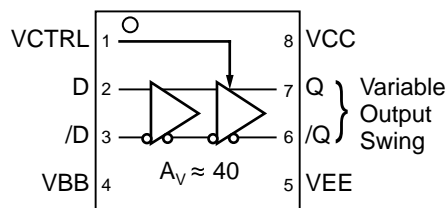


PACKAGE/ORDERING INFORMATION



TOP VIEW
8-Pin MLF®
Ultra-Small Outline
(2mm x 2mm)

Ordering Information

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY89307VMITR	MLF-8	Industrial	P16S	Sn-Pb
SY89307VMGTR ⁽¹⁾	MLF-8	Industrial	P16S with Pb-Free bar-line indicator	Pb-Free NiPdAu

Note:

1. Pb-Free package is recommended for new designs.

PIN DESCRIPTION

Pin Number	Pin Name	Type	Pin Function
2, 3	D, /D	100K ECL Input	Differential PECL/ECL Inputs: If inputs are left open, Q output will default to LOW. See "Input Interface Applications" section for single-ended inputs.
7, 6	Q, /Q	100K PECL/ECL Output	Differential Outputs: Variable swing PECL/ECL output pair defaults to LOW if D inputs left open. See "Application Implementation" section for recommendations on terminations.
8	VCC	Positive Power Supply	Positive Power Supply: Bypass with 0.1μF//0.01μF low ESR capacitors.
5	VEE, Exposed Pad	Negative Power Supply	Negative Power Supply: V _{EE} and Exposed pad must be tied to most negative supply. For PECL/LVPECL connect to ground.
4	VBB	Reference Voltage Output	Bias Voltage: V _{CC} -1.3V. Used as reference voltage when AC-coupling to the D, /D inputs. Bypass with 0.01μF capacitor to V _{CC} .
1	VCTRL	Control Voltage	Voltage Input: Variable voltage input to control output swings.

Absolute Maximum Ratings⁽¹⁾

Supply Voltage (V_{CC})	..... -0.5V to +6.0V
Input Voltage (V_{IN})	..... -0.5V to V_{CC}
LVPECL Output Current (I_{OUT})	
Continuous	..... 50mA
Surge	..... 100mA
Input Current	
Source or sink current on D, /D ± 50 mA
Current (V_{BB})	
Source or sink current on V_{BB} , Note 3 ± 1.5 mA
Lead Temperature (soldering, 20 sec.)	..... +260°C
Storage Temperature (T_S)	..... -65°C to +150°C

Operating Ratings⁽²⁾

Supply Voltage ($|V_{CC}-V_{EE}|$)	..... 3.0V to 3.6V
.....	..... 4.5V to 5.5V
Ambient Temperature (T_A)	..... -40°C to +85°C
Package Thermal Resistance, (Note 4)	
MLF™ (θ_{JA})	
Still-Air	..... 93°C/W
500lfpm	..... 87°C/W
MLF™ (Ψ_{JB})	
Junction-to-Board	..... 56°C/W

PECL/ECL (100K) DC ELECTRICAL CHARACTERISTICS

$V_{CC} = +3.3V \pm 10\%$ or $+5V \pm 10\%$ and $V_{EE} = 0V$; $V_{CC} = 0V$ and $V_{EE} = -3.3V \pm 10\%$ or $-5V \pm 10\%$; $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $R_L = 50\Omega$ to $V_{CC} - 2V$ unless otherwise noted.

Symbol	Parameter	Condition	Min	Typ	Max	Units
I_{EE}	Power Supply Current	Max V_{CC} , no load	—	—	51	mA
V_{OH}	Output HIGH Voltage		$V_{CC} - 1.085$	—	$V_{CC} - 0.88$	V
V_{OL}	Output LOW Voltage	$V_{CTRL} = V_{BB}$	$V_{CC} - 1.90$	—	$V_{CC} - 1.650$	V
	Output LOW Voltage	$V_{CTRL} = V_{CC}$	$V_{CC} - 1.125$	—	$V_{CC} - 0.975$	V
V_{IH}	Input HIGH Voltage		$V_{CC} - 1.165$	—	$V_{CC} - 0.88$	V
V_{IL}	Input LOW Voltage		$V_{CC} - 1.810$	—	$V_{CC} - 1.475$	V
V_{BB}	Bias Voltage		$V_{CC} - 1.38$	—	$V_{CC} - 1.26$	V
I_{IH}	Input HIGH Current	D, /D	—	—	150	μA
I_{IL}	Input LOW Current		0.5	—	—	μA
		$V_{CTRL} = V_{IH}$			80	μA

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 RATING 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.
3. Due to the limited drive capability use for input of the same package only.
4. Package thermal resistance assumes exposed pad is soldered (or equivalent) to the devices most negative potential on the PCB.

AC ELECTRICAL CHARACTERISTICS

$V_{CC} = +3.3V \pm 10\%$ or $+5V \pm 10\%$ and $V_{EE} = 0V$; $V_{CC} = 0V$ and $V_{EE} = -3.3V \pm 10\%$ or $-5V \pm 10\%$; $T_A = -40^\circ C$ to $+85^\circ C$, $R_L = 50\Omega$ to $V_{CC} - 2V$ unless otherwise noted.

