



Page 1 of 21

**CRYSTAL OSCILLATORS, CLASS 2
4MHz TO 100MHz
AHCMOS AND AC MOS COMPATIBLE OUTPUT
RAD-HARD**

BASED ON TYPE RK135

ESCC Detail Specification No. 3503/001

Issue 8	November 2024
---------	---------------



Document Custodian: European Space Agency – see <https://escies.org>

LEGAL DISCLAIMER AND COPYRIGHT

European Space Agency, Copyright © 2024. All rights reserved.

The European Space Agency disclaims any liability or responsibility, to any person or entity, with respect to any loss or damage caused, or alleged to be caused, directly or indirectly by the use and application of this ESCC publication.

This publication, without the prior permission of the European Space Agency and provided that it is not used for a commercial purpose, may be:

- copied in whole, in any medium, without alteration or modification.
- copied in part, in any medium, provided that the ESCC document identification, comprising the ESCC symbol, document number and document issue, is removed.

DOCUMENTATION CHANGE NOTICE

(Refer to <https://escies.org> for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION
1692	Specification upissued to incorporate changes per DCR

TABLE OF CONTENTS

1	GENERAL	5
1.1	SCOPE	5
1.2	APPLICABLE DOCUMENTS	5
1.3	TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS	5
1.4	THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS	5
1.4.1	The ESCC Component Number	5
1.4.1.1	Characteristics Codes	5
1.4.2	Component Type Variants	6
1.5	MAXIMUM RATINGS	7
1.6	PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION	8
1.6.1	Flat Package (FP1) – 14 leads (Variant 01)	8
1.6.2	Flat Package (FP2) – 20 leads (Variant 02)	9
1.6.3	Flat Package (FP3) – 12 leads (Variant 03)	10
1.6.4	Flat Package (FP4) – 16 leads (Variant 04)	11
1.6.5	J-Lead Package (JL2) – 4 leads (Variant 06)	12
1.7	FUNCTIONAL DIAGRAM	13
1.8	MATERIALS AND FINISHES	13
2	REQUIREMENTS	14
2.1	GENERAL	14
2.1.1	Oscillator Class	14
2.1.2	Deviations from the Generic Specification	14
2.1.2.1	Deviations from Qualification and Periodic Tests - Chart F4	14
2.2	MARKING	14
2.3	ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES	14
2.3.1	Room Temperature Electrical Measurements	15
2.3.2	High and Low Temperatures Electrical Measurements	16
2.3.3	Notes to Paras. 2.3.1 and 2.3.2 Room, High and Low Electrical Measurements	17
2.4	PARAMETER DRIFT VALUES	17
2.5	INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS	18
2.6	BURN-IN CONDITIONS	19
2.7	FREQUENCY AGEING CONDITIONS	19
2.8	OPERATING LIFE CONDITIONS	19
2.9	TOTAL DOSE RADIATION TESTING	19
2.9.1	Bias Conditions and Total Dose Level for Total Dose Radiation Testing	19
2.9.2	Electrical Measurements for Total Dose Radiation Testing	20
	APPENDIX A	21

1 GENERAL

1.1 SCOPE

This specification details the ratings, physical and electrical characteristics and test and inspection data for the component type variants and/or the range of components specified below. It supplements the requirements of, and shall be read in conjunction with, the ESCC Generic Specification listed under Applicable Documents.

1.2 APPLICABLE DOCUMENTS

The following documents form part of this specification and shall be read in conjunction with it:

- (a) ESCC Generic Specification No. [3503](#).

1.3 TERMS, DEFINITIONS, ABBREVIATIONS, SYMBOLS AND UNITS

For the purpose of this specification, the terms, definitions, abbreviations, symbols and units specified in ESCC Basic Specification No. [21300](#) shall apply.

1.4 THE ESCC COMPONENT NUMBER AND COMPONENT TYPE VARIANTS

1.4.1 The ESCC Component Number

The ESCC Component Number shall be constituted as follows:

Example: 350300101R100M000000HC

- Detail Specification Reference: 3503001
- Component Type Variant Number: 01 (as required)
- Total Dose Radiation Level Letter (100krad(Si)): R (as required)
- Characteristic code: Nominal Frequency (100MHz): 100M000000 (as required)
- Characteristic code: Output Waveform (AHCMOS): HC (as required)

1.4.1.1 *Characteristics Codes*

Characteristics to be codified as part of the ESCC Component Number shall be as follows:

- (a) Nominal Frequency expressed by means of the following codes. The unit quantity shall be MHz:

Nominal Frequency f_{Nom} (MHz)	Code
X.XXXXXX	XMXXXXXX
XX.XXXXXX	XXMXXXXXX
XXX.XXXXXX	XXXMXXXXXX

- (b) Output Waveform type expressed by means of the following codes:

Output Waveform	Code
AHCMOS	HC
ACMOS	AC

1.4.2 Component Type Variants

The component type variants applicable to this specification are as follows:

Variant Number	Nominal Output Frequency f_{Nom} (MHz)	Case	Nominal Supply Voltage V_{CCNom} (V)	Output Waveform	Terminal Material and Finish	Weight max g	Total Dose Radiation Level Letter
01	4 to 100	FP1	3.3	AHCMOS, ACMOS	D2	5	R [100krad(Si)]
02	4 to 100	FP2	3.3	AHCMOS, ACMOS	D2	5	R [100krad(Si)]
03	4 to 100	FP3	3.3	AHCMOS, ACMOS	D2	5	R [100krad(Si)]
04	4 to 100	FP4	3.3	AHCMOS, ACMOS	D2	5	R [100krad(Si)]
06	4 to 100	JL2	3.3	AHCMOS, ACMOS	D2	2	R [100krad(Si)]

The terminal material and finish shall be in accordance with the requirements of ESCC Basic Specification No. [23500](#).

