

Features

- Linear Gain: 27 dB
- Saturated Output Power: +39 dBm Pulsed
- 50 Ω Input / Output Match
- Lead-Free 5 mm 20-lead PQFN Package
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

The MAAP-010171 is a 2-stage, 8 W saturated S-band power amplifier in a 5mm 20 lead PQFN package, allowing easy assembly. This product is fully matched to 50 ohms on both the input and output. It can be used as a power amplifier stage or as a driver stage in high power pulsed applications. It is ideally suited for Air Traffic Control, Weather, Military and S-band radar applications.

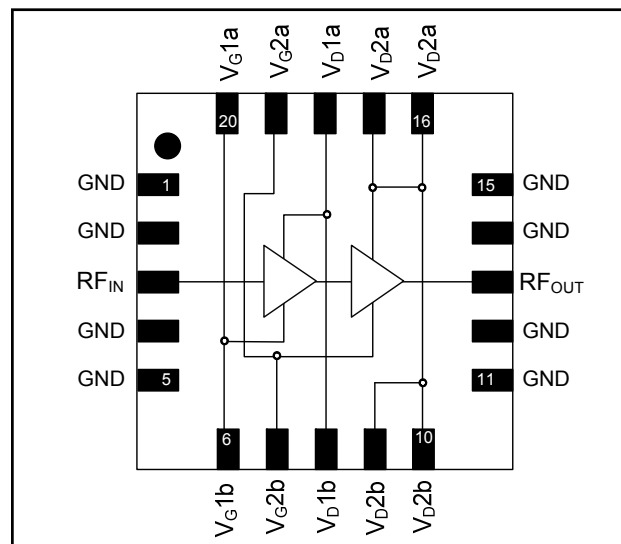
Each device is 100% RF tested to ensure performance compliance. The part is fabricated using M/A-COM Technology Solutions' high linearity pHEMT Process.

Ordering Information ¹

Part Number	Package
MAAP-010171-TR0500	500 piece reel
MAAP-010171-TR1000	1000 piece reel
MAAP-010171-001SMB	Sample Board

1. Reference Application Note M513 for reel size information.

Functional Schematic



Pin Configuration ²

Pin No.	Function	Pin No.	Function
1	Ground	11	Ground
2	Ground	12	Ground
3	RF _{IN}	13	RF _{OUT}
4	Ground	14	Ground
5	Ground	15	Ground
6	V _G 1b	16	V _D 2a
7	V _G 2b	17	V _D 2a
8	V _D 1b	18	V _D 1a
9	V _D 2b	19	V _G 2a
10	V _D 2b	20	V _G 1a
		21	Paddle ³

2. M/A-COM Technology Solutions recommends connecting unused package pins to ground.

3. The exposed pad centered on the package bottom must be connected to RF, DC, and thermal ground.

* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

Electrical Specifications:
Freq. 2.5 - 3.5 GHz, $V_{DD} = 9$ V Pulsed, 100 μ s Pulse Width, 10% Duty Cycle, $Z_0 = 50 \Omega$

Parameter	Units	Min.	Typ.	Max.
Gain	dB	25	27	—
Input Return Loss	dB	—	10	—
Output Return Loss	dB	—	10	—
Psat	dBm	37	39	—
Small Signal Current (I_{DD})	A	—	1	—
Efficiency	%	—	38	—

Absolute Maximum Ratings ^{4,5}

Parameter	Absolute Maximum
Input Power	+22 dBm
Supply Voltage	11 V
Gate Current	25 mA
Duty Cycle	50 %
Operating Temperature	-40°C to +85°C
Junction Temperature ^{6,7}	+150 °C
Storage Temperature	-55°C to +150°C

4. Exceeding any one or combination of these limits may cause permanent damage to this device.

5. M/A-COM Technology Solutions does not recommend sustained operation near these survivability limits.

6. Operating at nominal conditions with $T_J \leq 150^\circ\text{C}$ will ensure $MTTF > 1 \times 10^6$ hours.

7. Junction Temperature (T_J) = $T_C + \Theta_{jc} * (V * I)$
 Typical thermal resistance (Θ_{jc}) = 5.75° C/W

Operating the MAAP-010171

To operate the MAAP-010171, follow these steps.
 Ramp down or shut down in reverse order.

