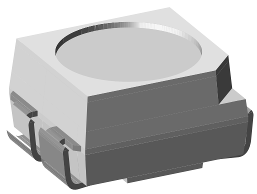
Power SMD LED PLCC-4


19210

DESCRIPTION

The TLM.32.. series is an advanced development in terms of heat dissipation.

The leadframe profile of this PLCC-3 SMD package is optimized to reduce the thermal resistance.

This allows higher drive current and doubles the light output compared to Vishay's high intensity SMD LED in PLCC-2 package.

PRODUCT GROUP AND PACKAGE DATA

- Product group: LED
- Package: SMD PLCC-4
- Product series: power
- Angle of half intensity: ± 60°

FEATURES

- Utilizing AlInGaP technology
- Available in 8 mm tape
- Luminous intensity, color and forward voltage categorized per packing unit
- Luminous intensity ratio per packing unit $I_{Vmax}/I_{Vmin} \leq 1.6$
- ESD class 2
- Suitable for all soldering methods according to CECC
- Lead (Pb)-free device

Pb-free

e3

APPLICATIONS

- Traffic Signals and Signs
- Interior and exterior lighting
- Dashboard illumination
- Indicator and backlighting purposes for audio, video, LCDs switches, symbols, illuminated advertising etc.

PARTS TABLE

PART	COLOR, LUMINOUS INTENSITY	DOMINANT WAVELENGTH
TLMK3200	Red, I_V > 200 mcd (typ. 500 mcd)	611 nm to 622 nm
TLMK3201	Red, I_V = (250 to 800) mcd	611 nm to 622 nm
TLMK3202	Red, I_V = (320 to 800) mcd	611 nm to 622 nm
TLMK3203	Red, I_V = (400 to 1250) mcd	611 nm to 622 nm
TLMS3200	Red, I_V > 160 mcd (typ. 300 mcd)	626 nm to 638 nm
TLMS3201	Red, I_V = (160 to 400) mcd	626 nm to 638 nm
TLMS3202	Red, I_V = (250 to 800) mcd	626 nm to 638 nm
TLMO3200	Soft orange, I_V > 200 mcd (typ. 500 mcd)	600 nm to 611 nm
TLMO3201	Soft orange, I_V = (250 to 800) mcd	600 nm to 611 nm
TLMO3202	Soft orange, I_V = (320 to 800) mcd	600 nm to 611 nm
TLMO3203	Soft orange, I_V = (400 to 1250) mcd	600 nm to 611 nm
TLMY3200	Yellow, I_V > 200 mcd (typ. 450 mcd)	583 nm to 594 nm
TLMY3201	Yellow, I_V = (250 to 800) mcd	583 nm to 594 nm
TLMY3202	Yellow, I_V = (320 to 800) mcd	583 nm to 594 nm
TLMY3203	Yellow, I_V = (400 to 1250) mcd	583 nm to 594 nm

ABSOLUTE MAXIMUM RATINGS[1] TLMK32.., TLMS32.., TLMO32.., TLMY32..				
PARAMETER	**TEST CONDITION**	**SYMBOL**	**VALUE**	**UNIT**
Reverse voltage		V_R	5	V
Forward current		I_F	70	mA
Power dissipation	$T_{amb} \leq 65$ °C (290 K/W), $T_{amb} \leq 70$ °C (270 K/W)	P_{tot}	180	mW
Junction temperature		T_j	125	°C
Operating temperature range		T_{amb}	- 40 to + 100	°C
Storage temperature range		T_{stg}	- 40 to + 100	°C
Thermal resistance junction/ ambient	mounted on PC board FR4 optional paddesign (see page 11)	R_{thJA}	290	K/W
	mounted on PC board FR4 recommended paddesign (see page 10)	R_{thJA}	270	K/W

Note:
[1] T_{amb} = 25 °C, unless otherwise specified

OPTICAL AND ELECTRICAL CHARACTERISTICS[1] TLMK32.., RED							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN**	**TYP.**	**MAX**	**UNIT**
Luminous intensity	I_F = 50 mA	TLMK3200	I_V	200	500		mcd
		TLMK3201	I_V	250		800	mcd
		TLMK3202	I_V	320		800	mcd
		TLMK3203	I_V	400		1250	mcd
Luminous flux/Luminous intensity			ϕ_V/I_V		3		mlm/mcd
Dominant wavelength	I_F = 50 mA		λ_d	611	617	622	nm
Peak wavelength	I_F = 50 mA		λ_p		624		nm
Spectral bandwidth at 50 % $I_{rel\ max}$	I_F = 50 mA		$\Delta\lambda$		18		nm
Angle of half intensity	I_F = 50 mA		φ		± 60		deg
Forward voltage	I_F = 50 mA		V_F	1.85	2.1	2.55	V
Reverse current	V_R = 5 V		V_R		0.01	10	µA

