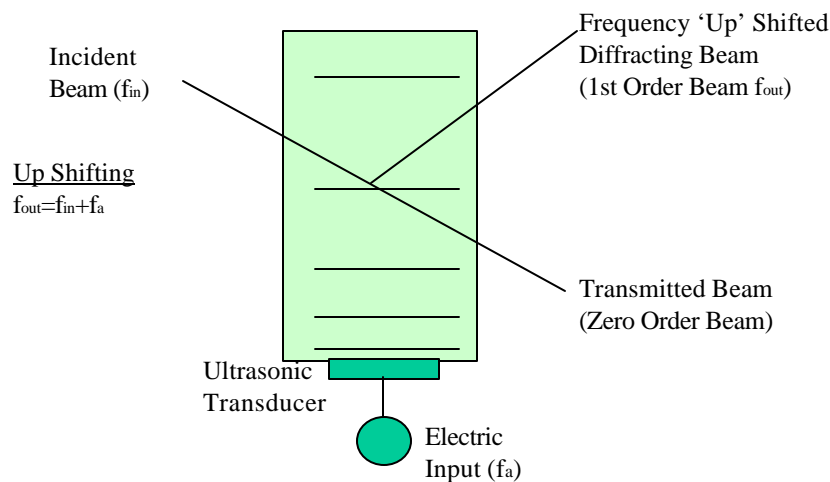
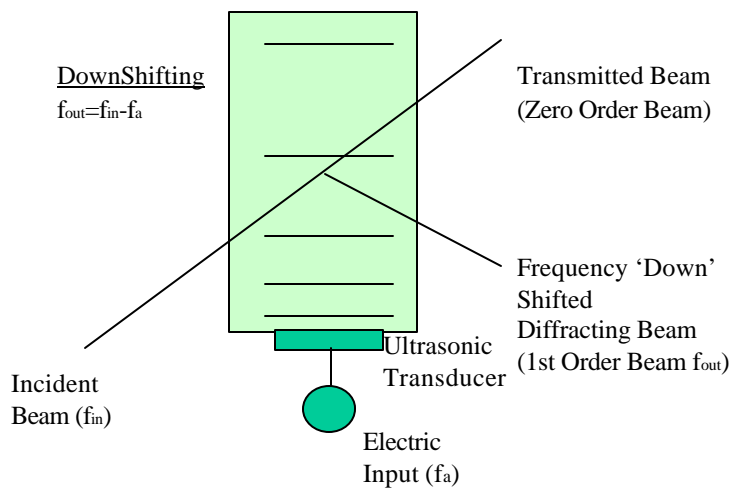




Acousto-Optic Frequency Shifter

The diffracted beam of the AOM and AOD is also shifted in frequency (wavelength), by the the acoustic beam. This is called the Doppler shift. If the incident acoustic wave is introduced in the direction of the incident optical wave, the laser frequency shifts towards the higher side. If the incident acoustic wave is introduced in the apposite direction of the incident optical wave, the laser shifts towards the lower frequency side



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Frequency Shifter Model Table

Model Number	Driver Number	Spectral Range (nm)	DE %	Shift MHz	Active Aperture (nm)	Material
AMF-90-2-2.1	FFF-90	1000-2200	15	90	1.00	AM
AMF-55-1.3	FFF-55	1000-2200	80	55	2.00	AM
AMF-100-1.3	FFF-100	1000-2200	80	100	2.00	AM
GEF-40-10	FFF-40	2000-12000	75	40	2.00	Ce
GEF-60-1.5	FFF-60	2000-12000	75	60	1.5	Ce
GEF-80-20	FFF-80	2000-12000	70	80	1.00	Ce
GPF-250-100	FFF-250	590-1000	60	250	0.75	GaP
GPF-650-225	FFF-250	590-1000	50	650	0.18	GaP
GPF-1000-500	FFF-1000	590-1000	40	1000	0.076	GaP
GPF-1500-1000	FFF-1500	590-1000	10	1500	0.076	GaP
GPF-1700-500	FFF-1700	590-1000	30	1700	0.076	GaP
IPF-200-50	FFF-200	1000-1600	40	200	0.75	InP
IPF-400-200	FFF-400	1000-1600	35	400	0.5	InP
IPF-600-200	FFF-600	1000-1600	30	600	0.18	InP
IPF-800-300	FFF-800	1000-1600	20	800	0.076	InP
IPF-1000-350	FFF-1000	1000-1600	15	1000	0.076	InP
IPF-1300-400	FFF-1300	1000-1600	10	1300	0.076	InP

