

RFPO45 G.8263

1.0 Specification References

Parameter	Description
a. Rakon part number	M6575LF
b. Description	25MHz MERC 9x7 HOT CMOS 3.3V
c. Version	2 (2021-12-21)
d. Package	9.7 x 7.5 x 4.3 mm max.



2.0 Absolute Maximum Ratings ¹

Parameter	Min.	Max.	Unit.
a. Storage temperature	-55	125	°C
b. Supply voltage (Vcc)	-0.5	6	V
c. Power dissipation		2	W
d. Load		50	pF

3.0 Frequency Characteristics ²

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Nominal frequency (Fn)		25.0		MHz	
b. Frequency calibration			±0.5	ppm	At 25°C ± 2°C, at time of shipment, reference to nominal frequency
c. Reflow shift			±1	ppm	After 1 hour recovery at 25°C
d. Operating temperature range	0		85	°C	
e. Frequency stability over temperature (in still air)			±20	ppb	Reference to (F _{MAX} + F _{MIN})/2
f. Holdover stability, variable temperature (in still air)			10	ppb	Absolute value reference to F(t=0), ΔT = ±20°C, see temperature test profile attached
g. Holdover stability, constant temperature (in still air)			1	ppb	Absolute value reference to F(t=0), 24 hours, after 60 days of continuous operation
h. Frequency slope ΔF/ΔT in still air			±1	ppb/°C	Temperature ramp ≤ 0.5°C/minute
i. Free-run accuracy			±4.6	ppm	All causes, 20 years life, reference to Fn
j. Supply voltage stability		±10		ppb	±5% variation, reference to frequency at 3.3V
k. Load sensitivity		±10		ppb	±5pF variation, reference to frequency at 15pF
l. Warm-up time ³		5		minutes	
m. Acceleration sensitivity		< 2		ppb/g	Gamma vector 3-axes, 30-1500Hz
n. Wander compliance	G.8263 MTIE requirements met under minimum loop bandwidth of 0.05mHz (3200 second max time constant) under G.8263 (amendment) appendix IV temperature profile (see attached, ±20°C excursion at 0.5°C/min).				

¹ Operating beyond this limit may result in change or permanent damage to the device.

² The characteristics of the component may be temporarily affected by the processes of assembly and soldering. The frequency specifications apply after 48 hours of continuous operation after assembly. Nominal conditions apply unless otherwise stated.

³ Time needed for frequency to be within ±20 ppb reference to frequency after 1 hour, at 25°C. Parameter is frequency, assembly and operating history dependent.

4.0 Frequency Aging

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Long term stability			±1 ±3	ppm ppm	First year 20 years

5.0 Root Allan Variance (20 MHz unit at 25°C)

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Root Allan Variance		7*10 ⁻¹¹ 7*10 ⁻¹¹ 7*10 ⁻¹¹ 8*10 ⁻¹¹ 8*10 ⁻¹¹			tau = 0.1s tau = 1.0s tau = 10s tau = 100s tau = 1000s

6.0 Power Supply

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Supply voltage (Vcc)		3.3		V	±5%
b. Input power (Warm up)			500	mW	
c. Input power (Steady state in still air at 25°C)			400	mW	

7.0 Oscillator Output - HCMOS

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Output voltage level low (V _{OL})			10% Vcc	V	
b. Output voltage level high (V _{OH})	90%Vcc			V	
c. Rise and fall time			4	ns	10% to 90% level
d. Duty cycle	45		55	%	At 50% level
e. Load		15		pF	

8.0 SSB Phase Noise (at 25°C)

Parameter	Typ.	Max.	Unit.	Test Condition / Description
a. 1Hz offset	-60		dBc/Hz	
b. 10Hz offset	-90		dBc/Hz	
c. 100Hz offset	-117		dBc/Hz	
d. 1kHz offset	-137		dBc/Hz	
e. 10kHz offset	-149		dBc/Hz	
f. 100kHz offset	-154		dBc/Hz	
g. 1MHz offset	-155		dBc/Hz	

9.0 Pin Connections

Parameter	Description
a. Pin 1	Do not connect
b. Pin 2	GND
c. Pin 3	Output
d. Pin 4	Supply Voltage (Vcc), for correct operation decouple the supply voltage with a 10 μ F capacitor close to the oscillator

10.0 Marking

Parameter	Description
a. Type	Laser marked
b. Line 1	[rakon]
c. Line 2	[MXXXX] = Part number
d. Line 3	[XX.X MHz] = Frequency in MHz
e. Line 4	[o YYWWX] = Pin 1 identifier (indent), date / location code