1. Apply V_G between -1 V and -0.5 V to set IDQ to 1 A
2. Apply RF Power ON
3. Apply V_{DD} Pulsed

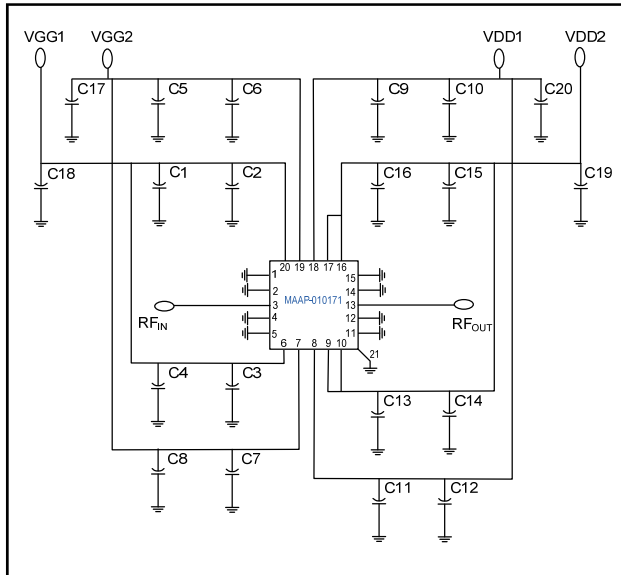
Handling Procedures

Please observe the following precautions to avoid damage:

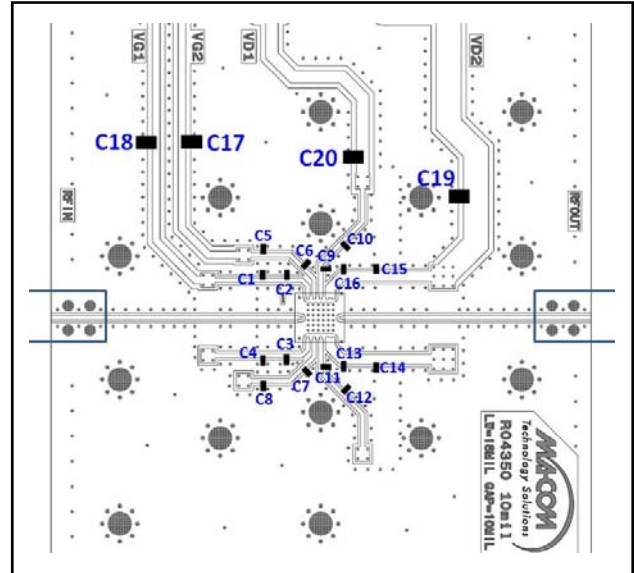
Static Sensitivity

Gallium Arsenide Integrated Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Schematic



Recommended PCB Layout

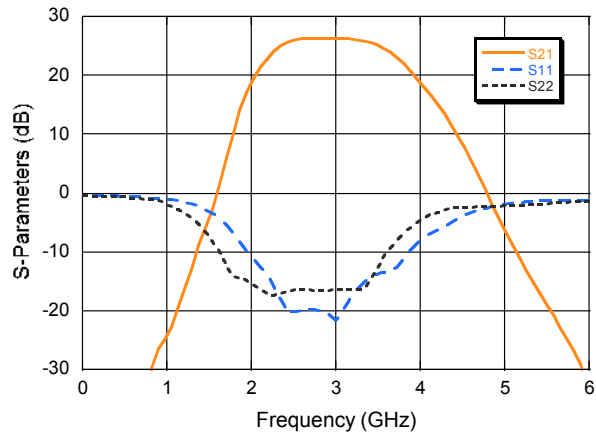


Parts List

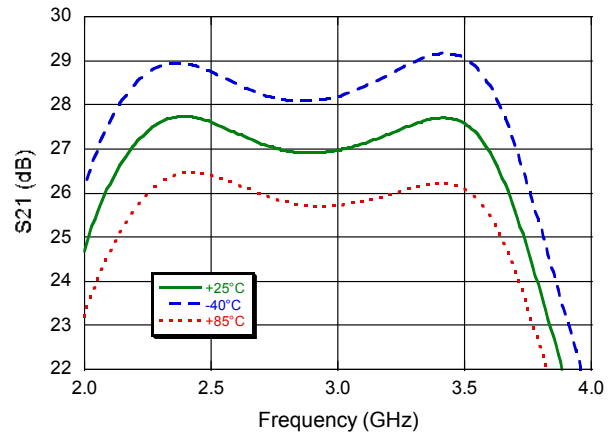
Component	Value	Package
C2, C3, C6, C7, C9, C11, C13, C16	100 pF	0402
C1, C4, C5, C8, C10, C12, C14, C15	1000 pF	0402
C17, C18	1 μ F	0805
C19, C20	10 nF	0805

