

LED — ALOX™ SUBSTRATE

Technical Specification

Thermal Data

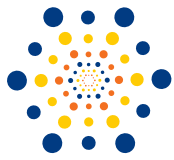
Parameter	Units	Value	Comments
Thermal Coefficient of Expansion (TCE) (Average value for the combination of Aluminum & ALOX™ in the substrate)	ppm/deg	8-12	This value is adjustable and controllable. Great advantage over plastics in matching properties to the silicon die.
Thermal Conductivity – ALOX™ Dielectric	Watt/ m*deg	5-15	Property of the Dielectric.
Thermal Conductivity – Aluminum	Watt/ m*deg	240	Integral Heat Sink option
Operating temperatures	deg	< 350°C	

Electrical Data

Parameter	Conditions/std.	Units	Value	Comments
Withstand Voltage	@ ALOX™ thickness 75 μm	Volts	2,500	See BDV application notes
Receptivity of Cu traces	@20 μm and 10μm respectively	Ω/square.	0.0017-0.0025	MCL measurements
Via Series Resistance	Via chain	mΩ/via	< 10	MCL measurements
Leakage current (via to inner Al layer)	@200 Volts ALOX thickness 65μm	A	10 ⁻¹¹	TV2 (Outsource)
Leakage current (z-direction; Al inner layer to top/bottom copper thru Top/bottom ALOX)	@100 Volts ALOX thickness 35μm	A	2x10 ⁻⁸	TV2 (Outsource)

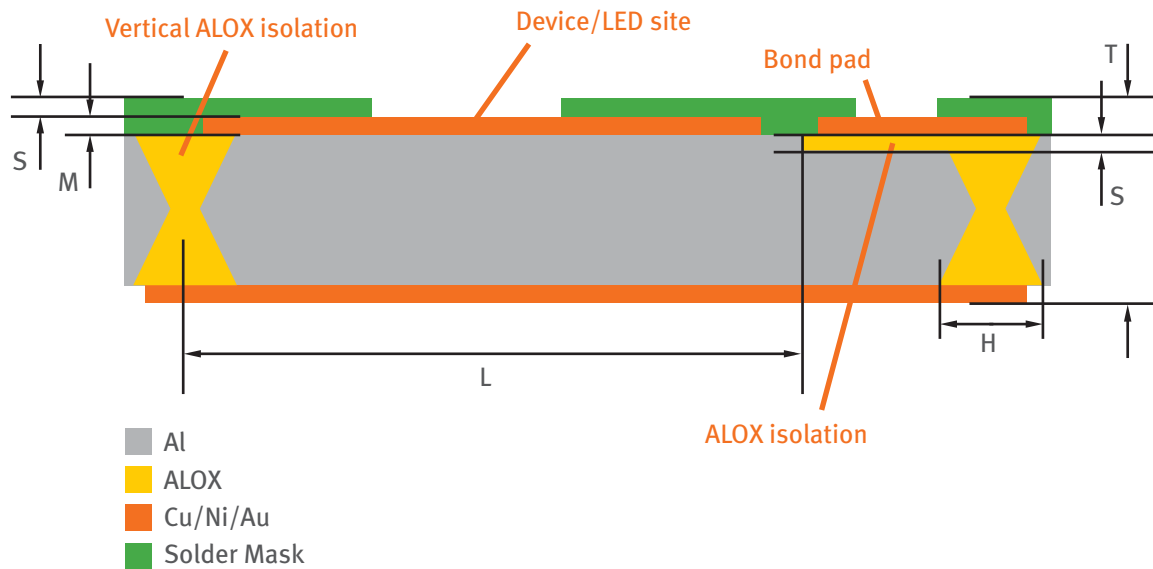
Mechanical Data

Parameter	Units	Value
Young Modulus (E)	GPa	130
Poisson Ratio (ν)	GPa	0.29
Flexural Strength	GPa	60,000

