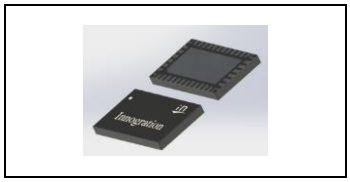
1-8000MHz, 1.5W, 28V GaN Fully matched PA Module



Description

The GMAH0080-2 is a 1.5-watt ,single stage integrated Power Amplifier Module, designed for broad band applications, with frequencies from 1MHz to 8GHz. The module is 50 Ω input/output matched and requires minimal external components.

The module implements distributed power amplifier in form of multi chips, housed in cost effective plastic open cavity package, offers a much lower cost than traditional MMIC solutions.

Vds=28V, Idq=15mA, CW

Parameter	1MHz	1GHz	2GHz	3GHz	4GHz	5GHz	6GHz	7GHz	8GHz	Units
Linear Gain	12.2	10.8	10.5	10.6	10.9	11.2	9.8	8.5	7.6	dB
Gain@Pin=26dBm	9.7	9.2	8.8	8.5	8.7	8.3	7.9	6.9	5.7	dB
Pout@Pin=26dBm	3.7	3.3	3.0	2.8	2.9	2.7	2.5	2.0	1.5	W
Eff@Pin=26dBm	49	43	37	33	35	34	29	24	20	%

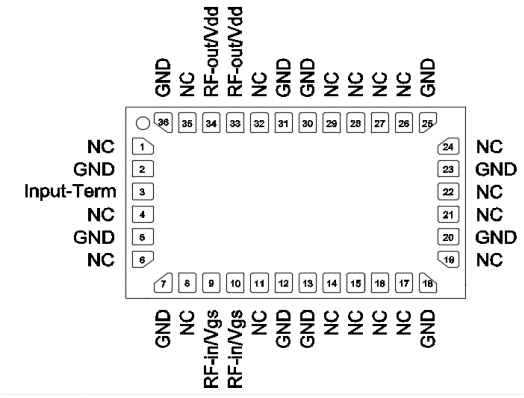
Product Features

- Operating Frequency Range: 1M-8GHz
- Operating Drain Voltage: +28 V
- 50 Ω Input/Output
- Psat: ⩾2W
- Small signal gain:>7dB, Power gain:>5dB
- Minimum efficiency:>20%
- 6x10 mm Surface Mount Package
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

Applications

- Ultra Broadband Amplifiers
- Fiber Drivers
- Test Instrumentation
- EMC Amplifier Drivers
- 2-way Radios

Pin Configuration and Description



Top View

Pin No.	Symbol	Description
33,34	RFout/Vdd	Transistor 1, Drain Bias & RF Output
9,10	RFin/Vgs	Transistor 1, RF Input &Gate Bias
3	Input-Term	Transistor 1, Input 50 ohm term
Others	NC	No connection
2,5,7,12, 13,18,20,23,25, 30, 31,36 Package Base	GND	DC/RF Ground. Must be soldered to EVB ground plane over array of vias for thermal and RF performance. Solder voids under Pkg Base will result in excessive junction temperatures causing permanent damage.

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DSS}	150	Vdc
Gate--Source Voltage	V_{GS}	-10 to +2	Vdc
Operating Voltage	V_{DD}	+36	Vdc
Storage Temperature Range	Tstg	-65 to +150	°C
Case Operating Temperature	T_C	+150	°C
Operating Junction Temperature	T_J	+225	°C

Table 2. Thermal Characteristics

Characteristic	Symbol	Value	Unit
Thermal Resistance, Junction to Case T_C= 87°C, T_J=175°C, DC test	$R_{\theta JC}$	8	°C/W