Typical Performance Curves

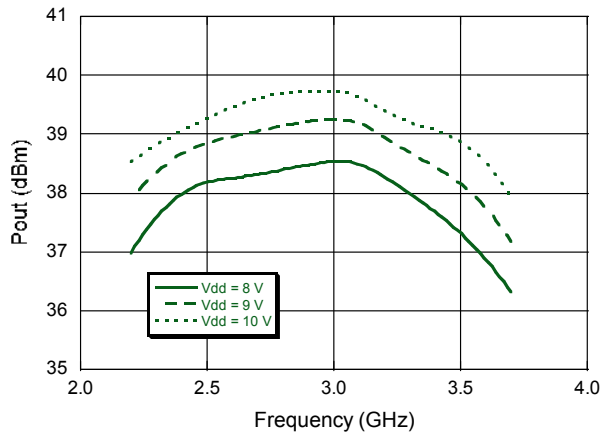
S-Parameters



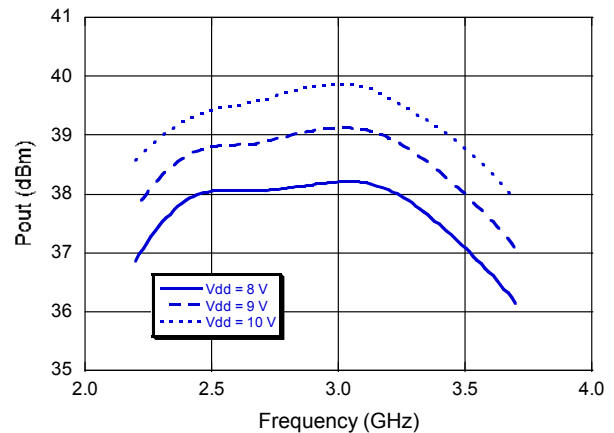
Small Signal Gain



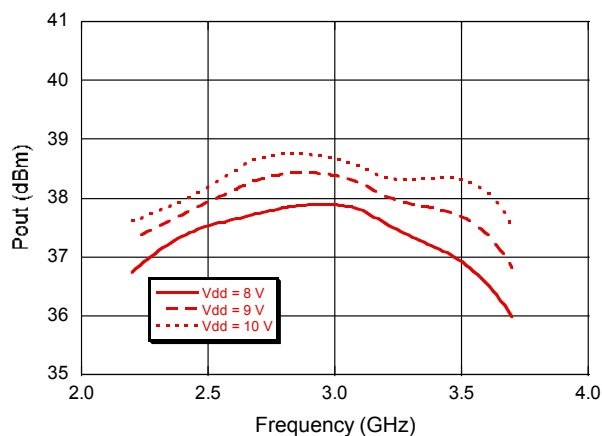
Output Power, Pin = 19 dBm @ +25°C



Output Power, Pin = 19 dBm @ -40°C

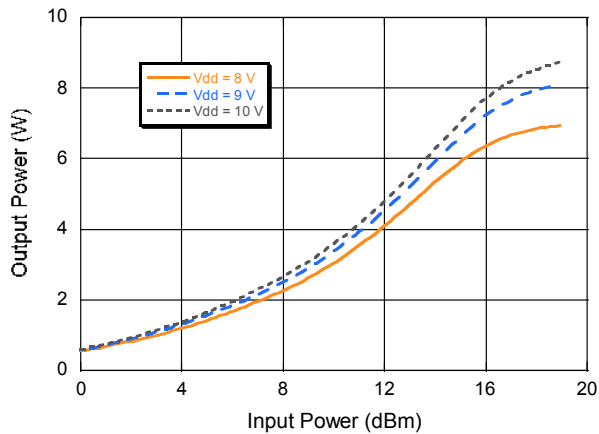


Output Power, Pin = 19 dBm @ +85°C

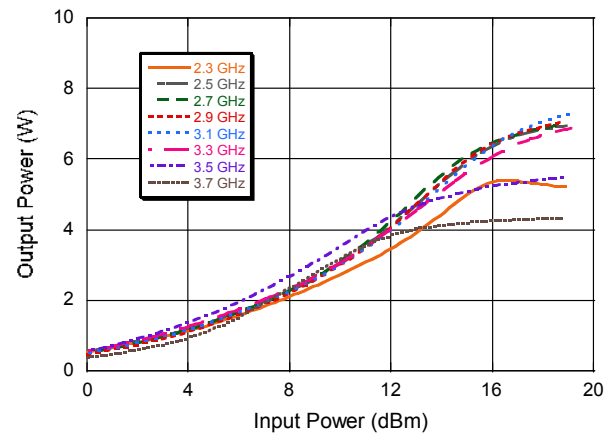


