

#### ● FEATURES

- ISO/TS 16949 CERTIFIED FACILITY
- RELIABILITY TESTING PER AEC-Q200
- PPAP DOCUMENTATION AVAILABLE
- SMALL PACKAGE OF 2.0 x 1.6 mm
- EXCELLENT TOLERANCE AND STABILITY
- CUSTOM SPECIFICATIONS AVAILABLE



#### ■ SPECIFICATIONS

PARAMETER		VALUE
FREQUENCY RANGE		16.000 MHz to 65.000 MHz
MODE OF OSCILLATION	FUNDAMENTAL	16.000 MHz to 65.000 MHz
FREQUENCY TOLERANCE AT 25°C		±50 ppm max (±10 ppm, ±15 ppm, ±20 ppm and ±30 ppm available)
FREQUENCY STABILITY OVER TEMPERATURE ‡		±50 ppm max (±10 ppm, ±15 ppm, ±20 ppm and ±30 ppm available, see Table 2)
OPERATING TEMPERATURE RANGE ‡		-20°C to +70°C Standard -40°C to +85°C Extended -40°C to +105°C Extended6 -40°C to +125°C Extended1
STORAGE TEMPERATURE RANGE		-55°C to +125°C
AGING		±1 ppm per year max
LOAD CAPACITANCE		6 pF to 32 pF or Series
EQUIVALENT SERIES RESISTANCE		See Table 1
SHUNT CAPACITANCE		3.0 pF max
DRIVE LEVEL		100 µW typ, 500 µW max
INSULATION RESISTANCE		500 MΩ min
SHOCK RESISTANCE		±5 ppm max 75 cm drop test in 3 axes onto a hard wood surface
REFLOW CONDITIONS		260°C 10 s max



‡ Not all combinations of temperature and frequency stability available, consult factory.

**TABLE 1**

FREQUENCY (MHz)	MODE	ESR MAX (Ω)
16 ≤ F0 < 30	FUND	100
30 ≤ F0 ≤ 65	FUND	80

**TABLE 2**

TEMP RANGE (°C)	STABILITY (ppm)				
	±10	±15	±20	±30	±50
-20 to +70	O	O	O	O	O
-40 to +85	×	O	O	O	O
-40 to +105	×	×	△	O	O
-40 to +125	×	×	△	△	O

Note: O: Available, △: Conditional, ×: Not available

**SERIES R2016A**

**■ PART NUMBERING SYSTEM**

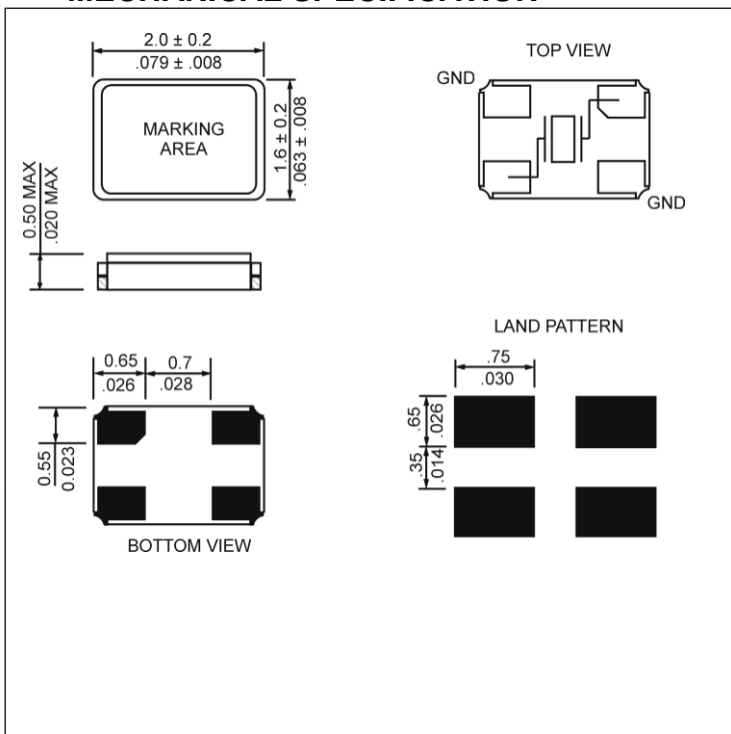
TYPE	FREQUENCY	LOAD CAPACITANCE	MODE	TOLERANCE/STABILITY (PPM/PPM)
R2016A	in MHz	8 to 32 pF for Parallel S for Series	<b>Blank for &lt; 24.576 MHz</b> <b>F for ≥ 24.576 MHz</b>	Blank for max ppm Example: 1020, 2050

EXTENDED TEMPERATURE	TAPE & REEL
Blank for Standard EXT for Extended EXT6 for Extended6 EXT1 for Extended1	TR

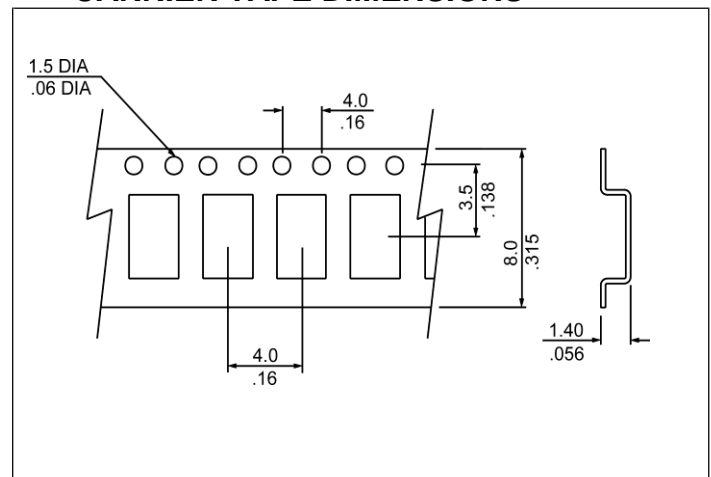
**EXAMPLE: R2016A-24.000-18-3050-EXT1-TR**

