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L2D2® LAMPS

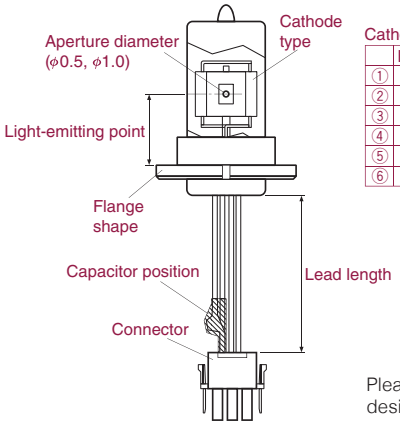
The L2D2® lamps are UV light sources with a long service lifetime and high stability. These L2D2 lamps have characteristics essential for light sources used in chemical analysis instruments and provide high measurement accuracy.



Features

- Long life: 4000 h (L6565)
- High stability: 0.005 %(p-p) typ.
- Small intensity variations
- Low cost
- Error-free lighting

Example of custom-designed lamp



Cathode ratings

	Preheating	Operating
①	2.5 V	1.0 V
②	2.5 V	1.7 V
③	3.0 V	0 V – 1 V
④	10 V	2.5 V – 6 V
⑤	10 V	7 V
⑥	12 V – 15 V	0 V

Please consult us about custom designed lamp.

Specifications

Type No.	Type	Ⓐ Dimensional outline	Window material	Spectral distribution (nm)	Aperture diameter (mm)	Output stability at 230 nm: Drift Max. (%/ h)	Output stability at 230 nm: Fluctuation (p-p) Typ. (%)	Ⓑ Guaranteed life at 230 nm (h)	Required discharge starting voltage Ⓒ Max. (V dc)	Anode current (mA dc)	Tube voltage Typ. (V dc)
L6565	Standard	①	UV glass	185 to 400	1.0	±0.3	0.005	4000	350	300 ± 30	80
L6301					0.5			2000	400		
L6301-50		⑧									
L6303		①									
L12313		③									
L12313-50		⑦									
L6307		②									
L6309											
L7296		④	Synthetic silica	160 to 400							
L7296-50		⑥									
L12307		②	UV glass	185 to 400							
L7293		⑤	MgF_2	115 to 400	1.0	—	—	2000Ⓓ	350		
L7293-50		⑨									
L6999	See-through	①	UV glass	185 to 400	0.5	±0.3	0.005	2000	400		
L6999-50		⑧									
L9030		④	Synthetic silica	160 to 400							
L9030-50		⑥									

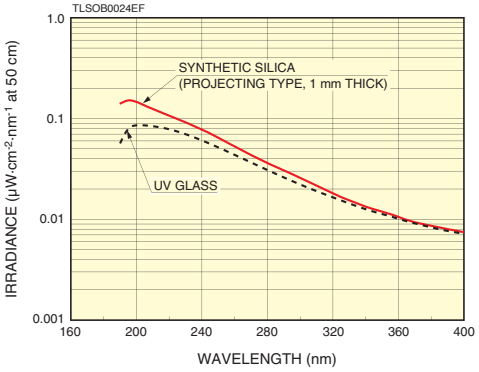
ⒶSee pages 7 and 8.
Ⓑ Lamp life end is defined as the point when light output at 230 nm falls to 50 % of its initial value or when output fluctuations exceed 0.05 % (p-p).
Ⓒ A pulse voltage higher than this value must be supplied to start reliable lamp discharge.
Ⓓ Operating life may vary depending on operating environmental conditions (vacuum atmosphere).

