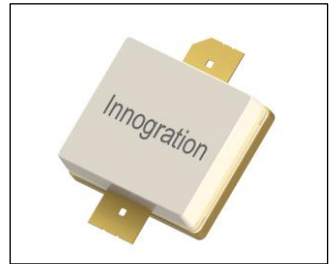




GaN HEMT 28V, HF-1.5GHz 150W, RF Power Transistor

Description

The STCH15150A2C is a 150W GaN HEMT, designed for multiple application up to 1.5GHz. It can be used in CW, Pulse and any other modulation modes. There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.



- Typical class AB 1.3-1.5GHz RF Performance with device soldered

$V_{ds}=28V$, $I_{dq}=220mA$, CW

Voltage(V)	Pin(dBm)	Psat(dBm)	Psat(W)	Gain(dB)	Eff(%)
28	39	>51.7	>150	12.7	70

- Typical class AB 600-1000MHz RF Performance with device soldered

$V_{ds}=28V$, $I_{dq}=200mA$, CW

Voltage(V)	Pin(dBm)	Psat(dBm)	Psat(W)	Gain(dB)	Eff(%)
28	35.5	50.6-51.5	115-140	15-16	63-70

- Typical class AB 500-1500MHz RF Performance with device soldered

$V_{ds}=28V$, $I_{dq}=200mA$, CW

Voltage(V)	Pin(dBm)	Psat(dBm)	Psat(W)	Gain(dB)	Eff(%)
28	38.5	50.2-51.9	105-150	11.5-14	62-70

Applications

- L band power amplifier
- P band power amplifier
- ISM/RF Energy power amplifier

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

1. Set VGS to the pinch--off (VP) voltage, typically $-5V$
2. Turn on VDS to nominal supply voltage
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically $-5V$
3. Reduce VDS down to 0 V
4. Turn off VGS

Table 1. Maximum Ratings

Rating	Symbol	Value	Unit
Drain--Source Voltage	V_{DS}	+200	Vdc
Gate--Source Voltage	V_{GS}	-8 to +0.5	Vdc
Operating Voltage	V_{DD}	50	Vdc
Maximum gate current	I_{gs}	34	mA
Storage Temperature Range	T_{stg}	-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 by FEA $T_c=85^{\circ}C$, at $P_{diss}=60W$	$R_{\theta JC}$	1.3	°C /W



Table 3. Electrical Characteristics (TA = 25°C unless otherwise noted)

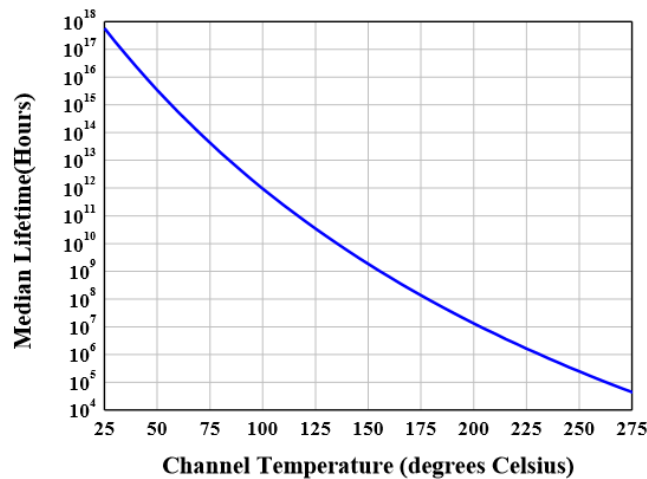
DC Characteristics (measured on wafer prior to packaging)

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	VGS=-8V; IDS=34mA	V _{DSS}		200		V
Gate Threshold Voltage	VDS =10V, ID = 34mA	V _{GS(th)}	-4		-2	V
Gate Quiescent Voltage	VDS =28V, IDS=220mA, Measured in Functional Test	V _{GS(Q)}		-3.2		V

