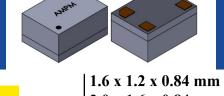
AMPM-SERIES



FEATURES

- Compact footprint as small as 1.6x1.2mm
- Low 0.84mm profile
- Low power consumption
- 1MHz to 80MHz output frequency range
- Short lead time for new frequencies
- Wide -40°C to +85°C operating temperature range
- Output enable or ultra-low power standby: $12\mu A (typ)$
- Low operating current: 1.3mA IDD (typ)

ELECTRICAL SPECIFICATIONS

Electrical characteristics unless otherwise indicated, $V_{pp} = 1.8V - 5\%$ to 3.3V + 10%, temperature range -40°C to 85 °C

Paramet	ers	Min.	Тур.	Max.	Units	Note
Frequency 1	Range	1.0000		80.0000	MHz	
Power Supply Vo	oltage (V _{DD})	1.71		3.63	V	
Current Consum	ption (I _{DD})		1.3		mA	$f_{out} = 24$ MHz, $V_{DD} = 1.8$ V, No Load
Standby Current Cons	summation (I)		12	30		$V_{DD} = 1.8/2.5V$
Standby Current Cons	sumption (I _{STBY})		80	160	μA	V _{DD} =3.3V
Operating Temper	ature Range	-40		+85	°C	See Options
Storage Temp	perature	-55		+150	°C	
All Inclusive Frequ	anay Stability	-25		+25	nnm	Options "D" or "F"
All melusive Mequ	ency stability	-50		+50	ppm	Options "E" or "G"
A airea	_	-5		+5	ppm ppm	1 st year @25°C
Aging		-1		+1	ppm	Per year after first year
Duty Cy	Duty Cycle			55	%	1 MHz to 39 MHz 61 MHz to 80 MHz
		40		60		40 MHz to 60 MHz
Output Logic Levels	$V_{_{ m OH}}$	$0.8*V_{_{ m DD}}$			v	Logic High $I = 1 mA$
Output Logic Levels -	V _{OL}			0.2*V _{DD}		Logic Low I = -1 mA
T	\mathbf{V}_{IH}	$0.7*V_{ m DD}$			N7	Logic High
Input Logic Levels	V _{IL}			0.3*V _{DD}		Logic Low
Enable Pull-Up	Resistor		300		kΩ	
Power Supply F	Ramp (t _{PU})	0.1		100	ms	Time to 90% targeted V_{DD}
Start-up Tim	ne (t _{su})			1.5	ms	From 90% V _{DD} to valid clock output, @ 25°C



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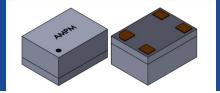
ESD Sensitive RoHS/RoHS II Compliant

MSL = MSL1

APPLICATIONS

- Wearables
- Internet of Things (IoT)
- Industrial IoT
- Audio and video
- Drones and robotics

AMPM-SERIES



ESD Sensitive RoHS/RoHS II Compliant MSL = MSL 1

ELECTRICAL SPECIFICATIONS

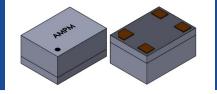
Parameters		min	Тур.	Max.	Units	Note
Output Enable Time (t _{EN})				1	μs	
Output Disable Tim	e (t _{DA})			200+2period	ns	
			2.5	3.5		$CL = 5 \text{ pF} V_{DD} = 1.8 \text{ V}$
Bigg(T)/Egll(T) Time	Low Drive $20\% \leftrightarrow 80\%$		1.5	2.2		$CL = 5 \text{ pF}$ $V_{DD} = 2.5 \text{ V}/3.3 \text{ V}$
$Rise(T_r)/Fall(T_f)$ Time	Std Drive		1.2	2.0	ns	$CL = 10 \text{ pF} V_{DD} = 1.8 \text{V}$
	$20\% \leftrightarrow 80\%$		0.6 1.2		CL = 10 pF $V_{DD} = 2.5 \text{V}/3.3 \text{V}$	
	Low Drive		32	40		$V_{DD} = 1.8V$
DMC Dania d Littan	$f_{out} = 27 \text{ MHz}$		25	32		$V_{\rm DD} = 2.5/3.3 V$
RMS Period Jitter	Std Drive		23	30	ps	$V_{\rm DD} = 1.8 V$
	$f_{out} = 27 \text{ MHz}$		20	28		$V_{\rm DD} = 2.5/3.3 V$
	Low Drive		180	240		$V_{DD} = 1.8V$
Cuele to Cuele Litter (Beelt)	$f_{out} = 27 \text{ MHz}$		120	170	20	$V_{\rm DD} = 2.5/3.3 V$
Cycle-to-Cycle Jitter (Peak)	Std Drive		115	190	ps	$V_{\rm DD} = 1.8 V$
	$f_{out} = 27 \text{ MHz}$		90	150		$V_{\rm DD} = 2.5/3.3 V$

