

CXG1190AEQ

Description

The CXG1190AEQ is one of a range of low insertion loss, high power MMIC antenna switches for GSM/UMTS dual-mode handset. The low insertion loss serves to extend the handset talk time.

The switch also contains on-chip logic circuits and built-in dual-LPF on GSM transmit paths for suppression of transmitter harmonics. The dual-LPF is mounted on the lead frame and enables the reduction of component count and simple PCB layout.

(Applications: GSM (Triple/Quad band)/UMTS dual-mode handset)

Features

- ◆ Low height (1.3mm Max.)
- ◆ Low insertion loss
 - 0.90dB (Typ.) on Tx2 (1910MHz)
 - 0.85dB (Typ.) on Rx4 (1990MHz)
 - 0.60dB (Typ.) on TRx (1980MHz)
- ◆ Built-in dual-LPF
 - Att -30dB (Typ.) @2fo (Tx1)
 - Att -30dB (Typ.) @2fo (Tx2)
- ◆ 3 CMOS compatible control lines
- ◆ Small package size
 - 28-pin LQFN (4.5mm × 3.2mm × 1.3mm)

Package

28-pin LQFN (Plastic)

Structure

GaAs Junction-gate PHEMT built-in logic circuits and dual-LPF
Sony PHEMT GaAs process is utilized for low insertion loss.

This IC is ESD sensitive device. Special handling precautions are required.

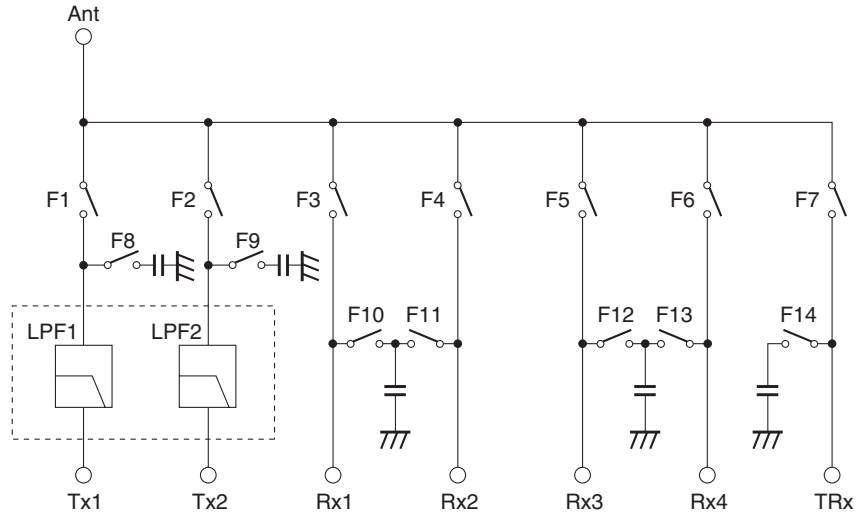
Sony reserves the right to change products and specifications without prior notice. This information does not convey any license by any implication or otherwise under any patents or other right. Application circuits shown, if any, are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits.

**Absolute Maximum Ratings**

(Ta = 25°C)

