TPGY218YU

HiFi Audio Switches with Negative Swing Capability and Over-Voltage-Protection

Descriptions

The **TPGY218YU** is a high performance, Single-Pole, Single Throw (SPST) multiplexer that combines a low-distortion audio switch path. The architecture is designed to allow audio signals to swing below ground.

The **TPGY218YU** includes an over voltage protection of Ro and Lo pins to protect internal port. Typical applications involve switching in portables and consumer applications such as mobile phone, tablet, laptop, portable media players.

The **TPGY218YU** is available in QFN1418 package. Standard products are Pb-Free and halogen-Free.

Features

- Single Supply Range : 2.5V to 4.5V
- MUTE Pin Voltage : 18V
- Ro and Lo Pins OVP Threshold : 4.75V
- Audio Path On-Resistance : 2.5Ω
- THD+N@ 32Ω load & 0.7Vrms : -105dB
- Signal-to-Noise (SNR) Ratio : 115dBA
- Audio Swing Range (R_L = 1KΩ) : 2.5Vrms

Applications

- HiFi Audio Equipment

Typical Application and Functional Diagram

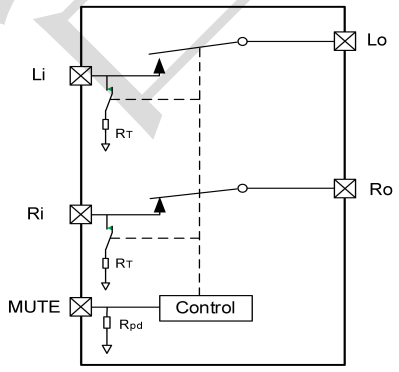


Fig.1 Typical Application and Functional Diagram

Pin Configuration

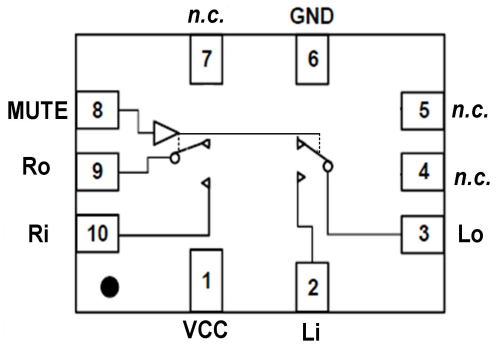


Fig.2 Pin Configuration

Pin Descriptions

Pin Number	Symbol	Descriptions
1	VCC	Power Supply
2	Li	Audio Left Input Source
3	Lo	Audio Left Output
4,5,7	*n.c.*	Not Connection
6	GND	Ground
8	MUTE	When 1, Audio Paths are OFF; When 1, Audio Paths are ON
9	Ro	Audio Right Output
10	Ri	Audio Right Input Source

Table-1 Pin Descriptions

Truth Table

MUTE	Status of Lo and Ro Status
=1	Lo disconnected to Li, Ro disconnected to Ri
=0	Lo connected to Li, Ro connected to Ri

Table-2 Truth Table

Absolute Maximum Ratings (1)

Parameter	Symbol	Value	Unit
Supply voltage range	V_{CC}	-0.3 ~ 6.5	V
Audio signal voltage range	V_{AUDIO}	-2.5 ~ VCC	V
MUTE pin voltage range	V_{VBUS}	-0.3 ~ 18	V
Continues output current	I_{OUT}	±200	mA
Junction temperature range	T_J	150	°C
Lead temperature range	T_L	260	°C
Storage temperature range	T_{STG}	-65 ~ +150	°C
Thermal resistance	$R_{\theta JA}$	250	°C/W
ESD protection (HBM)	MUTE to GND	±4000	V
	V_{CC} to GND	±5000	V
	Lo and Ro to GND	±4000	V
	Li and Ri to GND	±4000	V

Table-3 Absolute Maximum Ratings

Recommend Operating Ratings (2)

Parameter	Symbol	Value	Unit
Supply voltage range	V_{CC}	2.5 ~ 4.5	V
Audio signal voltage range	V_{AUDIO}	-3.0 ~ +3.0	V
MUTE pin voltage range	V_{VBUS}	-0 ~ 18	V
Operating temperature range	T_{OPR}	-40 ~ 85	°C

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.

Table-4 Recommend Operating Ratings

Electronics Characteristics (Ta=25°C, V_{CC}=3.3V, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Control Input Voltage HIGH	V_{IH}	2.5V< V_{CC}<3.0V	1.3			V
		3.0V< V_{CC}<3.5V	1.5			V
Control Input Voltage LOW	V_{IL}	2.5V< V_{CC}<3.0V			0.3	V
		3.0V< V_{CC}<3.5V			0.5	V
Quiescent Supply Current	I_{CC}			20	35	uA
MUTE Input Leakage Current	I_{IN}	0< V_{IS}<18V			2	uA
Off state leakage current	I_{OFF}				1	uA
MUTE Internal Pull-Down Resistors	R_{PD}			4		MΩ
Audio Path Termination Resistors	R_T			33		Ω
Audio Switch On Resistance	R_{ON}	$V_{L/R}$ = -2V~+2V, I_{ON} = 60mA		2.5	2.7	Ω

Audio Switch Delta RON	ΔR_{ON}	$V_{L/R}$ = -2V~+2V, I_{ON} = 60mA		0.02		Ω
Audio Switch RON Flatness	R_{FLAT}	$V_{L/R}$ = -2V~+2V, I_{ON} = 60mA		0.02		Ω
Quiescent Supply Current	I_{CC}			55		uA
Non-Adjacent Channel Crosstalk	Xtalk	f=1KHz R_T=32Ω		-90		dB
Off Isolation	O_{IRR}	f=1KHz R_T=32Ω		-110		dB
Total Harmonic Distortion	THD	f = 20Hz to 20KHz, R_L = 32Ω, V_{IN} = 0.7V_{rms}		-105		dB
		f = 20Hz to 20KHz, R_L = 1KΩ, V_{IN} = 1.5V_{rms}		-110		dB
Signal-to-Noise Ratio	SNR	f = 20Hz to 20kHz, R_L = 32Ω, VIN = 2Vrms		-115		dB
On Capacitance	C_{ON}	V_{Bias} = 0.2V, f = 1MHz		5		pF
Off Capacitance	C_{OFF}	V_{Bias} = 0.2V, f = 1MHz		4		pF

Table-5 Electrical Characteristics

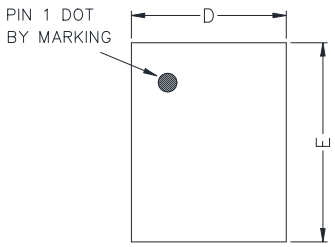
Note:

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

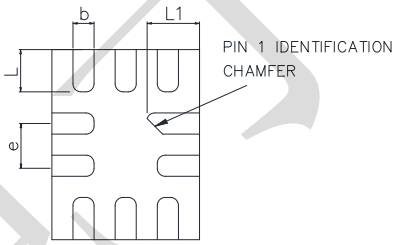
(2) R_{ON} matching between channels is calculated by subtracting the channel with the lowest max Ron value from the channel with the highest max Ron value.

Package Outline Dimensions

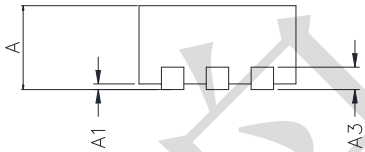
QFN1418-10L



TOP VIEW



BOTTOM VIEW



SIDE VIEW

Symbol	Dimensions in Millimeters		
	Min.	Typ.	Max.
A	0.40	0.45	0.50
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		