

New Product Update

Design smaller, smarter products
with new MSPM0C Arm Cortex
MCUs

Samantha Pozzi

Product Marketing Engineer

Agenda

- ARM Cortex- M0+ MCU portfolio overview
- The 8-Bit / 16-Bit MCU market
- C-Series M0+ MCUs
- Application examples
- Getting started

MSPM0 MCUs | More options. Unlimited possibilities.

The most comprehensive portfolio of Arm® Cortex® M0+ microcontrollers that delivers the sensing and processing features you need



Cost optimized

- Leveraging TI's recent capacity and cost investments
- Industry's smallest packages enable the smallest PCB designs
- High performance integrated analog to reduce BOM cost



Scalable

- 24/32/80 MHz, 8-128 kB flash, 8-64 pins, and scalable analog
- Pin to pin compatible across wide range of memory & analog options
- 105° C, 125° C, and AEC-Q100 automotive options



Simple to use

- Fast, fully graphical device configuration with code generation
- Code size optimized drivers (1/3rd the size of competitors)
- Plug-and-play subsystems, code examples, and reference designs



TEXAS INSTRUMENTS

MSPM0 MCUs | Reducing your system cost

TI's 65nm technology with Flash

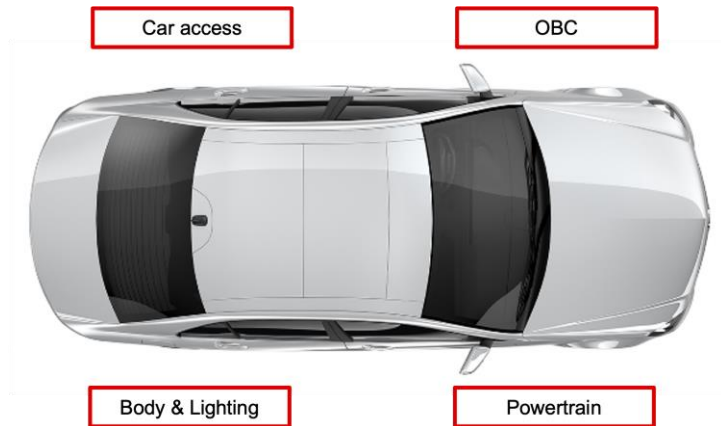
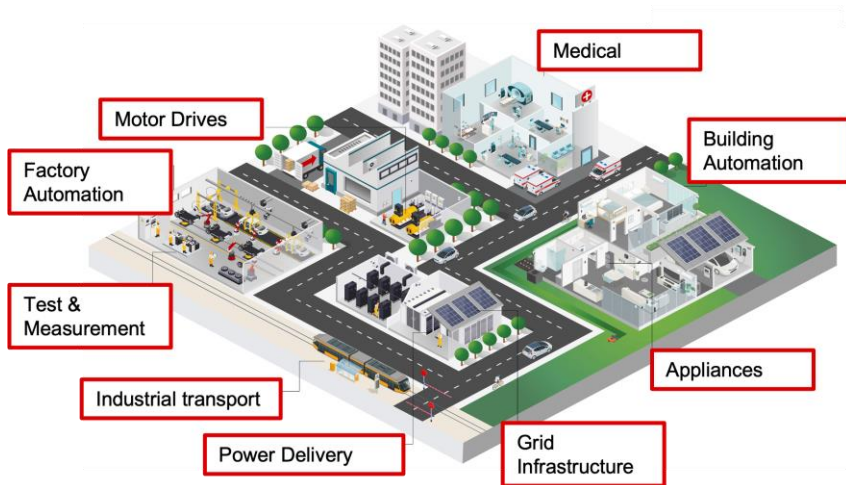
Best cost structure for microcontrollers with mix of digital, analog & memory

Smallest packages

Leverage the cost benefit of packages that are used by high volume analog

Advanced analog integration

Save components, board space and simplify supply chain with integrated advanced analog