Ruggedness Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Load mismatch capability	1.5GHz, Pout=150W Pulsed CW All phase, No device damages	VSWR		10:1		

Figure 2: Median Lifetime vs. Channel Temperature



1.3-1.5GHz
Typical performance

Figure 3: Network analyzer output S11/S21

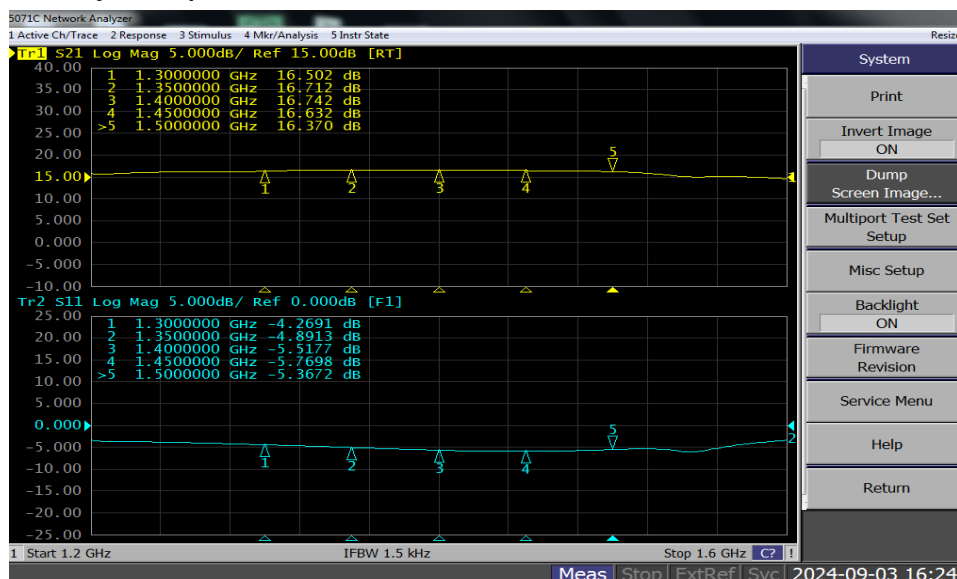
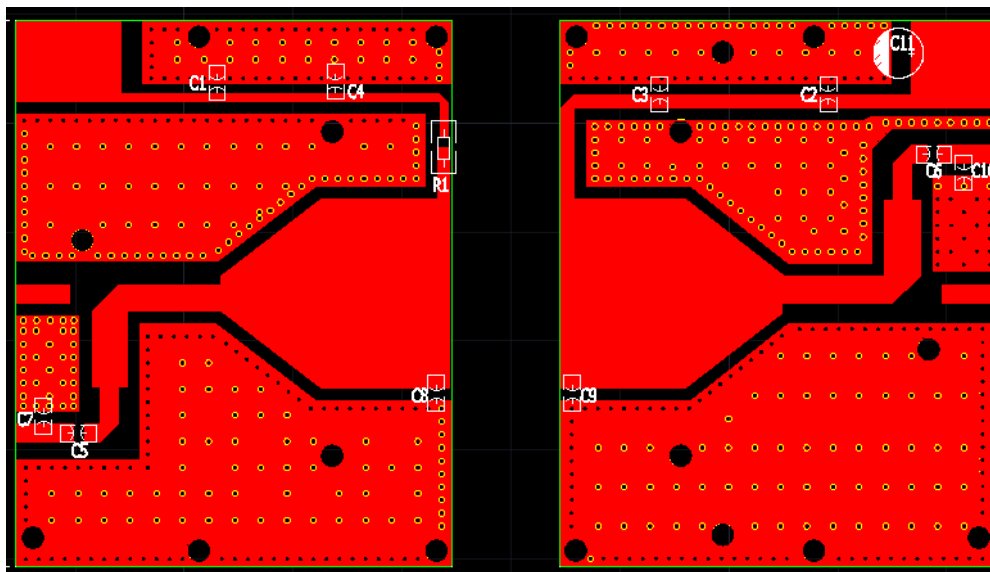