ABSOLUTE MAXIMUM RATINGS

Parameters	min	Тур.	Max.	Units	Note
Supply Voltage	-0.3		+4.0	V	
Input Voltage	-0.3		V _{DD} +0.3	V	
Maximum Junction Temperature			+150	°C	
Ambient Operating Temperature	-40		+85	°C	Industrial
Ambient Operating Temperature	-20		+70	°C	Extended Commercial
Storage Ambient Temperature Range	-55		+150	°C	
Soldering Temperature		+260		°C	
ESD Protection	4 kV HBM, 400V MM, 2 kV CDM				



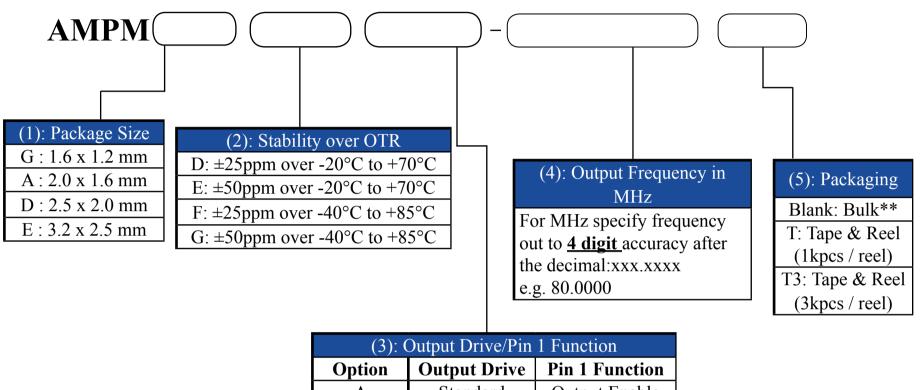
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ESD Sensitive RoHS/RoHS II Compliant MSL = MSL 1

OPTIONS AND PART IDENTIFICATION



(3): Output Drive/Pin 1 Function			
Option	Output Drive	Pin 1 Function	
Α	Standard	Output Enable	
В	Standard	Standby	
С	Low	Output Enable	
D	Low	Standby	

Part Number Example: AMPMGGD - 16.0000T

**MOQ per package: 1.6x1.2mm: 100pcs/bag 2.0x1.6mm: 100pcs/bag 2.5x2.0mm: 140 pcs/tube 3.2x2.5mm: 110 pcs/tube

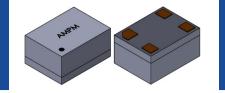
For Quick turn-around programmable sample orders <u>less than MOQ</u> represented above: Due to the immediate availability of stock and the qty of the order, the parts may be delivered as Cut Tape, Loose parts in Antistatic Bag or in Tube(s).

For orders <u>equal to or greater than MOQ</u> and <u>less than 1000pcs</u>: Due to packaging, the order must be a multiple of MOQ per package size above

For orders <u>equal to or greater than 1000pcs</u>: Bulk is not an option. Please refer to tape and reel packaging.



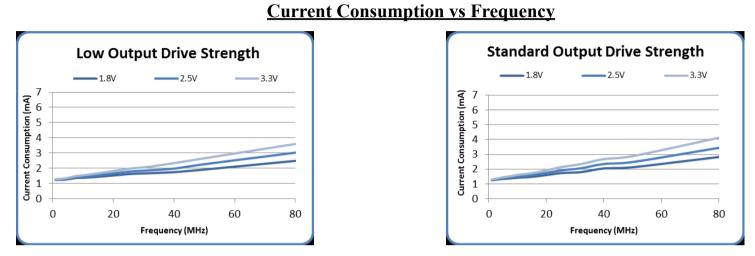
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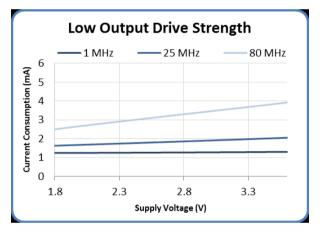
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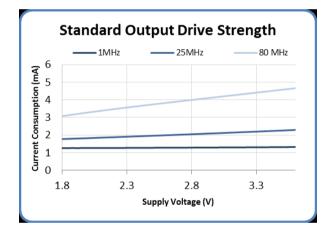
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TYPICAL PERFORMANCE DATA @ 25°C ± 3°C



Current Consumption vs Supply Voltage





PINFUNCTIONS

Pin Number	Pin Name	Description
	OE	Output Enable Note 1&3 : High or Open = Specified Frequency Output Low = Output is high impedance
1	STBY	Standby Note 1&3: High or Open = Specified Frequency Output Low = Output is high impedance, Device is in low power mode, Supply current is I _{STBY}
2	GND	Power Supply Ground
3	Output	Oscillator clock output
4	V _{DD}	Power supply Note 2

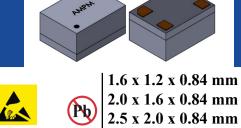
Notes :

- 1. If pin 1 is high or floating, there will be frequency output. If pin 1 is low, output will be disengaged.
- 2. Bypass with 0.1 µF capacitor placed as close to VDD pin as possible.
- 3. 300 K Ω internal pull-up resistor present on pin 1.



