

Preliminary DATA SHEET

GSQ5111: 200 to 1200MHz ISM 4Watts High Power Amplifier

Product overview

GSQ5111 is a two-stage HBT high power amplifier for indoor/outdoor wireless application such as RFID or Lora system application. It works for 900MHz and can deliver 36dBm output peak power with 31dB power gain, and excellent linearity. The GSQ5111 input port is internally matched 500hm and integrated temperature compensation circuits within a tiny lead frame package.

Key Features

- 400MHz – 1200MHz
- 31dB Gain
- 50% PAE at 36dBm output power
- 36dBm output peak power
- Integrated temperature compensation circuits
- Compact and low-cost 3mm x 3mm QFN package (MSL3, 260°C per JEDEC J-STD-020)
- ESD Level: HBM 1000V; CDM 1000V
- ROHS compatible

Applications

- wireless systems
- Power amplifier Module
- Customer Premises Equipment (CPE)
- Automatic meter readers
- RFID Readers

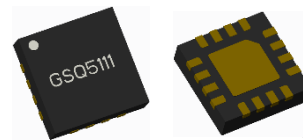


Figure 1. 16pin 3 x 3 mm QFN Package

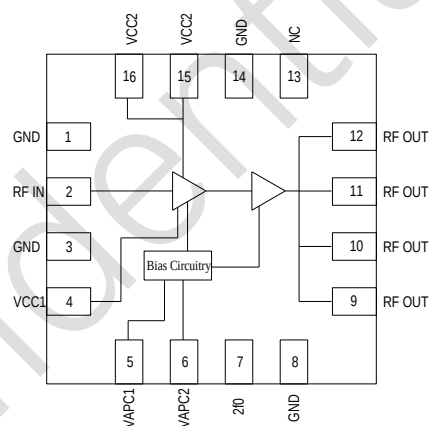


Figure 2. GSQ5111 Function Block Diagram

Table 1. Pin-to-Pin Compatible PA Family

Part Num	Frequency (MHz)	3GPP Band
GSQ5110	400-1200MHz	n5,8,20,28,71

Ordering Information

Part No.	Description
GSQ5111	400-1200MHz 4W linear PA, 13' Reel with 4000pcs

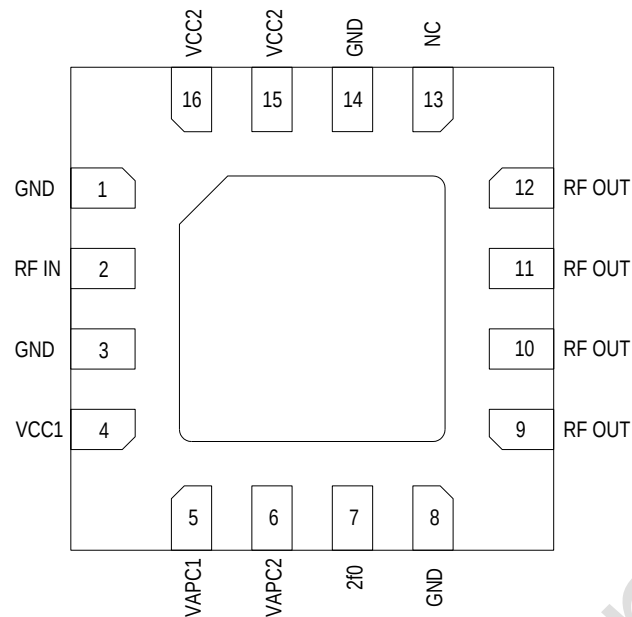


Figure 3. GSQ5111 Pinout (Top View)

Table 2. GSQ5111 Signal Descriptions

Pin	Name	Description	Pin	Name	Description
1	GND	Ground	9	RFOUT	RF output port
2	RFIN	RF input port	10	RFOUT	RF output port
3	GND	Ground	11	RFOUT	RF output port
4	VCC1	Stage 1 collector voltage	12	RFOUT	RF output port
5	VAPC1	Voltage of bias circuit	13	NC	Not connected
6	VAPC2	Voltage of bias circuit	14	GND	Ground
7	2f0	2 nd harmonic trap	15	VCC2	Stage 2 collector voltage
8	GND	Ground	16	VCC2	Stage 2 collector voltage