Pick a device optimized for your solution from a broad, pin-2-pin portfolio

MSPM0 MCUs | Scalable portfolio

Up to 125°C Ta
1.62-3.6V

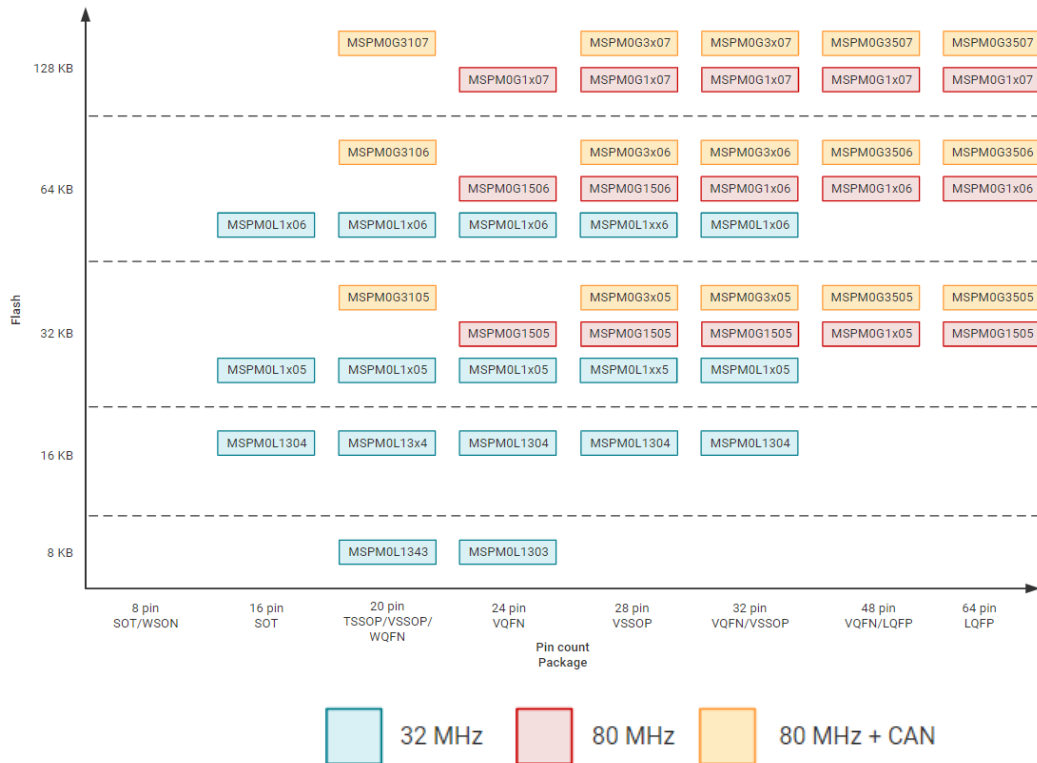


- 80MHz CPU
- CAN-FD options
- Fast 4Msps sim-sam ADCs
- Math accelerator



- 32MHz CPU
- 71µA/MHz (CoreMark run)
- 6µA-max standby at 85 °C
- 1µA-typ standby at 25 °C

Unified software development kit & tools
Pin-to-pin compatible in 15+ packages
TI 65nm flash multi-sourced manufacturing



The need for small, low-cost MCUs

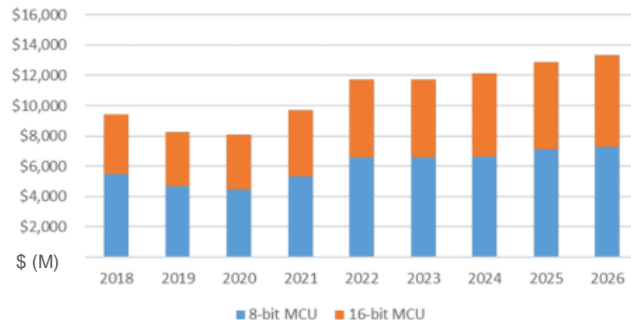
MCUs Market Trends

- Rising demand for high performance 32-bit MCUs
- Consistent demand for 8-bit & 16-bit MCUs

