

## Preliminary Data Sheet

### VSC7958

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

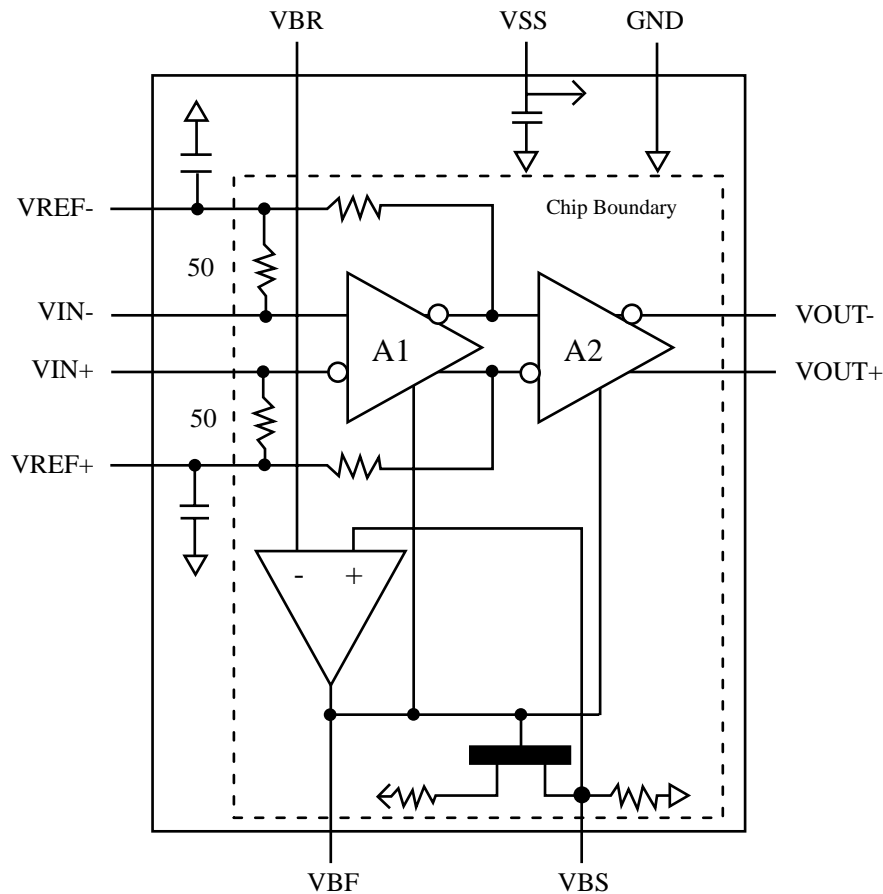
#### Features

- 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



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

## VSC7958

**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 <sub>p-p</sub>	Single-ended source
$(V_{IN+}) - (V_{IN-})^{(1)}$	Input Voltage Swing	-	-	1600	mV <sub>p-p</sub>	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 <sub>p-p</sub>	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 $50\Omega$	-	15	-	dB	At 1.5GHz
$S_{22}^{(1)}$	Output Return Loss Reference to $50\Omega$	-	15	-	dB	At 1.5GHz
$I_{SS}$	Supply Current	-	80	100	mA	
NF <sup>(1)</sup>	Noise Figure	-	15	-	dB	8kHz to 18GHz
$V_{NR}^{(1)}$	Input Referred Wide Band Noise	-	170	-	$\mu V_{rms}$	Total single-ended output noise voltage divided by small-signal gain. 8kHz to 18GHz
$\theta_{JC}$	Thermal Resistance	-	30	-	$^{\circ}C/W$	Junction-to-case

