

# Electronic Components

**ODHKA4185-01**  
Issue Date: May 28, 2004

## KGA4185

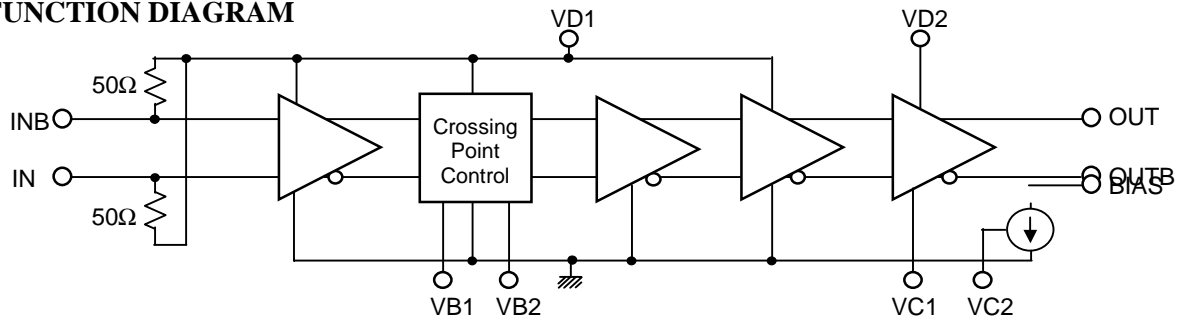
## Advanced Information

### 11.3 Gbps Direct Modulation Driver IC

#### FEATURES

- Maximum Input Data Rate : Up to 11.3Gbps
- Modulation Current Control : 20mApp - 80mApp at 25Ω Load
- Bias Current Control : 5mA - 60mA
- Crossing Point Controllability : 35% - 65%

#### FUNCTION DIAGRAM



#### ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit	Note
Supply Voltage	VD1	-0.3	4.0	V	
Supply Voltage of Output Stage	VD2	-0.3	6.0	V	
X-Point Control and Reference Voltage	VB1/VB2	-1.0	2.4	V	
Output Amplitude Control Voltage	VC1	-1.0	1.6	V	
Output Bias Control Voltage	VC2	-1.0	2.6	V	
Input Amplitude	Vin	-	1.5	Vpp	AC coupled
Operating Temperature at Package Base	Ts	-10	100	°C	
Storage Temperature	Tst	-40	125	°C	

#### RECOMMENDED OPERATING CONDITIONS

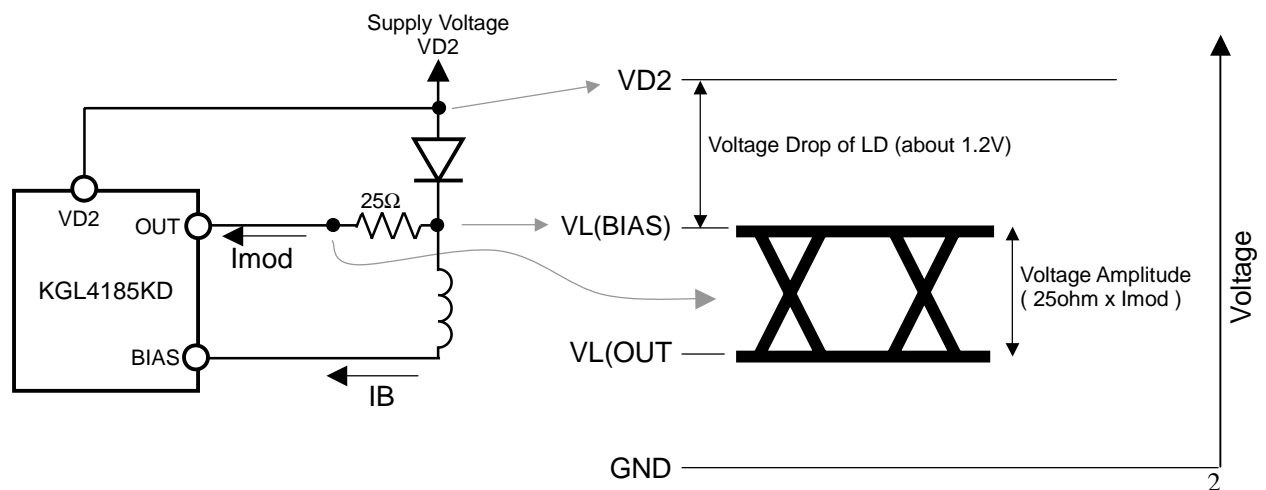
Parameter	Symbol	Min	Typ	Max	Unit	Note
Supply Voltage	VD1	3.13	3.3	3.47	V	
Supply Voltage of Output Stage	VD2	3.13	3.3	3.47	V	AC coupled using Bias-Tee
		4.75	5.0	5.25	V	DC coupled
X-Point Control Voltage	VB1	0.6	1.2	1.8	V	
X-Point Reference Voltage	VB2 <sup>1)</sup>	1.0	1.2	1.4	V	
Output Amplitude Control Voltage	VC1	0	-	1.2	V	
Output Bias Control Voltage	VC2	0	-	2.4	V	
Single-ended Input Amplitude	Vin	0.4	-	1.2	Vpp	AC coupled
Differential Input Amplitude		0.2	-	1.2	Vpp	AC coupled
Low Voltage of Modulation Current Output	VL(OUT)	1.5	-	-	V	
Low Voltage of Bias Current Output	VL(BIAS)	1.9	-	-	V	
Operating Temperature at Package Base	Ts	-5	-	85	°C	
Input Interface	AC coupled (External blocking capacitor is required)					
Output Interface	DC coupled ( Need 25Ω termination to VD2 ) or AC coupled ( External Bias-Tee is required to supply output bias )					