Table 3. GSQ5111 Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Storage Temperature	TSTG	-55 to 125	°C
Operating Temperature	TC	-40 to 105	°C
Operating Junction Temperature	TJ	175	°C
Thermal Resistance	Rθjc		°C/W
Operating Voltage	VCC1, VCC2	5.5	V
Input Power	PIN	10	dBm

Table 4. GSQ5111 Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Voltage	VCC, VCC2	3	5	5.5	V
VAPC1, VAPC2 voltage	VAPC1, VAPC2	2.4	3.2		V
VAPC1, VAPC2 current	IAPC1, IAPC2		8	15	mA
Operating frequency	freq	400		1200	MHz
Operating temperature	TC	-40	25	85	°C

Table 5. GSQ5111 Electrical Specifications

(VCC=VCC2 =5V, VAPC1=VAPC2=3.2V, f=920MHz, TC=+25 °C, Input /Output Load = 50Ω)

Parameter	Conditions	Min	Typ	Max	Unit
Frequency		400	920	1200	MHz
Output P1dB			34		dBm
Output P3dB			36		dBm
Gain @ 33dBm			31		dB
Power added efficiency	@Psat		50		%
Quiescent current			300	350	mA
ACPR @ 26dBm	20MHz LTE E-TM 1.1, 9.5dB PAR		-47		dBc
Input return loss			-10		dB

