

CTSLVEL16VT

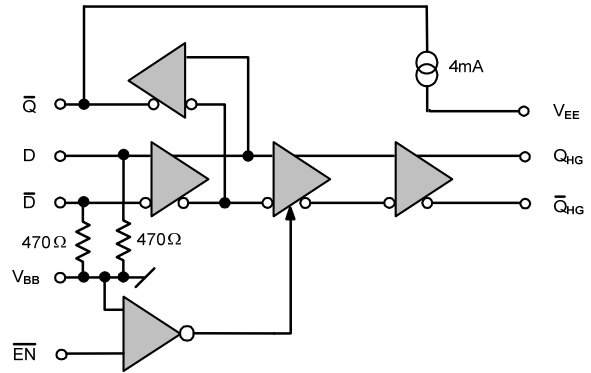
PECL/ECL Oscillator Gain Stage & Buffer with Selectable Enable

MLP8

FEATURES

- Minimizes External Components
- High Bandwidth for $\geq 1\text{GHz}$
- Similar Operation as CTSLVEL16VR
 - Except in Disabled Condition
 - Q_{HG} is High
- -147 dBc/Hz Typical Noise Floor

BLOCK DIAGRAM



DESCRIPTION

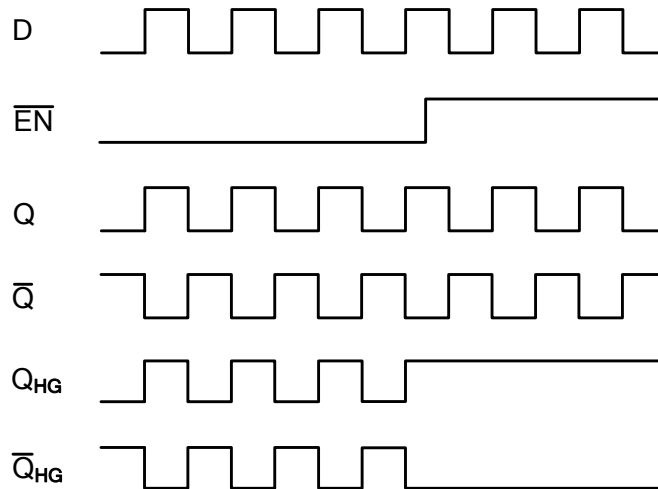
The CTSLVEL16VT is a specialized oscillator gain stage with a high gain output buffer including an enable function. The $Q_{HG}/\bar{Q}_{HG}$ outputs have voltage gain several times greater than the $\bar{Q}$ output. It provides a $Q_{HG}/\bar{Q}_{HG}$ enable that allows continuous oscillator operation via the $\bar{Q}$ outputs.

The CTSLVEL16VT also provides a 4mA internal pull-down current source for $\bar{Q}$ outputs. Internal input biasing further reduces the number of needed external components.

ENGINEERING NOTES

The CTSLVEL16VT is a specialized oscillator gain stage with a high gain output buffer including an enable. The $Q_{HG}/\bar{Q}_{HG}$ outputs have a voltage gain several times greater than the $\bar{Q}$ output. When the $\bar{EN}$ input is LOW, the $\bar{Q}$ and $Q_{HG}/\bar{Q}_{HG}$ outputs follow the data inputs. When $\bar{EN}$ is HIGH, the Q_{HG} output is forced high and the $\bar{Q}_{HG}$ output is forced low.

In the CTSLVEL16VT, the $\bar{D}$ input is internally tied directly to the V_{BB} pin and the D input is tied to the V_{BB} pin through a 470Ω internal bias resistor. Bypassing V_{BB} to ground with a 0.01 μF capacitor is recommended.

