VC-04-92 Data Sheet

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【Applications】

For the following consumer and industrial applications
・Light source for 3D sensing
・Light source for gesture recognition
・Light source for distance measuring of VR, AR equipment
・Light source for infrared camera

【Part number】

VC-04-92-110-085

- Diffuser FOV *See table1
- VCSEL junction 1 : Single junction, 2 : Double junction
- Peak wavelength 8 : 850nm, 9 : 940nm
- Product code 04 : Driver in package, Stack VCSEL

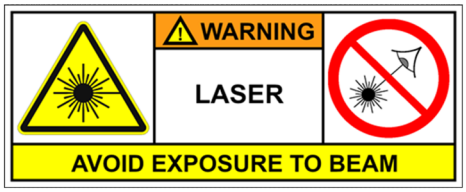
<Table1: Diffuser Lineup>

last six digits	Diffuser FOV(HxV)
047-041	47°x41°
060-045	60°x45°
072-055	72°x55°
090-070	90°x70°
110-085	110°x85°
140-095	140°x95°

CAUTION

During operation, laser light is emitted from the laser diode.
If the laser light or its reflected light enters the eye, it may cause eye damage or blindness.
Eye damage or blindness may result.
・Do not look directly into the laser beam.
・Do not look directly or indirectly into the laser beam.
Removing the diffuser at the top of the package is dangerous as it exposes the laser beam directly to the outside.
Never remove the diffuser.
The diffuser may also come off if it is subjected to a large impact.
Even when using a diffuser, adjust the power supply voltage and duty cycle to obtain IEC 60825-1 Class 1 level output.

WARNING



・This product emits strong infrared laser light when lit.
・Do not look directly at the product while it is lit as this may cause eye damage.
・Please take sufficient safety measures in your equipment equipped with this product in order to prevent light leakage, etc., from affecting the human body.

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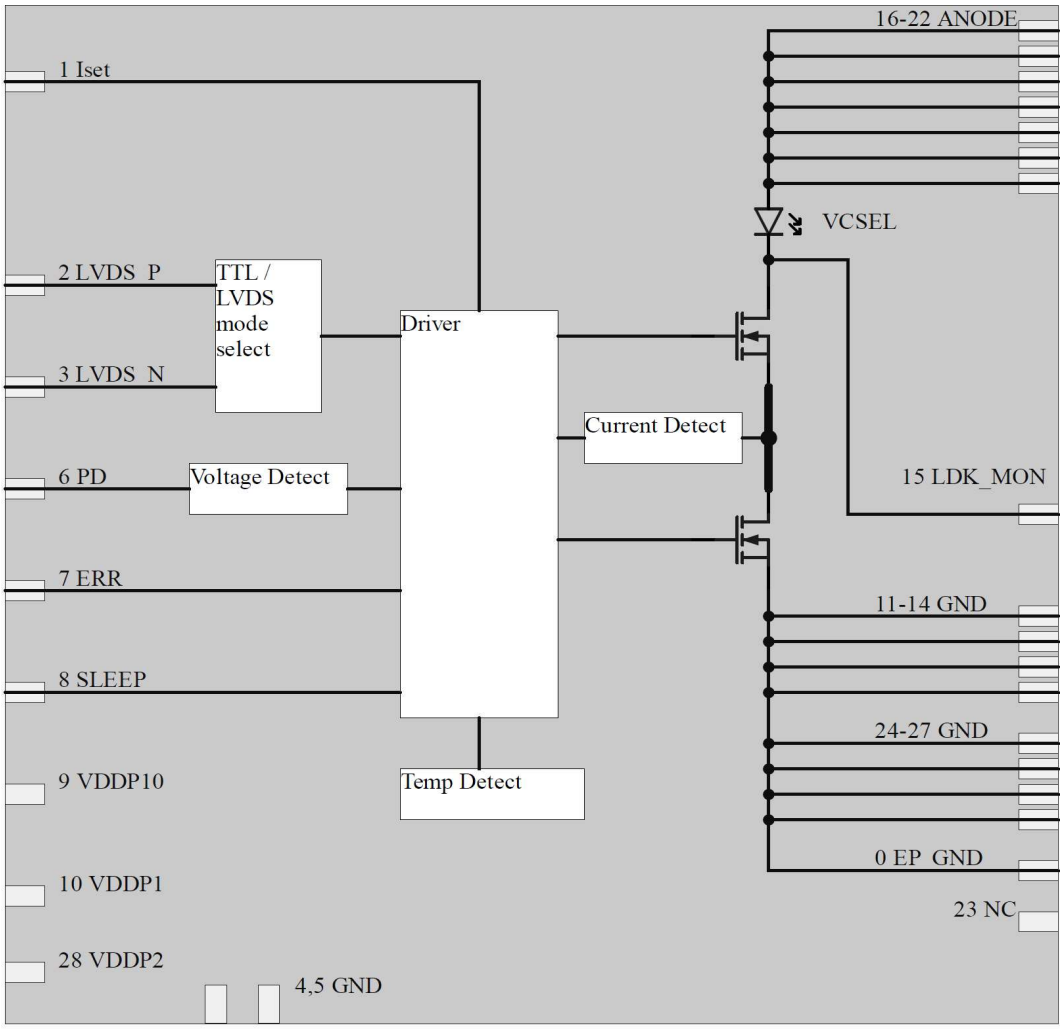
【Absolute Maximum Ratings】

