

Ultra-low Profile, Low power, SMD MEMS Oscillator



3.5 x 3.0 x 0.25mm

ASTMLPT



RoHS/RoHS II compliant

Moisture Sensitivity Level (MSL) – 1

FEATURES:

- Ultra-low profile, compact size: 3.5 x 3.0 x 0.25mm
- Supply Voltage options: 3.3V, 2.8V, 2.5V, 1.8V
- Low Current Consumption: 3.2mA typ. (no load, V_{dd}=1.8V)
- Frequency Stability: ±100ppm over -40 to +85°C
- High Performance MEMS Technology by SiTime

APPLICATIONS:

- Smart cards
- SD cards
- High capacity SIM cards
- Near Field Communications
- Multi-chip modules and System-in-package
- Portable devices

STANDARD SPECIFICATIONS:

All electrical specifications in this table are specified with 15pF output load and for all V_{dd} options unless otherwise stated.

Parameters	Min	Typ	Max	Unit	Notes
Output Frequency Range (F)	1		110	MHz	
Frequency Stability (F _{stab})	-100		+100	ppm	Inclusive of initial tolerance at 25°C, variations over operating temperature, rated power supply voltage change and load change, shock and vibration.
Aging (Ag)	-1		+1	ppm	1 st year @ 25°C
Operating Temperature Range (T _{use})	-20		+70	°C	Option "E"
	-40		+85		Option "L"
Supply Voltage (V _{dd})	1.71	1.8	1.89	V	Option "18"
	2.25	2.5	2.75		Option "25"
	2.52	2.8	3.08		Option "28"
	2.97	3.3	3.63		Option "33"
Current Consumption (I _{dd})		3.7	4.1	mA	No load, F=20MHz, V _{dd} =2.5V,2.8V,3.3V
		3.2	3.5		No load, F=20MHz, V _{dd} =1.8V
Standby Current (I _{std})		2.4	4.3	µA	\overline{ST} =GND, V _{dd} =3.3V, output is weakly pulled down
		1.2	2.2		\overline{ST} =GND, V _{dd} =2.5V or 2.8V output is weakly pulled down
		0.4	0.8		\overline{ST} =GND, V _{dd} =1.8V, output is weakly pulled down
Output Type	LVCMOS				
Duty Cycle	45	50	55	%	All V _{dd} options. F≤75MHz
	40	50	60		All V _{dd} options. F>75MHz
Rise/Fall Time (T _r /T _f)		1	2	ns	20%-80%, V _{dd} =2.5V, 2.8V or 3.3V, 15pF load
		1.3	2.5		20%-80%, V _{dd} =1.8V, 15pF load
Output High Voltage (V _{OH})	90%*V _{dd}			V	I _{OH} =-4mA (V _{dd} =3.3V)
					I _{OH} =-3mA (V _{dd} =2.8V or 2.5V)
					I _{OH} =-2mA (V _{dd} =1.8V)
Output Low Voltage (V _{OL})			10%*V _{dd}	V	I _{OL} =4mA (V _{dd} =3.3V)
					I _{OL} =3mA (V _{dd} =2.8V or 2.5V)
					I _{OL} =2mA (V _{dd} =1.8V)
Output Load (Ld)			15	pF	At max. frequency and supply voltage
Input High Voltage (V _{IH})	70%*V _{dd}			V	Pin 1
Input Low Voltage (V _{IL})			30%*V _{dd}	V	Pin 1
Startup Time (T _{start})			10	ms	Measured from the time V _{dd} reaches its rated minimum value
Resume Time (T _{resume})		3.0	3.8	ms	Measured from the time \overline{ST} pin crosses 50% threshold