Figure 4: Picture of application board



Component	Description	Suggestion
C1,C2	10uF/200V-1210	Ceramic multilayer capacitor
C3	100pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C4	68pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C5, C6	30pf	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ101111
C6	24pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ300709
C7	0.5pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ301111
C8,C9	3pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTDMQ101111
C10	0.3pF	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.MQ100505
C11	470uF/63V	Electrolytic Capacitor
R1	10 Ω -2512	Chip Resistor
PCB	30Mil Rogers4350	



0.6-1GHz Typical performance

Figure 5: Network analyzer output S11/S21

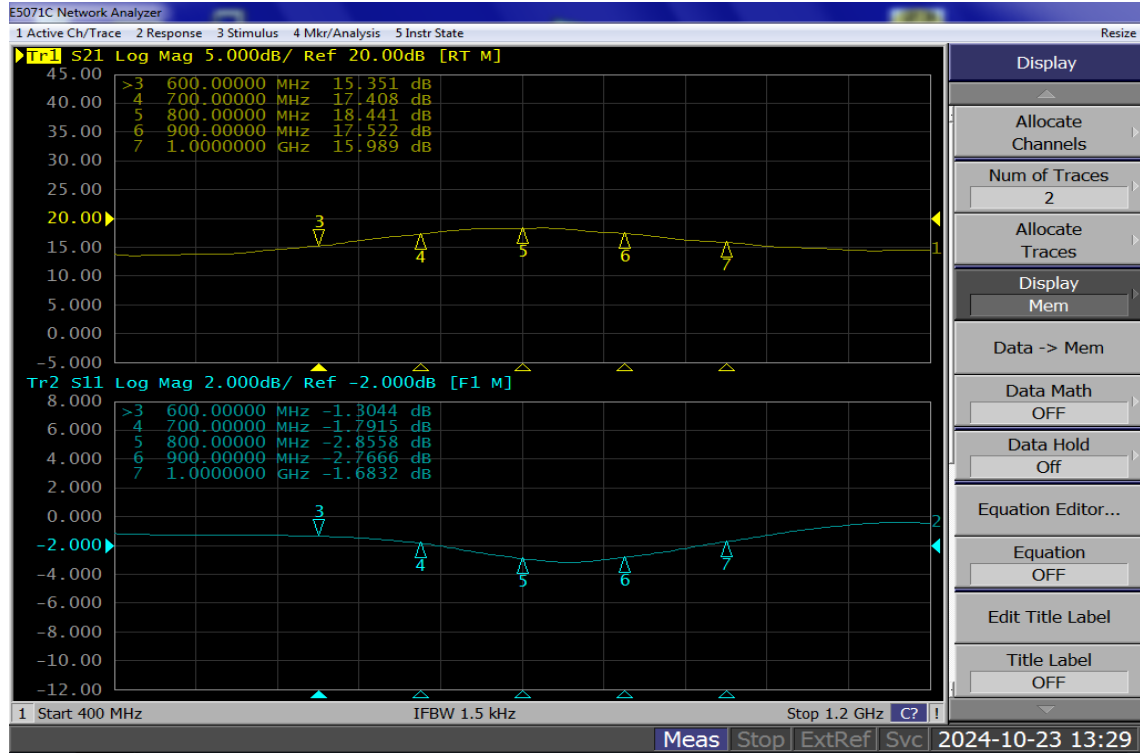
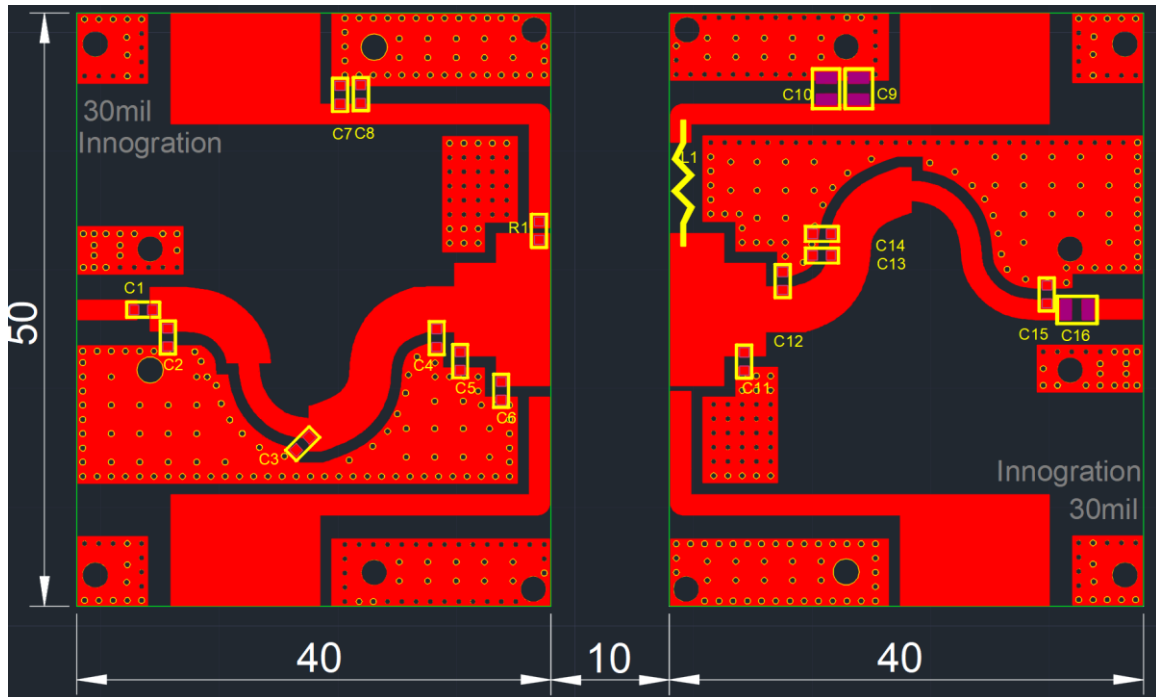


