OKI

Oki, Network Solutions for a Global Society

Electronic Components

ODHKGL4175JW-02
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KGL4175JW

10.7 Gbps Direct Modulatin LASER Driver IC

FEATURES

- Low Power : 0.6 W (excluding modulation current and bias current)
- High Sensitive Input : 0.25 Vpp (differential)
- Modulation Current Control : 20 mApp to 50 mApp
- Bias Current Control : 0 mA to 45 mA
- X-Point Controllability : 40 % to 60 %
- Surface Mount Type PKG

APPLICATIONS

- SONET OC-192 and SDH STM-64 Transmission Systems up to 10.7Gbps
- 10GBE Systems
- Optical Transmitters/Transceivers/Transponders

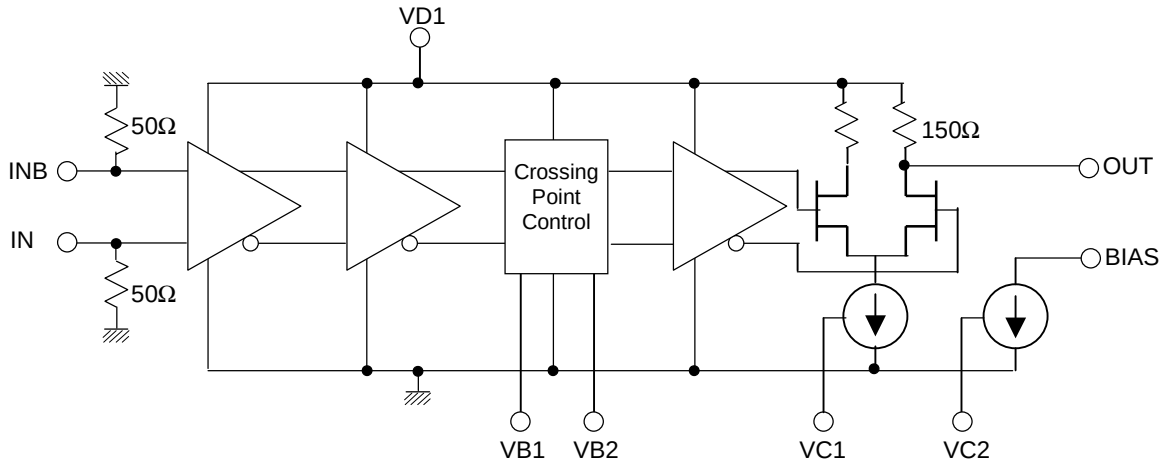
GENERAL DESCRIPTION

The KGL4175JW is a high performance direct modulated LASER diode driver for 10GBE and SONET/SDH applications up to 10.7Gb/s. The device provides typically 20-50mApp single-ended modulation current, 0-45mA bias Current, and duty cycle (X-Point) control.

The KGL4175JW data input accepts single ended or differential AC-coupled signals. The modulation current can be tuned by varying VC1. The bias current can be tuned by varying VC2.
The KGL4175JW is capable of adjusting the crossing point (X-point) from 40% to 60% of the output eye diagram via the differential voltage between VB1 and VB2

The KGL4175JW is packaged in a small 26-pin QFP Package : 5x5.2mm

FUNCTION DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit	Note
Supply Voltage	VD1	-0.3	4	V	
Voltage of Modulation Current Output	V(OUT)	-0.3	6	V	
Voltage of Bias Current Output	V(BIAS)	-0.3	6	V	
X-Point Control Voltage	VB1	-1	+2.5	V	
X-Point Reference Voltage	VB2	-1	+2.5	V	
Modulation Current Control Voltage	VC1	-1	+1.6	V	
Bias Current Control Voltage	VC2	-1	+2.6	V	
Input Amplitude	Vin	-	1.6	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	
Low Voltage of Modulation Current Output	VL(OUT)	1.4	-	-	V	
Low Voltage of Bias Current Output	VL(BIAS)	1.9	-	-	V	
X-Point Control Voltage	VB1	0.6	1.2	1.8	V	
X-Point Reference Voltage	VB2 [1)]		1.2		V	
Output Amplitude Control Voltage	VC1	0	-	1.2	V	
Output Bias Control Voltage	VC2	0	-	2.4	V	
Single-ended Input Amplitude	Vin	0.5	-	1.2	Vpp	AC coupled
Differential Input Amplitude		0.25	-	1.2	Vpp	AC coupled
Operating Temperature at Package Base	Ts	0	-	85	°C	
Input Interface	AC coupled (External blocking capacitor is required)					
Output Interface	DC coupled(Pull up through LD)					

