

GENERAL DESCRIPTION

The SGM33685G is a high performance RF front-end module (FEM), which integrates a fully matched 900MHz power amplifier (PA), low noise amplifier (LNA), SPDT T/R switch, DPDT switch and a controller inside.

The device is designed for IoT and industrial applications supporting the frequency range from 860MHz to 930MHz. External V_{REF} is not required.

The SGM33685G is available in a Green TLGA-4×4-24L package.

APPLICATIONS

Internet of Things
Industrial Applications
Smart Meters

FEATURES

- **VCC0/VCC2 Supply Voltage:** 3.0V to 5.0V
- **VCC1 Supply Voltage:** 2.8V to 3.3V
- **Saturated Output Power at 5.0V:**
 - ♦ 34.0dBm at 860MHz to 876MHz
 - ♦ 33.5dBm at 900MHz to 930MHz
- **Current Consumption**
 - ♦ 650mA @ $P_{OUT} = 30\text{dBm}$, at 860MHz to 876MHz
 - ♦ 590mA @ $P_{OUT} = 30\text{dBm}$, at 900MHz to 930MHz
- **Integrated LNA with Bypass**
- **Integrated ANT Swapping DPDT**
- **FEM Noise Figure:** 1.7dB
- **CMOS Controller Integrated**
- **On-Chip 50Ω Matching for Input Port and Output Port**
- **Available in a Green TLGA-4×4-24L Package**
(MSL3, 260°C per JEDEC J-STD-020)

BLOCK DIAGRAM

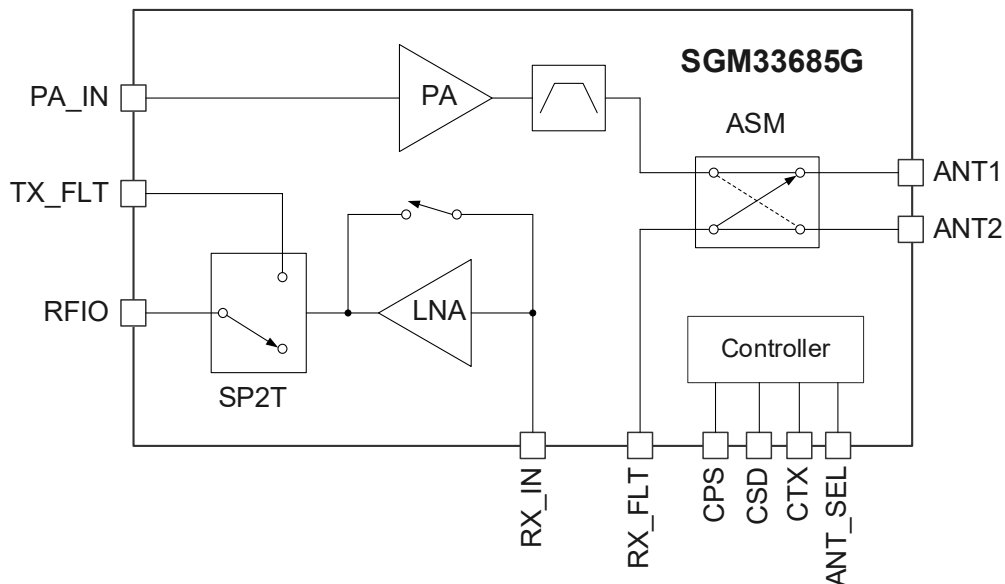


Figure 1. SGM33685G Block Diagram

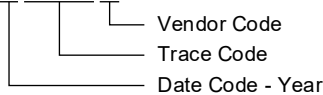
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM33685G	TLGA-4×4-24L	-40°C to +105°C	SGM33685GGTLAM24G/TR	SGM18R GTLAM24 XXXXXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code.

XXXXX



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage V_{CC0} , V_{CC2}	5.5V
Supply Voltage V_{CC1}	3.6V
Control Voltage, CPS, CSD, CTX, ANT_SEL	3.6V
Max TX Input Power, P_{IN}	15dBm
Max RX Input Power, P_{IN}	15dBm
Package Thermal Resistance	
TLGA-4×4-24L, θ_{JA}	45°C/W
TLGA-4×4-24L, θ_{JB}	23.3°C/W
TLGA-4×4-24L, θ_{JC} (TOP)	51.2°C/W
TLGA-4×4-24L, θ_{JC} (BOT)	18.9°C/W
Storage Temperature Range	-40°C to +150°C
Lead Temperature (Soldering, 10s)	+260°C
ESD Susceptibility ^{(1) (2)}	
HBM	±1000V
CDM	±1000V

NOTES:

1. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.
2. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