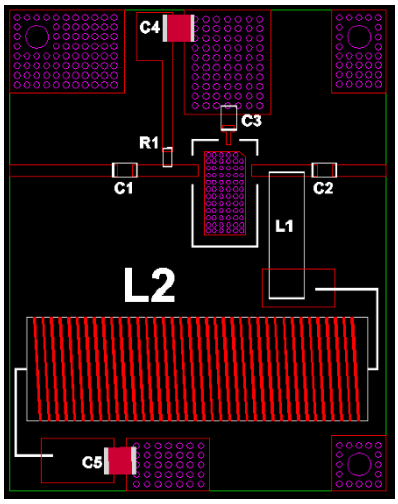
Table 3. Electrical Characteristics

Parameter	Condition	Min	Typ	Max	Unit
Frequency Range		1		8000	MHz
Power Gain @ Psat		5			dB
P_{SAT}		1.5			
Drain Efficiency @ P_{SAT}		20			%
Unless otherwise noted: TA = 25°C, V_{DD} =28 V, Pulse Width=100 us, Duty cycle=10%					

Load Mismatch of per Section (On Test Fixture, 50 ohm system): V_{DD} =28 V, I_{DQ} =10 mA, f = 3.5 GHz

VSWR 10:1 at Psat pulse CW Output Power	No Device Degradation

Reference Circuit of Test Fixture Assembly Diagram



		Part NO.	Vendor
C1, C2,C3	50V 1uF Chip Capacitor	GRM21BR71H105KA12L	muRata
C4,C5	10uF 100V Chip Capacitor	C5750X7S2A106M230KB	TDK
L1	1.3uH 4.2A Inductor	4310LC-132KEC	Coilcraft
L2	100 uH 2A Inductor	5250-RC	Bourns
R1	510 ohm Resistor		
PCB	RO4350B,20mil,er=3.48		

Figure 1. Test Circuit Component Layout

TYPICAL CHARACTERISTICS

Figure 2. Network analyzer output S11/S21 (Pin=0dBm)