Note:
[1] T_{amb} = 25 °C, unless otherwise specified

OPTICAL AND ELECTRICAL CHARACTERISTICS[1] TLMS32.., RED							
PARAMETER	**TEST CONDITION**	**PART**	**SYMBOL**	**MIN**	**TYP.**	**MAX**	**UNIT**
Luminous intensity	I_F = 50 mA	TLMS3200	I_V	160	300		mcd
		TLMS3201	I_V	160		400	mcd
		TLMS3202	I_V	250		800	mcd
Luminous flux/Luminous intensity			ϕ_V/I_V		3		mlm/mcd
Dominant wavelength	I_F = 50 mA		λ_d	626	630	638	nm
Peak wavelength	I_F = 50 mA		λ_p		641		nm
Spectral bandwidth at 50 % $I_{rel\ max}$	I_F = 50 mA		$\Delta\lambda$		17		nm
Angle of half intensity	I_F = 50 mA		φ		± 60		deg
Forward voltage	I_F = 50 mA		V_F	1.85	2.1	2.55	V
Reverse current	V_R = 5 V		V_R		0.01	10	µA

Note:
[1] T_{amb} = 25 °C, unless otherwise specified

OPTICAL AND ELECTRICAL CHARACTERISTICS[1] TLMO32.., SOFT ORANGE							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN	TYP.	MAX	UNIT
Luminous intensity	I_F = 50 mA	TLMO3200	I_V	200	500		mcd
		TLMO3201	I_V	250		800	mcd
		TLMO3202	I_V	320		800	mcd
		TLMO3203	I_V	400		1250	mcd
Luminous flux/Luminous intensity			ϕ_V/I_V		3		mlm/mcd
Dominant wavelength	I_F = 50 mA		λ_d	600	605	611	nm
Peak wavelength	I_F = 50 mA		λ_p		611		nm
Spectral bandwidth at 50 % $I_{rel\ max}$	I_F = 50 mA		$\Delta\lambda$		17		nm
Angle of half intensity	I_F = 50 mA		φ		± 60		deg
Forward voltage	I_F = 50 mA		V_F	1.85	2.1	2.55	V
Reverse current	V_R = 5 V		V_R		0.01	10	µA

Note:
[1] T_{amb} = 25 °C, unless otherwise specified

OPTICAL AND ELECTRICAL CHARACTERISTICS[1] TLMY32.., YELLOW							
PARAMETER	TEST CONDITION	PART	SYMBOL	MIN	TYP.	MAX	UNIT
Luminous intensity	I_F = 50 mA	TLMY3200	I_V	200	450		mcd
		TLMY3201	I_V	250		800	mcd
		TLMY3202	I_V	320		800	mcd
		TLMY3203	I_V	400		1250	mcd
Luminous flux/Luminous intensity			ϕ_V/I_V		3		mlm/mcd
Dominant wavelength	I_F = 50 mA		λ_d	583	588	594	nm
Peak wavelength	I_F = 50 mA		λ_p		590		nm
Spectral bandwidth at 50 % $I_{rel\ max}$	I_F = 50 mA		$\Delta\lambda$		18		nm
Angle of half intensity	I_F = 50 mA		φ		± 60		deg
Forward voltage	I_F = 50 mA		V_F	1.85	2.1	2.55	V
Reverse current	V_R = 5 V		V_R		0.01	10	µA

Note:
[1] T_{amb} = 25 °C, unless otherwise specified

FORWARD VOLTAGE CLASSIFICATION		
GROUP	FORWARD VOLTAGE (V)	
	MIN	MAX
1	1.85	2.25
2	2.15	2.55

COLOR CLASSIFICATION						
GROUP	DOMINANT WAVELENGTH (NM)					
	RED		SOFT ORANGE		YELLOW	
	MIN	MIN	MAX	MIN	MAX	MAX
1	611	618	598	601	581	584
2	614	622	600	603	583	586
3			602	605	585	588
4			604	607	587	590
5			606	609	589	592
6			608	611	591	594

LUMINOUS INTENSITY CLASSIFICATION		
GROUP	LUMINOUS INTENSITY (MCD)	
	MIN	MAX
Xa	160	250
Xb	200	320
Ya	250	400
Yb	320	500
Za	400	630
Zb	500	800
0a	630	1000
0b	800	1250

GROUP NAME ON LABEL			
LUMINOUS INTENSITY GROUP	HALFGROUP	WAVELENGTH	FORWARD VOLTAGE
Z	b	2	1

One packing unit/tape contains only one classification group of luminous intensity, color and forward voltage.
Only one single classification groups is not available.
The given groups are not order codes, customer specific group combinations require marketing agreement.
No color subgrouping for Super Red.

