

Low R_{ON} , High Voltage, Rail-to-Rail Negative Signal Passing, SPST Analog Switch

General Description

ET32123 is a high voltage, wide range positive and negative signal passing, single-pole/single-throw (SPST) analog switch that is designed to operate from a single 2.3V to 5.5V power supply. Targeted applications include battery powered audio equipment that benefit from the ET32123 ultra low 95m Ω (max@25°C) on-resistance for switch.

ET32123 is a committed single-pole/single-throw (SPST) switch with low R_{ON} . This configuration can be used as a single signals switch and power switch.

ET32123 can pass -3V to 18V wide range positive and negative signals with very low distortion.

Features

- Wide Voltage Operation: 2.3V to 5.5V
- Ultra Low On-Resistance: 95m Ω (max@25°C)
- -3V to +18V Rail-to-Rail Low Distortion Positive and Negative Signal Passing
- Both COM to NO, NO to COM are disconnected when EN=LOW
- Both COM and NO are without Discharge
- Fast Switching Times
- Low Input Leakage Current
- 1.2V Logic Compatible Control Pin
- -40°C to +85°C Operating Temperature Range
- Package Information:

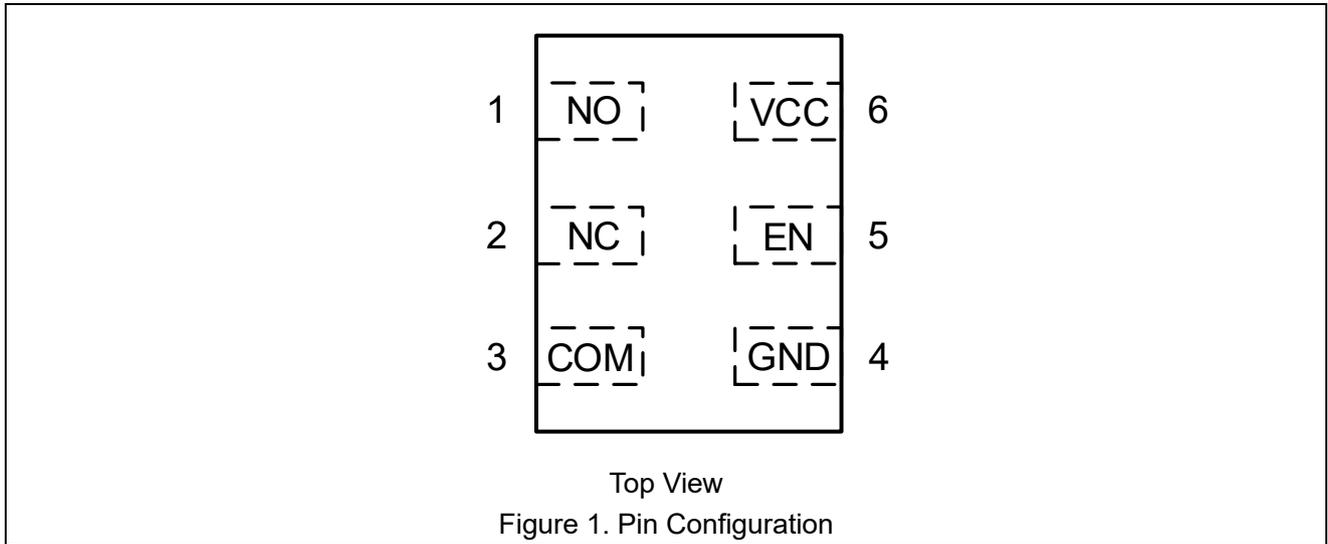
Part No.	Package	Packing Option	MSL
ET32123	FCDFN-6 (1.2mm \times 1.5mm)	Tape and Reel , 3K	Level 1

Application

- HiFi Audio Switch
- Portable Instrumentation
- Battery-Operated Equipment

ET32123

Pin Configuration



Pin Function

Pin No.	Name	I/O	Description
1	NO	I/O	NO Terminal. This pin can be an input or an output of switch.
2	NC	-	Null Pin.
3	COM	I/O	COM Terminal. This pin can be an input or an output of switch.
4	GND	/	Ground Pin.
5	EN	I	Enable Control. When EN=LOW, both COM to NO, NO to COM are disconnected, and ET32123 will be in shutdown state. When EN=HIGH, ET32123 will be in working state, COM and NO will be connected.
6	VCC	I	Power Supply Pin.