Operating Frequency Range 1	860MHz to 876MHz
Operating Frequency Range 2	900MHz to 930MHz
Supply Voltage, V_{CC0} , V_{CC2}	3.0V to 5.0V
Supply Voltage, V_{CC1}	2.8V to 3.3V
Control Voltage, CPS _{IH} , CSD _{IH} , CTX _{IH} , ANT_SEL _{IH}	1.35V to 3.3V
Control Voltage, CPS _{IL} , CSD _{IL} , CTX _{IL} , ANT_SEL _{IL}	0V to 0.45V
Operating Ambient Temperature Range	-40°C to +105°C

OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

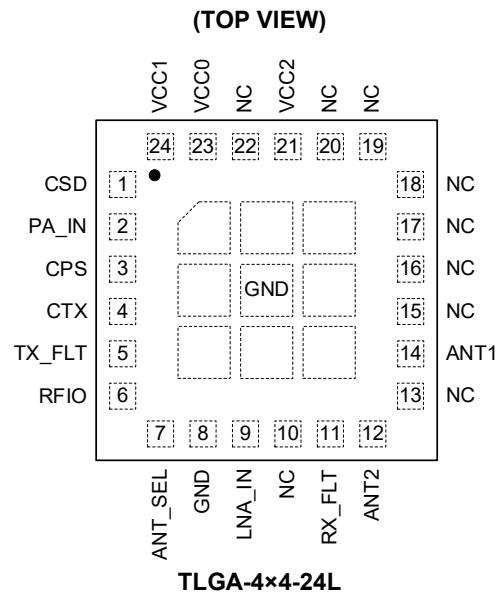
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

PIN CONFIGURATION



PIN DESCRIPTION

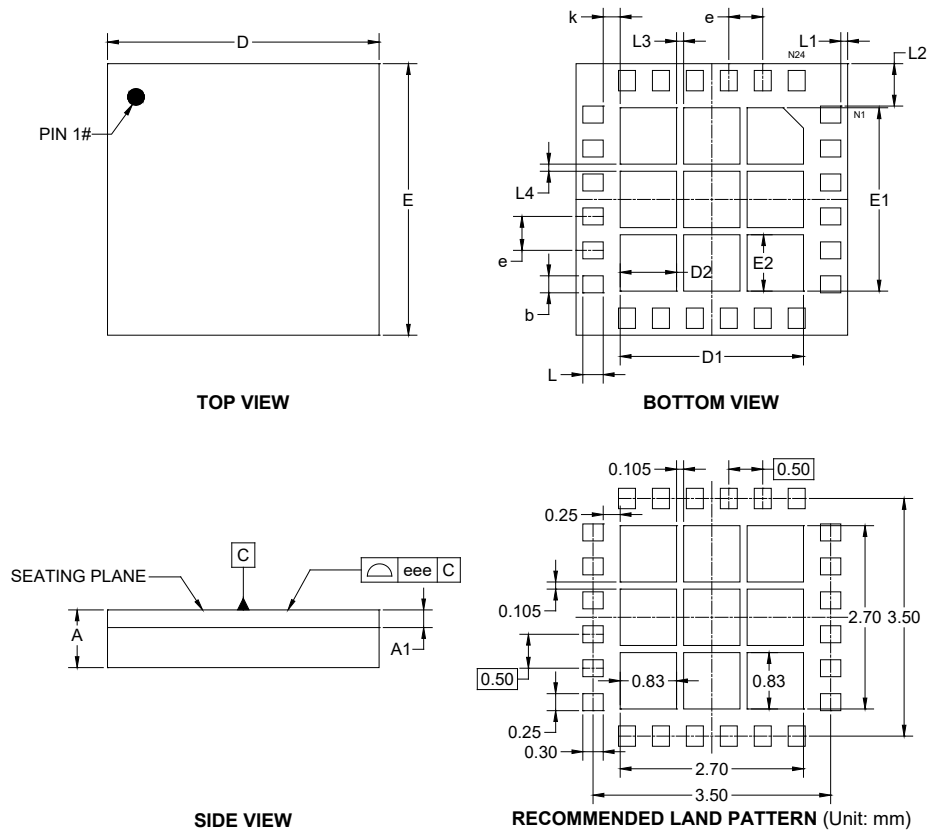
PIN	NAME	FUNCTION
1	CSD	Control Input Shutdown.
2	PA_IN	PA Input from TX_FLT Pin.
3	CPS	RX Path Select Control.
4	CTX	TX Enable.
5	TX_FLT	TX Input from SP2T.
6	RFIO	TX Input from Transceiver/RX Output to Transceiver.
7	ANT_SEL	Antenna Select Control Logic.
8	GND	Ground.
9	LNA_IN	LNA Input from External RX Filter.
10, 13, 15, 16, 17, 18, 19, 20, 22	NC	No Connection.
11	RX_FLT	RX Signal from ASM, to External RX Filter.
12	ANT2	Antenna Port 2.
14	ANT1	Antenna Port 1.
21	VCC2	Supply Voltage 2 for FEM.
23	VCC0	Supply Voltage 0 for FEM.
24	VCC1	Supply Voltage 1 for FEM.
Exposed Pad	GND	Exposed Pad. Must be connected to ground.