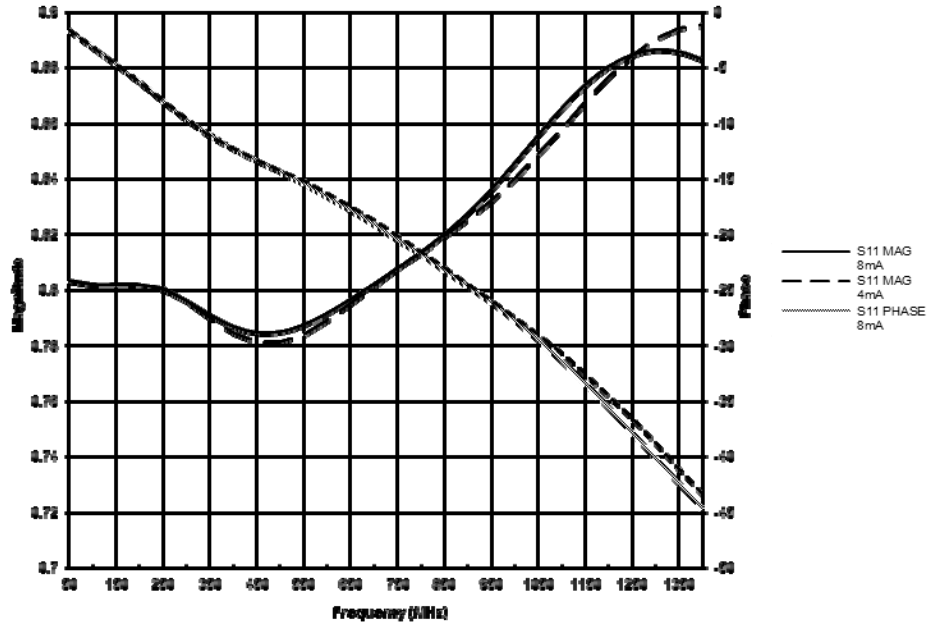


Timing Diagram

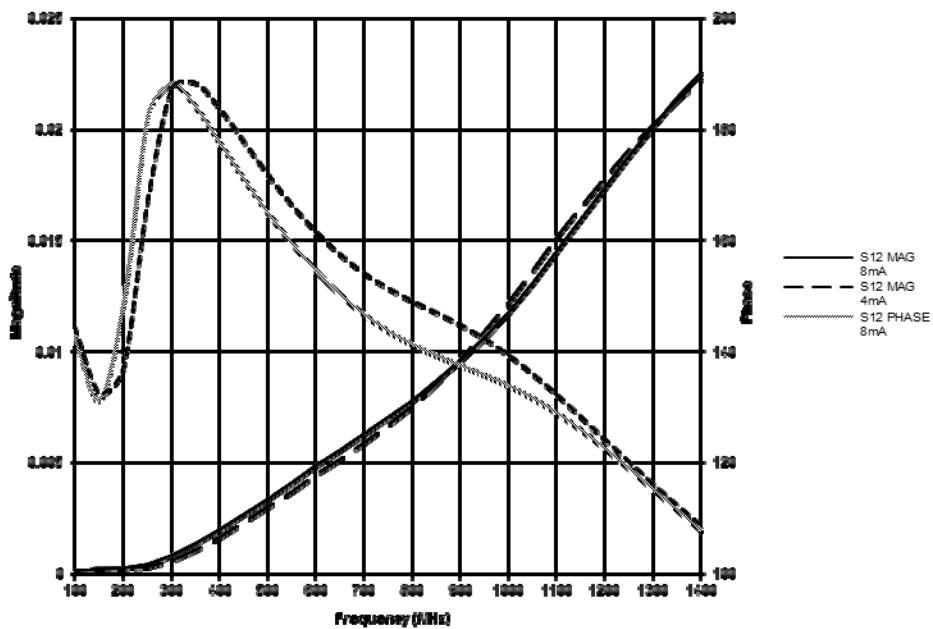
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S11