ET32123

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Symbol	Parameters		Min	Max	Unit
V _{CC}	VCC to GND		0	6	V
V _{EN}	EN to GND		0	6	V
V _{IS}	COM, NO to GND		-5	20	V
I _{IS}	Continuous Current from COM to NO		±2000		mA
I _{PEAK}	Peak Current from COM to NO		±2200		mA
T _J	Maximum Junction Temperature			+150	°C
T _{STG}	Storage Junction Temperature		-65	+150	°C
T _{LEAD}	Lead Temperature (Soldering, 10s)			+260	°C
V _{ESD}	Electrostatic Discharge Capability	Human Body Model, JESD22-A114	≥±2.0		kV
		Charged Device Model, JESD22-C101	≥±1.0		
I _{LU}	Latch up Current Maximum Rating		≥±100		mA

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. ETEK does not recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameters		Min	Max	Unit
V _{CC}	Supply Voltage Range		2.3	5.5	V
V _{SW}	COM to NO when disconnected		-15	15	V
T _A	Operating Temperature Range		-40	+85	°C

ET32123

Electrical Characteristics

$V_{CC} = 3.3V$, $T_A = -40^{\circ}C$ to $+85^{\circ}C$, typical values are at $T_A = +25^{\circ}C$, unless otherwise noted.

Symbol	Parameters	Conditions	Temp	Min	Typ	Max	Unit
Analog Switch							
V_{IS}	Analog Signal Range		+25°C	-3		18	V
R_{ON}	On-Resistance	$I_{IS}=200mA$	+25°C		85	95	mΩ
			Full		105	130	
$R_{FLAT(ON)}$	On-Resistance Flatness	$I_{IS}=200mA$	Full		0.001	0.01	Ω
$I_{COM/NO(OFF)}$	COM/NO Off Leakage Current	$V_{COM}=-3V/3V$ $V_{NO}=3V/-3V$	Full		0.01	0.35	uA
$I_{COM(ON)}$ $I_{NO(ON)}$	Channel On Leakage Current	$V_{NO}=-3V/3V$, $V_{COM}=floating$ or $V_{NO}=floating$, $V_{COM}=-3V/3V$	Full		0.01	0.35	uA
EN Inputs							
V_{IH}	Input High Voltage	$V_{CC}=2.3V$ to $5.5V$	Full	0.9			V
V_{IL}	Input Low Voltage	$V_{CC}=2.3V$ to $5.5V$	Full			0.4	V
R_{PD}	EN Pull Down Resistor		Full	2	5	8	MΩ
I_{EN}	EN Leakage Current	$V_{EN}=1.8V$	Full		0.35	1	uA
Dynamic Characteristics							
O_{ISO}	Off Isolation ⁽¹⁾	$f=1kHz$, $R_L=50\Omega$, Signal=0dBm	+25°C		-95	-70	dB
		$f=20kHz$, $R_L=50\Omega$, Signal=0dBm	+25°C		-70	-50	
BW	-3dB Bandwidth ⁽¹⁾	Signal=0dBm, $R_L=50\Omega$, $C_L=5pF$	+25°C	100	150		MHz
C_{ON}	Channel On Capacitance ⁽¹⁾		+25°C		40	60	pF
THD+N	Total Harmonic Distortion +Noise ⁽¹⁾	$V_{IS}=2V_{RMS}$, $R_L=600\Omega$	+25°C		-110	-90	dB
		$V_{IS}=1V_{RMS}$, $R_L=8\Omega$			-105	-85	
		$f=1kHz$, $P=0.5W$, $R_L=8\Omega$			-90	-80	
		$f=1kHz$, $P=7W$, $R_L=8\Omega$			-65	-50	
t_{START}	Start Up Time	Time from $V_{EN} > V_{IH}$ to $V_{COM} = 90\%$ of V_{NO} , $V_{NO}=0.6V$, $R_L=50\Omega$	+25°C	100	300	600	us
t_{pd}	Propagation Delay ⁽¹⁾	(NO to COM) or (COM to NO) $V_{IS}=0$ to $5V$, $f=400kHz$ $R_L=50\Omega$	+25°C		0.1	5	ns