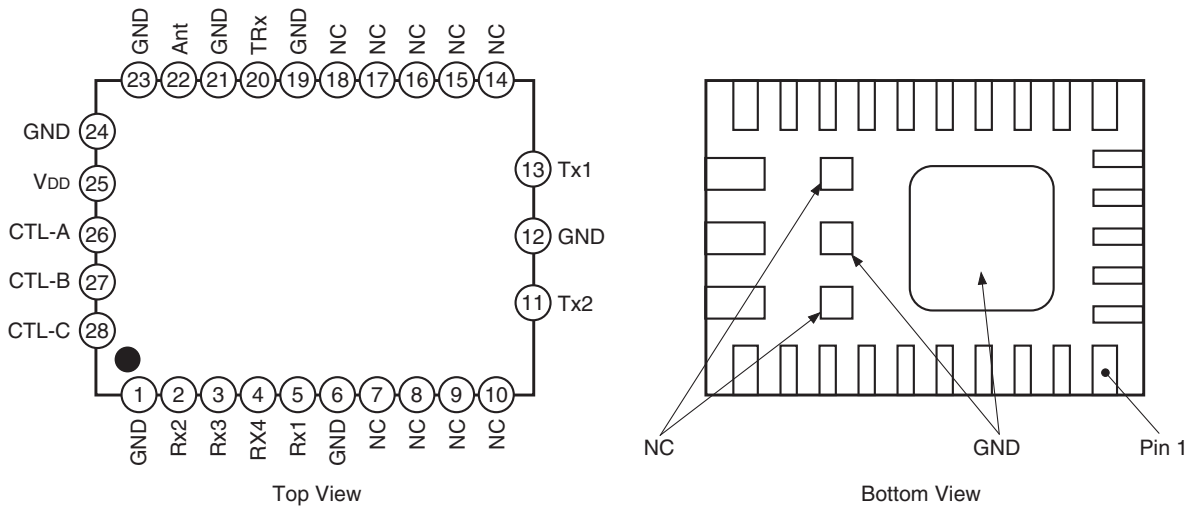
◆ Bias voltage	V _{DD}	7	V
◆ Control voltage (CTL-A/B/C)	V _{ctl}	5	V
◆ Operating temperature	T _{opr}	-30 to +90	°C
◆ Storage temperature	T _{stg}	-65 to +150	°C

Block Diagram



Note) Built-in SW control circuit

Pin Configuration



Note) Each Rx pin can be used from 869 to 1990MHz frequency range.
So user can select these Rx pins suitably.

Pin Description

Pin No.	Symbol	Pin No.	Symbol
1	GND	15	NC
2	Rx2	16	NC
3	Rx3	17	NC
4	Rx4	18	NC
5	Rx1	19	GND
6	GND	20	TRx
7	NC	21	GND
8	NC	22	Ant
9	NC	23	GND
10	NC	24	GND
11	Tx2	25	V _{DD}
12	GND	26	CTL-A
13	Tx1	27	CTL-B
14	NC	28	CTL-C

Truth Table

Item	Vctl state			Switch state													
	A	B	C	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
Tx1	H	H	L	H	L	L	L	L	L	L	L	H	H	H	H	H	H
Tx2	H	L	L	L	H	L	L	L	L	L	H	L	H	H	H	H	H
Rx1	L	L	L	L	L	H	L	L	L	L	H	H	L	H	H	H	H
Rx2	L	L	H	L	L	L	H	L	L	L	H	H	H	L	H	H	H
Rx3	L	H	H	L	L	L	L	H	L	L	H	H	H	H	L	H	H
Rx4	L	H	L	L	L	L	L	L	H	L	H	H	H	H	H	L	H
TRx	H	L	H	L	L	L	L	L	L	H	H	H	H	H	H	H	L

Electrical Characteristics

(V_{DD} = 2.8V, V_{ctl} = 2.8V, T_a = 25°C)