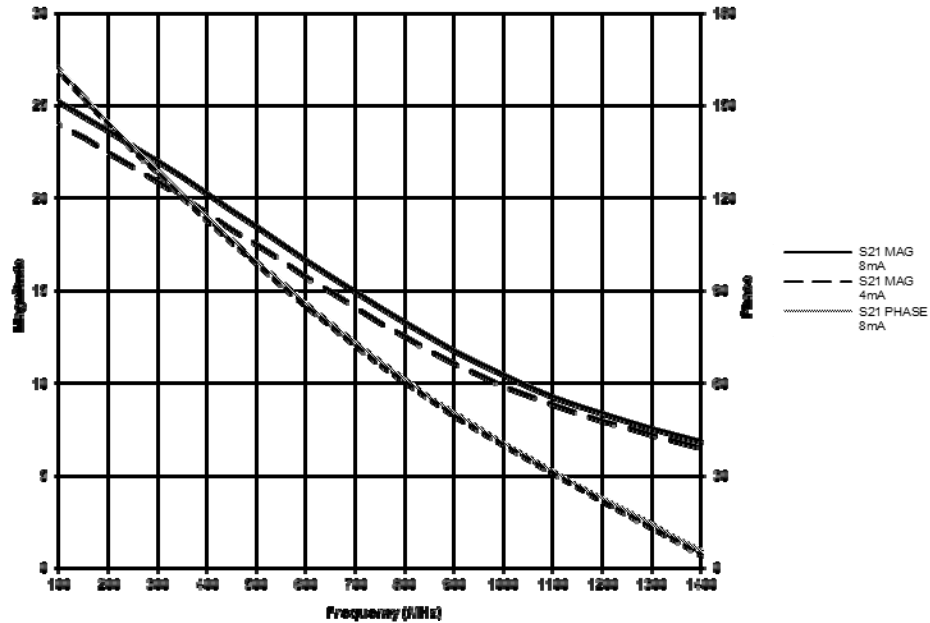


S12

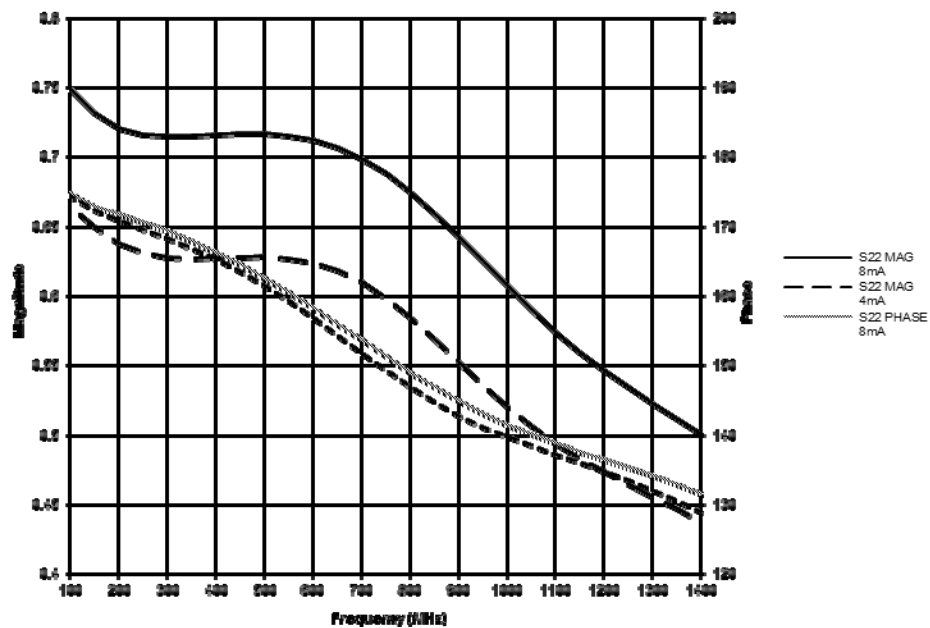
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S21



S22

ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings are those values beyond which device life may be impaired.

Symbol	Characteristic	Condition	Rating	Unit
V_{CC}	PECL Power Supply	$V_{EE} = 0V$	0 to + 6.0	V
V_{D_PECL}	PECL D Input Voltage	Referenced to V_{BB}	± 0.75	V
V_{EN_PECL}	PECL D Input Voltage	$V_{EE} = 0V$	0 to + 6.0	V
V_{EE}	ECL Power Supply	$V_{CC} = 0V$	-6.0 to 0	V
V_{D_ECL}	ECL D Input Voltage	Referenced to V_{BB}	± 0.75	V
V_{EN_ECL}	ECL D Input Voltage	$V_{CC} = 0V$	-6.0 to 0	V
I_{OUT}	Output Current	Continuous Q	25	mA
		Surge Q	50	
		Continuous Q_{HG}	50	
		Surge Q_{HG}	100	
T_A	Operating Temperature Range	-	-40 to +85	°C
T_{STG}	Storage Temperature Range	-	-65 to +150	°C
ESD_{HBM}	Human Body Model Electro Static Discharge	-	2500	V
ESD_{MM}	Machine Model Electro Static Discharge	-	200	V
ESD_{CDM}	Charged Device Model Electro Static Discharge	-	2000	V

