

Product Description

ATEK591P3 is a compact 2 stage amplifier with high gain and linearity. Amplifier operates up to 600 MHz and low frequency range goes down to 10 MHz. Operation below 10 MHz is possible by adjusting lumped bias component values.

Amplifier is housed in compact 3x3 mm low cost SMD package, input and output matched to 50 ohms internally. Evaluation Board, bare die, custom package, and module options are available upon request.

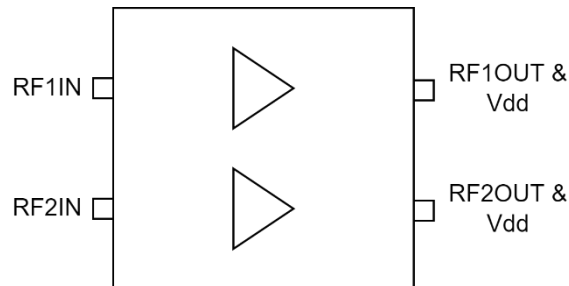
Product Features

- Frequency Range: LF - 600 MHz
- Gain: 48.5 dB at 300MHz
- OIP3: 32 dBm at 300MHz
- OP1dB: 19 dBm at 300MHz
- Positive Supply
- 3x3 mm compact size

Applications

- Wideband Receivers
- SDR
- Test Equipment
- Digitizers
- Telecommunication

Functional Block Diagram



Electrical Specifications

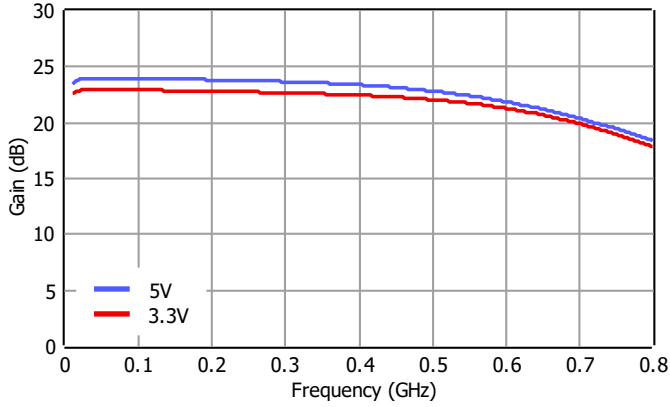
Conditions unless otherwise specified: $V_{DD} = 5\text{ V}$, $I_{DQ} = 105\text{ mA}$, Typical, $T = 25\text{ C}$, CW.

Parameter		Min	Typ	Max	Units
Operational Frequency Range		LF		600	MHz
Gain (2 Stage)	10 MHz		48		dB
	50 MHz		49		
	100 MHz		49		
	300 MHz		48		
	600 MHz		43		
Isolation (2 Stage)	10 MHz		42		dB
	50 MHz		58		
	100 MHz		57		
	300 MHz		54		
	600 MHz		43		
Input Return Loss			12		dB
Output Return Loss			12		dB
Output IP3			32		dBm
Output P1dB			19		dBm
DC Supply Voltage (Vdd)			3.3 5		V
DC Supply Current (Both Amplifier)			64 105		mA
DC Supply Current (Amplifier 1)			30 50		mA
DC Supply Current (Amplifier 2)			34 55		mA
Operating Temperature		-40		85	°C

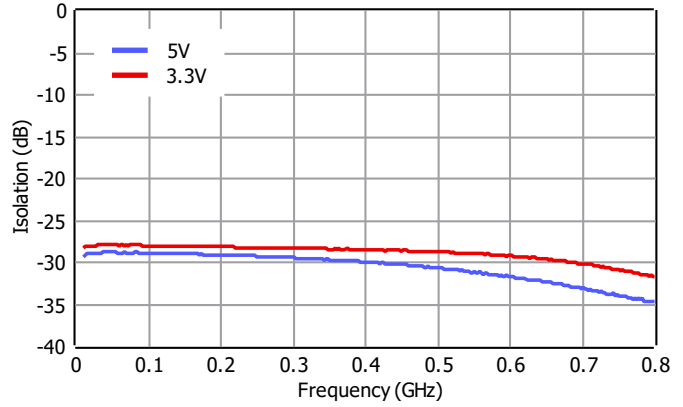
Typical Performance Plots

Conditions unless otherwise specified: $V_{DD} = 5V$, Typical, $T = 25^\circ C$, CW.