Symbol	Parameter/Conditions	Min.	Max.	Unit
Tstg	Storage temperature	-20	110	℃
Ts	Operating temperature	-20	85	℃
Tj	Junction temperature	-	125	℃
Vddp	Voltage at VDDP1,2,10	-0.3	6.5	V
Vin	Voltage at input terminal	-0.3	VDD+0.3	V
Vanode	Voltage at VCSEL anode	-	12	V

【IC Block diagram】



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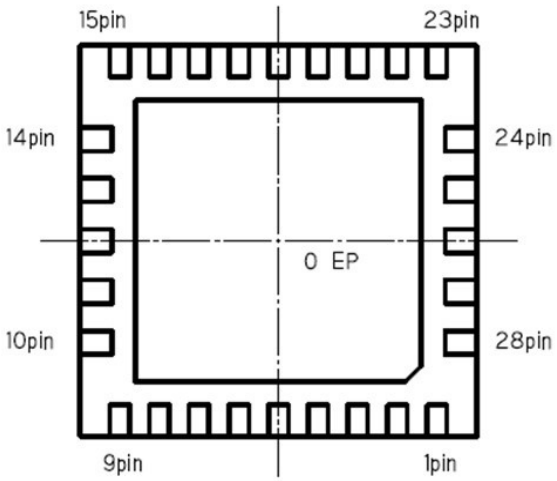
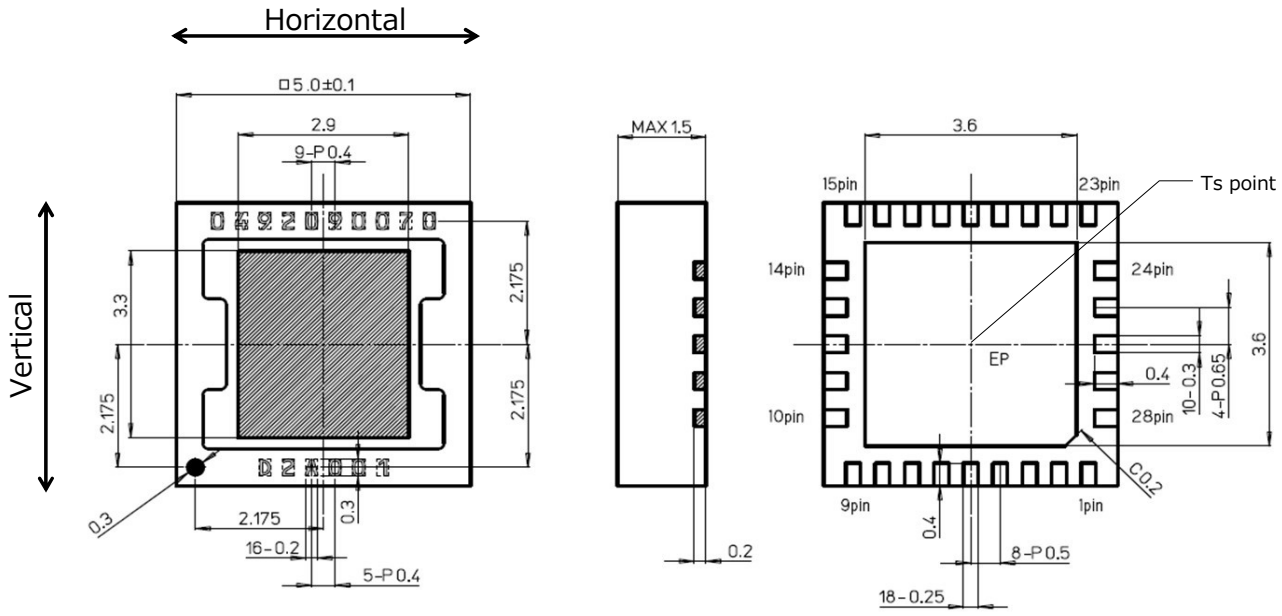
【Pin configuration】



