



## M4TXX-BR12SH

### TIMEKEEPER SNAPHAT (Battery & Crystal)

- Provides Battery Backup Power for Non-Volatile TIMEKEEPERS and Controllers in the SNAPHAT SOIC Package
- Removable Battery Avoids Heat Associated with Surface Mount Process
- Snaps Directly onto Surface-Mounted SNAPHAT SOIC
- Choice of Battery Capacities
  - M4T28-BR12SH = 48 mAh
  - M4T32-BR12SH = 120 mAh
- Keyed Insertion to Insure Proper Assembly
- Removable for Replacement and Proper Disposal
- Available in Tubes or Tape & Reel
- For Use with the 28 and 44 pin SOIC Versions of the TIMEKEEPER Product Families

#### DESCRIPTION

The M4Txx-BR12SH SNAPHAT top is a detachable lithium power source for ST's non-volatile TIMEKEEPER surface mount SOIC (MH) package (28 and 44 pin).

The SNAPHAT top contains both the battery and crystal and is designed to be "snapped on" after the SOIC is surface mounted on the PC board. Thus the two piece solution avoids the battery and crystal from having to be exposed to the high temperatures of the surface mount process.

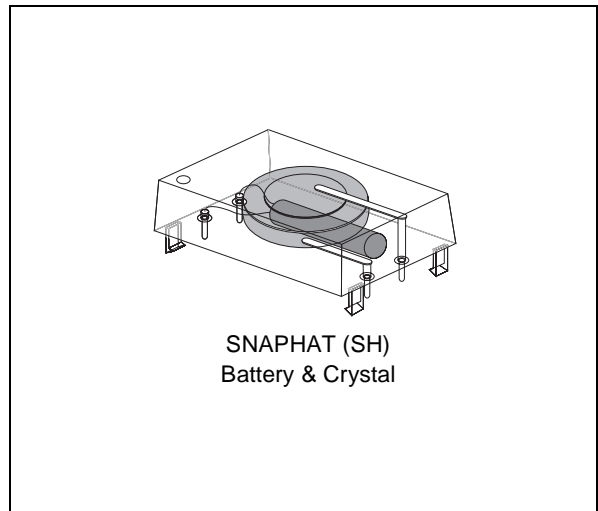
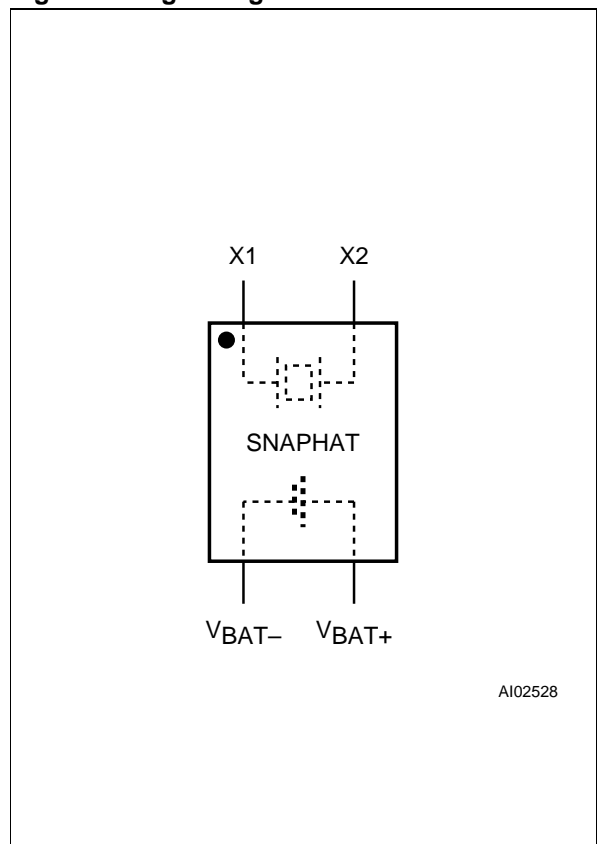


Figure 1. Logic Diagram



**MECHANICAL INFORMATION**

Electrical connection to the SOIC is made through four pins that connect to the four press fitted sockets at each end of the SOIC. Critical contact points between the pins and sockets are gold-plated to resist oxidation. Internally, each socket contains six independent contact fingers to form redundant connections between the two components. These sockets were designed with high point contact force to provide the lowest possible contact resistance. The SNAPHAT top also incorporates four molded-in retaining clips which hold onto the ends of the SOIC insuring mechanical and electrical connection even under severe mechanical shock and vibration. The combined SOIC and SNAPHAT assembly can sustain shock levels in excess of 100 g without separating. This package also passes variable frequency testing in accordance with MIL-STD-883, method 2007.2, condition A.