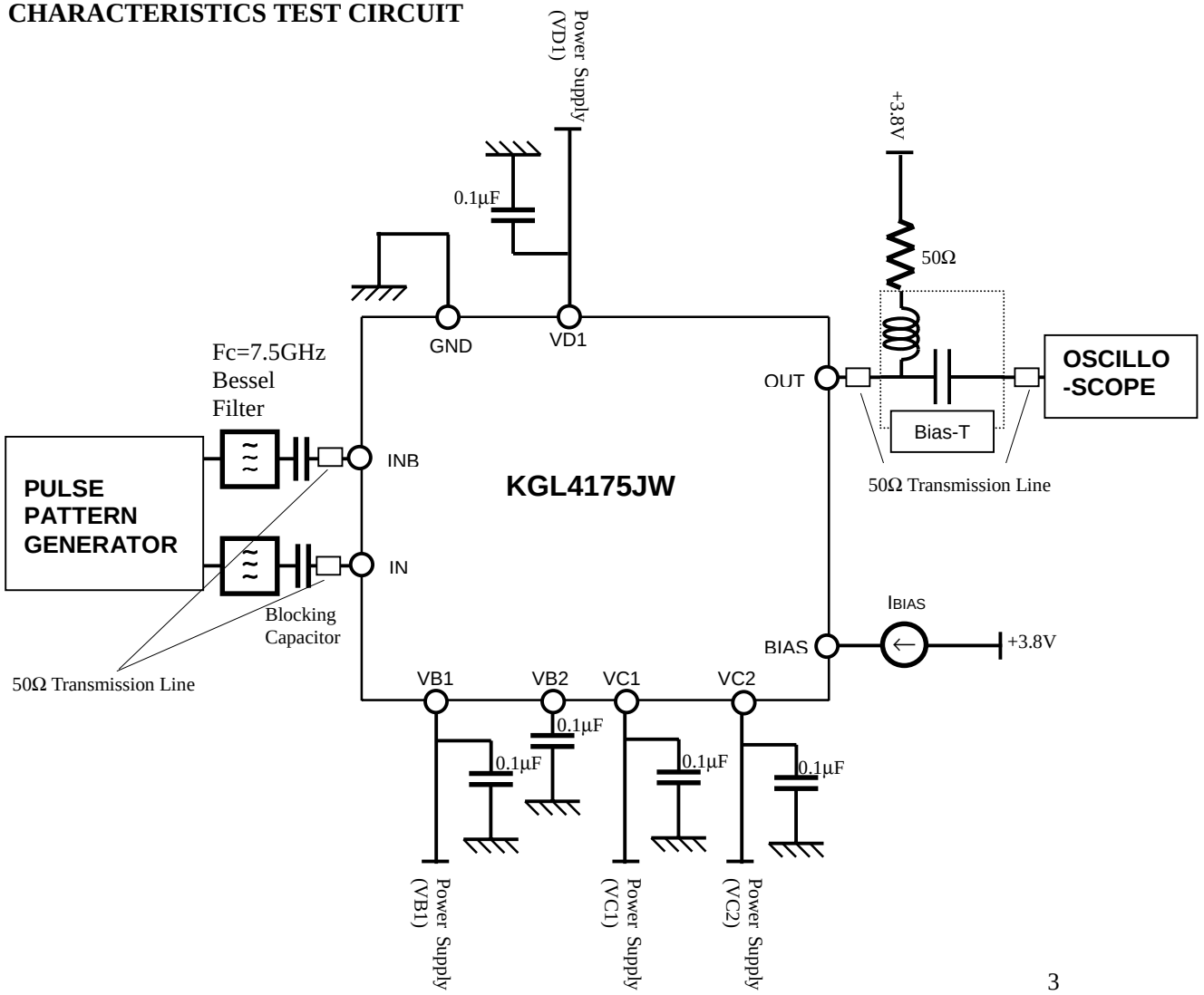
1) VB2 can be open or biased by the external circuit.
For VB2 opened, VB2 is biased at about 1.2V (VD1=3.3V).