Item	Symbol	Path	Condition	Min.	Typ.	Max.	Unit	
Insertion loss	IL	Tx1 – Ant	*1	—	0.85	1.05	dB	
		Tx2 – Ant	*2	—	0.90	1.15		
		TRx (Tx) – Ant	*3	—	0.60	0.80		
		Ant – Rx1	*4/*5	—	0.75/0.85	0.95/1.05		
		Ant – Rx2	*4/*5	—	0.75/0.85	0.95/1.05		
		Ant – Rx3	*4/*5	—	0.75/0.85	0.95/1.05		
		Ant – Rx4	*4/*5	—	0.75/0.85	0.95/1.05		
		Ant – TRx (Rx)	*6	—	0.65	0.85		
Isolation	ISO.	Active path: Tx1					dB	
		Ant – Rx1	824 to 915MHz	27	—	—		
		Ant – Rx2		27	—	—		
		Ant – Rx3		30	—	—		
		Ant – Rx4		30	—	—		
		Ant – Tx2		25	—	—		
		Ant – TRx		25	—	—		
		Active path: Tx2						
		Ant – Rx1	1710 to 1785MHz 1850 to 1910MHz	20	—	—		
		Ant – Rx2		20	—	—		
		Ant – Rx3		32	—	—		
		Ant – Rx4		30	—	—		
		Ant – TRx		18	—	—		
		Active path: TRx						
		Ant – Rx1	1920 to 1980MHz	20	—	—		
		Ant – Rx2		20	—	—		
		Ant – Rx3		20	—	—		
		Ant – Rx4		20	—	—		
		Tx1 – Ant	824 to 915MHz	20	—	—		
		Tx2 – Ant	1710 to 1785MHz 1850 to 1910MHz	20	—	—		
		Active path: Rx1						
		Tx1 – Ant	824 to 915MHz	20	—	—		
		Tx2 – Ant	1710 to 1785MHz 1850 to 1910MHz	20	—	—		
		Active path: Rx2						
		Tx1 – Ant	824 to 915MHz	20	—	—		
		Tx2 – Ant	1710 to 1785MHz 1850 to 1910MHz	20	—	—		
		Active path: Rx3						
		Tx1 – Ant	824 to 915MHz	20	—	—		
		Tx2 – Ant	1710 to 1785MHz 1850 to 1910MHz	20	—	—		
		Active path: Rx4						
		Tx1 – Ant	824 to 915MHz	20	—	—		
		Tx2 – Ant	1710 to 1785MHz 1850 to 1910MHz	30	—	—		

Item	Symbol	Path	Condition	Min.	Typ.	Max.	Unit		
Harmonics		Tx1 – Ant	2nd Harmonic	1648 to 1698MHz 1760 to 1830MHz	CW, Pin = +34dBm	—	-40	-36	dBm
			3rd Harmonic	2472 to 2547MHz 2640 to 2745MHz		—	-43	-36	
		Tx2 – Ant	2nd Harmonic	3420 to 3570MHz 3760 to 3820MHz	CW, Pin = +32dBm	—	-38	-35	
			3rd Harmonic	5130 to 5355MHz 5550 to 5730MHz		—	-43	-38	
		TRx – Ant	2nd Harmonic	3840 to 3960MHz	CW, Pin = +29dBm	—	-38	-35	
			3rd Harmonic	5760 to 5940MHz		—	-43	-38	
Attenuation		Tx1 – Ant	1648 to 1830MHz	2fo	25	30	—	dB	
			2472 to 2745MHz	3fo	25	30	—		
			3296 to 3660MHz	4fo	20	25	—		
			4120 to 4575MHz	5fo	15	18	—		
			4944 to 5490MHz	6fo	15	18	—		
			5768 to 6405MHz	7fo	15	18	—		
		Tx2 – Ant	3420 to 3820MHz	2fo	25	30	—		
			5130 to 5730MHz	3fo	25	30	—		
VSWR	VSWR	Ant	824 to 2170MHz	—	1.4	1.6	—		
		Tx1	824 to 915MHz	—	1.4				
		Tx2	1710 to 1910MHz	—	1.3				
		TRx	1920 to 2170MHz	—	1.3				
		Rx1	869 to 1910MHz	—	1.4				
		Rx2		—	1.4				
		Rx3		—	1.4				
		Rx4		—	1.4				
Switching speed	Swt	Ant – Tx1 Ant – Tx2 Ant – TRx	90% OFF to 90% ON	—	3	5	μs		

- *1 Frequency = 915MHz, Input signal is CW, Pin = +34dBm
- *2 Frequency = 1910MHz, Input signal is CW, Pin = +32dBm
- *3 Frequency = 1980MHz, Input signal is CW, Pin = +29dBm
- *4 Frequency = 960MHz, Input signal is CW, Pin = -5dBm
- *5 Frequency = 1990MHz, Input signal is CW, Pin = -5dBm
- *6 Frequency = 2170MHz, Input signal is CW, Pin = -5dBm

Supply voltage

(Ta = 25°C)