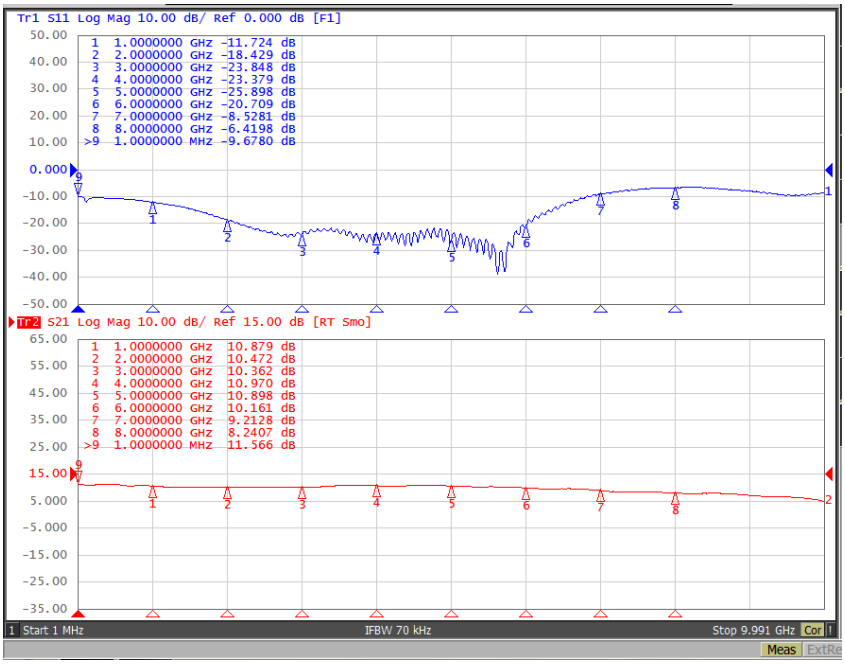
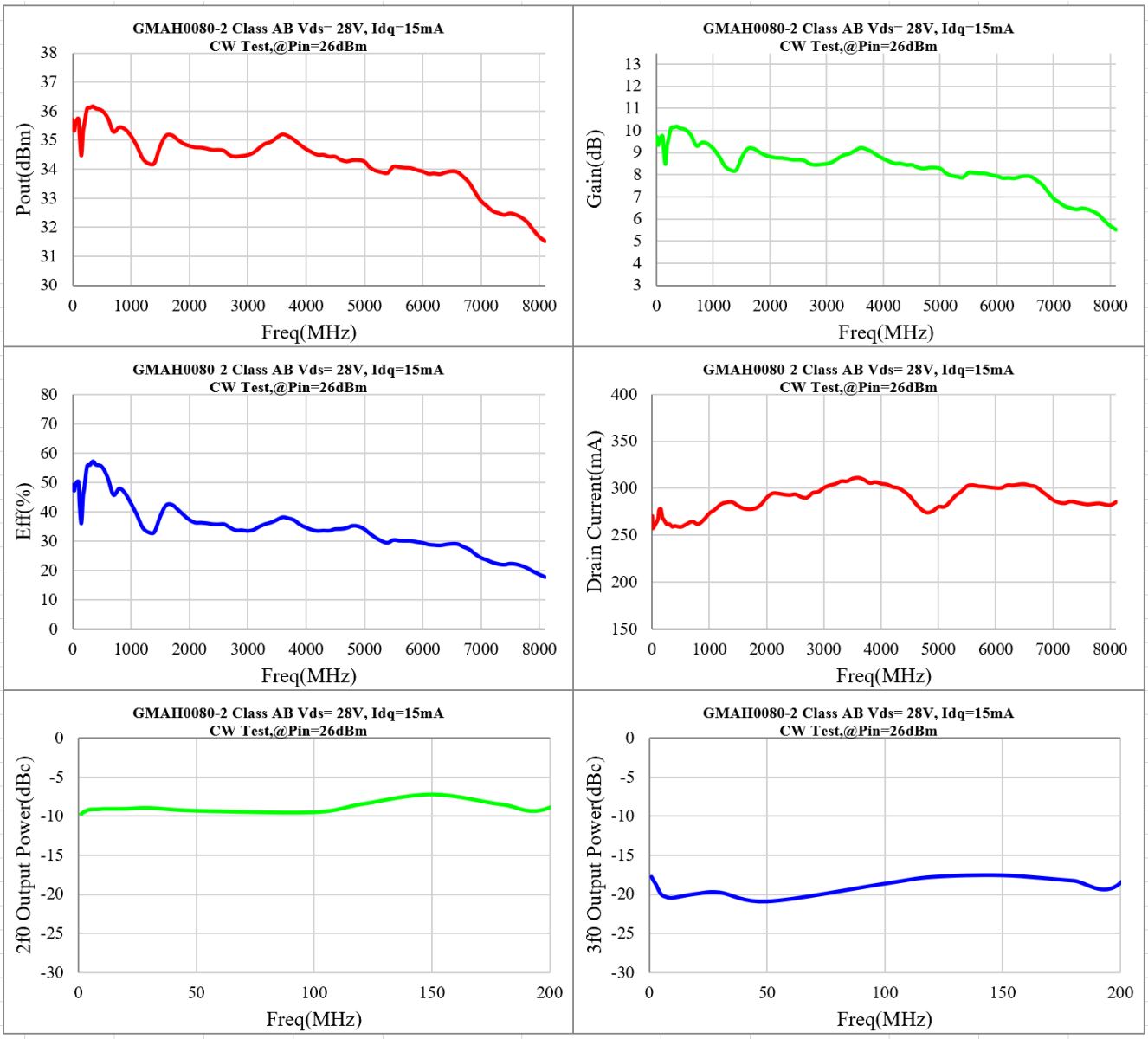
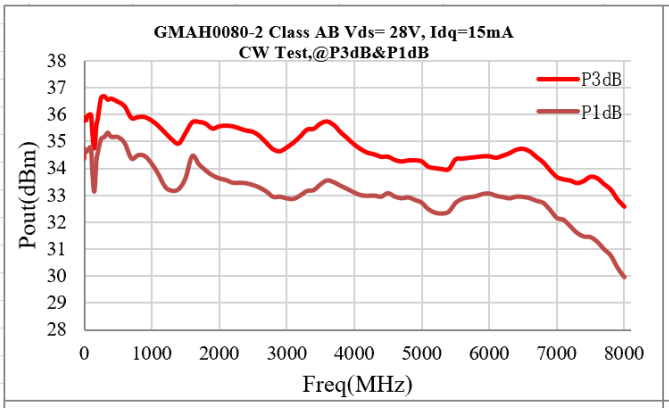
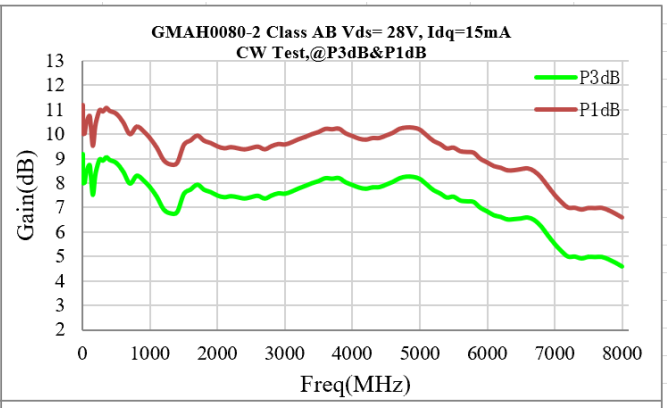
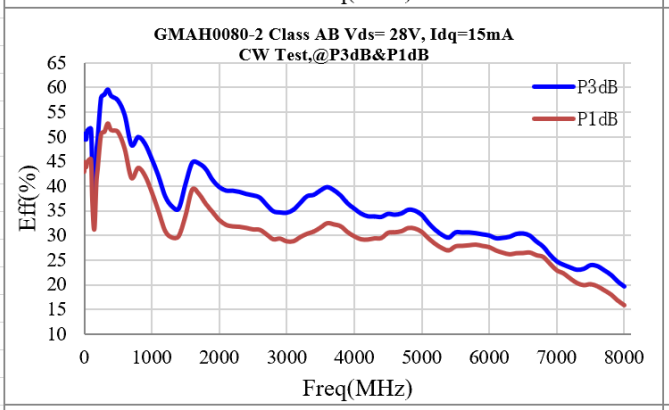