Characteristics

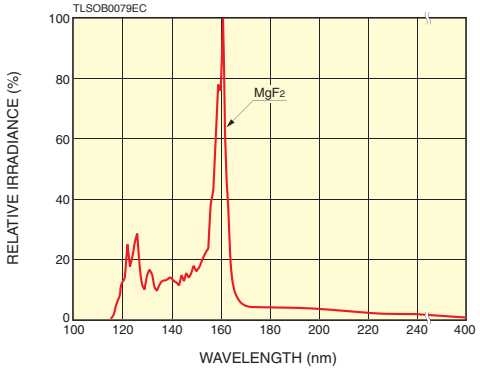
●Spectral distribution

Deuterium lamps emit high intensity light in the UV range at wavelengths shorter than 400 nm. Light intensity on the short wavelength side is determined by the window material used.

■UV glass, Synthetic silica

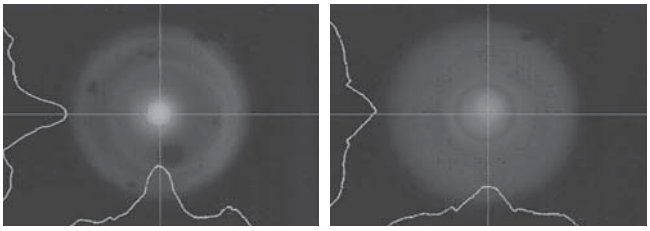


■MgF_2



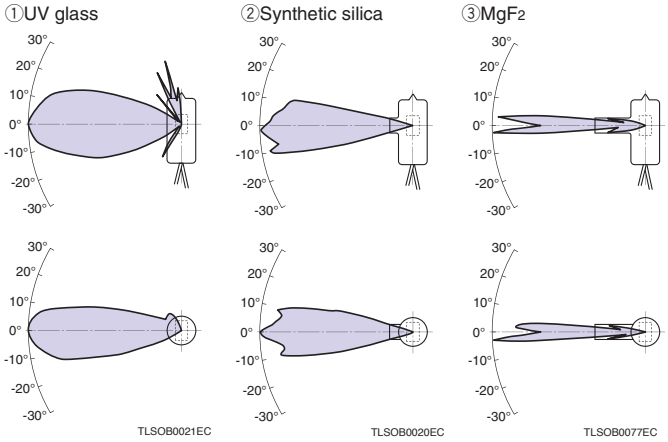
●Arc distribution

Arc distribution of deuterium lamps is determined by the aperture (light exit) size. At the same input current and voltage, lamps with a 0.5 mm aperture provide 1.4 times higher intensity than lamps with a 1.0 mm diameter aperture.



APERTURE: ϕ0.5 mm　　APERTURE: ϕ1.0 mm

●Directivity (Light distribution)



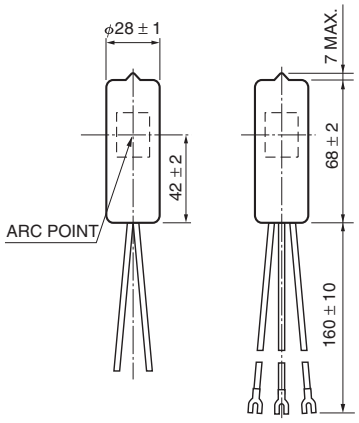
Filament ratings				Filament warm-up time	Applicable power supply Ⓗ		Bulb wall temperature (Recommended) Ⓘ	Type No.
Warm-up		Operating						
Voltage Ⓔ (V dc, ac)	Current Typ. (A dc, ac)	Voltage (V dc)	Current Typ. (A dc)	Min. (s)	AC input type	DC input time		
2.5 ± 0.25	4	1.0 ± 0.1	1.8	20	C9598-2510	M9596-2510	245 to 290	L6565
								L6301
								L6301-50
		1.7 ± 0.2	3.3		C9598-2517	M9596-2517		L6303
3	5	0 to 1	0 to 1.8		C9598-3000	M9596-3000		L12313
								L12313-50
10 ± 1	0.8	2.5 to 6.0 Ⓕ	0.3 to 0.6		C9598-1035	M9596-1035		L6307
	1.2	7.0 ± 0.5	1		C9598-1070	M9596-1070		L6309
								L7296
								L7296-50
12 to 15	0.5 to 0.55	0 Ⓖ	0 Ⓖ		C9598-1555	M9596-1555		L12307
2.5 ± 0.25	4	1.0 ± 0.1	1.8		C9598-2510	M9596-2510		L7293
								L7293-50
								L6999
								L6999-50
								L9030
								L9030-50