ELECTRICAL CHARACTERISTICS

Typical values are at VD=-5.2V, Ts=25°C.

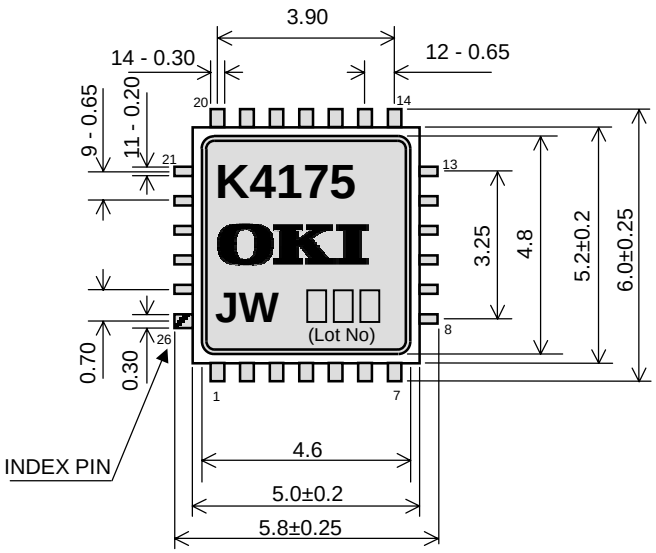
Parameter		Symbol	Condition	Min	Typ	Max	Unit
Maximum Operating Data Rate			NRZ	10.7	-	-	Gbps
Supply Current		Id1		-	150	180	mA
Minimum Modulation Current		Imod (min)	50 Ω load	-	20	25	mApp
Maximum Modulation Current		Imod (max)	50 Ω load	45	50	-	mApp
Minimum Bias Current		Ibias (min)	50 Ω load	-	0	0.5	mA
Maximum Bias Current		Ibias (max)	50 Ω load	40	45	-	mA
X-Point Control Range	High	XPH	50 Ω load, NRZ	57	60		%
	Low	XPL		-	40	43	%
X-Point Stability		Del (Xp)	50 Ω load, 0–85°C	-10	-	10	%
Output Rise/Fall Time		Tr/Tf	50 Ω load, 20%/80%	-	25	37	ps
Input Return Loss		S11	100kHz–10 GHz	-	12	-	dB