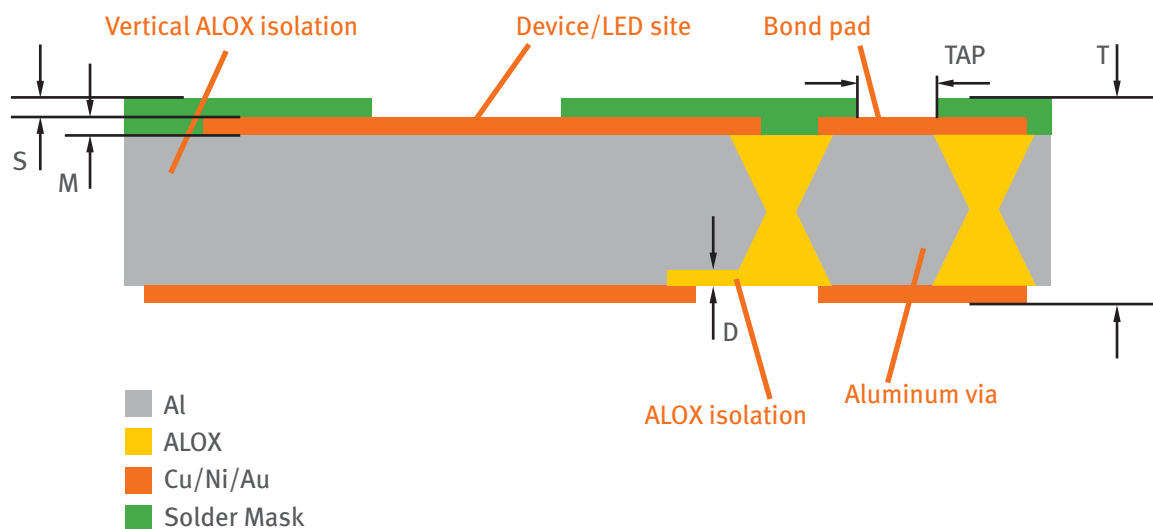


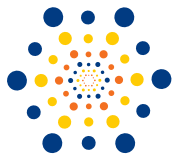
Geometrical Data – 4 substrate options

OPTION 1 – ROUTING ON TOP PLUS VERTICAL ISOLATION

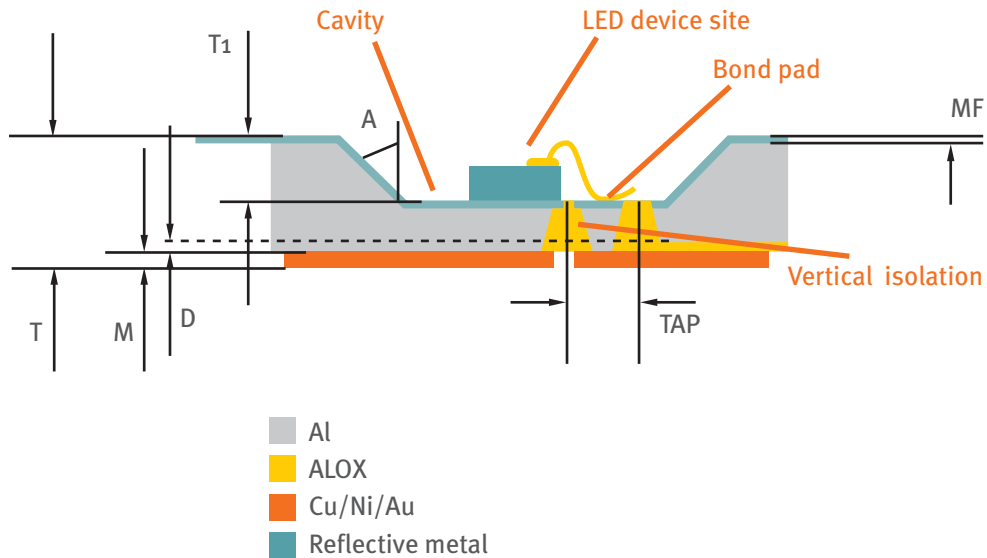


OPTION 2 – ROUTING ON BOTTOM & OPTION FOR ALOX VIA

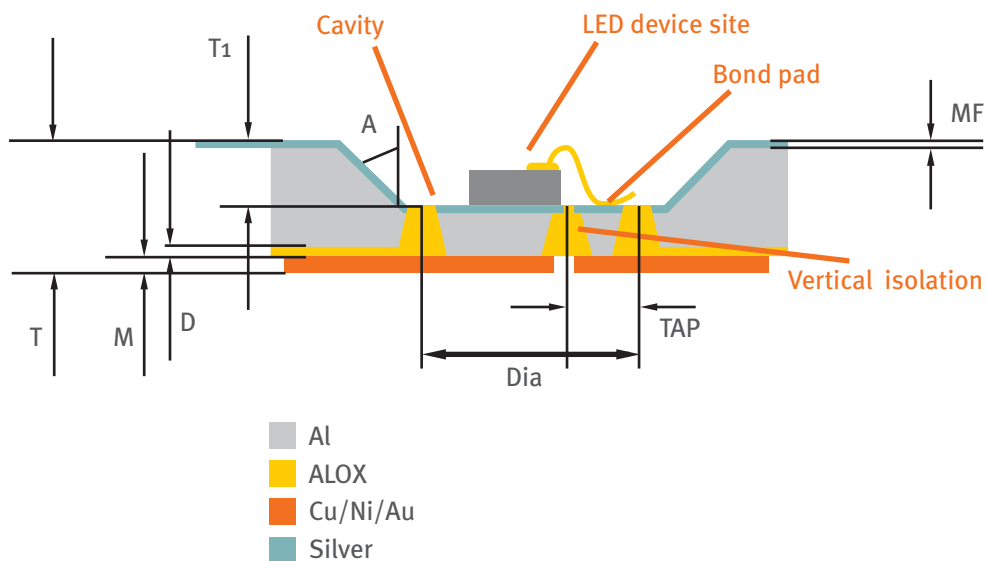


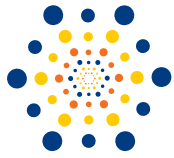


OPTION 3 – LED ASSEMBLY – LED/HEAT-SINK SHORT TO BODY



OPTION 4 – LED ASSEMBLY – LED ISOLATED FROM BODY





Terms Descriptions and Dimensions of Elements

#	Name of elements	Short Description	Minimum (µm)	Maximum (µm)
1.	T*	Total substrate thickness	200	800
