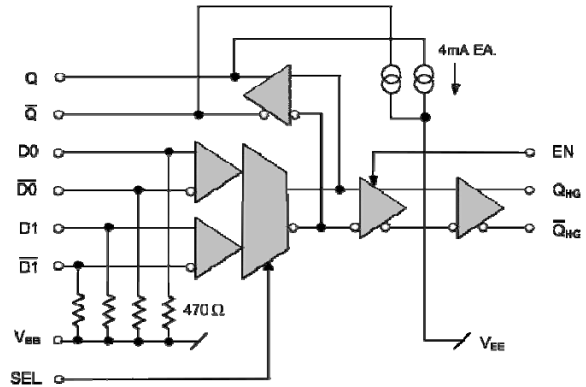


## FEATURES

- Minimizes External Components
- Similar Operation as CTSLVEL16VR except with Selectable Data Input Pairs
- High Bandwidth for  $\geq 1\text{GHz}$
- $-147\text{ dBc/Hz}$  Typical Noise Floor

## BLOCK DIAGRAM



## DESCRIPTION

The CTSLVEL16VV is a specialized oscillator gain stage with two selectable data input pairs and a high gain output buffer including an enable. Selectable data input pairs permit switching between two different oscillator frequencies. The  $Q_{HG}/\bar{Q}_{HG}$  outputs have a voltage gain several times greater than the  $Q/\bar{Q}$  outputs. An enable allows continuous oscillator operation by only controlling the  $Q_{HG}$  outputs.

The CTSLVEL16VV also provides a reference voltage ( $V_{BB}$ ) with internal biasing resistors to each input to minimize external components.

## ENGINEERING NOTES

The CTSLVEL16VV is a specialized oscillator gain stage with two selectable data input pairs and a high gain output buffer including an enable. The  $Q_{HG}/\bar{Q}_{HG}$  outputs have a voltage gain several times greater than the  $Q/\bar{Q}$  outputs.

The CTSLVEL16VV provides two selectable data input pairs that permit switching between two different oscillator frequencies. When the select pin (SEL) is LOW or open (NC) data from the  $D0/\bar{D}0$  is selected. When the SEL pin is HIGH data from the  $D1/\bar{D}1$  is selected. Allowing continuous oscillator operation, the (EN) enable works with either data input pair. When EN is HIGH or open (NC), input data is passed to both sets of outputs. When EN is LOW, the  $Q_{HG}/\bar{Q}_{HG}$  outputs will be forced LOW/HIGH respectively, while input data will continue to be passed to the  $Q/\bar{Q}$  outputs. The EN and SEL inputs can be driven with an ECL/PECL signal or a full supply swing CMOS type logic signal.

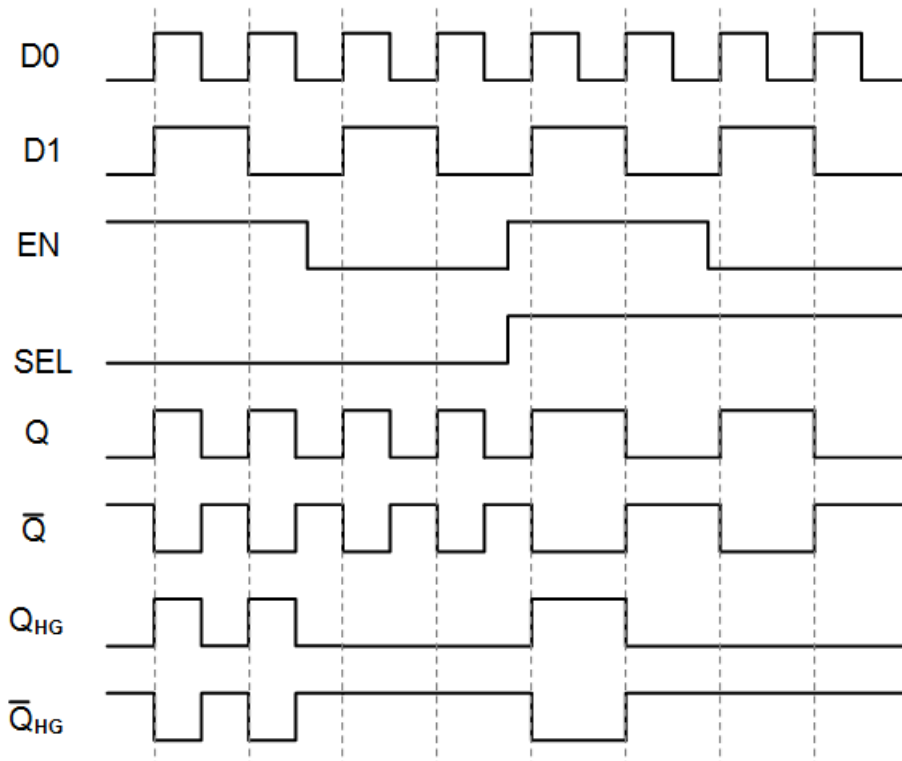
The CTSLVEL16VV also provides a  $V_{BB}$  with a 1.5mA sink/source current. Each data input is separately connected to  $V_{BB}$  with a 470 $\Omega$  internal bias resistor. Bypassing  $V_{BB}$  to ground with a 0.01 $\mu\text{F}$  capacitor is recommended.