Ⓔ If the cable between the lamp and power supply is too long, a large filament voltage drop occurs in the cable that might make the lamp filament voltage too low. The filament power supply should be designed to supply the specified voltage at the lamp input terminal.
Ⓕ Recommended operating voltage is 3.5 V ± 0.5 V.
Ⓖ During lamp operation a discharge current flows into the filament so no external power supply is needed to maintain the filament temperature.
Ⓗ To extract full performance from our deuterium lamps we recommend using our dedicated power supplies.
Ⓘ Recommended temperature for operating a lamp in the lamp housing. Consult us on how to measure the temperature.
* Custom lamps not listed above will be available on request. Please feel free to contact us.

Dimensional outline (Unit: mm)

❶ L6301, L6565, L6303, L6999

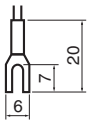
See-through type



CONNECTION

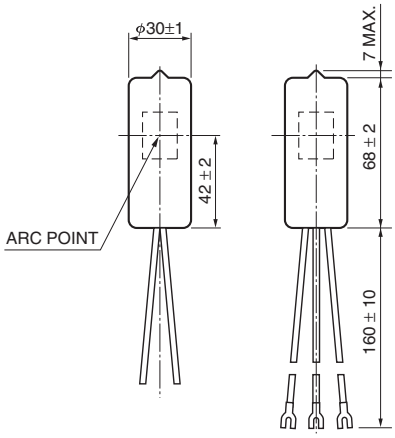
L6303	
FILAMENT	: BLUE
FILAMENT · GND	: BLACK
ANODE	: RED

L6301, L6565, L6999	
FILAMENT	: BLUE
FILAMENT	: BLUE
ANODE	: RED



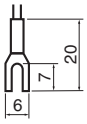
TLSOA0040ED

❷ L6307, L6309 , L12307



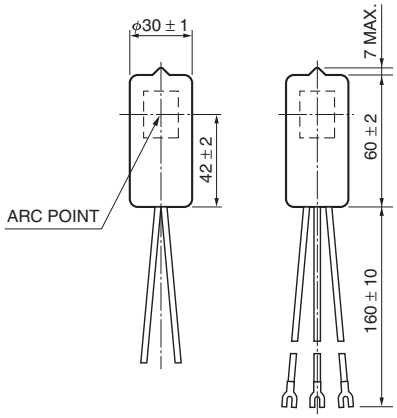
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FILAMENT·GND	: BLACK
ANODE	: RED



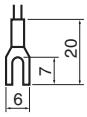
TLSOA0018EF

❸ L12313



CONNECTION

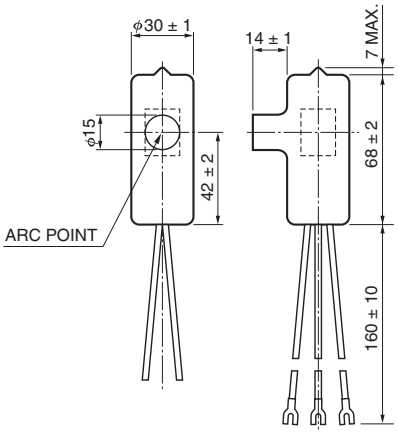
FILAMENT	: BLUE
FILAMENT·GND	: BLUE
ANODE	: RED