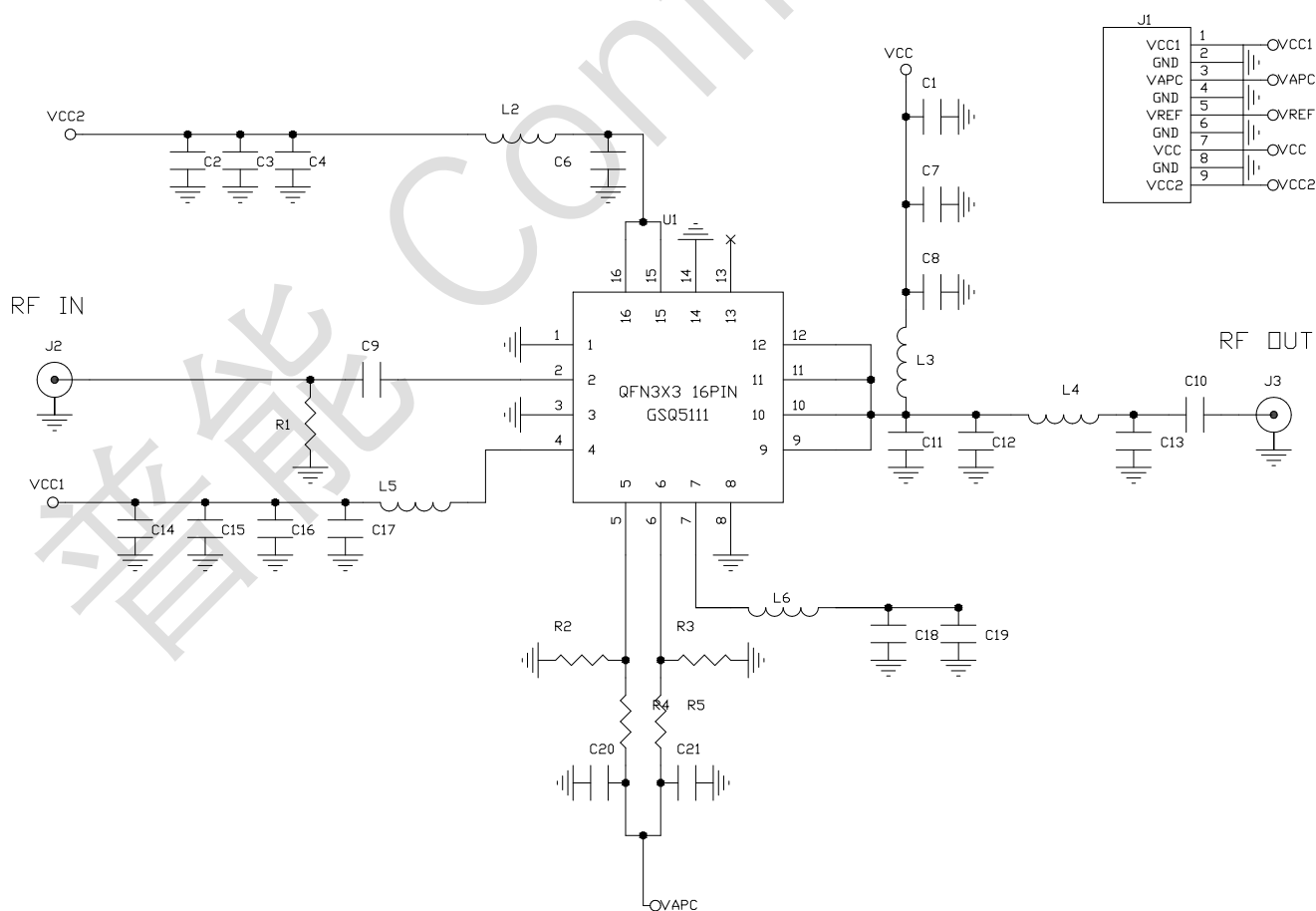


Figure 4. GSQ5111 Evaluation Board Schematic

Table 6. GSQ5111 Evaluation Board Bill of Materials (BOM) for 860-925MHz application

Component	Description	Size
C17, C7	100pF 25V $\pm 10\%$ X7R	C0402
C15, C8, C6, C18, C21	1200pF 25V $\pm 10\%$ X7R	C0402
C2, C14, C1	4.7uF 16V $\pm 10\%$ X7R	C1206
R4, R5, L2, L6	0R $\pm 5\%$ 1/16W	R0402
C9, C10	47pF 25V $\pm 10\%$ X7R	C0402
L5	2.5nH Sunlord MWSD	L0402
L3	10nH Sunlord MWSD	L0603
L4	2.6nH Sunlord MWSD	L0402
C11	1pF 25V $\pm 2\%$ X7R	C0402
C12	15pF 25V $\pm 0.1\text{pF}$ X7R	C0402
C13	4pF 25V $\pm 1\text{pF}$ X7R	C0402
C19	5.1pF 25V $\pm 0.1\text{pF}$ X7R	C0402

Rest of the components on the schematic are not used in this part.