AUTOMOTIVE GRADE Surface Mount Microprocessor Crystal, R2016A package, 2.0 x 1.6 mm, 24.000 MHz, Fundamental mode, 18 pF Load, ±30 ppm Tolerance, ±50 ppm Stability from -40°C to +125°C, Tape and reel packaging

**■ MECHANICAL SPECIFICATION**



**■ CARRIER TAPE DIMENSIONS**

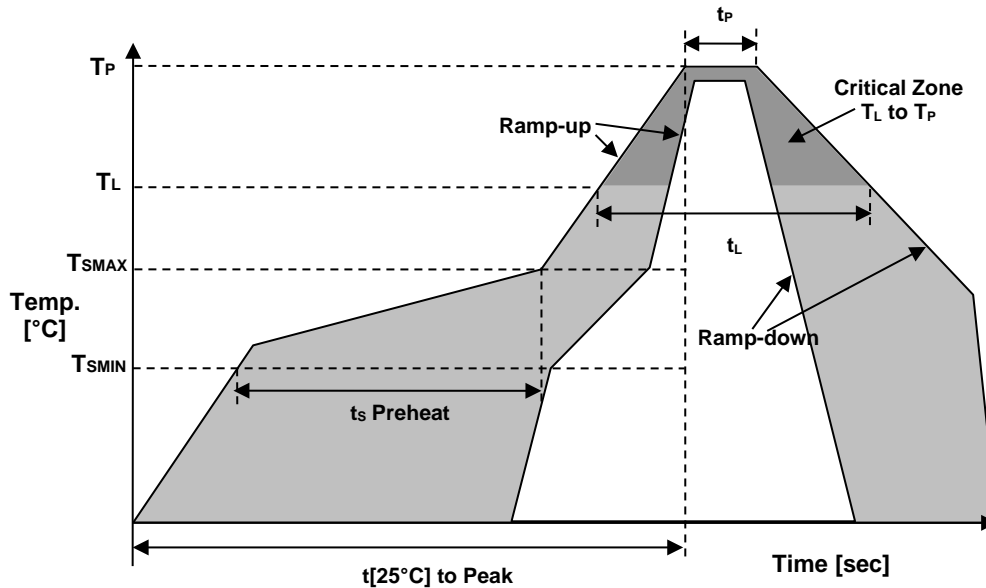


NOTE: REFER TO EIA-481 FOR NON-SPECIFIED DIMENSIONS

**■ PACKAGING**

180 mm REEL DIAMETER  
8 mm TAPE WIDTH, 4 mm PITCH  
QUANTITY: 3000 PIECES PER REEL

## REFLOW PROFILE



Reflow profile (Reference IPC/JEDEC J-STD-020)		
Temperature Min Preheat	$T_{SMIN}$	150°C
Temperature Max Preheat	$T_{SMAX}$	200°C
Time ( $T_{SMIN}$ to $T_{SMAX}$ )	$t_s$	60-180 sec.
Temperature	$T_L$	217°C
Peak Temperature	$T_P$	260°C
Ramp-up rate	$R_{UP}$	3°C/sec max.
Ramp-down rate	$R_{DOWN}$	6°C/sec max.
Time within 5°C of Peak Temperature	$t_P$	10 sec.
Time $t_{[25^\circ\text{C}]}$ to Peak Temperature	$t_{[25^\circ\text{C}]}$ to Peak	480 sec.
Time	$t_L$	60-150 sec.

## ENVIRONMENTAL

PARAMETER	VALUE
MOISTURE SENSITIVITY LEVEL	1
RoHS	Compliant
REACH SVHC	Compliant
HALOGEN-FREE	Compliant
TERMINATION FINISH	Au
UNIT WEIGHT	0.0475 g



The process of manufacturing R2016A series of Automotive Grade Surface Mount Microprocessor Crystals is performed by using **Advanced Product Quality Planning (APQP)**. This technique defines and establishes the following actions:

- Product design activities communicating special characteristics to the process design activity, prior to design release, linking the DFMEA to PFMEA.
- Plan, acquire and install appropriate process equipment and tooling based on design tolerances provided by the customer. – CPPD (Collaborative Product Process Design)
- Assembly personnel communicating suggestions on better ways to assemble a product prior to the completion of the design of the product. – DFA/M (Design for Assembly and Manufacturing)
- Manufacturing or Process Engineering establishing adequate Quality Controls for features of a product or parameters of a process, which still risk potential failure. – Control Plan Methodology
- Performing Stability and Capability studies on special characteristics to understand the variation present and predict future performance. – SPC (Statistical Process Control and Process Capability)

Request for **Production Part Approval Process (PPAP)** documentation must be requested at time of order placement. Requests for part approval will be supported in official PPAP format and with documented results as requested at time of order placement. Actual measurements are taken of the parts produced and are used to complete the various test sheets of PPAP.

## ■ NOTICE

If you intend to use our product referenced above in an automotive application that may result in loss of life or assets, please do not fail to advise us of your intention beforehand. The use of the listed part in those applications is not covered by warranty, and we will not be held accountable for any liability claims. We reserve the right to not supply parts in those circumstances.

December 2022