TLSOA0039EF

❹ L7296, L9030

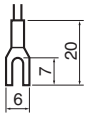
See-through type



CONNECTION

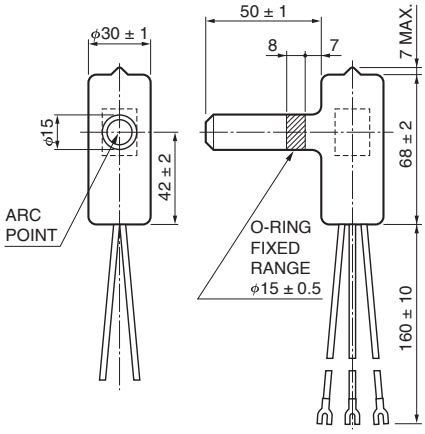
L7296	
FILAMENT	: BLUE
FILAMENT·GND	: BLACK
ANODE	: RED

L9030	
FILAMENT	: BLUE
FILAMENT	: BLUE
ANODE	: RED



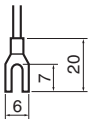
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❺ L7293



CONNECTION

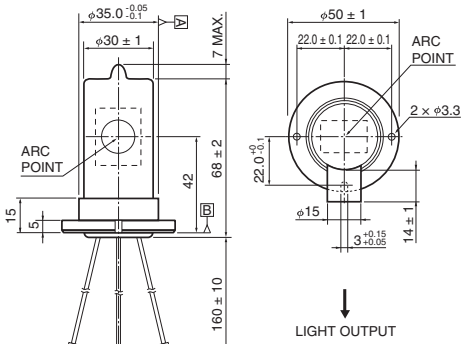
L7293	
FILAMENT	: BLUE
FILAMENT	: BLUE
ANODE	: RED



TLSOA0011EF

❻ L7296-50, L9030-50

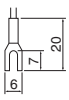
See-through type



CONNECTION

L7296-50	
FILAMENT	: BLUE
FILAMENT·GND	: BLACK
ANODE	: RED

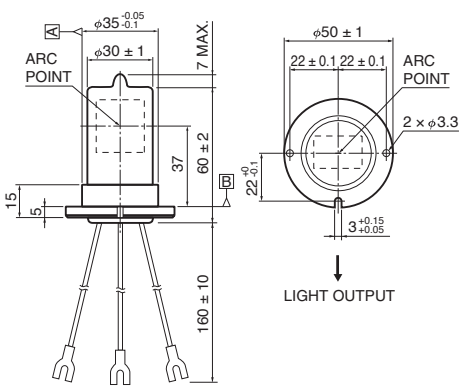
L9030-50	
FILAMENT	: BLUE
FILAMENT	: BLUE
ANODE	: RED



Tolerance of emitting point (center)
With respect to axial line A: ±0.1
With respect to plane B: ±0.1

TLSOA0075EE

❼ L12313 -50

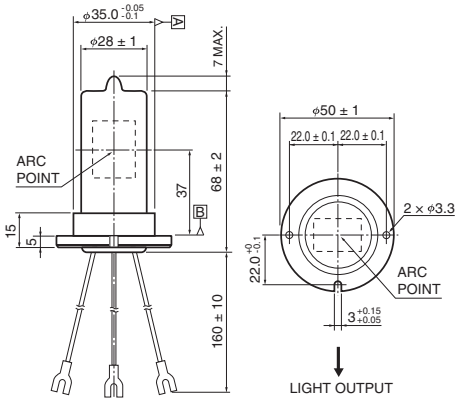


CONNECTION
FILAMENT: BLUE
FILAMENT: BLUE
ANODE : RED

Tolerance of emitting point (center)
With respect to axial line A: ±0.1
With respect to plane B: ±0.1

TLSOA0050EA

See-through type
❽ L6301-50, L6999-50

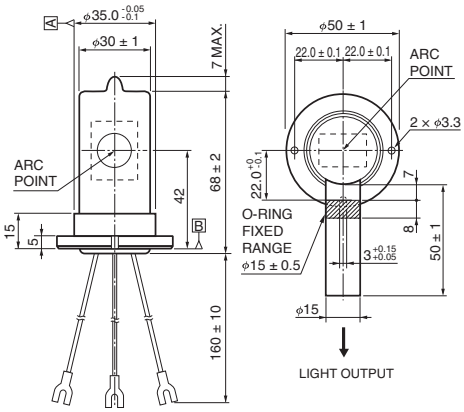


CONNECTION
FILAMENT: BLUE
FILAMENT: BLUE
ANODE : RED

Tolerance of emitting point (center)
With respect to axial line A: ±0.1
With respect to plane B: ±0.1