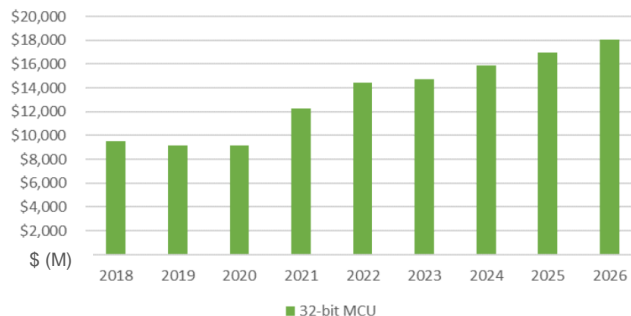
Problem

- Limited supply and capacity investment for 8-bit and 16-bit MCUs compared to 32-bit MCUs
- Engineers are facing performance and cost challenges with legacy 8-bit and 16-bit MCUs

8-bit & 16-bit MCU Market Trend



32-bit MCU Market Trend



MSPM0 C-Series microcontrollers

MSPM0C1103/4

1.62 - 3.6V
-40 to 125 °C

CPU
ARM Cortex-M0+
24 MHz

NVIC / 1-ch Basic DMA

On-chip Memory

8, or 16 kB flash

1 kB SRAM

Data Integrity & Security

CRC accelerator (16 bit)

Programming & Debug

ARM SWD interface

Power & Clocking

POR / BOR

Internal LF 32kHz (3%)

Internal HF 24MHz (1%)

Communication

UART w/ LIN (1)

SPI (1)

I2C (1) w/ FastMode+

Precision Analog

12-bit SAR ADC (10-ch)

Internal ADC reference (1.5%)

Timers

Advanced control 16-bit 4 CC (1)

General purpose 16-bit 4 CC (1)

General purpose 16-bit 2 CC (1)

