



www.raycan.com

Optoelectronic Next

VCSEL

>> Linking the World

- >1550 nm VCSEL MM/SM
- >1310 nm VCSEL MM/SM
- >850 nm VCSEL MM/SM
- >780 nm VCSEL
- >1060 nm VCSEL
- >1310 nm RCLED
- >VCSEL for CWDM
- >GaAs / InGaAs PD

RayCan Co.,Ltd.

KT Center 2F, 138 Gajeong-dong,
Yusong-gu, Daejeon 305-350, Korea
TEL : +82-42-867-1550, 1310
FAX : +82-42-867-1551
E-mail : raycan@raycan.com
<http://www.raycan.com>

September, 2011

VCSEL >> Linking the world

1310nm, 1490nm, 1550nm single mode VCSEL

: Providing reliable single mode LW VCSEL solution with 2.5 Gbps, 4.25 Gbps and 10 Gbps

Electrical and optical characteristics (T=25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Threshold current	I_{th}		2	3	mA	
Forward voltage	V_f			3	V	
Series resistance	R_s		100	200	Ω	
Output power	P_o		1.0		mW	
Wavelength	λ	1300	1320	1340	nm	1310 nm
		1530	1550	1570	nm	1550 nm
Side mode suppression	SMSR	30	35		dB	
Rise and fall time (20% ~ 80%)	t_r		~ 100		psec	2.5 Gbps
	t_f		~ 150			
	t_r		~ 90		psec	4.25 Gbps
	t_f		~ 120			
t_r		~ 60		psec	10 Gbps	
t_f		~ 60				
Beam divergence	θ		10	12	degree	FWHM

1310nm, 1490nm, 1550nm multimode VCSEL

: Providing reliable multimode LW VCSEL solution with 2.5 Gbps, 4.25 Gbps and 10 Gbps

Electrical and optical characteristics (T=25°C unless otherwise stated)

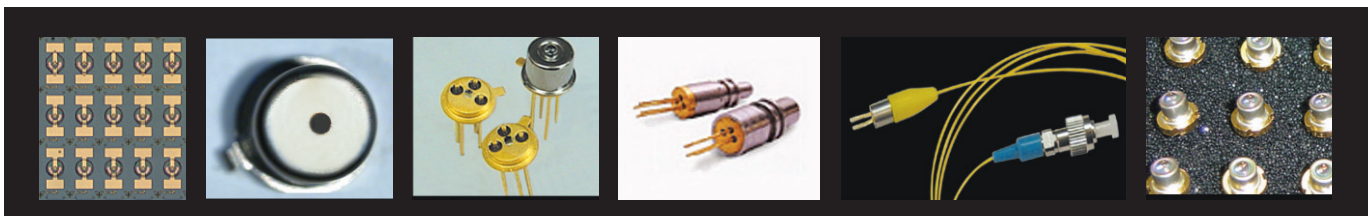
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Threshold current	I_{th}		3	4	mA	
Forward voltage	V_f			3	V	
Series resistance	R_s		70	150	Ω	
Output power	P_o		2.0		mW	
Wavelength	λ	1300	1320	1340	nm	1310 nm
		1530	1550	1570	nm	1550 nm
RMS spectral width	$\Delta\lambda$			0.85	nm	
Rise and fall time (20% ~ 80%)	t_r		~ 100		psec	2.5 Gbps
	t_f		~ 150			
	t_r		~ 90		psec	4.25 Gbps
	t_f		~ 120			
t_r		~ 60		psec	10 Gbps	
t_f		~ 60				
Beam divergence	θ		11	17	degree	FWHM

1310nm CWDM VCSEL

: Providing CWDM VCSELs with 20 nm spacing

Electrical and optical characteristics (T=25°C unless otherwise stated)

Parameter	Symbol	Typ.	Unit	Notes
Wavelength	λ	1271 +/-3	nm	
		1291 +/-3		
		1311 +/-3		
		1331 +/-3		



850nm single mode VCSEL

: Providing oxide-confined single mode 850nm VCSEL solution

Electrical and optical characteristics (T=25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Threshold current	I_{th}		1	2	mA	
Forward voltage	V_f		3		V	
Series resistance	R_s		300		Ω	
Output power	P_o		1.0		mW	
Wavelength	λ	840	850	860	nm	
Side mode suppression	SMSR	25	30		dB	
Peak temperature dependence	$\Delta\lambda/\Delta T$		0.06		nm/°C	T = 0 to 85°C
Beam divergence	θ		24		degree	1/e ² FW

850nm multimode VCSEL

: Providing oxide-confined multimode 850 nm VCSEL solution with 2.5 Gbps, 4.25 Gbps, 6 Gbps and 10 Gbps

