

Power Amplifier MMIC 17-21 GHz



Product Datasheet

K-PA-1721

Power Amplifier MMIC for K-band.

Overview

The K-PA-1721 is a 3-stage MMIC power amplifier that covers frequencies from 17 GHz to 21 GHz. This MMIC provides 22 dBm of saturated power and > 29% PAE, with 5 dBm input power, from a 3 V supply voltage and 220 mA current. The small signal gain is > 21 dB with 0.5 dB flatness, and both input and output are well matched to 50 ohm.

The MMIC is fully passivated for additional protection and has all bond pads and backside gold plated. It is compatible with precision die attach methods, as well as thermo-compression and thermosonic wire bonding, making it ideal for MCM and hybrid microcircuit applications. All data shown is measured with the chip in a 50 Ohm environment, with 100 pF decoupling capacitors on all DC connections and is contacted using RF probes.



Features

- 17 – 21 GHz
- > 22 dBm saturated output power
- > 29% PAE
- > 21 dB small signal gain
- < 0.5 dB gain flatness
- Unconditionally stable



Applications

- Satellite communications
- Radar
- Mobile communications
- 5G
- Security

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Specification Overview

Parameter	Min	Typ	Max	Unit
Frequency Range	17		21	(GHz)
Gain	20	21	22	(dB)
Input Return Loss	10	14		(dB)
Output Return Loss	8	15		(dB)
Pout	22	22.5	23	(dBm)
Drain Voltage		3		(V)
Current		220		(mA)

Absolute Maximum Ratings

Parameter	Rating
Drain Voltage	6 V
Drain Current	400 mA
RF Input Power	10 dBm
Storage Temperature	-65 to +150 °C
Channel Temperature	+150°C
Operating Temperature	-40°C to + 85 °C

Exceeding any one or combination of these limits may cause permanent damage to this device. Sustained operation near these survivability limits is not recommended.

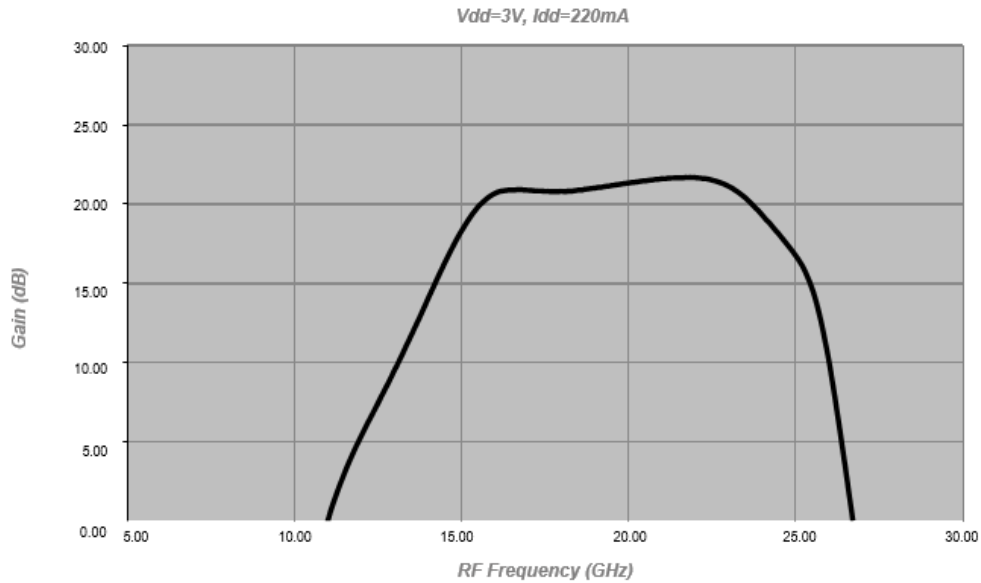
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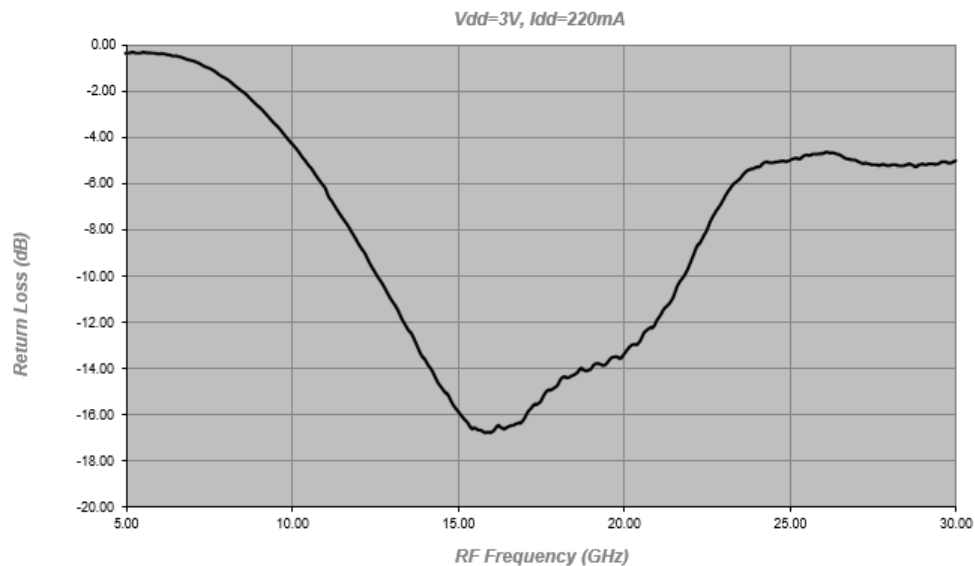
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Measured Performance Data