Typical Performance Curves

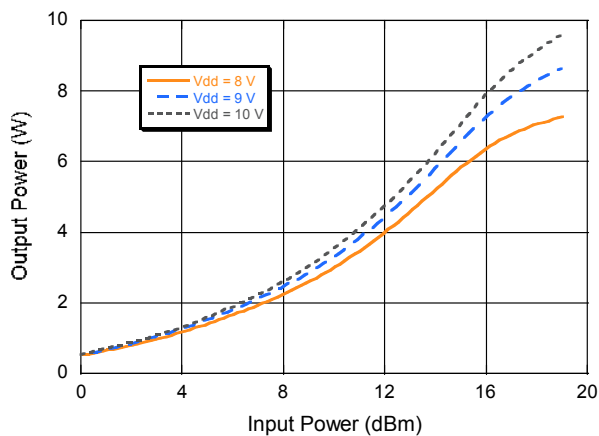
Output Power @ 2.5 GHz



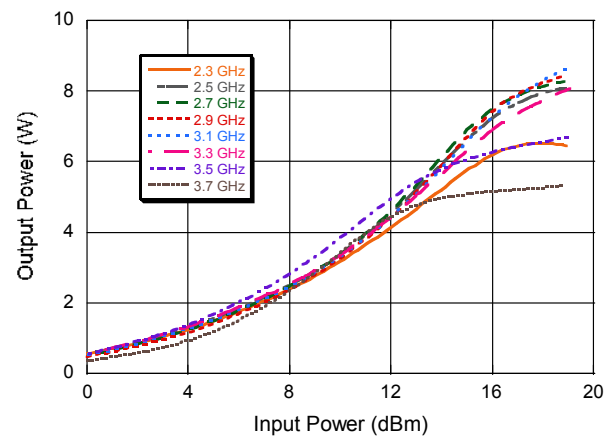
Output Power, V_{DD} = 8 V



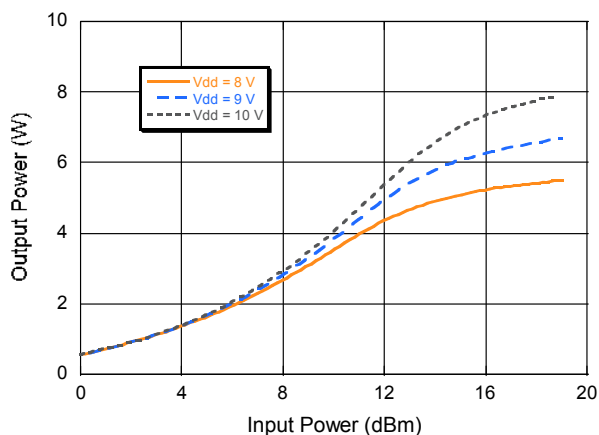
Output Power @ 3.1 GHz



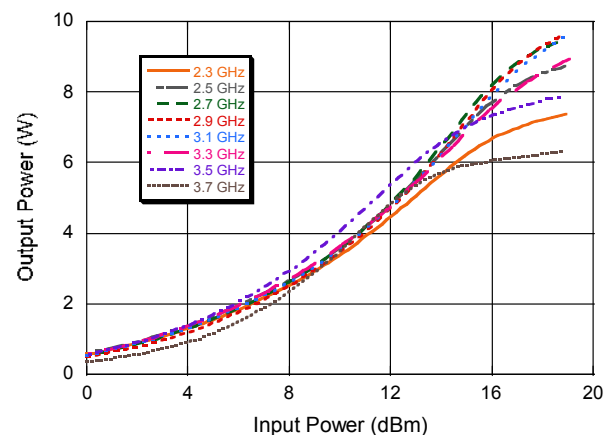
Output Power, V_{DD} = 9 V



Output Power @ 3.5 GHz

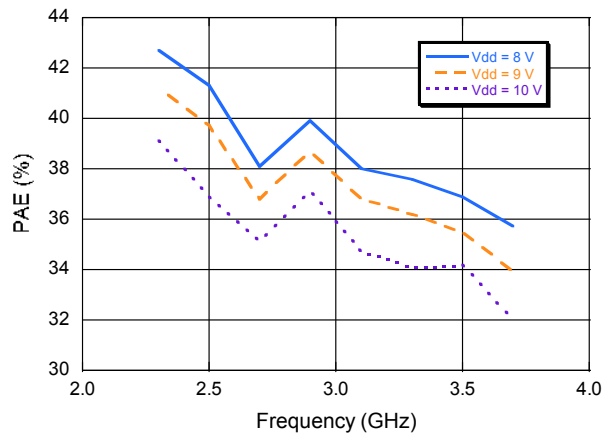