ET32123

Electrical Characteristics(Continued)

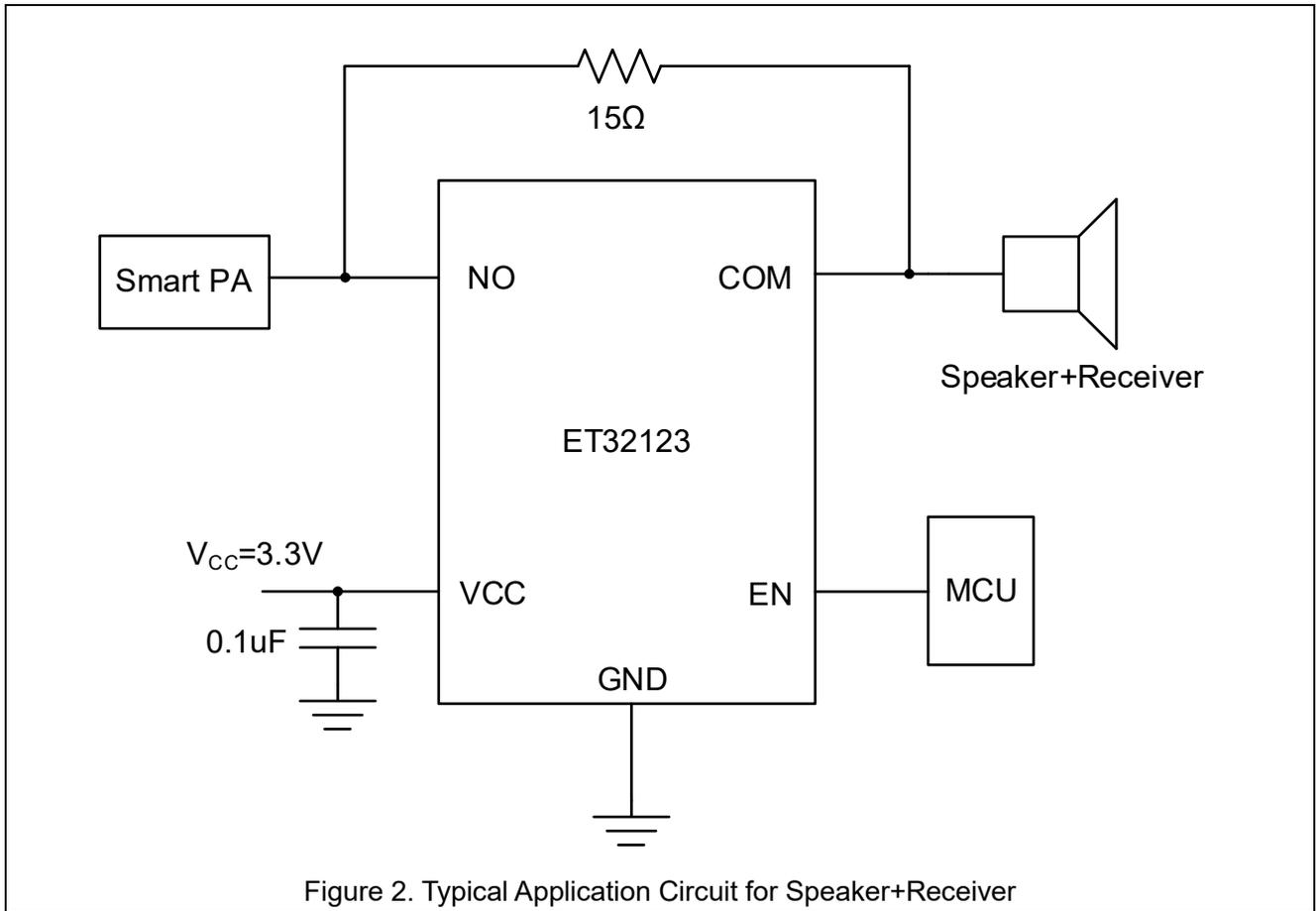
$V_{CC} = 3.3V$, $T_A = -40^{\circ}C$ to $+85^{\circ}C$, typical values are at $T_A = +25^{\circ}C$, unless otherwise noted.