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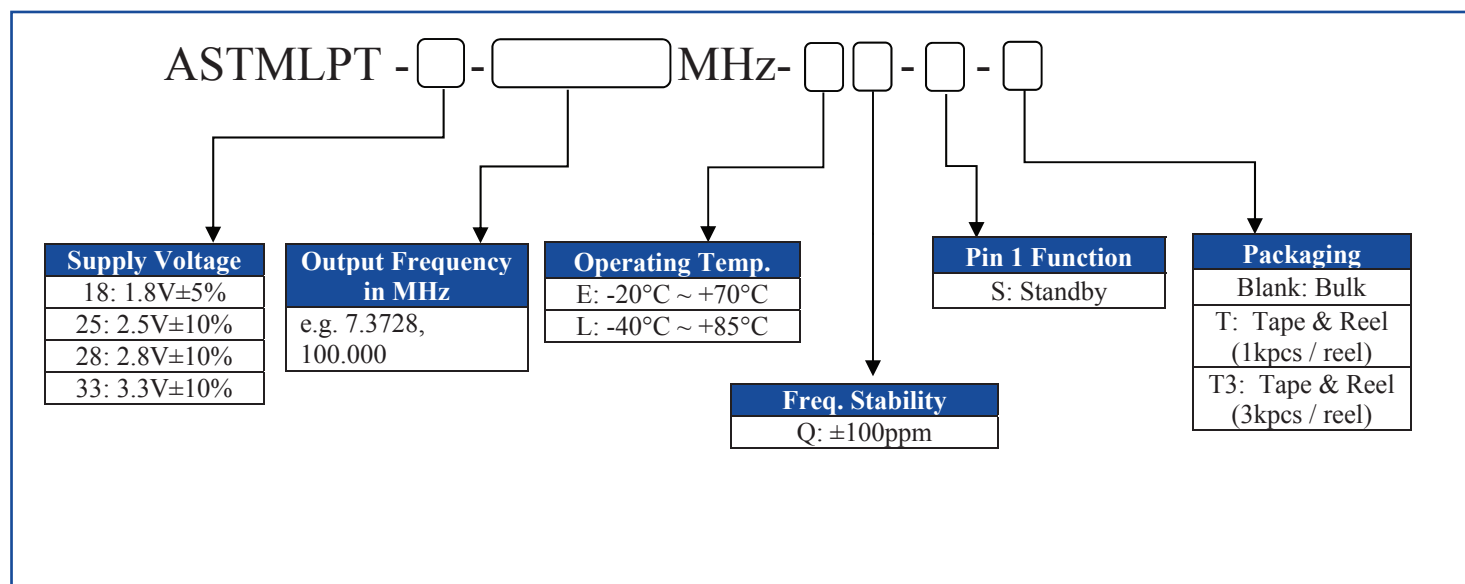
Parameters	Min	Typ	Max	Unit	Notes
RMS Period Jitter (T_{jitt})			4.0	ps	F=75MHz, V_{dd} =2.5V, 2.8V or 3.3V
			5.5		F=75MHz, V_{dd} =1.8V
RMS Phase Jitter (random) (T_{phj})		0.6		ps	F=75MHz, integration bandwidth=900kHz to 7.5MHz, V_{dd} =2.5V, 2.8V or 3.3V
		0.8			F=75MHz, integration bandwidth=900kHz to 7.5MHz, V_{dd} =1.8V

Absolute Maximum Ratings

Attempted operation outside the absolute maximum ratings may cause permanent damage to the part. Actual performance of the IC is only guaranteed within the operational specifications, not at absolute maximum ratings.

Parameters	Min.	Max.	Unit
Storage Temperature	-65	150	°C
V_{DD}	-0.5	4	V
Electrostatic Discharge		6000	V
Theta JA (with copper plane on V_{dd} and GND)		75	°C/W
Theta JC (with PCB traces of 0.010 inch to all pins)		24	°C/W
Soldering Temperature (follow standard Pb free soldering guidelines)		260	°C
Number of Program Writes		1	
Program Retention over -40 ~ +125°C, Process, V_{dd} (0 to 3.65V)	1000+		years

PART IDENTIFICATION:



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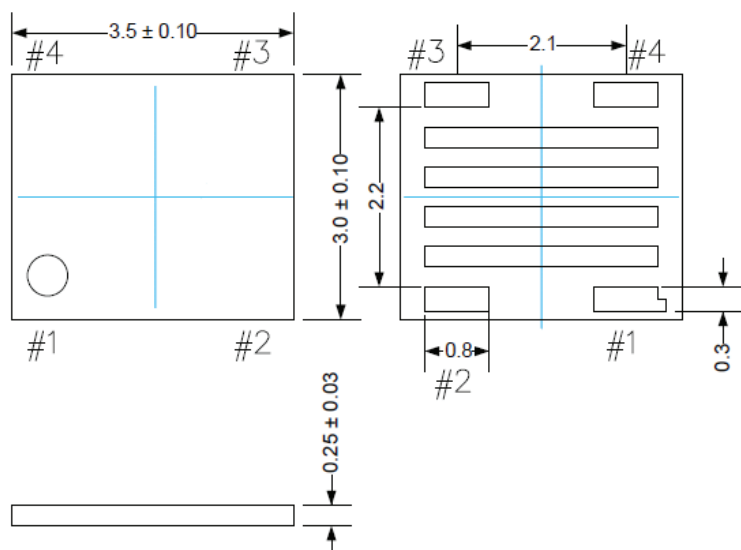


