



MAGIC LED PLB010050 Series

Product Datasheet

Description

Plessey MAGIC PLB010050 die are designed for a wide range of low power applications such as decorative lighting, automotive interior, signage and indicators. The light is emitted from the top surface only and close to a Lambertian distribution. The die is suitable for assembling as single devices, or in strings or arrays for specific applications. The dies are supplied on a blue tape in single intensity and colour bin, to provide close uniformity.

Features

- Blue LED die
- GaN-on-Si technology
- Single surface top-emitting
- Wide wavelength range

Applications

- Decoration Lighting
- Instrument panel backlighting
- Illumination symbols
- Signage
- Displays
- Phosphor driving

Variant	Colour	Dominant Wavelength (nm)	
		Min.	Max.
PLB010050M	Blue Phosphor	450	460
PLB010050P	Blue Visible	460	470
PLB010050T	Blue Visible	470	480

Absolute Maximum Ratings

$T_{amb} = +25^{\circ}\text{C}$ unless otherwise stated

Parameter	Symbol	Minimum	Maximum	Unit
DC Forward Current	I_F	-	90	mA
Peak Pulse Forward Current ^[1]	I_{FP}	-	120	mA
Reverse Voltage	V_R	-	5	V
Storage Temperature	T_{stg}	-40	+105	$^{\circ}\text{C}$
Junction Temperature	T_j	-40	+105	$^{\circ}\text{C}$

^[1] Pulse width $\leq 10\text{ms}$, duty cycle $\leq 10\%$

Electro-optical Characteristics

$T_{amb} = +25^{\circ}\text{C}$ unless otherwise stated

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	$I_F = 60\text{mA}$	2.8	3.1	3.6	V
Reverse Current	I_R	$V_R = 5\text{V}$	-	-	10	μA
Dominant wavelength	λ_d	$I_F = 60\text{mA}$	450	-	460	nm
			460	-	470	
			470	-	480	
Thermal Resistance	R_{thj-m} ^[1]		-	11	-	K/W

^[1] Junction to mounting face (excluding package)

Ordering Information

Name	Order code	Colour Range	Luminous Intensity Range
PLB010050M	PLB010050MAJ000	M1, M2, M3 & M4	1B, 2B & 3B
PLB010050P	PLB010050PAJ000	P1, P2	2B, 3B & 4B
PLB010050T	PLB010050TAJ000	T1, T2	3B, 4B & 5B

Intensity Bin Groups

$I_F = 60\text{mA}$, $T_{\text{amb}} = +25^\circ\text{C}$, unless otherwise stated

Variant	Group	Luminous Intensity I_v ^[1] (mcd)		Radiant Power Range (mW) ^[1]	
		Min.	Max.	Min.	Max.
PLB010050M	1B	-	-	42	47
	2B	-	-	47	52
	3B	-	-	52	57
PLB010050P & PLB010050T	2B	440	475	-	-
	3B	475	600	-	-
	4B	600	750	-	-
	5B	750	1060	-	-

^[1] Tolerance $\pm 11\%$ and packaged with a 1 millimeter radius silicone dome lens (R.I. 1.41)

Dominant Wavelength Bin Groups

$I_F = 60\text{mA}$, $T_{\text{amb}} = +25^\circ\text{C}$, unless otherwise stated

Group	λ_d ^[1] (nm)	
	Min.	Max.
M1	450	452.5
M2	452.5	455
M3	455	457.5
M4	457.5	460
P1	460	465
P2	465	470
T1	470	475
T2	475	480

