Discovery Semiconductors, Inc.®
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Data Sheet
June 2003

DSC 30S, 40S, 50S: Wide Bandwidth High Power Low Distortion PIN Diodes

Description:

The DSC 30S, 40S and 50S are hermetically sealed, high reliability, low harmonic distortion photodiode modules with internal 50 ohm termination designed for high optical power applications with minimum bandwidths of 18, 14 and 10 GHz, respectfully. The devices are well suited for receiver applications with optical preamplification. The modules have a small physical footprint and removable RF connector. The DSC 30, 40 and 50 models are unterminated versions for special applications.

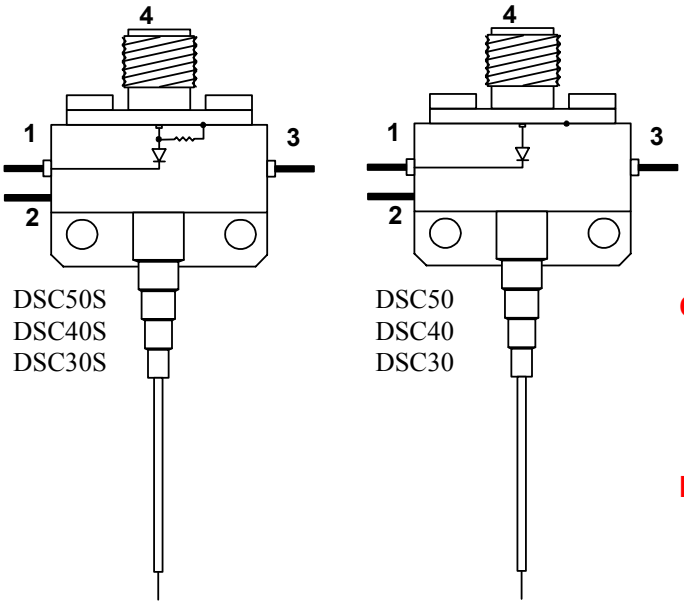
Features:

- High Optical Power Delivers up to 1 V_{pp} Output
- Low Group Delay
- Low PDL
- Low Harmonic Distortion
- Small Footprint & High Reliability
- Meets GR-468 Standards

Applications:

- Optically Amplified Systems
- RZ, NRZ, super FEC formats to 30 GHz
- Low Distortion Analog Links

Block Diagram:



Pin Connections:

1.	Bias Voltage Photodiode V_{bd}
2.	Case Ground - Observe Polarities
3.	NC
4.	RF Signal Out

CAUTION: Always follow these steps:

1. **Connect ground first**
2. **Use current-limited power supply**
3. **Apply stabilized bias of correct polarity**
4. **Then apply optical power**

IMPORTANT: Always shutdown with these steps:

1. **Remove optical power before removing bias**
2. **Power down before disconnecting devices**

Optical / Electrical Specifications:

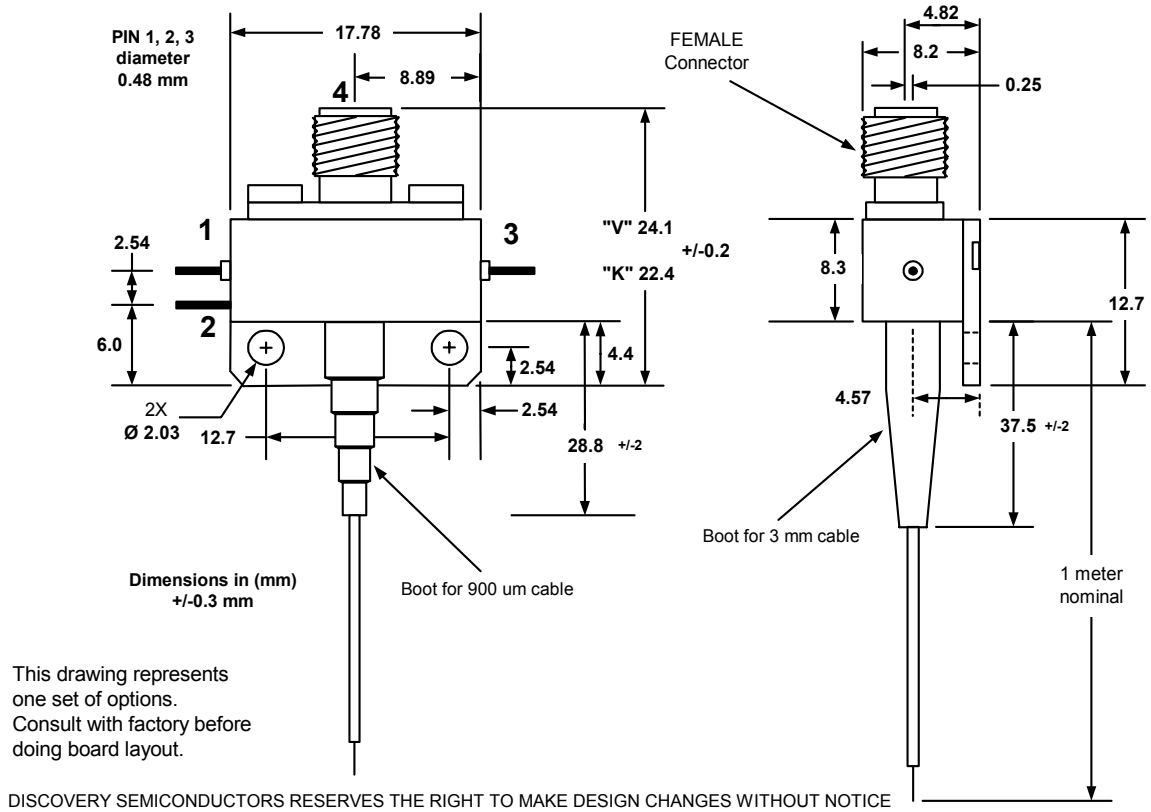
Parameter		Min	Typ	Max	Units
Responsivity	@ 1550 nm	0.70	0.80	-	A / W
	@ 1310 nm	0.75	0.80	-	
Ripple [1]		-0.5	-	+1.5	dB
Logic Sense / Coupling		Positive Non-Inverting / DC 50 Ω			
Group Delay [2]		-	± 7	-	ps
3 dB Bandwidth	30S[5]	18	22	-	GHz
	40S[5]	14	16	-	
	50S[5]	10	12	-	
Power Dissipation (= V_{bd} * I_{bd})	30S	-	-	150	mW
	40S, 50S	-	-	200	
Dark Current @ 25 °C, 5V		-	10	100	nA
Optical Return Loss		-30	-35	-	dB
Wavelength Response Range		800		1650	nm
Bias Voltage @ + 13 dBm		-	+6	-	V
1 dB small signal compression	30S @ 5 V		23		mA
	40S @ 5 V		26		
	50S @ 5 V		28		
CSO (Composite Second Order Distortion) @ + 4 dBm		-70	-	-	dBc
CTO (Composite Third Order Distortion) @ + 4 dBm		-75	-	-	dBc
Optical PDL @ 1550 nm [3]		-	0.06	0.12	dB

Absolute Maximum Ratings:

Operating Temperature Range [4]		0 to +70	°C
Storage Temperature Range		-40 to +85	°C
PIN Bias Voltage		+0.5 to +10	V
Forward Current		10	mA
Optical Input Power Damage Threshold [6]	30S	+17	dBm Peak NRZ 50% duty cycle
	40S, 50S	+19	
Lead Soldering Temp (10 s)		250	°C

[1] Flatness – relative to mean DC to 70% of the 3 dB bandwidth.
[2] Group Delay – 500 MHz to 3 dB bandwidth.
[3] Optical PDL measured with the Agilent measurement system.
[4] Heat sink is required.
[5] Power Bandwidth of unterminated 30, 40 & 50 is unspecified: Typically, it runs 60% of terminated version.
[6] With an EDFA occasional "Light Burst" not lasting more than 10 micro seconds.

Dimensioned Outline Drawing:



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Optical Input:

Connector	Polish	Fiber	Buffer	Length
FC or SC	PC,UPC or APC	SMF28	3 mm option 900 um tight buffer (std)	1 meter
FC	PC, UPC	125 / 50 MM	3 mm or 900 um	option
FC	PC, UPC	125 / 62.5 MM		option
others by request	UPC or APC	SMF28	900 um	option

Electrical Output:

Standard: "K"* type connector female **Optional:** "KM"* type connector male (extra cost)

DSC30S, DSC40S, DSC50S: 50 ohm internal termination**:**

DSC30, DSC40, DSC50: no internal termination (external circuit must supply DC return path):

Ordering information:

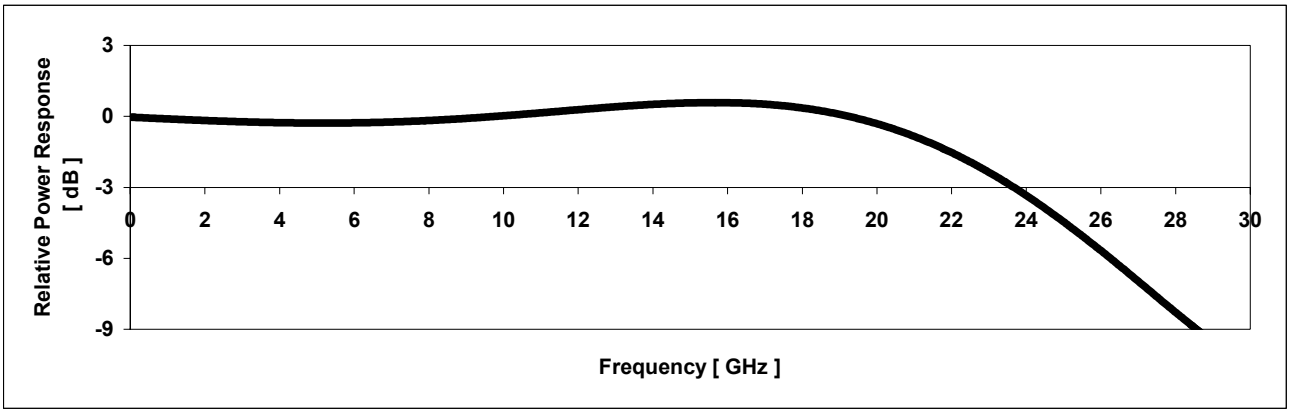
Parts should be ordered as DSCXX(S)-YT-ZZ/UUU-Ψ where the code characters:

- XX are replaced by the desired model digits, e.g. 40 for the 40 micron device,
- S When present, specifies full bandwidth & 50 ohm termination; omit for open termination & reduced power bandwidth
- Y is '3' for standard optical return loss, '5' for >45 dB (extra cost, '6' for 50 mm multimode fiber, proximity focused (extra cost),
- T is '3' for 3 mm and is '9' for 0.9 mm diameter buffer (standard),
- ZZ specifies the fiber optic connector (FC, SC, LC),
- UUU specifies the ferrule finish diameter (PC, UPC, APC).
- Ψ specifies the K* connector, which is the only output connector available.

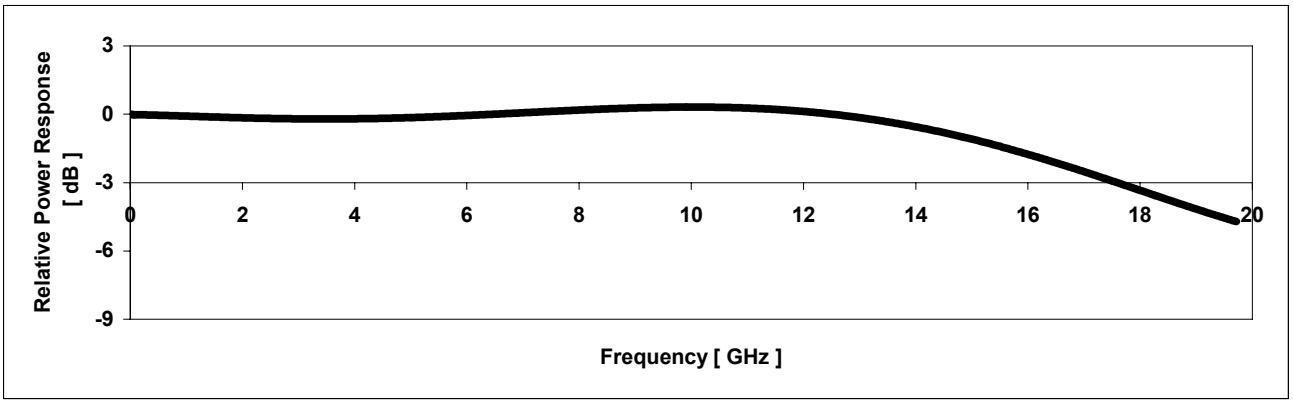
* K connector is a trademark of Anritsu Company; K connectors are 2.92 mm coaxial (compatible with 3.5 mm SMA).

Frequency Response Curves:

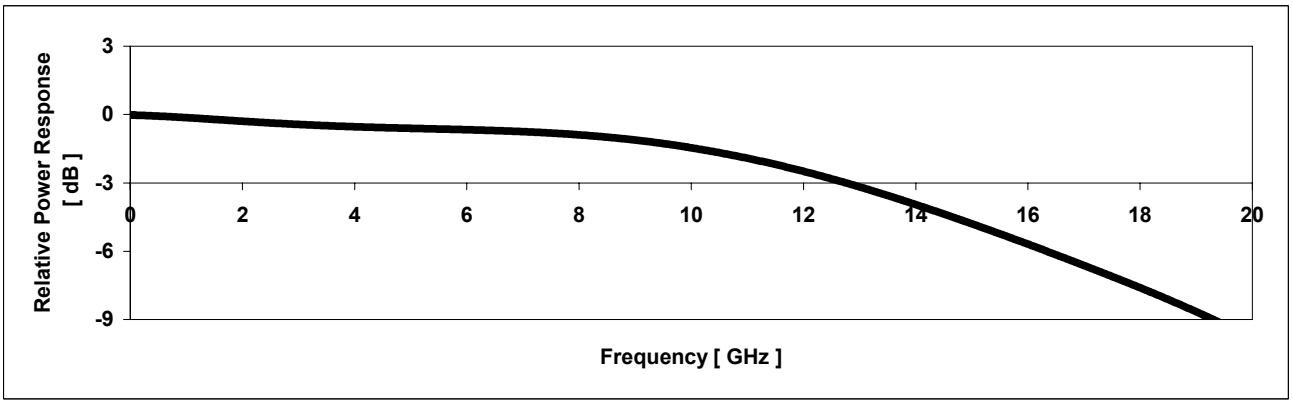
DSC30S:



DSC40S:



DSC50S:



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