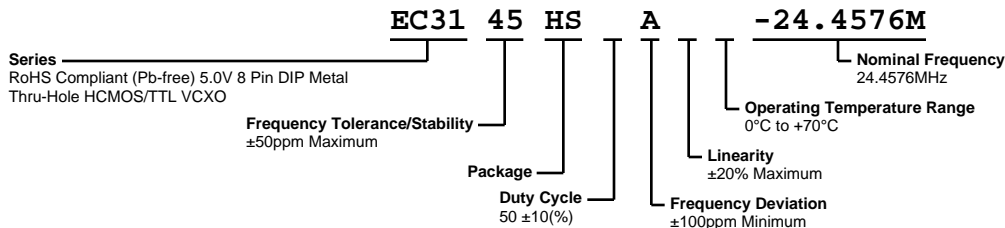


# EC3145HSA-24.4576M



## ELECTRICAL SPECIFICATIONS

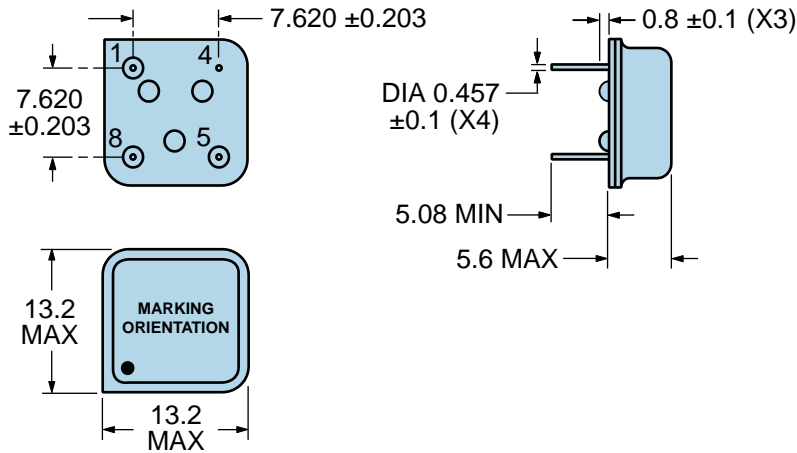
Nominal Frequency	24.4576MHz
Frequency Tolerance/Stability	±50ppm Maximum (Inclusive of all conditions: Calibration Tolerance at 25°C, Frequency Stability over the Operating Temperature Range, Supply Voltage Change, Output Load Change, First Year Aging at 25°C, Shock, and Vibration)
Aging at 25°C	±5ppm/year Maximum
Operating Temperature Range	0°C to +70°C
Supply Voltage	5.0Vdc ±5%
Input Current	40mA Maximum
Output Voltage Logic High (Voh)	2.4Vdc Minimum with TTL Load, Vdd-0.5Vdc Minimum with HCMOS Load
Output Voltage Logic Low (Vol)	0.4Vdc Maximum with TTL Load, 0.5Vdc Maximum with HCMOS Load
Rise/Fall Time	5nSec Maximum (Measured at 0.4Vdc to 2.4Vdc w/TTL Load; Measured at 20% to 80% of waveform with HCMOS Load)
Duty Cycle	50 ±10(%) (Measured at 1.4Vdc with TTL Load or at 50% of waveform with HCMOS Load)
Load Drive Capability	10TTL Load or 15pF HCMOS Load Maximum
Output Logic Type	CMOS
Control Voltage	2.5Vdc ±2.0Vdc
Frequency Deviation	±100ppm Minimum
Linearity	±20% Maximum
Transfer Function	Positive Transfer Characteristic
Absolute Clock Jitter	±100pSec Maximum
One Sigma Clock Period Jitter	±25pSec Maximum
Start Up Time	10mSec Maximum
Storage Temperature Range	-55°C to +125°C

## ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

Fine Leak Test	MIL-STD-883, Method 1014, Condition A
Gross Leak Test	MIL-STD-883, Method 1014, Condition C
Lead Integrity	MIL-STD-883, Method 2004
Mechanical Shock	MIL-STD-202, Method 213, Condition C
Resistance to Soldering Heat	MIL-STD-202, Method 210
Resistance to Solvents	MIL-STD-202, Method 215
Solderability	MIL-STD-883, Method 2003
Temperature Cycling	MIL-STD-883, Method 1010
Vibration	MIL-STD-883, Method 2007, Condition A