11.0 Manufacturing Information

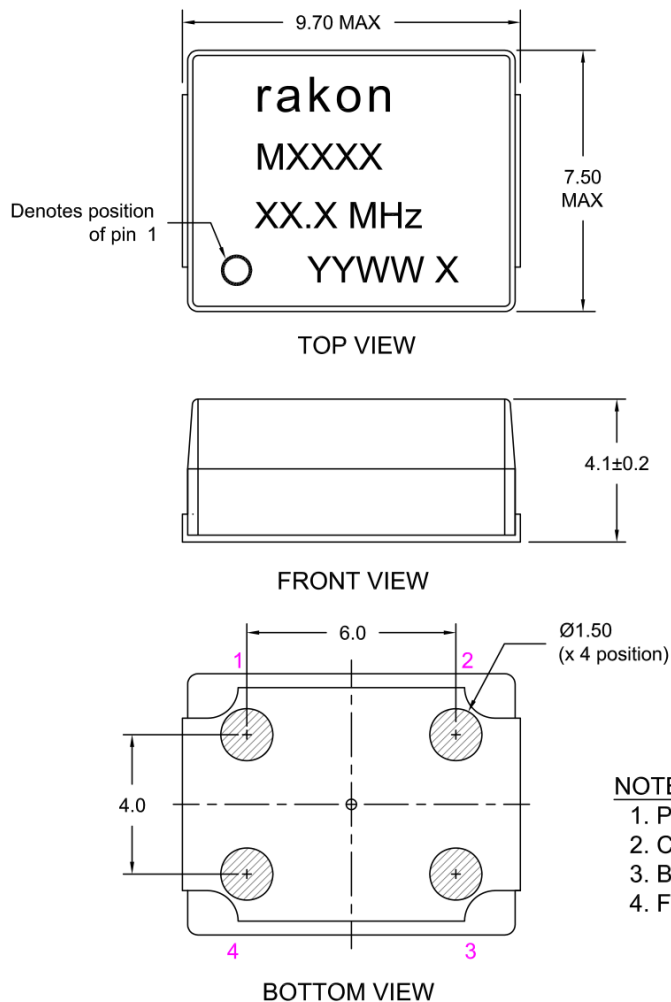
Parameter	Description
a. Reflow soldering	IPJ/JEDEC J-STD-020, see Pb-free solder reflow profile attached
b. Packaging description	Tape & Reel as per EIA-481-E (see drawing)
c. Application note	For optimum performance follow the instructions in Guidelines for use of Mercury™ /Mercury+™ IC-OCXO

12.0 Environmental Specification

Parameter	Description
a. RoHS	Parts are fully compliant with the European Union directives 2011/65/EU and 2015/863/EU (amending annex II to directive 2011/65/EU) on the restriction of the use of certain hazardous substances in electrical and electronic equipment
b. Acceleration steady state	IEC 60068-2-7 test Ga, 5000g, 10s (at peak acceleration), Y-axis only
c. Moisture sensitivity	IPC/JEDEC J-STD-020, Class 1
d. Temperature cycle	IEC 60068-2-14 test Na, 400 cycles, -40°C to +125°C
e. Solderability	JESD 22-B102, Method 2, precondition 150°C, 16 hours
f. Humidity	EIA/JEDEC 22-A101, 85°C/85%R.H., 1000 hours
g. Shock	IEC 60068-2-27, test Ea; 1500g, 0.5ms, 18 shocks total
h. Vibration	IEC 60068-2-6, test Fc: 20g, 60 to 2000Hz 12 hours total

13.0 Model Outline: RFPO45 G.8263

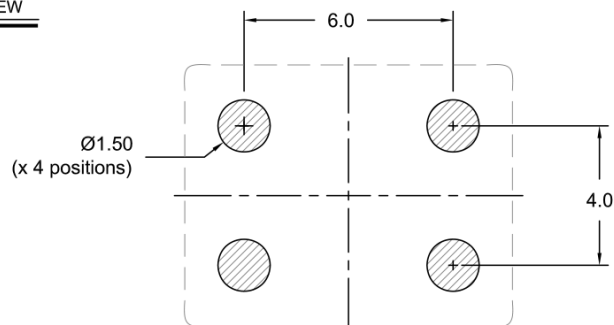
MODEL DRAWING



NOTE:

1. Pin connections are detailed in the specification.
2. Cover: Plastic
3. Base: FR4
4. Finish: 0.05 ~ 0.13 µmGold over 3 ~ 6 µm Nickel.

