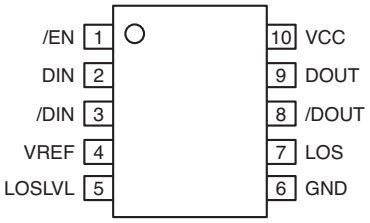
PACKAGE/ORDERING INFORMATION



10-Pin MSOP (K10-1)

Ordering Information[1]

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY88903VKC	K10-1	Commercial	903V with Pb-free bar-line indicator	Sn-Pb
SY88903VKCTR[2]	K10-1	Commercial	903V with Pb-free bar-line indicator	Sn-Pb
SY88903VKG	K10-1	Industrial	903V with Pb-free bar-line indicator	NiPdAu Pb-Free
SY88903VKGTR[2]	K10-1	Industrial	903V with Pb-free bar-line indicator	NiPdAu Pb-Free

Notes:

1. Contact factory for die availability. Die is guaranteed at $T_A = 25°C$, DC electricals only.
2. Tape and Reel.

PIN DESCRIPTION

Pin Number	Pin Name	Type	Pin Function
1	EN	TTL Input	Output Enable (Active Low).
2	DIN	Data Input	Data Input.
3	/DIN	Data Input	Inverting Data Input.
4	VREF	Output	Reference Voltage Output for LOS Level Set (see Figure 3).
5	LOSLVL	Input	LOS Limit Set.
6	GND	Ground	Ground
7	LOS	TTL Output (Open Collector)	Loss-of-Signal Indicator (Active Low).
8	/DOUT	PECL Output	Inverting Data Output.
9	DOUT	PECL Output	Data Output.
10	VCC	Power Supply	Positive Power Supply.

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Absolute Maximum Ratings[1]

Supply Voltage (V_{CC}) ..... 0V to +7.0V
Input Voltage (D_{IN}, /D_{IN}, /EN, LOS_{LVL}) ..... 0V to V_{CC}
Output Voltage
(D_{OUT}, /D_{OUT}) with 50Ω Load ... V_{CC} –2.5V to V_{CC} +0.3V
(VREF) ..... V_{CC} –2.0V to V_{CC}
Lead Temperature (soldering, 20 sec.) ..... 260°C
Maximum Operating Junction Temperature (T_J) ..... +125°C
Storage Temperature (T_S) ..... –55°C to +125°C

Operating Ratings[2]

Supply Voltage (V_{IN}) ..... +2.97V to +5.5V
Ambient Temperature (T_A) ..... –40°C to +85°C
Package Thermal Resistance
MSOP (θ_{JA}) Still-air ..... 113°C/W

DC ELECTRICAL CHARACTERISTICS

V_{CC} = +5V ±10% or +3.3V ±10%; R_{LOAD} = 50Ω to V_{CC} –2V; T_A = –40°C to +85°C; unless noted.

Symbol	Parameter	Condition	Min	Typ	Max	Units
I_{CC}	Power Supply Current	No output load		30	42	mA
I_{IL}	/EN Input LOW Current	V_{IN} = 0.5V	–0.3			mA
I_{IH}	/EN Input HIGH Current	V_{IN} = 2.7V V_{IN} = VCC			20 100	µA
V_{CMR}	Common Mode Range		GND +2.0		V_{CC}	V
V_{OFFSET}	Differential Output Offset				±160	mV
LOS_{LVL}	LOSLVL Level		V_{REF}		V_{CC}	V
V_{OL}	LOS Output Low Level	I_{OL} = +2mA			0.5	V
I_{OH}	LOS Output Leakage	V_{OH} = 5.5V			250	µA
V_{OH}	DOUT and /DOUT HIGH Output		V_{CC} –1085	V_{CC} –955	V_{CC} –880	mV
V_{OL}	DOUT and /DOUT LOW Output		V_{CC} –1830	V_{CC} –1705	V_{CC} –1620	mV
V_{REF}	Reference Supply		V_{CC} –1.38	V_{CC} –1.32	V_{CC} –1.26	V
I_{REF}	VREF Output Current		–0.8		0.5	mA
V_{IH}	/EN Input HIGH Voltage		2.0			V
V_{IL}	/EN Input LOW Voltage				0.8	V

Notes:

1. Permanent device damage may occur if absolute maximum ratings are exceeded. This is a stress rating only and functional operation is not implied at conditions other than those detailed in the operational sections of this data sheet. Exposure to absolute maximum ratings conditions for extended periods may affect device reliability.
2. The data sheet limits are not guaranteed if the device is operated beyond the operating ratings.

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AC ELECTRICAL CHARACTERISTICS

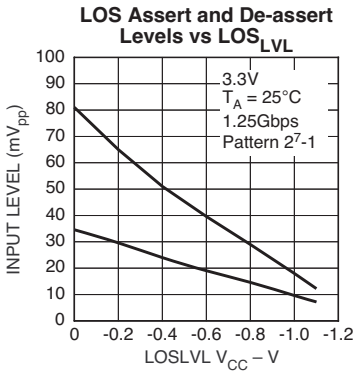
V_{CC} = +5V ±10% or +3.3V ±10%; R_{LOAD} = 50Ω to V_{CC} –2V; T_A = –40°C to +85°C; unless noted.

