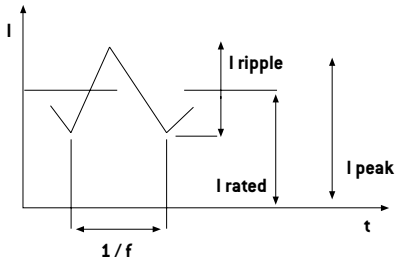
Notes

1. Inductance at 0.25 V, 100 kHz
2. I rated (permanent DC) without heatsink
3. I peak = I rated + I ripple = 150% I rated
   I ripple = 50% I rated at F=500 kHz
4. I peak defined at T env = +85°C and T internal max < +125°C

Iron losses calculated with converter duty cycle $\alpha = 0.25$

Dielectric withstanding 500 Vrms (winding/magnetic core)

Isolation resistance > 1 GΩ (winding/magnetic core)

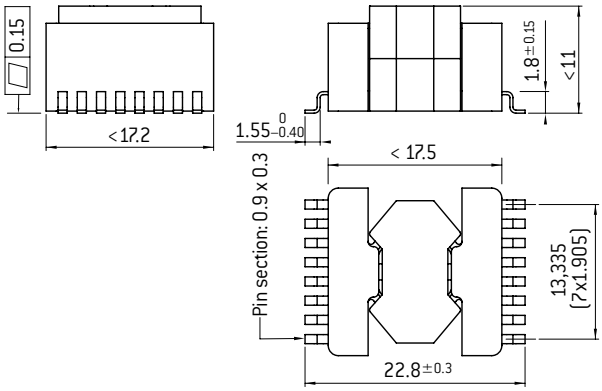


To Order

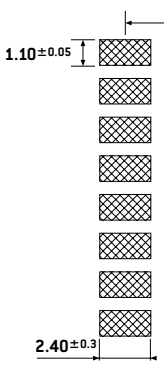
CCM 20 ### #W

CCM	5	###	#	W
SMD Energy Storage Inductor	Size	Value code 1K5 = 1.5 µH M10 = 100 µH 1M0 = 1000 µH	Version	GW Terminals

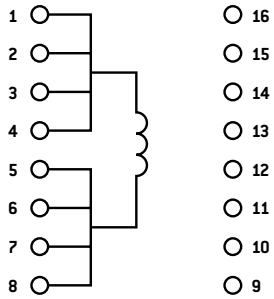
Dimensions
(mm, top view)



PCB Layout (suggested)



Connections



HIGH GRADE PRODUCTS

SMD Power Inductors
CCM 6 1W High Reliability Applications

- Energy storage, smoothing, filtering
- Applied standards: ECSS-Q-70-02, MIL-STD-202, DO-160
- Compliant with esa ESCC 3201/011
- Materials meet UL94-V0 rating
- Suited for I_R and vapor reflow soldering
- Frequency range up to 1 MHz
- Operating temperature range: –55°C to +125°C
- Weight: 12 grams

Electrical Data (25°C)

ID Code	L[1] no load ±5% (µH)	I[2] rated max (A)	I[3] peak max (A)	L[4] at I peak ±10% (µH)	Rdc ±10% (mΩ)
CCM 6 2K2 1W	2,18	10,9	13,6	2,07	2,98
CCM 6 3K4 1W	3,40	8,9	11,1	3,23	4,27
CCM 6 4K7 1W	4,70	7,7	9,63	4,47	4,27
CCM 6 6K7 1W	6,66	6,9	8,63	6,33	6,36
CCM 6 10K 1W	10,2	5,4	6,75	9,73	9,62
CCM 6 15K 1W	15,2	4,3	5,38	14,4	16
CCM 6 22K 1W	21,9	3,7	4,63	20,8	21
CCM 6 33K 1W	32,9	3	3,75	31,3	27
CCM 6 47K 1W	46,2	2,6	3,25	43,9	38
CCM 6 68K 1W	67,0	2,1	2,63	63,7	63
CCM 6 M10 1W	100	1,72	2,15	95,0	97
CCM 6 M15 1W	154	1,42	1,78	146	137
CCM 6 M22 1W	219	1,21	1,51	208	181
CCM 6 M33 1W	324	0,96	1,20	308	307
CCM 6 M47 1W	467	0,83	1,04	443	379
CCM 6 M68 1W	676	0,68	0,850	642	564
CCM 6 1M0 1W	999	0,56	0,700	949	827
CCM 6 1M5 1W	1505	0,45	0,563	1430	1401
CCM 6 2M2 1W	2190	0,38	0,475	2081	1759