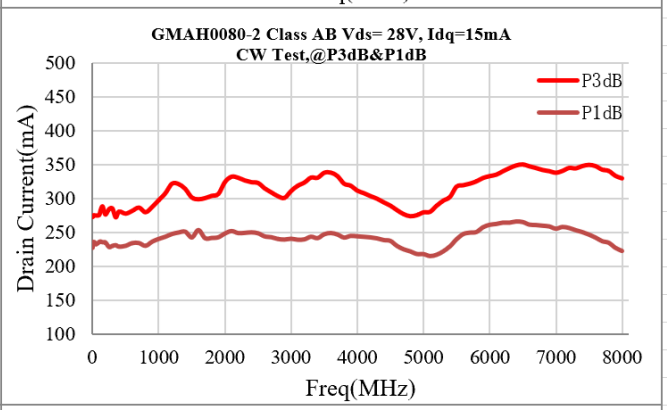
Figure. Power Gain and, efficiency and Pout, Drain current, harmonic @Pin=26dBm ,and P1/P3dB vs. Frequency

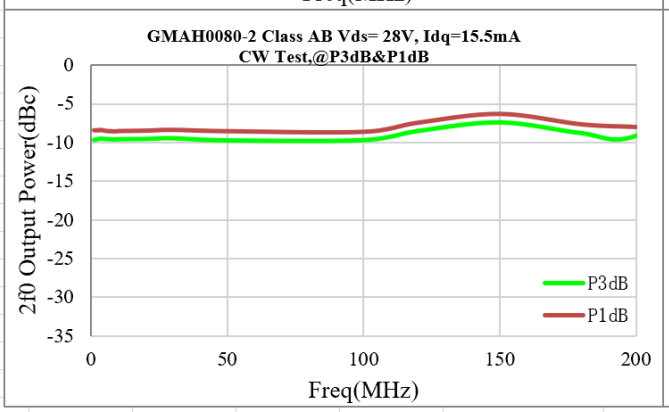


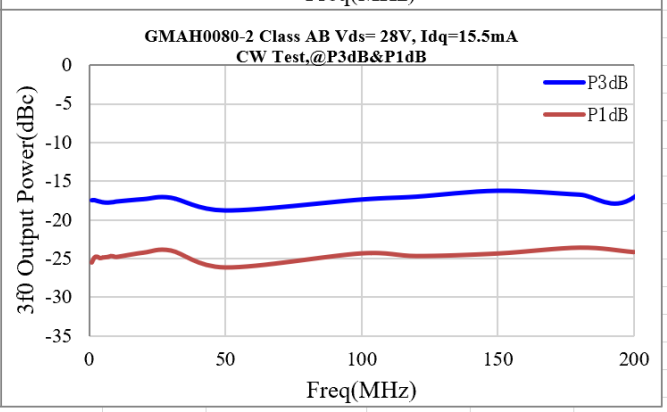

GMAH0080-2 Class AB Vds= 28V, Idq=15mA
CW Test,@P3dB&P1dB
Pout(dBm)
Freq(MHz)
P3dB
P1dB

