

APPLICATION FOR ESCC TECHNOLOGY FLOW QUALIFICATION

Component Title: Custom Magnetics (Inductors, Chokes and Transformers)

Appl. No.

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SCC / ESA Date: 15/02/2020

364

Technology Flow submitted for qualification

Summary Description of Technology flow	Detailed Technology Description	d Flow No.	BASED On Technology			logy		Test Structures	Test Components Proposed for tructures Qualification		
The Technology Flow covers custom magnetic components at Flux/SA for the domain as described in FT08699018-2, PID and QML document.	It includes cust inductors, chok transformers. Combined Mag family (sub- assemblies) are included into the domain.	omized es and netics e not e	Inductors, chokes and tran			transformers.	Air sha ma cus ma	coils, toroids, aped agnetics, stom agnetics	Various topologies covering the do List included into the test reports FT08690279, FT08699017 and int PID. Summary provided into box 1	omain. o the 2.	
Component Manufact	urer 2		Locatio	n of N	/anufa	acturin	a Plant	3	ESCC Sr	ecification used for Qualification	4
Flux A/S Industrivangen 5 4550 Asnaes Denmark			Vianuie		grian	0	Generic:	ESCC3201 issue 7	4		
									Detail/s:	ESCC3201/013 issue 1	
Qualification Report Reference	ce and date:					5	PID used for	manut	facturing Qualific	cation Lot	6
FT08690279 and delta qualif	ication FT086990	17.									
							Ref No:	FT	08690019		
Date: 30/01/2018 at	nd 05/12/2019						Issue:	13			
							Date:	15/	/11/2016		
PID changes since Original O of Qualification.	Qualification or las	at extensi	on	7	Curr	rent Pl	D Verified by			ESA	8
None 🗆									Name of E	xecutive Representative	
Minor*					Ref	No:	FT08869901	5 (Nev	w PID for ESCC	qualified parts)	
Major* ⊠					lssu	e:	4				
Incorporation of ESCC structure and domain definitions, Updates following implementation of audit actions. No changes in the manufacturing process.			Date	э:	05/03/2020						
											9
Current Manufacturing faciliti	es surveyed by:					ES	A		on	05/12/2019	
			(Nan	ne of E	Execut	tive R	esponsible Age	ency)		(Date)	
Satisfactory: Ye	es 🖂	No			Cor	rectiv	e Actions close	d out	Yes 🛛	No 🗆 N/A 🗆	
Report: FLU-AUD-1219 action plan				n 08782241-2,	closu	re verified durin	g teleconference 3 rd February 2019,				
Quality and Reliability Data											10
Evaluation testing performed	Yes 🗌	1	No				Failure an available	alysis	s, DPA, NCCS	Yes 🛛 No 🗆	
CA on 5 different topologies											
Report Ref. No.: Date:				Reports C Flux CA r	A000 eply: r	4175 and CA00 eport 08699023	04176.				
Equivalent Data: Design, Manufacturing and test heritage for space				Additional ESCC Lot	CA to t.	o be performed o	on a sample from the first manufactur	ed			

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ESCC	Component Title:	Custom Magnetics (Inducto	istom Magnetics (Inductors, Chokes and Transformers)			Appl. No.	
	Executive Member:	ESCC / ESA	Date:	15/02/2020	364		
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The undersigned hereby certifies on behalf of the ESCC Executive - that the above information is correct; - that the appropriate documentation has been evaluated; - that full compliance to all ESCC requirements is evidence except as stated in box 15; - that the reports and data are available at the ESCC Executive and therefore applies on behalf of ESA as the responsible Executive Member for ESCC qualification status to be extended to the component(s) listed herein.

Date: 24/03/2020

((Signature of the Executive Coordinator)

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Continuation of Boxes above: 8 different topologies covering the domain have been tested for the initial qualification according to ESCC requirements (3201 issue 7 and 3201/013). 4-5 samples from 40 different component types went through testing representing around 180 samples. Summary of the selected test vehicles can be found here below.

Test vehicles:

Sample Ref	FT Number	Description
S8	14221029-1-B equivalent to 320114221029-1	Power Transformer
S9	14220152-2-B equivalent to 320114220152-2	Output Inductor GK
S11	14171022-2-B equivalent to 320114171022-2	Transformer RM
S16	14110241-2-B equivalent to 320114110241-2	BOB FTPS POWER TRANSFORM
S17	14110133-5-B equivalent to 320114110133-5	Gate Drive Transformer
S24	12240143-1-B equivalent to 320112240143-1	Coupled Inductor
RM topology		

Sample Ref	FT Number	Description
S3	14260122-1-B equivalent to 320114260122-1	Transformer E30-T-5780
S10	14210148-2-B equivalent to 320114210148-2	Transformer
S23	12260014-2-B equivalent to 320112260014-2	EFD Inductor
FED topology	•	·

Sample Ref	FT Number	Description	
S18	14011001-5-B equivalent to 320114011001-5	Balun Transformer Parylene Coated	
Double Aperture Cores topology			