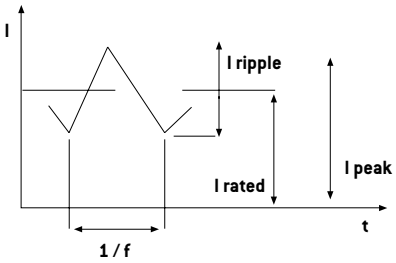
Notes

1. Inductance at 0.25 V, 100 kHz
2. I rated (permanent DC) without heatsink
3. I peak = I rated + I ripple = 150% I rated
   I ripple = 50% I rated at F=500 kHz
4. I peak defined at T env = +85°C and T internal max < +125°C

Iron losses calculated with converter duty cycle $\alpha = 0.25$

Dielectric withstanding 500 Vrms (winding/magnetic core)

Isolation resistance > 1 GΩ (winding/magnetic core)

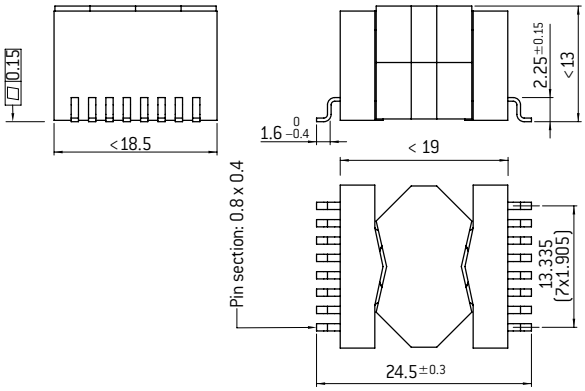


To Order

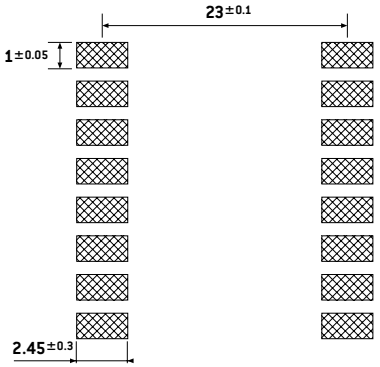
CCM 6 ### #W

CCM	6	###	#	W
SMD Energy Storage Inductor	Size	Value code 4K9 = 4,9 µH M10 = 100 µH 1M0 = 1000 µH	Version	GW Terminals

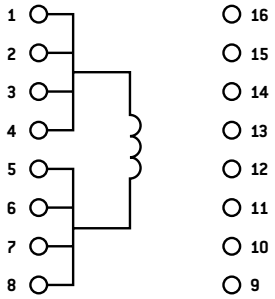
Dimensions
(mm, top view)



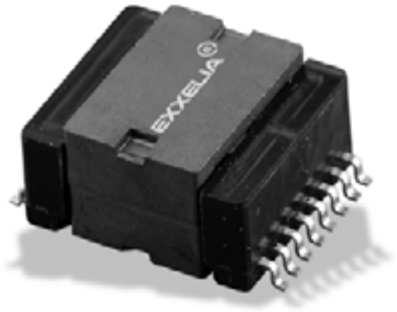
PCB Layout (suggested)



Connections



SMD Power Inductors
CCM 20 1W High Reliability Applications



- Energy storage, smoothing, filtering
- Applied standards: ECSS-Q-70-02, MIL-STD-202, DO-160
- Compliant with esa ESCC 3201/011
- Materials meet UL94-V0 rating
- Suited for I_R and vapor reflow soldering
- Frequency range up to 1 MHz
- Operating temperature range: –55°C to +125°C
- Weight: 21 grams