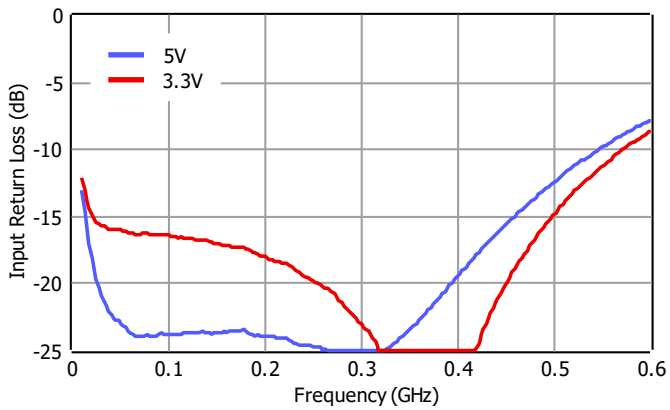
Amplifier 1 Gain



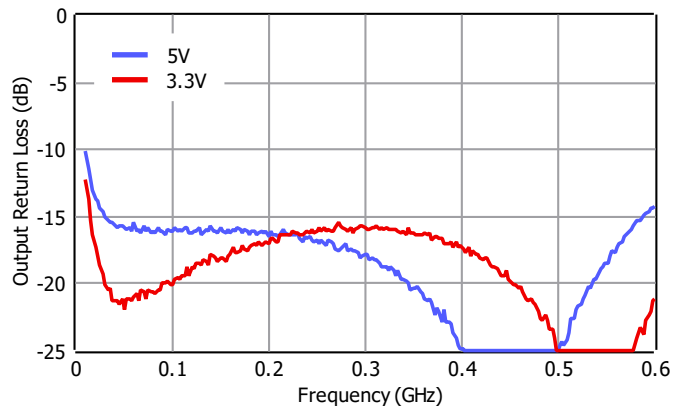
Amplifier 1 Isolation



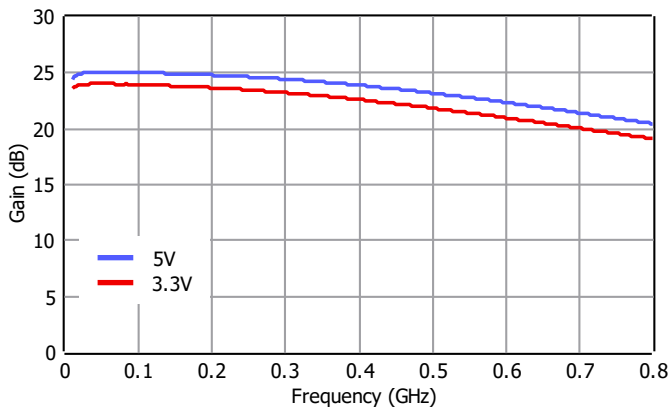
Amplifier 1 Input Return Loss



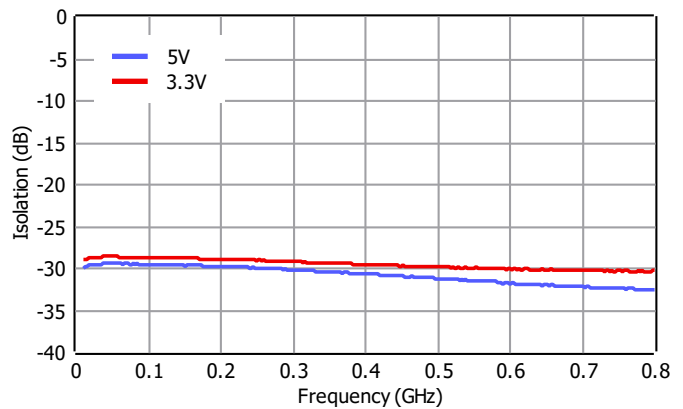
Amplifier 1 Output Return Loss



Amplifier 2 Gain



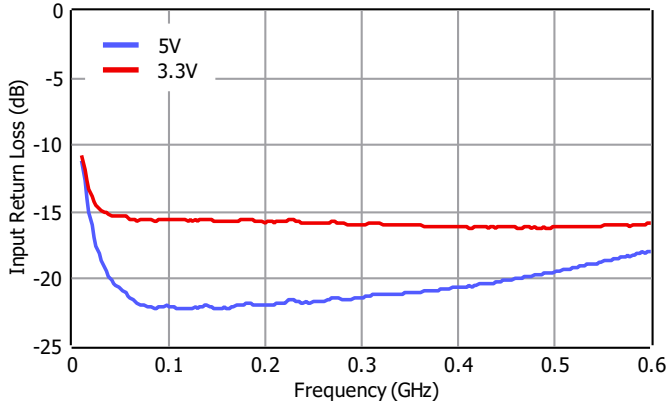
Amplifier 2 Isolation



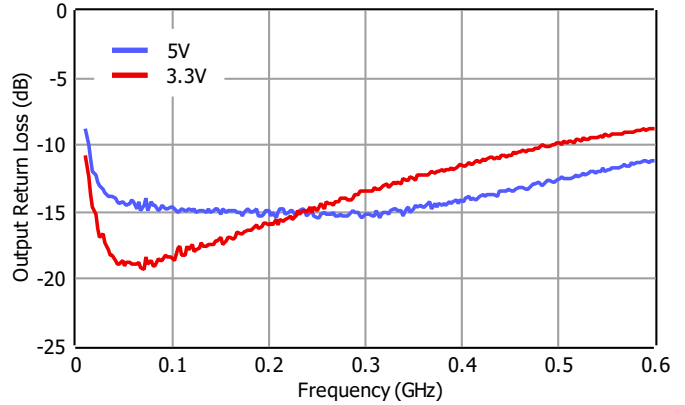
Typical Performance Plots

Conditions unless otherwise specified: $V_{DD} = 5V$, Typical, $T = 25\text{ C}$, CW.