Item	Min.	Typ.	Max.	Unit
Bias voltage (V _{DD})	2.6	2.8	3.6	V

Control voltage

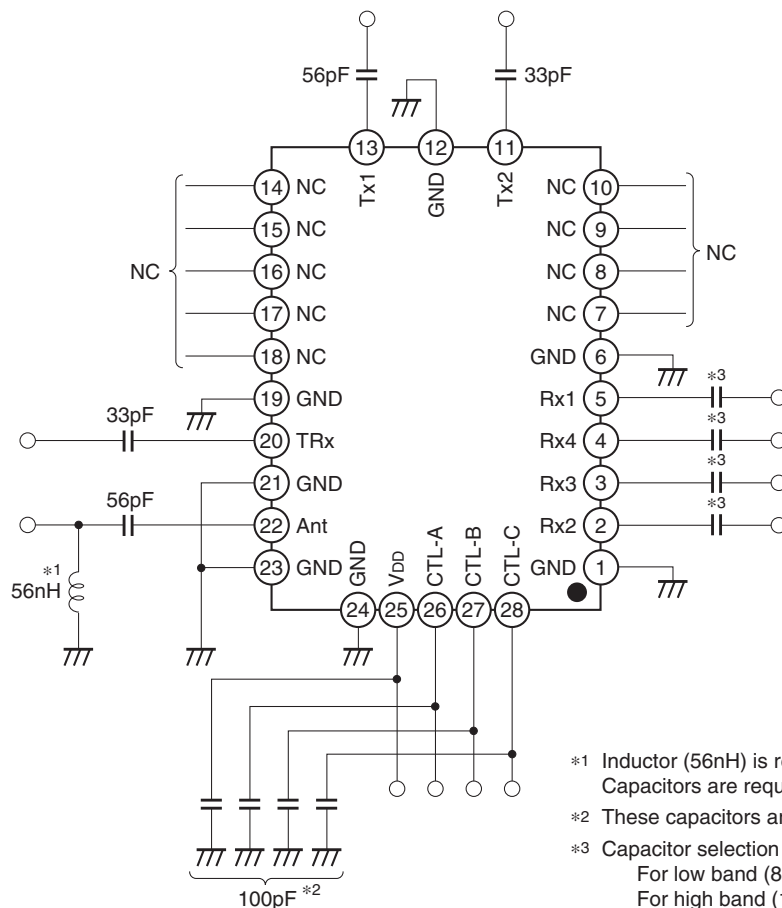
(Ta = 25°C)

Item	State	Min.	Typ.	Max.	Unit
Control voltage (CTL-A/B/C)	High	2.0	2.8	3.6	V
	Low	0	—	0.5	