1) VB2 can be opened or biased by the external circuit. For VB2 opened, VB2 is biased at about 1.2V (VD1=3.3V).

**ELECTRICAL CHARACTERISTICS (TARGET SPECIFICATIONS)**

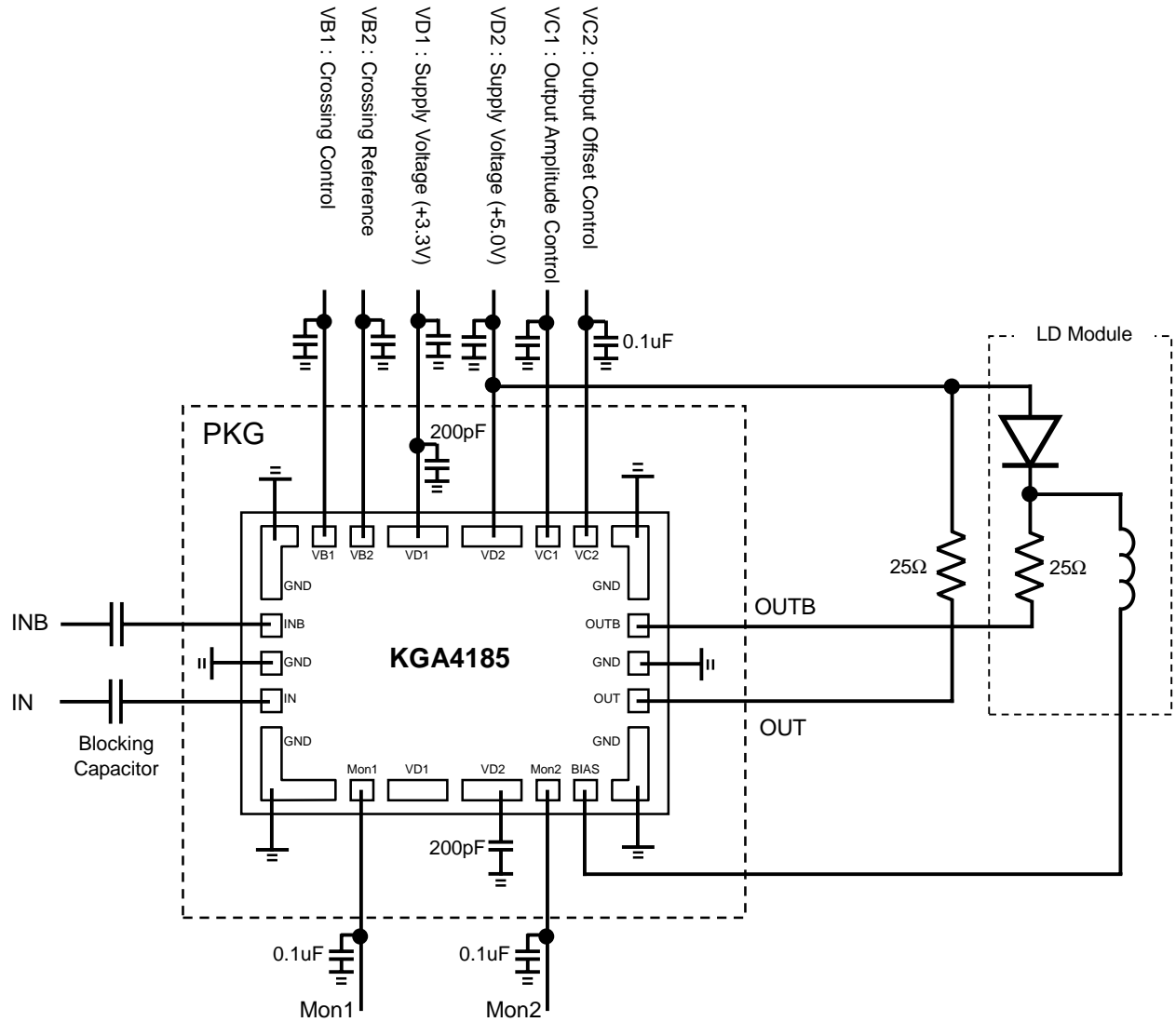
This table is electrical characteristics at “OUT” port.  
 “OUTB” port characteristics is TBD.