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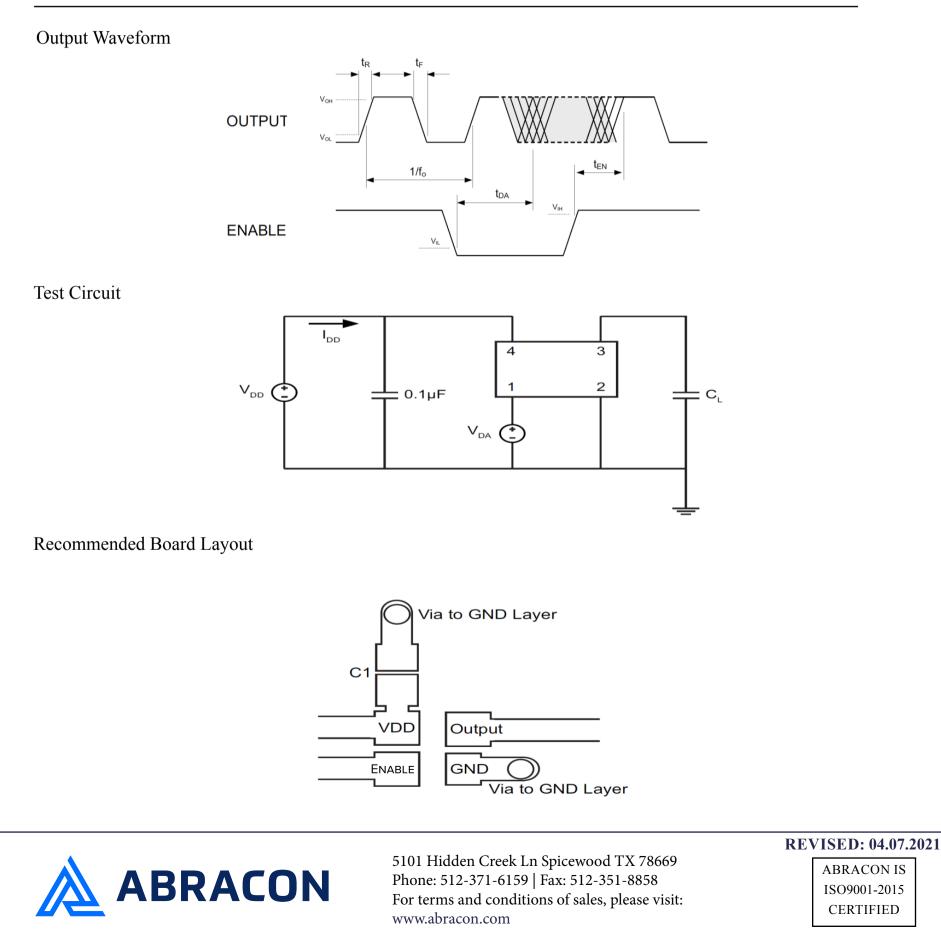


ESD Sensitive RoHS/RoHS II Compliant MSL=MSL1

OUTPUT BUFFER OPTIONS

The AMPM Series is available in multiple output driver configurations. The low-power driver minimizes current consumption and EMI while delivering greater than 1 mA output current at 20% to 80% of the supply voltage. The standard-drive delivers greater than 3 mA output current at 20% to 80% of the supply voltage.

DIAGRAMS



Downloaded from Arrow.com.

AMPM-SERIES

MECHANICAL DIMENSIONS

1.6 x 1.2 mm VFLGA Package Outline

Top View

Bottom View

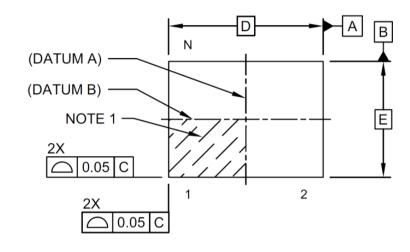
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CH – NOTE 1

4X L

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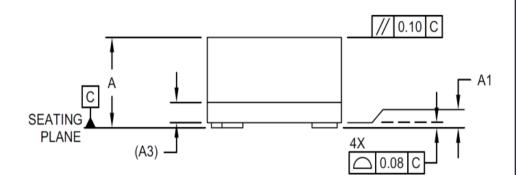
3X b1