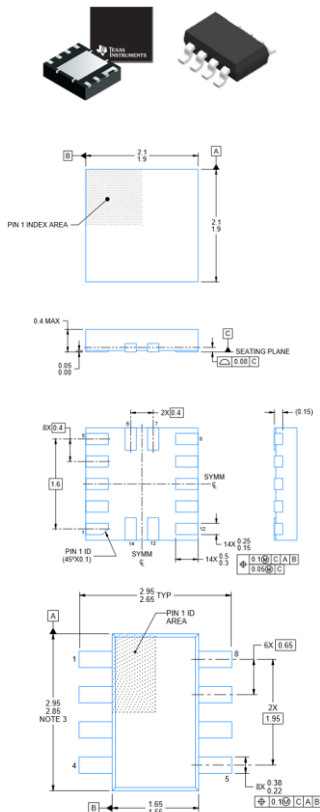
Windowed watchdog

IO

Up to 18 GPIO

Leaded packages: SOT-8/16, VSSOP-20, TSSOP-20

No-lead packages: WSON-8, WQFN-20



< \$0.18

Starting at 1 kU

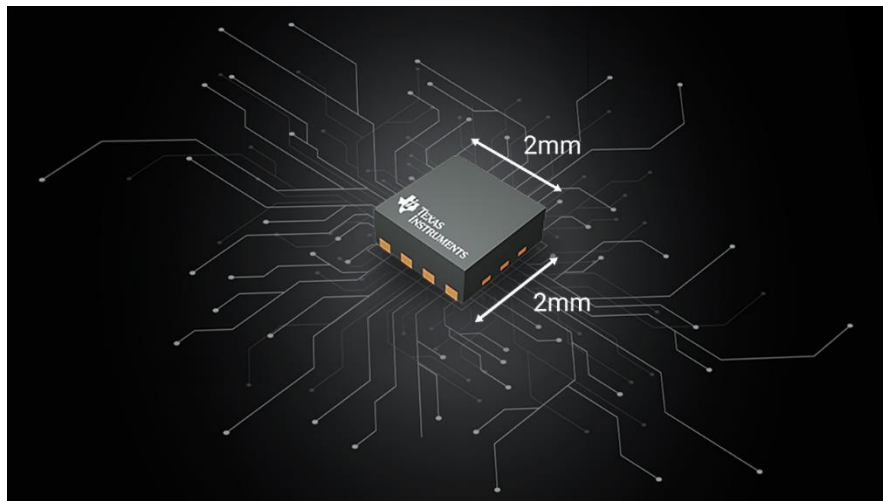
10

8-kB – 16-kB memory,
package, peripheral options

6

Of the industry's smallest, easiest
to assemble MCU Packages

MSPM0C MCUs | Room to do more



6 GPIOs

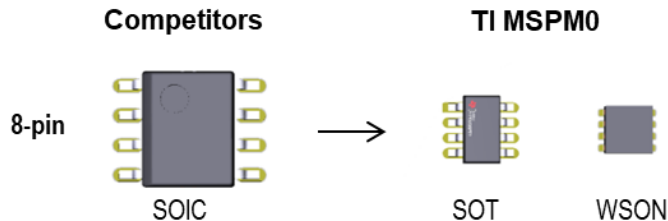
Available with 8-pin WSON-DGS package

2x2 mm²

TI's smallest M0+ MCU package

7.35x Smaller

Compared to common 8-pin SOIC

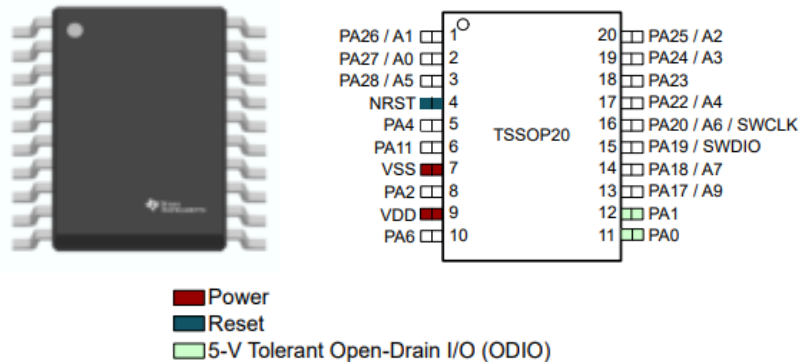


Drop-in replacement | Get a cost reduction faster

TSSOP-20

Package is pin to pin compatible with popular devices on the market

MSPM0 TSSOP20 pinout (Top View)