Each  $Q/\bar{Q}$  output has a 4mA on-chip pull-down current source. External resistors may also be used to increase pull-down current of the  $Q/\bar{Q}$  to a maximum of 25mA each (includes a 4mA on-chip current source).

Truth Table

| EN        | CS-SEL   | Q                   | Q <sub>HG</sub>     | Q <sub>HG</sub>     |
|-----------|----------|---------------------|---------------------|---------------------|
| High/Open | Low/Open | D0/ $\overline{D0}$ | D0/ $\overline{D0}$ | D0/ $\overline{D0}$ |
| High/Open | High     | D1/ $\overline{D1}$ | D1/ $\overline{D1}$ | D1/ $\overline{D1}$ |
| Low       | Low/Open | D0/ $\overline{D0}$ | Low                 | High                |
| Low       | High     | D1/ $\overline{D1}$ | Low                 | High                |

Timing Diagram

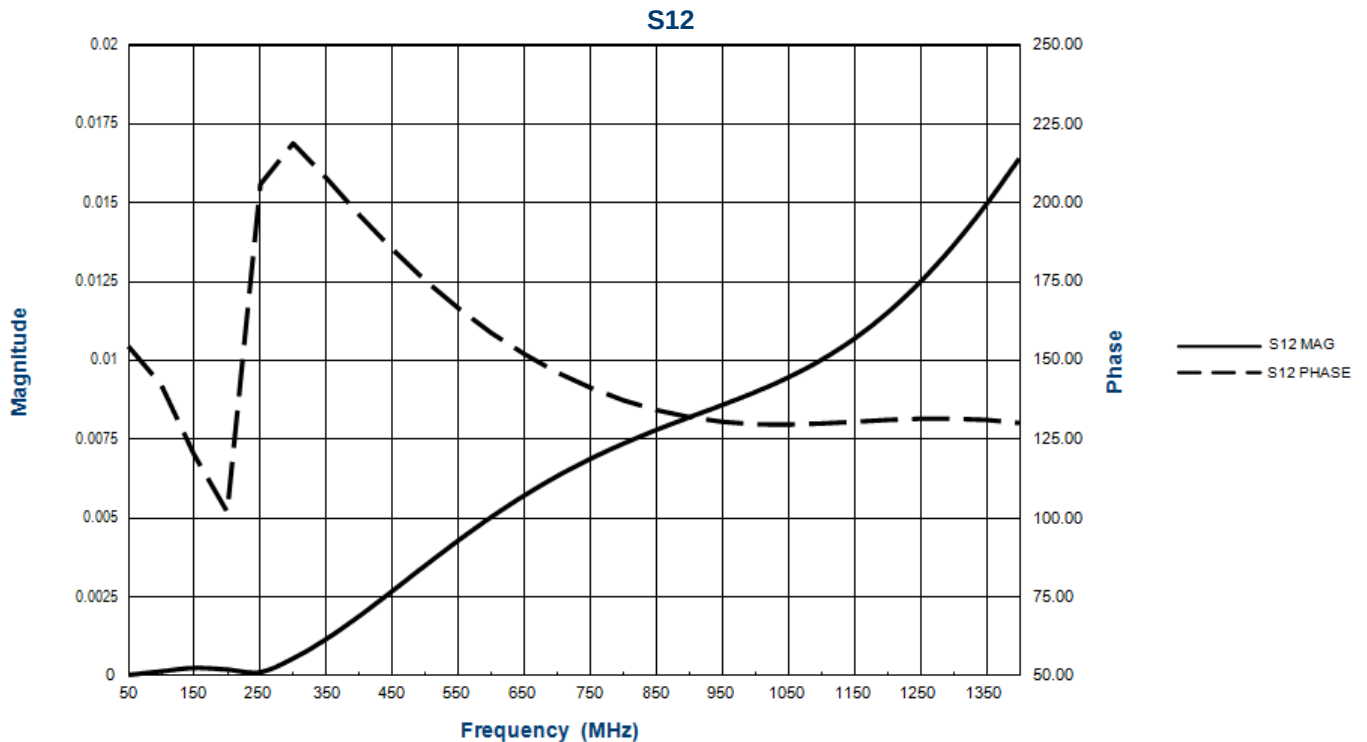
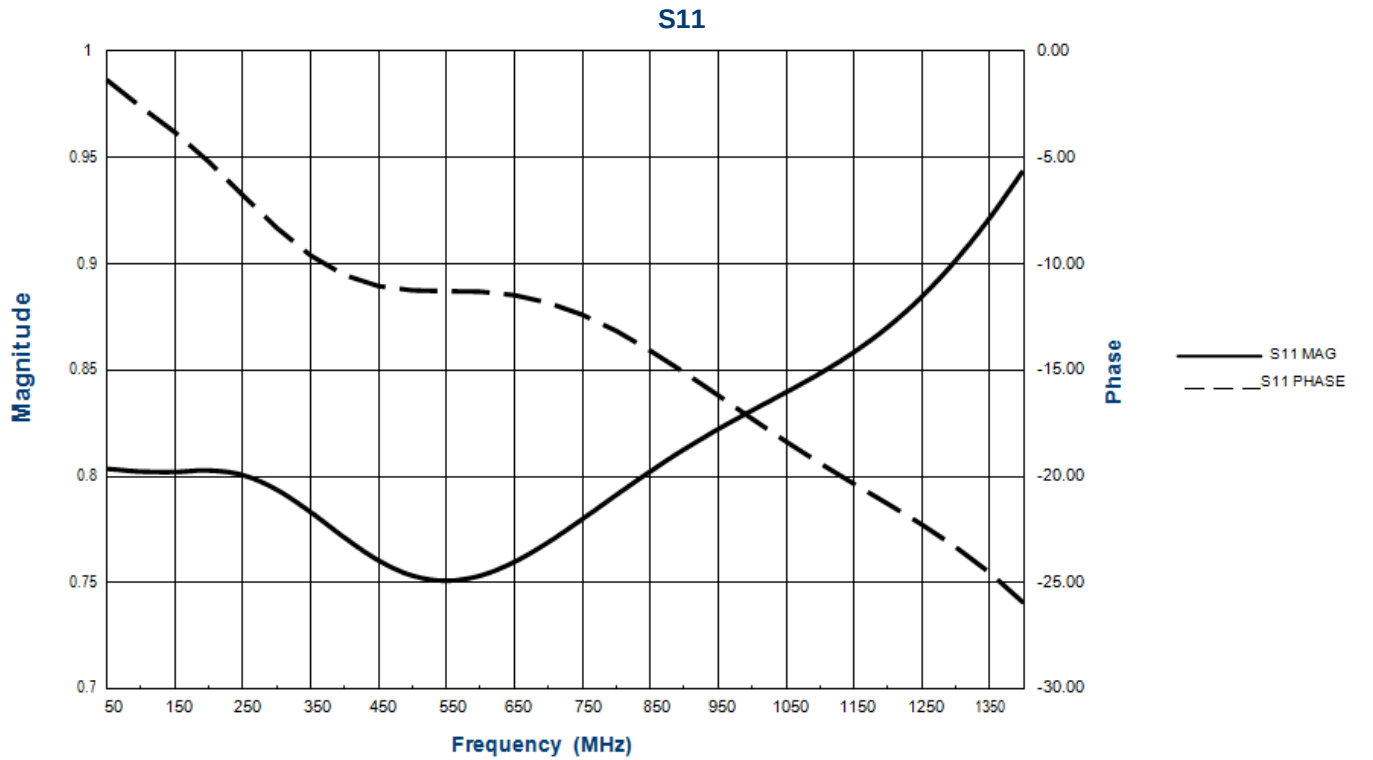