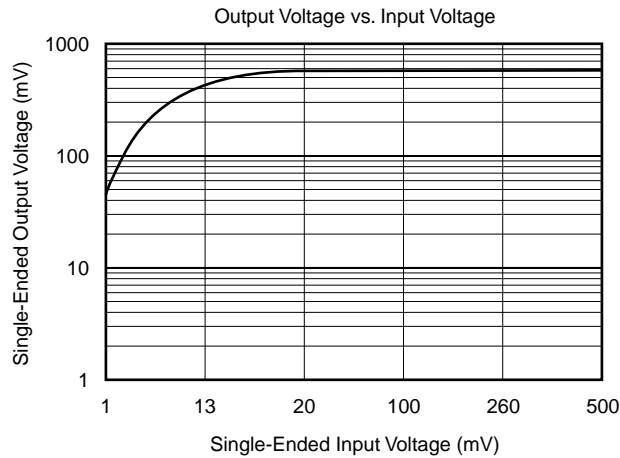
NOTE:(1) These values are not measured during production test. These values are results of engineering characterization.

## Preliminary Data Sheet

### VSC7958

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

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



### **Absolute Maximum Ratings** <sup>(1)</sup> (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 ( $T_{STG}$ ).....	$-40^\circ\text{C}$ to $125^\circ\text{C}$
Operating Temperature Range.....	$0^\circ\text{C}$ to $100^\circ\text{C}$

*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.*

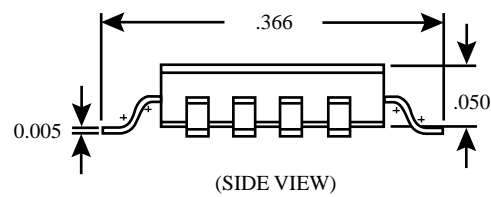
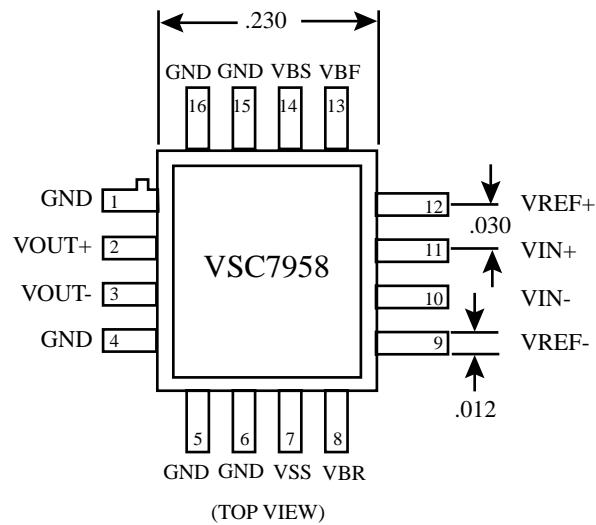
### **Recommended Operating Conditions**

Case Temperature Range ( $T_C$ ).....	$0^\circ\text{C}$ to $85^\circ\text{C}$
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