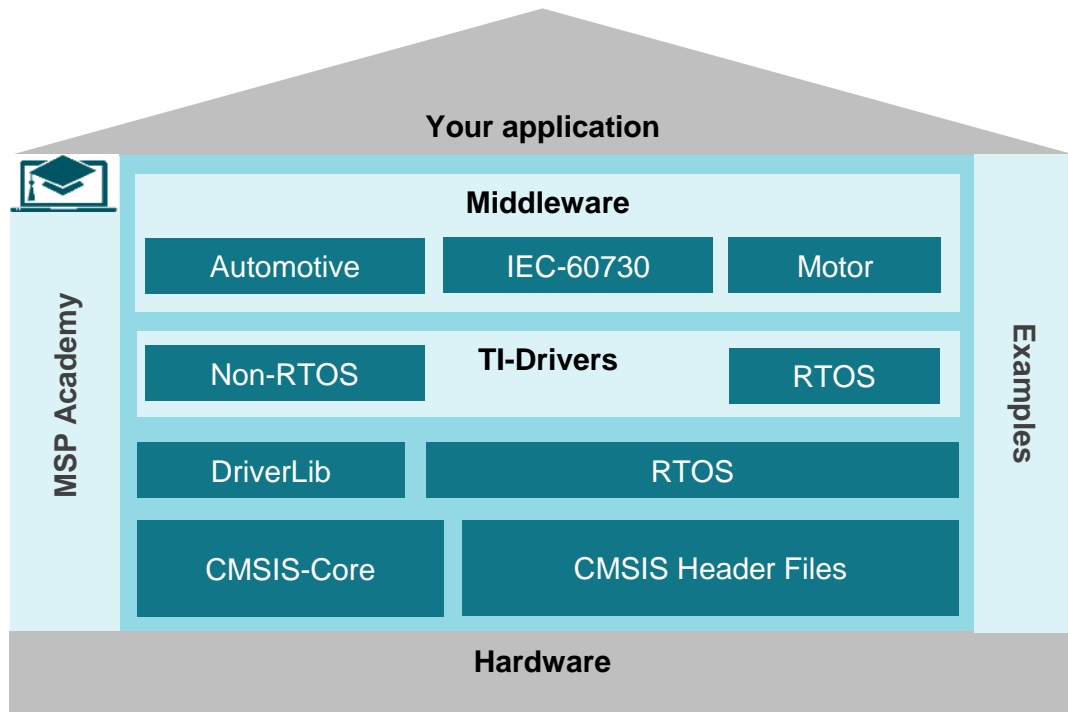
Zero code migration

Application code FULLY re-usable for select MCU vendors

Migration guide

Available to minimize the SW migration time & effort

MSPM0 MCUs | Optimized software



Rapid prototyping tools



Available Now!

MSPM0C1104
Launchpads are
\$5.99



TI
CCS

IAR
SYSTEMS



KEIL
Tools by ARM



3P Tools



TEXAS INSTRUMENTS

Visual development | From design to config and tuning

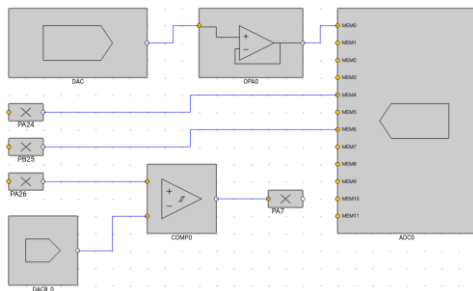
Get started in the TI Developer Zone dev.ti.com

Analog design

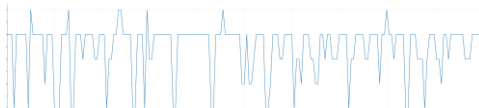
ti.com/tool/mspm0-analog-configurator



Drag-and-drop ADCs, DACs, CMPs, amps



View & log data converter outputs in real time



System configuration

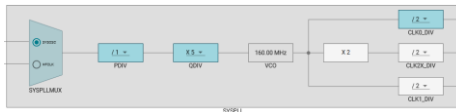
ti.com/tool/sysconfig



Select and set up peripherals

I2C - SMBUS	Target Baud Rate	115200
MCAN	Calculated Baud Rate	115211.52
SPI	Calculated Error (%)	0.01
UART - LIN	Word Length	8 bits
UART - CAPTURE	Parity	None
TIMERS (6)	Stop Bits	One
TIMER - CAPTURE		

