

Preliminary Data Sheet

VSC7958

2.5Gb/s High Speed Limiting Post Amplifier
for OC-48/SDH-16 Applications

Features

- 2.5Gb/s Data Rates (OC-48/SDH-16)
- Input Offset Error Cancellation
- Single 5V Power Supply
- Fully Differential Architecture

General Description

The Vitesse high speed limiting amplifier is intended for use as a post amplifier in wide band fiber optic links with data rates up to 2.5Gb/s. This amplifier provides very high sensitivity and broadband operation with a fully differential architecture. Additional features include on-chip, offset-correction circuitry to provide excellent pulse width distortion characteristics.

VSC7958 Block Diagram

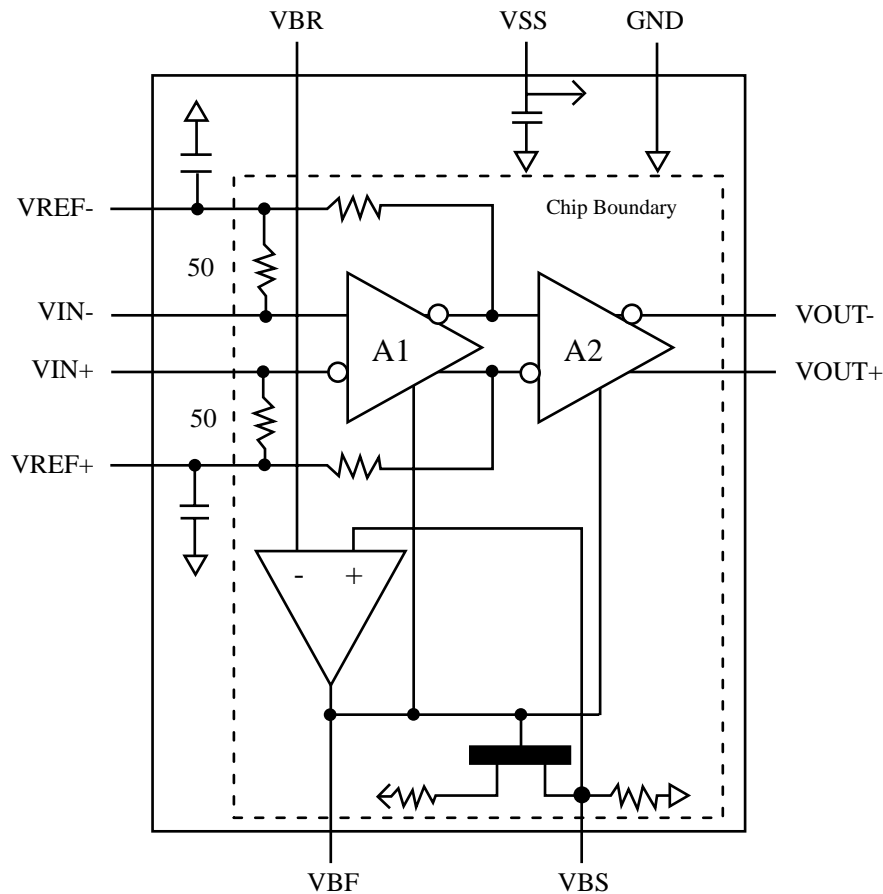


Table 1: Electrical Specifications

All min and max values are tested at $V_{SS} = -4.5V$ and $-5.5V$, unless otherwise noted. All min and max values are guaranteed from $T_{CASE} = 0^{\circ}C$ to $85^{\circ}C$, unless otherwise noted.