Electrical and optical characteristics (T=25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Threshold current	I_{th}		1.5	3.0	mA	
Forward voltage	V_f		2.2	2.5	V	I = 7 mA
Series resistance	R_s		50	80	Ω	I = 7 mA
Output power	P_o		2.0		mW	I = 7 mA
Wavelength	λ	840	850	860	nm	I = 7 mA
RMS spectral width	$\Delta\lambda$			0.85	nm	I = 7 mA
Slope efficiency	η_i		0.4		mW/mA	
Peak temperature dependence	$\Delta\lambda/\Delta T$		0.06		nm/°C	T = 0 to 85°C
Rise and fall time (20% ~ 80%)	t_r		~ 120		psec	2.5 Gbps
	t_f		~ 150			
	t_r		~ 90		psec	4.25 Gbps
	t_f		~ 120			
	t_r		~ 50		psec	10 Gbps
	t_f		~ 60			

PIN Photodiode

: Providing GaAs / InGaAs PIN photodiode solution with 4.25 Gbps, 6 Gbps and 10 Gbps

Electrical and optical characteristics (T=25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Responsivity	R	0.5 0.9			A/W	$\lambda=850\text{nm}$ (GaAs) 1550nm (InGaAs)
Active area diameter	d_{act}		50~80		μm	4.25 ~ 10 Gbps
Dark current	I_d			1.0	nA	V _{bias} = 5V
Breakdown voltage	V_B	40 30			V	$I_d = 1 \mu\text{A}$ (GaAs) $I_d = 1 \mu\text{A}$ (InGaAs)
Rise and fall time (20% ~ 80%)	t_r		~ 90		psec	4.25 Gbps
	t_f		~ 90			
	t_r		~ 50		psec	10 Gbps
	t_f		~ 50			

VCSEL >> Linking the world

780nm multimode VCSEL

: Providing oxide-confined multimode 780nm VCSEL solution with 2.5Gbps and 4.25Gbps

Electrical and optical characteristics (T=25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Threshold current	I_{th}		1.5	3.0	mA	
Forward voltage	V_f		2.2	2.5	V	$I = 7 \text{ mA}$
Series resistance	R_s		50	80	Ω	$I = 7 \text{ mA}$
Output power	P_o		2.0		mW	$I = 7 \text{ mA}$
Wavelength	λ	770	780	790	nm	$I = 7 \text{ mA}$
RMS spectral width	$\Delta\lambda$			0.85	nm	$I = 7 \text{ mA}$
Slope efficiency	η_i		0.4		mW/mA	
Peak temperature dependence	$\Delta\lambda/\Delta T$		0.06		nm/°C	$T = 0 \text{ to } 85^\circ\text{C}$
Rise and fall time (20% ~ 80%)	t_r		~ 120		psec	2.5 Gbps
	t_f		~ 150		psec	
	t_r		~ 90		psec	4.25 Gbps
	t_f		~ 120		psec	

1060nm multimode VCSEL

: Providing oxide-confined multimode 1060nm VCSEL solution with 2.5Gbps, 4.25Gbps and 10Gbps

Electrical and optical characteristics (T=25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Threshold current	I_{th}		1.5	3.0	mA	
Forward voltage	V_f		2.2	2.5	V	$I = 7 \text{ mA}$
Series resistance	R_s		50	80	Ω	$I = 7 \text{ mA}$
Output power	P_o		2.0		mW	$I = 7 \text{ mA}$
Wavelength	λ	1040	1060	1080	nm	$I = 7 \text{ mA}$
RMS spectral width	$\Delta\lambda$			0.85	nm	$I = 7 \text{ mA}$
Slope efficiency	η_i		0.35		mW/mA	

1310nm RC LED

: Providing low cost and short distance transmission solution

Electrical and optical characteristics (T=25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Fiber coupled power	P_f		25		μW	$I = 60 \text{ mA}$ 62.5 μm fiber
Output power	P_o		1		mW	$I = 60 \text{ mA}$
Peak wavelength	λ_p	1270	1310	1340	nm	$I = 60 \text{ mA}$
RMS spectral width	$\Delta\lambda$		70		nm	$I = 60 \text{ mA}$
Forward voltage	V_f		1.3	1.7	V	$I = 60 \text{ mA}$
Capacitance	C		20		pF	$V = 0 \text{ V}$ 1 MHz
Rise and fall time (20% ~ 80%)	t_r		3		nsec	$I = 60 \text{ mA}$
	t_f		3		nsec	
Peak wavelength temperature variation	$\Delta\lambda_p/\Delta T$		0.12		nm/°C	$0^\circ\text{C to } 85^\circ\text{C}$

VCSEL array: 4/8/12 channel array

Package: chip/TOSA, 46, 56, 90/TOSA/pigtail

Options: m-PD/TEC/A-lens with TO package/specific wavelength