CTSLVEL16VV

## Dual Frequency PECL/ECL Oscillator Gain Stage & Buffer with Enable

MLP16

**Not recommended for new designs**

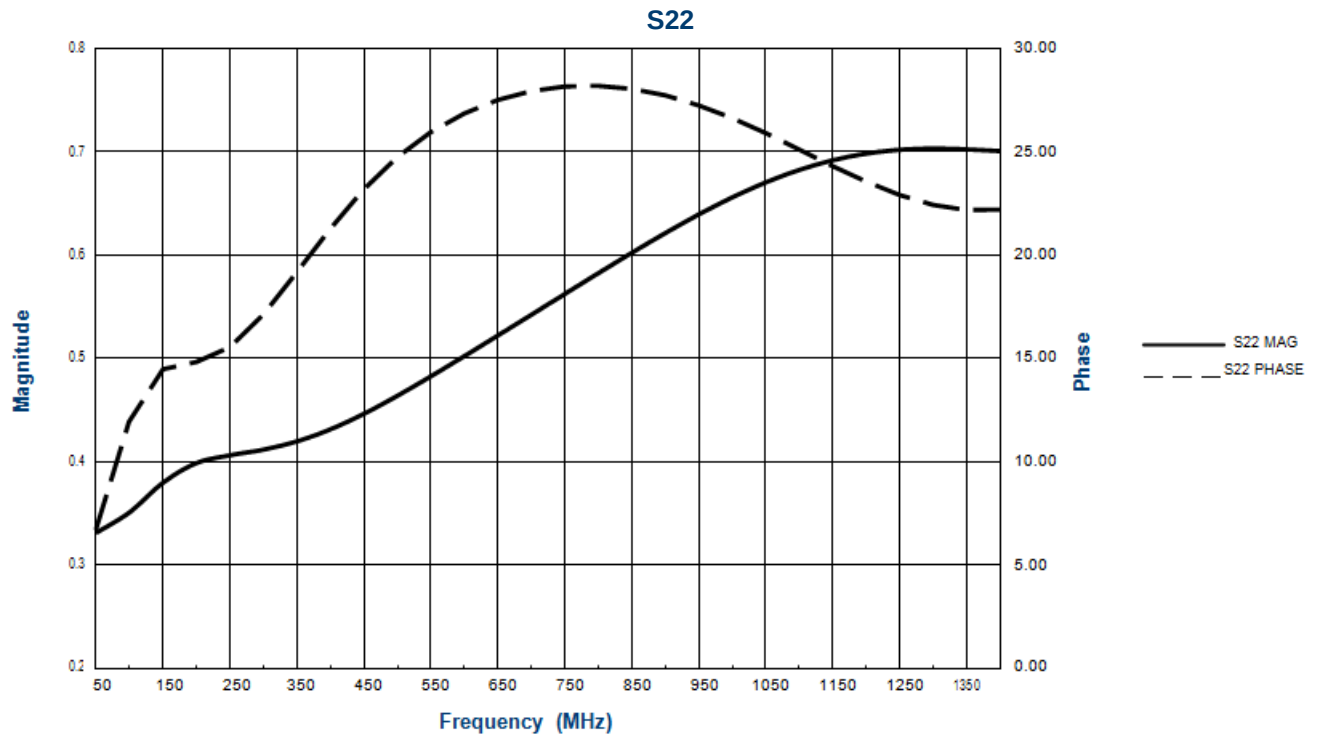
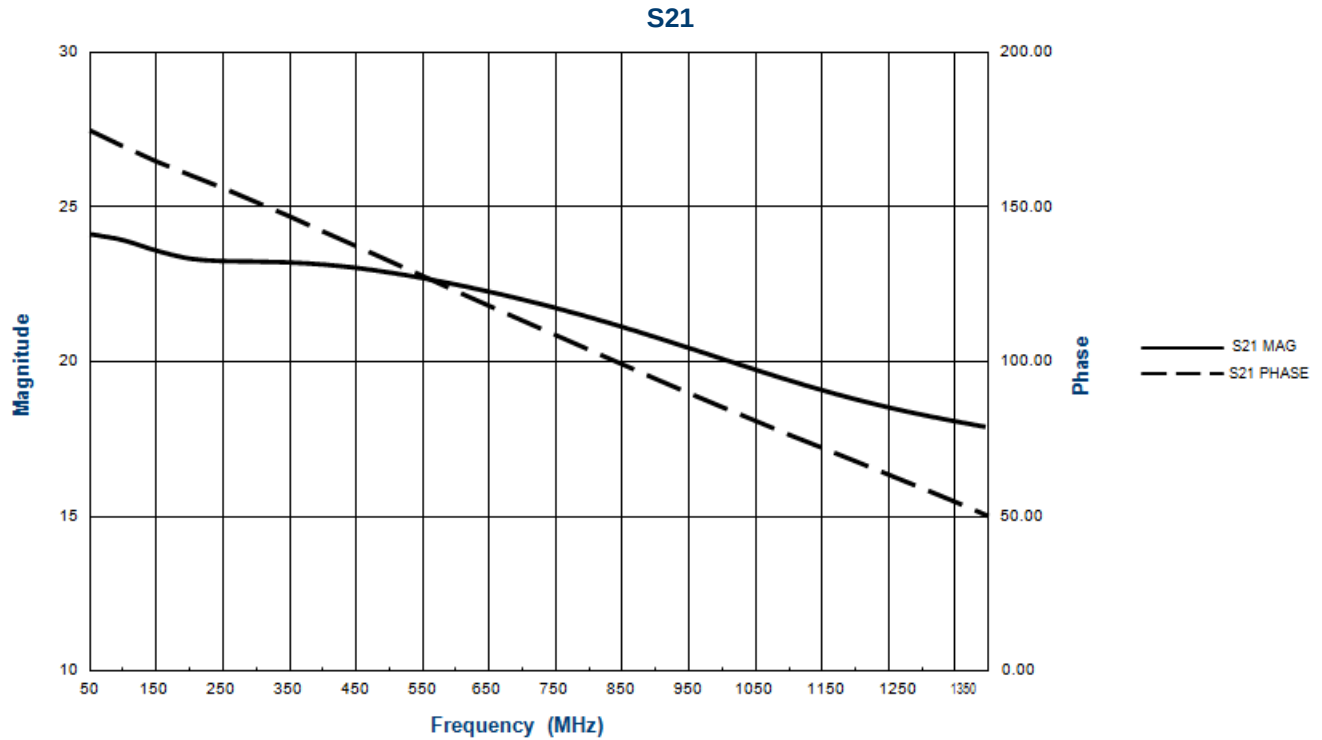