TLSOA0051ED

❾ L7293-50

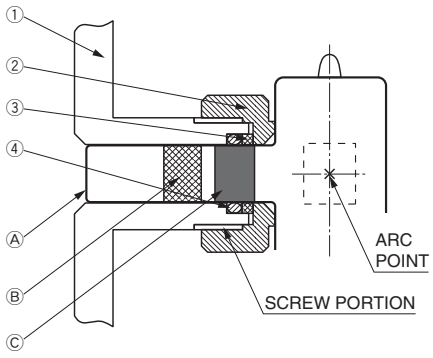


CONNECTION
FILAMENT: BLUE
FILAMENT: BLUE
ANODE : RED

Tolerance of emitting point (center)
With respect to axial line A: ±0.1
With respect to plane B: ±0.1

TLSOA0088EC

Mounting example on the vacuum system (L7293, L7293-50)



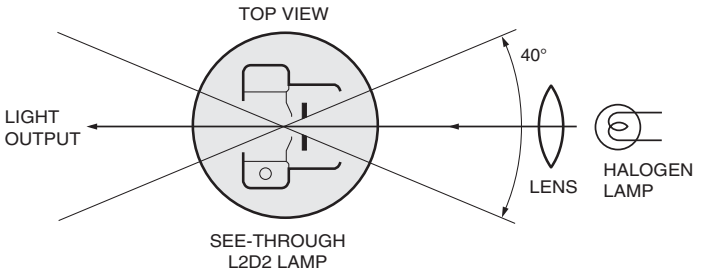
①VACUUM FLANGE
②TIGHTENING SCREW
③O-RING JIS B2401
CALL No. V15
④SPACER
ⒶMgF2 WINDOW
ⒷGRADED SEAL
ⒸO-RING FIXED RANGE

TLSO 0053EA

See-through type

The see-through type electrode structure enables straight-line arrangement of the halogen lamp, deuterium lamp, optical system and optical path. This simplifies optical design of UV-VIS spectrophotometer etc., and eliminates loss of light amount caused by the half mirror.

An example for optics of See-through type



TLSOC0011EF

▼Type No.
L6999, L6999-50, L9030, L9030-50

X2D2® LAMPS | L2D2® LAMPS

POWER SUPPLY FOR D_2 LAMPS LAMP HOUSE

Applications using deuterium lamps require very high stability of light output, so using a Hamamatsu dedicated power supply and lamp house is recommended to operate these lamps. When users are designing their own power supply and lamp housing, we provide technical support and follow-up to ensure an optimal optical design so please consult us when needed.

E9522-50: for L9518 E9558-50: for L9519
E9522: for L6301-50 E9558: for L7296-50

* We welcome requests for custom products for see-through types (L10804, L6999-50, L6999-50 and L9030-50).

Power supply for X2D2® lamps / Lamp housing



▲Power supply Left: C9559, Right: M9521



▲Lamp housing Left: E9522-50, Right: E9558-50

Power supply for L2D2® lamps / Lamp housing



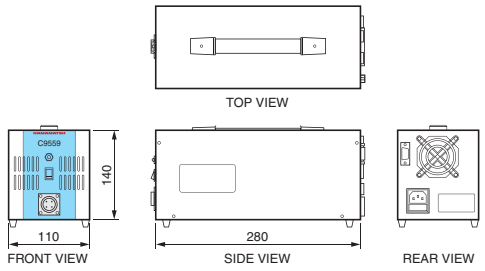
▲Power supply Left: C9598, Right: M9596



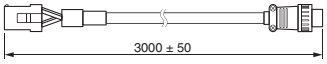
▲Lamp housing Left: E9522, Right: E9558

Dimensional outline (Unit: mm)