Bottom View

Pin No	Pin Name	Function
0	EP	Thermal pad and ground
1	ISET	Current control voltage
2	LVDS_P	Positive LVDS input and TTL switching input
3	LVDS_N	Negative LVDS input and TTL/LVDS input selector
4	GND	Ground
5	GND	Ground
6	PD	Photo diode voltage input
7	ERR	Error monitor output (open drain)
8	SLEEP	Switching operation on/off
9	VDDP10	Internal circuit power supply
10	VDDP1	Driver power supply
11	GND	Ground
12	GND	Ground
13	GND	Ground
14	GND	Ground
15	LDK_MON	VCSEL cathode voltage monitor
16	ANODE	VCSEL anode power supply
17	ANODE	VCSEL anode power supply
18	ANODE	VCSEL anode power supply
19	ANODE	VCSEL anode power supply
20	ANODE	VCSEL anode power supply
21	ANODE	VCSEL anode power supply
22	ANODE	VCSEL anode power supply
23	NC	No connection
24	GND	Ground
25	GND	Ground
26	GND	Ground
27	GND	Ground
28	VDDP2	Driver power supply

【Package dimensions】



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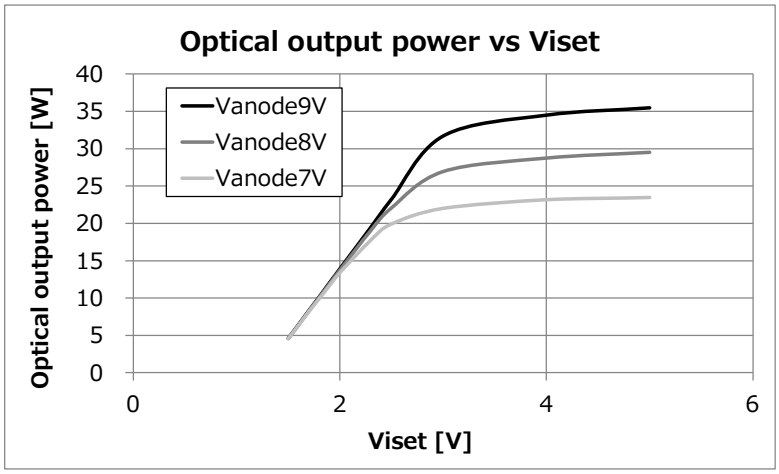
【Optical characteristics】

