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Fax message[1] to Steve Nixon
From *Tim Stokes*

Company:	**Viamed**	
Fax No:	**01535-635582**	**Date: 4.8.98**
Ref:	**TS / Viamed [file]**	**Page 1 of 1**

Dear Steve,

Further to our last conversation I have been discussing this again with the factory and the discussions are becoming a little circular.
Could I therefore review again precisely what is required for your LED :

1. We discussed two different LEDs in a single plastic mold package. Please specify what wavelengths are required for the two different LEDs, i.e. 665 nm + 890 nm, 665 nm + 900 nm, 665 nm + 940 nm, different combinations, other wavelengths ?
2. Could you specify what the output power requirements are from the LED and what drive current you would use ? If you have tested the samples that I sent then it would be easier to just say that part no. Lxxxx is acceptable (or not).
3. We discussed that if you can accept common terminals then this would be no problem. If discrete anode and cathode connections are needed, to independantly modulate the LEDs however, then I am afraid that this is not possible with existing package designs. You also mentioned the possibility of having a back to back connection – could you explain precisely what you mean by this (if you have the spec. for any such device please send it to me) ?

With regards to the photodiode then I believe that the samples forwarded to you are more than adequate. Have you been able to test these to confirm suitability ?

We also discussed the product developed by Hartlepool Hospital (Dave Brough). Do you need to order any components yet for this product ?

I await your comments and then I will discuss with our engineers once more.

Best regards,

Tim Stokes
General Manager Solid State Products

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[1] **If you have any problems or queries regarding this fax transmission, please contact us on the above number.**

Registered in England No. 2228744

HAMAMATSU

L6112 & L6112-01

660 nm Visible LED

ABSOLUTE MAXIMUM RATINGS

Operating Temperature	:	-30°C to +85°C
Storage Temperature	:	-40°C to +100°C
Maximum Reverse Voltage	:	3 Volts
Maximum Forward Current, I_F	:	70 mA
Maximum Pulsed Current, I_{FP}	:	0.5 Amps (at tw = 10 µs)
Maximum Power Dissipation	:	150 mW

ELECTRO-OPTICAL CHARACTERISTICS (For L6112)
Measured at +25°C.

Characteristics	Value
Typical Peak Wavelength	665 nm
Minimum Peak Wavelength	650 nm
Maximum Peak Wavelength	680 nm
Spectral Halfwidth, Δλ (FWHM)	25 nm typical
Typical Radient Flux (with I_F = 20 mA)	5.5 mW
Minimum Radient Flux (with I_F = 20 mA)	4 mW
Typical Forward Voltage, Vf (with I_F = 20 mA)	1.8 Volts
Maximum Forward Voltage, Vf (with I_F = 20 mA)	2.1 Volts
Maximum Reverse Current, Vr = 3 Volts	20 µA
Maximum Frequency	5 MHz typical

Also available,
L6112-01 in the same package as L1915-01 890 nm LED.
L6112-02 in the same package as L1915-02 890 nm LED.

ccSL (SL)

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Fax message[1] to Steve Nixon
From *Tim Stokes*

Company:	**Viamed**	
Fax No:	**01535-635582**	**Date: 23.10.98**
Ref:	**TS / Viamed [file]**	**Page 1 of 2**

Dear Steve,

Further to our recent conversations and our last meeting three weeks ago, we have continued to discuss this project again with the factory and it remains difficult to see precisely what we can offer. I therefore propose that we set to "oneside" the exact specifications of the LEDs for one minute (e.g. wavelength tolerance etc.) and instead we will talk about all of the LED options and the associated cost:

1. As discussed two different LEDs in separate packages is the easiest route and you have some sample devices from us already. I appreciate however that with our 5.4 mm standard plastic mold packages the two emitters would be about 5 mm apart, which is too great a distance. If this distance could be reduced to 2.5 mm (but still using the two devices in different 5.4 mm plastic mold packages) would this be of interest as a special device ?
2. We have as a standard a package suitable of accomodating 2 or 3 LEDs, but in this case the anode connection is common and all LEDs are pulsed simultaneously (i.e. this is no good for your application). A plastic mold package with separate anode and cathode terminals is technically possible, but is not available as via a suitable external circuit (such as anode to cathode / back to back / etc.).
3. To manufacture a new lead frame / plastic mold package to have the discrete anode and cathode pins requested would usually only be undertaken for requirements of at least 10K pcs. per month. Such a custom package would require new tooling costing at least £ 50,000.
4. The cost for such a special dual element plastic molded LED in production would be about £ 1.20 each at quantities of 10K pcs. per annum, reducing to £ 0.95 each at quantities of 25K pcs. per annum.
5. A lower cost option (in terms of tooling) would be to mount the two discrete LED chips onto a PC-board. This would give lower output power (due to having no reflectors etc. which are included in the plastic mold package), but from what we discussed this is no problem for your application. The tooling charges needed to make a special PC-board, the necessary assembly jigs and test fixtures would be about £ 15,000 to £ 20,000.

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6. The production pricing for such a dual element LED mounted on a PC-board would be more expensive than the plastic molded version (due to the extra assembly labour), and an estimate is £ 1.50 each for 10K pcs. and £ 1.20 each for 25 K pcs. per annum.
7. With regards to the photodiode then I believe that we have a few options that would be suitable, either the S2506-02 (large area), S2506-10 (large area with red filter to cut out stray visible light) or the S5077 (smaller area).
   The costs for 10K pcs. p.a. are as follows :
   S2506-02 £ 0.49
   S2506-10 £ 0.69
   S2973-01 £ 0.62
   S5077 £ 0.49

As I will be out of the office for the next couple of weeks, perhaps you could discuss this proposal with Mike and advise what (if anything) you would like to do.

Best regards,

Tim Stokes
General Manager Solid State Products
cc : Mike Green Internal Sales Engineer