TYPICAL CHARACTERISTICS

T_{amb} = 25 °C, unless otherwise specified

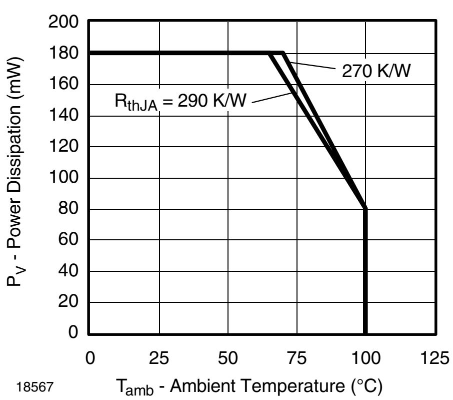


Figure 1. Power Dissipation vs. Ambient Temperature

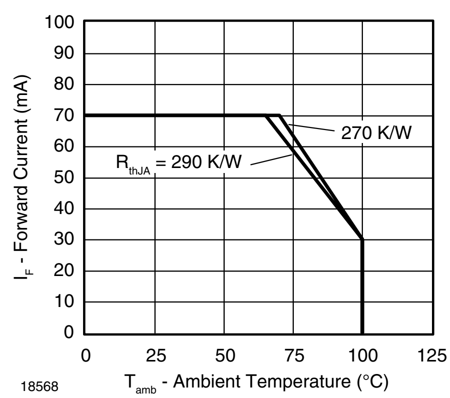


Figure 2. Forward Current vs. Ambient Temperature

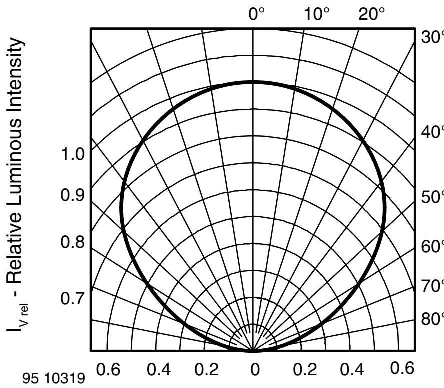


Figure 3. Rel. Luminous Intensity vs. Angular Displacement

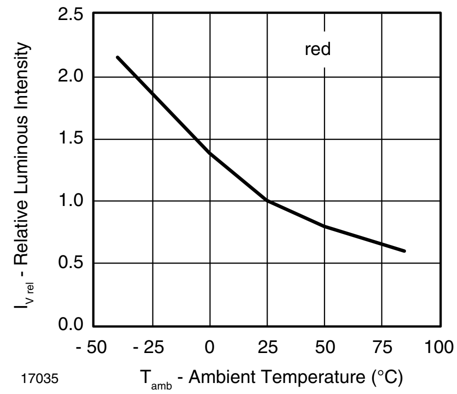


Figure 6. Relative Luminous Intensity vs. Amb. Temperature

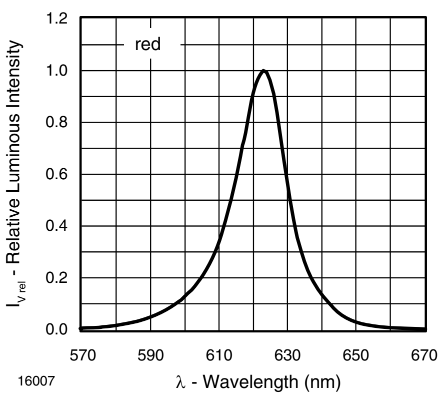


Figure 4. Relative Intensity vs. Wavelength

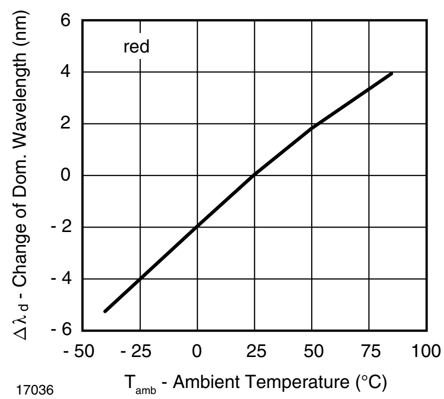