Total dose radiation level letters are defined in ESCC Basic Specification No. [22900](#). If an alternative radiation test level is specified in the Purchase Order the letter shall be changed accordingly.

1.5 MAXIMUM RATINGS

The maximum ratings shall not be exceeded at any time during use or storage.

Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

Characteristics	Symbols	Maximum Ratings	Unit	Remarks
Supply Voltage	V_{CC}	-0.5 to +7	V	Note 1
Load Impedance	C_L	50	pF	Note 2
Operating Temperature Range	T_{op}	-55 to +110	°C	T_{amb}
Storage Temperature Range	T_{stg}	-55 to +110	°C	
Soldering Temperature	T_{sol}	+260	°C	Note 3

NOTES:

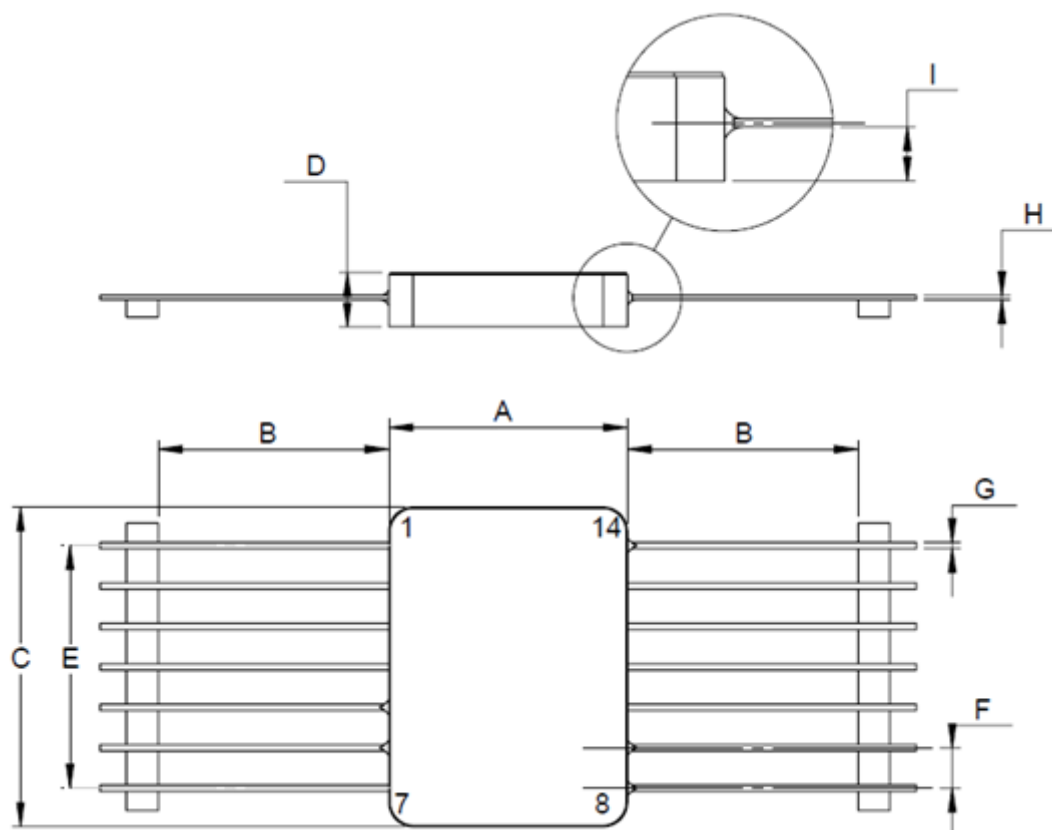
- Device is functional as follows: $+3.13V \leq V_{CC} \leq +3.47V$ (where nominal V_{CC} , $V_{CCNom} = +3.3V$)
- Device is functional as follows:

Output Waveform	Frequency Range	Load Impedance
AHCMOS	$4MHz \leq f_{Nom} < 80MHz$	$C_{LMin} = 13pF \leq C_L \leq C_{LMax} = 18pF$ (load in parallel with $R_L = 1k\Omega$) (where nominal C_L , $C_{LNom} = 15pF$)
	$80MHz \leq f_{Nom} \leq 100MHz$	$C_{LMin} = 8.2pF \leq C_L \leq C_{LMax} = 11pF$ (load in parallel with $R_L = 1k\Omega$) (where nominal C_L , $C_{LNom} = 10pF$)
ACMOS	$4MHz \leq f_{Nom} < 100MHz$	$C_{LMin} = 13pF \leq C_L \leq C_{LMax} = 18pF$ (load in parallel with $R_L = 1k\Omega$) (where nominal C_L , $C_{LNom} = 15pF$)

- Hand soldering: duration 10 seconds maximum at a distance of not less than 1.5mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed.