Φ

0.07 C A B

0.03M

Side View



ESD Sensitive

Description	Marker	Dimensions (mm)
Number of Terminals	Ν	4
Terminal Pitch	e	1.20 BSC
Terminal Pitch	e1	0.75 BSC
Overall Height	Α	0.84 ± 0.05
Standoff*	A1	.02
Substrate Thickness (with Terminals)	A3	0.20REF
Overall Length	D	1.60BSC
Overall Width	E	1.20BSC
Terminal Width	b1	0.30 ± 0.05
Terminal Width	b2	0.375 ± 0.05
Terminal Length	L	0.35 ± 0.05
Terminal 1 Index Chamfer	СН	0.125

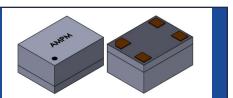
*Standoff max .05 mm and min 0.00 mm

Dimensioning and tolerance per ASME Y14.5M BSC: Basic Dimension. Theoretically exact value shown without tolerances REF: Reference Dimension, usually without tolerance, for information purposes only



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(Pb

1.6 x 1.2 x 0.84 mm

2.0 x 1.6 x 0.84 mm

2.5 x 2.0 x 0.84 mm 3.2 x 2.5 x 0.85 mm

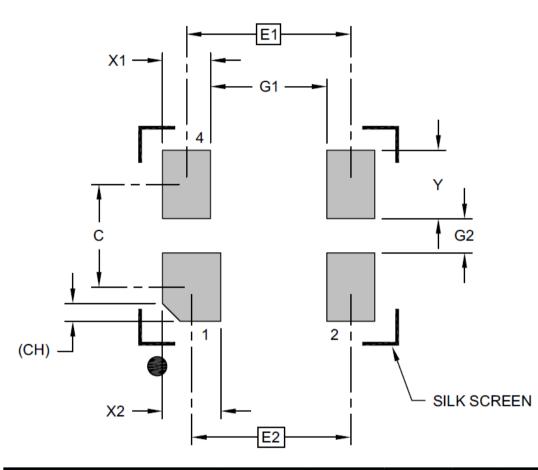
MSL = MSL1

RoHS/RoHS II Compliant

AMPM-SERIES

MECHANICAL DIMENSIONS

Recommended Landing Pattern



Description	Marker	Max	Тур	Max	Unit
Contact Pitch	E1	1.20 BSC			
Contact Pitch	E2	1.	16 BSC		
Contact Spacing	С		0.75		
Contact Width	X1			0.35	
Contact Width	X2			0.43	mm
Contact Pad Length	Y			0.50	
Space Between Contacts	G1	0.85			
Space Between Contacts	G2	0.25			
Contact 1 Index Chamfer	СН	0.13	x 45° RE	F	

Dimensioning and tolerance per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances REF: Reference Dimension, usually without tolerance, for information purposes only

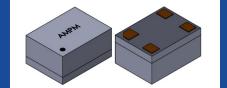


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1.6 x 1.2 x 0.84 mm

2.0 x 1.6 x 0.84 mm

2.5 x 2.0 x 0.84 mm 3.2 x 2.5 x 0.85 mm

MSL = MSL1

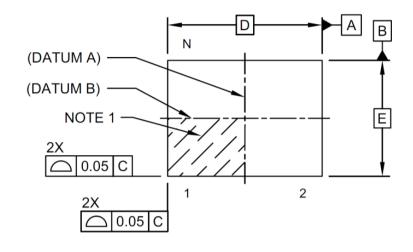
RoHS/RoHS II Compliant

AMPM-SERIES

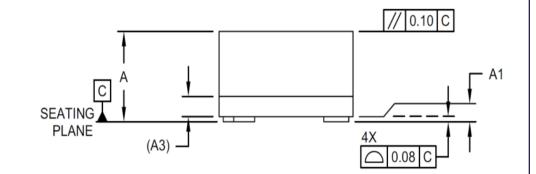
MECHANICAL DIMENSIONS

2.0 x 1.6 mm VFLGA Package Outline

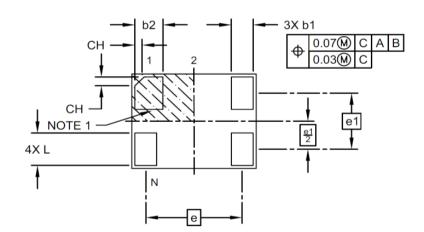
Top View



Side View



Bottom View



Description	Marker	Dimensions (mm)
Number of Terminals	Ν	4
Terminal Pitch	e	1.55 BSC
Terminal Pitch	e1	0.95 BSC
Overall Height	А	0.84 ± 0.05
Standoff*	A1	.02
Substrate Thickness (with Terminals)	A3	0.20 REF
Overall Length	D	2.00 BSC
Overall Width	E	1.60 BSC
Terminal Width	b1	0.35 ± 0.05
Terminal Width	b2	0.45 ± 0.05
Terminal Length	L	0.55 ± 0.05
Terminal 1 Index Chamfer	СН	0.15

*Standoff max .05 mm and min 0.00 mm

Dimensioning and tolerance per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances REF: Reference Dimension, usually without tolerance, for information purposes only