Parameter	Symbol	Conditions	MIN	TYP	MAX	Unit
Foward voltage	Vf	If=4A*	2.7	4.1	5.5	V
Optical output power	Po	If=4A*	4.5	6.1	7.7	W
Peak wavelength	λp	If=4A*	929	941	953	nm
Field of view at FWHM	FOV(HxV)	If=4A*	—	47x41	—	deg
			—	60x45	—	
			—	72x55	—	
			—	90x70	—	
			—	110x85	—	
			—	140x95	—	
Wavelength shift /Temperature	⊿λp/⊿T	—	—	0.070	—	nm/℃
Thermal resistance	Rj-s	Ts point	—	18	—	℃/W

*Viset = 5V、Pulse width = 100μs、Duty Cycle2%、Ta = 25℃

【Optical output power control】

Vdd = 5V, Pulse width = 20ns, Duty Cycle0.2%, Ta = 25℃



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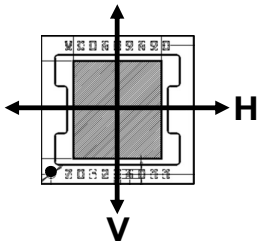
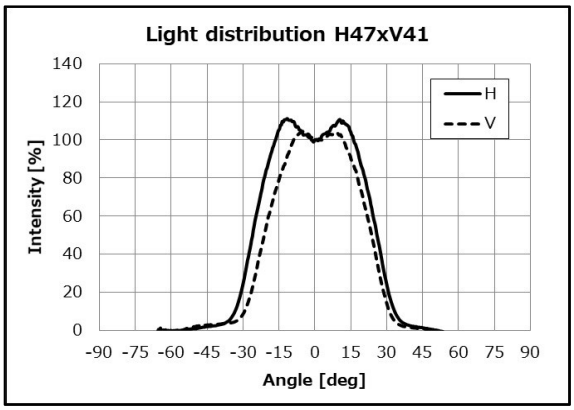
【Light distribution（FOV）】