Figure 7. Change of Dominant Wavelength vs. Ambient Temperature

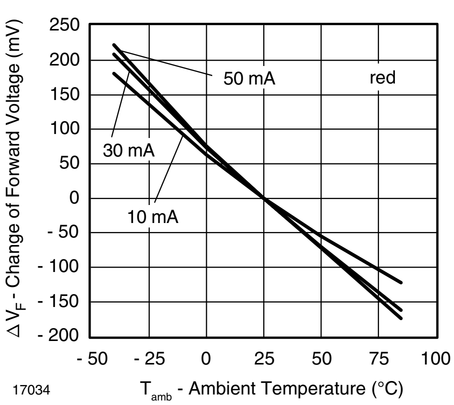


Figure 5. Change of Forward Voltage vs. Ambient Temperature

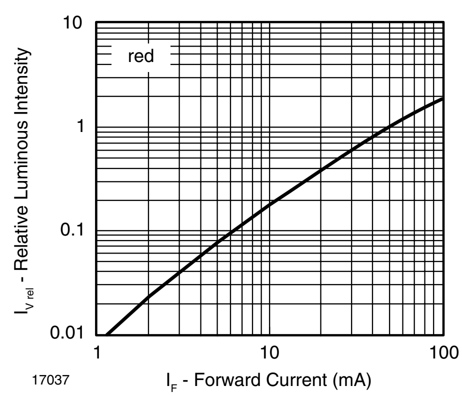


Figure 8. Relative Luminous Intensity vs. Forward Current

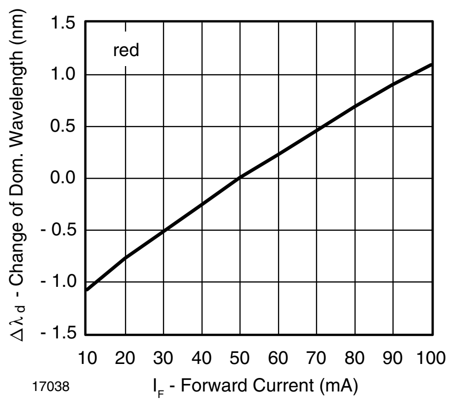


Figure 9. Change of Dominant Wavelength vs. Forward Current

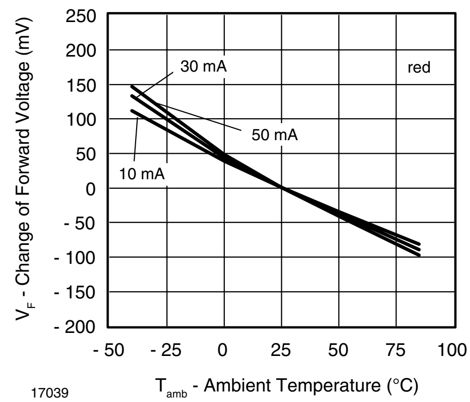


Figure 12. Change of Forward Voltage vs. Ambient Temperature

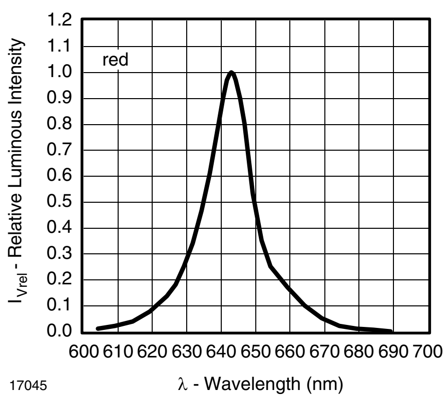


Figure 10. Relative Intensity vs. Wavelength

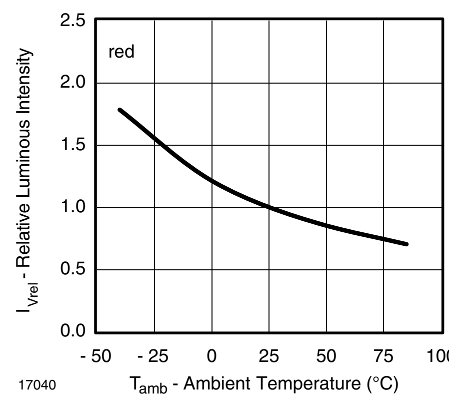


Figure 13. Relative Luminous Intensity vs. Amb. Temperature