CTSLVEL16VV

## Dual Frequency PECL/ECL Oscillator Gain Stage & Buffer with Enable

MLP16

**Not recommended for new designs**



## 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                                  | Referenced to $V_{BB}$ | $\pm 0.75$  | V    |
| $V_{EN\_PECL}$     | PECL D Input Voltage                          | $V_{EE} = 0V$          | 0 to + 6.0  | V    |
| $V_{EE}$           | ECL Power                                     | $V_{CC} = 0V$          | -6.0 to 0   | V    |
| $V_{D\_ECL}$       | ECL D Input Voltage                           | Referenced to $V_{BB}$ | $\pm 0.75$  | 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 <sub>HBM</sub> | Human Body Model Electro Static Discharge     | -                      | 2500        | V    |
| ESD <sub>MM</sub>  | Machine Model Electro Static Discharge        | -                      | 200         | V    |
| ESD <sub>CDM</sub> | 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 <sup>1</sup>  | -1045    | -835     | -1025    | -835     | -1025    | -835     | -1025    | -835     | mV   |
| $V_{OL}$ | Output LOW Voltage <sup>1</sup>   | -1925    | -1555    | -1900    | -1620    | -1900    | -1620    | -1900    | -1620    | mV   |
| $V_{IH}$ | Input HIGH Voltage D              | -1165    | -740     | -1165    | -740     | -1165    | -740     | -1165    | -740     | mV   |
|          | Input HIGH Voltage EN,SEL         | -1165    | $V_{CC}$ | -1165    | $V_{CC}$ | -1165    | $V_{CC}$ | -1165    | $V_{CC}$ |      |
| $V_{IL}$ | Input LOW Voltage D               | -1900    | -1475    | -1900    | -1475    | -1900    | -1475    | -1900    | -1475    | mV   |
|          | Input LOW Voltage EN,SEL          | $V_{EE}$ | -1475    | $V_{EE}$ | -1475    | $V_{EE}$ | -1475    | $V_{EE}$ | -1475    |      |
| $V_{BB}$ | Reference Voltage                 | -1390    | -1250    | -1390    | -1250    | -1390    | -1250    | -1390    | -1250    | mV   |
| $I_{IH}$ | Input HIGH Current EN,SEL         |          | 150      |          | 150      |          | 150      |          | 150      | μA   |
| $I_{IL}$ | Input LOW Current EN,SEL          | -100     |          | -100     |          | -100     |          | -100     |          | μA   |
| $I_{EE}$ | Power Supply Current <sup>1</sup> |          | 47       |          | 47       |          | 47       |          | 51       | mA   |