Sample Ref	FT Number	Description
S5	14240255-2-B equivalent to 320114240255-2	Transformer, T207-CMF-TO-250-8
S6	14231004-1-B equivalent to 320114231004-1	Transformer assembly
S7	14230080-1-B equivalent to 320114230080-1	Transformer EFD-3032
S12	14141010-1-B equivalent to 320114141010-1	Preregulator Current Sensor
S13	14121023-2-B equivalent to 320114121023-2	BDR Current Sense Transformer
S14	14120075-3-B equivalent to 320114120075-3	CSO-COME COMMAND TRANSFORMER
S15	14111002-2-B equivalent to 320114111002-2	Current Trafo 1:1:100:100
S20	12401014-2-B equivalent to 320112401014-2	Input Differential Filter
S21	12311053-1-B equivalent to 320112311053-1	Coupled Inductor
S22	12311036-1-B equivalent to 320112311036-1	Buck Converter Inductor
S25	12181014-1-B equivalent to 320112181014-1	Inductor 195µH 1.9A
S26	12171025-4-B equivalent to 320112171025-4	Filter Inductor
S27	12141088-2-B equivalent to 320112141088-2	Input Inductor
S28	12141060-1-B equivalent to 320112141060-1	Inductor
S29	12141041-4-B equivalent to 320112141041-4	CM Choke

S30	12121111-4-B equivalent to 320112121111-4	COIL R10 RA.1401.104.13Z Issue 04
S31	12111034-1-B equivalent to 320112111034-1	I_MEAS
S32	12071003-1-B equivalent to 320112071003-1	Toroidal Inductor
S33	12050016-1-B equivalent to 320112050016-1	Common Mode Choke 2x109.8µH
S34	12041025-2-B equivalent to 320112041025-2	DM Choke 200nH 9,1Adc
S35	12031029-1-B equivalent to 320112031029-1	DM Inductor 2
S36	12021032-1-B equivalent to 320112021032-1	Filter Choke
S37	12011025-1-B equivalent to 320112011025-1	Input filter choke 58uH 0,1A
S40	12021008-1-B equivalent to 320112021008-1	Inductor 102L375

Toroidal topology

Sample Ref	FT Number	Description
S38	12001201-1-B equivalent to 320112001201-1	RF Filter

Aircoils topology

Sample Ref	FT Number	Description
S1	14280056-1-B equivalent to 320114280056-1	IM2 In 68V- 71V, Out 8.5V / 13.5A
S2	14271044-1-B equivalent to 320114271044-1	IM In 100V Out 2.5V 18A
S4	14271043-2-B equivalent to 320114271043-2	IM In 50 V Out 7.75 V 25 A

Integrated Magnetics topology

Sample Ref	FT Number	Description
\$39	12000096-1-B equivalent to 320112000096-1	Amobead 3-2-3W
Ammobead topology		
Sample Ref	FT Number	Description
S19	12800014-1-B equivalent to 320112800014-1	FLUX SMT Series 1280 - EP5 Inductor

SMT EFD

Qualification testing:

Initial internal qualification from Flux (test report FT08690279) followed by additional testing (test report FT08699017) have been performed on the ~180 representative samples listed above to cover as minimum, the requirements from ESCC3201 Chart F4 and ESCC3201/013. The performed testing is summarized in the table below.

ESCC Qualification Test Requirement Ref. ESCC3201 Chart F4 (per ESCC3201/013 issue 1)	Flux Qual Test Details (Performed as per Flux Qualification Test Report)	Flux Qualification Test Report Ref. (Flux Doc 08690279-5)	
SG1			
Themal Shock	ESCC3201 para 8.2 with 25 cycles only. Additional testing per ESCC3201 para 8.2 (100 cycles performed)	para 5.4 Additional delta qualification test per Flux Doc 08699017-1, ESCC Delta Test, para 4.1	
Barometric Pressure - not required	Not required	N/A	
Temperature Rise - not required (performed only during intial qualification testing on any particular component design)	Not required	N/A	
Overload	ESCC3201/013 Annex A ref to para 8.8	para 5.12	
Resistance to Soldering Heat - not required	Not required	N/A	
SG2			
Mechanical Shock	ESCC3201/013 Annex A ref to para 8.10	para 5.10	
Vibration	ESCC3201/013 Annex A ref to para 8.11	para 5.9	
Immersion - not required	Not required	N/A	
Moisture Resistance	ESCC3201/013 Annex A ref to para 8.13 (except DWV performed with 5s application time)	para 5.11	

SG3			
Operating Life	ESCC3201/013 Annex A ref to para 8.14	para 5.13	
Permanence of Marking	MIL-STD-202 method 215 with Demineralized water & 2-propanol (considered equivalent to ESCC3201 para 8.15)	para 5.7	
SG4			
Solderability	ESCC3201/013 Annex A ref to para 8.16	para 5.1	
Terminal Strength	ESCC3201/013 Annex A ref to para 8.17	para 5.8	
other relevant Qual test requirements			
Dielectric Withstanding Voltage (Ref. Moisture Resistance test)	ESCC3201 para 8.3.1.4 with 5s application time only. Additional testing performed per ESCC3201/013 para 2.4 (& ESCC3201 para 8.3.1.4) (with 1 minute application time)	para 5.5 Additional delta qualification test per Flux Doc 08699017-1, ESCC Delta Test, para 4.2	

No failure or measurements out of specification have been observed.

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Non comr					I	13
No:	Specification		Paragraph		Non compliance	
110	opecification	Ion Paragraph Non compliance				
Additional	I I tasks required to achieve full co	I mpliance for ESCC qu	ualification or rationale for acceptability	/ of		
noncompl	iance:					14
N/A						
Executive	Manager Disposition					15
Applicatio	n Approval: Yes 🖂	No 🗆				13
Action / R	emarks:					
Date:						
				B. Sc	hade: Head of Product Ass And Safety Departm	surance