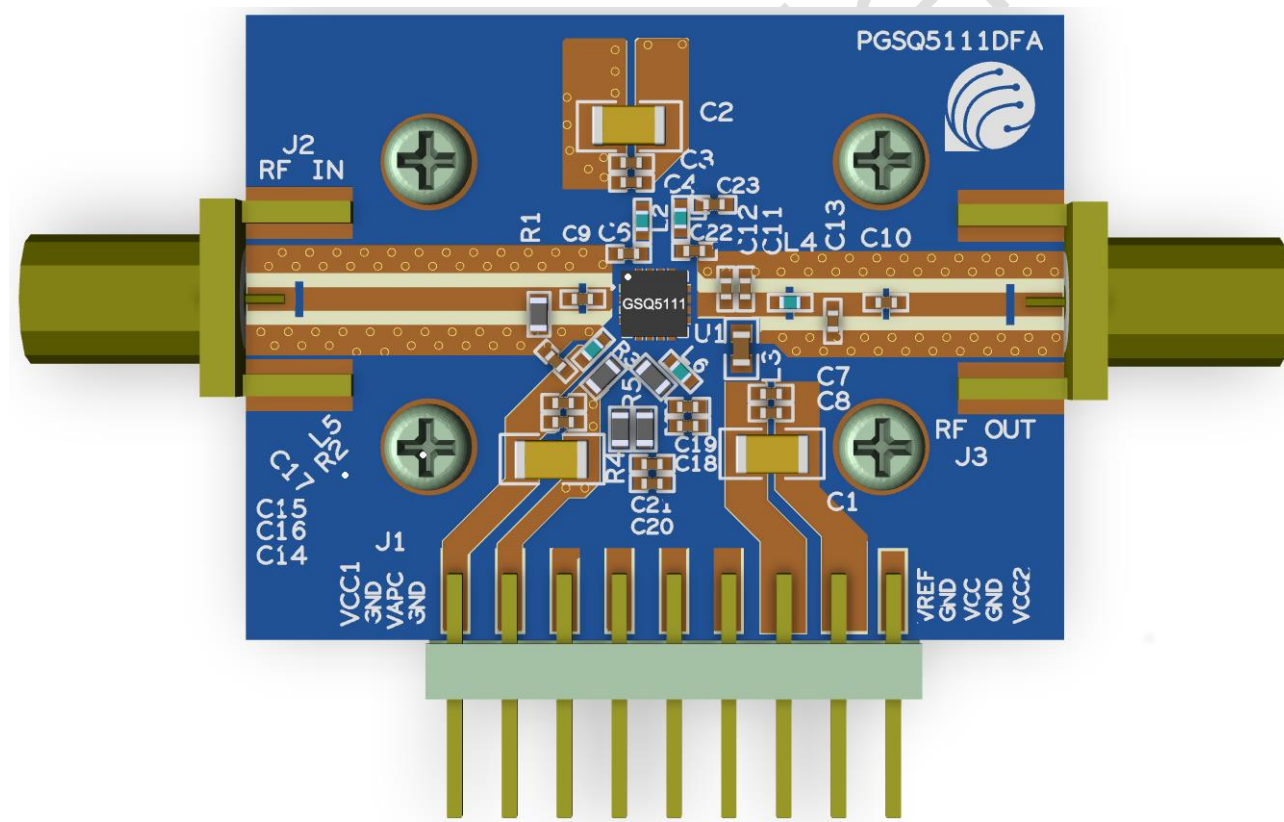


Figure 5. Evaluation board PCB information

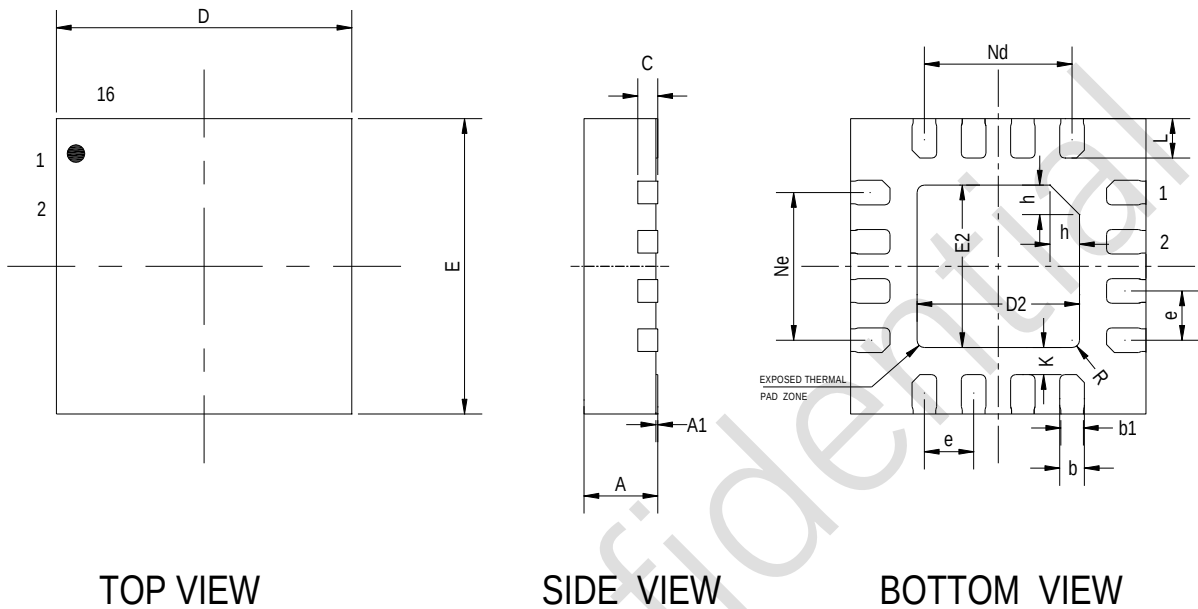
Evaluation board test procedure

Turn-on sequence

- 1 . Connect test equipment to the input and output port of Evaluation board and then connect DC ground.
- 2 . Turn on VCC2, VCC2 to 5V, then turn on VAPC1=VAPC2 to 3.2V in order.
- 3 . Apply RF signal.

Turn-off sequence

- 1 . Turn off RF signal.
- 2 . Turn off VAPC1, VAPC2, VCC, VCC2 in order.