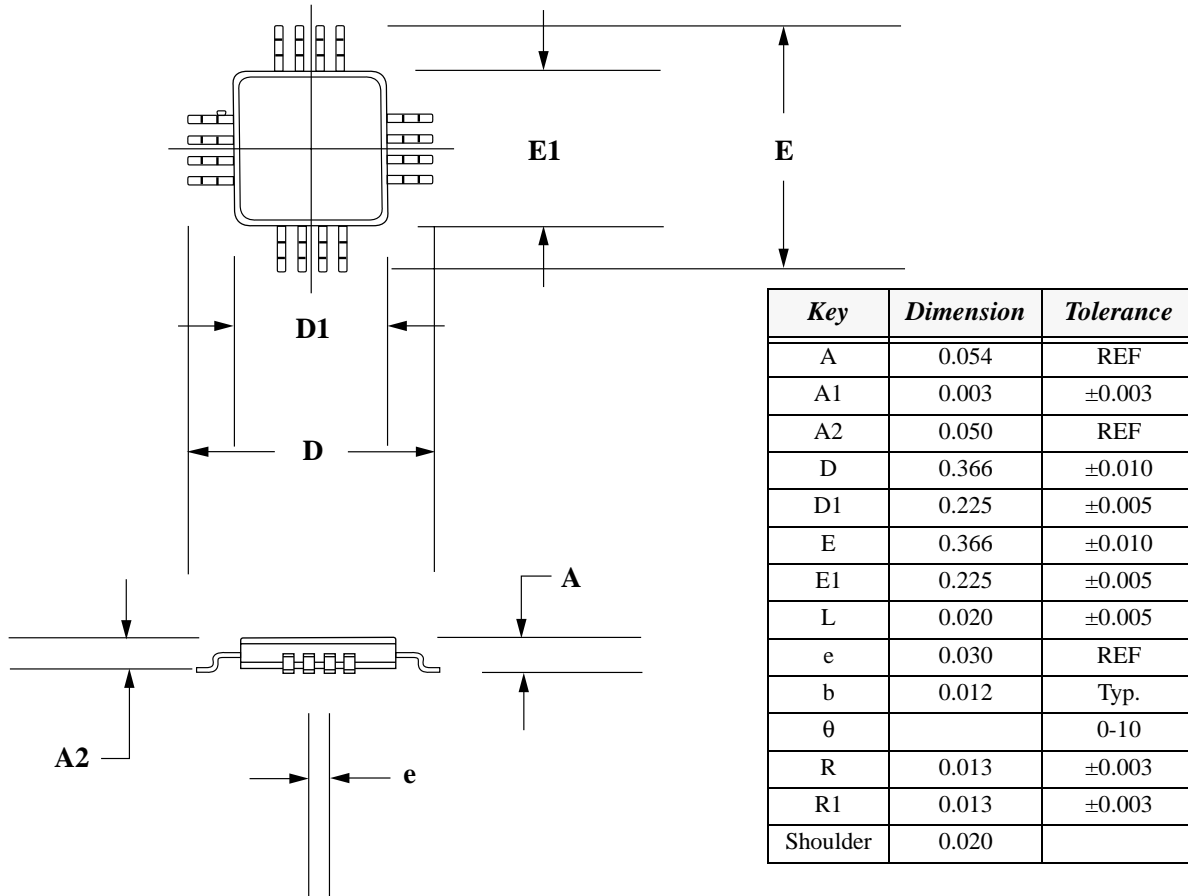
## Preliminary Data Sheet

### VSC7958

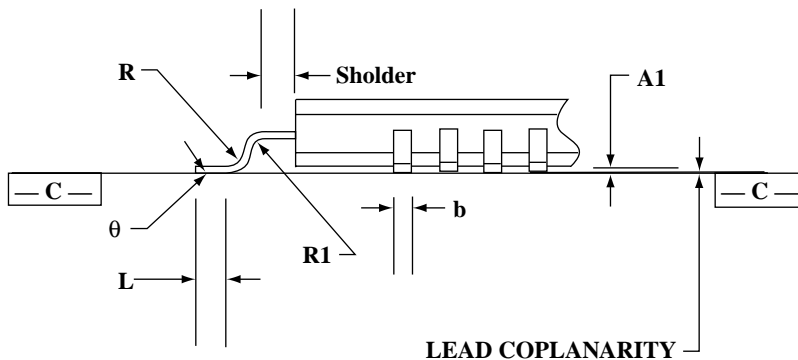
2.5Gb/s High Speed Limiting Post Amplifier  
for OC-48/SDH-16 Applications