CONTROL LOGIC

Mode	CPS	CSD	CTX	ANT_SEL
RX LNA Bypass Mode-ANT1	0	1	0	1
RX LNA Bypass Mode-ANT2	0	1	0	0
RX LNA Mode-ANT1	1	1	0	1
RX LNA Mode-ANT2	1	1	0	0
TX-ANT1 EN	0	0	1	0
TX-ANT2 EN	0	0	1	1

PACKAGE OUTLINE DIMENSIONS

TLGA-4×4-24L



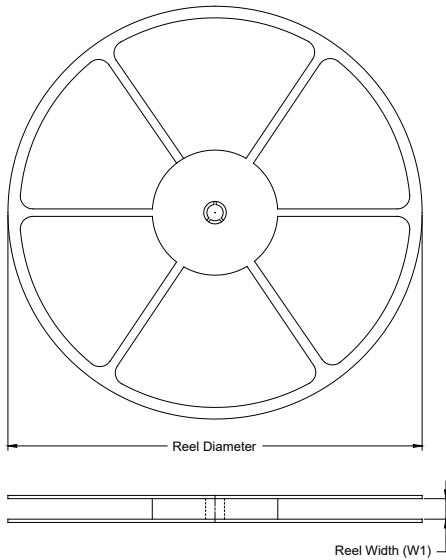
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.800	-	0.900
A1	0.260 REF		
b	0.200	-	0.300
D	3.900	-	4.100
E	3.900	-	4.100
D1	2.600	-	2.800
D2	0.830 REF		
E1	2.600	-	2.800
E2	0.830 REF		
e	0.500 BSC		
k	0.250 REF		
L	0.250	-	0.350
L1	0.100 REF		
L2	0.625 REF		
L3	0.105 REF		
L4	0.105 REF		
eee	0.100		

NOTE: This drawing is subject to change without notice.

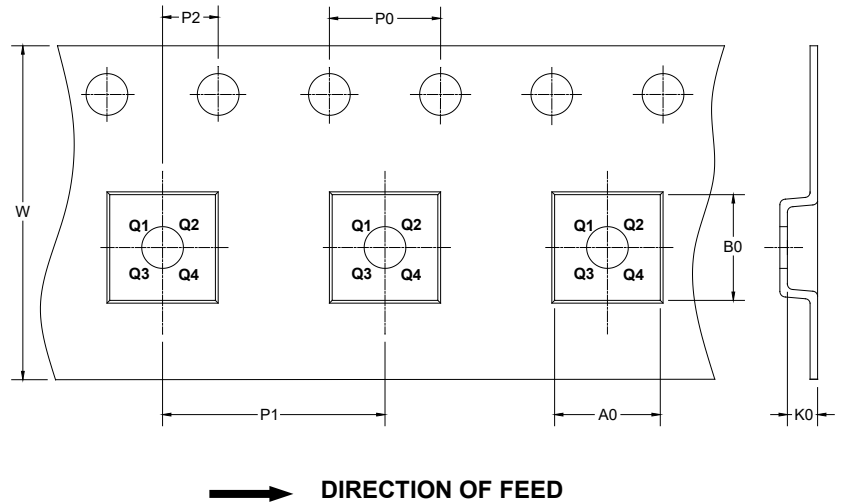
PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

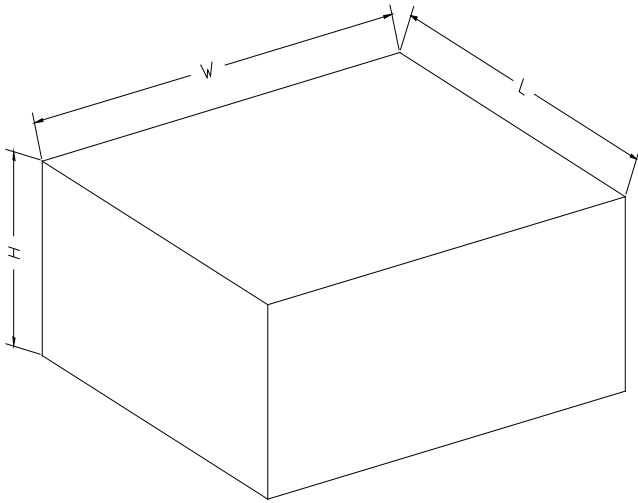
KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TLGA-4×4-24L	13"	12.4	4.30	4.30	1.10	4.0	8.0	2.0	12.0	Q2

DD0001

PACKAGE INFORMATION

CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
13"	386	280	370	5

DD0002