^[1] Tolerance $\pm 1\text{nm}$

Characteristic Curves

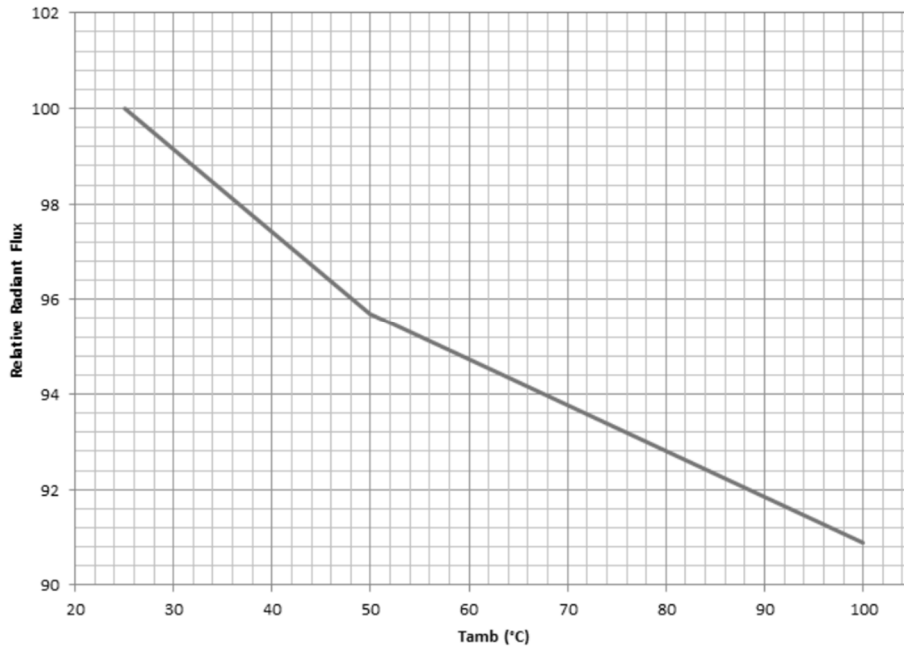


Figure 1: Relative radiant power at $I_F=60mA$ versus ambient temperature.

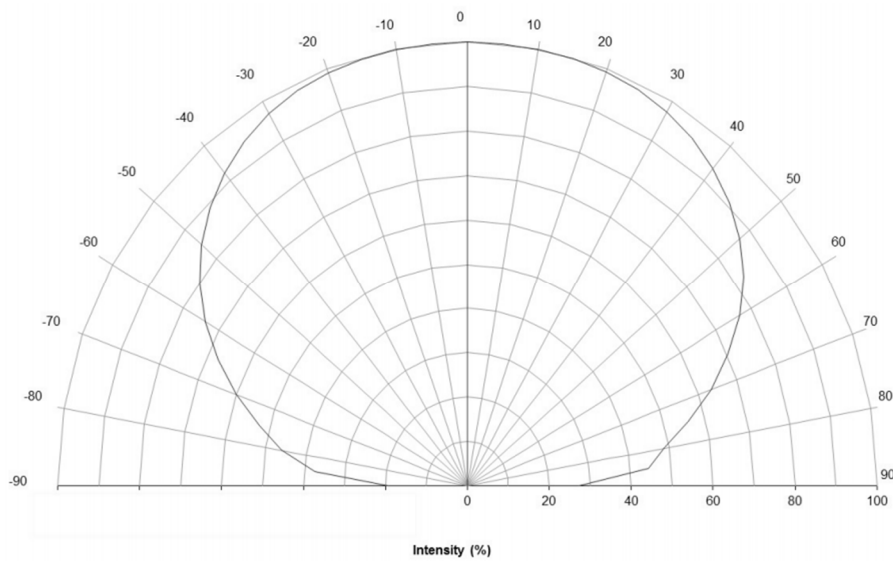


Figure 2: Normalised radiant intensity pattern distribution of a random die sample with a dome lens encapsulation (R.I. 1.4).

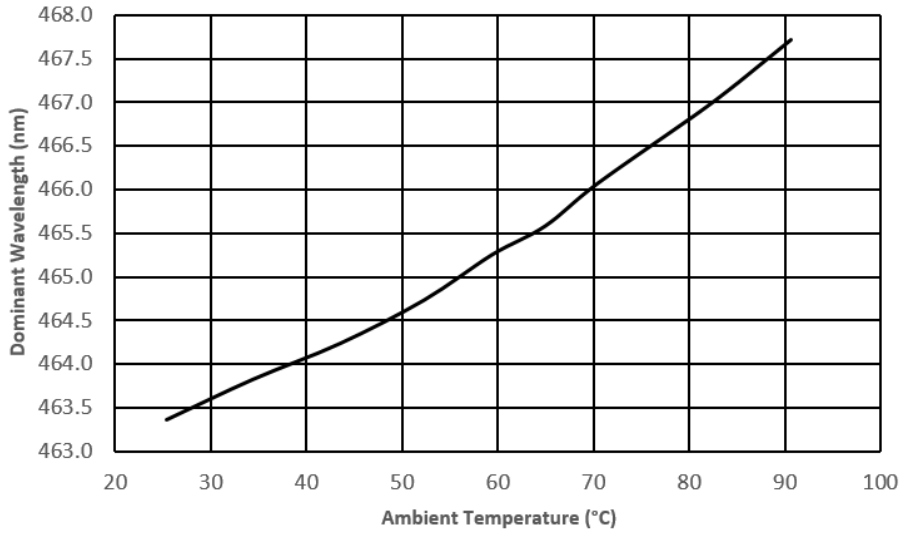


Figure 3: Dominant wavelength versus ambient temperature.