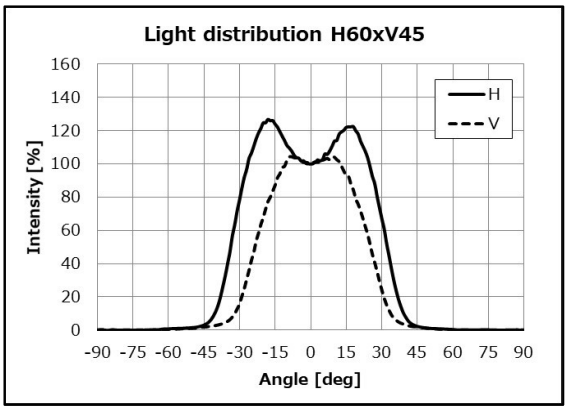


If = 4.0A、Viset = 5V、Pulse width = 100μs、Duty Cycle2%、Ta = 25℃

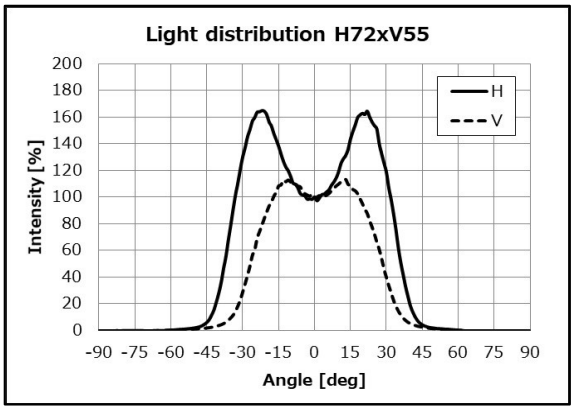
1) H47xV41



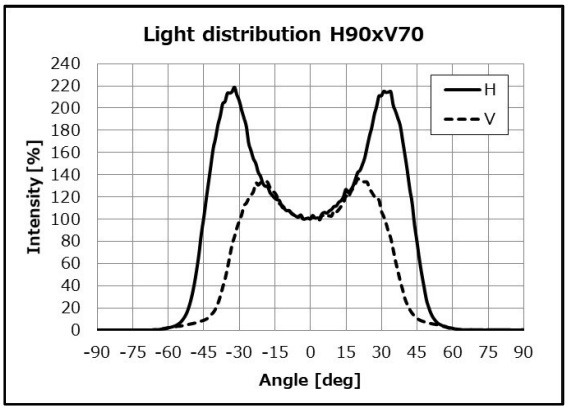
2) H60xV45



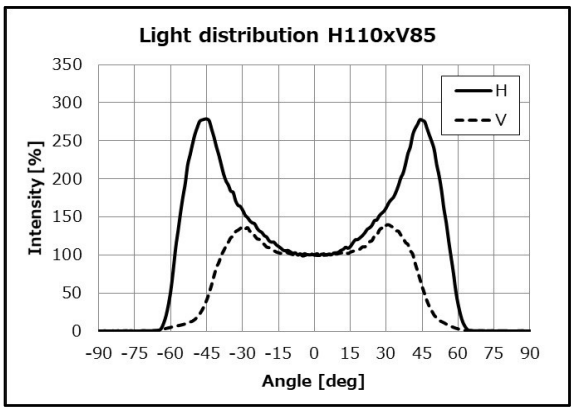
3) H72xV55



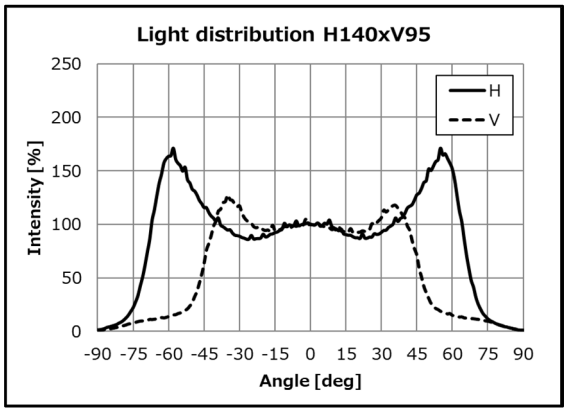
4) H90xV70



5) H110xV85



6) H140xV95



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【Electrical characteristics】

Parameter	Symbol	Conditions	MIN	TYP	MAX	Unit
Optical output rise time	Tr	Vanode=7V,Iset=1.5V 10%-90%	—	1	—	ns
Optical output fall time	Tf	Vanode=7V,Iset=1.5V 10%-90%	—	1	—	ns
Supply voltage in VDDP1,2,10	Vdd	VDDP1_P2_P10 input	4.5	5	5.5	V
Supply voltage in ANODE	Vanode		6.3	7	9	V
Current consumption	Ivdd	VDD=5V, SLEEP=Hi (Open) LVDS/TTL = OFF	—	10	20	mA
Current consumption	Ivdd	VDD=5V, SLEEP=Lo (Sleep) LVDS/TTL = OFF	—	0.2	0.4	mA
Current control	Viset	Iset input	1.4	—	5.5	V
Operating Input Frequency	Fop		—	—	100	MHz
Threshold voltage LVDS to TTL	Vsif	LVDS_N input	Vdd-0.3	Vdd-0.2	—	V
LVDS common mode voltage	Vcom	Termination resistor = 100Ω LVDS_P, LVDS_N input	0.2	—	2.2	V
LVDS input H	Vlvdsh	Termination resistor = 100Ω LVDS_P input	100	—	175	mV
LVDS input L	Vlvdsl	Termination resistor = 100Ω LVDS_N input	-175	—	-100	mV
Propagation delay	Tskw	LVDS/TTL→Vldk	—	5	—	ns
TTL input threshold voltage Hi	Vhttl	LVDS_N=VDD	2	—	—	V
TTL input threshold voltage Lo	Vlttl	LVDS_N=VDD	—	—	0.8	V

Note 1) Includes Vf measurement error of ±2%.
Note 2) Measurement error of optical output Po ±2.6% is included.
Note 3) Includes measurement error of peak wavelength λp ±0.4 nm.