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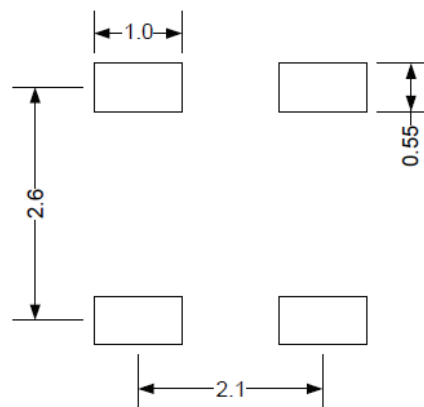


3.5 x 3.0 x 0.25mm

OUTLINE DIMENSION:



Recommended Land Pattern

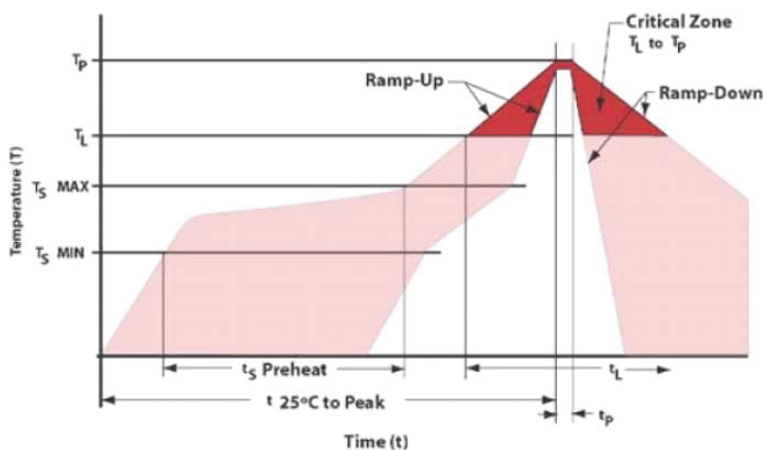


	Name		Functionality
1	\overline{ST}	Standby	H or Open ⁽¹⁾ : specified frequency output L: output is low (weak pull down). Oscillation stops.
2	GND	Power	Electrical ground ⁽²⁾
3	CLK	Output	Oscillator clock output
4	V _{dd}	Power	Power supply voltage ⁽²⁾

Notes: 1. In 1.8V mode, a resistor of <100kΩ between \overline{ST} pin and V_{dd} is recommended.
2. A capacitor value of 0.1μF between V_{dd} and GND is recommended.

Dimensions: mm

REFLOW PROFILE:



Item	Conditions
T _S MAX to T _L (Ramp-up Rate)	3°C/second max
Preheat	
Temperature Minimum (T _S MIN)	150°C
Temperature Typical (T _S TYP)	175°C
Temperature Maximum (T _S MAX)	200°C
Time (t _S)	60 – 180 seconds
Ramp-up Rate (T _L to T _P)	3°C/second max
Time Maintained Above	
Temperature (T _L)	217°C
Time (t _L)	60 – 150 seconds
Peak Temperature (T _P)	260°C max
Target Peak Temperature (T _P Target)	255°C
Time within 5°C of actual peak (t _P)	20 – 40 seconds
Max. Number of Reflow Cycles	3
Ramp-down Rate	6°C/second max
Time 25°C to Peak Temperature (t)	8 minutes max