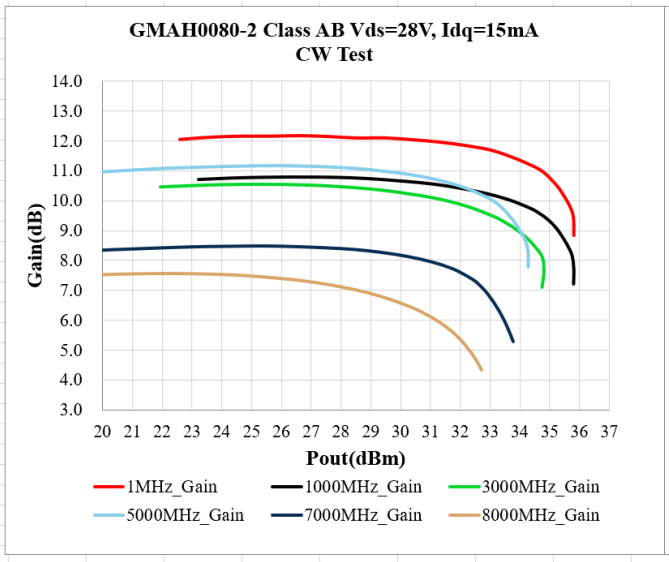

GMAH0080-2 Class AB Vds= 28V, Idq=15mA
CW Test,@P3dB&P1dB
Gain(dB)
Freq(MHz)
P3dB
P1dB

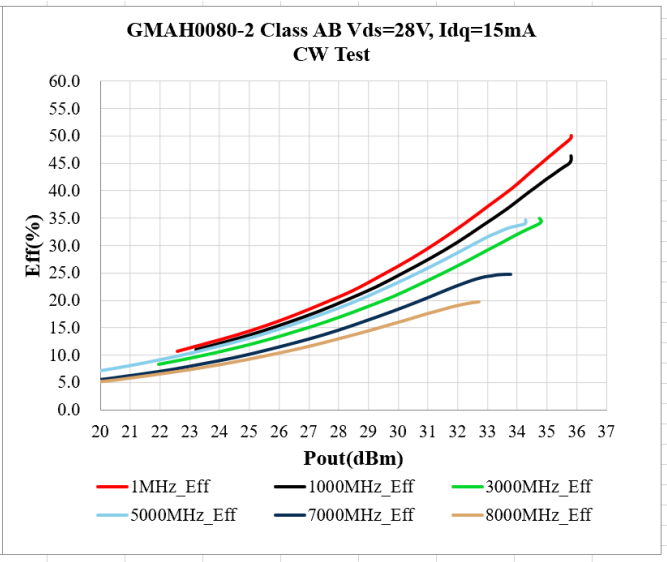

GMAH0080-2 Class AB Vds= 28V, Idq=15mA
CW Test,@P3dB&P1dB
Eff(%)
Freq(MHz)
P3dB
P1dB


GMAH0080-2 Class AB Vds= 28V, Idq=15mA
CW Test,@P3dB&P1dB
Drain Current(mA)
Freq(MHz)
P3dB
P1dB


GMAH0080-2 Class AB Vds= 28V, Idq=15.5mA
CW Test,@P3dB&P1dB
2f0 Output Power(dBc)
Freq(MHz)
P3dB
P1dB