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1.6 x 1.2 x 0.84 mm

2.0 x 1.6 x 0.84 mm

2.5 x 2.0 x 0.84 mm 3.2 x 2.5 x 0.85 mm

MSL = MSL1

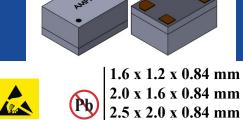
RoHS/RoHS II Compliant

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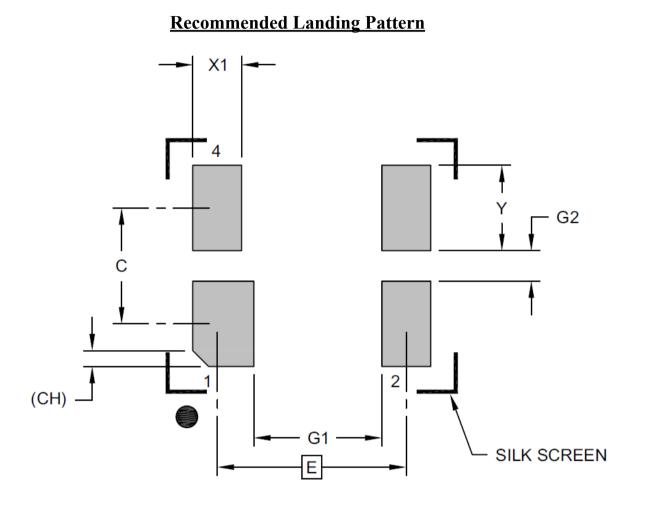
ESD Sensitive

AMPM-SERIES





ESD Sensitive 2.5 x 2.0 x 0.84 mm 3.2 x 2.5 x 0.85 mm RoHS/RoHS II Compliant MSL=MSL1



Description	Marker	Max	Тур	Max	Unit
Contact Pitch	E2	1.	55 BSC		
Contact Spacing	С		0.95		
Contact Width	X1			0.50	
Contact Width	X2			0.40	
Contact Pad Length	Y			0.70	mm
Space Between Contacts	G1	1.05			
Space Between Contacts	G2	0.25			
Contact 1 Index Chamfer	СН	0.13	x 45° RE	F	

Dimensioning and tolerance per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances REF: Reference Dimension, usually without tolerance, for information purposes only



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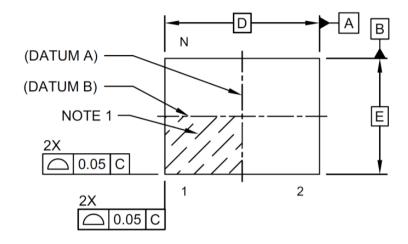
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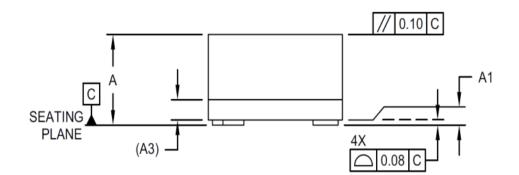
MECHANICAL DIMENSIONS

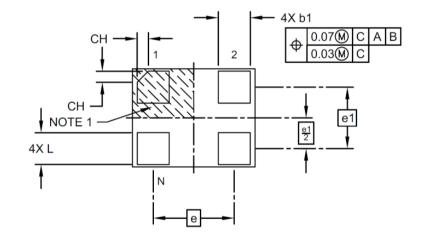
2.5 x 2.0 mm VLGA Package Outline

<u>Top View</u>



Side View





Description	Marker	Dimensions (mm)
Number of Terminals	Ν	4
Terminal Pitch	e	1.65 BSC
Terminal Pitch	e1	1.25 BSC
Overall Height	А	0.84 ± 0.05
Standoff*	A1	.02
Substrate Thickness (with Terminals)	A3	0.20REF
Overall Length	D	2.50BSC
Overall Width	Е	2.00BSC
Terminal Width	b1	0.65 ± 0.05
Terminal Length	L	0.65 ± 0.05
Terminal 1 Index Chamfer	СН	0.225

*Standoff max .05 mm and min 0.00 mm

Dimensioning and tolerance per ASME Y14.5M

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1.6 x 1.2 x 0.84 mm

2.0 x 1.6 x 0.84 mm

2.5 x 2.0 x 0.84 mm 3.2 x 2.5 x 0.85 mm

MSL = MSL1

RoHS/RoHS II Compliant

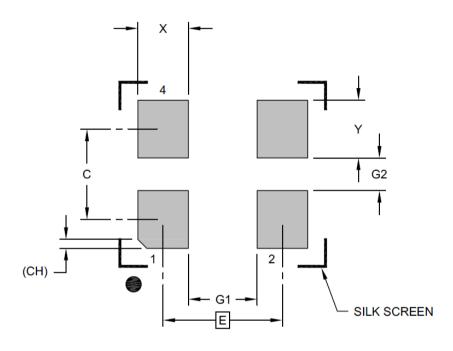
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ESD Sensitive