1.6 PHYSICAL DIMENSIONS AND TERMINAL IDENTIFICATION

1.6.1 Flat Package (FP1) – 14 leads (Variant 01)



Symbols	Dimensions mm		Notes
	Min	Max	
A	14.86	15.12	
B	13	-	
C	19.94	20.2	
D	-	3.71	
E	15.24 BSC		2 places
F	2.54 BSC		All leads
G	0.28	0.48	All leads
H	0.15	0.35	All leads
I	1.5	1.91	All leads

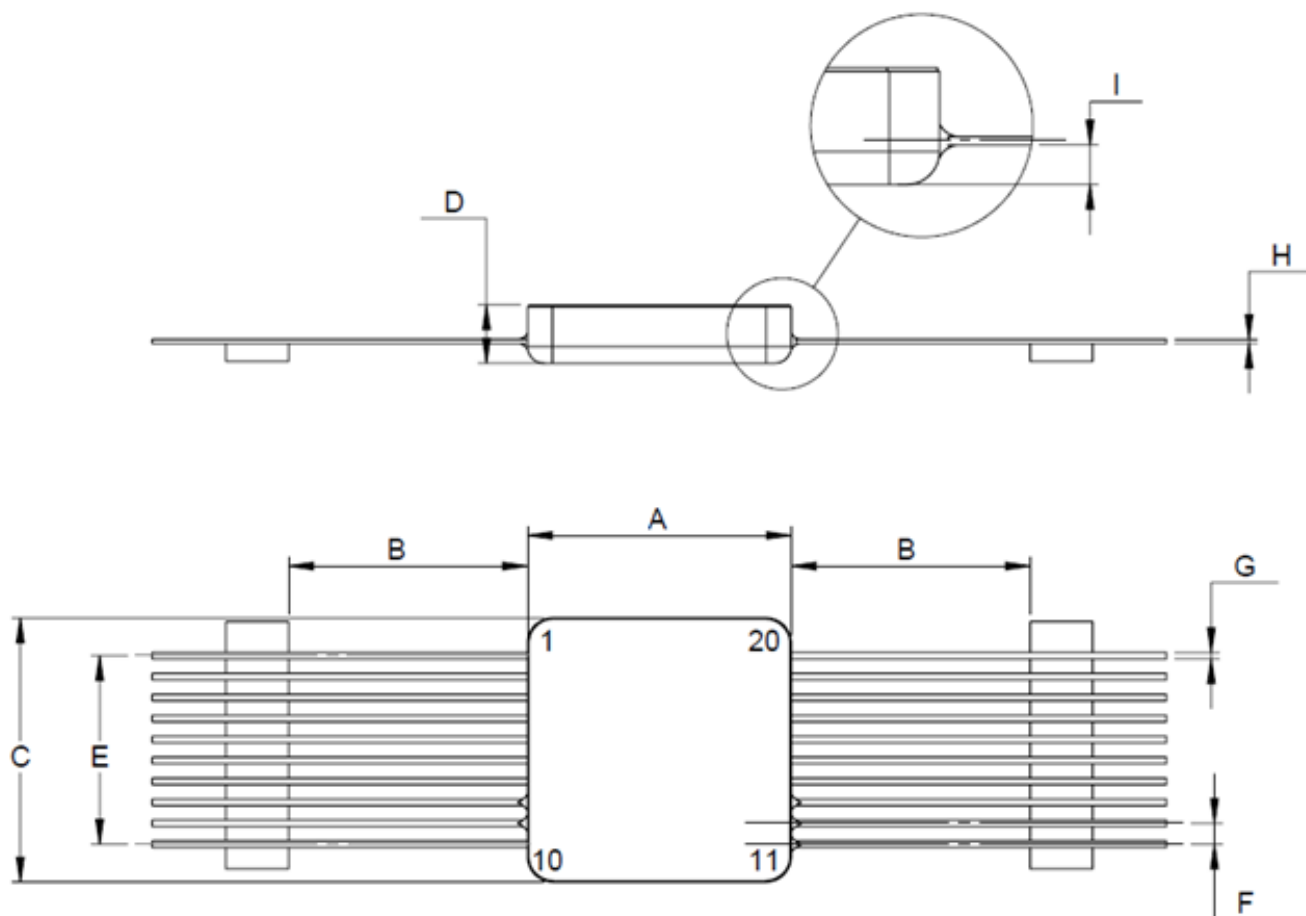
NOTES:

- The terminal identification is specified by marking of the terminal number on the lid as shown.

NOTE: only terminal number 1 is actually marked.

See Para. 1.7 for the terminal connections.

1.6.2 Flat Package (FP2) – 20 leads (Variant 02)



Symbols	Dimensions mm		Notes
	Min	Max	
A	15.75	16.01	
B	13	-	
C	15.75	16.01	
D	-	3.83	
E	11.43 BSC		2 places
F	1.27 BSC		All leads
G	0.28	0.48	All leads
H	0.15	0.35	All leads
I	1	1.41	All leads

