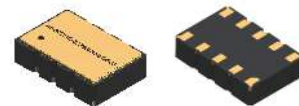


Ultra-low Power Real Time Clock Module with I²C Bus

AB-RTCMC-32.768kHz-IBO5-S3



RoHS/RoHS II compliant



3.7 x 2.5 x 0.9 mm

Moisture Sensitivity Level: MSL=1

FEATURES:

- Ultra-Low current consumption:
XTAL Mode 60nA typ. @3.0V
RC Mode 17nA typ. @3.0V
RC Autocalibrated Mode 22nA typ. @3.0V
- RTC module with built-in crystal oscillating at 32.768 kHz
- Operating voltage: 1.5 – 3.6V
- Operating temperature range: -40 to +85°C
- Factory calibrated Time accuracy ±2.0ppm typ. @ 25°C
- Automatic Battery Switchover
- Trickle Charger, Power Management & Power Switch Function
- Programmable CLKOUT frequencies
- I²C Bus Interface (fast mode 400kHz)
- Time keeping mode down to 1.5 V
- Programmable Alarm, Timer and INT
- Up to 512 Bytes of general purpose RAM
- Small and compact package size: 3.7 x 2.5 x 0.9 mm. RoHS-compliant and 100% lead free

APPLICATIONS:

- Smart cards
- Wireless sensors and tags
- Medical/Healthcare electronics
- Sports and fitness electronics
- Smart Utility meters
- Data loggers
- Appliances
- Tracking systems
- Home security systems
- Industrial and Consumer electronics
- Communications equipment

STANDARD SPECIFICATIONS:

Absolute Maximum Ratings

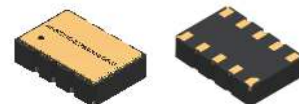
| Parameters | | Min. | Typ. | Max. | Units | Notes |
|---|---------------------------------|------|------|---------------------------|-------|-------------------------------------|
| Power Supply Voltage (V _{DD}) | | -0.3 | | 3.8 | V | |
| Backup Supply voltage (V _{BACKUP}) | | -0.3 | | 3.8 | V | |
| Input Voltage (V _I) | V _{DD} Power state | -0.3 | | V _{DD} + 0.3 | V | |
| | V _{BACKUP} Power State | -0.3 | | V _{BACUUP} + 0.3 | V | |
| Output Voltage (V _O) | V _{DD} Power state | -0.3 | | V _{DD} + 0.3 | V | |
| | V _{BACKUP} Power State | -0.3 | | V _{BACUUP} + 0.3 | V | |
| Input Current (I _I) | | -10 | | 10 | mA | |
| Output Current (I _O) | | -20 | | 20 | mA | |
| PSW Output Continuous Current (I _{OPC}) | | | | 50 | mA | |
| PSW Output Pulsed Current (I _{OPP}) | | | | 150 | mA | 1 second pulse |
| ESD Voltage (V _{ESD}) | CDM | | | ±500 | V | Charged Device Model |
| | HBM | | | ±4000 | V | Human Body Model |
| Latch-up Current (I _{LU}) | | | | 100 | mA | |
| Operating Temperature Range (T _{OP}) | | -40 | | +85 | °C | |
| Storage Temperature (T _{STG}) | | -55 | | +125 | °C | Stored as bare product |
| Lead Temperature (T _{SLD}) | | | | +300 | °C | Hand soldering for 10s |
| Reflow Soldering Temperature (T _{REF}) | | | | +260 | °C | Reflow profile per JEDEC J-STD-020D |