Symbol	Parameter	Condition	Min	Typ	Max	Units
f_{MAX}	Maximum Throughput	NRZ Data	2.5	—	—	Gbps
t_{pd}	Propagation Delay	D (Diff) D (SE)	100 100	— 250	300 400	ps
V_{PP}	Minimum Input Swing	Note 5	150	—	—	mV
V_{CMR}	Common Mode Range	Note 6	$V_{CC} - 1.3$	—	$V_{CC} - 0.4$	V
t_r, t_f	Output Rise/Fall Times (20% to 80%)	Q, /Q; Note 7	—	95	160	ps

Notes:

- Minimum input swing for which AC parameters are guaranteed. The device has a DC gain of ≈ 40 when output has a full swing.
- The CMR range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between $V_{PP}(\text{min.})$ and 1V. The lower end of the CMR range varies 1:1 with V_{EE} . The numbers in the spec table assume a nominal $V_{EE} = -3.3V$ and $V_{CC} = 0V$. Note for PECL operation, the $V_{CMR}(\text{min.})$ will be fixed at $3.3V - |V_{CMR}(\text{min.})|$.
- Output at full swing.

INPUT INTERFACE APPLICATIONS

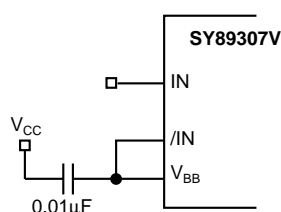


Figure 1. Single-Ended Input
(Terminating Unused Input)

APPLICATION IMPLEMENTATION

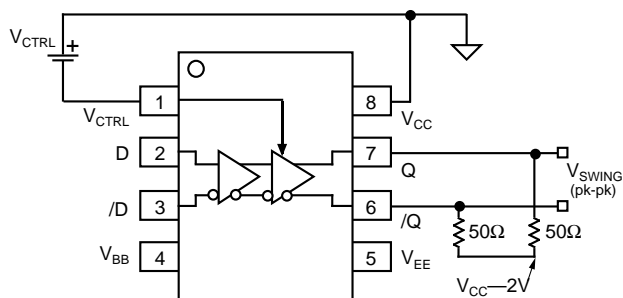


Figure 2. Voltage Source Implementation

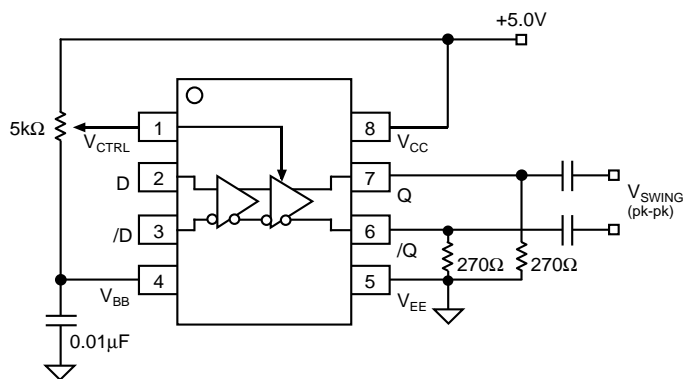
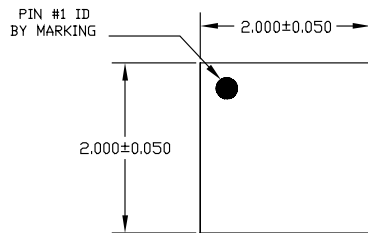
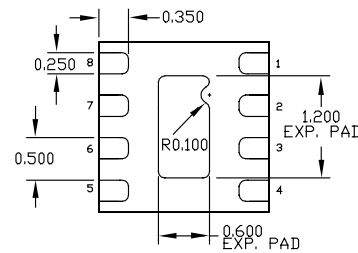


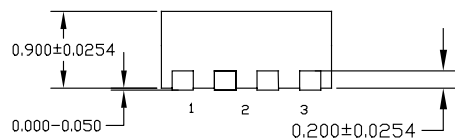
Figure 3. Alternative Implementation

8 LEAD ULTRA-SMALL EPAD-MicroLeadFrame® (MLF-8)

TOP VIEW

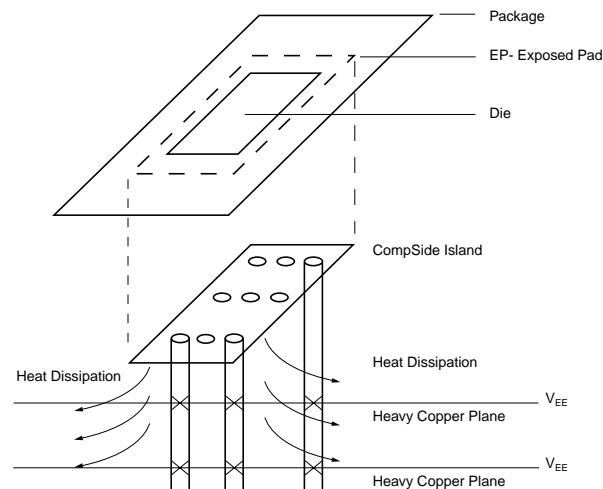


BOTTOM VIEW



SIDE VIEW

- NOTE:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
 2. MAX. PACKAGE WARPAGE IS 0.05 mm.
 3. MAXIMUM ALLOWABLE BURRS IS 0.076 mm IN ALL DIRECTIONS.
 4. PIN #1 ID ON TOP WILL BE LASER/INK MARKED.

**PCB Thermal Consideration for 8-Pin MLF® Package****Package Notes:**

1. Package meets Level 2 qualification.
2. All parts are dry-packaged before shipment.
3. Exposed pads must be soldered to a plane equivalent to device V_{EE} for proper thermal management.

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