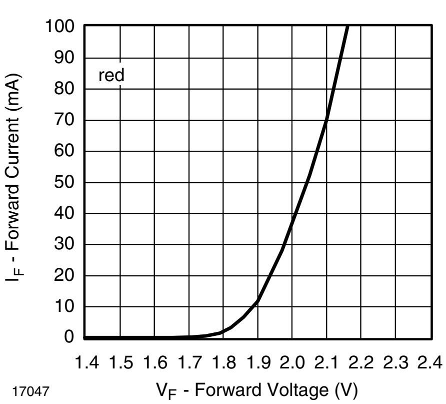


Figure 11. Forward Current vs. Forward Voltage

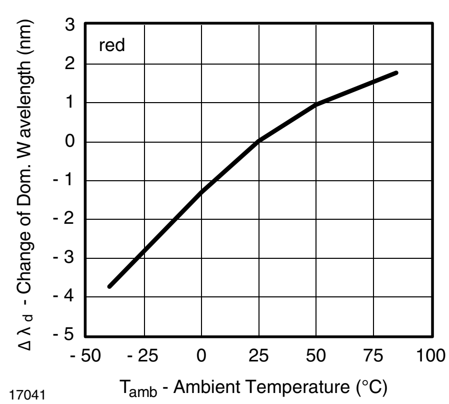


Figure 14. Change of Dominant Wavelength vs. Ambient Temperature

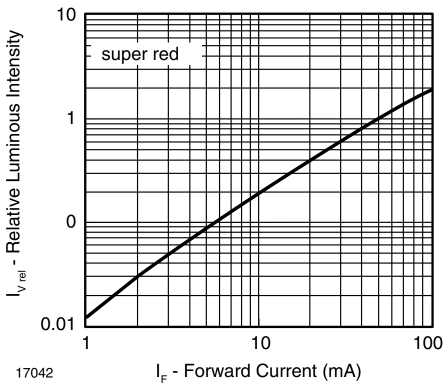


Figure 15. Relative Luminous Intensity vs. Forward Current

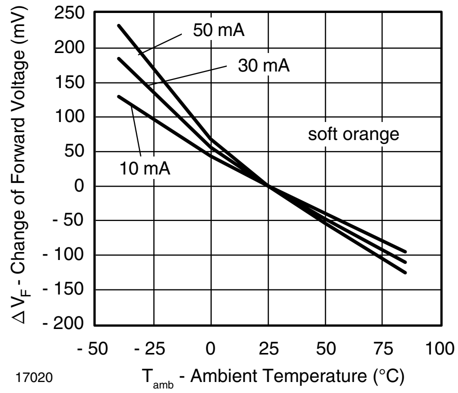


Figure 18. Change of Forward Voltage vs. Ambient Temperature

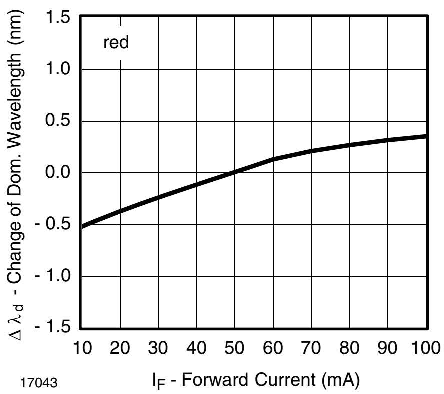


Figure 16. Change of Dominant Wavelength vs. Forward Current

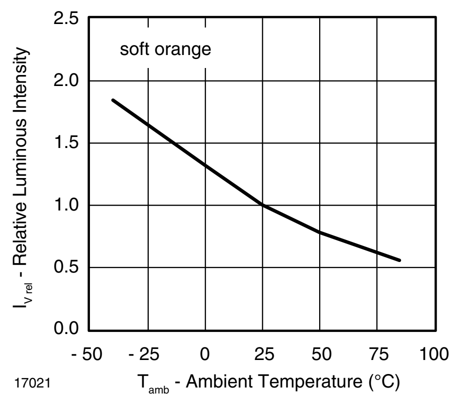


Figure 19. Relative Luminous Intensity vs. Amb. Temperature