Gain



Input Return Loss

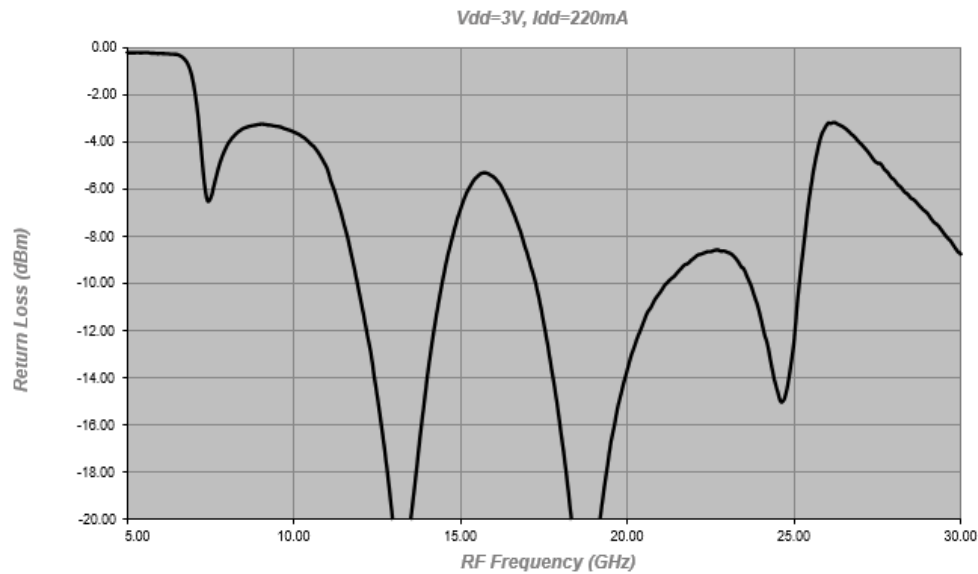


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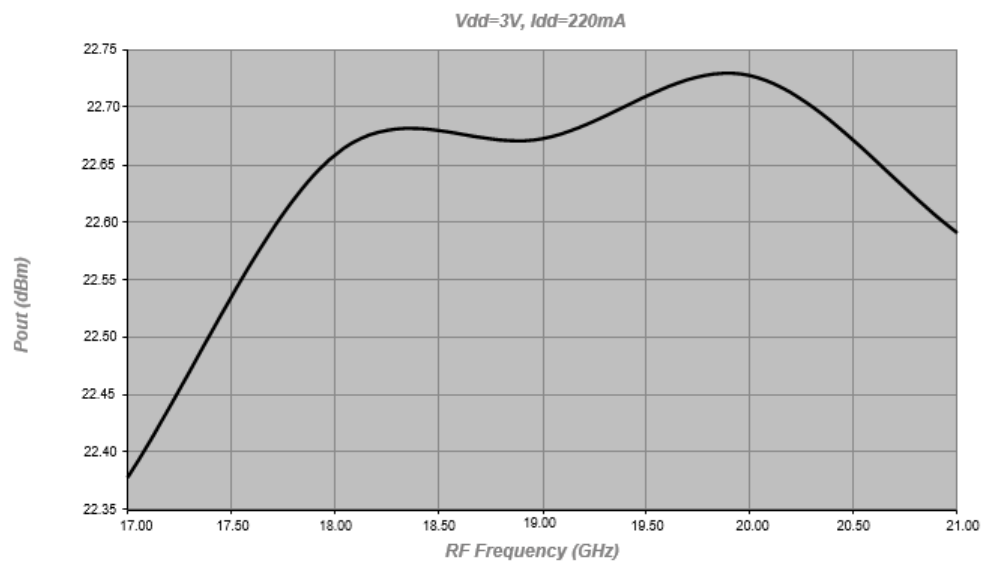