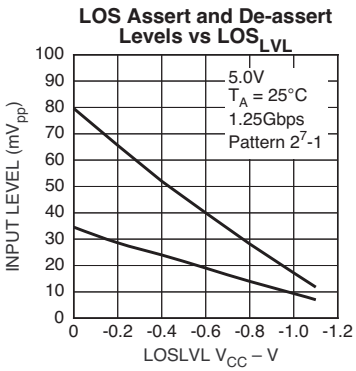
Symbol	Parameter	Condition	Min	Typ	Max	Units
PSRR	Power Supply[3] Rejection Ratio	Input referred, 55MHz		35		dB
V_{ID}	Input Voltage Range		5		1800	mV_{pp}
t_r, t_f	Output Rise/Fall Time	$V_{ID} > 100mV_{pp}$ $V_{ID} < 100mV_{pp}$		 trin,tfin	260	ps
V_{OD}	Differential Output Voltage Swing[4]	$V_{ID} = 15mV_{pp}$ $V_{ID} = 5mV_{pp}$		600 200		mV mV
t_{OFFL}	LOS Release Time[5] Minimum Input			0.1	0.5	µs
t_{OFFH}	LOS Release Time[6] Maximum Input			0.1	0.5	µs
t_{ONL}	LOS Assert Time[5]			0.2	0.5	µs
VSR	LOS Sensitivity Range	2^{23}–1 pattern	5		50	mV_{pp}
HYS	LOS Hysteresis	2^{23}–1 pattern	2	4.6	8	dB

Notes:

3. Input referred noise = RMS output noise/low frequency gain.
4. Input is a 622MHz square wave.
5. Input is a 200MHz square wave, t_r < 300ps, $8mV_{pp}$.
6. Input is a 200MHz square wave, t_r < 300ps, $1.8V_{pp}$.

TYPICAL CHARACTERISTICS





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DESIGN PROCEDURE

Output Termination

The SY88903V outputs must be terminated with a 50Ω load to V_{CC} –2V (or Thevenin equivalent).

Layout and PCB Design

Since the SY88903V is a high-frequency component, performance can largely be determined by board layout and design. A common problem with high-gain amplifiers is feedback from the large swing outputs to the input via the power supply.

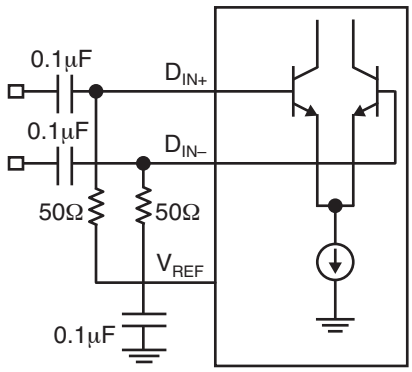
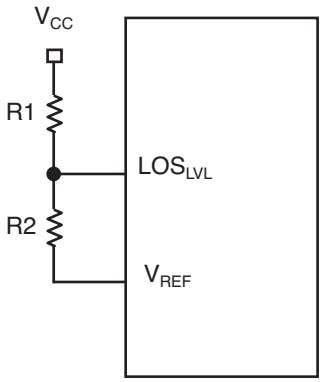


Figure 2. Differential Input Configuration

The SY88903V ground pin should be connected to the circuit board ground. Use multiple PCB vias close to the part to connect to ground. Avoid long, inductive runs which can degrade performance.



Notes:

$LOS_{LVS} = V_{CC} - 1.32V \times \frac{R1}{R1 + R2}$

$R1 + R2 \geq 2.6k\Omega$

Figure 3. LOSLVL Circut

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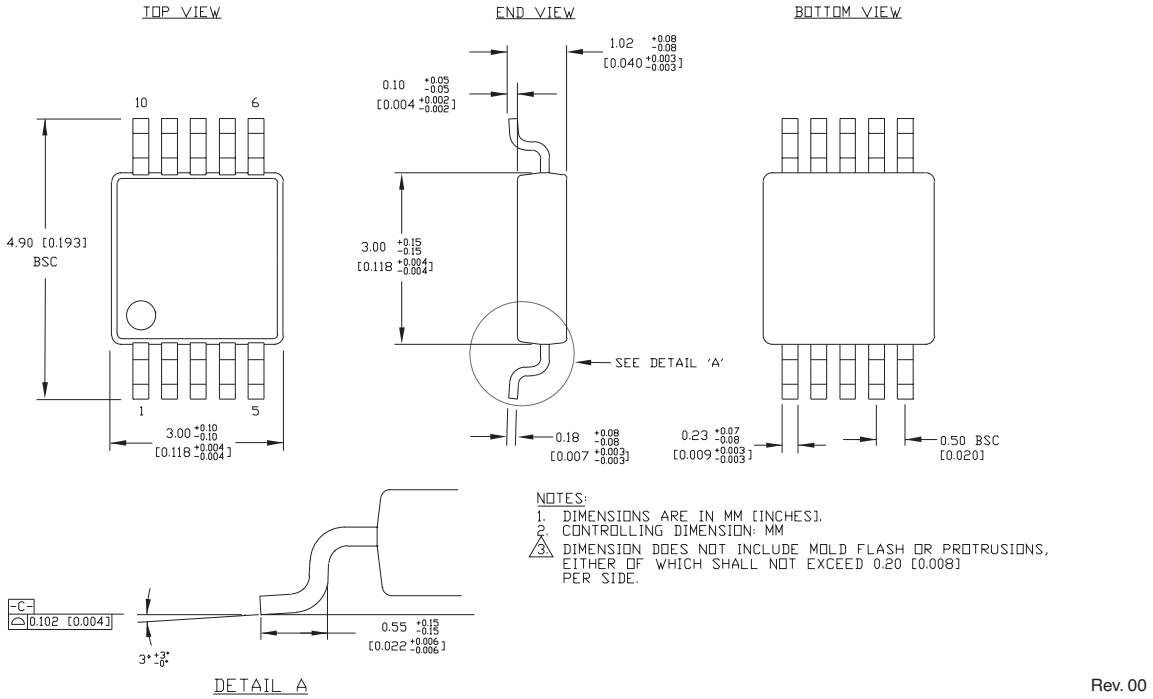
10-PIN MSOP (K10-1)



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