Electrical Data (25°C)

ID Code	L[1] no load ±5% (µH)	I[2] rated max (A)	I[3] peak max (A)	L[4] at I peak ±10% (µH)	Rdc ±10% (mΩ)
CCM 20 3K3 1W	3.28	15.1	18.9	3.11	2.6
CCM 20 4K7 1W	4.72	12.4	15.5	4.48	3.9
CCM 20 6K8 1W	6.76	11.2	14.0	6.42	4.7
CCM 20 10K 1W	10.24	8.6	10.8	9.73	6.7
CCM 20 15K 1W	15.0	7.4	9.25	14.3	9.1
CCM 20 23K 1W	23.0	5.9	7.38	21.9	13
CCM 20 33K 1W	32.9	4.9	6.13	31.3	18
CCM 20 46K 1W	46.2	4.2	5.25	43.9	26
CCM 20 71K 1W	70.6	3.3	4.13	67.0	41
CCM 20 M10 1W	100	2.8	3.50	95.0	58
CCM 20 M15 1W	154	2.3	2.88	146	83
CCM 20 M22 1W	219	1.93	2.41	208	126
CCM 20 M32 1W	324	1.6	2.00	308	172
CCM 20 M47 1W	467	1.34	1.68	443	244
CCM 20 M68 1W	676	1.09	1.36	642	385
CCM 20 1M0 1W	999	0.9	1.13	949	592
CCM 20 1M5 1W	1505	0.74	0.925	1430	815
CCM 20 2M2 1W	2190	0.61	0.763	2081	1224
CCM 20 3M3 1W	3318	0.49	0.613	3152	1927

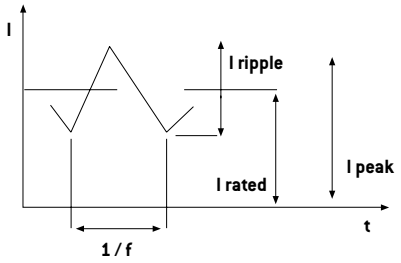
Notes

1. Inductance at 0.25 V, 100 kHz
2. I rated (permanent DC) without heatsink
3. I peak = I rated + I ripple = 150% I rated
   I ripple = 50% I rated at F=500 kHz
4. I peak defined at T env = +85°C and T internal max < +125°C

Iron losses calculated with converter duty cycle $\alpha = 0.25$

Dielectric withstanding 500 Vrms (winding/magnetic core)

Isolation resistance > 1 GΩ (winding/magnetic core)

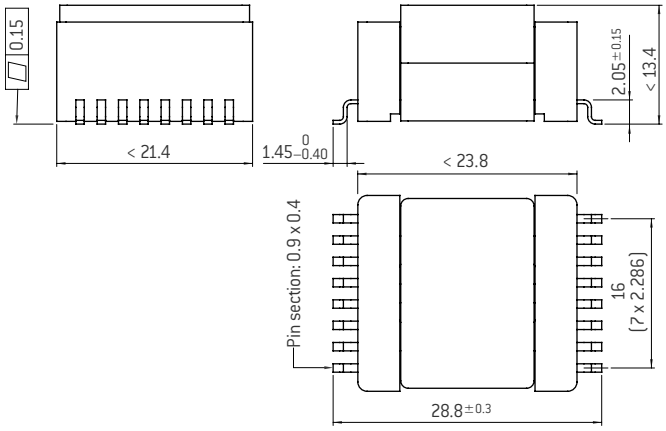


To Order

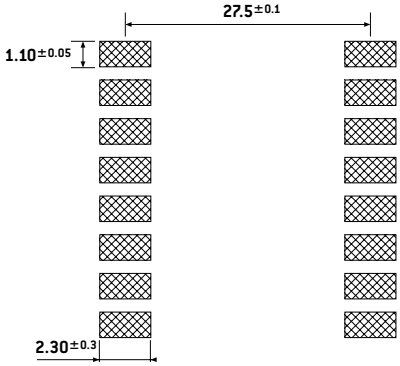
CCM 20 ### #W

CCM	20	###	#	W
SMD Energy Storage Inductor	Size	Value code 3K3 = 3.3 µH M10 = 100 µH 1M0 = 1000 µH	Version	GW Terminals