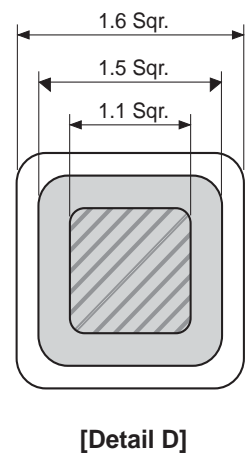
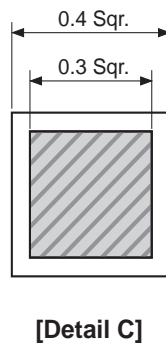
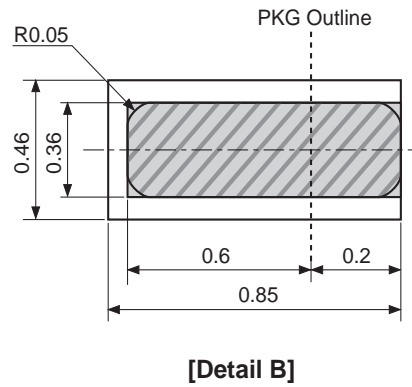
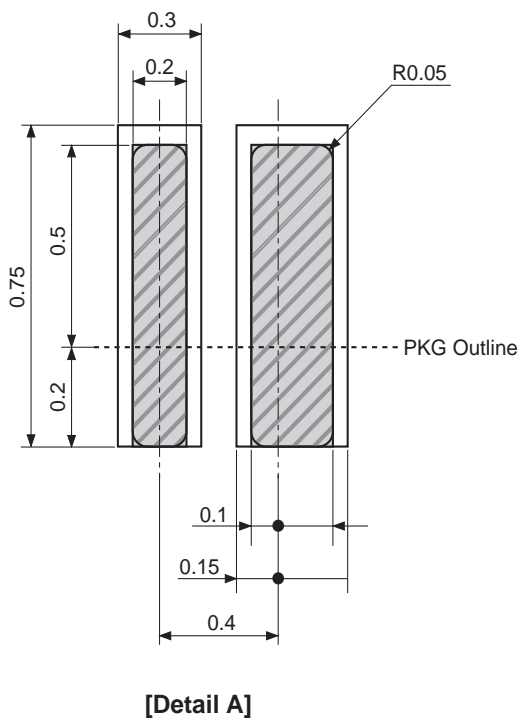
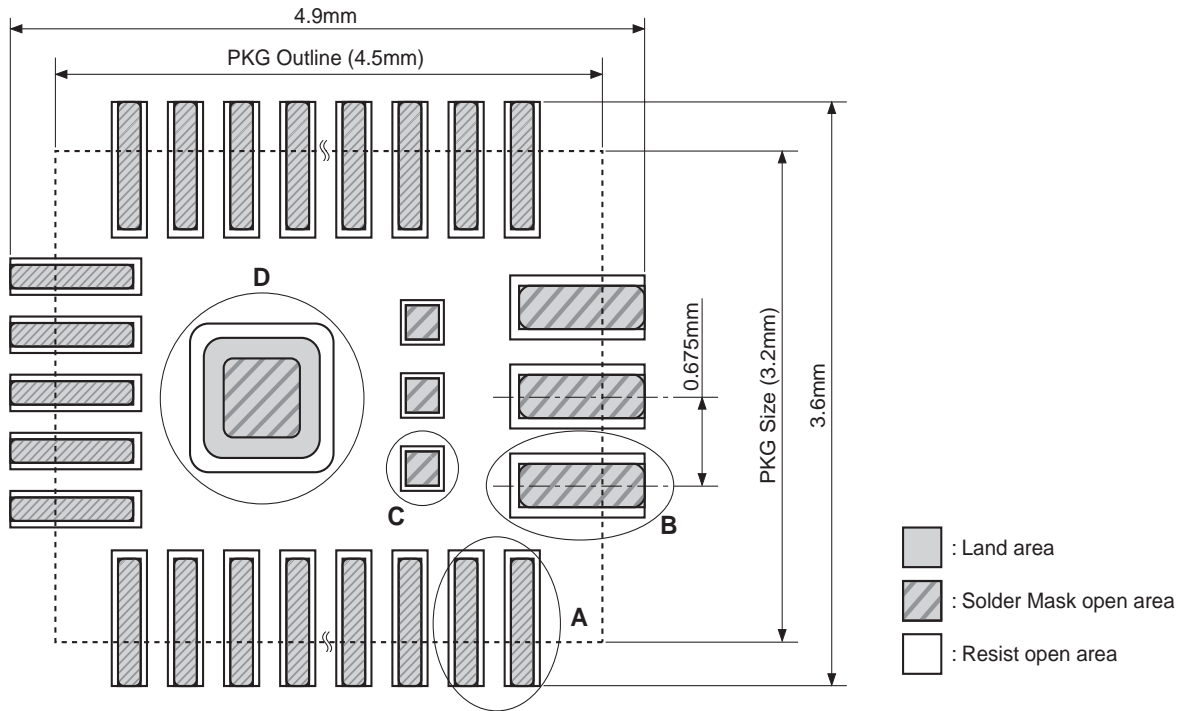
Current consumption

Item	Condition	Min.	Typ.	Max.	Unit
Bias current	V _{DD} = 2.8V	—	240	400	μA
Control current	V _{ctl} (H) = 2.8V/1-wire	—	25	50	

Recommended Circuit



- *1 Inductor (56nH) is recommended on Ant port for ESD protection. Capacitors are required on all RF ports for DC blocking.
- *2 These capacitors are not mandatory.
- *3 Capacitor selection for DC-block;
 For low band (869 to 960MHz): 56pF
 For high band (1805 to 1990MHz): 33pF



(Unit: mm)