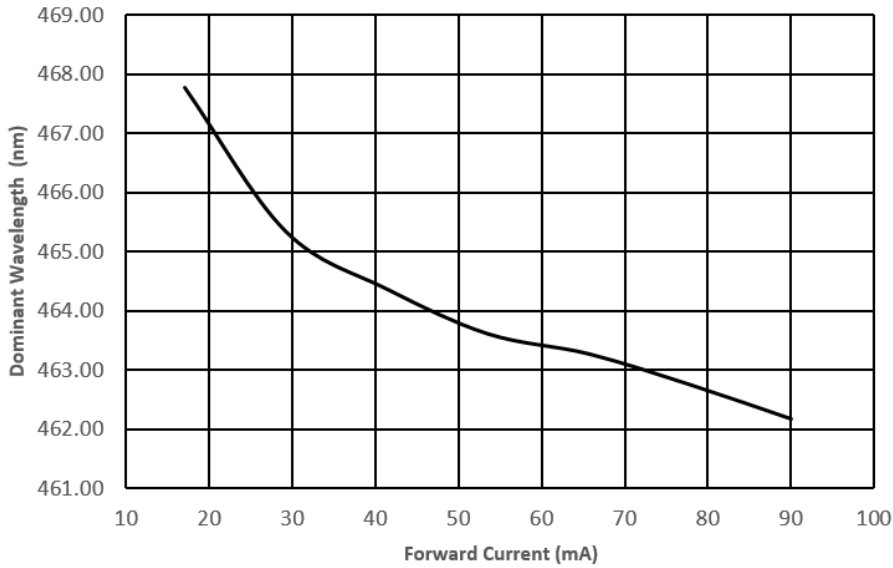


Figure 4: Dominant wavelength versus forward current at +25°C ambient.

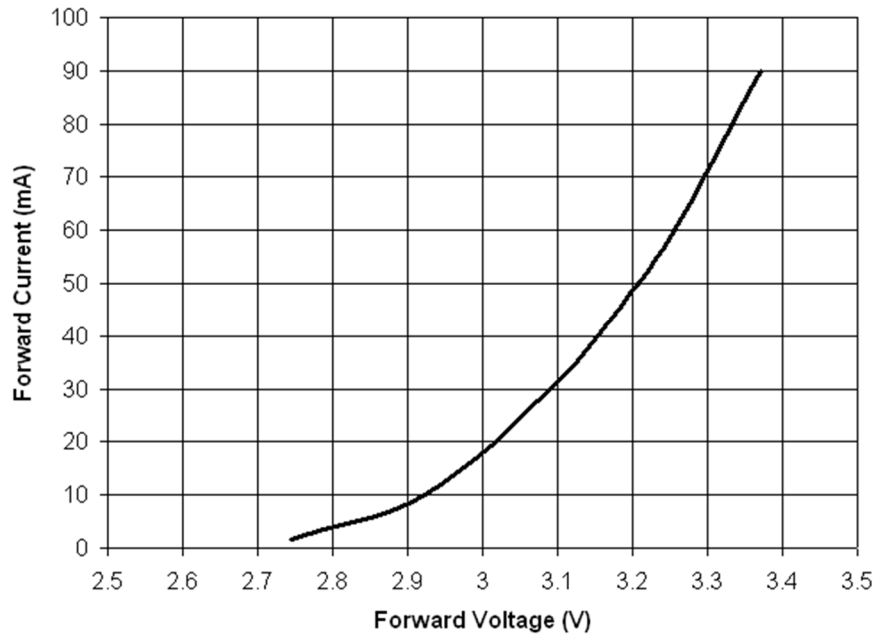


Figure 5. Typical forward voltage versus forward current.