Power Requirements							
I_{CC}	Power Supply Current	$V_{EN}=1.0V$ or $1.6V$	Full	40	80	130	μA
	Power Supply Current in Shutdown State	$V_{EN}=0V$	Full	0.1	1	5	μA
Thermal Protection							
T_{SHDN}	Thermal Shutdown ⁽¹⁾		-	130	150	170	$^{\circ}C$
T_{HYS}	Thermal Hysteresis ⁽¹⁾		-	10	20	30	$^{\circ}C$

Note1. This parameter is guaranteed by design and characterization.

ET32123

Application Circuit



ET32123

Typical Characteristics

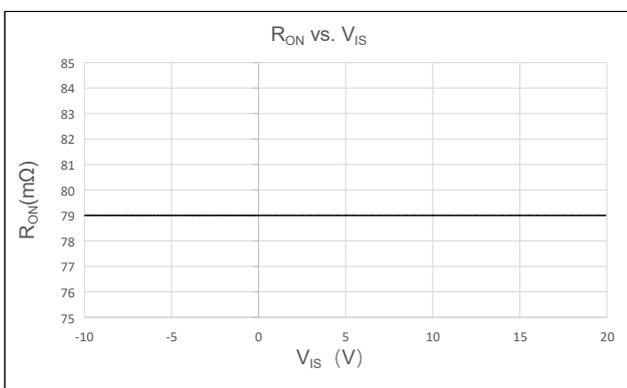