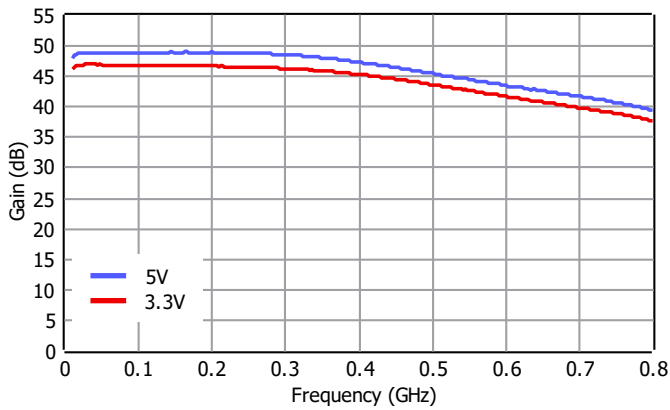
Amplifier 2 Input Return Loss



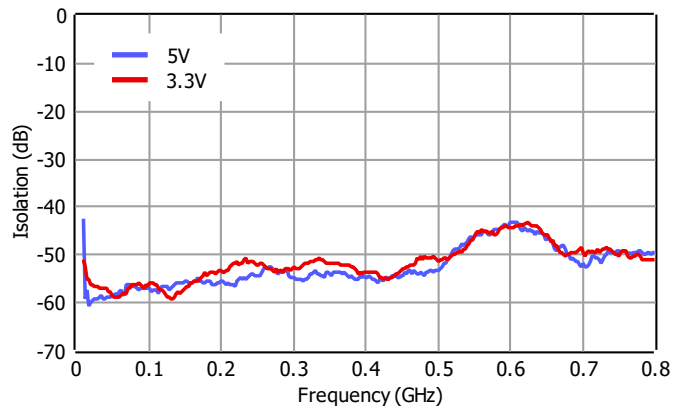
Amplifier 2 Output Return Loss



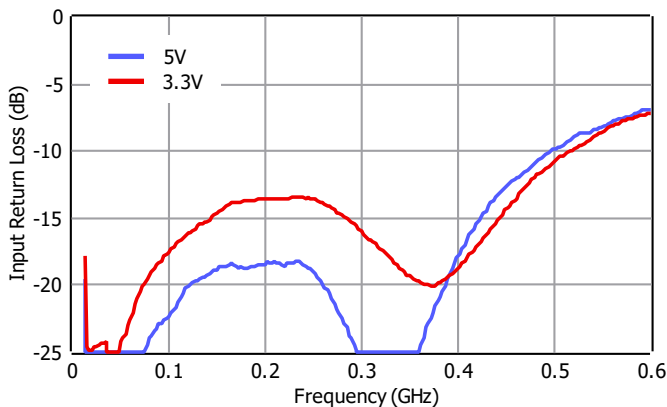
2 Stage Amplifier Gain (Amp2 is driven by Amp1)