Configure & optimize clock system



Solve pin multiplexing challenges

Pin Available	Pin Assigned	Warning	Power	Ground	Fixed (N/A)
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
73	74	75	76	77	78
79	80	81	82	83	84
85	86	87	88	89	90
91	92	93	94	95	96
97	98	99	100	101	102
103	104	105	106	107	108
109	110	111	112	113	114
115	116	117	118	119	120
121	122	123	124	125	126
127	128	129	130	131	132
133	134	135	136	137	138
139	140	141	142	143	144
145	146	147	148	149	150
151	152	153	154	155	156
157	158	159	160	161	162
163	164	165	166	167	168
169	170	171	172	173	174
175	176	177	178	179	180
181	182	183	184	185	186
187	188	189	190	191	192
193	194	195	196	197	198
199	200	201	202	203	204
205	206	207	208	209	210
211	212	213	214	215	216
217	218	219	220	221	222
223	224	225	226	227	228
229	230	231	232	233	234
235	236	237	238	239	240
241	242	243	244	245	246
247	248	249	250	251	252
253	254	255	256	257	258
259	260	261	262	263	264
265	266	267	268	269	270
271	272	273	274	275	276
277	278	279	280	281	282
283	284	285	286	287	288
289	290	291	292	293	294
295	296	297	298	299	300
301	302	303	304	305	306
307	308	309	310	311	312
313	314	315	316	317	318
319	320	321	322	323	324
325	326	327	328	329	330
331	332	333	334	335	336
337	338	339	340	341	342
343	344	345	346	347	348
349	350	351	352	353	354
355	356	357	358	359	360
361	362	363	364	365	366
367	368	369	370	371	372
373	374	375	376	377	378
379	380	381	382	383	384
385	386	387	388	389	390
391	392	393	394	395	396
397	398	399	400	401	402
403	404	405	406	407	408
409	410	411	412	413	414
415	416	417	418	419	420
421	422	423	424	425	426
427	428	429	430	431	432
433	434	435	436	437	438
439	440	441	442	443	444
445	446	447	448	449	450
451	452	453	454	455	456
457	458	459	460	461	462
463	464	465	466	467	468
469	470	471	472	473	474
475	476	477	478	479	480
481	482	483	484	485	486
487	488	489	490	491	492
493	494	495	496	497	498
499	500	501	502	503	504
505	506	507	508	509	510
511	512	513	514	515	516
517	518	519	520	521	522
523	524	525	526	527	528
529	530	531	532	533	534
535	536	537	538	539	540
541	542	543	544	545	546
547	548	549	550	551	552
553	554	555	556	557	558
559	560	561	562	563	564
565	566	567	568	569	570
571	572	573	574	575	576
577	578	579	580	581	582
583	584	585	586	587	588
589	590	591	592	593	594
595	596	597	598	599	600
601	602	603	604	605	606
607	608	609	610	611	612
613	614	615	616	617	618
619	620	621	622	623	624
625	626	627	628	629	630
631	632	633	634	635	636
637	638	639	640	641	642
643	644	645	646	647	648
649	650	651	652	653	654
655	656	657	658	659	660
661	662	663	664	665	666
667	668	669	670	671	672
673	674	675	676	677	678
679	680	681	682	683	684
685	686	687	688	689	690
691	692	693	694	695	696
697	698	699	700	701	702
703	704	705	706	707	708
709	710	711	712	713	714
715	716	717	718	719	720
721	722	723	724	725	726
727	728	729	730	731	732
733	734	735	736	737	738
739	740	741	742	743	744
745	746	747	748	749	750
751	752	753	754	755	756
757	758	759	760	761	762
763	764	765	766	767	768
769	770	771	772	773	774
775	776	777	778	779	780
781	782	783	784	785	786
787	788	789	790	791	792
793	794	795	796	797	798
799	800	801	802	803	804
805	806	807	808	809	810
811	812	813	814	815	816
817	818	819	820	821	822
823	824	825	826	827	828
829	830	831	832	833	834
835	836	837	838	839	840
841	842	843	844	845	846
847	848	849	850	851	852
853	854	855	856	857	858
859	860	861	862	863	864
865	866	867	868	869	870
871	872	873	874	875	876
877	878	879	880	881	882
883	884	885	886	887	888
889	890	891	892	893	894
895	896	897	898	899	900
901	902	903	904	905	906
907	908	909	910	911	912
913	914	915	916	917	918
919	920	921	922	923	924
925	926	927	928	929	930
931	932	933	934	935	936
937	938	939	940	941	942
943	944	945	946	947	948
949	950	951	952	953	954
955	956	957	958	959	960
961	962	963	964	965	966
967	968	969	970	971	972
973	974	975	976	977	978
979	980	981	982	983	984
985	986	987	988	989	990
991	992	993	994	995	996
997	998	999	1000	1001	1002
1003	1004	1005	1006	1007	1008
1009	1010	1011	1012	1013	1014
1015	1016	1017	1018	1019	1020
1021	1022	1023	1024	1025	1026
1027	1028	1029	1030	1031	1032
1033	1034	1035	1036	1037	1038
1039	1040	1041	1042	1043	1044
1045	1046	1047	1048	1049	1050
1051	1052	1053	1054	1055	1056
1057	1058	1059	1060	1061	1062
1063	1064	1065	1066	1067	1068
1069	1070	1071	1072	1073	1074
1075	1076	1077	1078	1079	1080
1081	1082	1083	1084	1085	1086
1087	1088	1089	1090	1091	1092
1093	1094	1095	1096	1097	1098
1099	1100	1101	1102	1103	1104
1105	1106	1107	1108	1109	1110
1111	1112	1113	1114	1115	1116
1117	1118	1119	1120	1121	1122
1123	1124	1125	1126	1127	1128
1129	1130	1131	1132	1133	1134
1135	1136	1137	1138	1139	1140
1141	1142	1143	1144	1145	1146
1147	1148	1149	1150	1151	1152
1153	1154	1155	1156	1157	1158
1159	1160	1161	1162	1163	1164
1165	1166	1167	1168	1169	1170
1171	1172	1173	1174	1175	1176
1177	1178	1179	1180	11	

