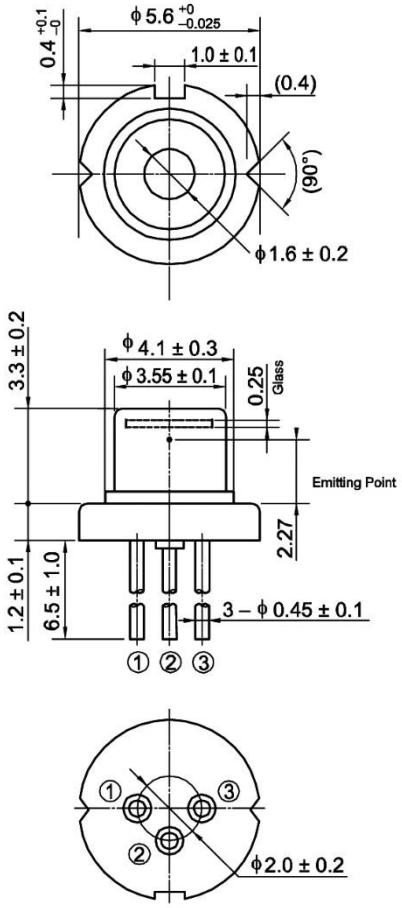
HL63723DGAM

642nm／200mW／High temperature operation Laser Diode for Automotive

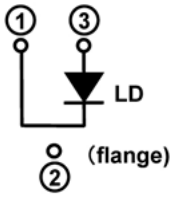
Outline



(Unit: mm)

Internal Circuit

HL63723DGAM



Features

- Optical output power: 210mW
- Wavelength: 642nm Typ.
- Wide operating temperature: -40 ~ 85°C
- Single transverse mode
- TE mode oscillation
- φ5.6mm CAN Package
- AEC-Q102 compliant product

Application

- AR Head Up Display
- Interior/Exterior projection
- Sensor
- Light source of optical equipment

Absolute Maximum Ratings (Tc=25°C)

Item	Symbol	Ratings	Unit
Optical output power Note1)	Po	210	mW
LD reverse voltage	$V_{R(LD)}$	2	V
Operating temperature Note1),2),3)	Topr	-40 ~ +85	°C
Storage temperature	Tstg	-40 ~ +105	°C

Note1) The relation of operating temperature vs optical output power and operating current are based on Fig.1, 2.
Note2) Operating temperature is defined by Case temperature “Tc”. High increase in temperature of LD chip itself is expected during operation due to high current density. Thus, without proper heat dissipation, it is observed that no specific output power is achieved or it results to LD degradation. It is advised that sufficient measure of heat dissipation should be taken so that LD’s maximum operating temperature is not exceeded during actual operation.
Note3) No condensation.