Model Number	Driver Number	Spectral Range (nm)	DE %	Shift MHz	Active Aperture (nm)	Material
LNF-2500-1000	FFF-2500	630/830	20	2500	0.076	LiNBO3
LNF-3500-1000	FFF-3500	630	5	3500	0.076	LiNBO3
QZF-80-20	FFF-80	200-4500	75	80	1.0	SiO2
QZF-150-30	FFF-150	200-4500	75	150	0.75	SiO2
QZF-210-40	FFF-210	200-4500	75	210	0.50	SiO2
TEF-200-50	FFF-200	400-840	60	200	0.75	TEO2
TEF-270-100	FFF-270	400-840	60	270	0.75	TEO2
TEF-540-200	FFF-540	400-840	40	540	0.18	TEO2
TEF-600-400	FFF-600	400-800	40	600	0.18	TEO2
TEF-1000-300	FFF-1000	400-840	40	1000	0.076	TEO2
TEF-1700-350	FFF-1700	400-480	15	1700	0.076	TEO2



IR Frequency Shifter (1 to 2.5 mm)

Specifications	AMF-55-1.3	AMF-100-1.3	AMF-90-20-2.1
Optical Wavelength	1300 nm	1300 nm	2100 nm
Optical Power Density	3 W/mm ²	3 W/mm ²	3 W/mm ²
Bandwidth (3dB)	55 MHz	100 MHz	20 MHz
Active Aperture	2 mm	2 mm	1.00 x 5.0 mm
Frequency Shift	55 MHz	100 MHz	90 MHz
Optical Transmission	> 95 %	> 95 %	> 66 % (uncoated)
Maximum Diffraction Efficiency	80 %	80 %	15 %
Wave Front Distortion	$\lambda/10$	$\lambda/10$	$\lambda/10$
Acoustic Velocity	25 mrad	25 mrad	37.5 mrad
Maximum RF Power	50 mrad	50 mrad	75 mrad
Input Impedance	2.52E+3 m/sec	2.52E+3 m/sec	2.52E+3 m/sec
V.S.W.R.	~1 W	~1 W	~1 W
Optical Polarization	50 ohms	50 ohms	50 ohms
Case Type	2:1	2:1	2:1
	Any	Any	Linear
	Air Cooled	Air Cooled	Air Cooled

IR Frequency Shifter (2 to 11 mm)

Item	Unit	GEF-40-10	GEF-60-1.5	GEF-80-20
Laser Wavelength	um	10.6	10.6	10.6
Active Aperture	mm	2.0	1.5	1.0
Frequency Shift	MHz	40	60	80
Bandwidth (3dB)	MHz	10	15	20
Optical Transmission	%	>85	>85	>85
Maximum Diffraction Efficiency	% @ watts	75 @ 35	75 @ 35	75 @ 30
Acoustic Mode	-	Longitudinal	Longitudinal	Longitudinal
Acoustic Velocity	m/sec	5.5 E+3	5.5 E+3	5.5 E+3
Maximum Electric Input	watts	50	50	50
Input Impedance	ohms	50	50	50
V.S.W.R.	-	2.0:1	2.0:1	2.0:1
Optical Polarization		Linear	Linear	Linear
Case Type		G	G	G

*-the exact RF power requirement will be defined during final test of fabricated device.

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High Speed VIS-NIR Frequency Shifter (.6-1.6 mm)

Item	Unit	GPF-250-100	GPF-650-225	GPF-1000-500
Laser Wavelength	nm	633	633	633
Active Aperture	mm	0.75	0.18	0.076
Frequency Shift	MHz	250	650	1000
Bandwidth (3dB)	MHz	100	225	500
Optical Transmission	%	80	80	80
Maximum Diffraction Effic.	%	60	50	60
Acoustic Mode	-	Longitudinal	Longitudinal	Longitudinal
Acoustic Velocity	m/sec	6.31E+3	6.31E+3	6.31E+3
Maximum Electric Input	watts	1	1	1
Input Impedance	ohms	50	50	50
V.S.W.R.	-	2.0:1	2.0:1	2.0:1
Optical Polarization	-	Linear	Linear	Linear
Case Type		A	A	A

High Speed VIS-NIR Frequency Shifter (.6-1.6 mm)

Item	Unit	GPF-1500-100	GPF-1700-500
Laser Wavelength	nm	633	633
Active Aperture	mm	0.076	0.076
Frequency Shift	MHz	1500	1700
Bandwidth (3dB)	MHz	1000	500
Optical Transmission	%	80	80
Maximum Diffraction Effic.	%	20	50
Acoustic Mode	-	Longitudinal	Longitudinal
Acoustic Velocity	m/sec	6.31E+3	6.31E+3
Maximum Electric Input	watts	1	1
Input Impedance	ohms	50	50
V.S.W.R.	-	2.0:1	2.0:1
Optical Polarization	-	Linear	Linear
Case Type		A	A

* - the required optical polarization direction is parallel to the sound direction (horizontal).



