Discovery Semiconductors, Inc.
An ISO 9001:2000 Certified Company

Data Sheet
February 2002

DSC-R406, R407 & R408 High Gain Narrowband Optical Receivers

Description:

Designed for microwave RF over fiber applications, these high-gain fiber-pigtailed modules are designed to support 28, 39 and 55 GHz applications. Compact, hermetically sealed module can be directly connected to microwave antenna for high data rate wireless transmission to mobile or fixed receivers.

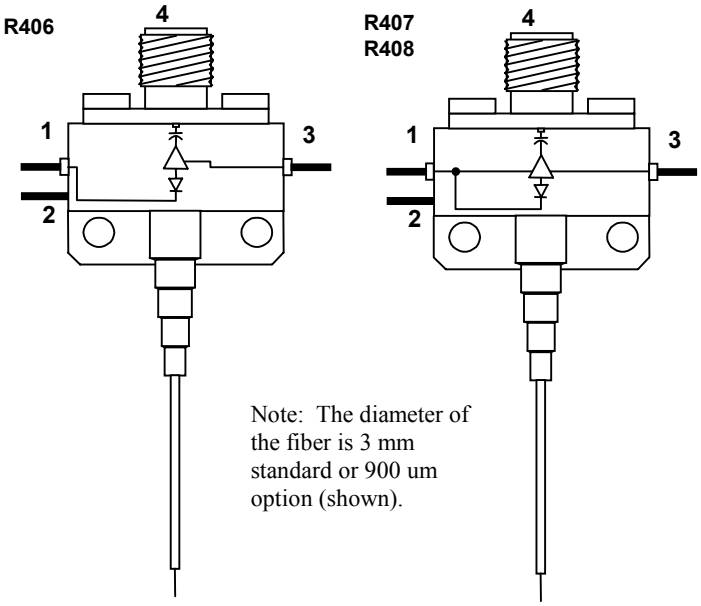
Features:

- R406 offers 20 dB gain for 28 GHz LMDS, K and Ka transmission over fiber
- R407 offers 24 dB gain for 39 GHz LMDS, Ka and Q bands
- R408 offers 20 dB gain for Q, U, V or W bands, 60 GHz cellular
- Low electrical back reflection
- Small size, hermetically sealed
- Meets industry GR-468 reliability Standards

Applications:

- Hybrid fiber/wireless systems
- Distribution of microwave RF carriers
- Optical phased-array radar

Block Diagram:



Note: The diameter of the fiber is 3 mm standard or 900 um option (shown).

Pin Connections:

1.	R406 – Bias, photodiode (V_{bd}) * R407 – Bias, photodiode & amplifier (V_{dd}) * R408 – Bias, photodiode & amplifier (V_{dd}) *
2.	Case Ground *
3.	R406 – Bias, amplifier drain (V_{dd}) * R407 – Bias, amplifier gate (V_{ss}) * R408 – Bias, amplifier gate (V_{ss}) *
4.	RF Signal Out:

* Observe Polarities found on test datasheet w/unit ALWAYS connect ground FIRST, either at case or by RF connection, then V_{ss} (if present), followed by V_{bd} and V_{dd}. Disconnect in the reverse order and ALWAYS disconnect ground LAST.

Optical / Electrical Specifications:

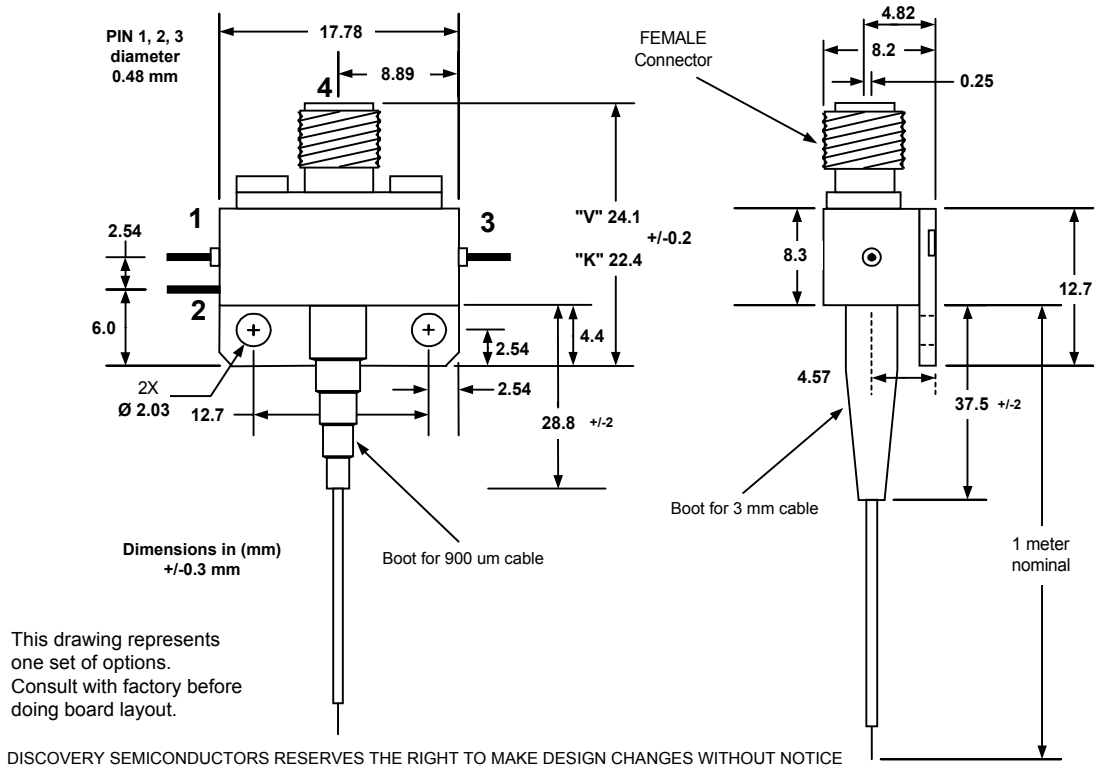
Parameter		R406	R407	R408	Units
Responsivity	@ 1550 nm	Min.: 0.5 / Typ.:0.6			A/W
	@ 1310 nm	Min.: 0.5 / Typ.:0.6			
Wavelength Response Range		800 to 1650			nm
FWHM Bandwidth	Min.	18	34	39	GHz
	Max	34	49	64	GHz
Power Gain of Amp.	Min.	18	24	20	dB
	Typ.	21	26	23	dB
Noise (Typ.)		2	3	3.8	dB
Vdd Bias Voltage (Diode & Amp.)		+5 / +5	+2.5	+2.5	V
Vss Bias (Amplifier Gate)		n/c	- 0.5	- 0.5	V
Power Dissipation	Typ.	350	130	160	mW
Electrical Return Loss	Typ.	8	3	12	dB
Optical Return Loss		Min.: 25 Typ.:30			dB
Optical input power at RF output 1 dB compression (typ.) point		1	1	2.5	dBm
Optical PDL @ 1550 nm (1)		Typ. 0.06 / Max: 0.12			dB
Logic Sense / Coupling		Inverting / AC			

Absolute Maximum Ratings:

Parameter	R406	R407	R408	Units
Operating Temperature Range (2)	0 to +70			°C
Storage Temperature Range	- 40 to +85			°C
Amplifier Bias V_{dd}	5.5	-1 to +0.3	-1 to +0.3	V
Photodiode Bias V_{bd}	5.5	5.5	5.5	V
Amplifier Current I_{dd}	130	100	100	mA
Optical Input Power Damage Threshold (3)	2	4	4	dBm Peak
Lead Soldering Temp (10 sec)	250			°C

(1) Optical PDL measured with the Agilent measurement system
(2) Heat sink is required
(3) Assumes 50% duty cycle

Dimensioned Outline Drawing:



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Optical Input:

Connector	Polish	Fiber	Buffer	Length
FC or SC	UPC or APC	SMF28	3mm loose buffer (std)	1 meter
others by request	UPC or APC		900 um tight buffer (opt)	option

Electrical Output:

Model	Standard	Option
DSC-R406	"K" [+] type female coaxial - standard	"V" * type female coaxial "KM" [+] or "VM" * type male coaxial
DSC-R407	"V" * type female coaxial – standard	"VM" * type male coaxial
DSC-R408	"V" * type female coaxial – standard	"VM" * type male coaxial

* V type RF connector is a trademark of Anritsu Company with barrel diameter of 1.85 mm RF (compatible with 2.4 mm).
[+] K type RF connector is a trademark of Anritsu Company with barrel diameter of 2.92 mm RF (compatible with 3.5 mm SMA).