| Symbol | Parameter | Min | Typ | Max | Units | Conditions |
|-------------------------------|--|-----|------|------|-------------------|--|
| $V_{IN\pm}^{(1)}$ | Input Voltage Swing | - | - | 800 | mV _{p-p} | Single-ended source |
| $(V_{IN+}) - (V_{IN-})^{(1)}$ | Input Voltage Swing | - | - | 1600 | mV _{p-p} | Differential source |
| $(V_{REF+}) - (V_{REF-})$ | Input Offset Voltage Swing | - | 10 | 25 | mV | $V_{IN} = 0$ |
| $(V_{OUT+}) - (V_{OUT-})$ | Output Voltage Swing | 320 | 500 | 1200 | mV _{p-p} | Differential Output Swing. $V_{IN} = 8mV$, Differential Input peak-to-peak |
| V_{OFFSET} | Output DC Offset Voltage | - | -0.5 | - | V | Measured to ground |
| PW% | Output Pulse Width | 90 | 100 | 110 | % | |
| t_R, t_F | Rise and Fall Time | - | 100 | - | ps | 20%-80%, $25^{\circ}C$, $V_{IN} = 50mV$ |
| G | Small Signal Gain | 26 | 30 | 45 | dB | $V_{IN} = 4mV_{p-p}$ single- ended |
| $f_{MAX}^{(1)}$ | Small Signal -3dB Bandwidth | - | 3 | - | GHz | $25^{\circ}C$, $V_{IN} = 4mV_{p-p}$ |
| $f_{MIN}^{(1)}$ | Low Frequency -3dB Cutoff | - | 30 | - | kHz | $25^{\circ}C$, $V_{IN} = 4mV_{p-p}$ |
| $S_{11}^{(1)}$ | Input Return Loss Reference to 50Ω | - | 15 | - | dB | At 1.5GHz |
| $S_{22}^{(1)}$ | Output Return Loss Reference to 50Ω | - | 15 | - | dB | At 1.5GHz |
| I_{SS} | Supply Current | - | 80 | 100 | mA | |
| NF ⁽¹⁾ | Noise Figure | - | 15 | - | dB | 8kHz to 18GHz |
| $V_{NR}^{(1)}$ | Input Referred Wide Band Noise | - | 170 | - | μV_{rms} | Total single-ended output noise voltage divided by small-signal gain. 8kHz to 18GHz |
| θ_{JC} | Thermal Resistance | - | 30 | - | $^{\circ}C/W$ | Junction-to-case |

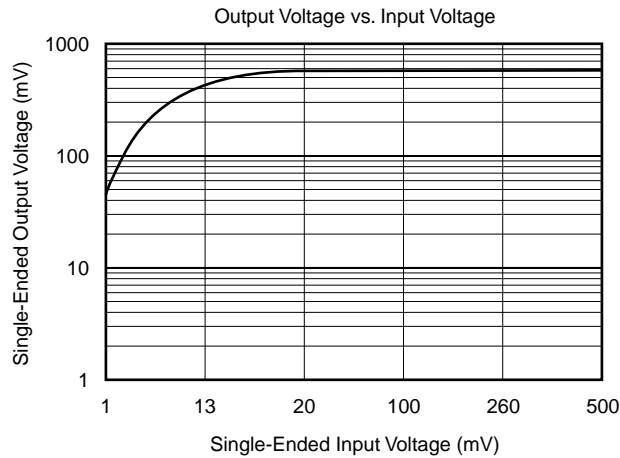
NOTE:(1) These values are not measured during production test. These values are results of engineering characterization.

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Figure 1: Typical Output Voltage vs. Input Voltage of Limiting Amplifier



Absolute Maximum Ratings ⁽¹⁾ (at $T_A = 25^\circ\text{C}$ unless otherwise specified)

| | |
|---|------------------|
| Power Supply Voltage (V_{SS}) | -7V to -0.5V |
| Power Dissipation | 1W |
| All Pins | V_{SS} to +.5V |
| (VREF+) - (VIN+) | $\pm 2\text{V}$ |
| (VREF-) - (VIN-) | $\pm 2\text{V}$ |
| Storage Temperature Range (T_{STG}) | -40°C to 125°C |
| Operating Temperature Range | 0°C to 100°C |

NOTE: (1) CAUTION: Stresses listed under "Absolute Maximum Ratings" may be applied to devices one at a time without causing permanent damage. Functionality at or above the values listed is not implied. Exposure to these values for extended periods may affect device reliability.