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.7	0.75	0.80
A1	0	0.02	0.05
b	0.2	0.25	0.3
b1	0.23REF		
c	0.203REF		
D	2.90	3.00	3.10
D2	1.6	1.65	1.70
e	0.50BSC		
Ne	1.50BSC		
Nd	1.50BSC		
E	2.90	3.00	3.10
E2	1.60	1.65	1.70
L	0.35	0.4	0.45
h	0.25	0.3	0.35
K	0.225	0.275	0.325
R	0.075REF		

Figure 6. GSQ5111 Package Dimensions

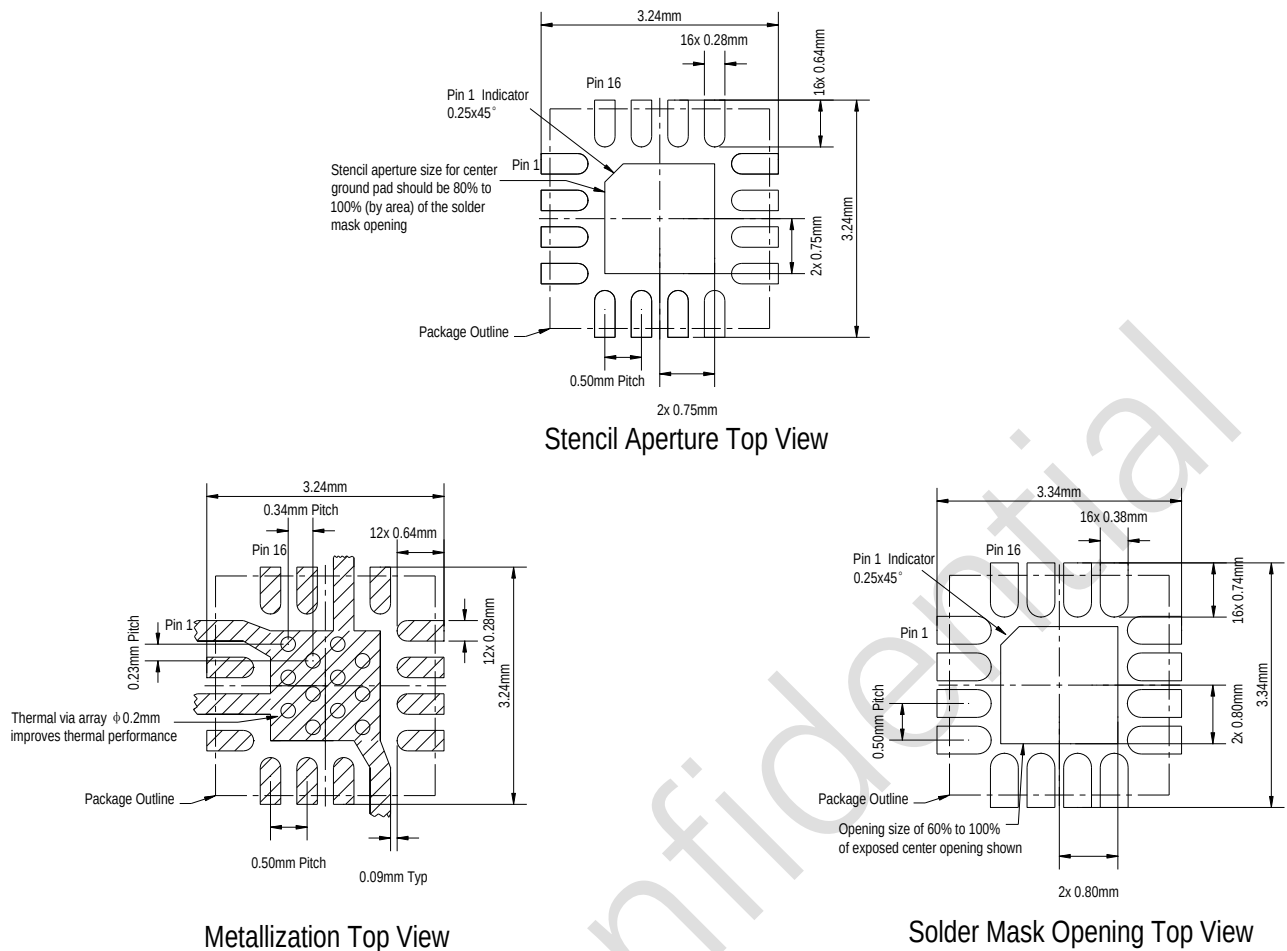


Figure 7. GSQ5111 PCB Layout Footprint

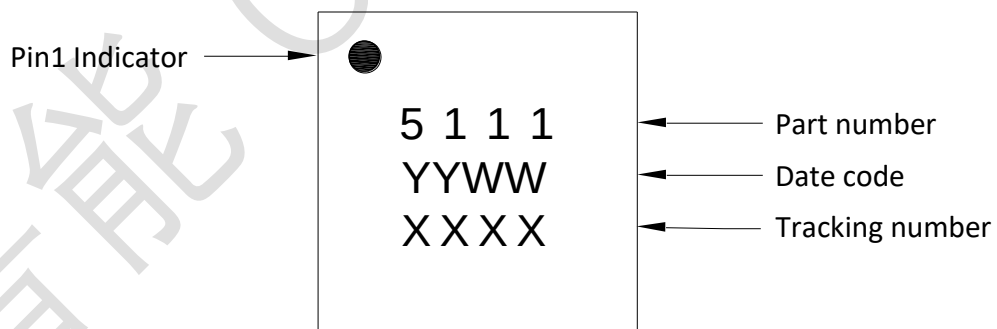
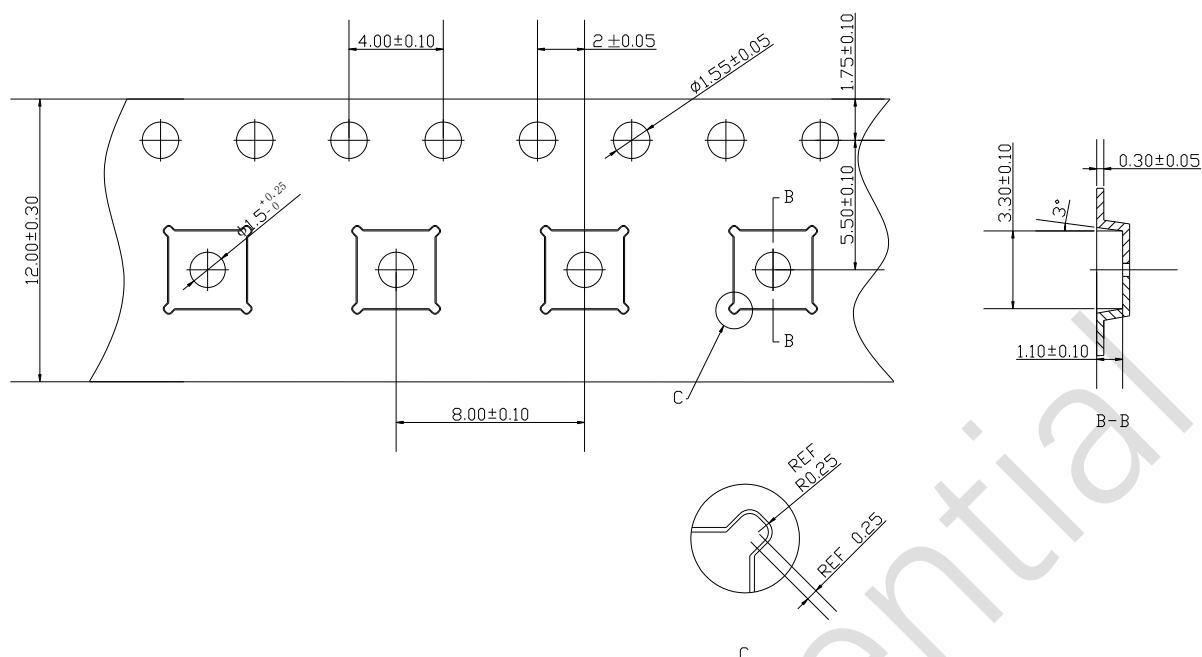


Figure 8. Typical Part Marking for the GSQ5111



Technical requirements:

- 1.The accumulative error of the distance between any 10 transmitting holes is ± 0.1 mm;
- 2.The lateral bending of the belt along the length direction is $\leq 1\text{mm}/100\text{mm}$;
- 3.Roughness: $R_a < 0.8\mu\text{m}$;
- 4.Carrier tape color:Black;

Figure 9. Tape and Reel Dimensions

GSQ5111 REVISION HISTORY

Revision	Date	Description
0.1	June 19, 2023	Initial release of datasheet
1	June 21, 2023	Initial release of datasheet
1.1	July 17, 2023	Update schematic/BOM and extend the frequency
1.3	June 5, 2024	Update marking info