AC CHARACTERISTICS TEST CIRCUIT

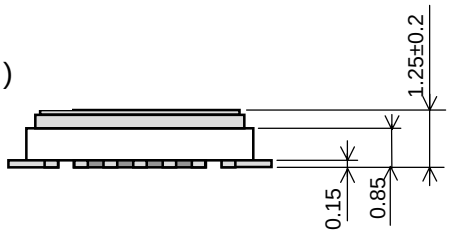


PACKAGE DIMENSIONS

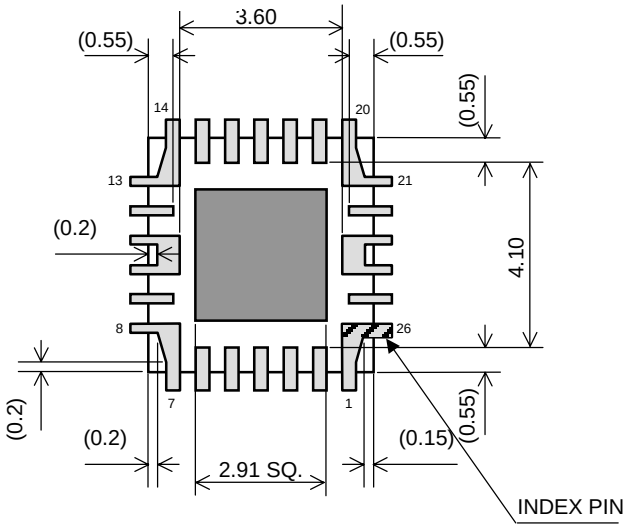
(Top View)



(Side View)



(Bottom View)



(Unit : mm)

Note. This package is non-hermetic.

PIN CONNECTION

No.	Symbol	Note
1	GND	Ground
2	GND	Ground
3	GND	Ground
4	GND	Ground
5	GND	Ground
6	Ibias	Bias Current Output Port
7	GND	Ground
8	GND	Ground
9	Imod	Modulation Current Output Port
10	GND	Ground
11	GND	Ground
12	GND	Ground
13	GND	Ground
14	GND	Ground
15	VC2	Bias Current Control Port
16	VC1	Modulation Current Control Port
17	VD1	Supply Voltage Port
18	VB2	X-Point Reference Port
19	VB1	X-Point Control Port
20	GND	Ground
21	GND	Ground
22	INB	Inverted Input Port
23	GND	Ground
24	GND	Ground
25	IN	Signal Input Port
26	GND	Ground

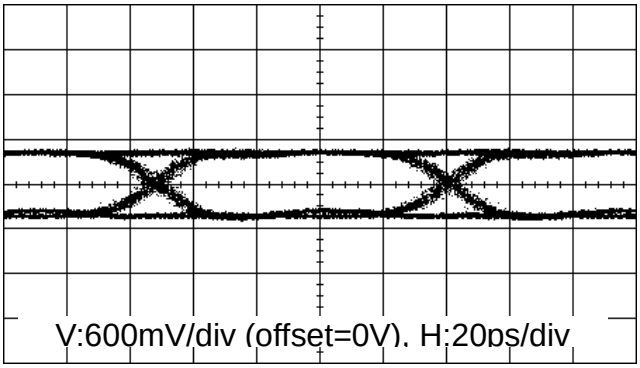
TYPICAL OPERATING CHARACTERISTICS

Measured Condition

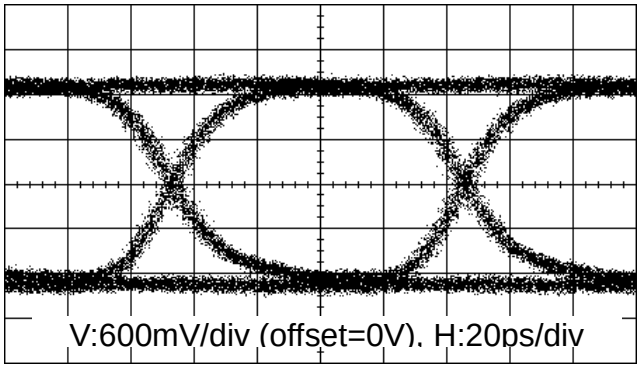
Input Signal 10.7bps, NRZ, PN31, Differential 0.5Vpp (0.25Vpp each), AC Coupled

Tr/Tf(20-80%) ≅36ps (through 7.5GHz Bessel Filters)