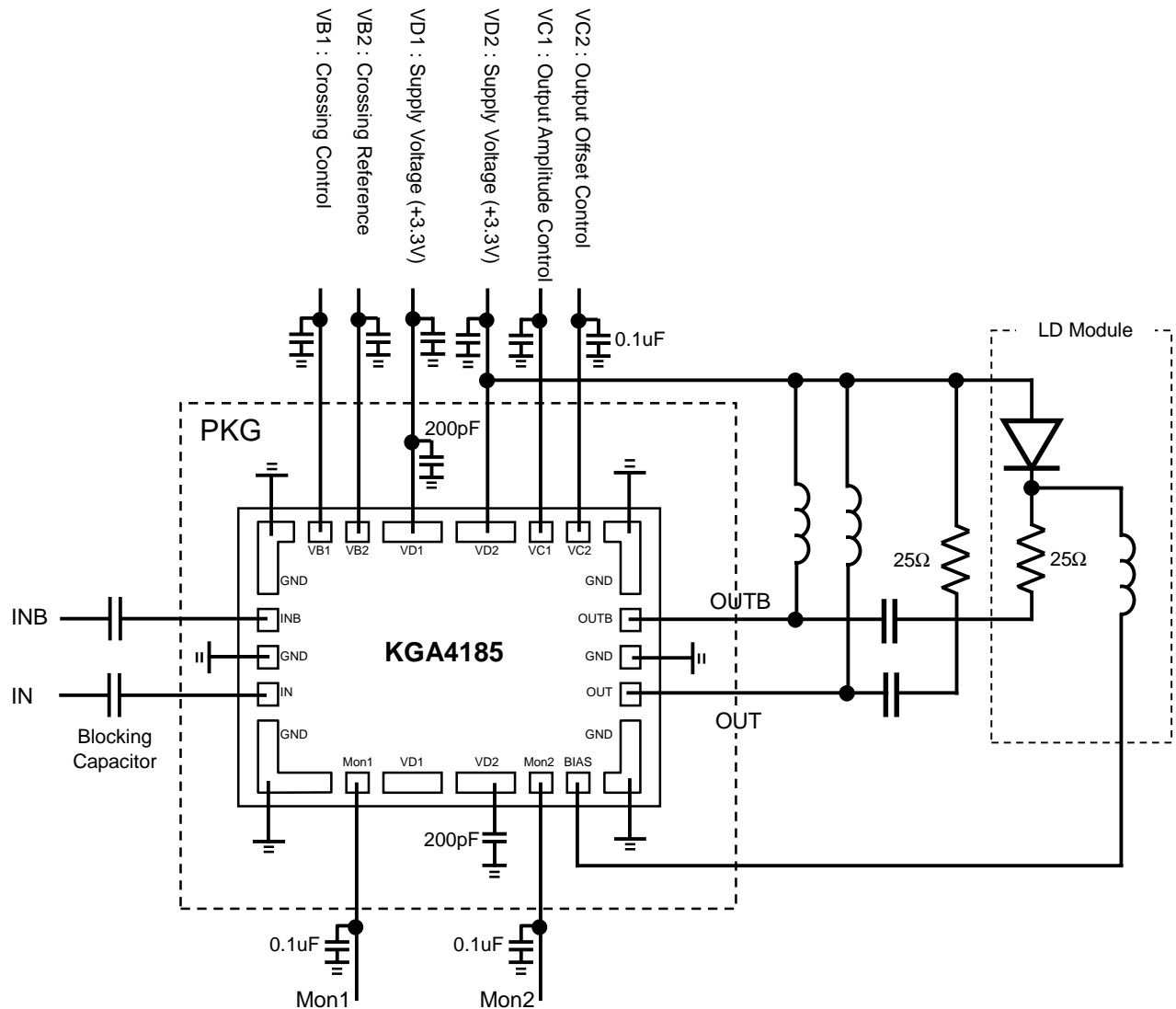
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Maximum Input Data Rate		NRZ	11.3	-	-	Gbps
Supply Current	Id1	50 Ω load	-	120	-	mA
Supply Current	Id2	AC coupled using Bias-Tee, VD2=3.3V, 25Ω load, I <sub>mod</sub> =80mApp, Excluding Bias Current	-	125	-	mA
		DC coupled, VD2=5.0V, 25Ω load, I <sub>mod</sub> =80mApp, Excluding Bias Current	-	125	-	
Power Consumption	Pwr	AC coupled using Bias-Tee, VD2=3.3V, 25Ω load, I <sub>mod</sub> =50mApp, Excluding Bias Current	-	0.65	-	W
		DC coupled, VD2=5.0V, 25Ω load, I <sub>mod</sub> =50mApp, Excluding Bias Current	-	0.77	-	
Minimum Modulation Current	I <sub>mod</sub> (min)	25 Ω load	-	20	30	mApp
Maximum Modulation Current	I <sub>mod</sub> (max)	25 Ω load	70	80	-	mApp
Minimum Bias Current	IB(min)		-	5	8	mA
Maximum Bias Current	IB(max)		60	80	-	mA
X-Point Control Range	High	XPH	25 Ω load, NRZ	60	65	%
	Low	XPL		-	35	
X-Point Stability	Del (Xp)	25 Ω load, 0–85°C	-10	-	10	%
Output Rise/Fall Time	Tr/Tf	25 Ω load, 20%/80%	-	27	-	ps
Input Return Loss	S11	100kHz–10GHz	-	12	-	dB