RECOMMENDED PAD LAYOUT - TOP VIEW



TITLE: RFPO40/45 MODEL DRAWING

RELATED DRAWINGS:

FILENAME: CAT646

REVISION: C

DATE: 25-Jan-12

SCALE: 5 : 1

Millimetres

TOLERANCES:

XX =

X.X = ±0.2

X.XX = ±0.10

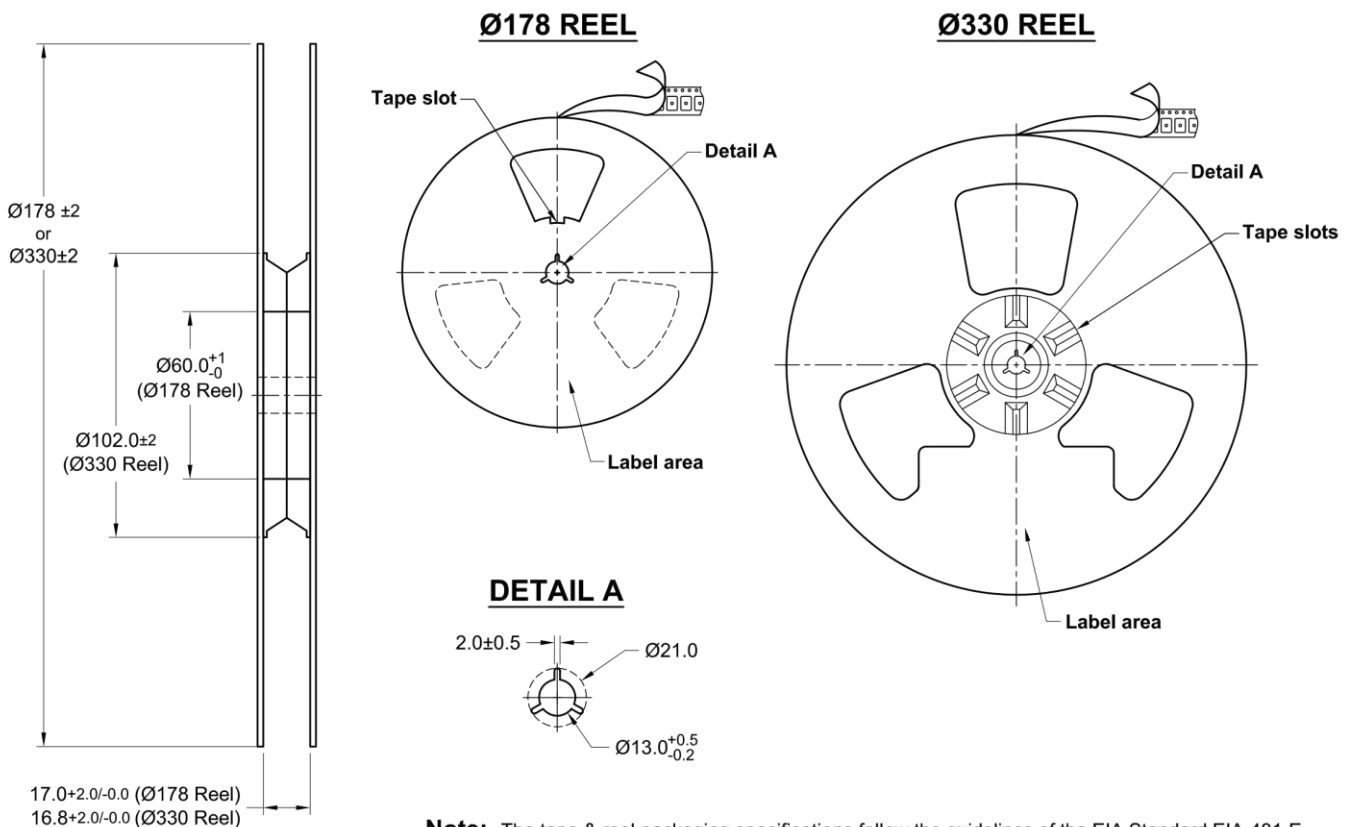
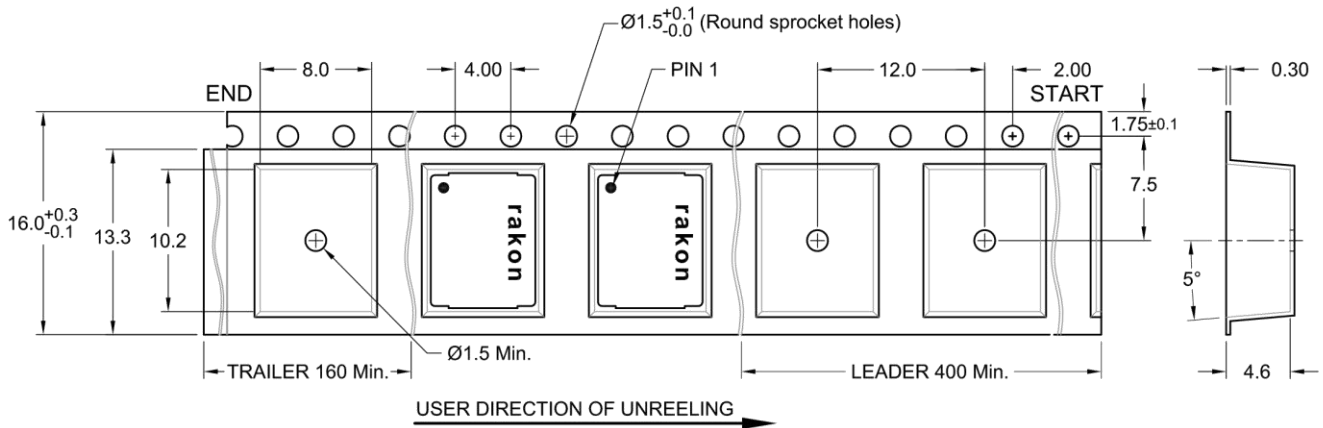
X.XXX =