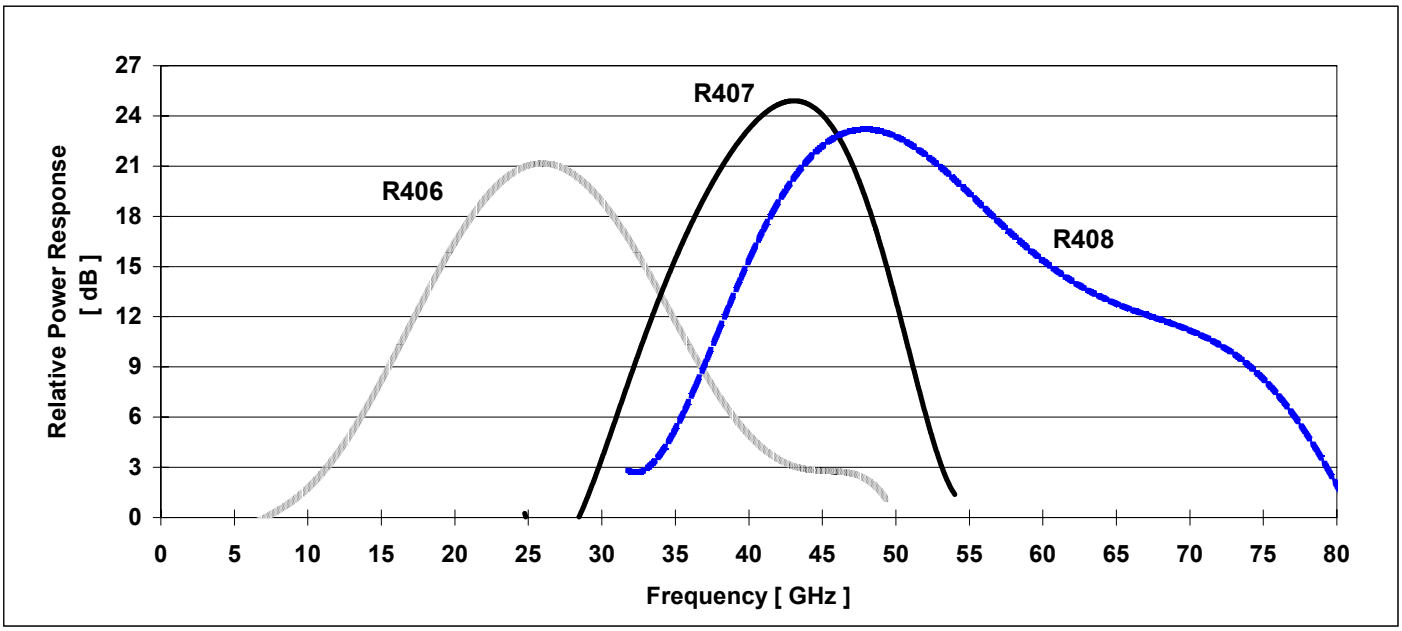
Ordering information:

Parts should be ordered as DSC-R40X-YT-ZZ/UUU-W(M) where the code characters:

- X is replaced by the desired model digit, e.g. 6 for model R406.
- Y is '3' for standard optical return loss (no other option available),
- T is '3' for 3mm (standard) and is '9' for 0.9mm diameter buffer,
- ZZ specifies the fiber optic connector (FC, SC, LC),
- UUU specifies polish type (APC, UPC),
- W specifies the RF output connector, with standard female socket. Add M for optional male pin.

Frequency Response Curves:

DSC-R406, DSC-R407, DSC-R408:



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