Figure 2 illustrates the affect of repeated insertion and extraction of the SNAPHAT top to the SOIC. The force required to extract the SNAPHAT, and then to re-insert it, reduces each time. After three or four extractions, though, the reduction starts to become unnoticeable, and the force required remains at a fairly constant figure. Typically, though, the SNAPHAT will only need to be extracted and re-inserted once in its lifetime.

**BATTERY CHARACTERISTICS**

Figure 3 illustrates the lithium coin cell discharge rate for a given load. This demonstrates the char-

**Table 1. Description**

Parameter	Value	
Operating Temperature	1 = 0 to 70 °C 6 = -40 to 85 °C	
Storage Temperature	-40 to 85 °C	
Nominal Crystal Frequency	32.768 kHz	
Load Capacitance	12.5 pF	
Nominal Battery Voltage	2.8 V	
Nominal Battery Capacity	48 mAh 120 mAh	M4T28 M4T32
Battery Chemistry	Li(CF)x	

acteristically flat voltage level supplied by the battery until very near the end of its life. These discharge levels have been greatly accelerated in comparison to the normal, actual usage.

**UL RECOGNITION**

The M4Txx-BR12SH has been recognized by Underwriters Laboratories under their Component Recognition Program and carries U.L. File Number E89556.

**Figure 2. SNAPHAT Insertion/Extraction Forces**

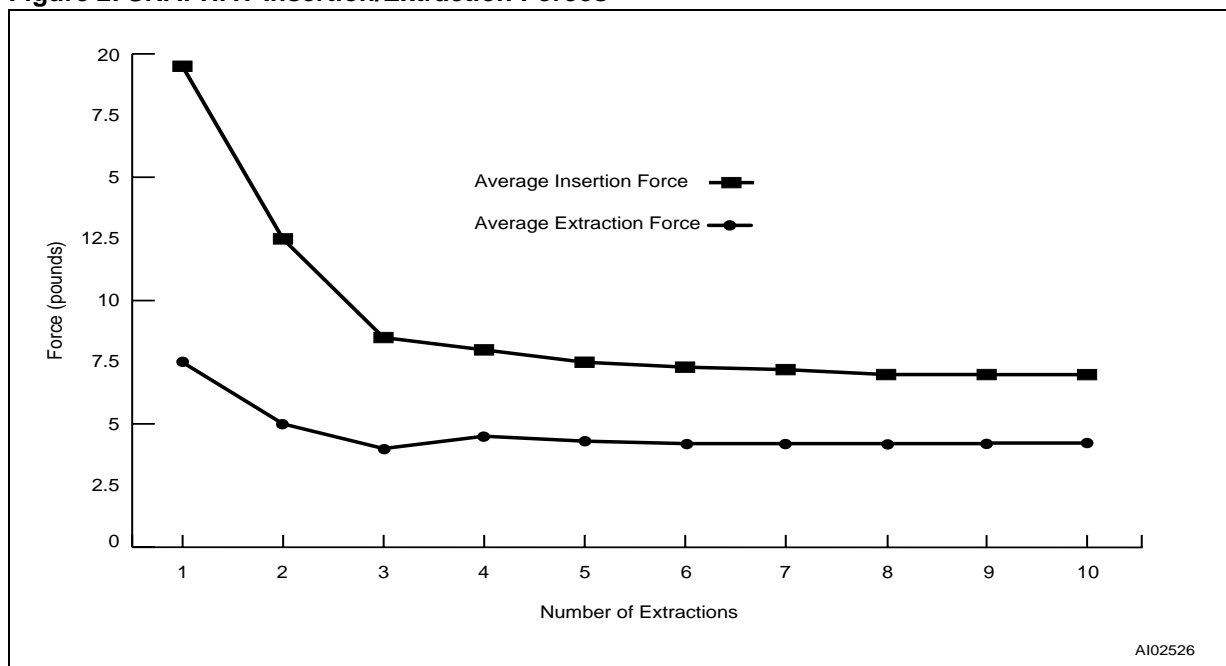
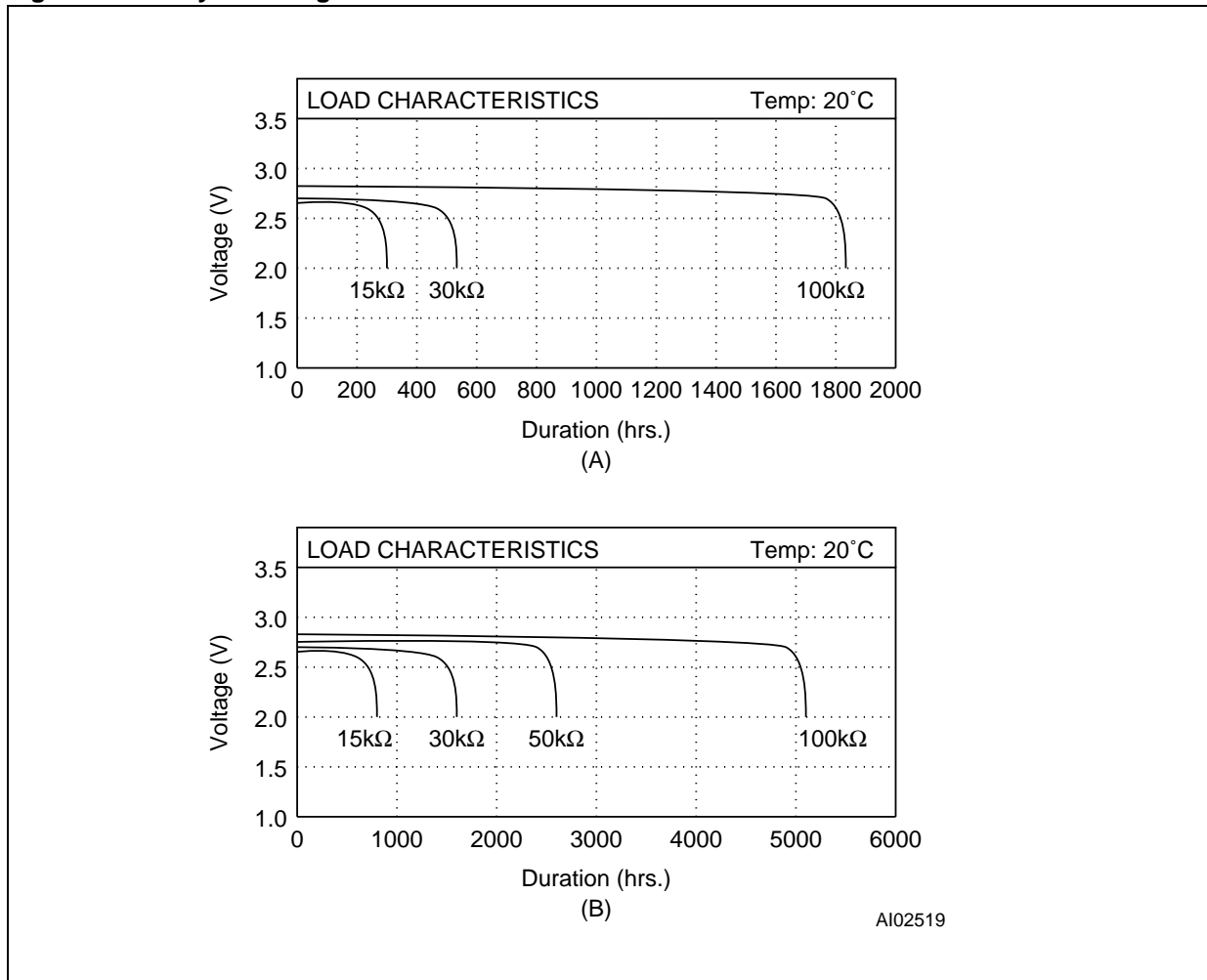


Figure 3. Battery Discharge Rates

**BATTERY LIFE**

For information on Data Retention Life and Battery Storage Life, please refer to the Application Note AN1012.

**GENERAL NOTES**

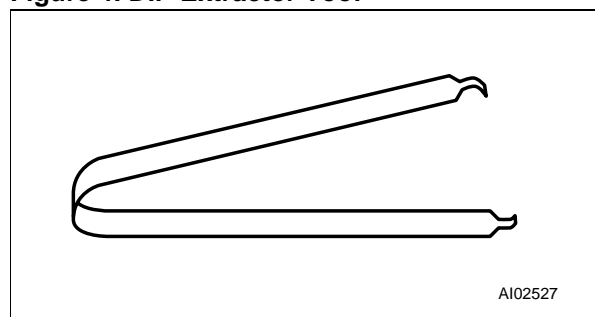
To remove the SNAPHAT top for replacement, a DIP/IC extractor tool should be used.