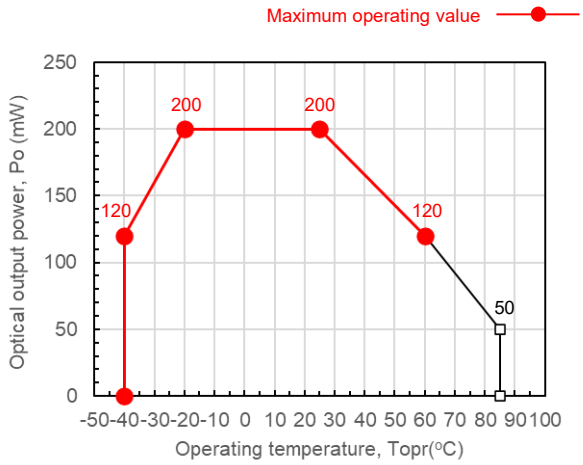


Fig.1 The relation of Operating temperature vs Optical output power

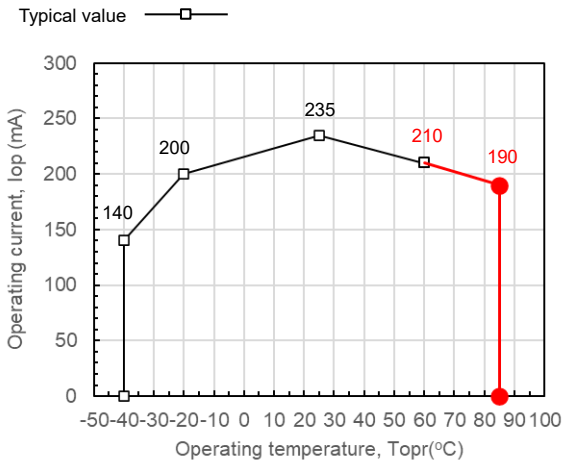
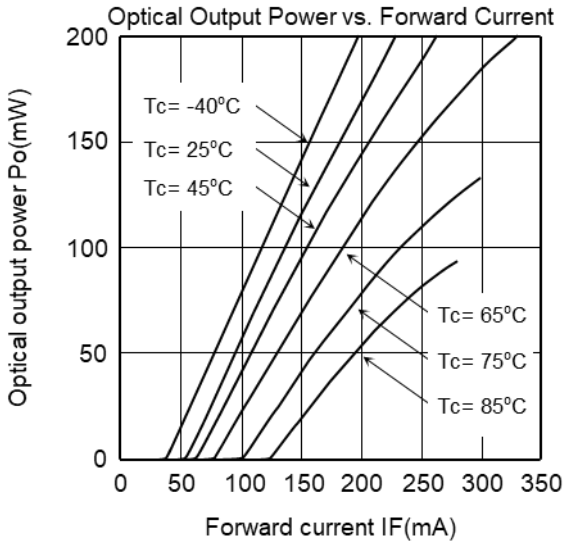


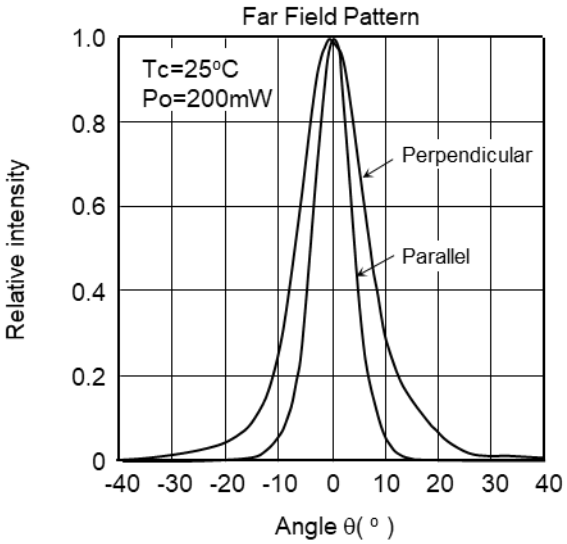
Fig.2 The relation of Operating temperature vs Operating current

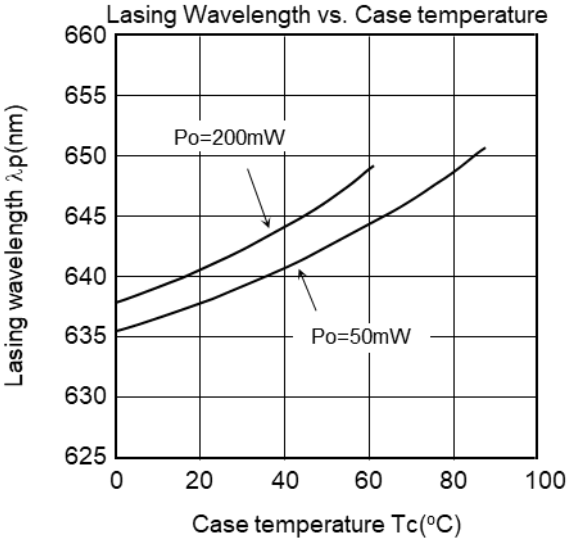
Optical and Electrical Characteristics (Tc=25°C)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Threshold current	Ith	-	55	80	mA	-
Operating current	Iop	-	235	280	mA	Po=200mW
Operating voltage	Vop	-	2.7	3.0	V	Po=200mW
Beam divergence Parallel to the junction	θ//	5	8	13	°	Po=200mW, FWHM
Beam divergence Perpendicular to the junction	θ⊥	11	15	19	°	Po=200mW, FWHM
Lasing Wavelength	λp	638	642	647	°	Po=200mW