●C9559

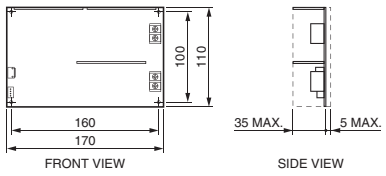


●Supplied lamp output cable



TLSOA0112EA

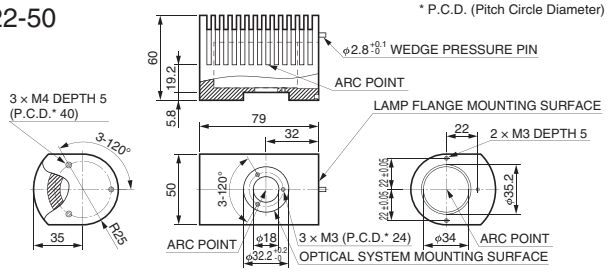
●M9521



TLSOA0113EA

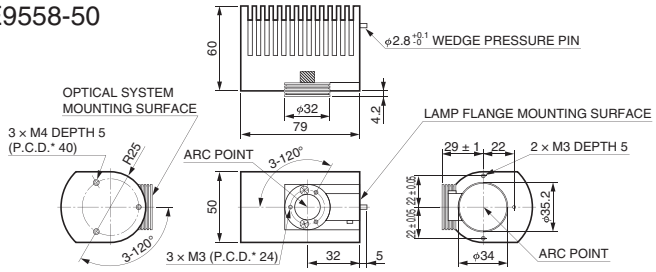
●E9522-50

* P.C.D. (Pitch Circle Diameter)



TLSOA0114EA

●E9558-50



TLSOA0115EA

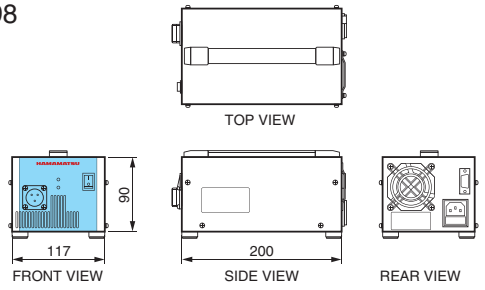
Power supply for X2D2 lamp specifications

Parameter				C9559	M9521	Unit
Input	Input voltage			AC 100 V to AC 240 V (100 V/200 V Auto switching) Single phase 50 Hz / 60 Hz	DC 24 V ± 2.4 V	—
	Input current (Max.)			1.4	3	A
Output	Output voltage (DC)	With load (Typ.)		85 / 90		V dc
		Without load (Min.)		200		V dc
	Output current (DC)			300 ± 30		mA dc
	Current fluctuation (p-p) (Typ.)			0.005		%
	Current drift at 25 °C (Typ.)			±0.02		%/h
	Filament ratings	Warm-up	Voltage	2.5 ± 0.2		V dc
			Current (Typ.)	4		A dc
		Operation	Voltage	1.7 ± 0.2		V dc
			Current (Typ.)	3.3		A dc
	Filament warm-up time			Approx. 20		s
	Trigger voltage	Anode		600		V peak
		Auxiliary electrode		600		V peak
Cooling method				—	Forced air cooling (0.3 m^3/min)	—
Operation ambient temperature				0 to +40		°C
Storage temperature				-10 to +60		°C
Operating and storage humidity				Below 80 (No condensation)		%
External control (Lamp ON/OFF, Lamp irradiation signal)				Yes	Yes	—
Conformance standards	CE			Yes	Yes	—
	UL (File No. E249677)			—	Yes	—

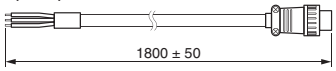
Dimensional outline (Unit: mm)

The power supply for the L2D2 cannot be used to operate X2D2 lamps. * P.C.D. (Pitch Circle Diameter)