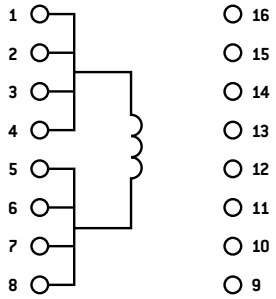
Dimensions
(mm, top view)



PCB Layout (suggested)



Connections



HIGH GRADE PRODUCTS

SMD Power Inductors
CCM 25 1W High Reliability Applications

- Energy storage, smoothing, filtering
- Applied standards: ECSS-Q-70-02, MIL-STD-202, DO-160
- Compliant with esa ESCC 3201/011
- Materials meet UL94-V0 rating
- Suited for I_R and vapor reflow soldering
- Frequency range up to 1 MHz
- Operating temperature range: –55°C to +125°C
- Weight: 21 grams

Electrical Data (25°C)

ID Code	L[1] no load ±5% (µH)	I[2] rated max (A)	I[3] peak max (A)	L[4] at I peak ±10% (µH)	Rdc ±10% (mΩ)
CCM25 4K7 1W	4.70	17.7	22.1	4.47	1.9
CCM25 6K8 1W	6.77	14.9	18.6	6.43	2.7
CCM25 10K 1W	10.2	12.6	15.8	9.73	4.0
CCM25 15K 1W	15.3	10.3	12.9	14.5	6.3
CCM25 22K 1W	22.0	8.6	10.8	20.9	8.8
CCM25 33K 1W	32.9	6.9	8.63	31.3	13
CCM25 46K 1W	46.2	5.9	7.38	43.9	18
CCM25 68K 1W	67.5	4.8	6.00	64.1	30
CCM25 M10 1W	100	4.1	5.13	95.0	44
CCM25 M15 1W	147	3.3	4.13	140	57
CCM25 M22 1W	219	2.8	3.50	208	77
CCM25 M32 1W	324	2.2	2.75	308	130
CCM25 M47 1W	467	1.9	2.38	443	175
CCM25 M68 1W	676	1.6	2.00	642	236
CCM25 1M0 1W	999	1.3	1.625	949	366
CCM25 1M5 1W	1505	1.06	1.325	1430	554
CCM25 2M2 1W	2190	0.87	1.088	2081	844
CCM25 3M3 1W	3318	0.7	0.875	3152	1318
CCM25 4M7 1W	4679	0.6	0.750	4445	1755

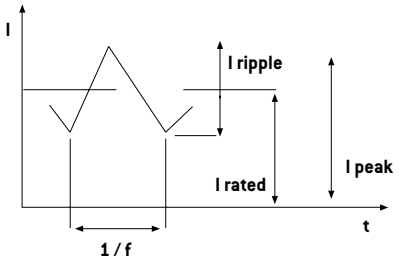
Notes

1. Inductance at 0.25 V, 100 kHz
2. I rated (permanent DC) without heatsink
3. I peak = I rated + I ripple = 150% I rated
   I ripple = 50% I rated at F=500 kHz
4. I peak defined at T env = +85°C and T internal max < +125°C

Iron losses calculated with converter duty cycle $\alpha = 0.25$

Dielectric withstanding 500 Vrms (winding/magnetic core)

Isolation resistance > 1 GΩ (winding/magnetic core)