AMPM-SERIES

MECHANICAL DIMENSIONS

Recommended Landing Pattern



Description	Marker	Max	Тур	Max	Unit
Contact Pitch	Е	1.	65 BSC		
Contact Spacing	С		1.25		
Contact Width	X1			0.70	
Contact Width	X2			0.80	mm
Contact Pad Length	Y			0.50	111111
Space Between Contacts	G1	0.95			
Space Between Contacts	G2	0.45			
Contact 1 Index Chamfer	СН	0.13	x 45° RE	F	

Dimensioning and tolerance per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances REF: Reference Dimension, usually without tolerance, for information purposes only



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1.6 x 1.2 x 0.84 mm

2.0 x 1.6 x 0.84 mm

2.5 x 2.0 x 0.84 mm 3.2 x 2.5 x 0.85 mm

MSL = MSL1

RoHS/RoHS II Compliant

(Pb)

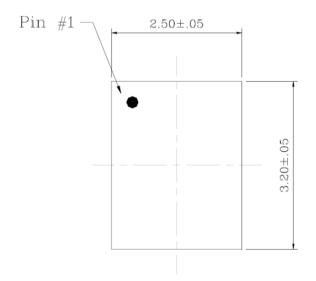
ESD Sensitive

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MECHANICAL DIMENSIONS

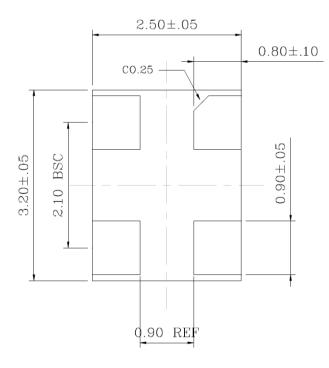
3.2 x 2.5 mm DFN Package Outline

<u>Top View</u>

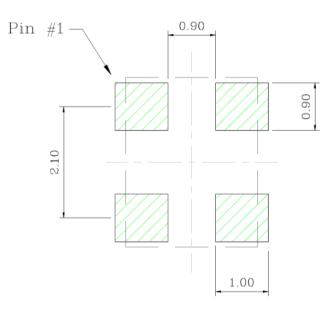


Side View

Bottom View



Recommended Landing Pattern



Dimensions : mm



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 Image: Sensitive
 1.6 x 1.2 x 0.84 mm

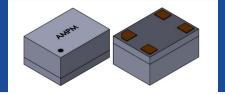
 2.0 x 1.6 x 0.84 mm
 2.0 x 1.6 x 0.84 mm

 2.5 x 2.0 x 0.84 mm
 3.2 x 2.5 x 0.85 mm

 RoHS/RoHS II Compliant

 MSL 1





(Pb)

1.6 x 1.2 x 0.84 mm

2.0 x 1.6 x 0.84 mm

2.5 x 2.0 x 0.84 mm 3.2 x 2.5 x 0.85 mm

MSL = MSL1

RoHS/RoHS II Compliant

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Reflow Profile [JEDEC J-STD-020]

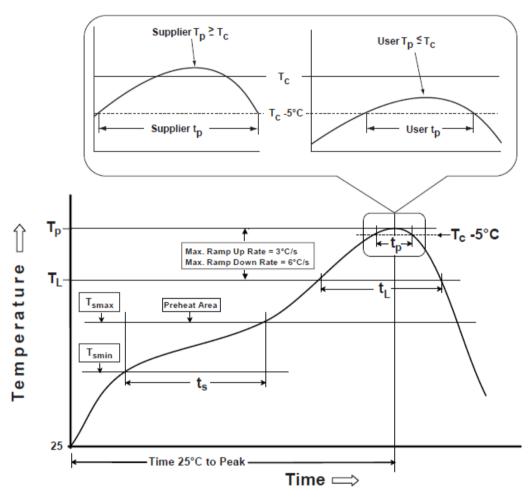


Table 1

SnPb Eutectic Process Classification Temperatures (T_c)

Package Thickness	Volume mm ³ <350	Volume mm ³ >350
<2.5 mm	235 °C	220 °C
>2.5 mm	220 °C	220 °C

ESD Sensitive

Table 2 Pb-Free Process

Classification Temperatures (T _c)			
Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm - 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat / soak		
Temperature minimum (T _{smin})	100°C	150°C
Temperature maximum (T _{smax})	150°C	200°C
Time (T _{smin} to T _{smax}) (t _s)	60 - 120 sec.	60 - 120 sec.
Average ramp-up rate (T _{smax} to T _P)	3°C/sec. max	3°C/sec. max
Liquidous temperature (TL)	183°C	217°C
Time at liquidous (t _L)	60 - 150 sec.	60 - 150 sec.
Peak package body temperature (T _P)*	see Table 1	see Table 2
Time (t _p)** within 5°C of the specified classification temperature (T _C)	20 sec.	30 sec.
Ramp-down rate (Tp to T _{smax})	6°C/sec. max	6°C/sec. max
Time 25°C to peak temperature	6 min. max	8 min. max
Reflow cycles	2 max	2 max

*Tolerance for peak profile temperature (T_P) is defined as a supplier minimum and a user maximum.