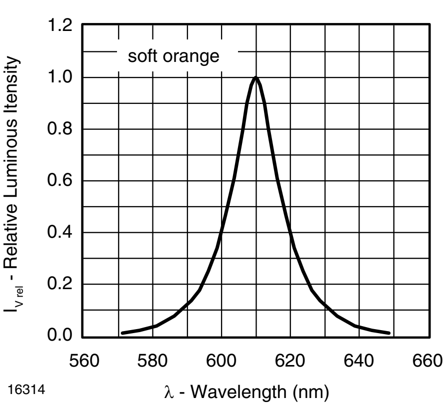


Figure 17. Relative Intensity vs. Wavelength

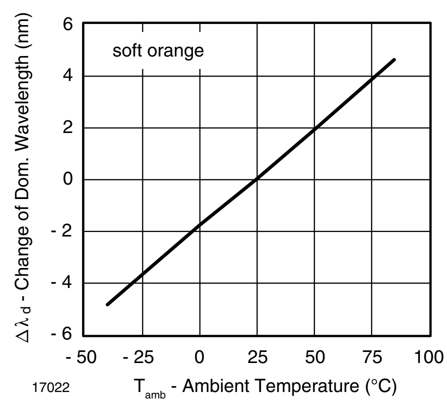


Figure 20. Change of Dominant Wavelength vs. Ambient Temperature

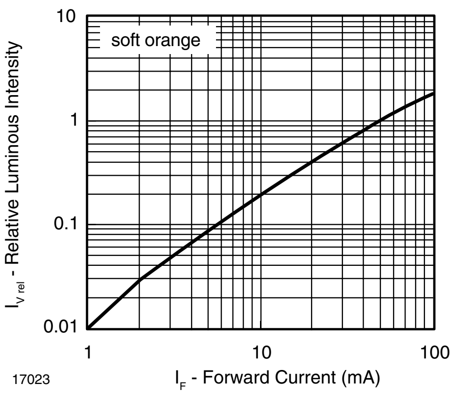


Figure 21. Relative Luminous Intensity vs. Forward Current

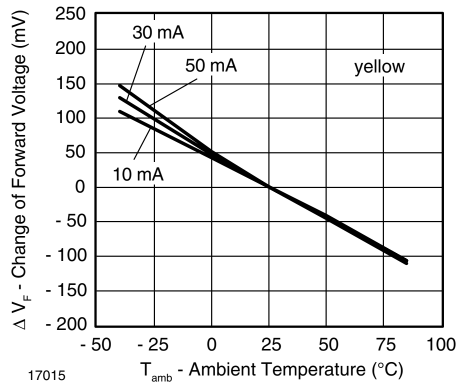


Figure 24. Change of Forward Voltage vs. Ambient Temperature

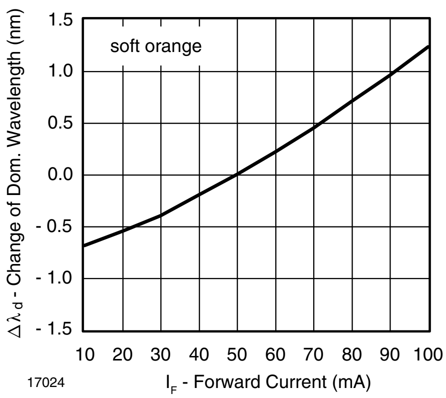


Figure 22. Change of Dominant Wavelength vs. Forward Current

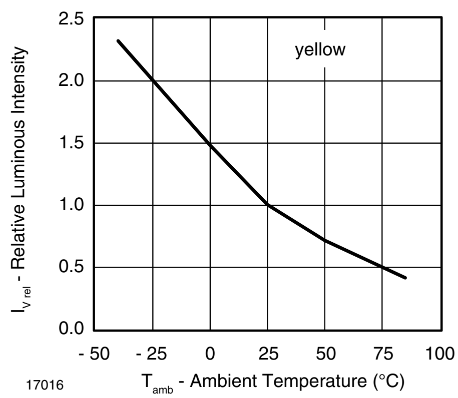


Figure 25. Relative Luminous Intensity vs. Amb. Temperature