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Output Return Loss



Saturated Output Power

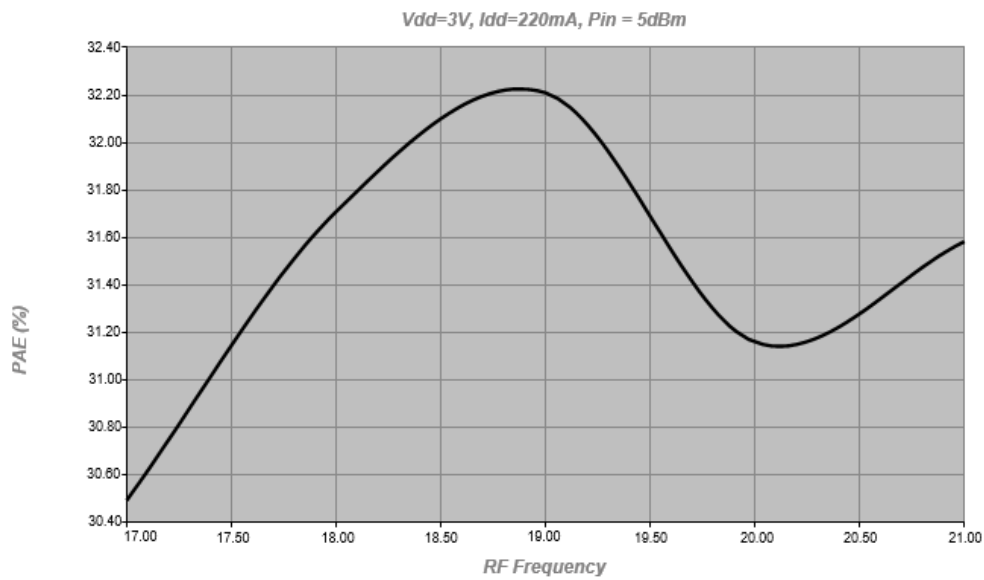


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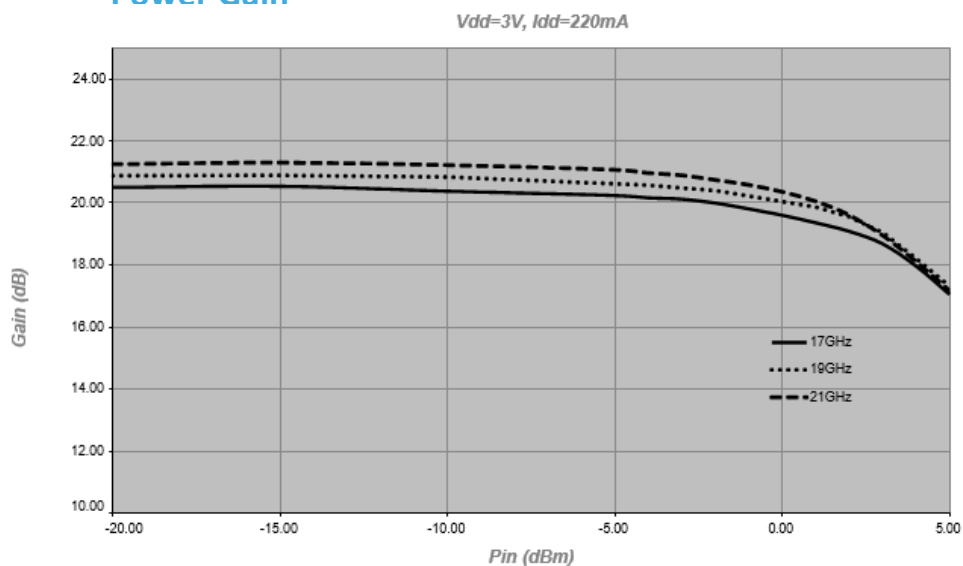