### Package Information

Figure 3: Package Dimensions

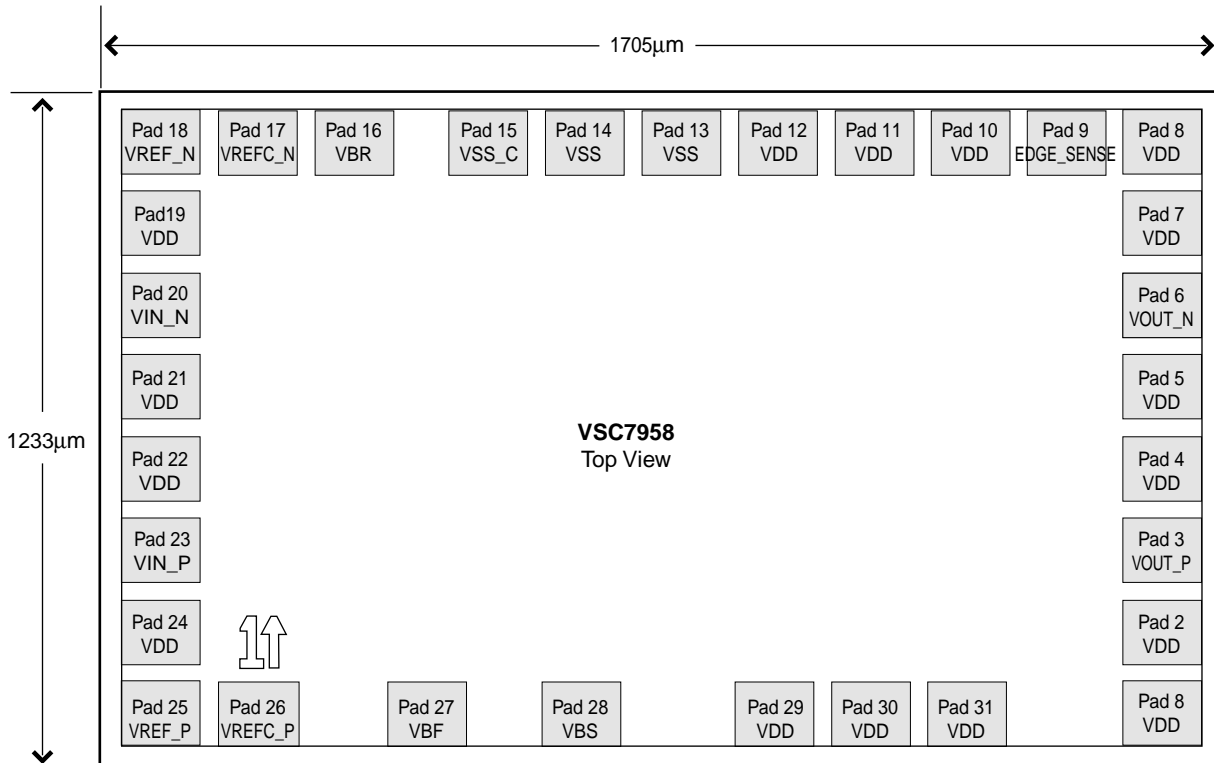


All Dimensions in inches



### 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.

## Preliminary Data Sheet

### VSC7958

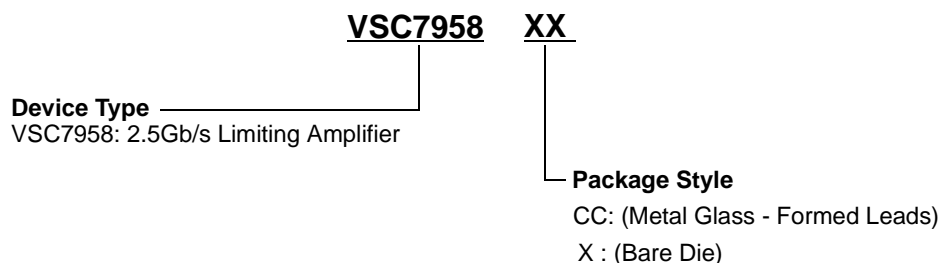
2.5Gb/s High Speed Limiting Post Amplifier  
for OC-48/SDH-16 Applications

**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 $\mu$ F cap and a 5 $\Omega$ 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 $\mu$ F cap and a 5 $\Omega$ 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.



## Notice

Vitesse Semiconductor Corporation ("Vitesse") provides this document for informational purposes only. This document contains pre-production information about Vitesse products in their concept, development and/or testing phase. All information in this document, including descriptions of features, functions, performance, technical specifications and availability, is subject to change without notice at any time. Nothing contained in this document shall be construed as extending any warranty or promise, express or implied, that any Vitesse product will be available as described or will be suitable for or will accomplish any particular task.

Vitesse products are not intended for use in life support appliances, devices or systems. Use of a Vitesse product in such applications without written consent is prohibited.

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

**Preliminary Data Sheet**

**VSC7958**

This page left intentionally blank.