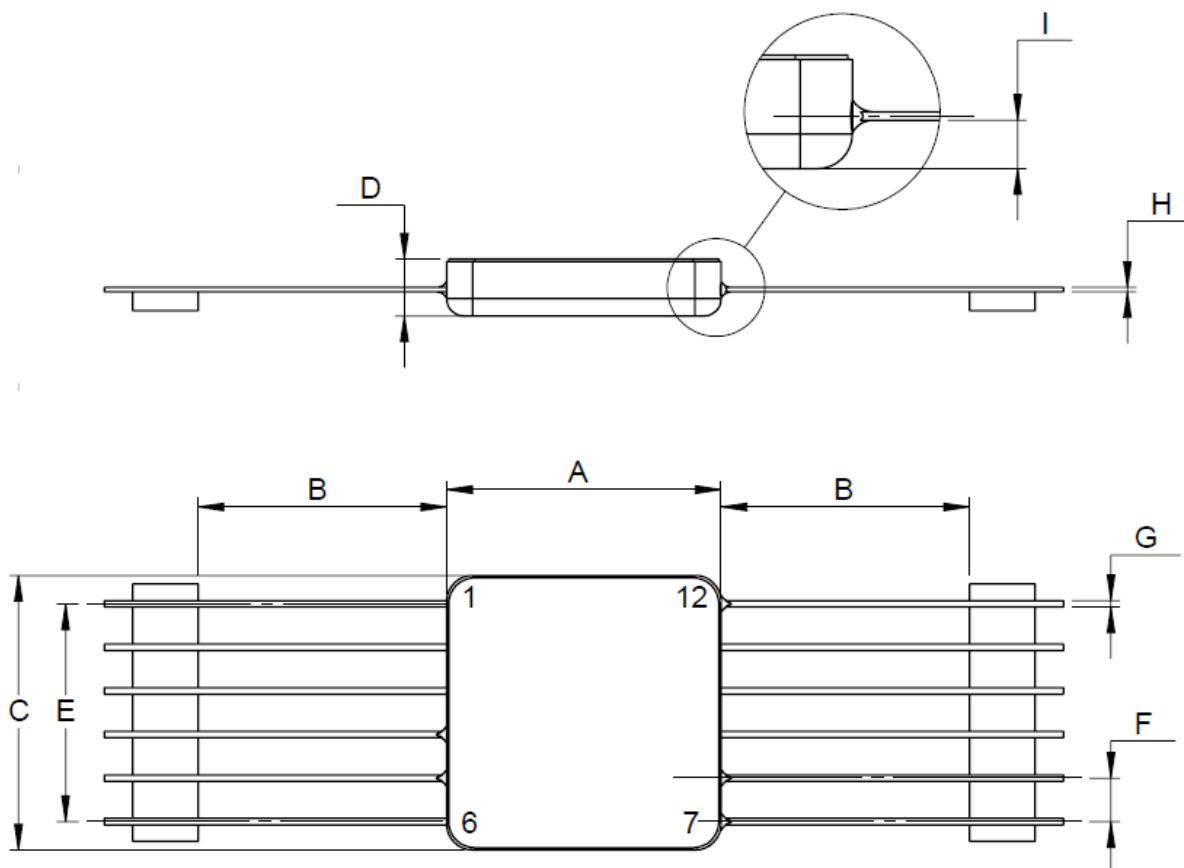
NOTES:

- The terminal identification is specified by marking of the terminal number on the lid as shown.

NOTE: only terminal number 1 is actually marked.

See Para. 1.7 for the terminal connections.

1.6.3 Flat Package (FP3) – 12 leads (Variant 03)



Symbols	Dimensions mm		Notes
	Min	Max	
A	15.75	16.01	
B	13	-	
C	15.75	16.01	
D	-	3.58	
E	12.7 BSC		2 places
F	2.54 BSC		All leads
G	0.28	0.48	All leads
H	0.15	0.35	All leads
I	1.2	1.61	All leads

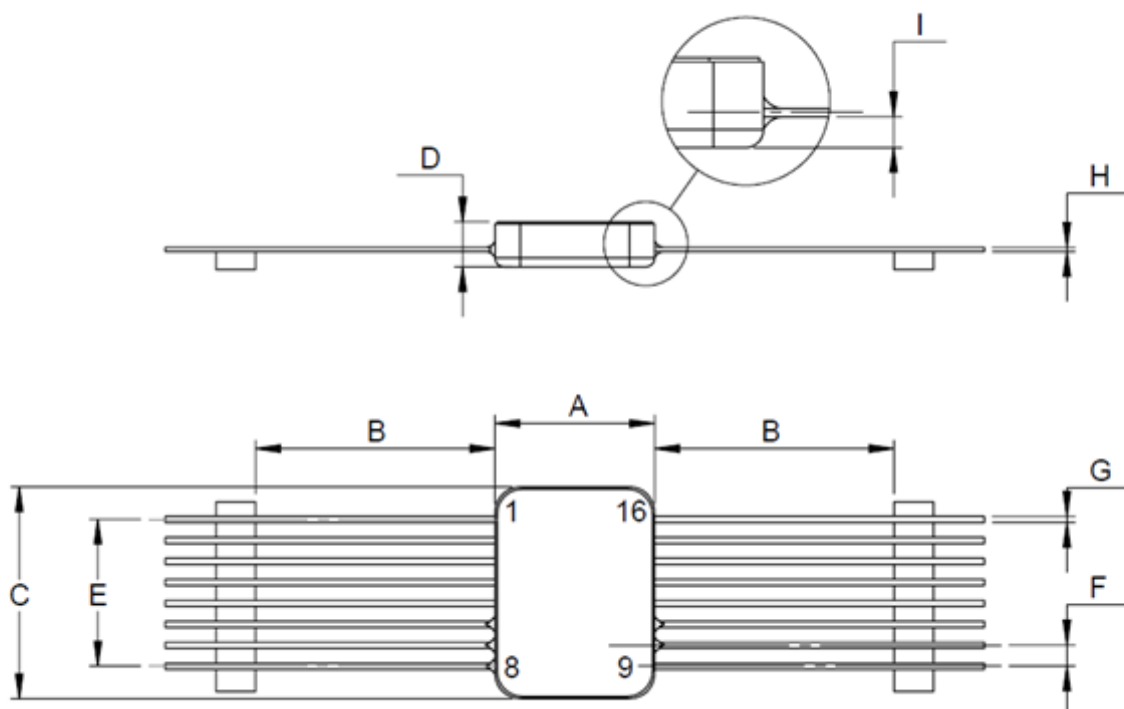
NOTES:

- The terminal identification is specified by marking of the terminal number on the lid as shown.

NOTE: only terminal number 1 is actually marked.

See Para. 1.7 for the terminal connections.