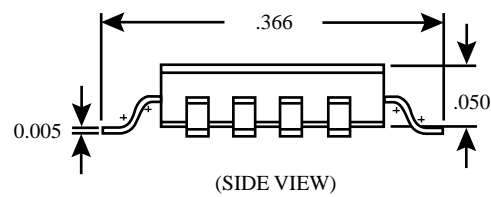
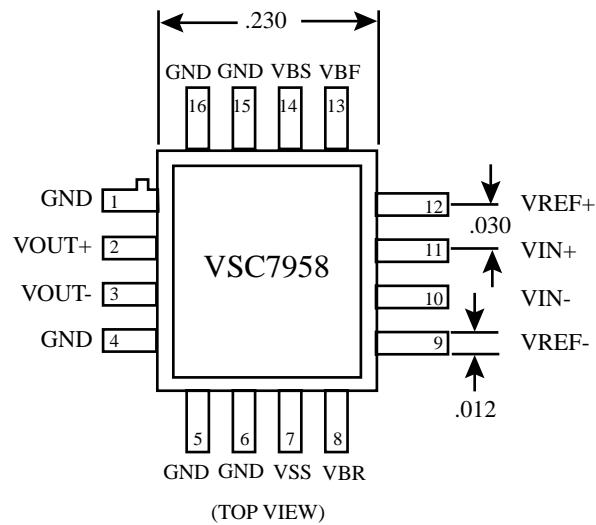
Recommended Operating Conditions

| | |
|------------------------------------|----------------|
| Case Temperature Range (T_C) | 0°C to 85°C |
| Negative Voltage Rail (V_{SS}) | -5.5V to -4.7V |

Bit Rate = 2.488Gb/s NRZ and data pattern = $2^{23} - 1$ PRBS, unless otherwise specified.