**Tolerance for time at peak profile temperature (t $_{\rm p})$ is defined as supplier minimum and a user maximum.



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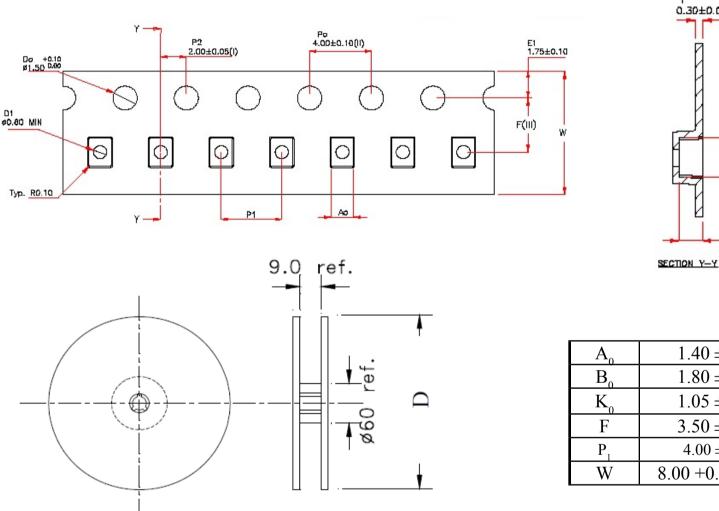
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AMPM-SERIES



PACKAGING

Bulk MOQ= 100pcs/Bag* T= 1,000pcs/reel (D=180mm) T3= 3,000pcs/reel (D=180mm)



Affected Package Size: 1.6 mm x 1.2 mm VFLGA

0.30±0.03

A_0	1.40 ± 0.05
\mathbf{B}_{0}	1.80 ± 0.05
K ₀	1.05 ± 0.05
F	3.50 ± 0.05
\mathbf{P}_{1}	4.00 ± 0.10
W	8.00 +0.30/-0.10

Dimensions : mm

* For Quick turn-around programmable sample orders less than MOQ represented above: Due to the immediate availability of stock and the qty of the order, the parts may be delivered as Cut Tape, Loose parts in Antistatic Bag or in Tube(s).

For orders equal to or greater than MOQ and less than 1000pcs: Due to packaging, the order must be a multiple of MOQ per package size above

For orders equal to or greater than 1000 pcs: Bulk is not an option. Please refer to tape and reel packaging.



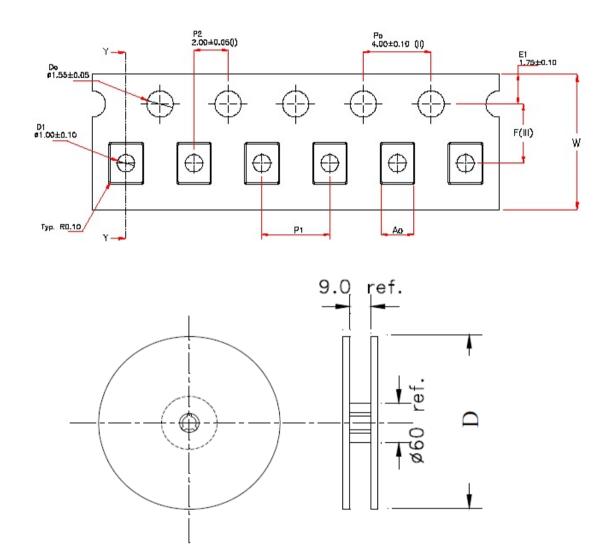
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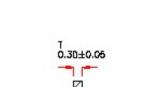
AMPM-SERIES

ESD Sensitive RoHS/RoHS II Compliant MSL = MSL 1

PACKAGING

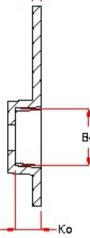
Bulk MOQ= 100pcs/Bag* T= 1,000pcs/reel (D=180mm) T3= 3,000pcs/reel (D=180mm)





Affected Package Sizes:

2.0 mm x 1.6 mm VFLGA



SECTION Y-Y

A_0	1.90 ± 0.05
B	2.30 ± 0.05
K ₀	1.05 ± 0.05
F	3.50 ± 0.05
P ₁	4.00 ± 0.10
W	8.00 +0.30/-0.10

Dimensions : mm

* For Quick turn-around programmable sample orders <u>less than MOQ</u> represented above: Due to the immediate availability of stock and the qty of the order, the parts may be delivered as Cut Tape, Loose parts in Antistatic Bag or in Tube(s).