1.6.4 Flat Package (FP4) – 16 leads (Variant 04)



Symbols	Dimensions mm		Notes
	Min	Max	
A	-	9.66	
B	13	-	
C	-	12.83	
D	-	3.1	
E	8.89 BSC		2 places
F	1.27 BSC		All leads
G	0.28	0.48	All leads
H	0.15	0.35	All leads
I	0.73	1.14	All leads

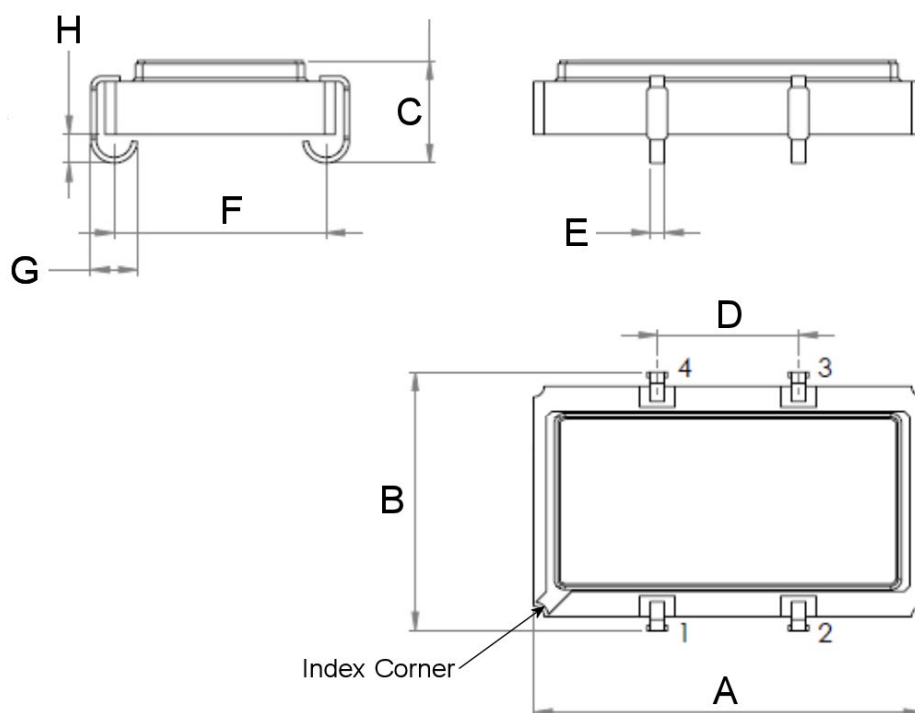
NOTES:

- The terminal identification is specified by marking of the terminal number on the lid as shown.

NOTE: only terminal number 1 is actually marked.

See Para. 1.7 for the terminal connections.

1.6.5 J-Lead Package (JL2) – 4 leads (Variant 06)

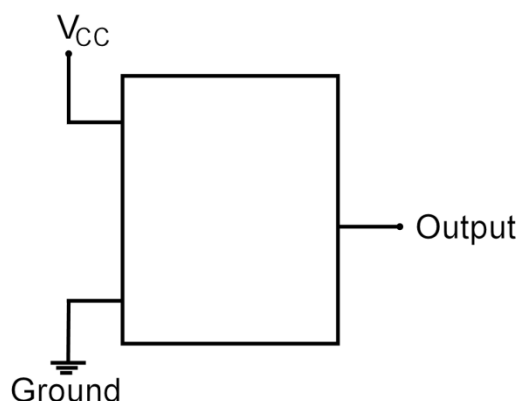


Symbols	Dimensions mm		Notes
	Min	Max	
A	13.72	14.22	
B	8.8	9.8	2 places
C	-	4.2	All leads
D	4.93	5.23	2 places
E	0.46	0.56	All leads
F	7.42	7.82	All leads
G	1.58	1.78	All leads
H	0.89	1.15	All leads

NOTES:

- The terminal identification is specified by reference to the index corner as shown.
See Para. 1.7 for the terminal connections.

1.7 FUNCTIONAL DIAGRAM



Variant Number	Case	Terminal Number				Notes
		Output	V _{CC}	Ground	Not Connected	
01	FP1	8	14	1, 2, 3, 4, 7, 10, 11, 12, 13	5, 6, 9	1, 2
02	FP2	11	13	1, 2, 3, 4, 5, 6, 7, 10, 14, 15, 16, 17, 18, 19, 20	8, 9, 12	1, 2
03	FP3	7	12	1, 2, 3, 6, 9, 10, 11	4, 5, 8	1, 2
04	FP4	10	8	1, 2, 3, 4, 5, 9, 12, 13, 14, 15, 16	6, 7, 11	1, 2
06	JL2	3	4	2	1	1, 2

NOTES:

- The case is connected to Ground.
- Not Connected pins must be connected to a potential (e.g., Ground)

1.8 MATERIALS AND FINISHES

Materials and finishes shall be as follows:

(a) Case

The FP1, FP2, FP3, FP4 cases (Variants 01, 02, 03, 04 respectively) shall be hermetically sealed, and have a metal body with hard glass seals and a seam sealed metal lid.

The JL2 case (Variant 06) shall be hermetically sealed, and have a ceramic body with brazed leads and a seam sealed lid.

(b) Terminals

As specified in Para. 1.4.2 Component Type Variants.

2 REQUIREMENTS

2.1 GENERAL

The complete requirements for procurement of the components specified herein are as stated in this specification and the ESCC Generic Specification. Permitted deviations from the Generic Specification, applicable to this specification only, are listed below.

Permitted deviations from the Generic Specification and this Detail Specification, formally agreed with specific Manufacturers on the basis that the alternative requirements are equivalent to the ESCC requirement and do not affect the component's reliability, are listed in the appendices attached to this specification.

2.1.1 Oscillator Class

The components specified herein shall satisfy the requirements Class 2 Oscillators in accordance with the Generic Specification.