**Caution:** To avoid draining battery do NOT place SNAPHAT pins in a conductive foam.

**Caution:** To avoid damaging SNAPHAT sockets do NOT wave solder SOIC.

For battery disposal information, see on the web at [www.rayovac.com](http://www.rayovac.com).

Figure 4. DIP Extractor Tool



## M4TXX-BR12SH

---

**Table 2. Ordering Information Scheme**

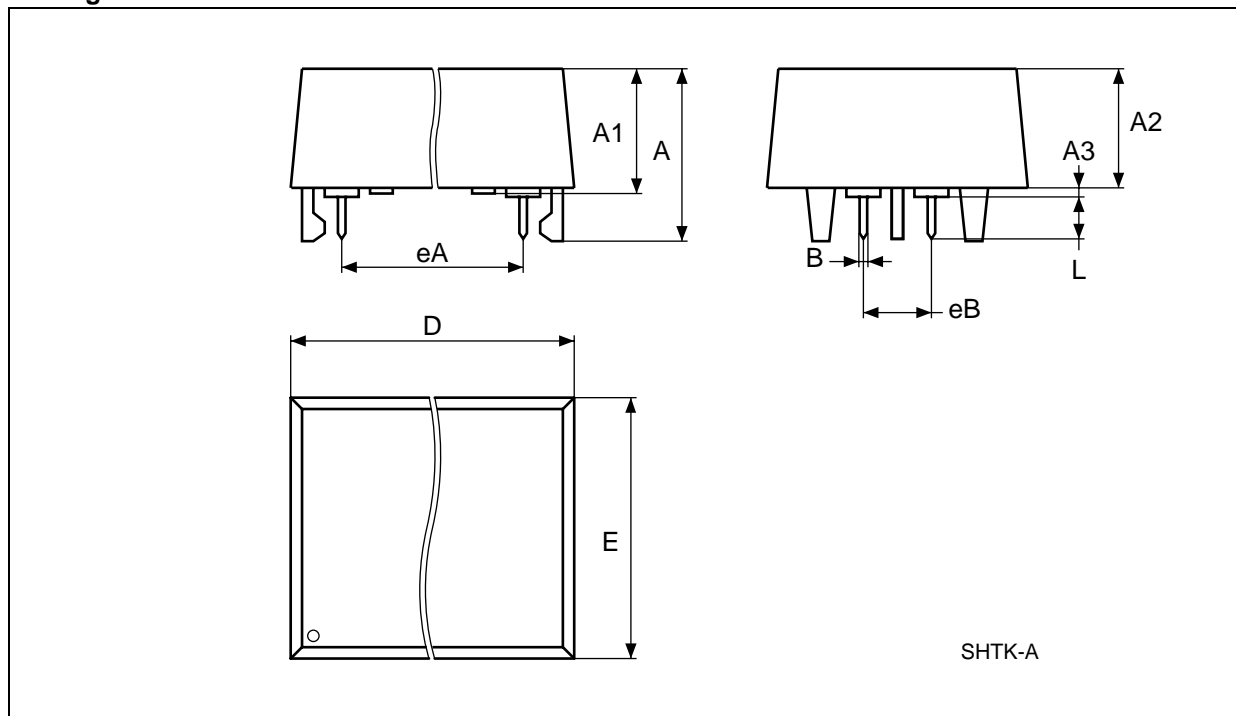
Example:	M4T28-BR12	SH	1
<b>Product Family</b> M4T = SNAPHAT Battery & Crystal			
<b>Battery Voltage &amp; Capacity</b> 28-BR12 = BR1225, 3 V, 48 mAh 32-BR12 = BR1632, 3 V, 120 mAh			
<b>Package</b> SH = SNAPHAT			
<b>Temperature Range</b> 1 = 0 to 70 °C 6 = -40 to 85 °C			

For further information on any aspect of this device, please contact the STMicroelectronics Sales Office nearest to you.