Output Power, V_{DD} = 10 V

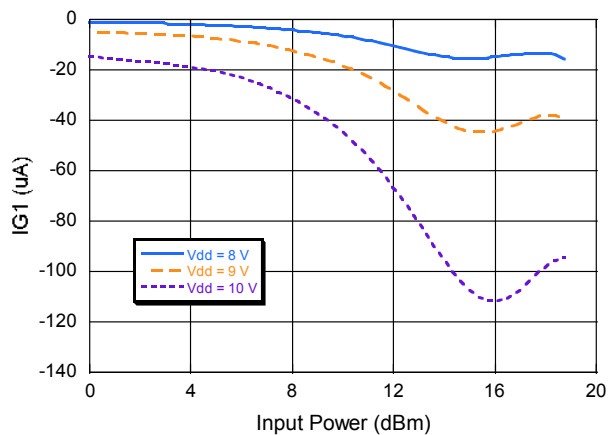


Typical Performance Curves

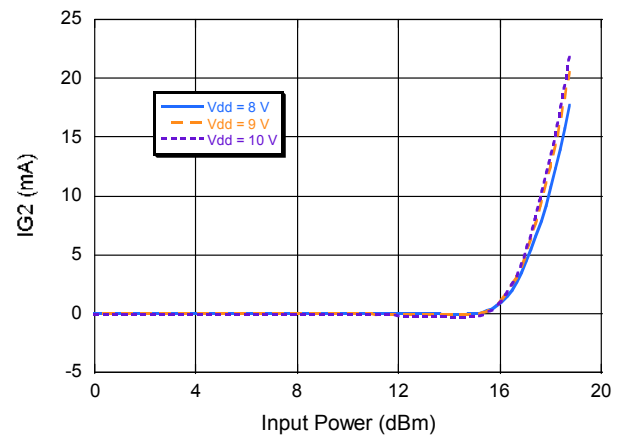
PAE



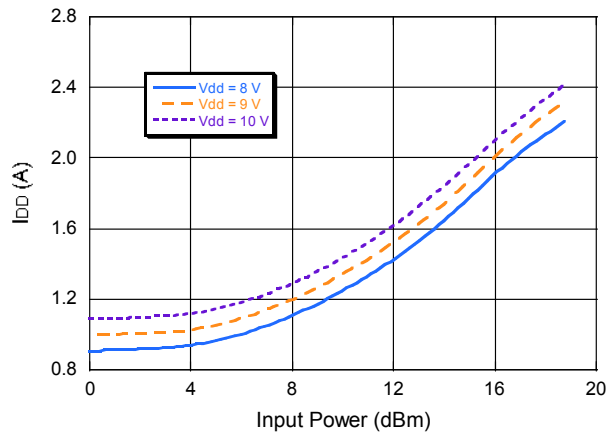
1st Stage Gate Current @ 2.9 GHz



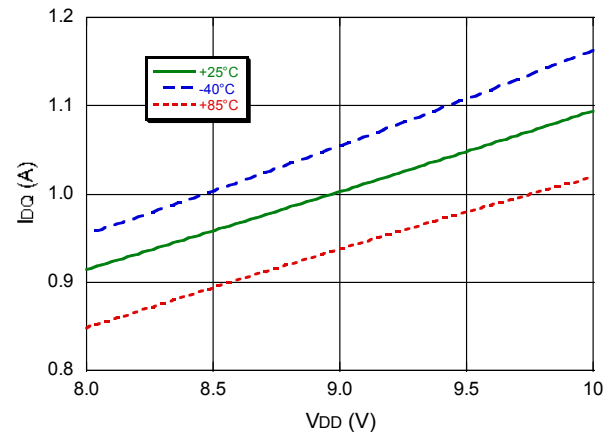
2nd Stage Gate Current @ 2.9 GHz



Drain Current @ 2.9 GHz



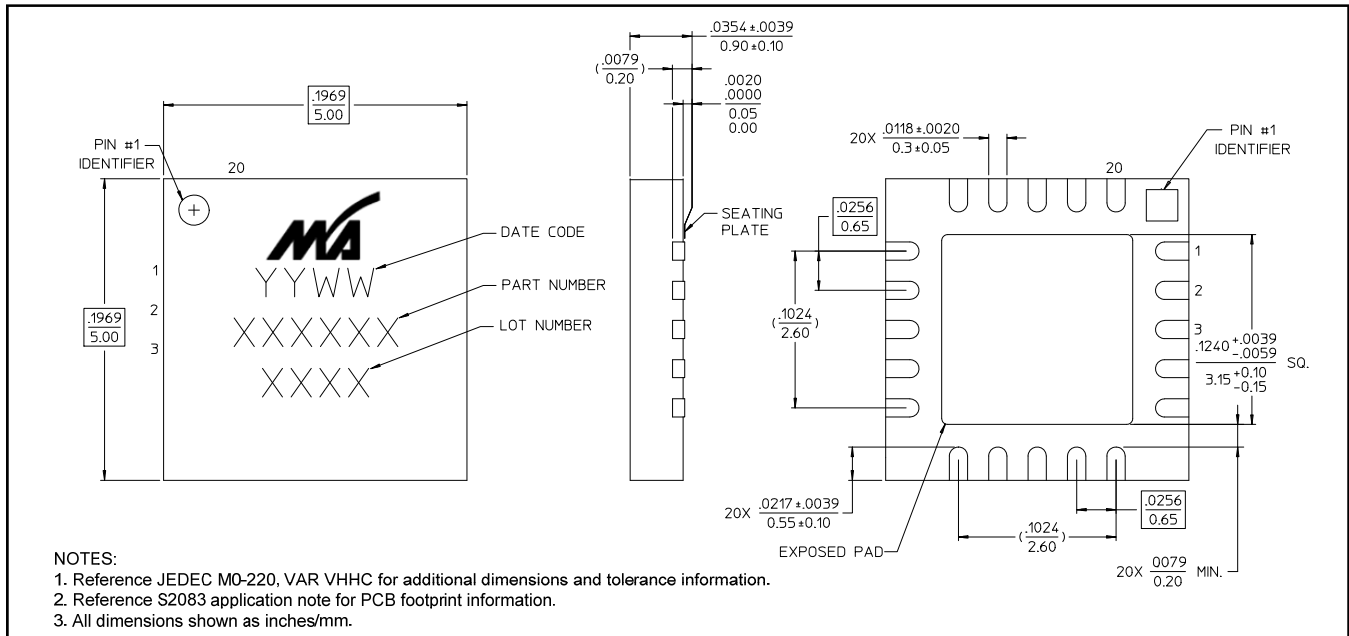
Small Signal Drain Current @ 2.9 GHz



Amplifier, Power, 8 W
2.5 - 3.5 GHz

Rev. V3

Lead-Free 5 mm 20-Lead PQFN[†]



[†] Reference Application Note S2083 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level 1 requirements.
Plating is 100% matte tin over copper.

AMEYA360

Components Supply Platform

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