2.1.2 Deviations from the Generic Specification

2.1.2.1 *Deviations from Qualification and Periodic Tests - Chart F4*

- (a) Mechanical Shock: the following test conditions shall apply:
[MIL-STD-202, Test Method 213](#), Test Condition F except that the tests condition values shall be: 2000g, 0.3ms, half-sine.
- (b) Random Vibration: the following test conditions shall apply:
[MIL-STD-202, Test Method 214](#), Test Condition I-J (37.8grms overall), 3 minutes per axis.

2.2 MARKING

The marking shall be in accordance with the requirements of ESCC Basic Specification No. [21700](#) and as follows.

The information to be marked on the component shall be:

- (a) Terminal identification (see Para. 1.6).
- (b) The ESCC Qualified Component symbol (for ESCC qualified components only).
- (c) The ESCC Component Number (see Para. 1.4.1).
- (d) Traceability information.

2.3 ELECTRICAL MEASUREMENTS AT ROOM, HIGH AND LOW TEMPERATURES

Electrical measurements shall be performed at room, high and low temperatures. Consolidated notes are given in Para. 2.3.3.

2.3.1 Room Temperature Electrical Measurements

Characteristics	Symbols	Test Method	Test Conditions Note 1	Limits		Units
				Min	Max	
Input Current	I_{IN}	ESCC No. 24200	For Output Waveform AHCMOS: For $4\text{MHz} \leq f_{Nom} < 20\text{MHz}$: For $20\text{MHz} \leq f_{Nom} < 50\text{MHz}$: For $50\text{MHz} \leq f_{Nom} \leq 100\text{MHz}$: For Output Waveform ACMOS: For $4\text{MHz} \leq f_{Nom} < 100\text{MHz}$:	- - - -	20 25 30 35	mA
Output Waveform (AHCMOS and ACMOS)	-	ESCC No. 24200		Symmetrical Square Wave (Note 2)		-
Output Voltage High Level	V_{OH}	ESCC No. 24200		2.4	-	V
Output Voltage Low Level	V_{OL}	ESCC No. 24200		-	0.4	V
Frequency Accuracy	$\Delta f/f_{Nom}$	ESCC No. 24200	At $T_{amb} = +25 \pm 1^\circ\text{C}$ Referred to f_{Nom}	-	± 25	ppm
Frequency-Voltage Tolerance	$\Delta f/f(V)$	ESCC No. 24200	At $T_{amb} = +25 \pm 1^\circ\text{C}$ Referred to f at V_{CCNom} For 3.13V, 3.3V & 3.47V:	-	± 3	ppm
Frequency-Load Tolerance	$\Delta f/f(L)$	ESCC No. 24200	For $C_L = C_{LMin}, C_{LNom} \text{ \& } C_{LMax}$, $R_L = 1\text{k}\Omega$, Referred to f at C_{LNom}	-	± 5	ppm
Startup Time	t_{su}	ESCC No. 24200		-	10	ms
Rise Time	t_r	ESCC No. 24200	For $4\text{MHz} \leq f_{Nom} < 16\text{MHz}$: For $16\text{MHz} \leq f_{Nom} < 80\text{MHz}$: For $80\text{MHz} \leq f_{Nom} \leq 100\text{MHz}$:	- - -	10 7 5	ns
Fall Time	t_f	ESCC No. 24200	For $4\text{MHz} \leq f_{Nom} < 16\text{MHz}$: For $16\text{MHz} \leq f_{Nom} < 80\text{MHz}$: For $80\text{MHz} \leq f_{Nom} \leq 100\text{MHz}$:	- - -	10 7 5	ns
Duty Cycle	DC	ESCC No. 24200		45	55	%
Ageing Analysis	$\Delta f/f$	ESCC No. 3503	Ageing Period = 30 days: Ageing Period = 1 year: Ageing Period = 18 years:	- - -	± 1.5 ± 5 ± 15	ppm

2.3.2 High and Low Temperatures Electrical Measurements

Characteristics	Symbols	Test Method	Test Conditions Note 1	Limits		Units
				Min	Max	
Input Current	I_{IN}	ESCC No. 24200	At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$ For Output Waveform AHCMOS: For $4MHz \leq f_{Nom} < 20MHz$: For $20MHz \leq f_{Nom} < 50MHz$: For $50MHz \leq f_{Nom} \leq 100MHz$: For Output Waveform ACMOS: For $4MHz \leq f_{Nom} < 100MHz$:	- - - -	20 25 30 35	mA
Output Waveform	-	ESCC No. 24200	At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$	Symmetrical Square Wave		-
Output Voltage High Level	V_{OH}	ESCC No. 24200	At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$	2.4	-	V
Output Voltage Low Level	V_{OL}	ESCC No. 24200	At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$	-	0.4	V
Frequency-Temperature Stability	$\Delta f/f(T)$	ESCC No. 24200	At $T_{amb} = -55 (+1 -0)^{\circ}C$ to $+110 (+0 -1)^{\circ}C$. Note 3 Referred to f at $T_{amb} = +25 \pm 1^{\circ}C$ For Variants 01 to 04: For $4MHz \leq f_{Nom} < 80MHz$: For $80MHz \leq f_{Nom} < 100MHz$: For Variant 06: For $4MHz \leq f_{Nom} < 100MHz$:	- - -	± 30 ± 40 ± 50	ppm
Frequency-Voltage Tolerance	$\Delta f/f(V)$	ESCC No. 24200	At $T_{amb} = -55 (+1 -0)^{\circ}C$ to $+110 (+0 -1)^{\circ}C$ Referred to f at V_{CCNom} For 3.13V, 3.3V & 3.47V:	-	± 4	ppm
Startup Time	t_{su}	ESCC No. 24200	At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$		10	ms
Rise Time	t_r	ESCC No. 24200	At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$ For $4MHz \leq f_{Nom} < 16MHz$: For $16MHz \leq f_{Nom} < 80MHz$: For $80MHz \leq f_{Nom} \leq 100MHz$:	- - -	10 7 5	ns
Fall Time	t_f	ESCC No. 24200	At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$ For $4MHz \leq f_{Nom} < 16MHz$: For $16MHz \leq f_{Nom} < 80MHz$: For $80MHz \leq f_{Nom} \leq 100MHz$:	- - -	10 7 5	ns
Duty Cycle	DC	ESCC No. 24200	At $T_{amb} = -55 (+5 -0)^{\circ}C$ and $+110 (+0 -5)^{\circ}C$	45	55	%