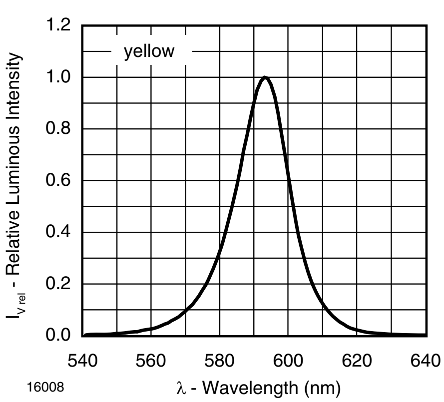


Figure 23. Relative Intensity vs. Wavelength

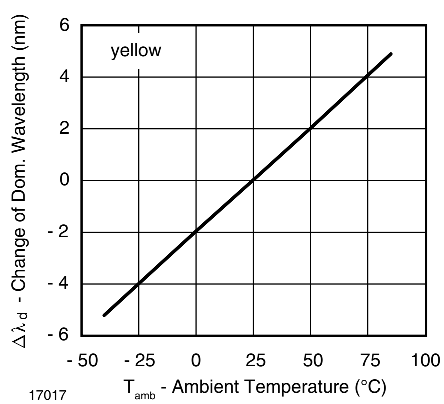


Figure 26. Change of Dominant Wavelength vs. Ambient Temperature

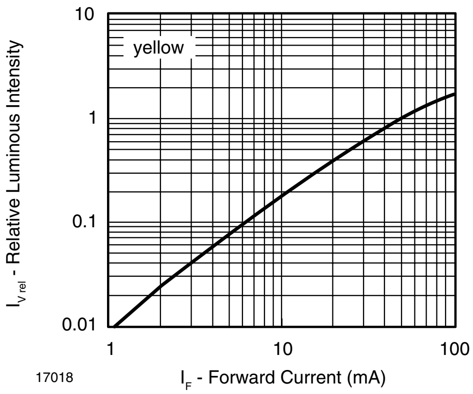


Figure 27. Relative Luminous Intensity vs. Forward Current

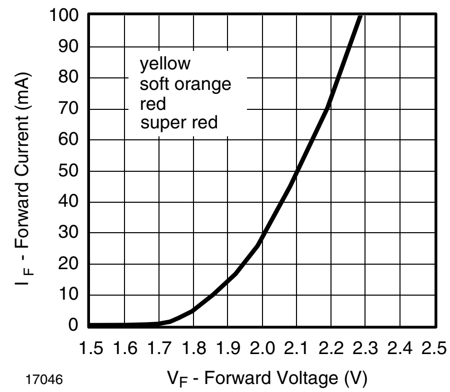


Figure 29. Forward Current vs. Forward Voltage

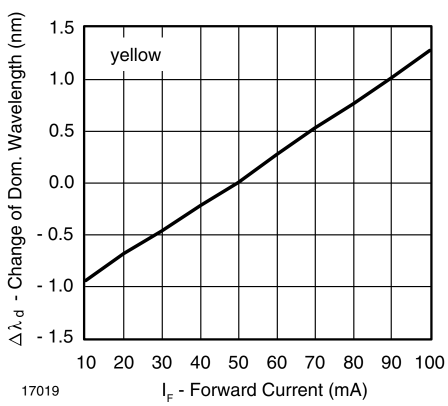


Figure 28. Change of Dominant Wavelength vs. Forward Current

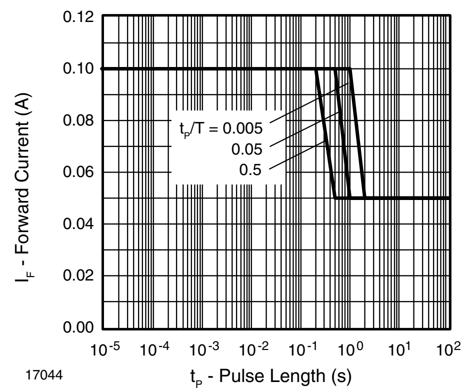
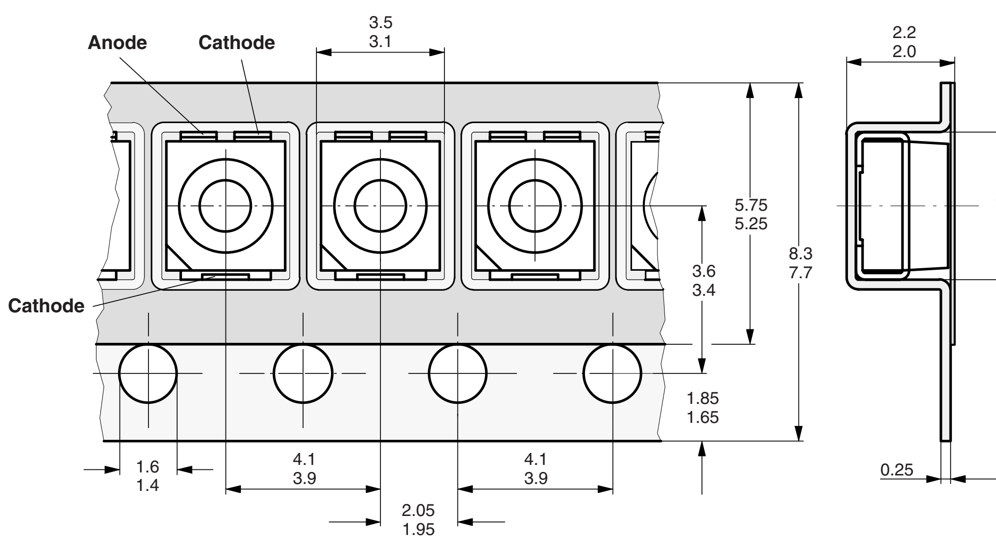
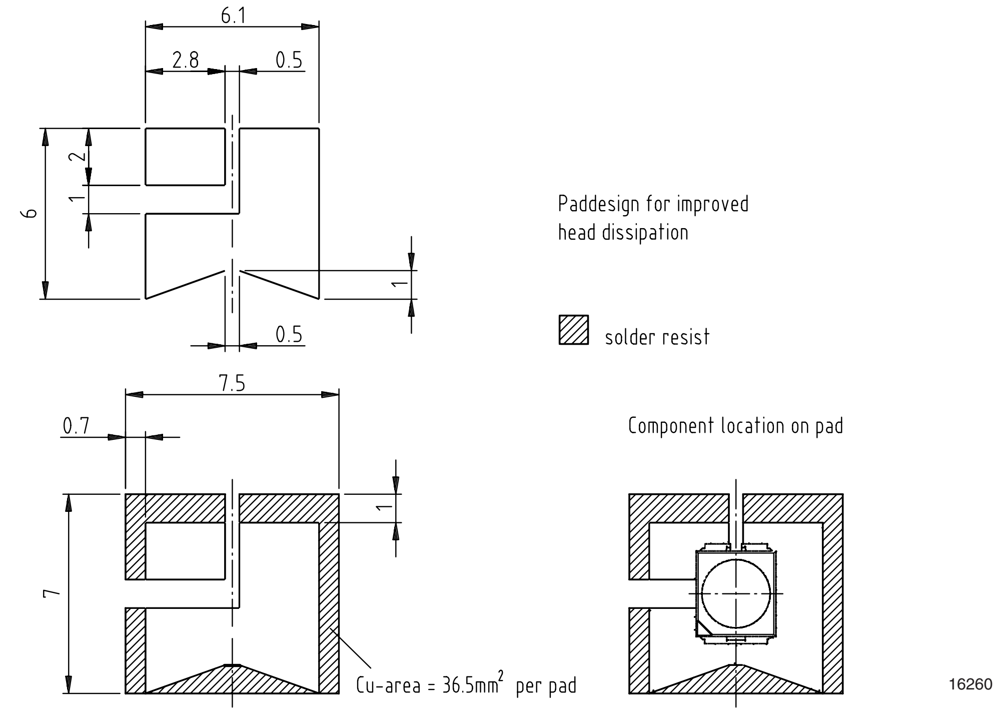


