WS7802LA-6/TR

High Power SPDT Antenna Switch

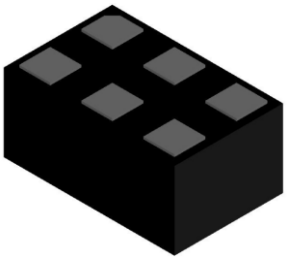


Figure 1 LGA 1107-6L (Bottom View)

Descriptions

The WS7802LA-6/TR is a CMOS silicon-on-insulator (SOI), single-pole, double-throw (SPDT) switch. The device is optimized for GSM, CDMA, WCDMA, LTE, and 5G_NR applications requiring high power and high linearity. The WS7802LA-6/TR is packaged in a compact 1.1mm × 0.7mm, 6-pin module. No external DC blocking capacitors are required on the RF paths if no DC voltage is applied to those paths.

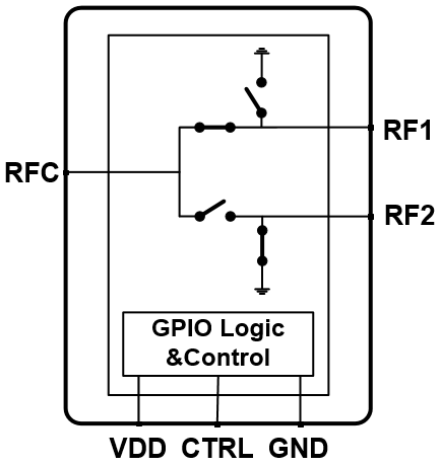


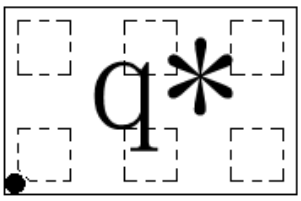
Figure 2 Functional Block Diagram

Features

- Broadband Frequency Range: 0.1 to 6.0 GHz
- Very Low Insertion Loss
- Excellent Isolation Performance
- GPIO Control Interface
- Compact 1.1mm × 0.7mm, LGA Package
- No DC blocking capacitors are required in typical applications

Applications

- Cellular Handset Applications
- Cellular Modems and USB Devices
- GSM, CDMA, WCDMA, LTE, and 5G_NR Applications



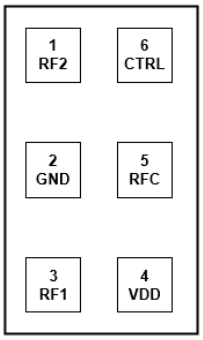
q = Device code
* = Date code（A~Z）

Figure 3 Marking (Top view)