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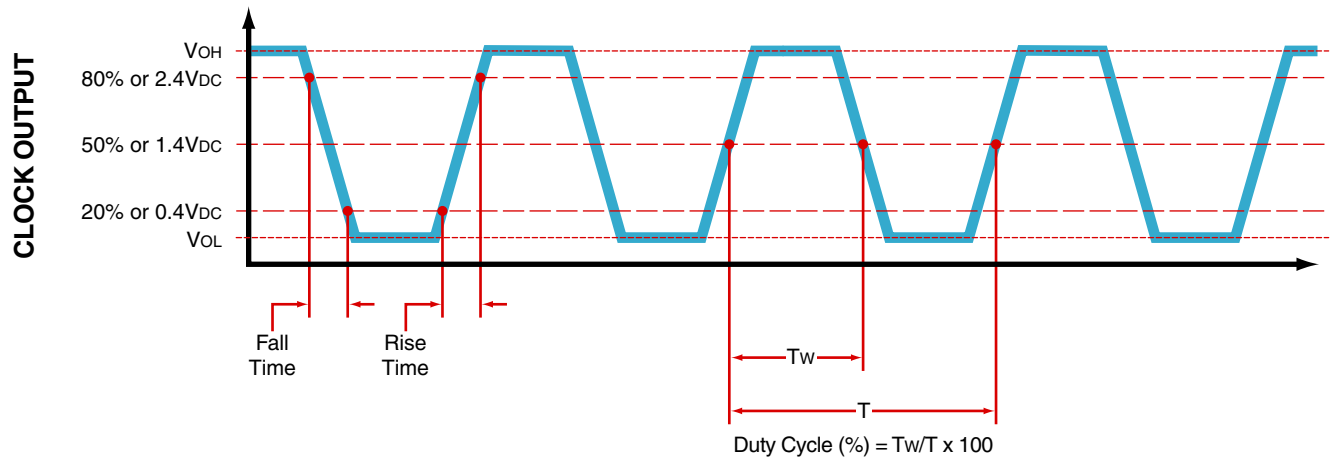
## MECHANICAL DIMENSIONS (all dimensions in millimeters)



PIN	CONNECTION
1	Control Voltage
4	Ground/Case Ground
5	Output
8	Supply Voltage

LINE	MARKING
1	<b>ECLIPTEK</b>
2	<b>EC31</b> EC31=Product Series
3	<b>24.457M</b>
4	<b>XXYYZ</b> XX=Ecliptek Manufacturing Code Y=Last Digit of the Year ZZ=Week of the Year

## OUTPUT WAVEFORM

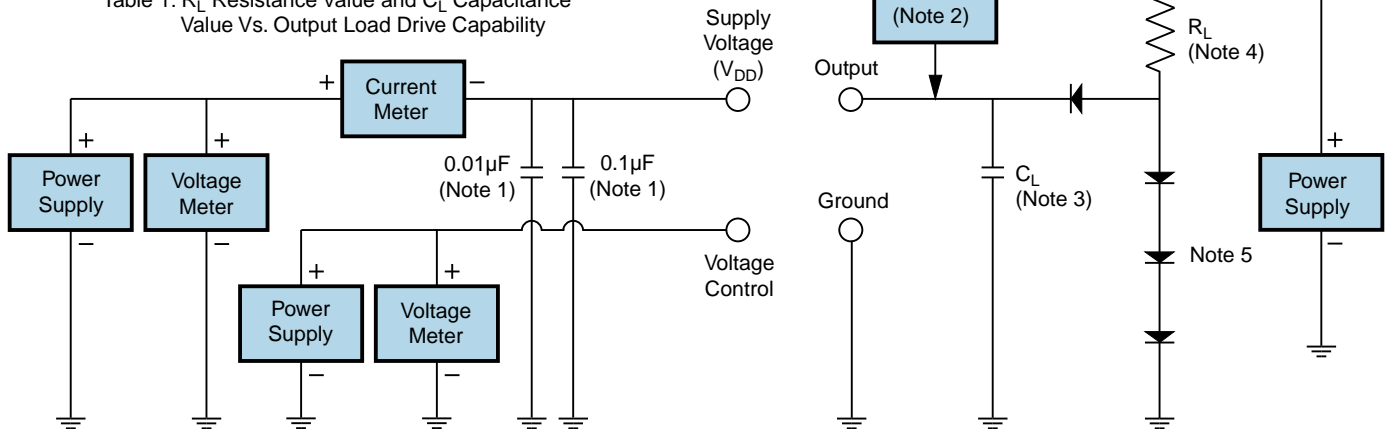


# EC3145HSA-24.4576M

## Test Circuit for TTL Output

Output Load Drive Capability	$R_L$ Value (Ohms)	$C_L$ Value (pF)
10TTL	390	15
5TTL	780	15
2TTL	1100	6
10LSTTL	2000	15
1TTL	2200	3

Table 1:  $R_L$  Resistance Value and  $C_L$  Capacitance Value Vs. Output Load Drive Capability



Note 1: An external 0.1 $\mu$ F low frequency tantalum bypass capacitor in parallel with a 0.01 $\mu$ F high frequency ceramic bypass capacitor close to the package ground and  $V_{DD}$  pin is required.