Ultra-low Power Real Time Clock Module with I²C Bus

AB-RTCMC-32.768kHz-IBO5-S3

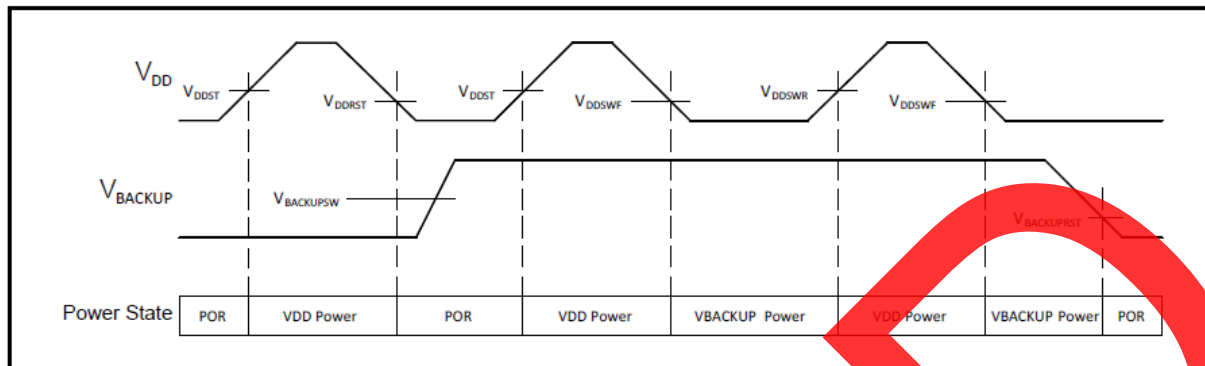


RoHS/RoHS II compliant



3.7 x 2.5 x 0.9 mm

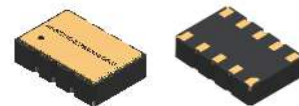
Power Supply and Switchover Parameters



T_A = -40 to +85°C, Typ. values at +25°C

| Parameters | Type | Power State | Test Conditions | Min. | Typ. | Max. | Units |
|--|---------|---|--|------|------|------|-------|
| System Power Voltage (V _{DD}) | Static | V _{DD} Power | Clocks operating and RAM and registers retained | 1.5 | 3.6 | | V |
| V _{DD} I ² C Interface Voltage (V _{DDIO}) | Static | V _{DD} Power | I ² C operation | 1.5 | | 3.6 | V |
| V _{DD} Start-up Voltage (V _{DDST}) ⁽¹⁾ | Rising | POR->V _{DD} Power | | 1.6 | | | V |
| V _{DD} Reset Voltage (V _{DDRST}) | Falling | V _{DD} Power -> POR | V _{BACKUP} < V _{BACKUP, MIN} or no V _{BACKUP} | | 1.3 | 1.5 | V |
| V _{DD} Rising Switchover Threshold Voltage (V _{DDSWR}) | Rising | V _{BACKUP} Power -> V _{DD} Power | V _{BACKUP} ≥ V _{BACKURST} | | 1.6 | 1.7 | V |
| V _{DD} Falling Switchover Threshold Voltage (V _{DDSWF}) | Falling | V _{DD} Power -> V _{BACKUP} Power | V _{BACKUP} ≥ V _{BACKSW, MIN} | 1.2 | 1.5 | | V |
| V _{DD} Switchover Threshold Hysteresis (V _{DDSWH}) ⁽²⁾ | Hyst. | V _{DD} Power <-> V _{BACKUP} Power | | | 70 | | mV |
| V _{DD} Falling Slew Rate to Switch to V _{BACKUP} State (V _{DDFS}) ⁽⁴⁾ | Falling | V _{DD} Power -> V _{BACKUP} Power | V _{DD} < V _{DDSW, MAX} | 0.7 | 1.4 | | V |
| Backup Voltage (V _{BACKUP}) | Static | V _{BACKUP} Power | Clocks operating and RAM and registers retained | 1.4 | | 3.6 | V |
| Backup Switchover Voltage Range (V _{BACKSW}) ⁽⁵⁾ | Static | V _{DD} Power -> V _{BACKUP} Power | | 1.6 | | 3.6 | V |
| Falling Backup POR Voltage (V _{BACKURST}) ⁽⁷⁾ | Falling | V _{BACKUP} Power -> POR | V _{DD} < V _{DDSWF} | | 1.1 | 1.4 | V |
| V _{BACK} Margin above V _{DD} (V _{BMRG}) ⁽³⁾ | Static | V _{BACKUP} Power | | 200 | | | mV |
| V _{BACK} Supply Series Resistance (R _{BACKESR}) ⁽⁶⁾ | Static | V _{BACKUP} Power | | 1.0 | 1.5 | | kΩ |

Ultra-low Power Real Time Clock Module with I²C Bus



3.7 x 2.5 x 0.9 mm

AB-RTCMC-32.768kHz-IBO5-S3



RoHS/RoHS II compliant

- (1) V_{DD} must be above V_{DDST} to exit the POR state, independent of the V_{BACKUP} voltage.
- (2) Difference between V_{DDSWR} and V_{DDSWF} .
- (3) V_{BACKUP} must be higher than V_{DD} by at least this voltage to insure the AB-RTCMC-32.768kHz-IBO5-S3 remains in the V_{BACKUP} Power state.
- (4) Maximum V_{DD} falling slew rate to guarantee correct switchover to V_{BACKUP} Power state. There is no V_{DD} falling slew rate requirement if switching to the V_{BACKUP} power source is not required.
- (5) V_{BACKUP} voltage to guarantee correct transition to V_{BACKUP} Power state when V_{DD} falls.
- (6) Total series resistance of the power source attached to the V_{BACKUP} pin. The optimal value is 1.5 k Ω , which may require an external resistor. V_{BACKUP} power source ESR (Equivalent Series Resistance) + external resistor value = 1.5 k Ω .
- (7) $V_{BACKRST}$ is also the static voltage required on V_{BACKUP} for register data retention.

Operating Parameters

$T_A = -40$ to $+85^\circ\text{C}$, Typ. values at $+25^\circ\text{C}$

| Parameters | Test Conditions | V_{DD} | Min. | Typ. | Max. | Units |
|---|-----------------|-------------|------|------|------|----------|
| Positive-going Input Threshold Voltage (V_{T+}) | | 3.0V | | 1.5 | 2.0 | V |
| | | 1.8V | | 1.1 | 1.25 | |
| Negative-going Input Threshold Voltage (V_{T-}) | | 3.0V | 0.8 | 0.9 | | V |
| | | 1.8V | 0.5 | 0.6 | | |
| Input Leakage Current (I_{LEAK}) | | 3.0V | | 0.02 | 80 | nA |
| Input Capacitance (C_I) | | | | 3 | | pF |
| PSW Output Resistance to V_{DD} ($R_{DS(on)}$) | PSW enabled | 1.7V | | 1.7 | 5.8 | Ω |
| | | 1.8V | | 1.6 | 5.4 | |
| | | 3.0V | | 1.1 | 3.8 | |
| | | 3.6V | | 1.05 | 3.7 | |
| Output Leakage Current (I_{OLEAK}) | | 1.7V – 3.6V | | 0.02 | 80 | nA |

Oscillator Parameters

$T_A = -40$ to $+85^\circ\text{C}$ unless otherwise indicated. $V_{DD} = 1.7$ to 3.6V, Typ. values at $+25^\circ\text{C}$ and 3.0V