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

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 <sup>1,2</sup> | 2255     | 2465     | 2275     | 2465     | 2275     | 2465     | 2275     | 2465     | mV   |
| $V_{OL}$ | Output LOW Voltage <sup>1,2</sup>  | 1375     | 1745     | 1400     | 1680     | 1400     | 1680     | 1400     | 1680     | mV   |
| $V_{IH}$ | Input HIGH Voltage D               | 2135     | 2560     | 2135     | 2560     | 2135     | 2560     | 2135     | 2560     | mV   |
|          | Input HIGH Voltage EN,SEL          | 2135     | $V_{CC}$ | 2135     | $V_{CC}$ | 2135     | $V_{CC}$ | 2135     | $V_{CC}$ |      |
| $V_{IL}$ | Input LOW Voltage D                | 1050     | 1825     | 1400     | 1825     | 1400     | 1825     | 1400     | 1825     | mV   |
|          | Input LOW Voltage EN,SEL           | $V_{EE}$ | 1825     | $V_{EE}$ | 1825     | $V_{EE}$ | 1825     | $V_{EE}$ | 1825     |      |
| $V_{BB}$ | Reference Voltage <sup>1</sup>     | 1910     | 2050     | 1910     | 2050     | 1910     | 2050     | 1910     | 2050     | mV   |
| $I_{IH}$ | Input HIGH Current EN              |          | 150      |          | 150      |          | 150      |          | 150      | μA   |
| $I_{IL}$ | Input LOW <sup>3</sup> Current EN  | -400     |          | -400     |          | -400     |          | -400     |          | μA   |
| $I_{EE}$ | Power Supply Current <sup>2</sup>  |          | 47       |          | 47       |          | 47       |          | 51       | mA   |

<sup>1</sup> Voltage levels vary 1:1 with  $V_{CC}$ .

<sup>2</sup> Specified with each output terminated through 50Ω resistors to  $V_{CC}$  —2V.

<sup>3</sup> Specified with EN and SEL forced to  $V_{EE}$ .

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 <sup>1,2</sup> | 3955     | 4165     | 3975  | 4165     | 3975  | 4165     | 3975  | 4165     | mV   |
| $V_{OL}$ | Output LOW Voltage <sup>1,2</sup>  | 3075     | 3445     | 3100  | 3380     | 3100  | 3380     | 3100  | 3380     | mV   |
| $V_{IH}$ | Input HIGH Voltage D               | 3835     | 4260     | 3835  | 4260     | 3835  | 4260     | 3835  | 4260     | mV   |
|          | Input HIGH Voltage EN,SEL          | 3835     | $V_{CC}$ | 3835  | $V_{CC}$ | 3835  | $V_{CC}$ | 3835  | $V_{CC}$ |      |
| $V_{IL}$ | Input LOW Voltage D                | 3100     | 3525     | 3100  | 3525     | 3100  | 3525     | 3100  | 3525     | mV   |
|          | Input LOW Voltage EN,SEL           | $V_{EE}$ |          |       |          |       |          |       |          |      |
| $V_{BB}$ | Reference Voltage <sup>1</sup>     | 3610     | 3750     | 3610  | 3750     | 3610  | 3750     | 3610  | 3750     | mV   |
| $I_{IH}$ | Input HIGH Current EN              |          | 150      |       | 150      |       | 150      |       | 150      | μA   |
| $I_{IL}$ | Input LOW <sup>3</sup> Current EN  | -1000    |          | -1000 |          | -1000 |          | -1000 |          | μA   |
| $I_{EE}$ | Power Supply Current <sup>2</sup>  |          | 47       |       | 47       |       | 47       |       | 51       | mA   |

<sup>1</sup> Voltage levels vary 1:1 with  $V_{CC}$ .

<sup>2</sup> Specified with each output terminated through 50Ω resistors to  $V_{CC}$  —2V.

<sup>3</sup> Specified with EN and SEL forced to  $V_{EE}$ .