●C9598

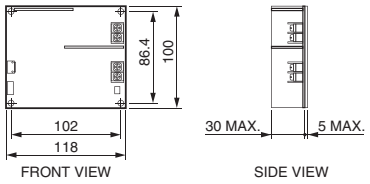


●Supplied lamp output cable



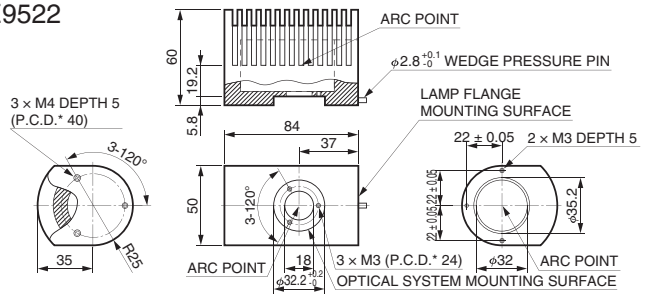
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●M9596



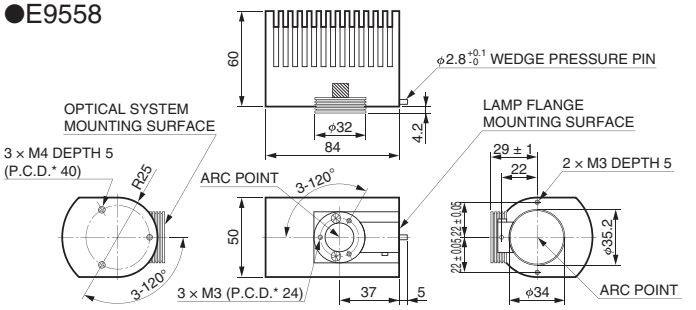
TLSOA0117EA

●E9522



TLSOA0118EA

●E9558



TLSOA0119EA

Power supply for L2D2 lamp specifications

Parameter			C9598	M9596	Unit
Input	Input voltage		AC 100 V to AC 240 V (100 V/200 V Auto switching) Single phase 50 Hz / 60 Hz	DC 24 V ± 2.4 V	—
	Input current (Max.)		0.9	2	A
Output	Output voltage (DC)	With load (Typ.)	80		V
		Without load (Min.)	200		V
	Output current (DC)		300 ± 30		mA
	Current Fluctuation (p-p) (Typ.)		0.005		%
	Current drift at +25 °C (Typ.)		±0.02		%/h
	Warm-up time		Approx. 20		s
	Trigger voltage		Approx. 600		V peak
Cooling method			—	Forced air cooling (0.3 m³/min)	—
Operation ambient temperature			0 to +40		°C
Storage temperature			-10 to +60		°C
Operating and storage humidity			Below 80 (No condensation)		%
External control (Lamp ON/OFF, Lamp irradiation signal)			Yes	Yes	—
Conformance standards	EN (CE marking)		Yes	Yes	—
	UL (File No. E249677)		—	Yes	—

Filament ratings

Type No.	Warm-up		Operation		Applicable lamp
	Voltage (V dc)	Current (A dc)(Typ.)	Voltage (V dc)	Current (A dc)(Typ.)	
C9598/M9596-2510	2.5 ± 0.2	4	1.0 ± 0.1	1.8	L6565, L7293, L6999, L6999-50, L7293-50 L6301, L6301-50, L9030, L9030-50
C9598/M9596-2517	2.5 ± 0.2	4	1.7 ± 0.2	3.3	L6303
C9598/M9596-3000	3 ± 0.2	5	0	0	L12313
C9598/M9596-1035	10 ± 0.5	0.8	3.5 ± 0.2	0.3	L6307
C9598/M9596-1070	10 ± 0.5	1.2	7 ± 0.4	1	L7296, L6309, L7296-50
C9598/M9596-1555	13.5 ± 0.7	0.5	5.25 ± 0.25	0.3	L12307

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