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PAE



Power Gain

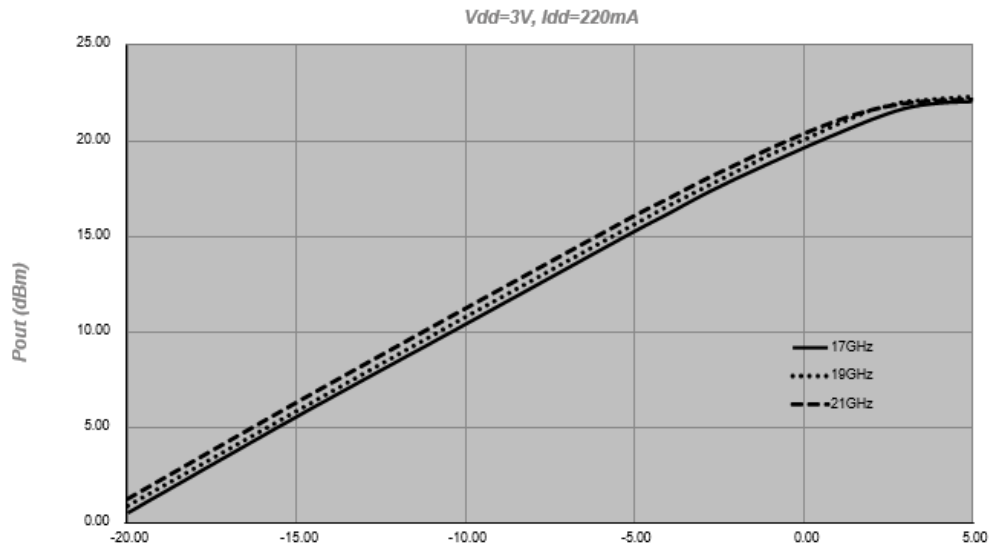


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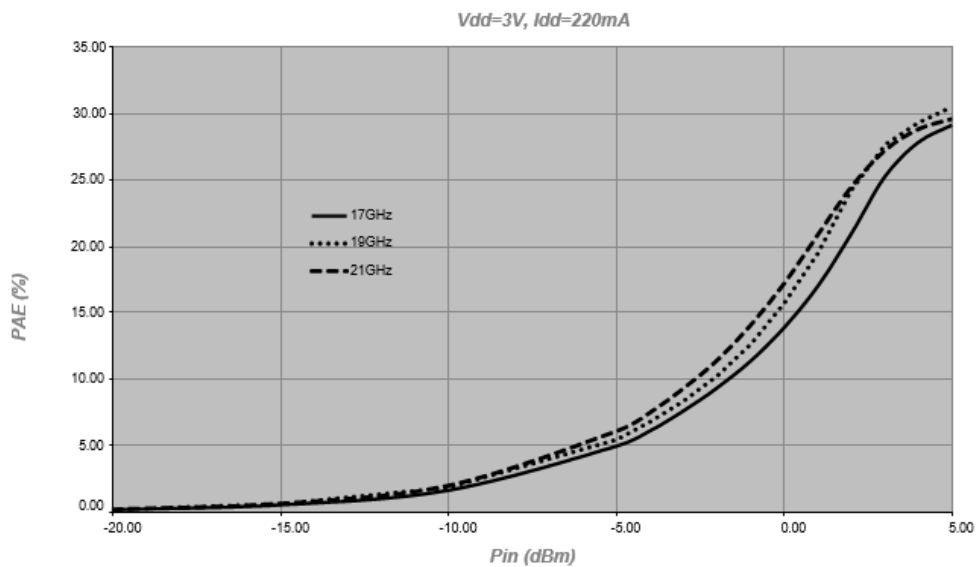