High Speed VIS-NIR Frequency Shifter

Item	Units	GPF-3400-200-.795
Substrate	-	GaP*
Wavelength of Operation	nm	795 nm
Frequency Shift	MHz	3400
RF Bandwidth	MHz	200
Active Aperture	μm	25
Optical Transmission	%	>80
Diffraction Efficiency	%	2% @ 1Watt RF
Wave Front Distortion	-	$\lambda/10$
Bragg Angle	mrad	214
Separation Angle	mrad	428
Acoustic Velocity	m/s	6.31E+3
Maximum RF Power*	W	0.1-0.5
Input Impedance	ohms	50
V.S.W.R	-	3:1
Optical Polarization	-	Linear
RF Connector	-	SMA

- The optical damage threshold of this material is 100 W/mm².

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High Speed IR Frequency Shifter (1.0-1.6 mm)

Item	Unit	IPF-200-50	IPF-400-200	IPF-600-200
Laser Wavelength	nm	1150	1150	1150
Active Aperture	mm	0.75	0.5	0.18
Frequency Shift	MHz	200	400	600
Bandwidth (3dB)	MHz	50	200	200
Optical Transmission	%	90	90	90
Maximum Diffraction Effc.	%	40-50	35	30
Acoustic Mode	-	Longitudinal	Longitudinal	Longitudinal
Acoustic Velocity	m/sec	5.1E+3	5.1E+3	5.1E+3
Maximum Electric Input	watts	1	1	1
Input Impedance	ohms	50	50	50
V.S.W.R.	-	2.0:1	2.0:1	2.0:1
Optical Polarization	-	Linear	Linear	Linear
Case Type		A	A	A

High Speed IR Frequency Shifter (1.0-1.6 mm)

Item	Unit	IPF-800-300	IPF-1000-350	IPF-1300-400
Laser Wavelength	nm	1150	1150	1150
Active Aperture	mm	0.076	0.076	0.076
Frequency Shift	MHz	800	1000	1300
Bandwidth (3dB)	MHz	300	350	400
Optical Transmission	%	90	90	90
Maximum Diffraction Effc.	%	20	15	10
Acoustic Mode	-	Longitudinal	Longitudinal	Longitudinal
Acoustic Velocity	m/sec	5.1E+3	5.1E+3	5.1E+3
Maximum Electric Input	watts	1	1	1
Input Impedance	ohms	50	50	50
V.S.W.R.	-	2.0:1	2.0:1	2.0:1
Optical Polarization	-	Linear	Linear	Linear
Case Type		A	A	A

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UV-VIS-IR Frequency Shifter (.2-4.5 mm)

Item	Unit	QZF-80-20	QZF-150-30	QZF-210-40
Laser Wavelength	nm	488	488	488
Active Aperture	mm	1.0	0.75	0.5
Frequency Shift	MHz	80	150	210
Bandwidth (3dB)	MHz	20	30	40
Optical Transmission	%	>98	>98	>98
Maximum Diffraction Effic.	% @ watts	75 @ 10	75 @ 10	75 @ 10
Acoustic Mode	-	Longitudinal	Longitudinal	Longitudinal
Acoustic Velocity	m/sec	5.72E+3	5.72E+3	5.72E+3
Maximum Electric Input	watts	10	10	10
Input Impedance	ohms	50	50	50
V.S.W.R.	-	2.0:1	2.0:1	2.0:1
Optical Polarization	-	Linear	Linear	Linear
Case Type	-	-	-	-

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High Speed UV-VIS-IR Frequency Shifter (.4-5 mm)

Item	Unit	TEF-200-50	TEF-270-100	TEF-540-200
Laser Wavelength	nm	630	630	630
Active Aperture	mm	0.75	0.75	0.18
Frequency Shift	MHz	200	270	540
Bandwidth (3dB)	MHz	50	100	200
Optical Transmission	%	>95	>95	>95
Maximum Diffraction Effc.	%	>75	>70	40
Acoustic Mode	-	Longitudinal	Longitudinal	Longitudinal
Acoustic Velocity	m/sec	4.2E+3	4.2E+3	4.2E+3
Maximum Electric Input	watts	1	1	1
Input Impedance	ohms	50	50	50
V.S.W.R.	-	2.0:1	2.0:1	2.0:1
Optical Polarization	-	Linear	Linear	Linear
Case Type	-	-	-	-

Item	Unit	TEF-600-200	TEF-1000-300	TEF-1700-350
Laser Wavelength	nm	630	630	630
Active Aperture	mm	0.18	0.076	0.076
Frequency Shift	MHz	600	1000	1700
Bandwidth (3dB)	MHz	200	300	350
Optical Transmission	%	>95	>95	>95
Maximum Diffraction Effc.	%	40	40	20
Acoustic Mode	-	Longitudinal	Longitudinal	Longitudinal
Acoustic Velocity	m/sec	4.2E+3	4.2E+3	4.2E+3
Maximum Electric Input	watts	1	1	1
Input Impedance	ohms	50	50	50
V.S.W.R.	-	2.0:1	2.0:1	2.0:1
Optical Polarization	-	Linear	Linear	Linear
Case Type	-	-	-	-