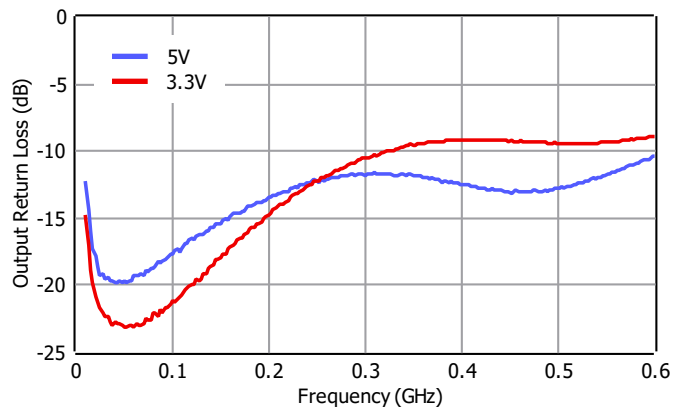
2 Stage Amplifier Isolation



2 Stage Amplifier Input Return Loss



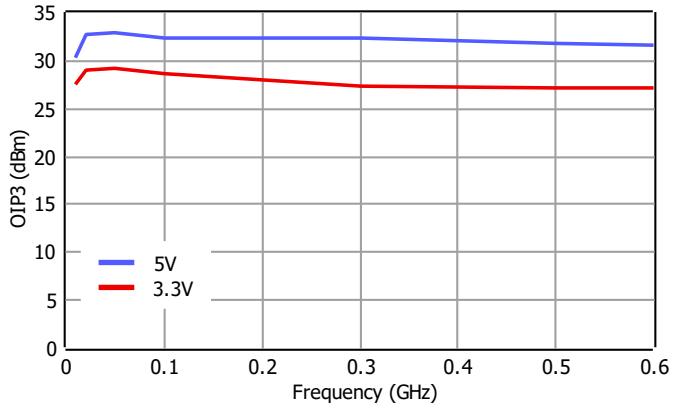
2 Stage Amplifier Output Return Loss



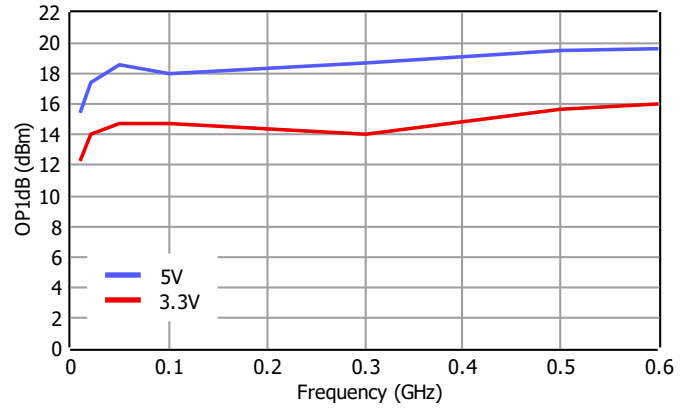
Typical Performance Plots

Conditions unless otherwise specified: $V_{DD} = 5V$, $I_{DQ} = 105\text{ mA}$, Typical, $T = 25\text{ C}$, CW.