Figure 3. On-Resistance vs. V_{IS} @V_{CC}=3.3V

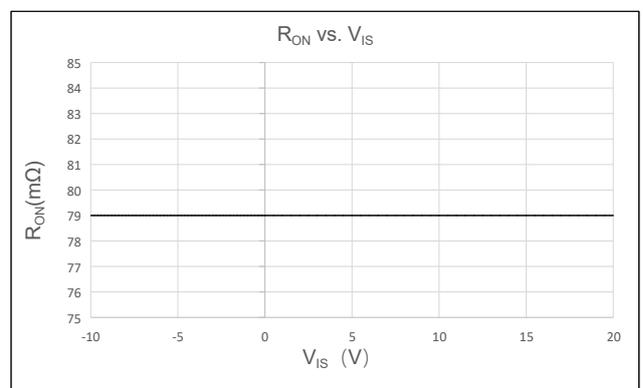


Figure 4. On-Resistance vs. V_{IS} @V_{CC}=5.5V

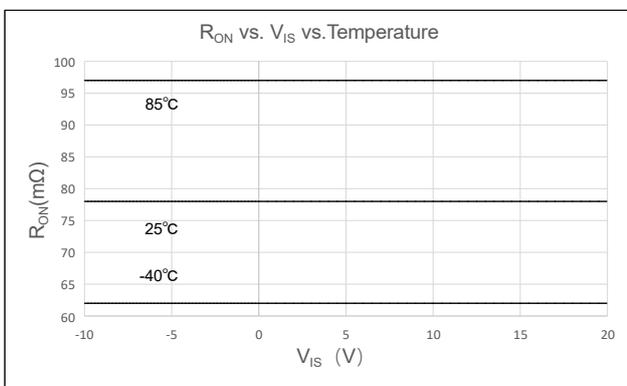


Figure 5. R_{ON} vs. V_{IS} vs. Temperature @V_{CC}=3.3V

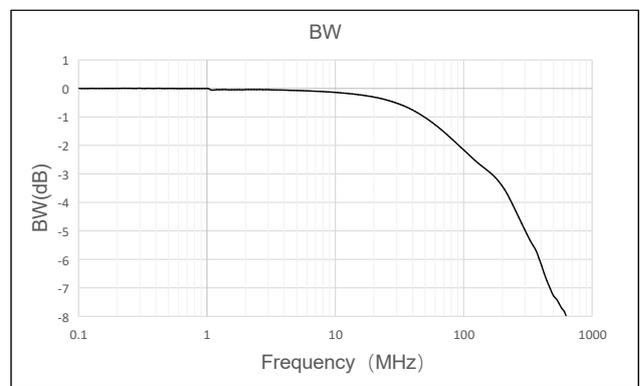


Figure 6. Bandwidth vs. Frequency @V_{CC}=3.3V

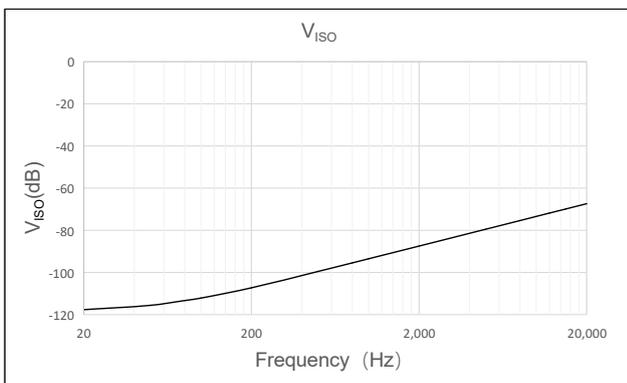


Figure 7. V_{ISO} vs. Frequency @V_{CC}=3.3V

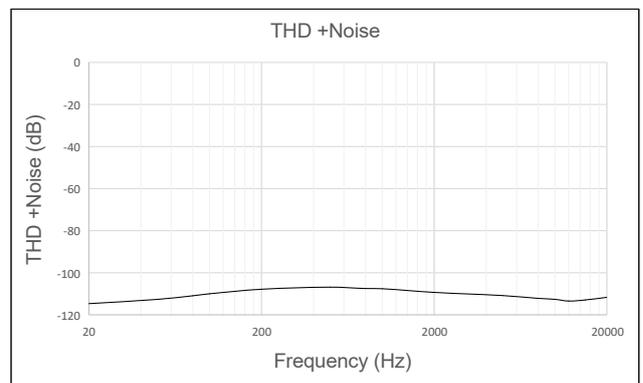
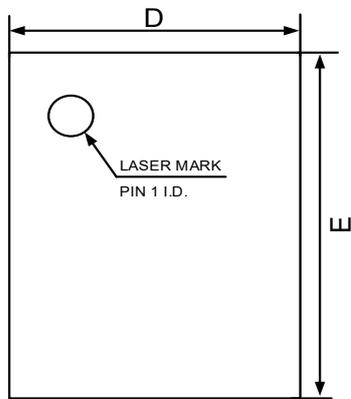