Package Pin Descriptions

Figure 2: Pin Configuration



*All values are typical in inches

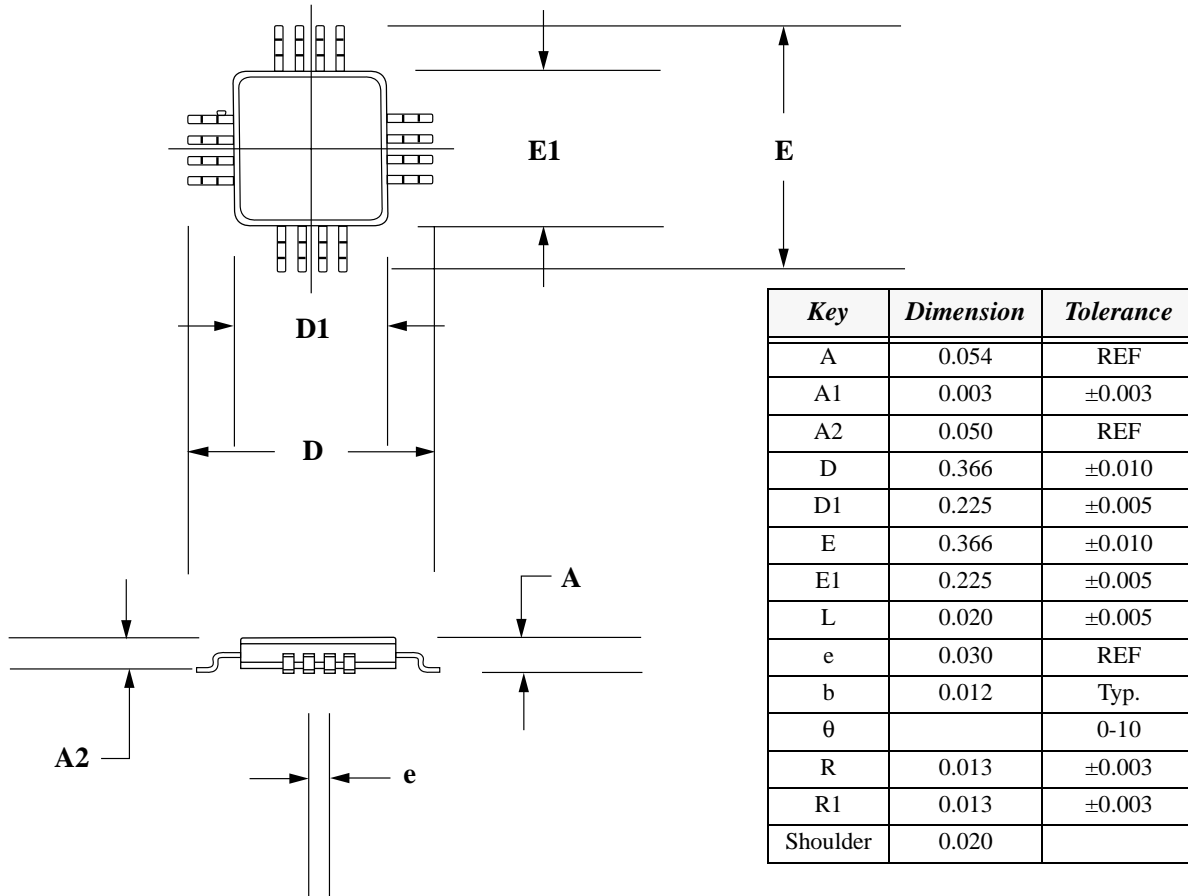
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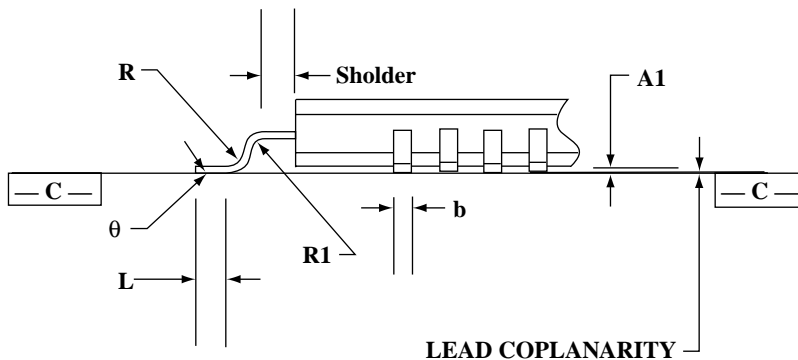
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Package Information