【Safety function】

Parameter	Symbol	Conditions	MIN	TYP	MAX	Unit
Overcurrent detection	Iocpeak	Duty=50%	—	32	—	A
Overcurrent detection delay	Toc		—	—	10	μs
Optical output detection Hi (Threshold voltage error to normal)	Vpdhi	PD voltage input Duty=40%	0.7	0.75	0.8	V
Optical output detection Lo (Threshold voltage normal to error)	Vpdlo	PD voltage input Duty=40%	0.23	0.25	0.27	V
Thermal shut down on	Toff		130	150	170	℃
Thermal shut down off	Ton		120	140	—	℃

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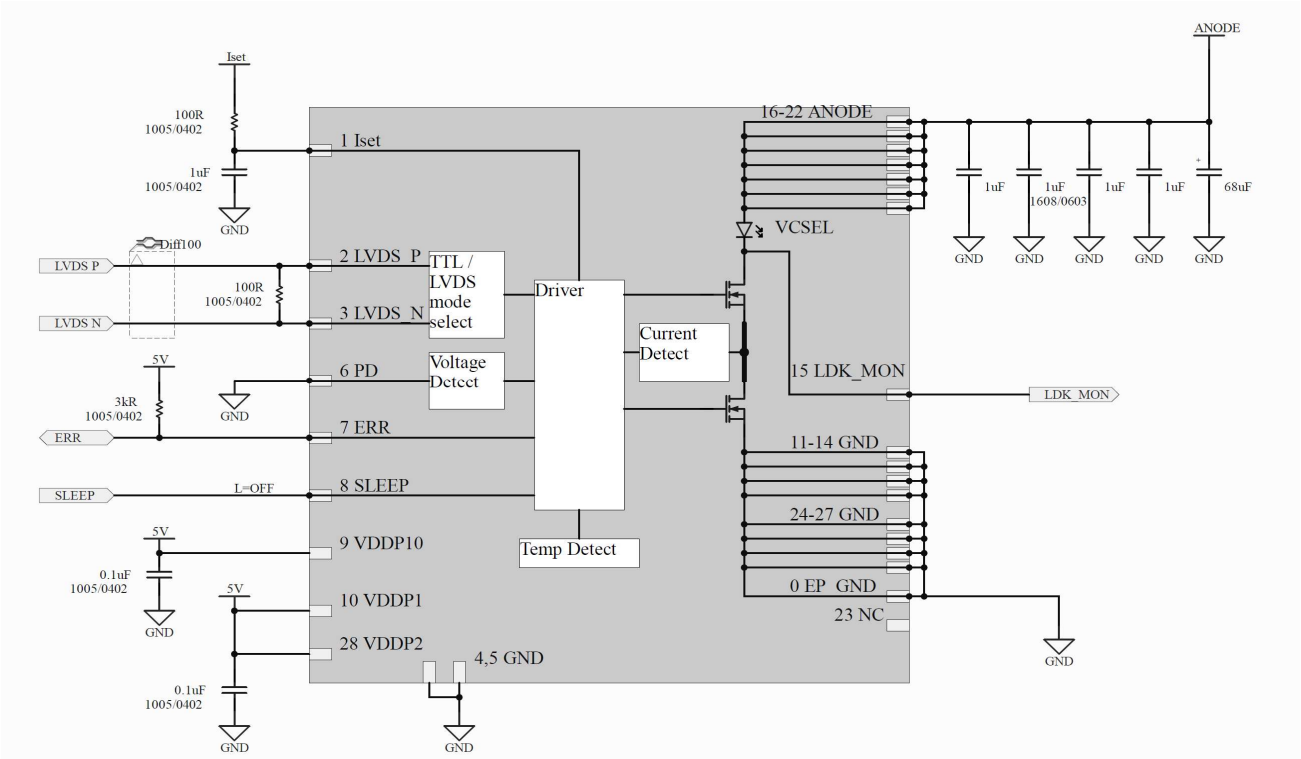
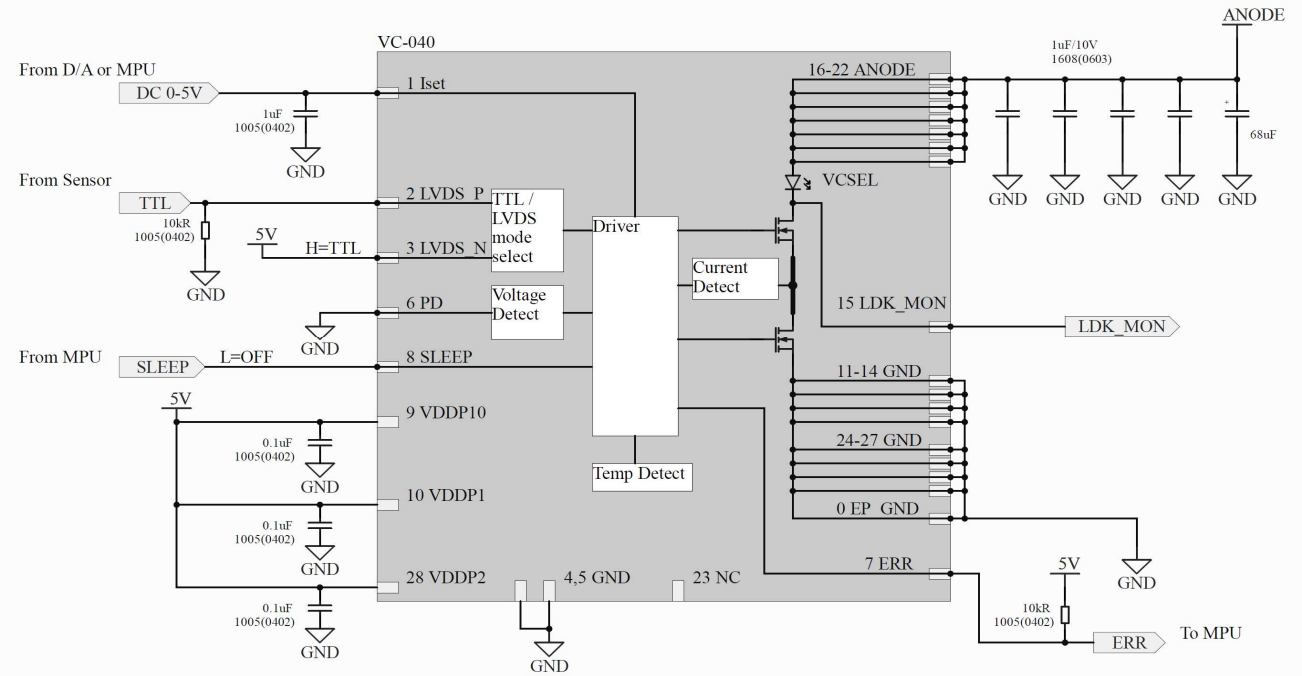
【Typical application circuit(LVDS)】



【Typical application circuit(TTL)】



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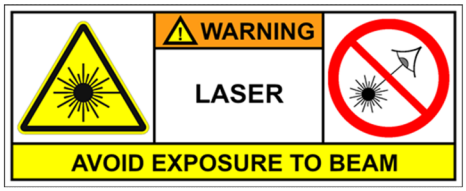

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