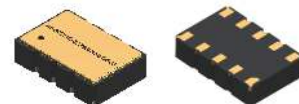
| Parameters | Test Conditions | Min. | Typ. | Max. | Units |
|---|--|------|--------|------|-------|
| Crystal Frequency (F_{XT}) | | | 32.768 | | kHz |
| XT Oscillator Failure Detection Frequency (F_{OF}) | | | 8 | | kHz |
| Calibrated RC Oscillator Frequency (F_{RCC}) ⁽¹⁾ | Factory calibrated at $+25^\circ\text{C}$, $V_{DD} = 2.8\text{V}$ | | 64 | | Hz |
| Uncalibrated RC Oscillator Frequency (F_{RCU}) | Calibration disabled (OFFSETR=0) – 128Hz level | 89 | 122 | 200 | Hz |
| Uncalibrated RC Oscillator Cycle-to-Cycle Jitter, Median (J_{RCCC}) | Calibration disabled (OFFSETR=0) – 128Hz level | | 2000 | | ppm |
| | Calibration disabled (OFFSETR=0) – 1Hz level | | 500 | | |
| RC Oscillator Cycle-to-Cycle Jitter, MIN, MAX (J_{RCCC}) | 128Hz level at $+25^\circ\text{C}$ | -1 | | 1 | % |
| | 128Hz level -10 to $+70^\circ\text{C}$ | -3.5 | | 3.5 | |
| | 128Hz level -40 to $+85^\circ\text{C}$ | -10 | | 10 | |
| XT Mode Digital Calibration Accuracy (A_{XT}) ⁽¹⁾ | Calibrated at an initial temperature and voltage. Factory calibrated at $+25^\circ\text{C}$, $V_{DD} = 3.0\text{V}$ | -2 | | +2 | ppm |

Ultra-low Power Real Time Clock Module with I²C Bus

AB-RTCMC-32.768kHz-IBO5-S3



RoHS/RoHS II compliant



3.7 x 2.5 x 0.9 mm

(Continued)

T_A = -40 to +85°C unless otherwise indicated. V_{DD} = 1.7 to 3.6V, Typ. values at +25°C and 3.0V

| Parameters | Test Conditions | Min. | Typ. | Max. | Units |
|--|------------------|------|------|------|-------|
| Autocalibration Mode Timing Accuracy, 512 second period, T _A = -10 to +60°C (A _{AC}) ⁽¹⁾ | 24 hour run time | | 35 | | ppm |
| | 1 week run time | | 20 | | |
| | 1 month run time | | 10 | | |
| | 1 year run time | | 3 | | |
| Autocalibration Mode Operating Temperature (T _{AC}) ⁽²⁾ | | -10 | | +60 | °C |

(1) Timing accuracy is specified at 25°C after digital calibration of the internal RC oscillator and digital calibration of the 32.768 kHz crystal. The 32.768 kHz tuning fork crystal has a negative temperature coefficient with a parabolic frequency deviation, which can result in a change of up to 150 ppm across the entire operating temperature range of -40°C to 85°C in XT mode. Autocalibration mode timing accuracy is specified relative to XT mode timing accuracy from -10°C to 60°C.

(2) Outside of this temperature range, the RC oscillator frequency change due to temperature may be outside of the allowable RC digital calibration range (+/-12%) for autocalibration mode. When this happens, an autocalibration failure will occur and the ACF interrupt flag is set. The AB-RTCMC-32.768kHz-IBO5-S3 should be switched to use the XT oscillator as its clock source when this occurs. Please see the AUTOCALIBRATION FAILURE section in the application manual for more details.

XT Frequency Characteristics

T_A = -40 to +85°C unless otherwise indicated. V_{DD} = 1.7 to 3.6V, Typ. values at +25°C and 3.0V, f_{OSC} = 32.768kHz

| Parameters | Test Conditions | Min. | Typ. | Max. | Units |
|--|--|--|---------------------|------|-------|
| Frequency Accuracy (ΔF/F) | T _A = +25°C; Calibration disabled (OFFSETX=0) | | ±100 ⁽¹⁾ | | ppm |
| Frequency vs. Temperature Characteristics (ΔF/F ₀) | T _{OPR} = -40 to +85°C | -0.035 ^{ppm/°C} * (T _{OPR} -T ₀) ² ±10% | | | ppm |
| Turnover Temperature (T ₀) | | +20 | +25 | +30 | °C |
| Aging First Year | T _A = +25°C | | | ±3 | ppm |
| Oscillator Start-up Voltage | T _A = -40 to +85°C | 1.6 | | | V |
| Oscillator Start-up Time | V _{DD} = 1.7V – 3.6V | | 1.0 | | s |
| CLKOUT Duty Cycle | F _{CLKOUT} = 32.768kHz; T _A = +25°C | 50 | 60 | 70 | % |

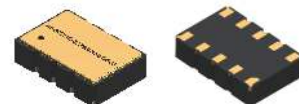
(1) The XT mode digital calibration accuracy is +/-2 ppm, see OSCILLATOR PARAMETERS.