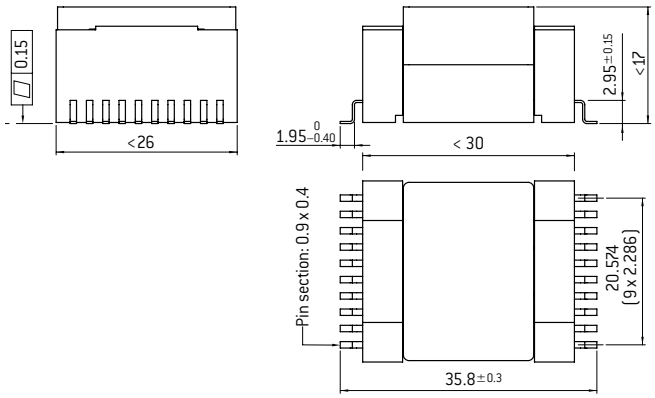


To Order

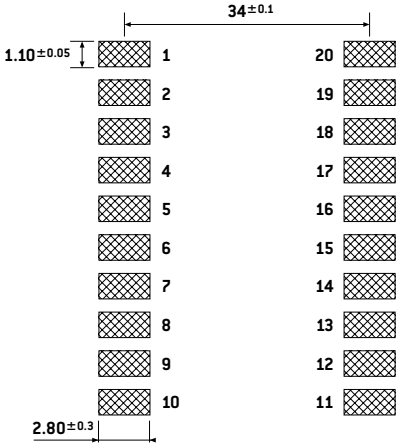
CCM 6 ### #W

CCM	25	###	#	W
SMD Energy Storage Inductor	Size	Value code 4K7 = 4,7 µH M10 = 100 µH 1M0 = 1000 µH	Version	GW Terminals

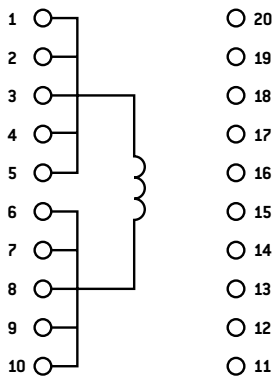
Dimensions
(mm, top view)



PCB Layout (suggested)



Connections



Custom SMPS Transformers CCM Technology

ESCC Technology Flow Certificate for Custom CCM Components ESCC 3201011

- Applied standards: MIL-STD202, ECSS-Q-70, DO-160D,
- Pick and place compatible
- Materials meet UL94-V0 rating
- Temperature range: –55°C +125°C
- RoHS by default, non RoHS upon request
- Meets solderability tests per MIL-STD 202-Method 208
- Jedec Tray
- Alkaline cleaning compatible

The Reference Design show examples of functions that can be designed in each CCM casing, they are design examples. For each custom design, losses and temperature elevation are optimized depending of the chosen CCM casing.

Each transformer meets the specific customer requirements and is the result of a partnership between the engineering teams.

Addressed Markets:

- Space, New Space, Avionic, VTOL and UAV, Defense, Railway, Oil Drilling,
- all harsh environments.

Forward Transformers- CCM Technology

Ref design	DC Input Voltage Range (Vdc)	Output Power (W)	Lp (µH)	DC Outputs (V/I)	Working Frequency (KHz)	Casing / Platform
FW-C6-18-1200	60-115	18	1200	12/1,3-12/0,1	250	**CCM6**
FW-C20-18-224	20-55	18,5	224	12,8/1,3-12,8/0,1	250	**CCM20**
FW-C20-13-503	32	13	503	15/0,6-1,9/1,11-3,3/0,19-5,4/0,11	180	**CCM20**
FWAC-C25-82-80	22-35	82	80	8,4/9,4-13,7/0,045	300/600	**CCM25**
FW-C25-20-4260	50-115	20	4260	13/1,3-13/0,15	250	**CCM25**
FW-C25-20-989	20-65	20	989	13/1,3-13/0,1	250	**CCM25**
FW-C25-110-91	22-38	110	91	24/4,4-5/0,1	200-600	**CCM25**