For orders <u>equal to or greater than MOQ</u> and <u>less than 1000pcs</u>: Due to packaging, the order must be a multiple of MOQ per package size above

For orders <u>equal to or greater than 1000 pcs</u>: Bulk is not an option. Please refer to tape and reel packaging.



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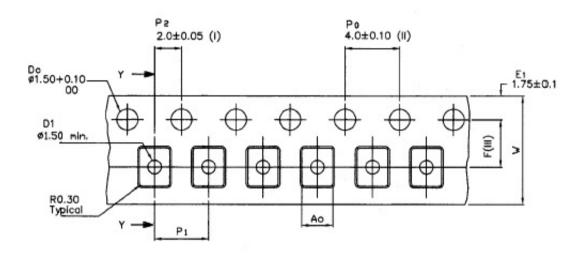
REVISED: 04.07.2021

AMPM-SERIES

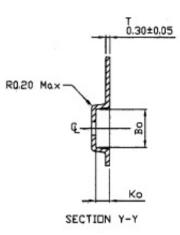
ESD Sensitive RoHS/RoHS II Compliant MSL = MSL 1

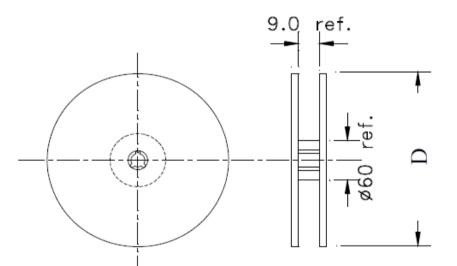
PACKAGING

Bulk MOQ= 140pcs/Tube* T= 1,000pcs/reel (D=180mm) T3= 3,000pcs/reel (D=180mm)



Affected Package Sizes: 2.5 mm x 2.0 mm VLGA





A_0	2.25 ± 0.05
B	2.80 ± 0.05
K ₀	1.10 ± 0.05
F	3.50 ± 0.05
P ₁	4.00 ± 0.10
W	8.00 +0.30/-0.10

Dimensions : mm

* For Quick turn-around programmable sample orders <u>less than MOQ</u> represented above: Due to the immediate availability of stock and the qty of the order, the parts may be delivered as Cut Tape, Loose parts in Antistatic Bag or in Tube(s).

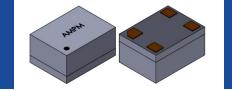
For orders <u>equal to or greater than MOQ</u> and <u>less than 1000pcs</u>: Due to packaging, the order must be a multiple of MOQ per package size above

For orders equal to or greater than 1000 pcs: Bulk is not an option. Please refer to tape and reel packaging.



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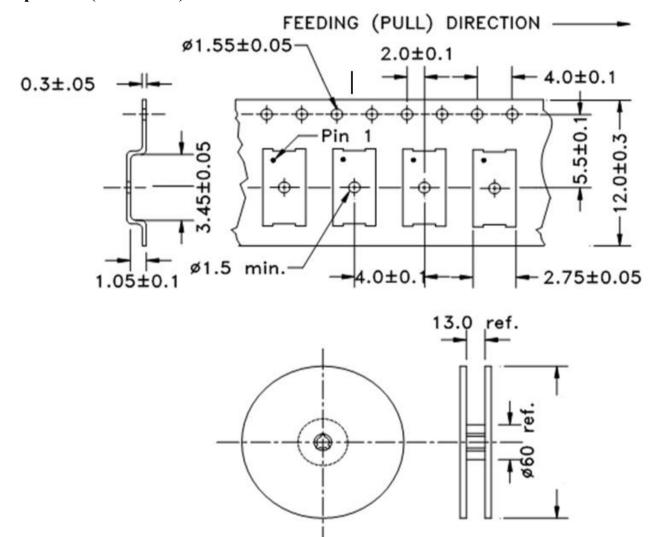
AMPM-SERIES

ESD Sensitive RoHS/RoHS II Compliant MSL = MSL 1

PACKAGING

Bulk MOQ= 110pcs/Tube* T= 1,000pcs/reel (D=180mm) T3= 3,000pcs/reel (D=180mm)

Affected Package Sizes: 3.2 mm x 2.5 mm DFN



Dimensions : mm

* For Quick turn-around programmable sample orders <u>less than MOQ</u> represented above: Due to the immediate availability of stock and the qty of the order, the parts may be delivered as Cut Tape, Loose parts in Antistatic Bag or in Tube(s).

For orders <u>equal to or greater than MOQ</u> and <u>less than 1000pcs</u>: Due to packaging, the order must be a multiple of MOQ per package size above

For orders <u>equal to or greater than 1000pcs</u>: Bulk is not an option. Please refer to tape and reel packaging.



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