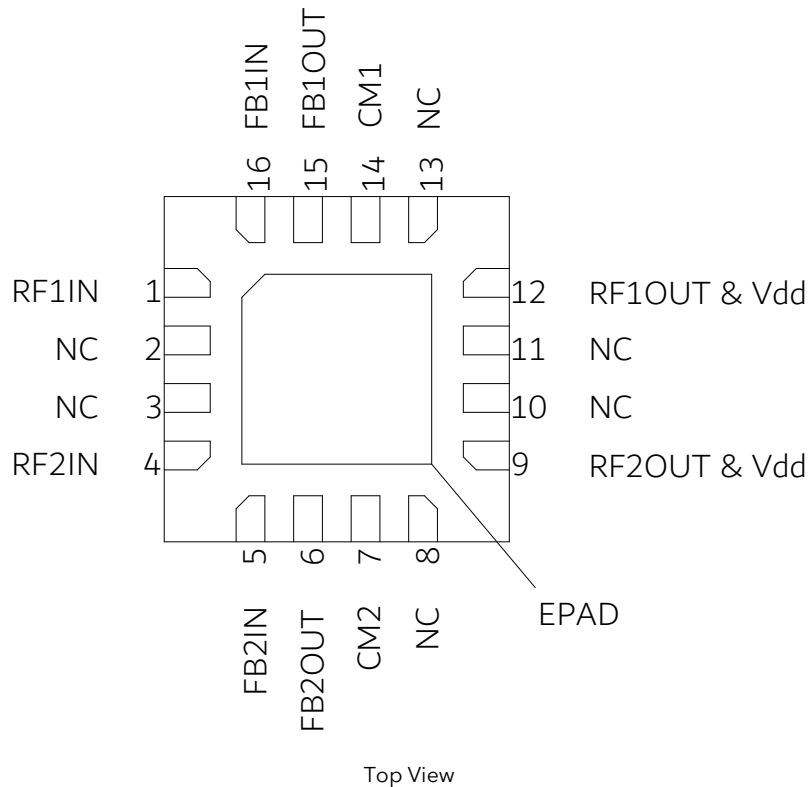
2 Stage Amplifier Output IP3



2 Stage Amplifier Output P1dB



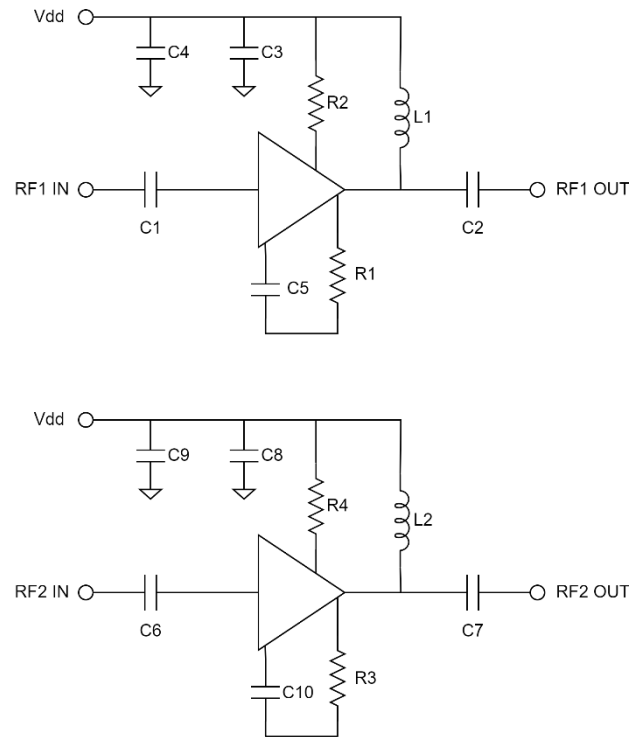
Pin Description



Pin Number	Pin Name	Description
1	RF1IN	Amplifier 1 RF input pin. Wideband external DC block capacitor is required.
4	RF2IN	Amplifier 2 RF input pin. Wideband external DC block capacitor is required.
12	RF1OUT & Vdd	Amplifier 1 RF output pin. Wideband external DC block capacitor is required.
9	RF2OUT & Vdd	Amplifier 2 RF output pin. Wideband external DC block capacitor is required.
16	FB1IN	Feedback Input pin for Amplifier 1.
15	FB1OUT	Feedback Output pin for Amplifier 1.
14	CM1	Current Mirror pin for Amplifier 1.
5	FB2IN	Feedback Input pin for Amplifier 2.
6	FB2OUT	Feedback Output pin for Amplifier 2.
7	CM2	Current Mirror pin for Amplifier 2.
2, 3, 8, 10, 11, 13	NC	These pins are not internally connected. Can be grounded on the PCB.
-	GND	Ground.
17	EPAD	Exposed Pad on the bottom of the package should be connected to ground with multiple number of vias to reduce the inductance to the GND.

Applications Information

Signal entering from RF IN goes to RF OUT with an amplification.
Typical application schematic to operate the amplifier is given below.



ATEK591P3 consists of 2 amplifiers, having different RF performance. Amplifiers can be used separately or can be cascaded to achieve higher gain.

C1, C2, C6 and C7 are DC block capacitors. It is recommended to use low loss DC block at frequency of operation to achieve the best performance.

L1 and L2 are used as RF choke inductors. It is recommended to use appropriate RF choke inductors at frequency of operation.

To extend the low frequency cutoff of the amplifier from 10 MHz to lower frequencies, higher value C1, C2, C6, C7, L1 and L2 external components can be used. This will improve low frequency performance at the expense of flat wideband response at higher frequencies.

C3, C4, C8 and C9 are used to filter out the ripples and unwanted signals coming from the Vdd supply. Using additional capacitors in parallel will improve this filtering. If this filtering is of no concern, then amplifier can be operated without these capacitors.

R2 and R4 are the current mirror resistors which are used to set the current of the amplifier.

All measurement results given in this document are generated with connectorized evaluation PCB measurements.

To generate the 2 stage amplifier performance plots, RF1 OUT is connected to RF2 IN by using the RF path provided on the evaluation board.

If required for the application, filtering and/or attenuation components can be connected between RF1 OUT and RF2 IN pins.