**TYPICAL APPLICATION ( DC COUPLED )**



**TYPICAL APPLICATION ( AC coupled )****APPLICATION NOTE**

## 1. For stable operation;

To prevent a dependence of "X-Point" on the supply voltage VD1,

Case 1 : VB2 is open

VB2 is biased at about  $0.364 \times VD1$  ( $1.2V @ VD1=3.3V$ ) by the internal circuit.

Control VB1, so that the voltage difference "VB1-VB2" is constant.

Case 2 : VB2 is biased

Bias VB2 at about 1.2V by using the external voltage source independent of VD1.

Control VB1 by using the external voltage source independent of VD1.

## 2. Power-up/shut-down sequence;

For power-up, supply voltage (VD2) at first, next supply voltage (VD1), then control voltages (VB1, (VB2), VC1, VC2).

For shut-down, control voltages( VB1, (VB2), VC1, VC2 ). at first, next VD1, then VD2.

Customer does not need to care about the sequence for the control voltages (VB1,(VB2),VC1,VC2).

## SAFETY AND HANDLING INFORMATION ON GaAs DEVICES

### Arsenic Compound (GaAs Devices)

The product contains arsenic (As) as a compound.

This material is stable for normal use, however, its dust or vapor may be potentially hazardous to the human body.

Avoid ingestion, fracture, burning or chemical treatment to the product.

- Do not put the product in your mouth.
- Do not burn or destroy the product.
- Do not perform chemical treatment for the product.

Keep laws and ordinances related to the disposal of the products.

## NOTICE

1. The information contained herein can change without notice owing to product and/or technical improvements. Before using the product, please make sure that the information being referred to is up-to-date.
2. The outline of action and examples for application circuits described herein have been chosen as an explanation for the standard action and performance of the product. When planning to use the product, please ensure that the external conditions are reflected in the actual circuit, assembly, and program designs.
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