

Optically Immersed 4.2 μm LED in heatsink optimized housing

LED42Su, LED42Sr

TE cooled Optically Immersed 4.2 μm LED

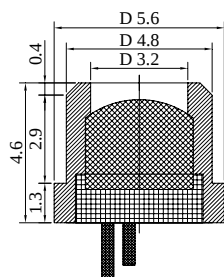
LED42TO8TEC

Peak wavelength	μm	4.15÷4.2		@22 °C
Pulse power	mW	Drive current 1 A, 0.02 duty cycle	0.08÷0.10	
Quasi-CW power	mW	Drive current 0.3 A, 0.5 duty cycle	0.04÷0.05	
CW power	mW	Drive current 0.2 A	0.03÷0.04	
Cut-off frequency	MHz	50 ¹		

Code	Emission size, mm	Weight, g	Optical components	Far-field pattern FWHM, deg.	Optical axis deviation, deg.	Optical power deviation in lot, %	Operation conditions, °C	Lifetime, hrs
LED42Su LED42Sr	$\varnothing 3.2$	~0.4	Si lens	~15	≤ 5	± 25	-60÷+120 ²	>100 000 ⁴
LED42 TO8TEC		~10	Si lens and output sapphire window D=6mm				-60÷+85 ³	

Product view

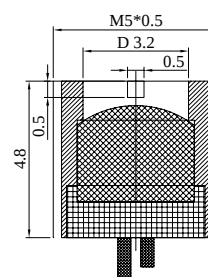
LED42Su



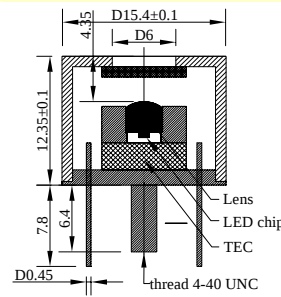
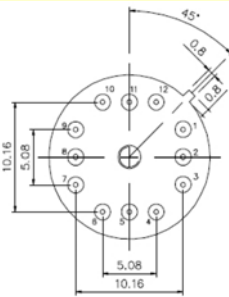
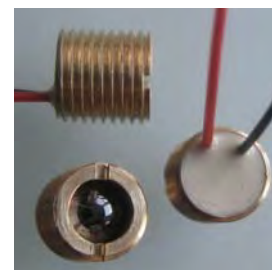
Pin assignment: red wire or long wire and red point on house - positive



LED42Sr



Pin assignment: red wire or long wire and red point on house - positive



Pin assignment
LED42TO8TEC12

- 1 TEC negative;
- 3 TEC positive;
- 4 LED negative;
- 6 LED positive;
- 7, 9 thermosensor;
- 11 $\perp$ (House)

Features

- Original growth of narrow gap semiconductor alloys onto n⁺-InAs substrate;
- Flip-chip design of LEDs;
- Optical coupling through the use of chalcogenide glasses and Si lenses with antireflection coating
- 3-fold increased LED output power;
- Beam collimation;
- Small on-off time (tenths of ns);
- Low power consumption (≤ 0.1 W)

Emission beam divergence is small and thus we recommend adjusting LED position regarding to the detector system before final evaluation/use of the devices. We recommend if possible using low duty cycle mode of operation with $I < 0.5 \times I_{\text{max}}$ so that higher efficiency and long term stability of a LED are achieved. Data are valid for LED attached to a heatsink and thermostabilized at 22°C. Heatsink is essential for TEC operation!