FW forward Transformer, FWAC Active Clamp Forward Transformer

Push-Pull Transformers- CCM Technology

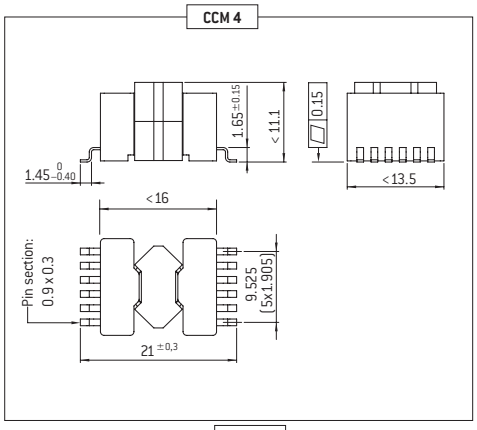
Ref design	DC Input Voltage Range (Vdc)	Output Power (W)	Lp (µH)	DC Outputs (V/I)	Working Frequency (KHz)	Casing / Platform
PP-C4-9-1270	40-68	9,3	1270	3,35/2-12,55/0,05-13,5/0,05	65	**CCM4**
PPCDR-C20-35-565	19-38	35	565	2*3,3/5-4* 6,3 or 12,5/0,03	250	**CCM20**
DIPPA-C20-20	*-	*-	20	2*20µH/2,5+0,5 to 250KHz-12,6/0,04	250	**CCM20**
PP-C20-32-266	26	31,8	266	15/0,75-6/0,4-4,5/0,45-/12/0,9-4,5/0,2	250	**CCM20**
PP-C20-18-3610	90-110	18,5	3610	5/1,4-5/0,15-5/0,05-45/0,001-12/0,03		**CCM20**
PP-C20-17-599	19-42	17,2	599	3,3/2-5/1,75-4* 6,3 or 12/0,03		**CCM20**
DIPPA-C20-91/139	*-	*-	91/139	91µH/1-139µH/0,87+0,13App@250KHz-12,5/0,04		**CCM20**
PP-C20-104-37	17-42	104	37	20/5 to 30/3,3	250	**CCM20**
DIPPA-C20-2x180	*-	*-	2x180	2x180µH+0,12App250KHz	250	**CCM20**

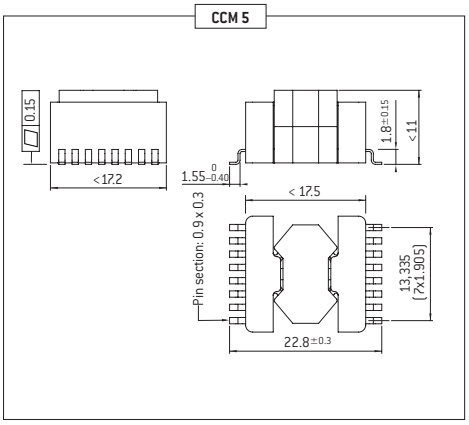
PP Push-Pull Transformer, PPCDR Push-Pull Transformer with Current Doubler Rectifier,
*DIPPA Double Inductor for push-pull transformer and auxillary winding