X° =

Hole =

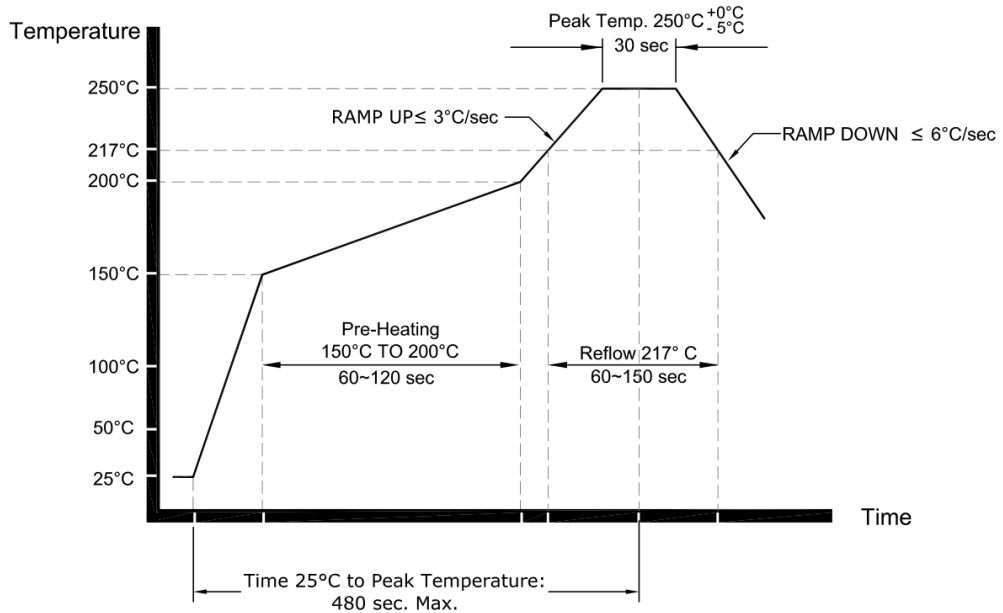
rakon

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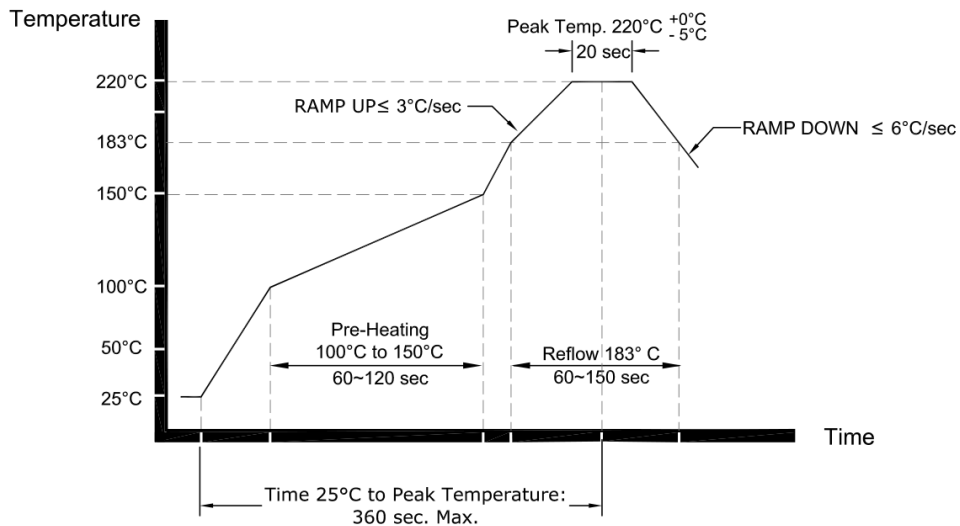