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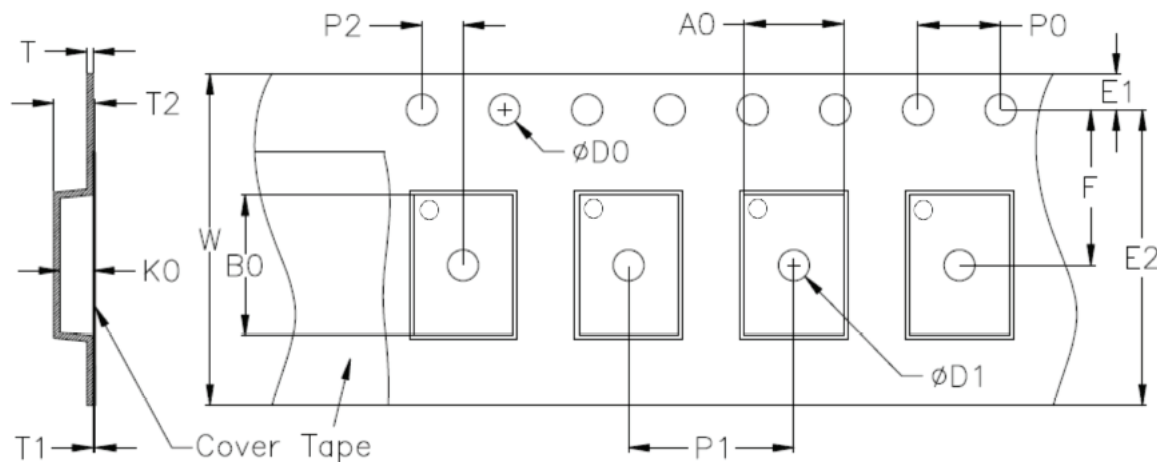
3.5 x 3.0 x 0.25mm

TAPE & REEL:

Packaging

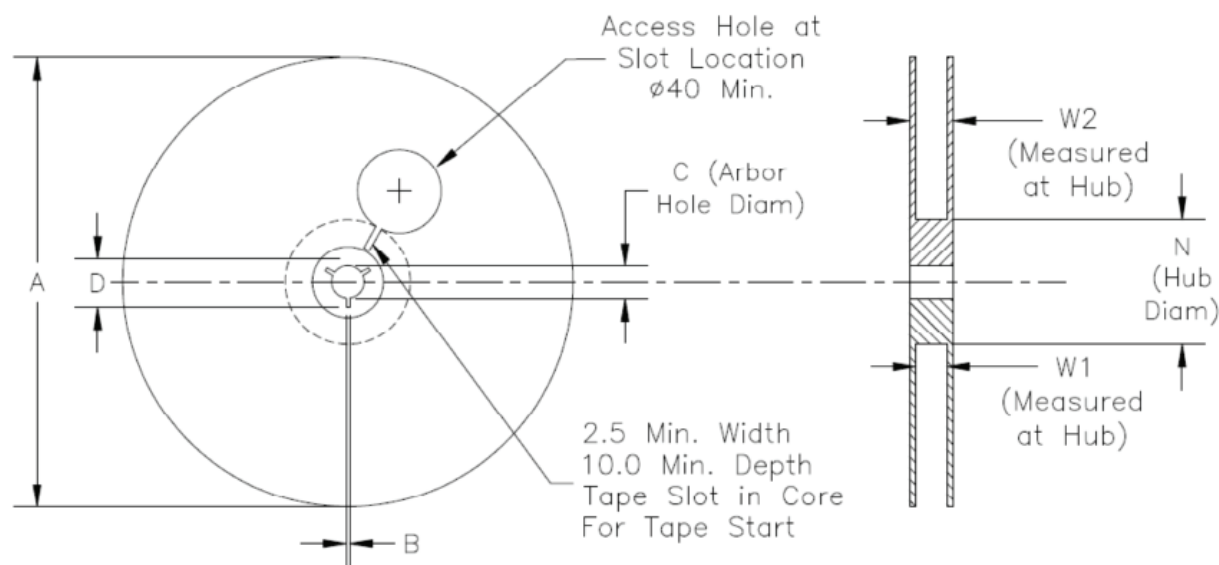
T: 1000pcs/reel

T3: 3000pcs/reel



Unit: mm

D0	D1 min.	E1	E2 min.	F	P0	P1	P2
1.5+0.1/-0.0	1.5	1.75±0.1	10.25	5.5±0.05	4.0±0.1	8.0±0.1	2.0±0.05
T	T1 max.	T2 max.	W max.	A0	B0	K0	
0.6	0.1	1.65	12.3	3.3±0.10	3.8±0.10	0.65±0.10	



A max.	B min.	C	D min.	N	W1	W2 max.
180	1.5	13.0±0.2	20.2	60±0.5	12.4+2.0/-0	18.4

Unit: mm

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