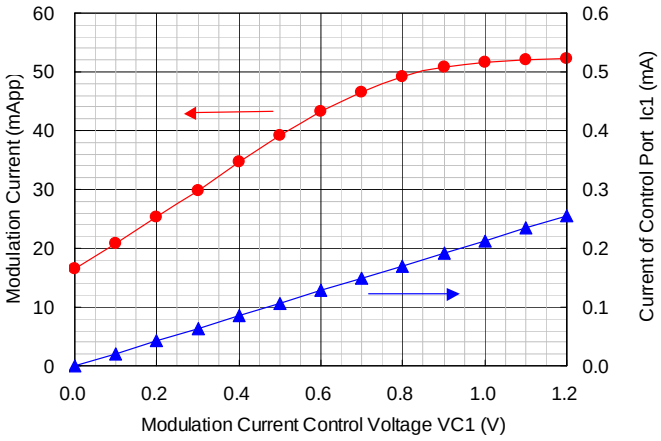
Waveforms @10.7Gbps Operate

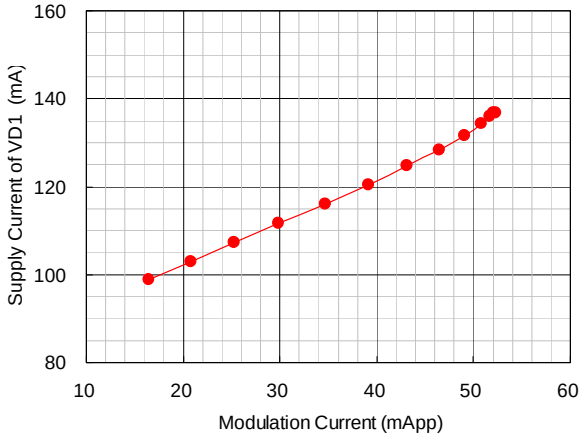


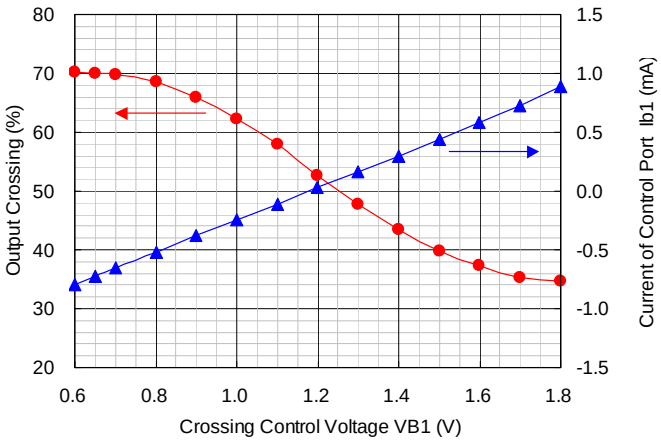
Amplitude : 0.823Vpp (16.5mApp)
Tr / Tf (20–80%) : 17.3ps / 17.8ps
Jitter (p-p) : 11.2ps

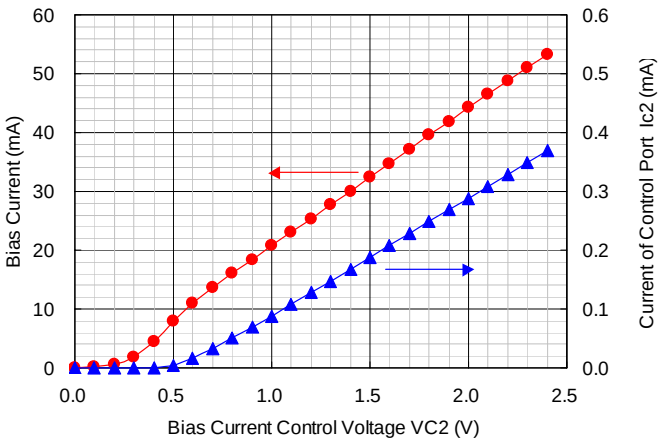


Amplitude : 2.608Vpp (52.1mApp)
Tr / Tf (20–80%) : 21.8ps / 25.2ps
Jitter (p-p) : 11.3ps