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Output Power



PAE

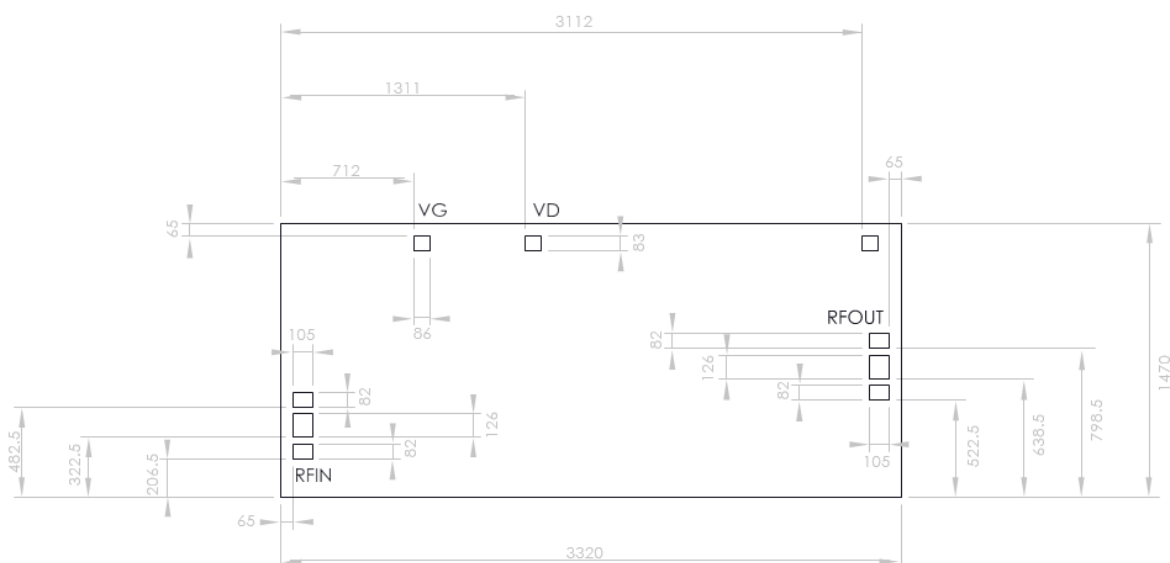


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Outline Drawing



Notes

1. All dimensions are in um.
2. Typical DC bond pads are 80um square.
3. RF bond pads are 105 x 120um square.
4. All pads have gold metalisation.
5. Gold backside metalisation.
6. Backside metal is ground.
7. Connections are not required for unlabelled bond pads.
8. Die thickness is 100um

Die Packaging Information

All die are delivered using gel-paks unless otherwise requested.