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

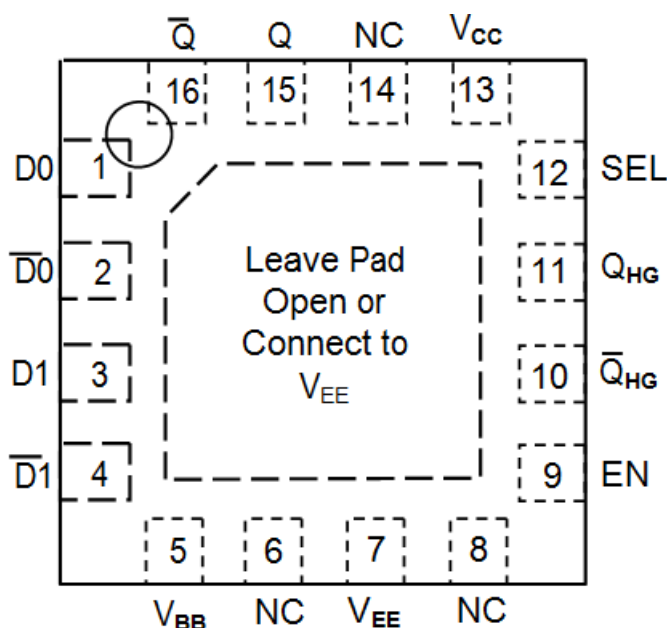
| Symbol                | Characteristic                   | -40°C    |          | 0°C      |          | 25°C     |          | 85°C     |          | Unit |
|-----------------------|----------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|------|
|                       |                                  | Min      | Max      | Min      | Max      | Min      | Max      | Min      | Max      |      |
| $t_{PLH}/t_{PHL}$     | Propagation Delay                | 2255     | 2465     | 2275     | 2465     | 2275     | 2465     | 2275     | 2465     | mV   |
| $t_{SKEW}$            | D to Q/Qb                        | 1375     | 1745     | 1400     | 1680     | 1400     | 1680     | 1400     | 1680     | mV   |
| $V_{PP} \text{ (AC)}$ | D to $Q_{HG}/Q_{bHG}$            | 2135     | 2560     | 2135     | 2560     | 2135     | 2560     | 2135     | 2560     | mV   |
|                       | Duty Cycle Skew <sup>1</sup>     | 2135     | $V_{CC}$ | 2135     | $V_{CC}$ | 2135     | $V_{CC}$ | 2135     | $V_{CC}$ |      |
| $t_R/t_F$             | Input Swing <sup>2</sup>         | 1050     | 1825     | 1400     | 1825     | 1400     | 1825     | 1400     | 1825     | mV   |
|                       | Output Rise and Fall (20% - 80%) | $V_{EE}$ | 1825     | $V_{EE}$ | 1825     | $V_{EE}$ | 1825     | $V_{EE}$ | 1825     |      |

<sup>1</sup> Duty cycle skew is the difference between a  $t_{PLH}$  and  $t_{PHL}$  propagation delay through a device.