Figure 6: Picture of application board





Component	Description	Suggestion
C1,C8	150pF MQ400805	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C2,C15	1pF MQ400805	EIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C3,C6	5.1pF MQ400805	EIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C7	10nF 0805	/
C9	10uF 1210	
C4,C5	4.3pF MQ400805	EIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C11	6.2pF MQ400805	EIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C12	5.6pF MQ400805	EIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C13	3.6pF MQ400805	EIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C14	3.0pF MQ400805	EIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C10	200pF MQ301111	EIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C16	150pF MQ301111	EIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
L1	0.8mm wire , 3mm inner diameter, 5Turns	DIY
R1	51 Ω 0805	/

0.5-1.5GHz Typical performance

Figure 7: Network analyzer output S11/S21

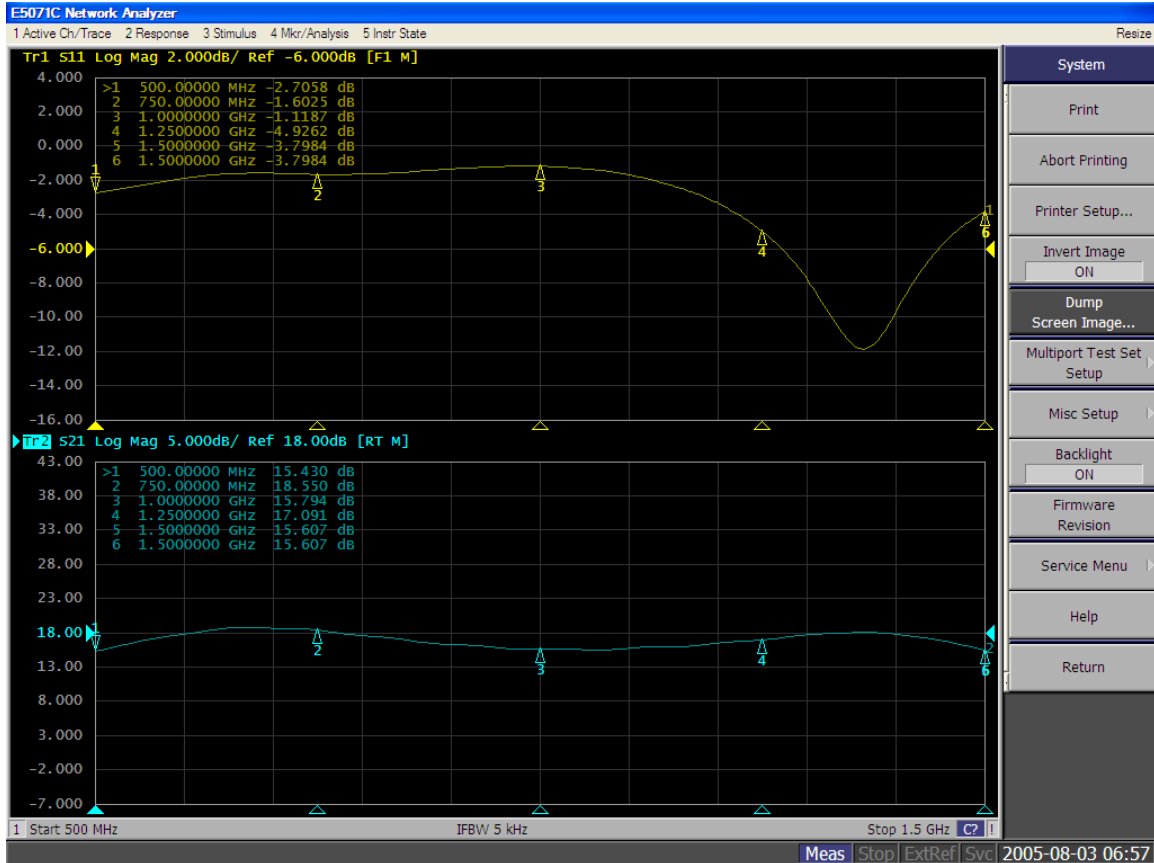
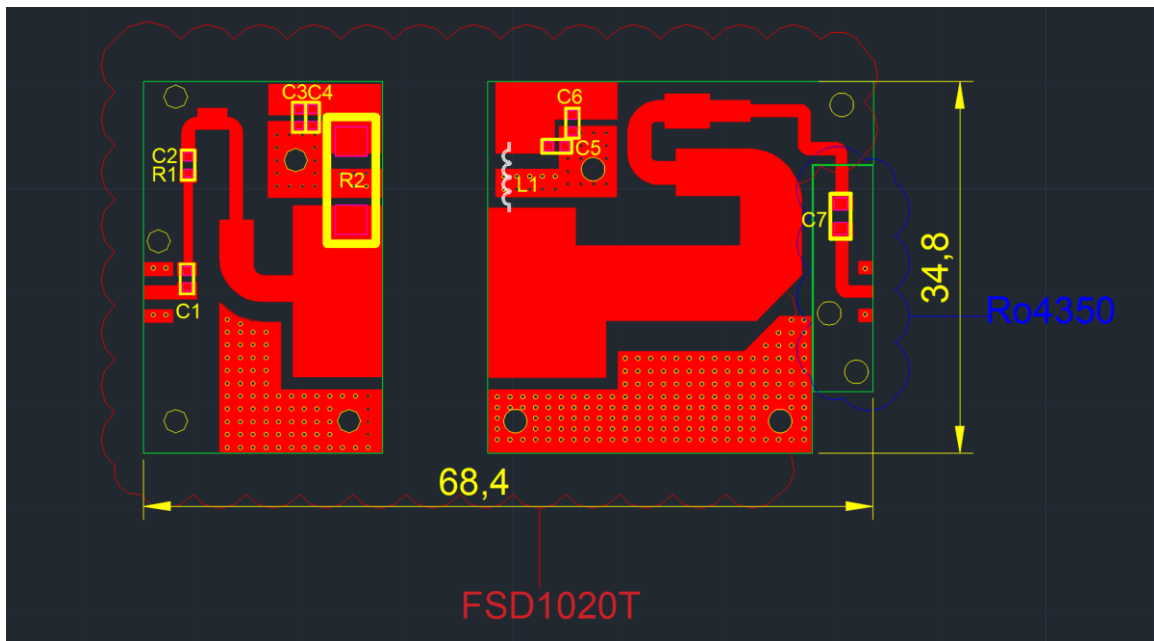