15.0 Reflow: RFPO45 G.8263

Pb-Free Reflow Soldering Profile *



Sn-Pb Eutectic Reflow Soldering Profile *



*** NOTE:**

These profile were used during the qualification testing of the product and therefore represents worst case conditions. It is not recommended for use by the customer in the actual assembly of these parts.

TITLE: RFPO40 SERIES REFLOW

RELATED DRAWINGS:

FILENAME: CAT649

REVISION: A

DATE: 25-Oct-11

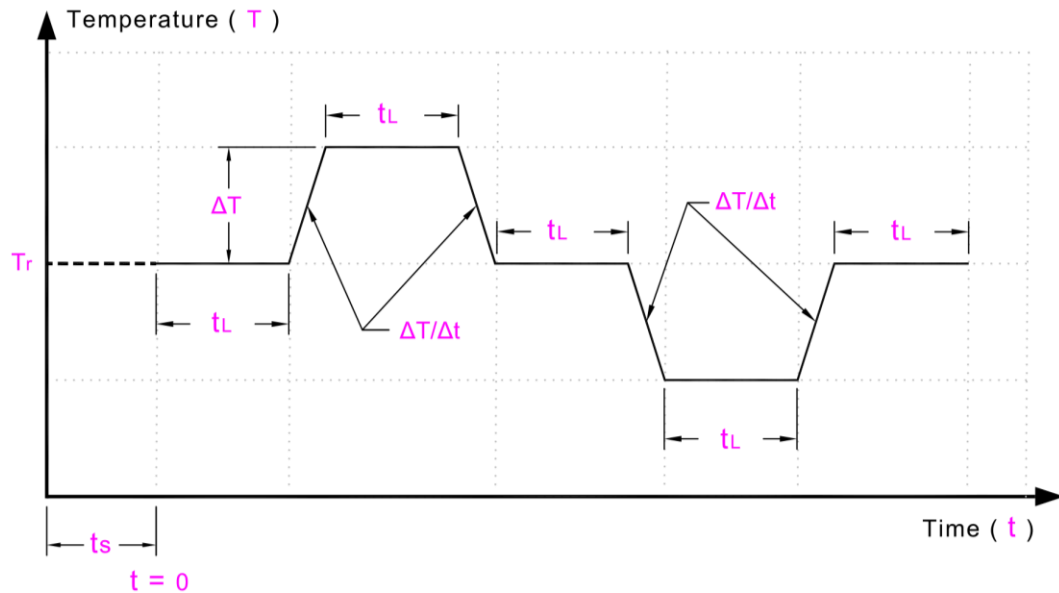
SCALE: NTS

Millimetres

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16.0 Temperature Test Profile: RFPO45 G.8263



Test Stabilisation Time (t_s)	24 hours
Loop Recovery Time (t_L)	4 hours
Reference Temperature Range (T_r)	$-40^{\circ}\text{C} \leq T_r \pm \Delta T \leq 85^{\circ}\text{C}$
Temperature Excursion ($ \Delta T $)	20°C
Ramp Rate ($ \Delta T/\Delta t $)	$0.5^{\circ}\text{C/minute}$

TITLE: G.8263 Temperature Test Profile

RELATED DRAWINGS:

FILENAME: CAT793

REVISION: A

DATE: 22-Apr-13

SCALE: NTS

Millimetres

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17.0 Specification History

Version	User	Changes	Approver	Date
A.	JO	Datasheet created	AR	2014-05-23
B.	JO	Changed from voltage control to fixed frequency	AR	2015-01-30
C.	JO	SAP number added	AR	2015-02-11
1.	JO	Released to production	BH	2015-03-04
2.	JO	Tape & reel drawing updated to CAT886C RoHS compliance statement updated No changes to product or test requirements	ECO-07430	2021-12-21