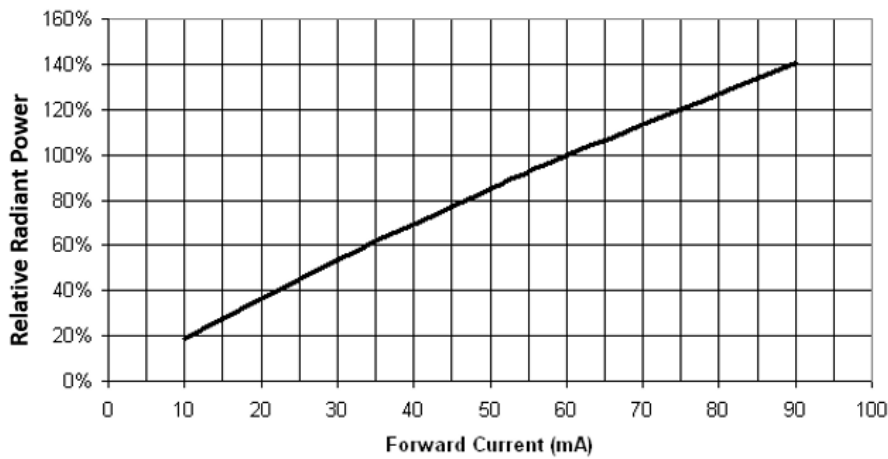


Figure 6. Relative radiant power versus forward current

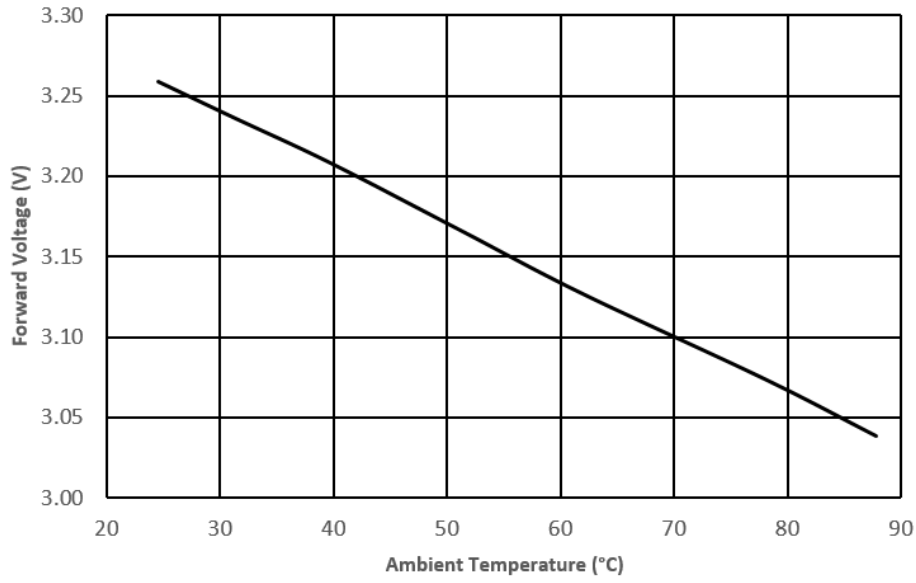
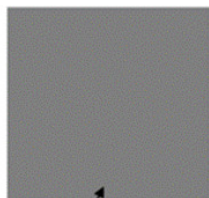


Figure 7. Forward voltage versus ambient temperature

Mechanical Specifications

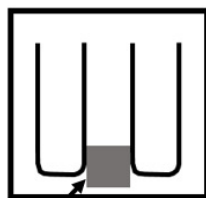
Description	Dimensions (µm)	Tolerance (µm)
Chip Area	510 x 510	± 10
Chip Thickness	150	± 10
Diameter of top (Al) Bond Pad	100 x 100	± 10
Al Bond Pad Thickness	2	± 0.2
Back Contact Metal (Au) Area	510 x 510	± 10
Back Contact Metal Thickness	1.1	±0.05

Bottom View



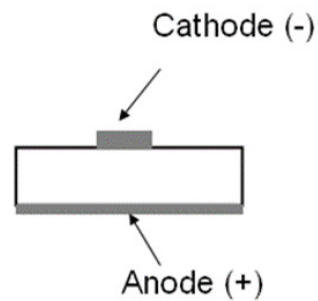
Backside metallization

Top View



Al bond pad

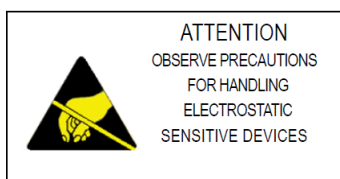
Side View



Handling Instructions

Plessey LEDs are not designed to operate with reverse bias.

Precautions are required to prevent reverse bias in applications and during handling.



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Products are intended for normal commercial applications. For applications requiring unusual environmental requirements, extended temperature range, or high reliability capability (e.g. military, or medical applications), special processing/testing/conditions of sale may be available on application to Plessey.

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