Notes

¹ - according to estimation

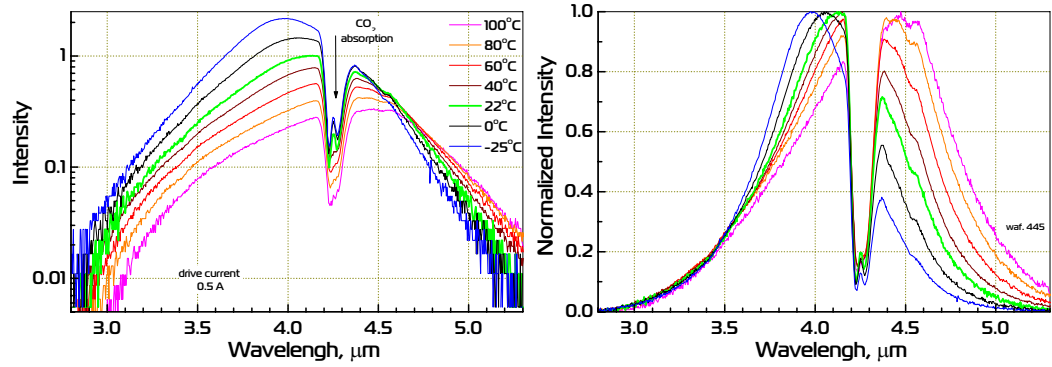
² - devices have passed through 15 thermo cycles : (20°C, 8 hrs) -transition period of 30 min - (+125°C, 8 hrs) without changes in specifications. Valid for devices produced since 01.2013. Operation conditions: -25÷+60 °C for old version LEDs.

³ - devices have passed through 15 thermo cycles : (-60°C, 30 min) - transition period of 30 min - (+85°C, 30 min) without changes in specifications. Valid for devices produced since 01.2013. Operation conditions: -25÷+60 °C for old version LEDs.

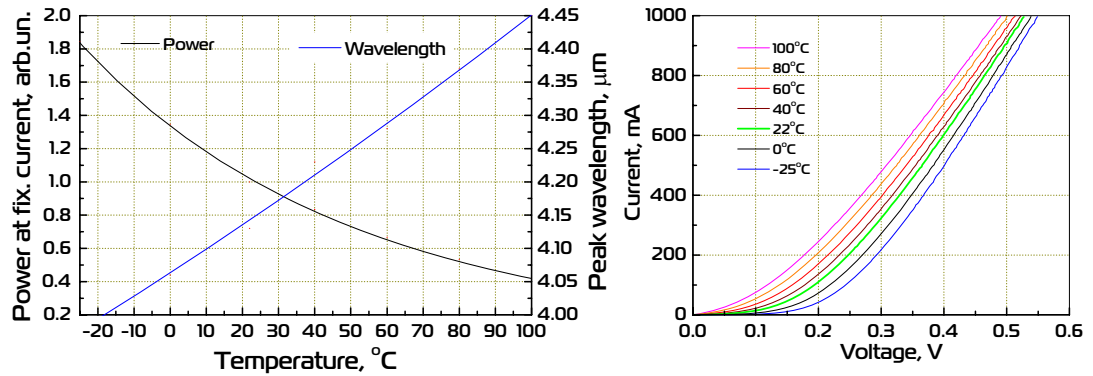
⁴ - according to accelerated degradation stress at CW drive current 0.2 A

Product specifications are subject to change without prior notice due to improvements or other reasons. Updated 04.09.13