Ultra-low Power Real Time Clock Module with I²C Bus

AB-RTCMC-32.768kHz-IBO5-S3

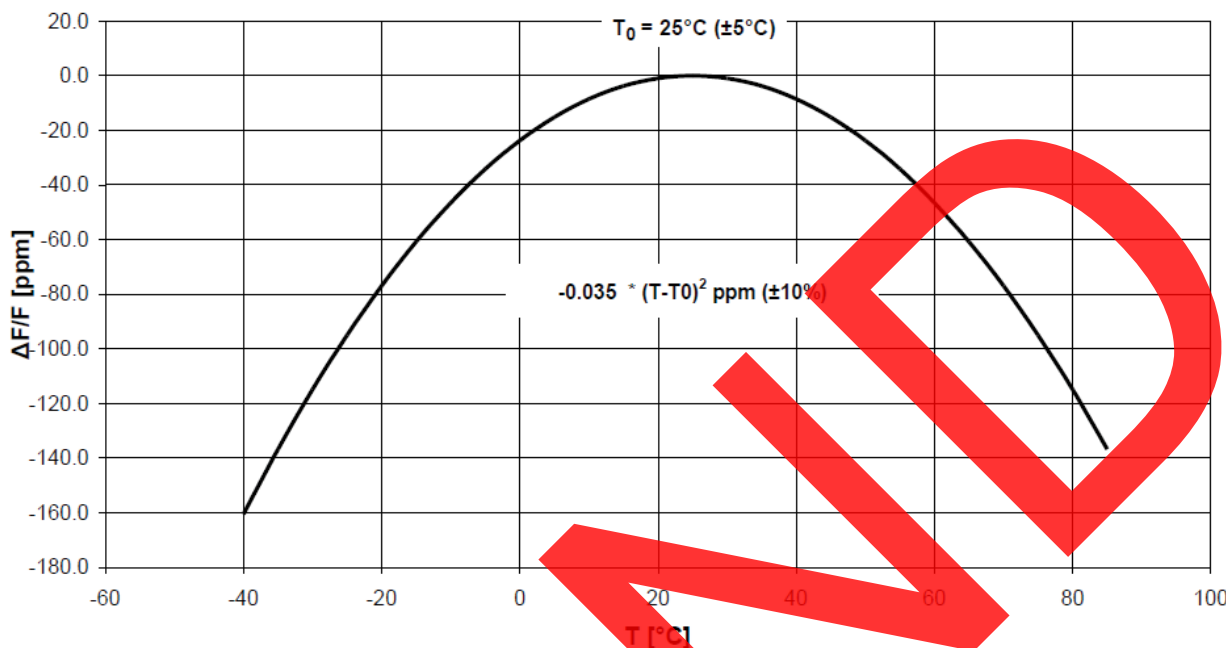


RoHS/RoHS II compliant



3.7 x 2.5 x 0.9 mm

XT Frequency vs. Temperature Characteristics



V_{DD} Supply Current

T_A = -40 to +85°C. V_{BACKUP} = 0 to 3.6V. Typ. values at +25°C. V_{DD} power state

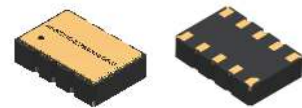
| Parameters | Test Conditions | V _{DD} | Min. | Typ. | Max. | Units |
|--|---|-----------------|------|------|------|-------|
| V _{DD} Supply Current during I2C burst Read/Write (I _{VDD:I2C}) | 400kHz bus speed, 2.2k pull-up resistors on SCL/SDA ⁽¹⁾ | 3.0V | | 6 | 10 | μA |
| | | 1.8V | | 1.5 | 3 | |
| V _{DD} Supply Current in XT Oscillator Mode (I _{VDD:XT}) | Time keeping mode with XT oscillator running ⁽²⁾ | 3.0V | | 60 | 330 | nA |
| | | 1.8V | | 27 | 290 | |
| V _{DD} Supply Current in RC Oscillator Mode (I _{VDD:RC}) | Time keeping mode with only the RC oscillator running (XT oscillator is off) ⁽²⁾ | 3.0V | | 17 | 220 | nA |
| | | 1.8V | | 14 | 170 | |
| Average V _{DD} Supply Current in Autocalibrated RC Oscillator Mode (I _{VDD:ACAL}) | Time keeping mode with only the RC oscillator running and Autocalibration enabled. ACP=512 seconds ⁽²⁾ | 3.0V | | 22 | 235 | nA |
| | | 1.8V | | 18 | 190 | |
| Additional V _{DD} Supply Current with CLK/INT at 32.768kHz (I _{VDD:CK32}) | Time keeping mode with XT oscillator running, 32.768kHz square wave on CLK/INT ⁽³⁾ | 3.0V | | 0.71 | | μA |
| | | 1.8V | | 0.34 | | |
| Additional V _{DD} Supply Current with CLK/INT at 64Hz (I _{VDD:CK64}) | All time keeping mode, 64Hz square wave on CLK/INT ⁽³⁾ | 3.0V | | 0.6 | | nA |
| | | 1.8V | | 0.3 | | |

Ultra-low Power Real Time Clock Module with I²C Bus

AB-RTCMC-32.768kHz-IBO5-S3



RoHS/RoHS II compliant



3.7 x 2.5 x 0.9 mm

- (1) Excluding external peripherals and pull-up resistor current. All other inputs (besides SDA and SCL) are at 0V or V_{DD} .
 Test conditions: Continuous burst read/write, 55h data pattern, 25 μ s between each data byte, 20 pF load on each bus pin.
- (2) All inputs and outputs are at 0V or V_{DD} .
- (3) All inputs and outputs except CLK / INT are at 0V or V_{DD} . 15 pF load on CLK / INT, pull-up resistor current not included.