2.3.3 Notes to Paras. 2.3.1 and 2.3.2 Room, High and Low Electrical Measurements

1. Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3^{\circ}\text{C}$ and the component under test shall be operated at V_{CCNom} with an output load of C_{LNom} in parallel with $R_L = 1\text{k}\Omega$. V_{CCNom} and C_{LNom} are specified in Para. 1.5 Maximum Ratings.
2. The shape of the output waveform shall conform to the requirements specified in the Manufacturer's PID, as applicable for AHCMOS or AC MOS (see Para. 1.4.1.1(b)).
3. Frequency-Temperature Stability shall be measured at a minimum of 10 equally spaced increments over the specified temperature range.

2.4 PARAMETER DRIFT VALUES

Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3^{\circ}\text{C}$.

The test methods and test conditions shall be as per the corresponding test defined in Para. 2.3.1 Room Temperature Electrical Measurements.

The drift values (Δ) shall not be exceeded for each characteristic specified. The corresponding absolute limit values for each characteristic shall not be exceeded.

Characteristics	Symbols	Limits			Units
		Drift Value Δ	Absolute		
			Min	Max	
Input Current	I_{IN}				mA
For Output Waveform AHCMOS:					
For $4\text{MHz} \leq f_{Nom} < 20\text{MHz}$:		$\pm 5\%$	-	20	
For $20\text{MHz} \leq f_{Nom} < 50\text{MHz}$:		$\pm 5\%$	-	25	
For $50\text{MHz} \leq f_{Nom} \leq 100\text{MHz}$:		$\pm 5\%$	-	30	
For Output Waveform ACMOS:					
For $4\text{MHz} \leq f_{Nom} < 100\text{MHz}$:		$\pm 5\%$	-	35	
Frequency Accuracy	$\Delta f/f_{Nom}$	± 10			ppm
Initial measurement:			-	± 20	
Final measurement:			-	± 25	

2.5 INTERMEDIATE AND END-POINT ELECTRICAL MEASUREMENTS

Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3 \text{ }^{\circ}\text{C}$.

The test methods and test conditions shall be as per the corresponding test defined in Para. 2.3.1 Room Temperature Electrical Measurements or Para. 2.3.2 High and Low Temperatures Electrical Measurements, as follows.

The drift values (Δ) shall not be exceeded for each characteristic specified. Unless otherwise specified, the corresponding absolute limit values for each characteristic shall not be exceeded.

Characteristics	Symbols	Test Conditions	Limits			Units
			Drift Value Δ	Absolute		
				Min	Max	
Input Current For Output Waveform AHCMOS: For 4MHz $\leq$ f _{Nom} < 20MHz: For 20MHz $\leq$ f _{Nom} < 50MHz: For 50MHz $\leq$ f _{Nom} $\leq$ 100MHz: For Output Waveform ACMOS: For 4MHz $\leq$ f _{Nom} < 100MHz:	I _{IN}	As per Para. 2.3.1	- - - -	- - - -	20 25 30 35	mA
Output Waveform	-	As per Para. 2.3.1	-	Symmetrical Square Wave		-
Output Voltage High Level	V _{OH}	As per Para. 2.3.1	-	2.4	-	V
Output Voltage Low Level	V _{OL}	As per Para. 2.3.1	-	-	0.4	V
Frequency Accuracy	$\Delta f/f_{Nom}$	As per Para. 2.3.1	± 8.5 (1)	-	± 25 (2)	ppm
Frequency-Temperature Stability For Variants 01 to 04: For 4MHz $\leq$ f _{Nom} < 80MHz: For 80MHz $\leq$ f _{Nom} < 100MHz: For Variant 06: For 4MHz $\leq$ f _{Nom} < 100MHz:	$\Delta f/f(T)$	As per Para. 2.3.2	- - -	- - -	± 30 ± 40 ± 50	ppm
Rise Time For 4MHz $\leq$ f _{Nom} < 16MHz: For 16MHz $\leq$ f _{Nom} < 80MHz: For 80MHz $\leq$ f _{Nom} $\leq$ 100MHz:	t _r	As per Para. 2.3.1	- - -	- - -	10 7 5	ns
Fall Time For 4MHz $\leq$ f _{Nom} < 16MHz: For 16MHz $\leq$ f _{Nom} < 80MHz: For 80MHz $\leq$ f _{Nom} $\leq$ 100MHz:	t _r	As per Para. 2.3.1	- - -	- - -	10 7 5	ns
Duty Cycle	DC	As per Para. 2.3.1	-	45	55	%

NOTES:

1. Drift value (Δ) is only applicable to testing during the Endurance Subgroup.
2. Absolute limit is only applicable to testing during the Environmental/Mechanical Subgroup.

2.6 BURN-IN CONDITIONS

The test conditions for Burn-in, tested as specified in the ESCC Generic Specification, shall be as follows:

- (a) Output Load: C_{LNom} in parallel with $R_L = 1k\Omega$. C_{LNom} is specified in Para. 1.5 Maximum Ratings.