Example Characteristic Curves







AEC-Q102 Qualification Report Environmental Test Summary

*AEC-Q102 #E0/#E1

#	ABV	Stress Test / Method	Test Condition		Sample Size	Failures *		
						El.	Opt.	Vis.
A1	PC	Pre-conditioning	N/A because not required for non-SMD device.					
A2a	WHT OL1	Wet High Temperature Operating Life JESD22-A101	Ta=85°C, 85%RH If=190mA, Tj=100°C Pon/off=30min.	1,000h	3Lot x 26pcs	0	0	0
A2b	WHT OL2	Wet High Temperature Operating Life JESD22-A101	Ta=85°C, 85%RH If=10mA, Tj=86°C CW	1,000h	3Lot x 26pcs	0	0	0
A2c	H³TRB	High Humidity High Temperature Reverse Bias	N/A because not required for non-PD/PTr.					
A3a	PTC	Power Temperature Cycling JESD22-A105	Tc=-40°C/+85°C If=190mA Pon/off=5min.	1,000c	3Lot x 26pcs	0	0	0
A3b	IOL	Intermittent Operational Life	N/A because not required for non-PD/PTr.					
A4	TC	Temperature Cycling JESD22-A104	Tc=-40°C/+105°C Each extreme 15min.	1,000c	3Lot x 26pcs	0	0	0
B1a	HT OL1	High Temperature Operating Life JESD22-A108	Tc=85°C If=190mA, Tj=100°C CW	1,000h	3Lot x 26pcs	0	0	0
B1b	HT OL2	High Temperature Operating Life JESD22-A108	Tc=25°C If=280mA, Tj=55°C CW	1,000h	3Lot x 26pcs	0	0	0
B1c	HTRB	High Temperature Reverse Bias	N/A because not required for non-PD/PTr.					
B2	LTOL	Low Temperature Operating Life JESD22-A108	Tc=-40°C If=140mA 5min ON / 5min OFF	500h	3Lot x 26pcs	0	0	0
B3	PLT	Pulsed Life JESD22-A108	Tc=55°C Po=200mW Pw=100us,duty=3%	1,000h	3Lot x 26pcs	0	0	0

*1 Random sample of parts that have successfully completed TC, PTC, HTOL1/2, WHTOL1/2. H2S, FMG.

*AEC-Q102 #E0/#E1

#	ABV	Stress Test / Method	Test Condition		Sample Size	Failures *		
						El.	Opt.	Vis.
C1	DPA	Destructive Physical Analysis AEC-Q102 Appendix 6	Optical Microscope Magnification 50x	-	2(for each test *1)	All acceptable for DPA test results.		
C2	PD	Physical Dimension JESD22-B100	Measuring microscope Magnification 50x	-	3Lot x 10pcs	All acceptable for PD test results.		
C3	WBP	Wire Bond Pull MIL-STD-750-2 Method 2037	MIL-STD-750-2 Method 2037 Test condition C	-	3Lot x 10bonds from 5pcs	All acceptable for WBP test results.		
C4	WBS	Wire Bond Shear JESD22-B116	Condition according to JESD22-B116	-	3Lot x 10bonds from 5pcs	All acceptable for WBS test results.		
C5	DS	Die Shear MIL-STD-750-2 Method 2017	MIL-STD-750-2 Method 2017 Test condition A	-	3Lot x 5pcs	All acceptable for DS test results.		
C6	TS	Terminal Strength MIL-STD-750-2 Method 2036	MIL-STD-750-2 Method 2036 Test cond A/D1/E/F	-	3Lot x 10pcs	All acceptable for TS test results.		
C7	DEW	Dew	N/A because not required for CAN PKG.					
C8	RSH	Resistance to Solder Heat AEC-Q005	JESD22-B106 Pb-free solder bath test 270°C, 7sec.	-	3Lot x 10pcs	0	0	0
C9	TR	Thermal Resistance JESD51-50/51/52	JESD51-50/51/52 Dynamic (transient) thermal measurement	-	1Lot x 10pcs	All acceptable for TR test results.		
C10	SD	Solderability J-STD-002	J-STD-002 V.A. Criteria Test A1 245°C, 5sec.	-	3Lot x 10pcs	All acceptable for SD test results.		
C11	WG	Whisker Growth	N/A because not required for non-Sn-based lead finishes device.					
C12	H2S	Hydrogen Sulphide IEC 60068-2-43	40°C/90%RH H_2S : 15ppm	336h	3Lot x 26pcs	0	0	0

*1 Random sample of parts that have successfully completed TC, PTC, HTOL1/2, WHTOL1/2. H2S, FMG.