Figure 8. THD + Noise vs. Frequency @V_{CC}=3.3V
V_{IS}=1V_{RMS}, R_L=8Ω

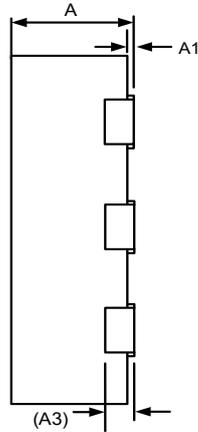
ET32123

Package Dimension

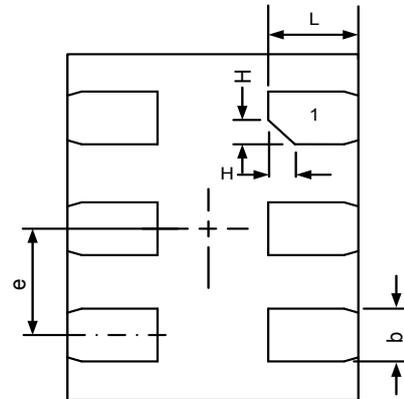
FCDFN-6 1.2mm×1.5mm



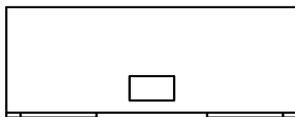
TOP VIEW



SIDE VIEW



BOTTOM VIEW



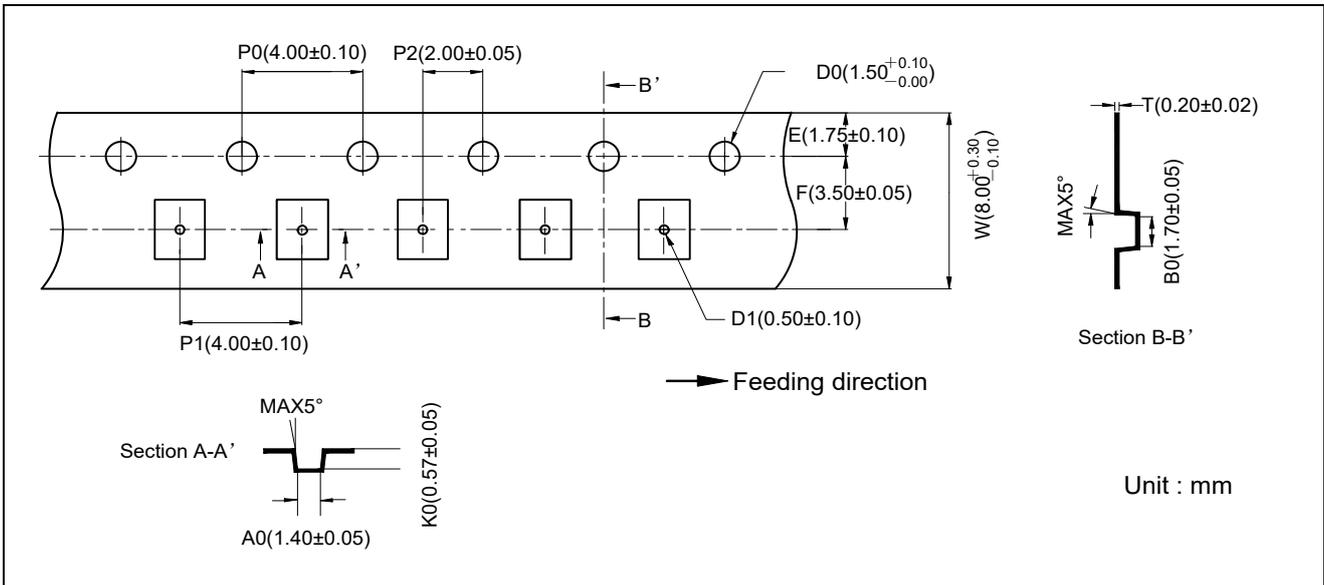
SIDE VIEW

COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

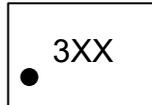
SYMBOL	MIN	NOM	MAX
A	0.34	0.37	0.40
A1	0.00	0.02	0.05
A3	0.127 REF		
b	0.15	0.20	0.25
D	1.15	1.20	1.25
E	1.45	1.50	1.55
e	0.45	0.50	0.55
L	0.30	0.35	0.40
H	0.10 REF		

ET32123

Tape Information



Marking Information



Note: X (Tracking Number) is variable, according to the wafer lot number.

ET32123

Revision History and Checking Table

Version	Date	Revision Item	Modifier	Function & Spec Checking	Package & Tape Checking
0.0	2024-09-14	Initial Version	Wum	Wum	Liuji
0.1	2024-12-27	Preliminary Version	Licx	Wum	Liuji
1.0	2025-06-24	Official Version	Licx	Wum	Liuji
1.1	2025-07-23	Update EC table and Typeset	Yinp	Wum	Liuji