V_{BACKUP} Supply Current

$T_A = -40$ to $+85^\circ\text{C}$. Typ. values at $+25^\circ\text{C}$, Max. values at $+85^\circ\text{C}$. V_{BACKUP} power state

| Parameters | Test Conditions | V_{DD} | V_{BACKUP} | Min. | Typ. | Max. | Units |
|---|---|--------------|--------------|------|------|------|-------|
| V_{BACKUP} Supply Current in XT Oscillator Mode ($I_{VBACK:XT}$) | Time keeping mode with XT oscillator running ⁽¹⁾ | $<V_{DDSWF}$ | 3.0V | | 63 | 330 | nA |
| | | | 1.8V | | 60 | 290 | |
| V_{BACKUP} Supply Current in RC Oscillator Mode ($I_{VBACK:RC}$) | Time keeping mode with only the RC oscillator running (XT oscillator is off) ⁽¹⁾ | $<V_{DDSWF}$ | 3.0V | | 19 | 220 | nA |
| | | | 1.8V | | 16 | 170 | |
| Average V_{BACKUP} Supply Current in Autocalibrated RC Oscillator Mode ($I_{VBACK:ACAL}$) | Time keeping mode with only the RC oscillator running and Autocalibration enabled. ACP=512 seconds ⁽¹⁾ | $<V_{DDSWF}$ | 3.0V | | 25 | 235 | nA |
| | | | 1.8V | | 21 | 190 | |
| V_{BACKUP} Supply Current in V_{DD} powered mode ($I_{VBACK:VDD}$) | V_{DD} powered mode ⁽¹⁾ | 1.7-3.6V | 3.0V | -5 | 0.6 | 20 | nA |
| | | | 1.8V | -10 | 0.5 | 16 | |

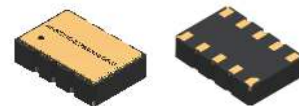
- (1) Test conditions: All inputs and outputs are at 0V or V_{DD} .

BREF Electrical Characteristics

$T_A = -20$ to $+70^\circ\text{C}$. Typ. values at $+25^\circ\text{C}$, $V_{DD} = 1.7$ to 3.6V

| Parameters | BREF | Min. | Typ. | Max. | Units |
|--|------|------|------|------|-------|
| V_{BACKUP} Falling Threshold (V_{BRF}) | 0111 | 2.3 | 2.5 | 3.3 | V |
| | 1011 | 1.9 | 2.1 | 2.8 | |
| | 1101 | 1.6 | 1.8 | 2.5 | |
| | 1111 | | 1.4 | | |
| V_{BACKUP} Rising Threshold (V_{BRR}) | 0111 | 2.6 | 3.0 | 3.4 | V |
| | 1011 | 2.1 | 2.5 | 2.9 | |
| | 1101 | 1.9 | 2.2 | 2.7 | |
| | 1111 | | 1.6 | | |

Ultra-low Power Real Time Clock Module with I²C Bus



3.7 x 2.5 x 0.9 mm

AB-RTCMC-32.768kHz-IBO5-S3



RoHS/RoHS II compliant

(Continued)

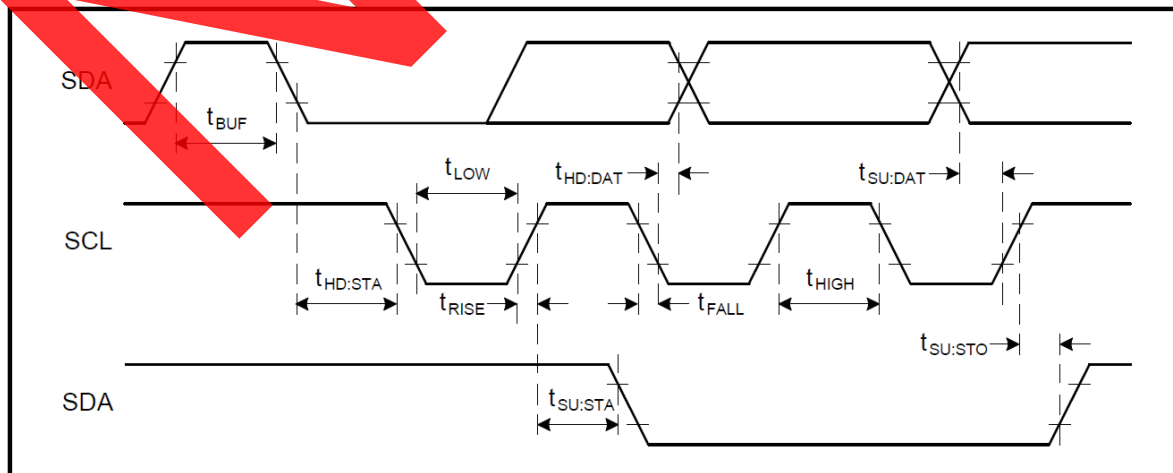
T_A = -20 to +70°C. Typ. values at +25°C, V_{DD} = 1.7 to 3.6V.

| Parameters | BREF | Min. | Typ. | Max. | Units |
|--|-----------------------|------|------|------|-------|
| V _{BACKUP} Threshold Hysteresis (V _{BRH}) | 0111 | | 0.5 | | V |
| | 1011 | | 0.4 | | |
| | 1101 | | 0.4 | | |
| | 1111 | | 0.2 | | |
| BREF/BPOL Change to BBOD Valid (t _{BREF}) | All valid BREF values | | 1000 | | ms |
| V _{BACKUP} Analog Comparator Recommended Operating Temperature Range (T _{BR}) | All valid BREF Values | -20 | | +70 | °C |