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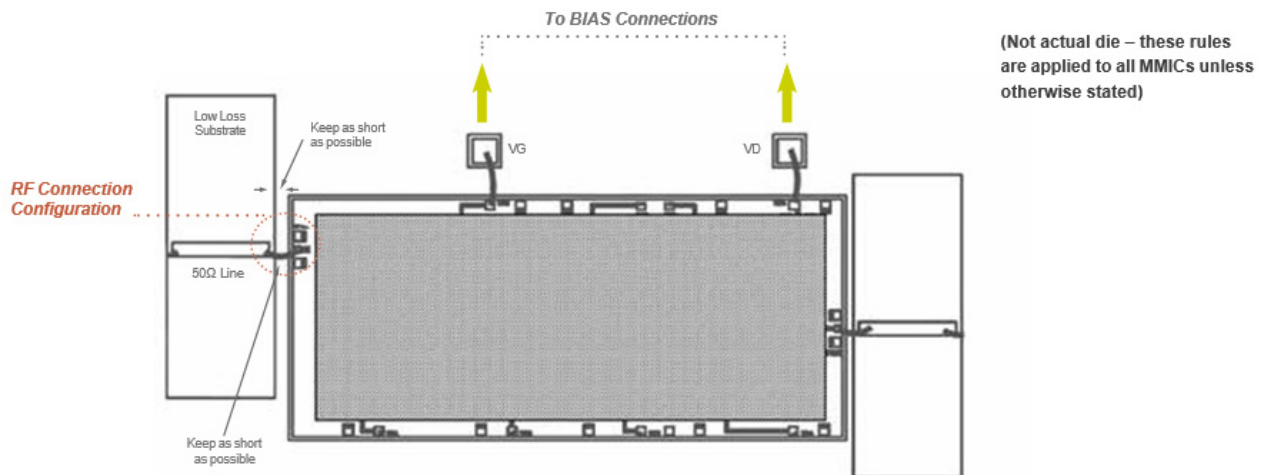


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Pad Descriptions

Name	Description
RF In	Input RF pad. This Pad is AC coupled
RF Out	Output RF pad. This pad is AC coupled
VD	Drain bias pad
VG	Gate bias pad
Bottom	The die backside must be connected to RF/DC ground

Connection Configurations



CAUTION!
ESD – Sensitive Device

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

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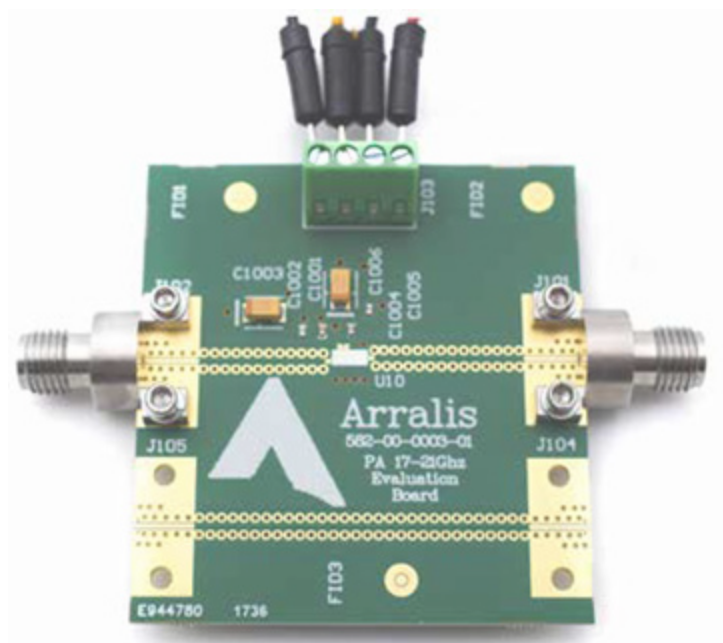
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General Notes On Assembly

Die should be mounted on conductive material such as gold-plated metal to provide a good ground and suitable heat sink, if necessary.

1. Attaching the die using Au/Sn preforms is preferable. The Eutectic melt for Au/ Sn occurs at approximately 280 °C so the die (plus mount and preform) is initially heated up to 180 °C and then it is heated for approximately 10 seconds to 280 °C using a nitrogen heat gun. The device will survive 10 seconds at this temperature. The static breakdown for GaAs devices is approximately 330 °C.
2. Pure, dry nitrogen should be used as the heat source.
3. If the devices cannot be lifted/ placed by a vacuum device, then ESD die-lifting tweezers are preferable.
4. Supply lines should be decoupled with 100 pF capacitors. Larger planar capacitors could be used if available.
5. Aluminium wire must not be used.

Application Circuit



Contact Information

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