2.7 FREQUENCY AGEING CONDITIONS

The test conditions for Frequency Ageing, tested as specified in the ESCC Generic Specification, shall be as follows:

- (a) Output Load: C_{LNom} in parallel with $R_L = 1k\Omega$. C_{LNom} is specified in Para. 1.5 Maximum Ratings.

2.8 OPERATING LIFE CONDITIONS

The test conditions for Operating Life, tested as specified in the ESCC Generic Specification, shall be as follows:

- (a) Output Load: C_{LNom} in parallel with $R_L = 1k\Omega$. C_{LNom} is specified in Para. 1.5 Maximum Ratings.

2.9 TOTAL DOSE RADIATION TESTING

All lots shall be irradiated in accordance with ESCC Basic Specification No. [22900](#), low dose rate (window 2: 36rad(Si) to 360rad(Si) per hour).

2.9.1 Bias Conditions and Total Dose Level for Total Dose Radiation Testing

The following bias condition (worst-case) shall be used for Total Dose Radiation Testing at $T_{amb} = +22 \pm 3^\circ C$:

With Supply Voltage: $V_{CC} = 3.47V$ during irradiation.

The total dose level applied shall be as specified in Para. 1.4.2 or in the Purchase Order.

2.9.2 Electrical Measurements for Total Dose Radiation Testing

Prior to irradiation testing the devices shall have successfully met Para. 2.3.1 Room Temperature Electrical Measurements specified herein.

Unless otherwise specified, the measurements shall be performed at $T_{amb} = +22 \pm 3^{\circ}\text{C}$.

Unless otherwise specified, the test methods and test conditions shall be as per the corresponding test defined in Para. 2.3.1 Room Temperature Electrical Measurements.

The parameters to be measured during irradiation testing, on completion of irradiation testing, after 24 hours anneal at Room Temperature and after 168 hours anneal at $T_{amb} = +100 \pm 3^{\circ}\text{C}$ are shown below.

Characteristics	Symbols	Limits		Units
		Min	Max	
Input Current For Output Waveform AHCMOS: For $4\text{MHz} \leq f_{Nom} < 20\text{MHz}$: For $20\text{MHz} \leq f_{Nom} < 50\text{MHz}$: For $50\text{MHz} \leq f_{Nom} \leq 100\text{MHz}$: For Output Waveform ACMOS: For $4\text{MHz} \leq f_{Nom} < 100\text{MHz}$:	I_{IN}	-	20 25 30 35	mA
Output Waveform	-	Symmetrical Square Wave		-
Output Voltage High Level	V_{OH}	2.4	-	V
Output Voltage Low Level	V_{OL}	-	0.4	V
Frequency Accuracy	$\Delta f/f_{Nom}$	-	± 25	ppm
Rise Time For $4\text{MHz} \leq f_{Nom} < 16\text{MHz}$: For $16\text{MHz} \leq f_{Nom} < 80\text{MHz}$: For $80\text{MHz} \leq f_{Nom} \leq 100\text{MHz}$:	t_r	-	10 7 5	ns
Fall Time For $4\text{MHz} \leq f_{Nom} < 16\text{MHz}$: For $16\text{MHz} \leq f_{Nom} < 80\text{MHz}$: For $80\text{MHz} \leq f_{Nom} \leq 100\text{MHz}$:	t_f	-	10 7 5	ns
Duty Cycle	DC	45	55	%

APPENDIX A

AGREED DEVIATIONS FOR RAKON FRANCE S.A.S. (F)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Para. 1.4.2 Component Type Variants	Oscillators with ACMOS outputs (output waveform code AC) are available from Rakon but only with specific frequencies. Customers should contact Rakon to confirm feasibility and availability.
	Oscillators with Nominal Output Frequencies, f_{NOM} , in the range 4MHz to 100MHz are available from Rakon. However, for frequencies below 24MHz, Customers should contact Rakon to confirm feasibility and availability.
Para. 2.1.2 Deviations from the Generic Specification: Deviations from Screening Tests - Chart F3	Constant Acceleration: MIL-STD-883, Test Method 2001 , Test Condition A, Y1 axis only shall apply except the stress level shall be 2500g minimum.
	Frequency Ageing: Ageing Analysis: The projected 1 and 18 year total frequency changes shall be determined by means of a logarithmic (rather than linear) extrapolation from the end of the ageing measurement period using the A and B constants determined from the least squares fit. e.g., The frequency change over the period of 1 year (365 days) for a total ageing measurement period of T_a , in days (where T_a is 30 days or longer), is given by: $\Delta f(1yr) = (A \times \ln(B \times (365 + T_a) + 1)) - (A \times \ln(B \times T_a + 1))$
Para. 2.1.2.1 Deviations from Qualification and Periodic Tests - Chart F4	Solderability: Solderability may be performed in accordance with Test Ta (without ageing) of IEC Publication No. 60068-2-20.

ADDITIONAL DATA - RAKON FRANCE S.A.S. (F)

(a) Electrical Characteristics

For information, the following details apply to the components specified herein:

- RMS Jitter:
 - For $f_{Nom} < 40\text{MHz}$: 8ps at $T_{amb} = 25^\circ\text{C}$ typical
 - For $f_{Nom} \geq 40\text{MHz}$: 5ps at $T_{amb} = 25^\circ\text{C}$ typical

Conditions:

Integrated Phase Jitter:

- $f_{Nom} < 16\text{MHz}$: 1kHz to 100kHz
- $f_{Nom} \geq 16\text{MHz}$: 10kHz to 10MHz

(b) Single Event Effects (SEE) Information

These components are susceptible to Single Event Latch-up (SEL) if operated in a space environment.

Performance:

- SEL Threshold: $> 60\text{MeV.cm}^2/\text{mg}$