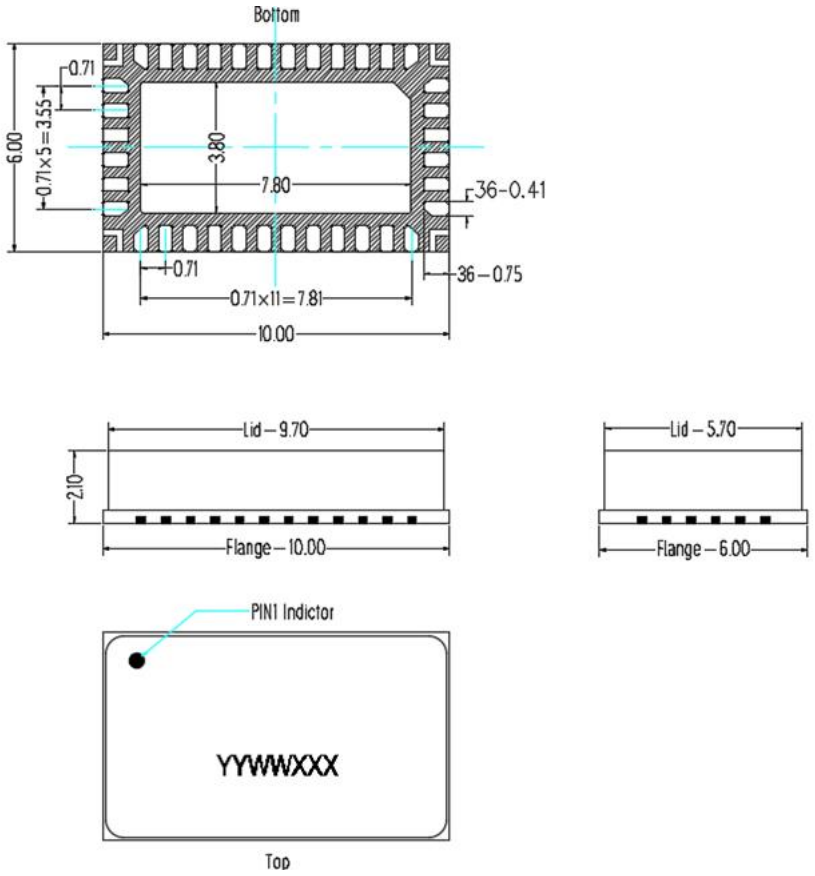

GMAH0080-2 Class AB Vds= 28V, Idq=15.5mA
CW Test,@P3dB&P1dB
3f0 Output Power(dBc)
Freq(MHz)
P3dB
P1dB


GMAH0080-2 Class AB Vds=28V, Idq=15mA
CW Test
Gain(dB)
Pout(dBm)
1MHz_Gain
1000MHz_Gain
3000MHz_Gain
5000MHz_Gain
7000MHz_Gain
8000MHz_Gain


GMAH0080-2 Class AB Vds=28V, Idq=15mA
CW Test
Eff(%)
Pout(dBm)
1MHz_Eff
1000MHz_Eff
3000MHz_Eff
5000MHz_Eff
7000MHz_Eff
8000MHz_Eff

Package Dimensions

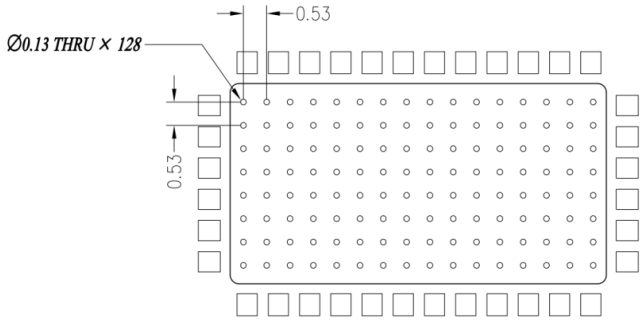
10*6 Plastic Package



Notes:

1. All dimensions are in mm;
2. The tolerances unless specified are ±0.2mm.

Mounting Footprint Pattern



Notes:

1. All dimensions are in mm;
2. Vias are required under the backside paddle of this device for proper RF/DC grounding and thermal dissipation. ALL vias are PTH to ground.

Revision history

Table 6. Document revision history

Date	Revision	Datasheet Status
2025/6/5	Rev 1.0	Production Datasheet

Application data based on ZHH-25-12

Disclaimers