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TPGT521YU

Audio Headset Analog Switch with Reduced GND Switch RON and OVP Capability

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Descriptions

The TPGT521YU is a 2-channel exchange switch. It operates from a single 2.3 V to 5. 5 V supply and features an ultra-low on resistance of 0.85 Ω for SBU1 and 0.85 Ω for SBU2 at a 3.3 V supply and TA = 25° C.

This device is fabricated with sub-micron CMOS technology to achieve fast switching speeds and is designed for break-before-make operation. The TPGT521YU guarantees low on-resistance matching between switches, on-resistance flatness over the signal range, high off-isolation and low crosstalk, which ensures excellent linearity and low distortion when switching audio signals. The TPGT521YU consists of two normally open and two normally close switches. The TPGT521YU provides Green QFN1.8*1.4-10 package.

Features

- Pin-to-pin TPGT521YU , QFN 1.4 x 1.8 -10L
- Ground FET Switches RON : 0.85Ω (TYP)
- High Off-Isolation = -105dB, f=1kHz, RL=32Ω, Vsw=1Vrms
- Power Supply Voltage Range: 2.3V to 5.5V
- Total Harmonic Distortion (MIC): 0.01% (TYP)
- Shutdown Current: <1 μ A (TYP)
- SBUx pins OVP: 4.2V (TYP), up to 12V DC.
- -40℃ to +85℃ Operating Temperature Range

Applications

- Mobile Phones/Tablet PCs, Notebook/Ultrabook Computers

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Functional Diagram and Typical Application

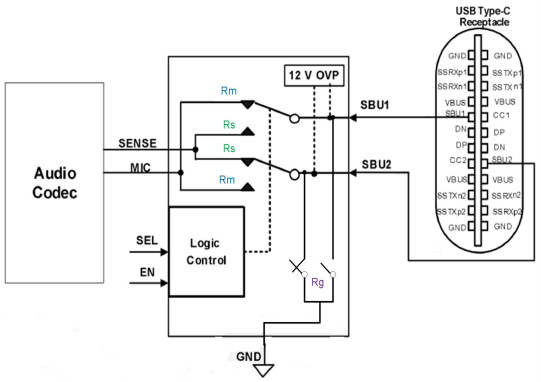


Fig.1 Functional Diagram and Typical Application

Pin Configuration

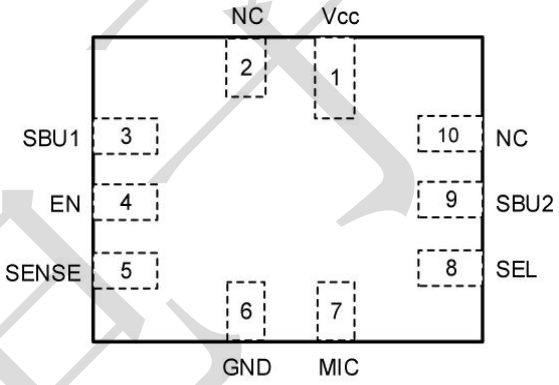


Fig.2 Top-Through View

Pin Descriptions

PIN	NAME	I/O	Description
1	VCC	–	Power Supply for the Chip.
2,10	NC	–	Not Connection
3,9	SBUx	I/O	Common Terminal
4	EN	I	Chip Enable, Action High
5	SENSE	O	Audio Gound Reference Output
6	GND	--	Ground
7	MIC	I/O	Microphone Signal
8	SEL	I	Switch Selection. When Low, SBU1=SENSE, SBU2=MIC When High, SBU1=MIC, SBU2=SENSE

Table-1 Pin Descriptions

Truth Table

EN	SEL	Function
Low	X	Both SBU1 and SBU2 are off
High	Low	SBU1=SENSE, SBU2=MIC
High	High	SBU2=SENSE, SBU1=MIC

Absolute Maximum Ratings (1)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	-0.5 ~6.5	V
Voltage Range on SEL, EN, MIC, SENSE	V_{IS}	-0.5 ~ 6.5	V
Voltage Range on SBU1, SBU2	V_{SBU}	-0.5 ~ 13.2	V
Storage Temperature Range	T_{STG}	-55 ~ 150	°C
Switch I/O Current Through SBU1 or SBU2	I_{IS}	500	mA

Recommend operating ratings (2)

Parameter	Symbol	Value	Unit
Supply Voltage	V_{CC}	2.3 ~ 5.5	V
Input/Output Voltage Range	V_{IN}	0.0 ~ 3.3	V

Note:

1. "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied.
2. The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.