2.	D*	Dielectric layer thickness	40	1/3 A
3.	M*	Copper layer thickness	10	50
4.	S*	Solder mask layer thickness	35	50
5.	H*	Width ALOX, vertical isolation	200	Proportional to 1/2A
6.	TAP*	Aluminum via pad	100	N/A
7.	L**	Size for LED assembly	Die size+300	N/A
8.	DIA***	Cavity Bottom size	Die size+600	N/A
9.	A ***	Angle of cavity wall	40°	60°
10.	T ₁ ***	Cavity depth	N/A	550
11.	MF*	Nickel / Gold	5 / 0.2	10 / 2
12.	MF*	Nickel / Silver	5 / 2	5 / 15

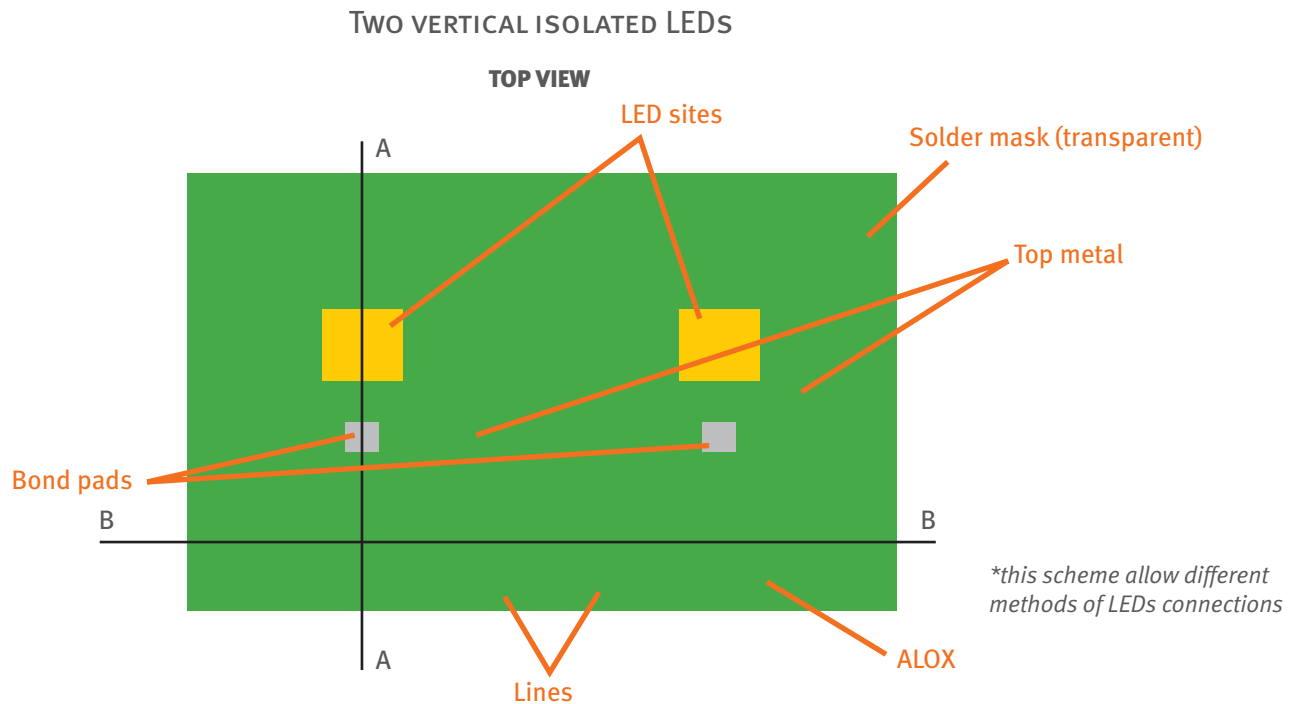
Attention. Distance of dielectric (ALOX) edge from unit edge 300 µm minimum