Figure 3: Package Dimensions

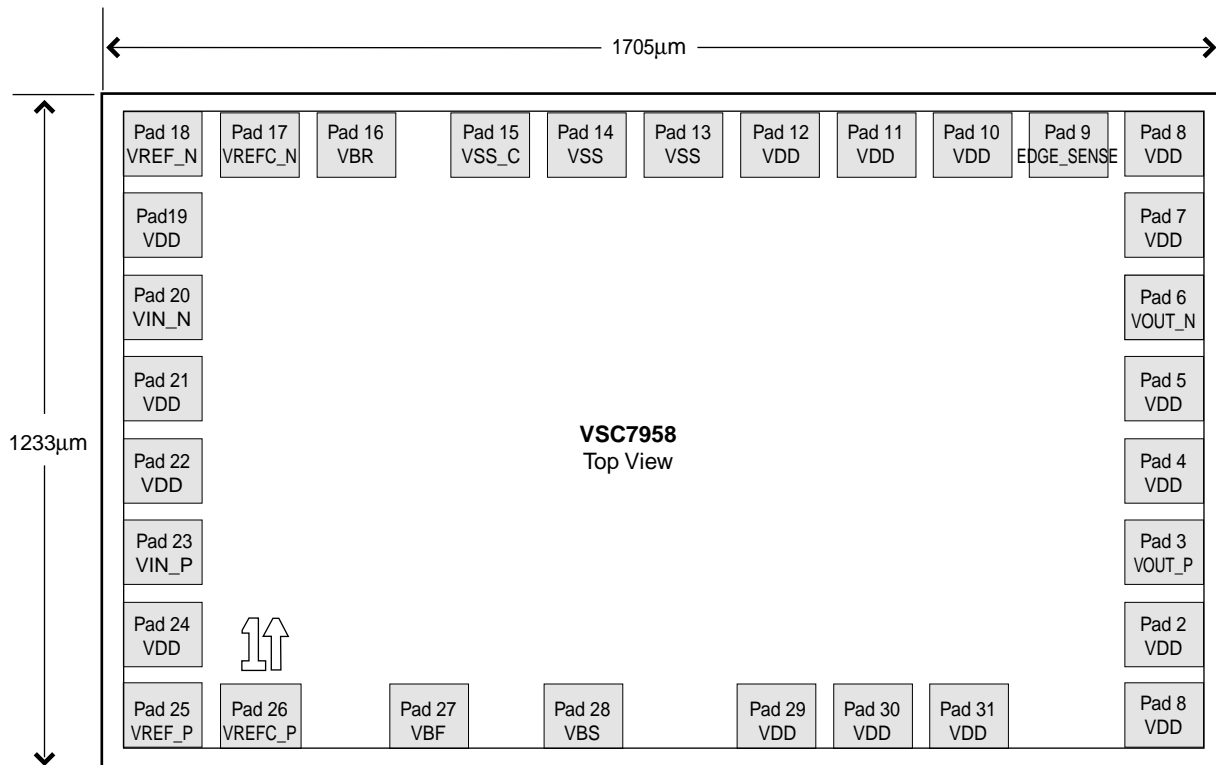


All Dimensions in inches



Die Information

Figure 4: Die Pad Information



Maximum Total Die Size: 1233µm x 1705µm
 Die Thickness: 305µm
 Pad Size: 100µm x 100µm
 Pad Passivation Opening: 90µm x 90µm

This device requires external components when used in die form.
 Please contact your Vitesse sales representative for information.

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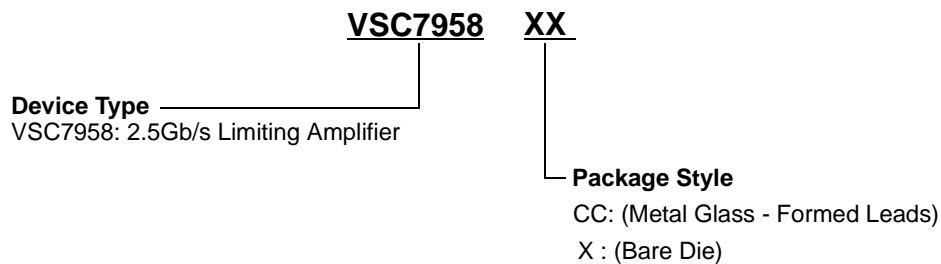
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Table 2: Pin Identifications

| Pin # | Name | Function |
|--|-------|---|
| 1, 4, 5, 6, 15, 16, and bottom heat spreader | GND | DEVICE GROUND The package bottom heat spreader should be connected to ground for the optimum thermal and electrical performance. |
| 2 | VOUT+ | POSITIVE DATA OUTPUT |
| 3 | VOUT- | NEGATIVE DATA OUTPUT |
| 7 | VSS | NEGATIVE DC SUPPLY |
| 8 | VBR | DEVICE REFERENCE VOLTAGE This pin can either float or be set to an external -1.5V supply. |
| 9 | VREF- | NEGATIVE DATA INPUT REFERENCE This pin should be bypassed to ground with a 0.1 μ F cap and a 5 Ω series resistor. |
| 10 | VIN- | NEGATIVE DATA INPUT |
| 11 | VIN+ | POSITIVE DATA INPUT |
| 12 | VREF+ | POSITIVE DATA INPUT REFERENCE This pin should be bypassed to ground with a 0.1 μ F cap and a 5 Ω series resistor. |
| 13 | VBF | INTERNAL TEST POINT Do not connect. |
| 14 | VBS | INTERNAL TEST POINT Do not connect. |

Ordering Information

The order number for this product is formed by a combination of the device number, and package style.



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