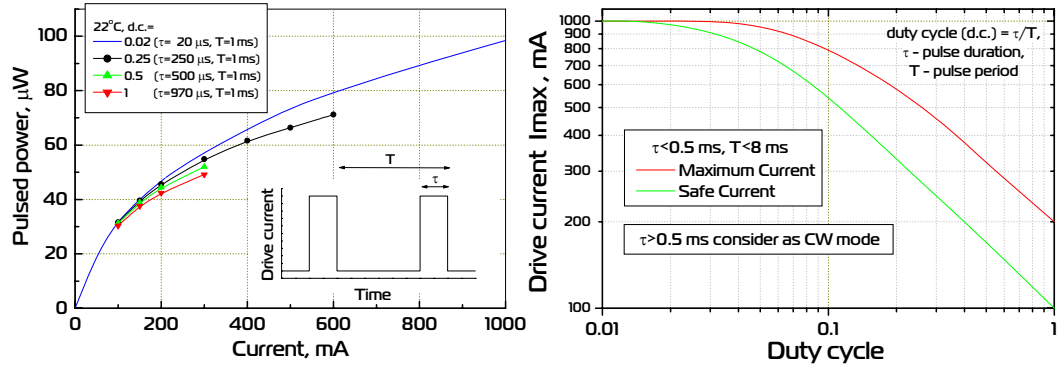
Emission spectra



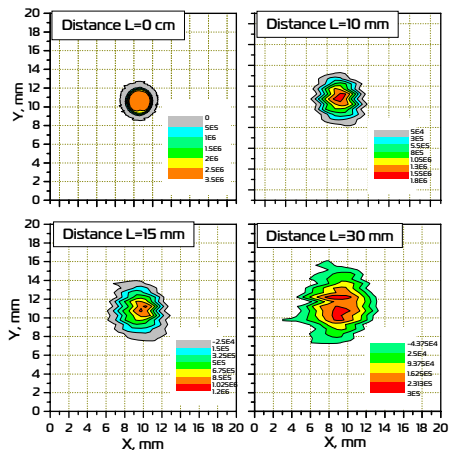
Power and peak wavelength vs. temperature; I – V curve



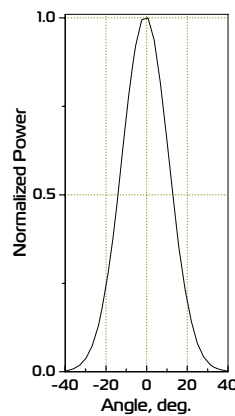
Output power and drive current vs operation conditions



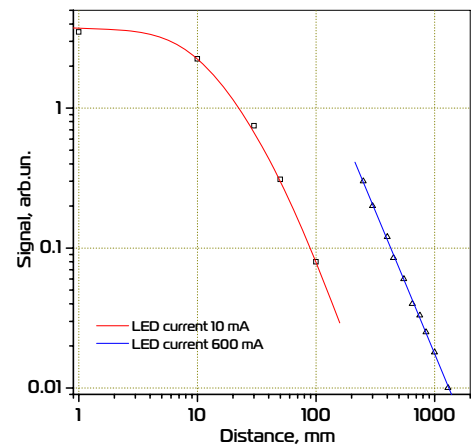
Radiation beam pattern in plane orthogonal to beam axis at several distances from LED



Angle distribution of output power



PD signal (PDxxSr/Su) vs. distance from activated LED



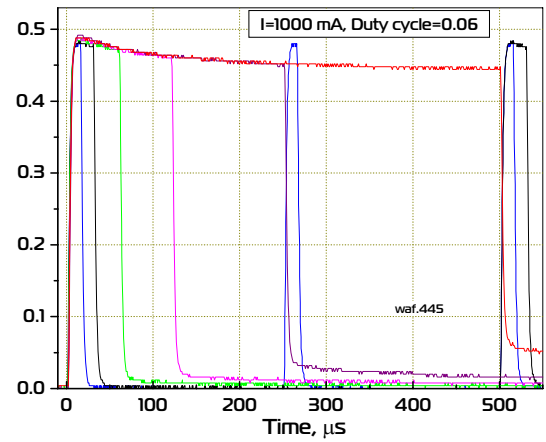
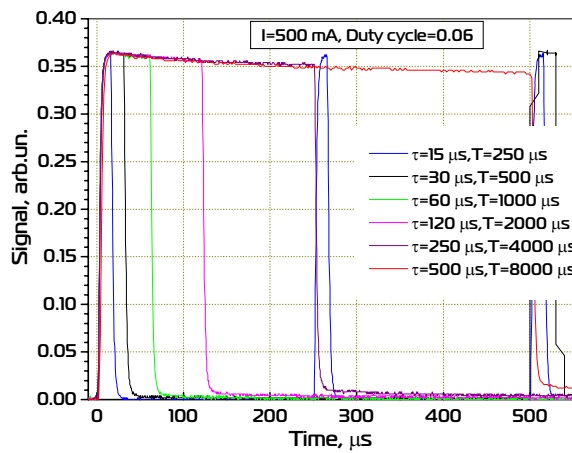
Far-field characterization

Time dependence of the output power for several values of d.c. and currents (LED attached to a heatsink at room temperature).