ECL DC Characteristics ($V_{EE} = -3.0V$ to $-5.5V$, $V_{CC} = GND$)

Symbol	Characteristic	-40°C		0°C		25°C		85°C		Unit
		Min	Max	Min	Max	Min	Max	Min	Max	
V_{OH}	Output HIGH Voltage ¹	-1045	-835	-1025	-835	-1025	-835	-1025	-835	mV
V_{OL}	Output LOW Voltage ¹	-1925	-1555	-1900	-1620	-1900	-1620	-1900	-1620	mV
V_{IH}	Input HIGH Voltage D,EN	-1165	-740	-1165	-740	-1165	-740	-1165	-740	mV
V_{IL}	Input LOW Voltage D,EN	-1900	-1475	-1900	-1475	-1900	-1475	-1900	-1475	mV
V_{BB}	Reference Voltage	-1390	-1250	-1390	-1250	-1390	-1250	-1390	-1250	mV
I_{IH}	Input HIGH Current EN		150		150		150		150	μA
I_{IL}	Input LOW Current EN	0.5		0.5		0.5		0.5		μA
I_{EE}	Power Supply Current ¹		48		48		48		54	mA

¹ Specified with each output terminated through 50Ω resistors to $V_{CC} - 2V$.

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LVPECL DC Characteristics ($V_{EE} = \text{GND}$, $V_{CC} = +3.3\text{V}$)

Symbol	Characteristic	-40°C		0°C		25°C		85°C		Unit
		Min	Max	Min	Max	Min	Max	Min	Max	
V_{OH}	Output HIGH Voltage ^{1,2}	2255	2465	2275	2465	2275	2465	2275	2465	mV
V_{OL}	Output LOW Voltage ^{1,2}	1375	1745	1400	1680	1400	1680	1400	1680	mV
V_{IH}	Input HIGH Voltage D,EN	2135	2560	2135	2560	2135	2560	2135	2560	mV
V_{IL}	Input LOW Voltage D,EN	1400	1825	1400	1825	1400	1825	1400	1825	mV
V_{BB}	Reference Voltage ¹	1910	2050	1910	2050	1910	2050	1910	2050	mV
I_{IH}	Input HIGH Current EN		150		150		150		150	μA
I_{IL}	Input LOW Current EN	0.5		0.5		0.5		0.5		μA
I_{EE}	Power Supply Current ²		48		48		48		54	mA

¹ For supply voltages other than 3.3V, use the ECL table values and ADD supply voltage value.

² Specified with each output terminated through 50 Ω resistors to $V_{CC} - 2\text{V}$.

PECL DC Characteristics ($V_{EE} = \text{GND}$, $V_{CC} = +5.0\text{V}$)

Symbol	Characteristic	-40°C		0°C		25°C		85°C		Unit
		Min	Max	Min	Max	Min	Max	Min	Max	
V_{OH}	Output HIGH Voltage ^{1,2}	3955	4165	3975	4165	3975	4165	3975	4165	mV
V_{OL}	Output LOW Voltage ^{1,2}	3075	3445	3100	3380	3100	3380	3100	3380	mV
V_{IH}	Input HIGH Voltage D,EN	3835	4260	3835	4260	3835	4260	3835	4260	mV
V_{IL}	Input LOW Voltage D,EN	3100	3525	3100	3525	3100	3525	3100	3525	mV
V_{BB}	Reference Voltage ¹	3610	3750	3610	3750	3610	3750	3610	3750	mV
I_{IH}	Input HIGH Current EN		150		150		150		150	μA
I_{IL}	Input LOW Current EN	0.5		0.5		0.5		0.5		μA
I_{EE}	Power Supply Current ²		48		48		48		54	mA

¹ For supply voltages other than 3.3V, use the ECL table values and ADD supply voltage value.

² Specified with each output terminated through 50Ω resistors to $V_{CC} - 2\text{V}$.