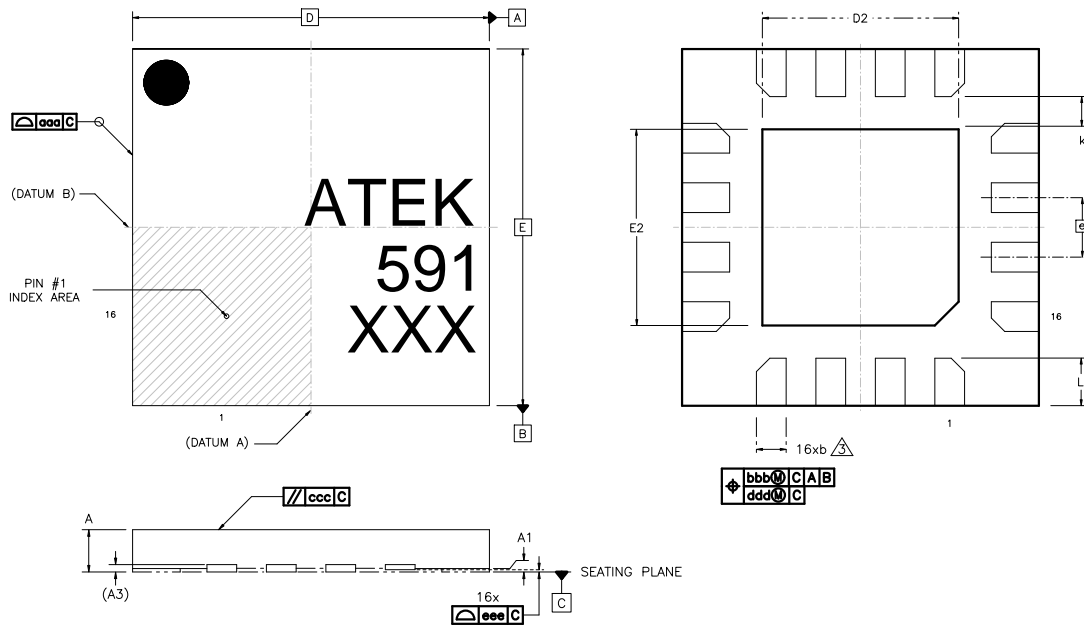
The NC pins of the Amplifier are connected to the GND on the PCBs used to generate the plots shown in this document. Vdd values shown on the datasheet correspond the Vdd pins shown on the application schematic, not the output pin of the amplifier.

Absolute Maximum Ratings

Parameter	Value/Range
Supply Voltage (Vdd)	TBD
RF Input Power	TBD
Storage Temperature	-55 to +125°C

Operation of this device outside the parameter ranges given above may cause damage. These conditions should not be applied simultaneously.

Mechanical and Marking Information



NOTES:
1) ALL DIMENSIONS IN MM
2) DIMENSIONING AND TOLERANCING PER ASME Y14.5-2009
3) DIMENSION b APPLIES TO METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30 MM FROM TERMINAL TIP

SYMBOL	MIN	MAX	SYMBOL	MIN	MAX
A, V	0.80	1.00	E2	1.55	1.75
A, W	0.70	0.80	e	0.50	BSC
A, L	1.40	1.70	k	0.20	-
A1	0.00	0.05	L	0.35	0.45
A3	0.20	REF	aaa		0.10
k	0.18	0.30	bbb		0.10
D	3.00	BSC	ccc		0.10
D2	1.55	1.75	ddd		0.05
E	3.00	BSC	eee		0.08

Handling Precautions



Caution!
ESD-Sensitive Device
Handle Accordingly

Contact Information

For the latest specifications, additional product information, support, and sales.

Web: www.atekmidas.com

Tel: +90-212-483-71-67

Email: support@atekmidas.com

Notice

This document and its contents are property of ATEK MIDAS. ATEK MIDAS has the right to change the document at any time without notice. ATEK MIDAS distributes this document as a service to its customers. ATEK MIDAS supports its customers to help them create market leader products. Customer is responsible from choosing the product and the configuration the product. This document is provided `as is` and does not provide any warranty.

Customer is responsible for the usage of this document, the information provided in the document and the usage of products. ATEK MIDAS shall have no responsibility from the customer products, customer applications and doings of customers.

Revisions

Revision No	Revision Date	Revision Reason	Section / Page No
1.0	05.09.2022	Initial Release	