Figure 8: Picture of application board

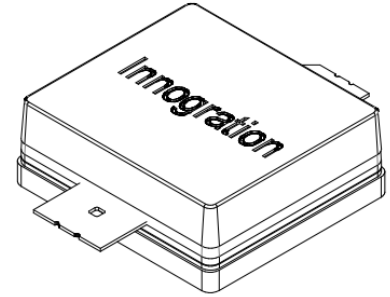
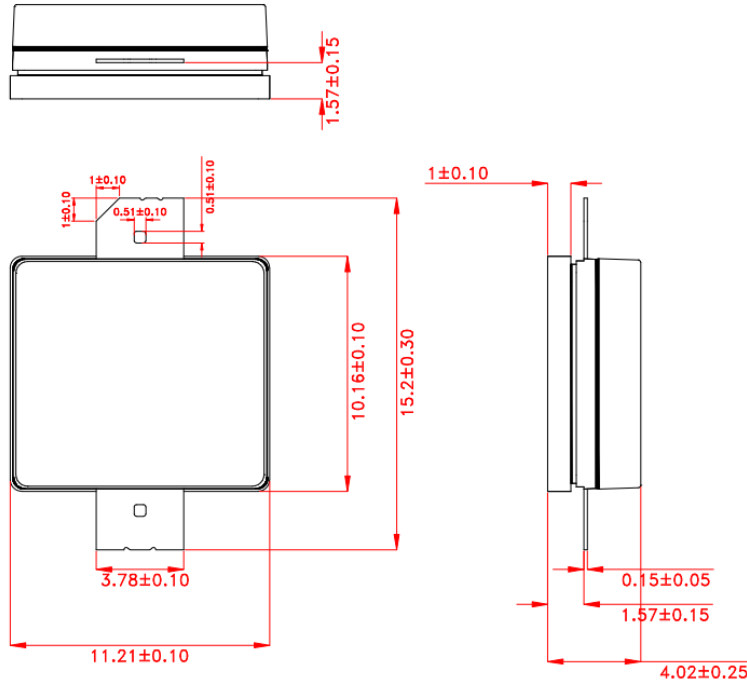




Component	Description	Suggestion
C3,C6	10nF 0805	/
R1	22 Ω 0805	/
C1	51pF MQ300805	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C2	39pF MQ300805	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C4	91pF MQ300805	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C5	51pF MQ300805	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
C7	43pF MQ300709	BEIJING YUANLU HONGYUAN ELECTRONIC TECHNOLOGY CO., LTD.
R2	10 Ω 2512	/
L1	0.8mm wire , 3mm inner diameter, 5Turns	DIY



Package Dimensions (Unit:mm)



Unit:mm

Tolerance ±0.10mm, Except as Noted.

Revision history

Table 4. Document revision history

Date	Revision	Datasheet Status
2024/9/3	V1.0	Preliminary Datasheet Creation
2024/10/25	V1.1	Add 0.6-1GHz data
2024/11/27	V1.1	Add 0.5-1.5GHz data

Application data based on: TC-24-55/SYX-24-36/SYX-24-43

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