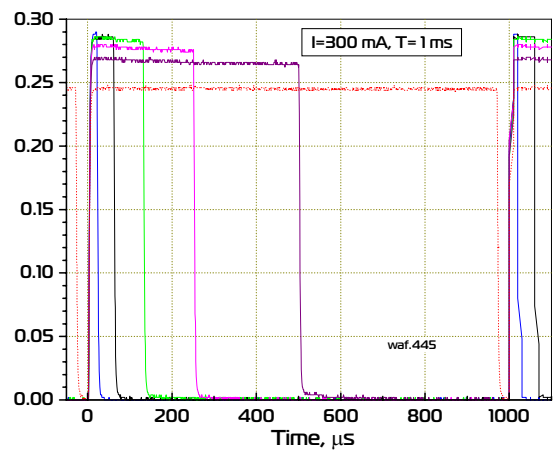
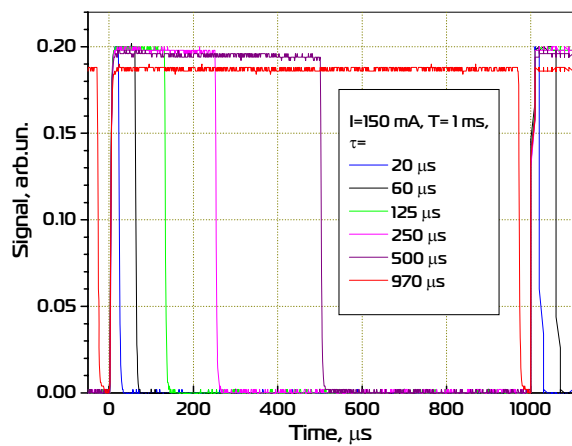
“Safe” operation mode

“Maximum current” operation mode

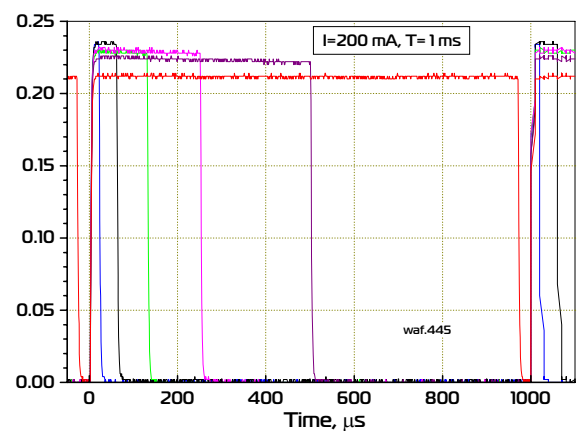
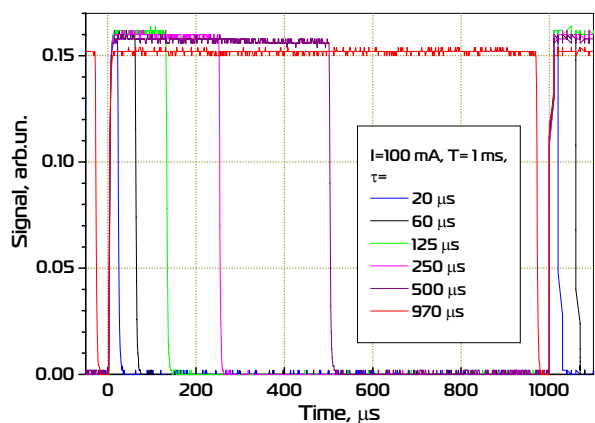
Pulse operation (d.c.=0.06)



Quasi CW mode (d.c.=0.5)



CW mode (d.c.=1)



Thermoelectric cooling module datasheet

Mounted TEC	H, mm	$\Delta T_{\max}$, K	$Q_{\max}$, W	$I_{\max}$, A	$U_{\max}$, V	R_{θ} , K/W
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1MC06-024/1-15