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AC Characteristics ($V_{EE} = -3.0V$ to $-5.5V$; $V_{CC}=GND$ or $V_{EE}=GND$; $V_{CC} = +3.0V$ to $+5.5V$)

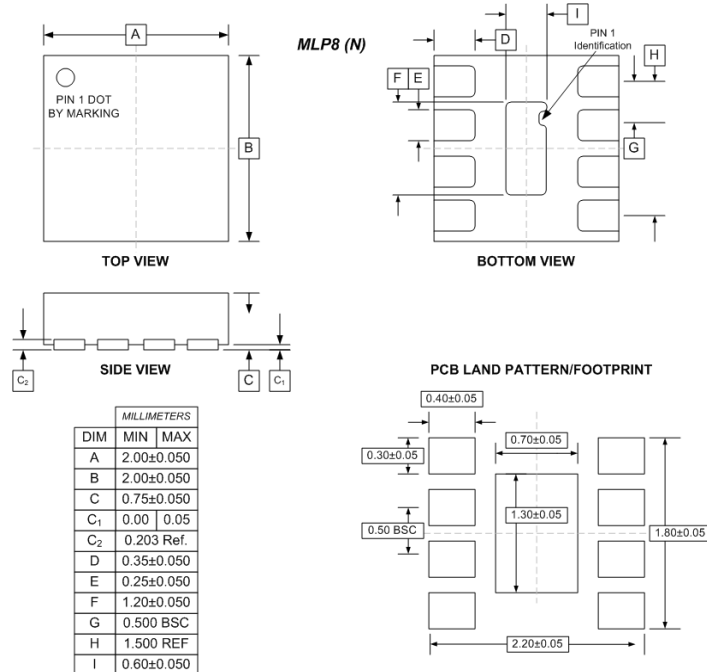
Symbol	Characteristic	40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
t_{PLH}/t_{PHL}	Propagation Delay													
	D to Q^1			350			350			350			350	ps
	D to Q_{HG}^2			450			450			450			450	ps
t_{SKEW}	Duty Cycle Skew ³		5	20		5	20		5	20		5	20	ps
V_{pp} (AC)	Input Swing ⁴ Differential	80		1000	80		1000	80		1000	80		1000	mV
	Input Swing ⁴ Single Ended	160		1500	160		1500	160		1500	160		1500	
t_r/t_f	Output Rise/Fall ^{1,2} (20% - 80%)	100		240	100		240	100		240	100		240	ps

¹ Specified with each output terminated through 50Ω resistors to $V_{CC} -2V$.

² Specified with each output terminated through 50Ω resistors to $V_{CC} -2V$.

³ Duty cycle skew is the difference between a t_{PLH} and t_{PHL} propagation delay through a device.

⁴ The peak-to-peak input swing is the range for which AC parameters are guaranteed. D and $\bar{D}$ must remain within the range of ± 750 mV with respect to V_{BB} . The device has a voltage gain of ~ 20 to the $\bar{Q}$ outputs and a voltage gain of ~ 100 to the $Q_{HG}/\bar{Q}_{HG}$ outputs.

PACKAGE DIMENSIONS


CTSLVEL16VT

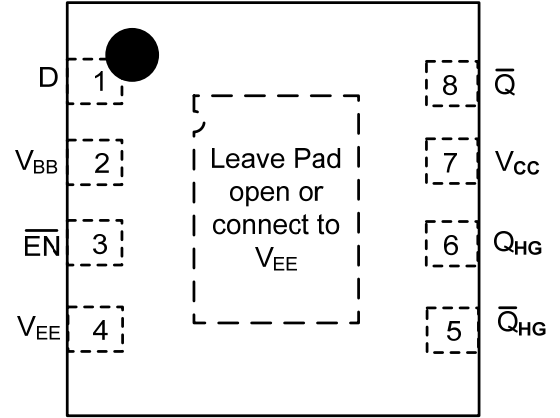
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Pin Description and Configuration

Pin Assignments for CTSLVEL16VTNNG

Pin	Name	Type	Function
1	D	Input	Data Input
2	V _{BB}	Output	Reference Voltage
3	EN	Input	Output Enable
4	V _{EE}	Power	Negative Supply
5	$\bar{Q}_{HG}$	Output	High Gain Inverting PECL Output
6	Q _{HG}	Output	High Gain PECL Output
7	V _{CC}	Power	Positive Supply
8	$\bar{Q}$	Output	Inverting PECL Output
9	NC	-	N/A



CTSLVEL16VTNNG

PART ORDERING NUMBER

Part Number	Package	Marking
CTSLVEL16VTNNG	MLP8	P8G YYWW