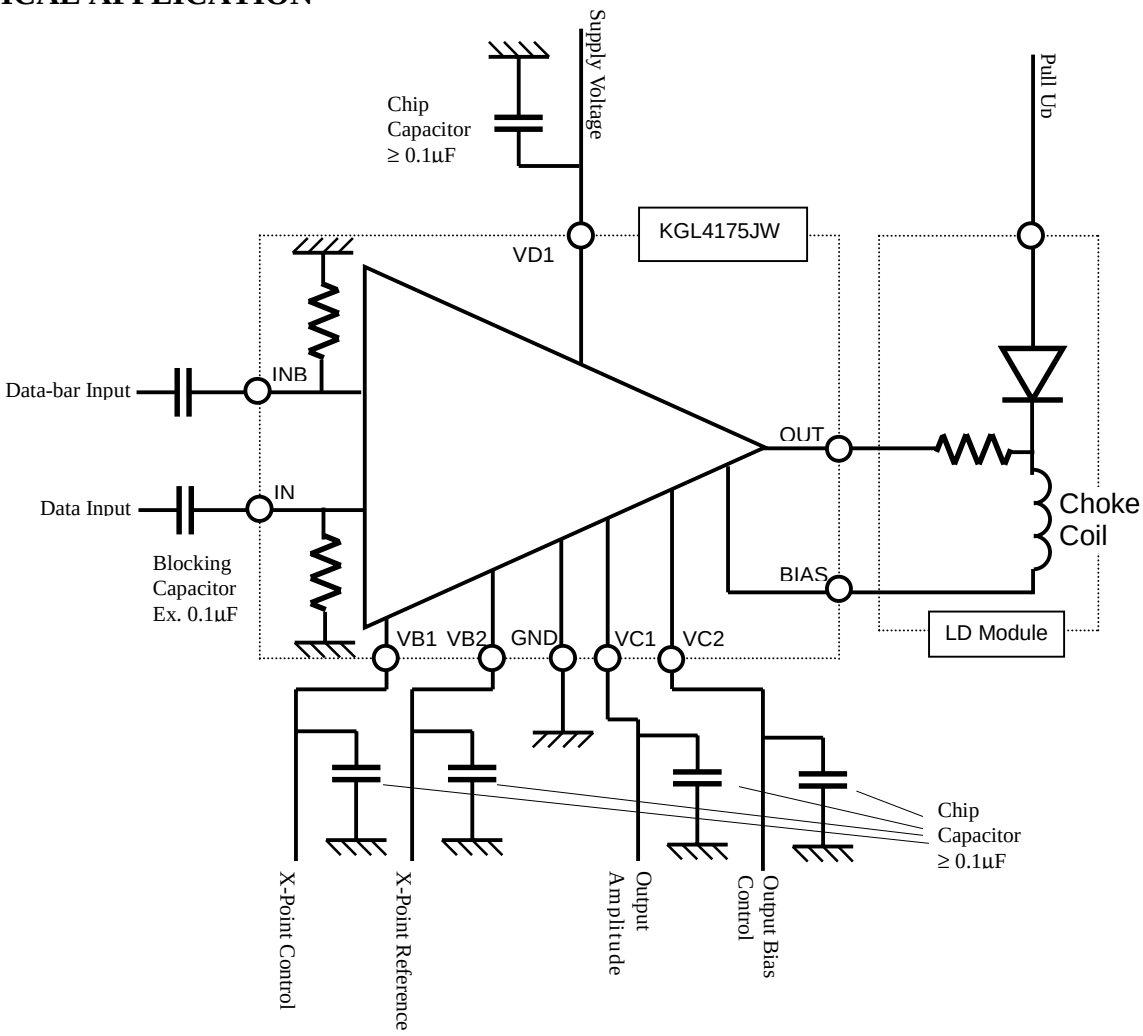








TYPICAL APPLICATION



TYPICAL PCB LAYOUT AND ASSEMBLING INFORMATION

Please request us the application note named GTD18810.

APPLICATION NOTE

1. For stable operation;

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

ESD Considerations:

This device can be damaged by ESD; therefore appropriate precautions must be taken to avoid exposure to ESD and EOS during handling, assembly, and testing of these devices. Failure to adhere to proper ESD/EOS precautions during handling and assembly of these devices can damage or adversely affect device reliability.

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