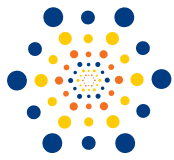
* For all options

** For options 1, 2.

*** For options 3, 4.

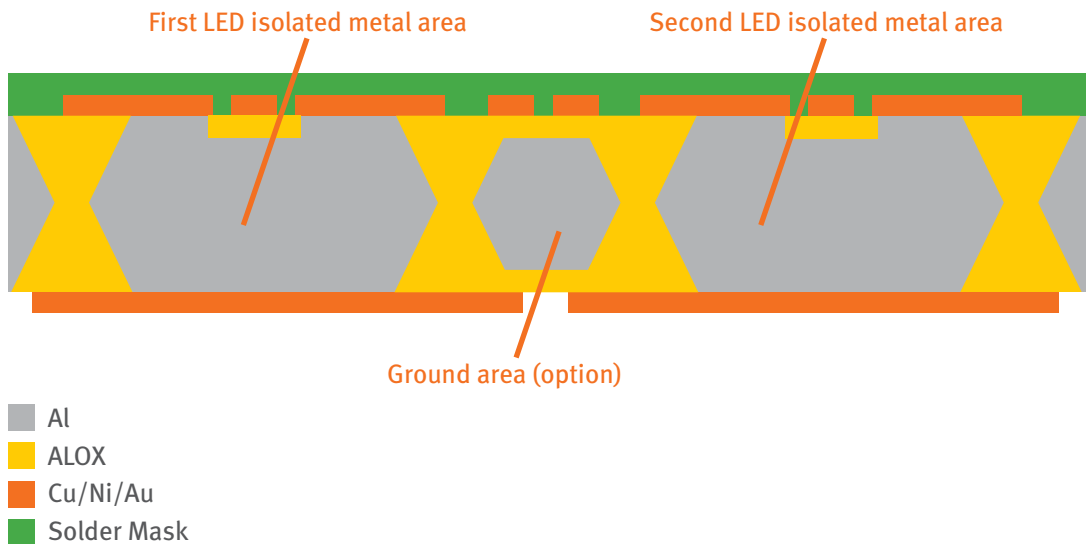
LED array sample options





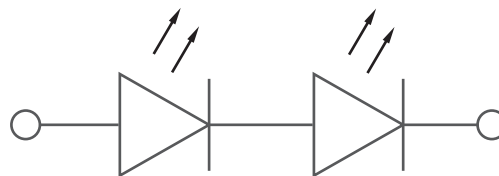
TWO VERTICAL ISOLATED LEDs

CROSS SECTION B-B

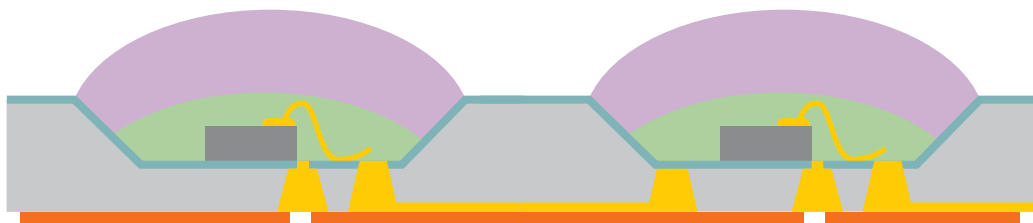


TWO LEDs SERIAL CONNECTED (ONE POLE CONNECTED TO BULK)

Scheme



Cross for example



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