

## E7184ALF

### 1.0 Specification References

Parameter	Description
a. Rakon part number	E7184ALF
b. Description	10.857MHz RPT1109B TCXO (dual crystal HCMOS)
c. Revision	E (2019-01-22)



### 2.0 Absolute Maximum Rating <sup>1</sup>

Parameter	Min.	Max.	Unit
a. Junction temperature		150	°C
b. Supply voltage (Vcc)	-0.5	7	V
c. All other inputs	-0.5	Vcc + 0.5	V
d. Power dissipation		100	mW

### 3.0 Frequency Characteristics

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Nominal frequency		10.857		MHz	
b. Frequency calibration			±2	ppm	Frequency at 25°C ±2°C, ≥ 60 minutes after soldering
c. Frequency stability over temperature			±1.5	ppm	Reference to frequency at 25°C. Temperature varied at ≤ 2°C/minute
d. Temperature range	-55		+90	°C	The operating temperature range over which the frequency stability is measured.
e. Frequency perturbations			0.5	ppm	Peak-to-peak amplitude of frequency perturbations within operating temperature range.
f. Frequency slope of perturbations			0.5	ppm/°C	Minimum of 1 frequency reading every 2°C, over the operating temperature range.
g. Static temperature hysteresis			±0.4	ppm	Frequency change after reciprocal temperature ramped over the operating range. Frequency measured before and after at 25°C
h. Supply voltage stability		±0.025	±0.2	ppm	±5% variation, reference to frequency at nominal supply voltage
i. Load sensitivity		±0.050	±0.2	ppm	±10% variation, reference to frequency at nominal load
j. Root Allan Variance		0.2	0.6	ppb	tau=1s
k. Long term stability (at 25°C)			±1 ±3	ppm	1 <sup>st</sup> year 10 years
l. Acceleration sensitivity		0.2	0.5	ppb/g	Gamma vector, 3-axes, 30-1500Hz

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

#### 4.0 Power Supply

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Supply voltage (V <sub>CC</sub> )		5		V	±5%
b. Supply current		3	4	mA	

#### 5.0 Oscillator Output

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Output waveform					HCMOS (LVCMOS & LVTTTL compatible as per JESD8C)
b. Output voltage level low (V <sub>OL</sub> )			10% V <sub>CC</sub>	V	
c. Output voltage level high (V <sub>OH</sub> )	90% V <sub>CC</sub>			V	
d. Rise and fall time			7	ns	10% to 90% level
e. Duty cycle	45		55	%	At 50% level
f. Load		15		pF	

#### 6.0 Pin Connections

Parameter	Connection
a. Pin 1	Do not connect
b. Pin 2	GND
c. Pin 3	Output
d. Pin 4	Supply Voltage (V <sub>CC</sub> )

#### 7.0 SSB Phase Noise (static at 25°C)

Parameter	Typ.	Unit	Test Condition / Description
a. 1 Hz offset	-70	dBc/Hz	
b. 10Hz offset	-100	dBc/Hz	
c. 100Hz offset	-132	dBc/Hz	
d. 1kHz offset	-142	dBc/Hz	
e. 10kHz offset	-147	dBc/Hz	
f. 100kHz offset	-150	dBc/Hz	

#### 8.0 Marking

Parameter	Test Condition / Description
a. Type	Engraved
b. Line 1	Rakon
c. Line 2	E7184
d. Line 3	10.857MHz
e. Line 4	WWYY (date code)

## 9.0 Manufacturing Information

Parameter	Test Condition / Description
a. Reflow soldering	See reflow profile diagram
b. PCB termination finish	ENIG (Electroless Nickel Immersion Gold)
c. Packaging description	Tape and reel