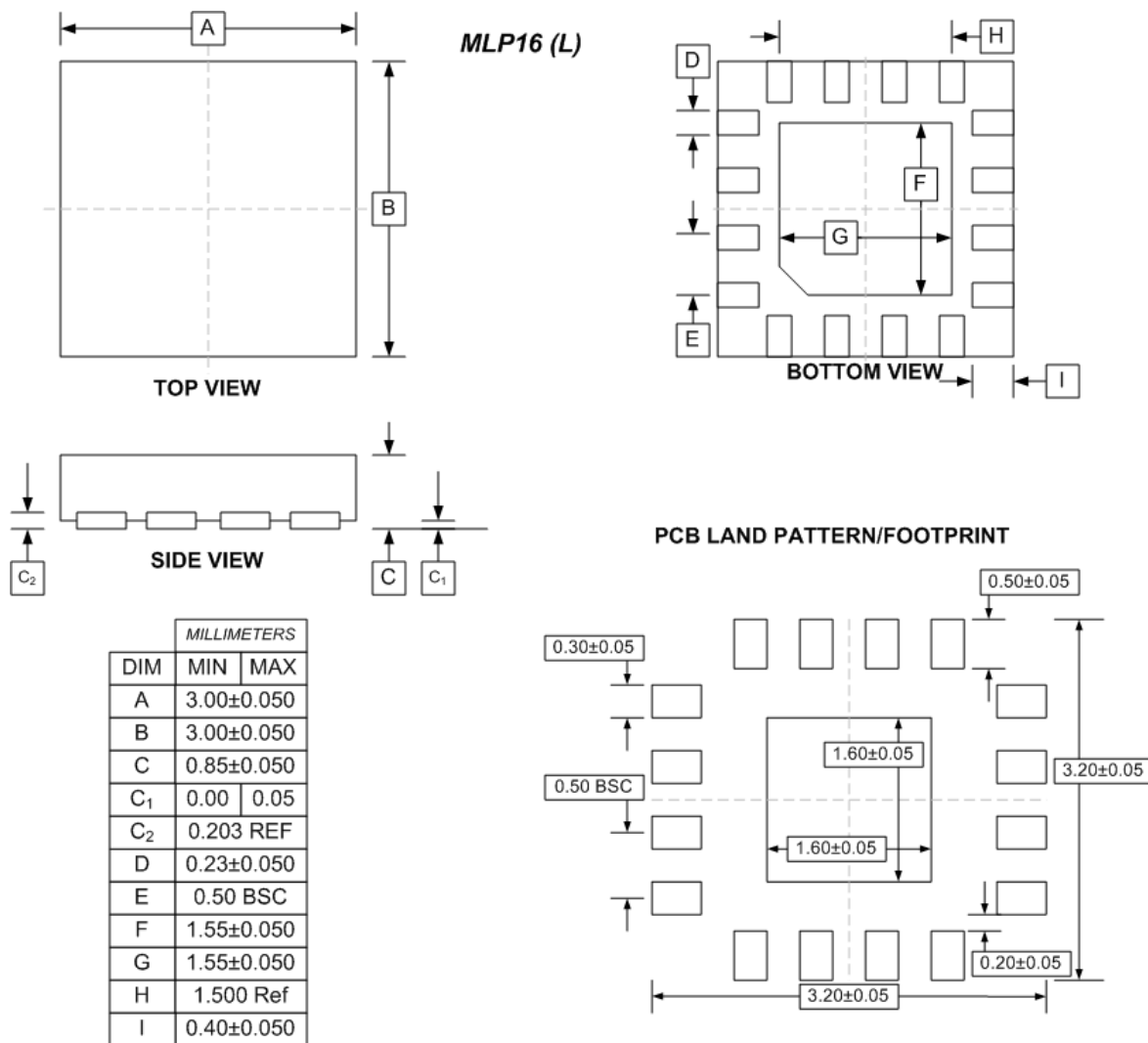
<sup>2</sup>  $V_{PP}$  is the peak-to-peak differential input swing for which AC parameters are guaranteed. The device has a voltage gain of  $\approx 20$  to Q/ $\bar{Q}$  outputs and a voltage gain of  $\approx 100$  to  $Q_{HG}/\bar{Q}_{HG}$  outputs.

**Pin Description and Configuration**
**Pin Assignments**

| Pin | Name           | Type   | Function                        |
|-----|----------------|--------|---------------------------------|
| 1   | D0             | Input  | Data Input                      |
| 2   | $\bar{D}0$     | Input  | Inverting Data Input            |
| 3   | D1             | Input  | Data Input                      |
| 4   | $\bar{D}1$     | Input  | Inverting Data Input            |
| 5   | $V_{BB}$       | Output | Reference Voltage               |
| 6   | NC             | -      | N/A                             |
| 7   | $V_{EE}$       | Power  | Negative Supply                 |
| 8   | NC             | -      | N/A                             |
| 9   | EN             | Input  | Output Enable                   |
| 10  | $\bar{Q}_{HG}$ | Output | High Gain Inverting PECL Output |
| 11  | $Q_{HG}$       | Output | High Gain PECL Output           |
| 12  | SEL            | Input  | Data Input Select               |
| 13  | $V_{CC}$       | Power  | Positive Supply                 |
| 14  | NC             | -      | N/A                             |
| 15  | Q              | Output | PECL Output                     |
| 16  | $\bar{Q}$      | Output | Inverting PECL Output           |



## PACKAGE DIMENSIONS



## PART ORDERING INFORMATION

| Part Number    | Package | Marking       |
|----------------|---------|---------------|
| CTSLVEL16VVRLG | MLP16   | CTSG 16K YYWW |



# AMEYA360

Components Supply Platform

Authorized Distribution Brand :



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