Electrical Characteristics (VCC = 2.3V to 5.5V, typical values are at VCC = 3.3V, T_A = +25°C, unless otherwise noted)

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Input Voltage Range	VCC		2.6		5.0	V
Shutdown Current	ISD			0.5	5	μA
Active Current	ICC			35		μA
Input/Output Voltage Range	VIO		0		3.3	V
Input Logic High	VIH	VCC = 2.3V	1.1		VCC	V
		VCC = 3.3V	1.1		VCC	
		VCC = 4.5V	1.3		VCC	
Input Logic Low	VIL	VCC = 2.3V	0		0.7	V
		VCC = 3.3V	0		0.8	
		VCC = 4.5V	0		0.8	
Pull Down Resistor of SEL/EN	RPD			2		MΩ
SBU1-to-GND On Resistance	RG1	IGND = 10mA		0.85		Ω
SBU2-to-GND On Resistance	RG2			0.85		
SBU1-to-Sense On Resistance	RS1	ISENSE = 10mA		0.5		Ω
SBU2-to-Sense On Resistance	RS2			0.5		
SBUx-to-Sense Ron Flatness	Rflat1	ISENSE = 10mA		0.05		Ω
SBU1-to-MIC On Resistance	RM1	IMIC = 10mA		5		Ω
SBU2-to-MIC On Resistance	RM2			5		
SBUx-to-Sense MIC Flatness	Rflat2	IMIC = 10mA		0.5		Ω
SBUx OVP Threshold	Vovp		3.8	4.2	4.6	V
OVP threshold hysteresis	Vhys			0.2		V
Maximum voltage to appear on SENSE/MIC	Vclamp	0 to 12V applied to SBUx RL=1k connected to SENSE/MIC			9	V
ON Capacitance of SBUx	CON	EN=VCC		20		pF
OFF Capacitance of SBUx	COFF	EN=0		22		pF
OFF Isolation	OISO	f=1kHz, RL=32, Vsw=1Vrms		-105		dB
Turn-on Time (EN to Output)	Ton	RL=50, CL=5p		250		μS
Turn-off Time (EN to Output)	Toff	RL=50, CL=5p		2		μS
Break-Before-Make (SEL to Output)	Tbbm	RL=50, CL=5p		70		μS
OVP Response Time	Tovp	RL=50, CL=5p		0.25		μS

Note:

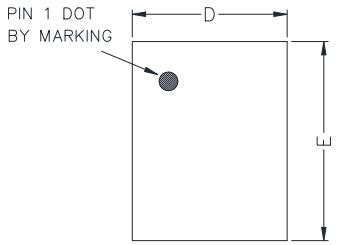
Table-4 Electrical Characteristics

(1) Flatness is defined as the difference between maximum and minimum value of ON-resistance at the specified analog signal voltage points.

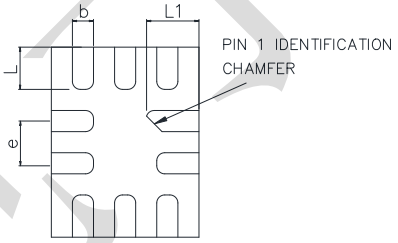
(2) R_{ON} matching between channels is calculated by subtracting the channel with the lowest max Ron value from the channel with the highest max Ron value.

Package Outline Dimensions

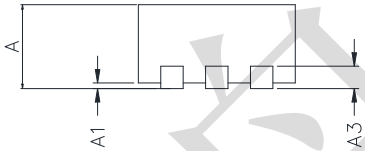
QFN1418-10L



TOP VIEW



BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.50	0.55	0.60
A1	0.00	-	0.05
A3	0.15 Ref.		
D	1.35	1.40	1.45
E	1.75	1.80	1.85
b	0.15	0.20	0.25
L	0.30	0.40	0.50
L1	0.40	0.50	0.60
e	0.40 BSC		