I²C AC Electrical Characteristics

T_A = -40 to +85°C. Typ. values at +25°C

| Parameters | V _{DD} | Min. | Typ. | Max. | Units |
|---|-----------------|------|------|------|-------|
| SCL Input Clock Frequency (f _{SCL}) | 1.7 – 3.6V | 10 | | 400 | kHz |
| Low Period of SCL Clock (t _{LOW}) | 1.7 – 3.6V | 1.3 | | | µs |
| High Period of SCL Clock (t _{HIGH}) | 1.7 – 3.6V | 600 | | | ns |
| Rise Time of SDA and SCL (t _{RISE}) | 1.7 – 3.6V | | | 300 | ns |
| Fall Time of SDA and SCL (t _{FALL}) | 1.7 – 3.6V | | | 300 | ns |
| START Condition Hold Time (t _{HD:STA}) | 1.7 – 3.6V | 600 | | | ns |
| START Condition Setup Time (t _{SU:STA}) | 1.7 – 3.6V | 600 | | | ns |
| SDA Setup Time (t _{SU:DAT}) | 1.7 – 3.6V | 100 | | | ns |
| SDA Hold Time (t _{HD:DAT}) | 1.7 – 3.6V | 0 | | | ns |
| STOP Condition Setup Time (t _{SU:STO}) | 1.7 – 3.6V | 600 | | | ns |
| Bus Free Time before a New Transmission (t _{BUF}) | 1.7 – 3.6V | 1.3 | | | µs |

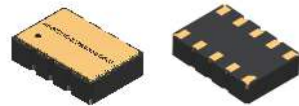


Ultra-low Power Real Time Clock Module with I²C Bus

AB-RTCMC-32.768kHz-IBO5-S3



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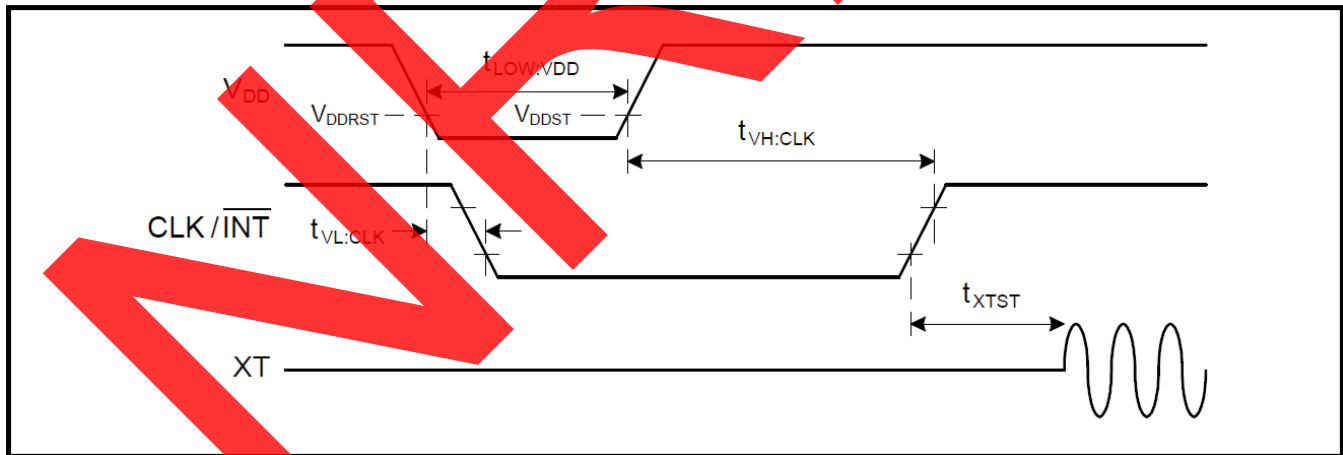


3.7 x 2.5 x 0.9 mm

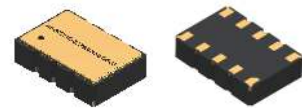
Power-on AC Electrical Characteristics

$T_A = -40$ to $+85^\circ\text{C}$. $V_{\text{BACKUP}} < 1.2\text{V}$

| Parameters | V_{DD} | T_A | Min. | Typ. | Max. | Units |
|--|-----------------|-------|------|------|------|-------|
| Low Period of V_{DD} to Ensure a Valid POR ($t_{\text{LOW:VDD}}$) | 1.7 – 3.6V | +85°C | | 0.1 | | s |
| | | +25°C | | 0.1 | | |
| | | -20°C | | 1.5 | | |
| | | -40°C | | 10 | | |
| V_{DD} Low to $\overline{\text{CLK/INT}}$ Low ($t_{\text{VL:CLK}}$) | 1.7 – 3.6V | +85°C | | 0.1 | | s |
| | | +25°C | | 0.1 | | |
| | | -20°C | | 1.5 | | |
| | | -40°C | | 10 | | |
| V_{DD} High to $\overline{\text{CLK/INT}}$ High ($t_{\text{VH:CLK}}$) | 1.7 – 3.6V | +85°C | | 0.4 | | s |
| | | +25°C | | 0.5 | | |
| | | -20°C | | 3 | | |
| | | -40°C | | 20 | | |
| $\overline{\text{CLK/INT}}$ High to XT Oscillator Start (t_{XTST}) | 1.7 – 3.6V | +85°C | | 0.4 | | s |
| | | +25°C | | 0.4 | | |
| | | -20°C | | 0.5 | | |
| | | -40°C | | 1.5 | | |