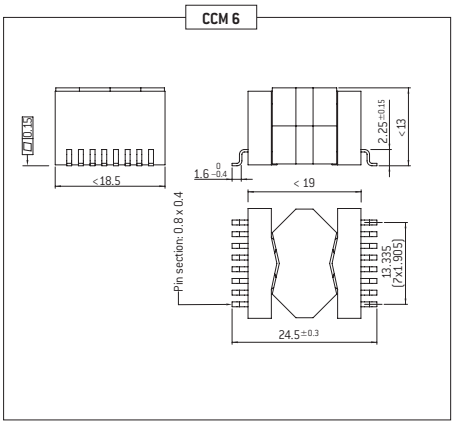
Custom SMPS Transformers CCM Technology

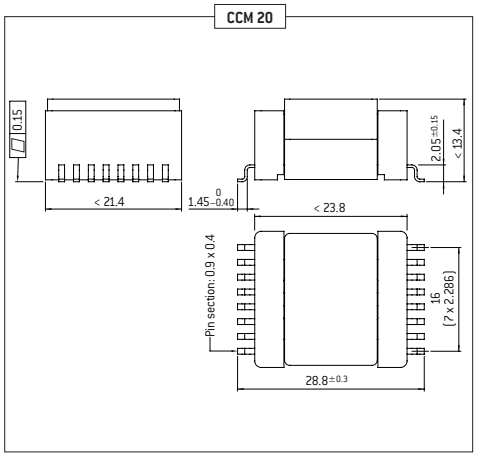
Flyback Transformers- CCM Technology

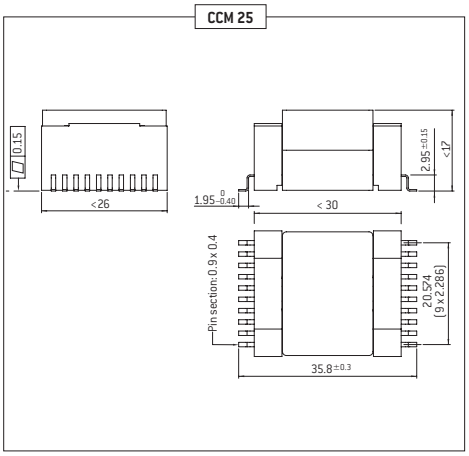
Ref design	DC Input Voltage Range (Vdc)	Output Power (W)	Lp (µH)	DC Outputs (V/I)	Working Frequency (KHz)	Casing / Platform
FC/D-C4-5-52	25-110	5,2	52	9/0,55	400	CCM4
FC-C4-6-52	17-42	5,8	52	12/0,25-12/0,03-6/0,15-6/0,15	250	CCM4
FD-C5-3-25,6	15-80	3,5	25,6	2*3,3/0,07-2*5,2/0,07-12,1/0,01	250	CCM5
FC-C5-10-46	26-29	10	46	7,45/0,9-7,5/0,35-7,25/0,005	175	CCM5
FD-C6-6-60	84-110	6,1	60	6,8/0,9-12,7/0,08-12,9/0,02		CCM6
FD-C6-16-25,6	24-30	15,7	25,6	3,3/1,3-6,9/0,4-12/0,4-6,9/0,15	125	CCM6
FD-C6-20-3844	250-310	20	3844	26/0,01-38/0,5	83	CCM6
FC-C6-8-454	40-60	8,1	454	12/0,05-4,5/0,6-7,5/0,035	300	CCM6
FD-C20-36-160	65-200	36	160	15/0,58-15/0,12-15/0,18-4,5/0,35	150	CCM20
FD-C20-14-100	84-110	14,4	100	6,8/2-12,6/0,1-12,6/0,025	100	CCM20
FD-C20-31-25	35-100	31,4	25	2,5/3,3-4,5/1,5-4*15/0,1-	150	CCM20
FD-C20-33-41	94-110	33,4	41	4,5/3,1-2*12,5/0,6-3*11,5/0,2	130	CCM20
FC-C20-22-180	45-110	22,4	180	6,6/2,6-15,9/0,1-17,1/0,12-12,5/0,03	120	CCM20
FD-C20-22,71-89	45-110	22,7	89	6,74/1,7-6,74/0,3-5,04/1,7-11,8/0,03-15,22/0,02	120	CCM20
FC-C25-94-25	46-65	94	25	3,35/0,91-7,2/0,1-7,1/0,95-7,1/0,25-2*12,9/2,5-14,8/0,7	130	CCM25
FDC-C25-48-16	20-45	48	16	7,3/2,1-15,2/0,83-18,4/,32-3*18/0,05	130	CCM25
FC-C25-40-64	26-29	40	64	2*4/2,6-11,8/0,04-13,5/0,15-12,7/0,04-25,2/0,5	175	CCM25
FC-C25-17-56	26-29	16,9	56	2*4,5/0,56-2*11,8/0,02-2*14/0,1	175	CCM25
FC-C25-27-81	26-29	27	81	4/1,1-5,75/0,22-2*11,8/0,02-15,3/0,005-20,7/0,9	175	CCM25
FC-C25-33-64	26-29	33,1	64	2*3,93/3,3-11,8/0,04-13,3/0,1-2*13,3/0,04	175	CCM25
FC-C25-90-10	22-37	90	10	30/1,9-7,5/1-4,5/2,5-15/,25-15/0,56	130	CCM25
FC-C25-71-25-	39-65	71	25	12/0,02-14,5/0,025-29,3/2,3-14,5/0,005	130	CCM25











Platform	Weight (g)	Height max. (mm)
CCM4	5	11,1
CCM5	7,5	11
CCM6	12	13
CCM20	21	13,4
CCM25	21	17