**Table 3. M4T28-BR12SH - TIMEKEEPER 4-pin SNAPHAT Housing for 48 mAh Battery & Crystal, Package Mechanical Data**

Symb	mm			inches		
	Typ	Min	Max	Typ	Min	Max
A			9.78			0.385
A1		6.73	7.24		0.265	0.285
A2		6.48	6.99		0.255	0.275
A3			0.38			0.015
B		0.46	0.56		0.018	0.022
D		21.21	21.84		0.835	0.860
E		14.22	14.99		0.560	0.590
eA		15.55	15.95		0.612	0.628
eB		3.20	3.61		0.126	0.142
L		2.03	2.29		0.080	0.090

**Figure 5. M4T28-BR12SH - TIMEKEEPER 4-pin SNAPHAT Housing for 48 mAh Battery & Crystal, Package Outline**



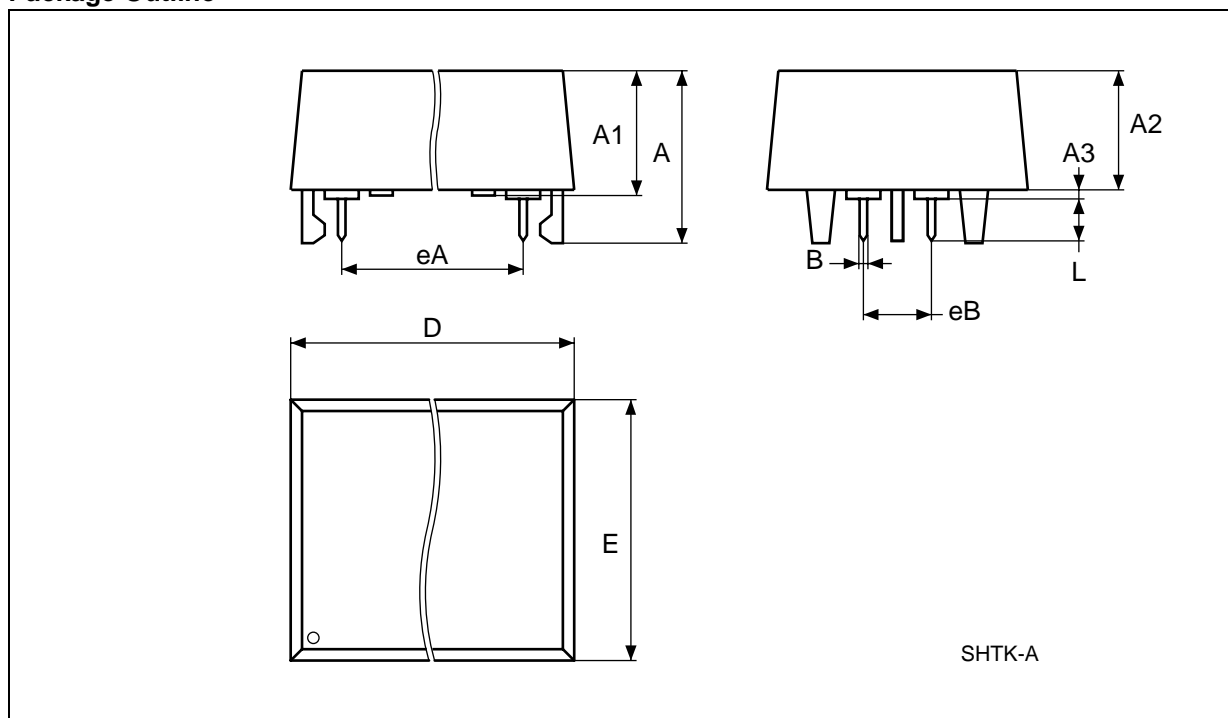
Drawing is not to scale.

**M4TXX-BR12SH**

**Table 4. M4T32-BR12SH - TIMEKEEPER 4-pin SNAPHAT Housing for 120 mAh Battery & Crystal, Package Mechanical Data**

Symb	mm			inches		
	Typ	Min	Max	Typ	Min	Max
A			10.54			0.415
A1		8.00	8.51		0.315	0.335
A2		7.24	8.00		0.285	0.315
A3			0.38			0.015
B		0.46	0.56		0.018	0.022
D		21.21	21.84		0.835	0.860
E		17.27	18.03		0.680	0.710
eA		15.55	15.95		0.612	0.628
eB		3.20	3.61		0.126	0.142
L		2.03	2.29		0.080	0.090

**Figure 6. M4T32-BR12SH - TIMEKEEPER 4-pin SNAPHAT Housing for 120 mAh Battery & Crystal, Package Outline**



Drawing is not to scale.

If you have any questions or suggestions concerning the matters raised in this document, please send them to the following electronic mail addresses:

*apps.nvram@st.com*                    (for application support)  
*ask.memory@st.com*                (for general enquiries)

Please remember to include your name, company, location, telephone number and fax number.

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is registered trademark of STMicroelectronics  
© 1999 STMicroelectronics - All Rights Reserved

All other names are the property of their respective owners.

STMicroelectronics GROUP OF COMPANIES  
Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia - Malta - Morocco -  
Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

<http://www.st.com>