Ultra-low Power Real Time Clock Module with I²C Bus



3.7 x 2.5 x 0.9 mm

AB-RTCMC-32.768kHz-IBO5-S3

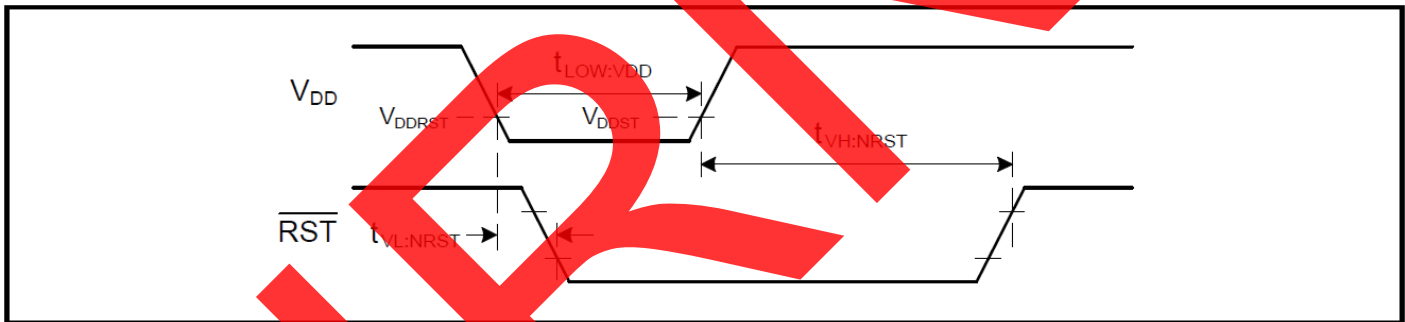


RoHS/RoHS II compliant

RST AC Electrical Characteristics

$T_A = -40$ to $+85^\circ\text{C}$. $V_{\text{BACKUP}} < 1.2\text{V}$

| Parameters | V_{DD} | T_A | Min. | Typ. | Max. | Units |
|---|-----------------|-------|------|------|------|-------|
| Low Period of V_{DD} to Ensure a Valid POR ($t_{\text{LOW:VDD}}$) | 1.7 – 3.6V | +85°C | | 0.1 | | s |
| | | +25°C | | 0.1 | | |
| | | -20°C | | 1.5 | | |
| | | -40°C | | 10 | | |
| V_{DD} Low to $\overline{\text{RST}}$ Low ($t_{\text{VL:NRST}}$) | 1.7 – 3.6V | +85°C | | 0.1 | | s |
| | | +25°C | | 0.1 | | |
| | | -20°C | | 1.5 | | |
| | | -40°C | | 10 | | |
| V_{DD} High to $\overline{\text{RST}}$ High ($t_{\text{VH:NRST}}$) | 1.7 – 3.6V | +85°C | | 0.5 | | s |
| | | +25°C | | 0.5 | | |
| | | -20°C | | 3.5 | | |
| | | -40°C | | 25 | | |



PART IDENTIFICATION

AB-RTCMC-32.768 kHz-IBO5-S3-



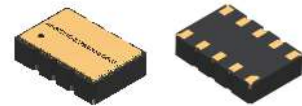
| Packaging |
|-----------------|
| Blank: Bulk |
| T: 1000pcs/reel |

Ultra-low Power Real Time Clock Module with I²C Bus

AB-RTCMC-32.768kHz-IBO5-S3

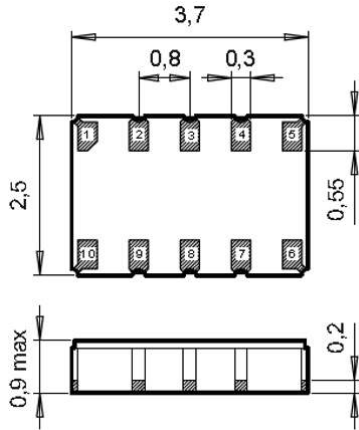


RoHS/RoHS II compliant

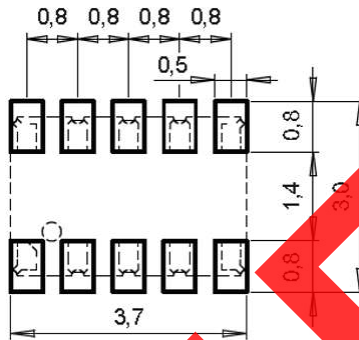


3.7 x 2.5 x 0.9 mm

OUTLINE DIMENSION:



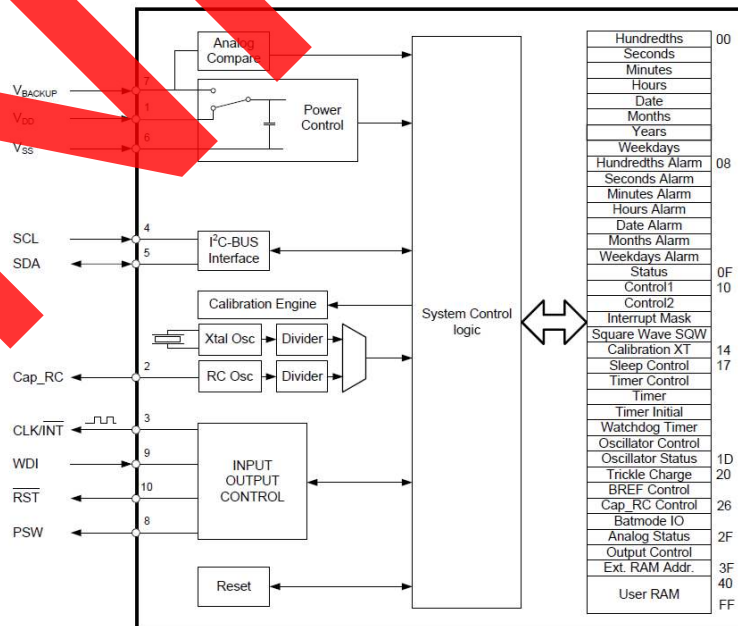
Recommended Land Pattern



| Pin No. | Pin Name | Function |
|---------|---------------------|-------------------------|
| 1 | V _{DD} | Power Supply Voltage |
| 2 | Cap_RC | Capacitor RC-Oscillator |
| 3 | CLK/INT | Clock Output/Interrupt |
| 4 | SCL | Serial Clock Input |
| 5 | SDA | Serial Data |
| 6 | V _{SS} | Ground |
| 7 | V _{BACKUP} | Backup Supply Voltage |
| 8 | PSW | Power Switch Output |
| 9 | WDI | Watchdog Input |
| 10 | RST | Reset Output |