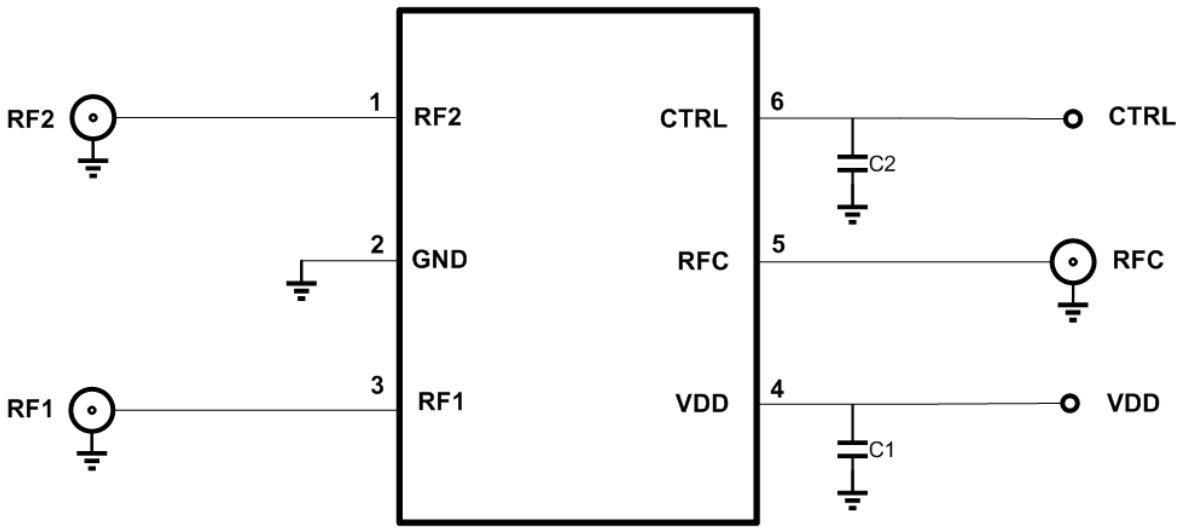
Order information

Device	Package	Shipping
WS7802LA-6/TR	LGA1107-6L	3000/Reel&Tape

Pin information

Pin	Function	Description	Transparent Top View
1	RF2	RF Port 2	
2	GND	Ground	
3	RF1	RF Port 1	
4	VDD	DC Supply Voltage	
5	RFC	RF Common Port	
6	CTRL	DC Control Voltage	

Application information



Note: C1=100pF, C2=100pF

Figure 4 Application Circuit

Absolute maximum ratings

Maximum ratings are absolute ratings, and operation of this device outside the parameter ranges given below may cause permanent damage.

Items	Symbol	Min	Max	Unit
VDD Voltage	V_{DD}	-0.5	3.5	V
CTRL Voltage	V_{CTRL}	-0.5	3.0	V
Maximum Input Power (12.5% Duty cycle, output port VSWR=1:1, 85°C, 915MHz)	P_{IN}		42	dBm
Operating Temperature	T_{OP}	-40	85	°C
Storage Temperature	T_{STG}	-40	125	°C
ESD Human Body Mode	ESD_HBM	2000		V
ESD Charge Device Mode	ESD_CDM	500		V

Recommended operating conditions

Parameters	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	V_{DD}	1.65	1.8/2.8	3.1	V
Power Supply Current	I_{DD}		70	100	μA
Logic Control "Low"	$V_{CTRL,LOW}$	0	0	0.3	V
Logic Control "High"	$V_{CTRL,HIGH}$	1.5	1.8	2.7	V
Switching Time	T_{SW}		2.3	5	μs

Electrical Characteristics

Nominal test condition unless otherwise stated: V_{DD} = 1.8/2.8V, V_{CTRL}=0/1.8V, Temp = +25°C, all unused RF ports terminated in 50Ω.

Parameters		Symbol	Conditions	Min.	Typ.	Max.	Unit
Insertion Loss (RFC to RFx, Single Path ON)		IL	617 - 960 MHz		0.25	0.35	dB
			960 - 2170 MHz		0.30	0.45	dB
			2170 - 2700 MHz		0.32	0.55	dB
			3300 - 3800 MHz		0.35	0.65	dB
			3800 - 4200 MHz		0.37	0.75	dB
			4400 - 5000 MHz		0.40	0.85	dB
			5150 - 5925 MHz		0.45	0.90	dB
Isolation (RFC to RFx, Single Path ON)	RFC to RFx	ISO	617 - 960 MHz	30	40		dB
	RFC to RFx		960 - 2170 MHz	27	33		dB
	RFC to RFx		2170 - 2700 MHz	25	31		dB
	RFC to RFx		3300 - 3800 MHz	21	27		dB
	RFC to RFx		3800 - 4200 MHz	20	26		dB
	RFC to RFx		4400 - 5000 MHz	20	24		dB
	RFC to RFx		5150 - 5925 MHz	15	22		dB
Adjacent Port Isolation (RF1 to RF2, Single Path ON)	RF1 to RF2	ISO	617 - 960 MHz	30	57		dB
	RF1 to RF2		960 - 2170 MHz	30	44		dB
	RF1 to RF2		2170 - 2700 MHz	25	39		dB
	RF1 to RF2		3300 - 3800 MHz	21	35		dB
	RF1 to RF2		3800 - 4200 MHz	20	33		dB
	RF1 to RF2		4400 - 5000 MHz	20	28		dB
	RF1 to RF2		5150 - 5925 MHz	15	25		dB
2nd Order Input Intercept Point	RFC to RF1	IIP2	f1: 1950MHz, 26dBm f2: 4090MHz, -20dBm	110	120		dBm
	RFC to RF2			110	120		dBm
3rd Order Input Intercept Point	RFC to RF1	IIP3	f1: 2560MHz, 26dBm f2: 3310MHz, -10dBm	65	70		dBm
	RFC to RF2			65	70		dBm
Harmonics (VSWR=1:1)	2F0 (GSM850/900)	HD2	617 - 960 MHz; Pin = 35dBm		-60	-45	dBm
	3F0 (GSM850/900)	HD3			-60	-45	dBm
	2F0 (GSM/DCS/PCS)	HD2	960 - 2170 MHz; Pin = 33dBm		-65	-45	dBm
	3F0 (GSM/DCS/PCS)	HD3			-65	-45	dBm
	2F0 (LTE LB)	HD2	617 - 960 MHz; Pin = 26dBm		-80	-60	dBm
	3F0 (LTE LB)	HD3			-80	-60	dBm
	2F0 (LTE MB)	HD2	960 - 2170 MHz; Pin = 26dBm		-80	-60	dBm
	3F0 (LTE MB)	HD3			-80	-60	dBm