## 10.0 Environmental Specification

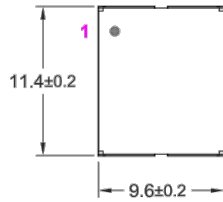
Parameter	Description
a. RoHS	Parts are fully compliant with the European Union directives 2002/95/EC and 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment. Note the RoHS compliant parts are suitable for assembly using both Lead-free solders and Tin / Lead solders.
b. Moisture resistance	JESD22-A113, MSL = 1
c. Mechanical vibration	MIL-STD-202, method 204, 20g, 10-2000Hz, 1.5 hours in each of three axes
d. Thermal shock	MIL-STD-202, method 107, 5 cycles -55°C to +125°C
e. Aging	MIL-PRF-55310, 1008 hours at +85°C
f. Reflow	IPC/JEDEC J-STD-020, 3 reflow cycles (peak temperature 260°C)
g. Storage temperature	-55°C to +125°C
h. Mechanical shock	IEC 60068-2-27, test Ea: 1500g <sub>n</sub> , acceleration for 0.5ms duration, Half-sine pulse, 3 shocks in each direction along three mutually perpendicular axes.
i. ESD – Human Body Model (HBM)	JESD22-A114, 1000V
j. ESD – Charge Discharge Model (CDM)	JESD22-C101, 1000V
k. ESD – Machine Model	JESD22-A115, 100V

## 11.0 Disclaimer

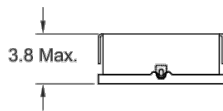
Parameter	Description
a. Disclaimer	"Samples supplied according to this specification are supplied from our development or pre-production programme and as such are not qualification approved products. No condition, warranty or representation regarding quality, suitability, performance, life or continuation of supply is given or implied and Guarantee in clause 6.1 of our standard Conditions of Sale is not applicable. The right is reserved to change the design or specification or cease supply without notice." RAKON Limited

## 12.0 Model Outline:

### MODEL OUTLINE



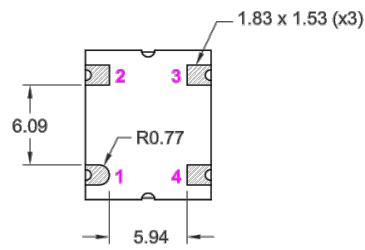
TOP VIEW



FRONT VIEW



SIDE VIEW

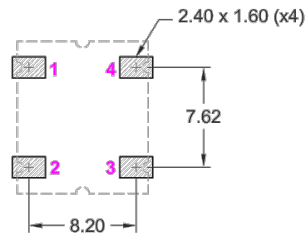


BOTTOM VIEW

#### NOTE:

Marking and Pin Connections are detailed in the specification.

### RECOMMENDED PAD LAYOUT - TOP VIEW



TITLE: RPT1109B MODEL

RELATED DRAWINGS:

FILENAME: CAT960

REVISION: C

DATE: 22-Jan-2019

SCALE: 2 : 1

Millimetres

TOLERANCES:

XX =

X.X = ±0.2

X.XX = ±0.10

X.XXX =

X° =

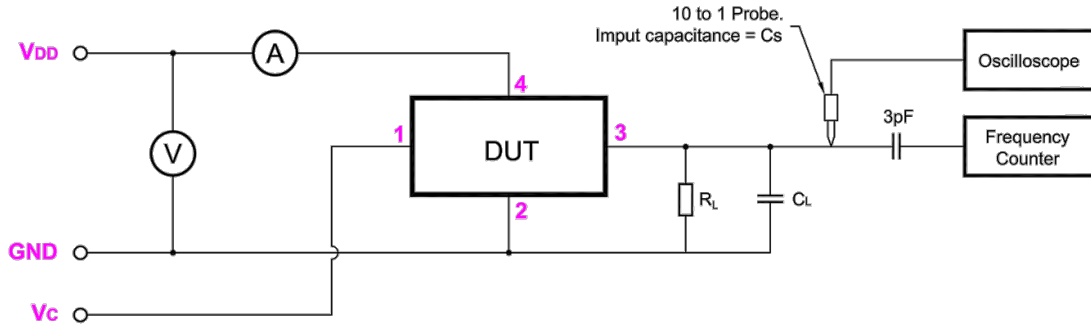
Hole =

# rakon

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## 13.0 Test Circuit:

### 4 Pin Test Circuit:



$C_L + C_s = 5\text{pF}$  for 20k//5pF  
 $C_L + C_s = 10\text{pF}$  for 10k//10pF

TITLE: RPT1109B Series Test Circuit

RELATED DRAWINGS:

FILENAME: CAT961

REVISION: A

DATE: 04-Jun-2015

SCALE:

Millimetres

TOLERANCES:

XX =

X.X =

X.XX =

X.XXX =

X° =

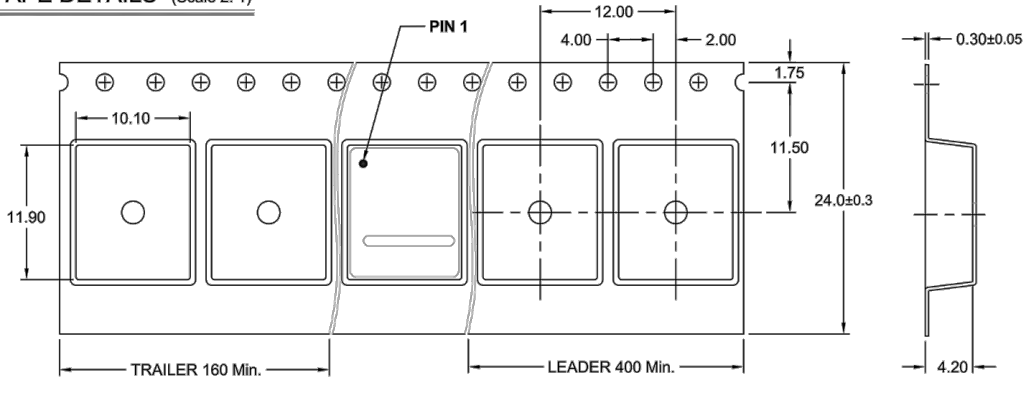
Hole =

# rakon

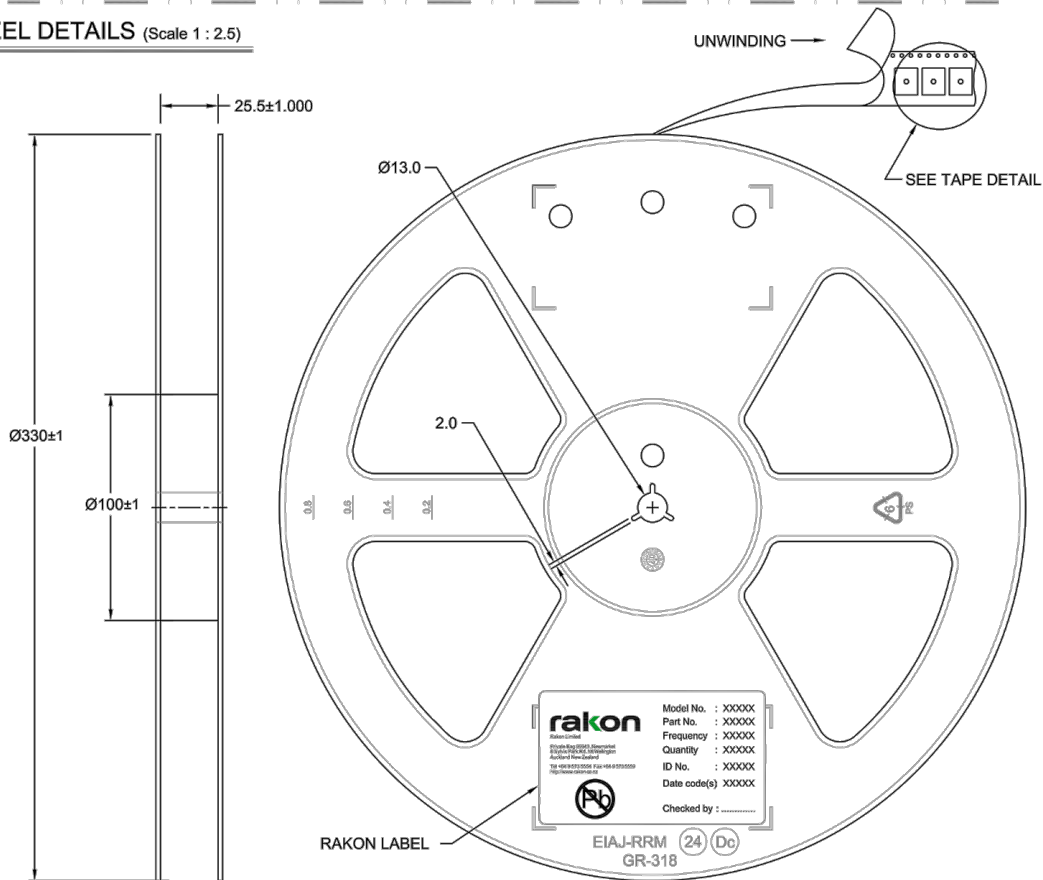
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## 14.0 Tape and Reel:

### TAPE DETAILS (Scale 2: 1)



### REEL DETAILS (Scale 1 : 2.5)



TITLE: RPT1109 Series Tape & Reel

RELATED DRAWINGS:

FILENAME: CAT938

REVISION: B

DATE: 04-Jun-2015

SCALE: 2 : 1

Millimetres

TOLERANCES:

XX = ±0.5

X.X = ±0.2

X.XX = ±0.10

X.XXX = ±0.05

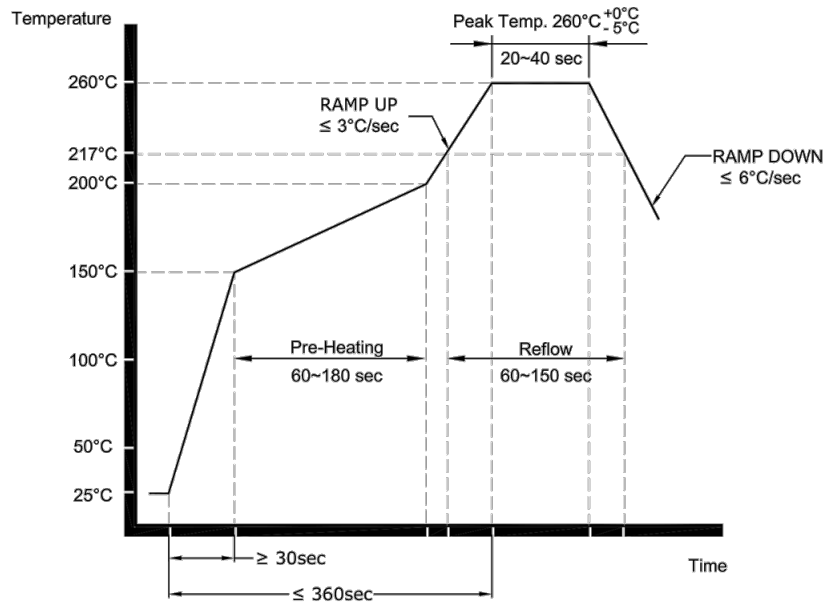
X° = ±1.0°

Hole = ±0.10

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## 15.0 Reflow:



**NOTE:**

The product has been tested to withstand the Reflow Profile shown. The Reflow Profile used to solder Rakon products is determined by the solder paste Manufacturer's specification. It is recommended that the Reflow Profile used does not exceed the one shown above.

TITLE: Pb-FREE SERIES OSCILLATORS REFLOW

FILENAME: CAT541

RELATED DRAWINGS:

REVISION: B

DATE: 05-Sep-11

SCALE: NTS

Millimetres

# rakon

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### 16.0 Specification History

Version	User	Changes	Approver	Date
A	JO	Initial issue	FP	2016-04-01
B	JO	Changed design to dual crystal w/ HCMOS output	FP	2016-04-06
C	JO	Updated specification based on customer feedback	FP	2016-04-28
D	JO	Changed part number to E7184ALF to signify use of SGWB crystal	HP	2017-11-02
E	JO	Outline drawing updated as per PSC383	LY/JS	2019-01-22