2.6

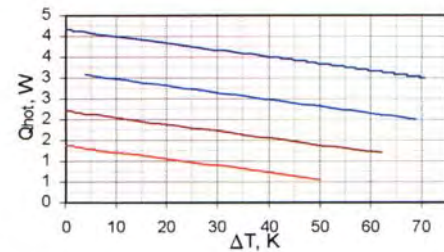
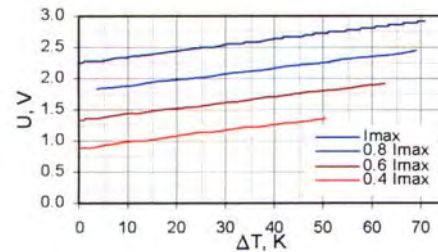
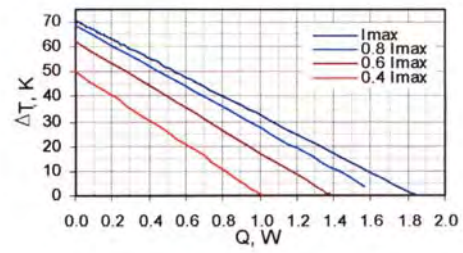
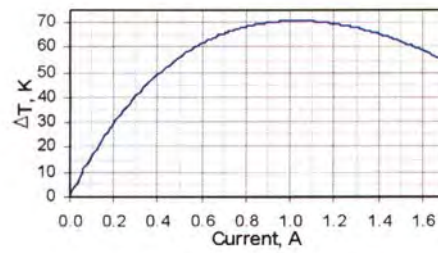
70

1.86

1.0

2.78

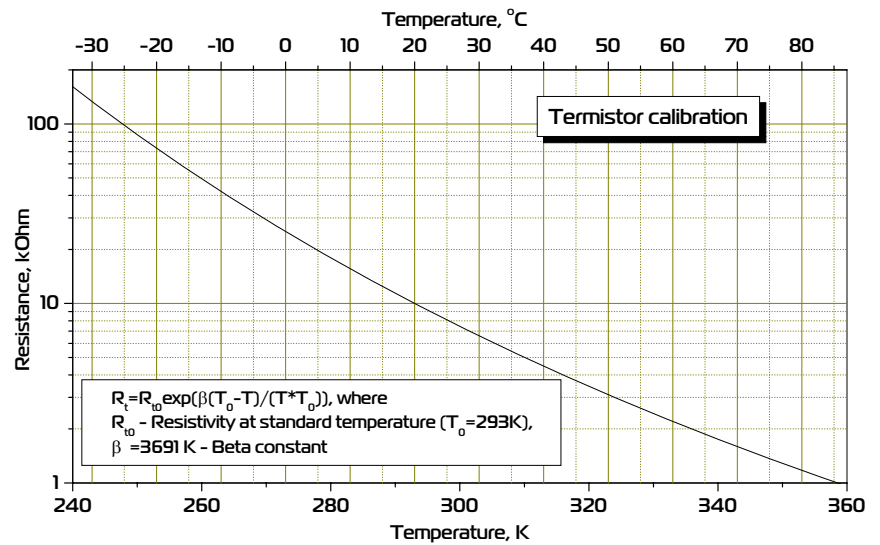
1.07

Data for $T_{\text{hot}} = 300$ K, from www.tec-microsystems.com; www.rmtitd.ru

Thermistor specification

T, °C	R, kΩ	T, °C	R, kΩ
-60	1134.5	15	12.44
-55	762.4	20	10.00
-50	521.6	25	8.09
-45	362.8	25	8.09
-40	256.3	30	6.60
-35	183.8	35	5.41
-30	133.6	40	4.47
-25	98.3	45	3.71
-20	73.3	50	3.10
-15	55.2	55	2.61
-10	42.1	60	2.20
-5	32.4	65	1.87
0	25.2	70	1.59
5	19.7	75	1.37
10	15.6	80	1.18

Type TB04-103

Possible TEC
heatsink view