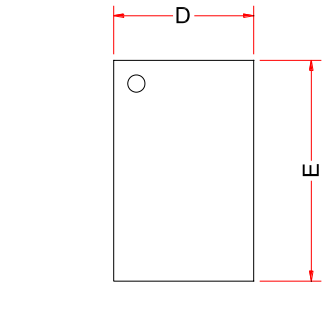
Parameters		Symbol	Conditions	Min.	Typ.	Max.	Unit
	2F0 (LTE HB)	HD2	2170 - 2700 MHz; Pin = 26dBm		-70	-55	dBm
	3F0 (LTE HB)	HD3			-70	-55	dBm
	2F0 (LTE B42/B43/n78)	HD2	3300 - 3800 MHz; Pin = 26dBm		-70	-55	dBm
	3F0 (LTE B42/B43/n78)	HD3			-70	-55	dBm
	2F0 (n77/n78)	HD2	3800 - 4200 MHz; Pin = 26dBm		-70	-55	dBm
	3F0 (n77/n78)	HD3			-70	-55	dBm
	2F0 (n79)	HD2	4400 - 5000 MHz; Pin = 26dBm		-65	-55	dBm
	3F0 (n79)	HD3			-75	-55	dBm
	2F0 (B46 WiFi)	HD2	5150 - 5925 MHz; Pin = 26dBm		-55	-45	dBm
	3F0 (B46 WiFi)	HD3			-75	-55	dBm
VSWR		VSWR	617 - 960 MHz		1.15	1.5	:1
			960 - 2170 MHz		1.25	1.5	:1
			2170 - 2700 MHz		1.28	1.5	:1
			3300 - 3800 MHz		1.30	1.7	:1
			3800 - 4200 MHz		1.32	1.8	:1
			4400 - 5000 MHz		1.35	1.9	:1
			5150 - 5925 MHz		1.42	2.0	:1

Truth Table for Operation

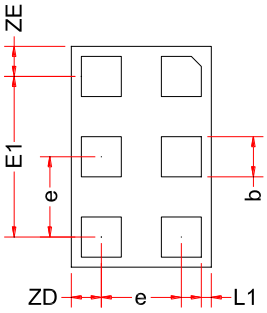
Mode	V_{CTRL}	State Description
1	$V_{CTRL,LOW}$	RFC to RF1 path ON
2	$V_{CTRL,HIGH}$	RFC to RF2 path ON