*AEC-Q102 #E0/#E1

#	ABV	Stress Test / Method	Test Condition		Sample Size	Failures *		
						El.	Opt.	Vis.
C1	DPA	Destructive Physical Analysis AEC-Q102 Appendix 6	Optical Microscope Magnification 50x	-	2(for each test *1)	All acceptable for DPA test results.		
C2	PD	Physical Dimension JESD22-B100	Measuring microscope Magnification 50x	-	3Lot x 10pcs	All acceptable for PD test results.		
C3	WBP	Wire Bond Pull MIL-STD-750-2 Method 2037	MIL-STD-750-2 Method 2037 Test condition C	-	3Lot x 10bonds from 5pcs	All acceptable for WBP test results.		
C4	WBS	Wire Bond Shear JESD22-B116	Condition according to JESD22-B116	-	3Lot x 10bonds from 5pcs	All acceptable for WBS test results.		
C5	DS	Die Shear MIL-STD-750-2 Method 2017	MIL-STD-750-2 Method 2017 Test condition A	-	3Lot x 5pcs	All acceptable for DS test results.		
C6	TS	Terminal Strength MIL-STD-750-2 Method 2036	MIL-STD-750-2 Method 2036 Test cond A/D1/E/F	-	3Lot x 10pcs	All acceptable for TS test results.		
C7	DEW	Dew	N/A because not required for CAN PKG.					
C8	RSH	Resistance to Solder Heat AEC-Q005	JESD22-B106 Pb-free solder bath test 270°C, 7sec.	-	3Lot x 10pcs	0	0	0
C9	TR	Thermal Resistance JESD51-50/51/52	JESD51-50/51/52 Dynamic (transient) thermal measurement	-	1Lot x 10pcs	All acceptable for TR test results.		
C10	SD	Solderability J-STD-002	J-STD-002 V.A. Criteria Test A1 245°C, 5sec.	-	3Lot x 10pcs	All acceptable for SD test results.		
C11	WG	Whisker Growth	N/A because not required for non-Sn-based lead finishes device.					
C12	H2S	Hydrogen Sulphide IEC 60068-2-43	40°C/90%RH H_2S : 15ppm	336h	3Lot x 26pcs	0	0	0

*AEC-Q102 #E0/#E1

#	ABV	Stress Test / Method	Test Condition		Sample Size	Failures *		
						El.	Opt.	Vis.
C13	FMG	Flowing Mixed Gas IEC 60068-2-60 Test method 4	25°C/75%RH H_2S : 10ppb, SO_2 : 200ppb NO_2 : 200ppb, Cl_2 : 10ppb	500h	3Lot x 26pcs	0	0	0
C14	BF	Board Flex	N/A because not required for through-hole leaded device.					
E0	EV	External Visual JESD22-B101	Optical Microscope Magnification 5x	-	All qualification parts	All acceptable for EV test results.		
E1	TEST	Pre- and Post-Stress Electrical and Photometric Test AEC-Q102 Section 2.3.7	LD tester Tc=25°C Po=200mW	-	All qualification parts	0	0	-
E2	PV	Parametric Verification HL63723DG specification	LD tester Tc=25°C Po=200mW	-	3Lot x 26pcs	0	0	0
E3	HBM	Electrostatic Discharge Human Body Model ANSI/ESDA/JEDEC JS-001	ANSI/ESDA/ JEDEC JS-001 ESD/HBM	up to ±2kV	3Lot x 10pcs	0	0	0
E4	CDM	Electrostatic Discharge Charged Device Model AEC Q101-005	AEC Q101-005 ESD/CDM	up to ±1kV	3Lot x 10pcs	0	0	0
G1	CA	Constant Acceleration MIL-STD-750-2 Method 2006	2000G force 1min. X1,X2,Y1,Y2,Z1,Z2	-	3Lot x 10pcs	0	0	0
G2	VVF	Vibration Variable Frequency JESD22-B103 Condition 1	20~2000Hz 20G/1.5mm X,Y,Z × 4 times	-	↑ *2 (3Lot x 10pcs)	0	0	0
G3	MS	Mechanical Shock JESD22-B110	1500G 0.5ms X,Y,Z × 5 times	-	↑ *2 (3Lot x 10pcs)	0	0	0
G4	HER	Hermeticity JESD22-A109	MIL-STD-750-2 Method 1071 Gross leak : condition C Fine leak : condtion H1	-	CA/VVF/MS TC,PTC,RSH parts	All acceptable for HER test results.		

*2 Items #G1-#G2-#G3-#G4 are performed as a sequential test.

Failure criteria

Parameter	Acceptance Criteria	Remark
Iop	+ / - 20%	Tc=25°C, Po=200mW
Vf1	+ / - 10%	Tc=25°C, Po=200mW
Vf2	+ / - 10%	Tc=25°C, If=23.5mA
λ p	+ / - 2nm	Tc=25°C, Po=200mW
PA	N/A	Tc=25°C, Po=5mW
θ //	N/A	Tc=25°C, Po=200mW, FWHM
θ ⊥	N/A	Tc=25°C, Po=200mW, FWHM

*Iop : Operating current *Vf : Forward voltage

* λ p : Lasing (Oscillation) wavelength *PA : Polarization angle

* θ // : Beam divergence parallel to the junction

* θ ⊥ : Beam divergence perpendicular to the junction

AEC-Q102 passed: [yes - no - with restriction]	yes
Robustness level (acc AEC-Q102 appendix 7a)	0
Corrosion class (acc AEC-Q102 test C12 - H2S)	A
Comments	----------

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