MSPM0 C-Series MCUs | Broad applications

24 MHz low-cost MCU with up to 16kB flash, 20 pins, 12-bit ADC

BUILDING & FACTORY AUTOMATION



Smoke detector



Gas detector



PIR sensor



Garage sensor



Field transmitter

APPLIANCE



Coffee machine



Power tool



Vacuum cleaner



Dish washer

PERSONAL ELECTRONIC



TWS



Stylus



E-toothbrush



Shaver



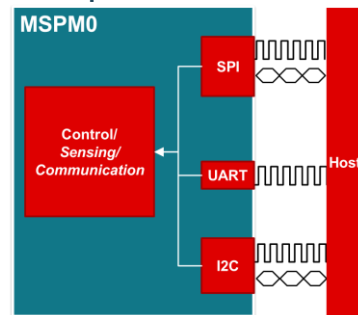
Printer



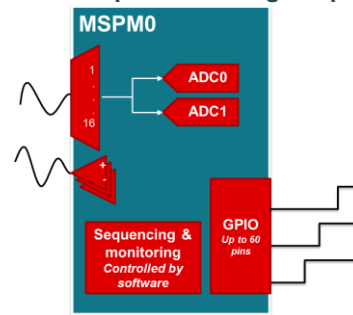
Wireless charger

SUBSYSTEM

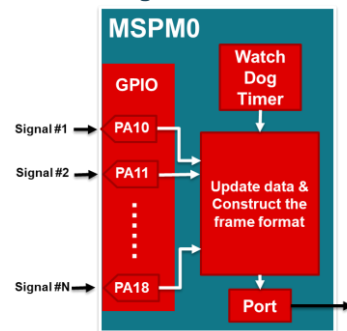
> IO Expander



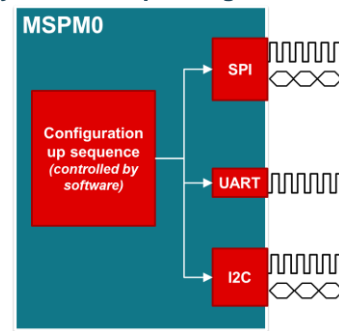
> Power Sequencer/Voltage Supervisor



> Watch Dog



> System startup/configuration controller



Getting started

You can start evaluating this device leveraging the following:

Content type	Content title	Link to content or more details
Product information	MSPM0C1104 product page	MSPM0C product page
Software	MSPM0 software development kit (SDK)	MSPM0-SDK
Webinar session	The smallest package TI MSPM0 MCU enables room to do more in your design	Register for our webinar on 4/16/2024
Technical blog content or white paper	TI's Smallest M0+ MCU Package Enables Room to do More in Your Design	App Brief
Technical blog content or white paper	Low-Cost MSPM0C MCUs as an I/O Expander	App Brief
Development tool or evaluation kit	MSPM0C1104 LaunchPad™ development kit	LaunchPad development kit



© Copyright 2024 Texas Instruments Incorporated. All rights reserved.

This material is provided strictly “as-is,” for informational purposes only, and without any warranty.
Use of this material is subject to TI’s **Terms of Use**, viewable at [TI.com](https://www.ti.com)

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](#) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2024, Texas Instruments Incorporated