Package Dimensions

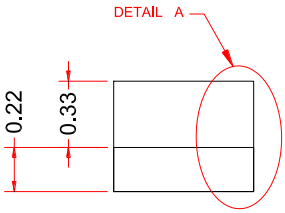
LGA1107-6L



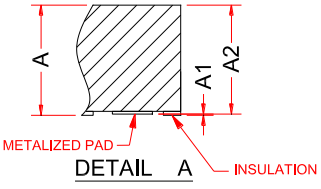
TOP VIEW

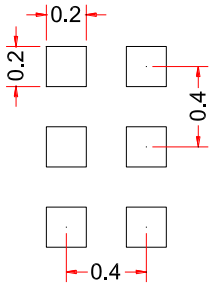


BOTTOM VIEW



SIDE VIEW



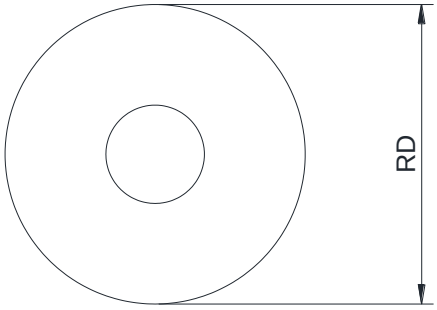


RECOMMENDED LAND PATTERN(unit:mm)

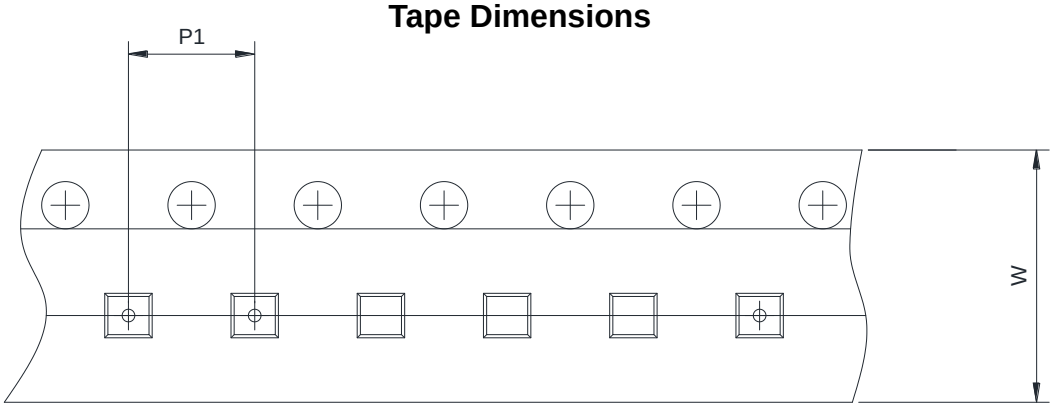
Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.50	0.55	0.60
A1	0.00	--	0.03
A2	--	--	0.57
b	0.15	0.20	0.25
L	0.15	0.20	0.25
D	0.65	0.70	0.75
E	1.05	1.10	1.15
D1	0.80 BSC		
E1	0.80 BSC		
ZD	0.15BSC		
ZE	0.15BSC		
e	0.40 BSC		
L1	0.00	0.05	0.10

Tape and Reel Information

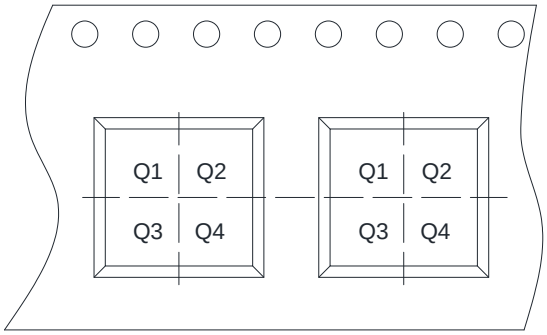
Reel Dimensions



Tape Dimensions



Quadrant Assignments For PIN1 Orientation In Tape



User Direction of Feed

RD	Reel Dimension	☑ 7inch	☐ 13inch		
W	Overall width of the carrier tape	☑ 8mm	☐ 12mm	☐ 16mm	
P1	Pitch between successive cavity centers	☐ 2mm	☑ 4mm	☐ 8mm	
Pin1	Pin1 Quadrant	☑ Q1	☐ Q2	☐ Q3	☐ Q4