Dimensions: mm

BLOCK DIAGRAM:

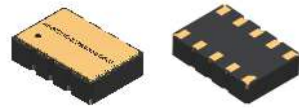


Ultra-low Power Real Time Clock Module with I²C Bus

AB-RTCMC-32.768kHz-IBO5-S3



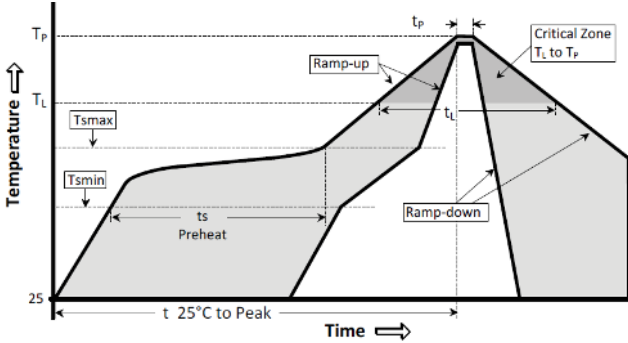
RoHS/RoHS II compliant



3.7 x 2.5 x 0.9 mm

REFLOW PROFILE:

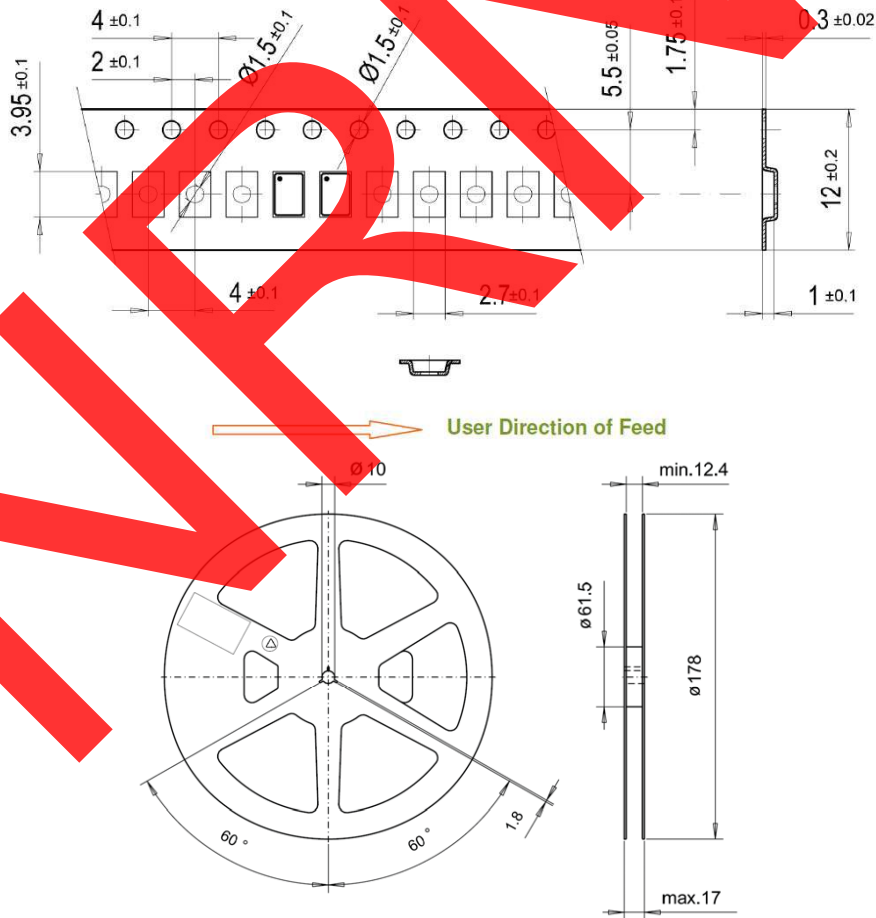
Maximum Reflow Conditions in accordance with IPC/JEDEC J-STD-020C "Pb-free"



| Temperature | Conditions | Units |
|---|----------------|-------|
| Average Ramp-up Rate (T_{Smax} to T_p) | 3°C/second max | °C/s |
| Ramp Down Rate (T_{cool}) | 6°C/second max | °C/s |
| Time 25°C to Peak Temperature ($T_{to-peak}$) | 8 minutes max | m |
| Preheat | | |
| Temperature Min (T_{Smin}) | 150 | °C |
| Temperature Max (T_{Smax}) | 200 | °C |
| Time T_{Smin} to T_{Smax} (t_s) | 60 ~ 180 | sec |
| Time Above Liquidus | | |
| Temperature Liquidus (T_L) | 217 | °C |
| Time above Liquidus (t_L) | 60 ~ 150 | sec |
| Peak Temperature | | |
| Peak Temperature (T_p) | 260 | °C |
| Time within 5°C of Peak Temperature (t_p) | 20 ~ 40 | sec |

TAPE & REEL:

T = 1000pcs/reel



Dimensions: mm

ATTENTION: Abracon Corporation's products are COTS – Commercial-Off-The-Shelf products; suitable for Commercial, Industrial and, where designated, Automotive Applications. Abracon's products are not specifically designed for Military, Aviation, Aerospace, Life-dependant Medical applications or any application requiring high reliability where component failure could result in loss of life and/or property. For applications requiring high reliability and/or presenting an extreme operating environment, written consent and authorization from Abracon Corporation is required. Please contact Abracon Corporation for more information.



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