Note 2: A low capacitance (<12pF), 10X attenuation factor, high impedance (>10Mohms), and high bandwidth (>300MHz) passive probe is recommended.

Note 3: Capacitance value  $C_L$  includes sum of all probe and fixture capacitance.

Note 4: Resistance value  $R_L$  is shown in Table 1. See applicable specification sheet for 'Load Drive Capability'.

Note 5: All diodes are MMBD7000, MMBD914, or equivalent.

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## Test Circuit for CMOS Output



Note 1: An external  $0.1\mu\text{F}$  low frequency tantalum bypass capacitor in parallel with a  $0.01\mu\text{F}$  high frequency ceramic bypass capacitor close to the package ground and  $V_{DD}$  pin is required.

Note 2: A low capacitance ( $<12\text{pF}$ ), 10X attenuation factor, high impedance ( $>10\text{Mohms}$ ), and high bandwidth ( $>300\text{MHz}$ ) passive probe is recommended.

Note 3: Capacitance value  $C_L$  includes sum of all probe and fixture capacitance.

## Recommended Solder Reflow Methods



### High Temperature Solder Bath (Wave Solder)

<b><math>T_s</math> MAX to <math>T_L</math> (Ramp-up Rate)</b>	3°C/second Maximum
<b>Preheat</b>	
- Temperature Minimum ( $T_s$ MIN)	150°C
- Temperature Typical ( $T_s$ TYP)	175°C
- Temperature Maximum ( $T_s$ MAX)	200°C
- Time ( $t_s$ MIN)	60 - 180 Seconds
<b>Ramp-up Rate (<math>T_L</math> to <math>T_p</math>)</b>	3°C/second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	217°C
- Time ( $t_L$ )	60 - 150 Seconds
<b>Peak Temperature (<math>T_p</math>)</b>	260°C Maximum for 10 Seconds Maximum
<b>Target Peak Temperature (<math>T_p</math> Target)</b>	250°C +0/-5°C
<b>Time within 5°C of actual peak (<math>t_p</math>)</b>	20 - 40 seconds
<b>Ramp-down Rate</b>	6°C/second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	8 minutes Maximum
<b>Moisture Sensitivity Level</b>	Level 1

## Recommended Solder Reflow Methods



### Low Temperature Infrared/Convection 185°C

**$T_s$  MAX to  $T_L$  (Ramp-up Rate)** 5°C/second Maximum

#### Preheat

- Temperature Minimum ( $T_s$  MIN) N/A
- Temperature Typical ( $T_s$  TYP) 150°C
- Temperature Maximum ( $T_s$  MAX) N/A
- Time ( $t_s$  MIN) 60 - 120 Seconds

**Ramp-up Rate ( $T_L$  to  $T_p$ )** 5°C/second Maximum

#### Time Maintained Above:

- Temperature ( $T_L$ ) 150°C
- Time ( $t_L$ ) 200 Seconds Maximum

**Peak Temperature ( $T_p$ )** 185°C Maximum

**Target Peak Temperature ( $T_p$  Target)** 185°C Maximum 2 Times

**Time within 5°C of actual peak ( $t_p$ )** 10 seconds Maximum 2 Times

**Ramp-down Rate** 5°C/second Maximum

**Time 25°C to Peak Temperature (t)** N/A

**Moisture Sensitivity Level** Level 1

## Recommended Solder Reflow Methods



### Low Temperature Solder Bath (Wave Solder)

<b><math>T_S</math> MAX to <math>T_L</math> (Ramp-up Rate)</b>	5°C/second Maximum
<b>Preheat</b>	
- Temperature Minimum ( $T_S$ MIN)	N/A
- Temperature Typical ( $T_S$ TYP)	150°C
- Temperature Maximum ( $T_S$ MAX)	N/A
- Time ( $t_s$ MIN)	30 - 60 Seconds
<b>Ramp-up Rate (<math>T_L</math> to <math>T_P</math>)</b>	5°C/second Maximum
<b>Time Maintained Above:</b>	
- Temperature ( $T_L$ )	150°C
- Time ( $t_L$ )	200 Seconds Maximum
<b>Peak Temperature (<math>T_P</math>)</b>	245°C Maximum
<b>Target Peak Temperature (<math>T_P</math> Target)</b>	245°C Maximum 1 Time / 235°C Maximum 2 Times
<b>Time within 5°C of actual peak (<math>t_p</math>)</b>	5 seconds Maximum 1 Time / 15 seconds Maximum 2 Times
<b>Ramp-down Rate</b>	5°C/second Maximum
<b>Time 25°C to Peak Temperature (t)</b>	N/A
<b>Moisture Sensitivity Level</b>	Level 1

### Low Temperature Manual Soldering

185°C Maximum for 10 seconds Maximum, 2 times Maximum.

### High Temperature Manual Soldering

260°C Maximum for 5 seconds Maximum, 2 times Maximum.