Figure 30. Forward Current vs. Pulse Length

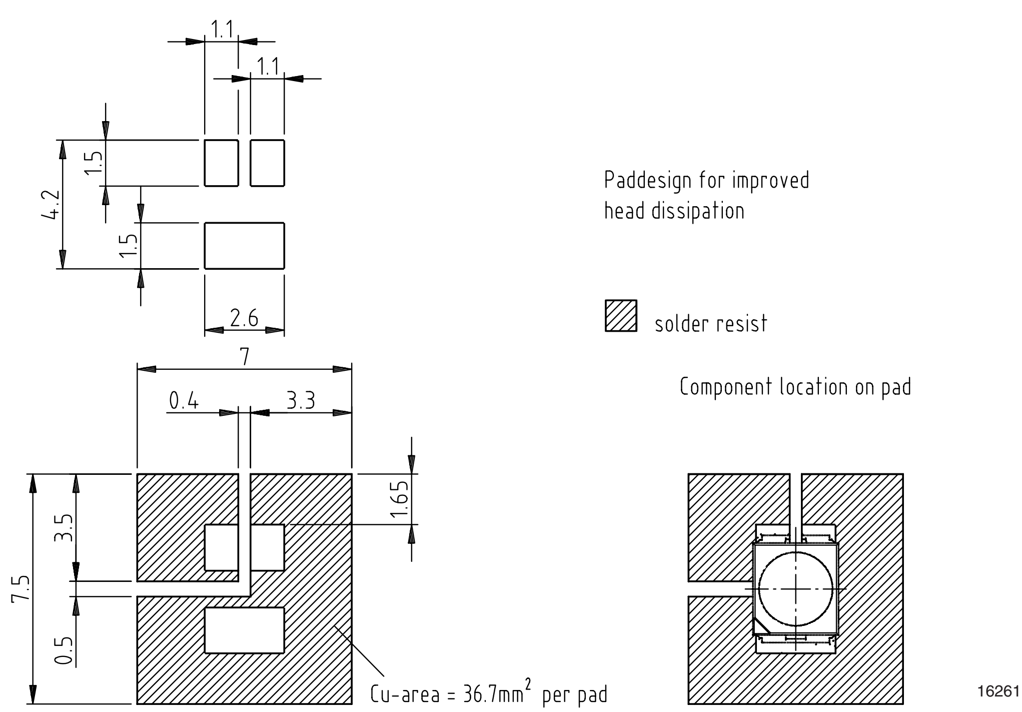
TAPING in millimeters



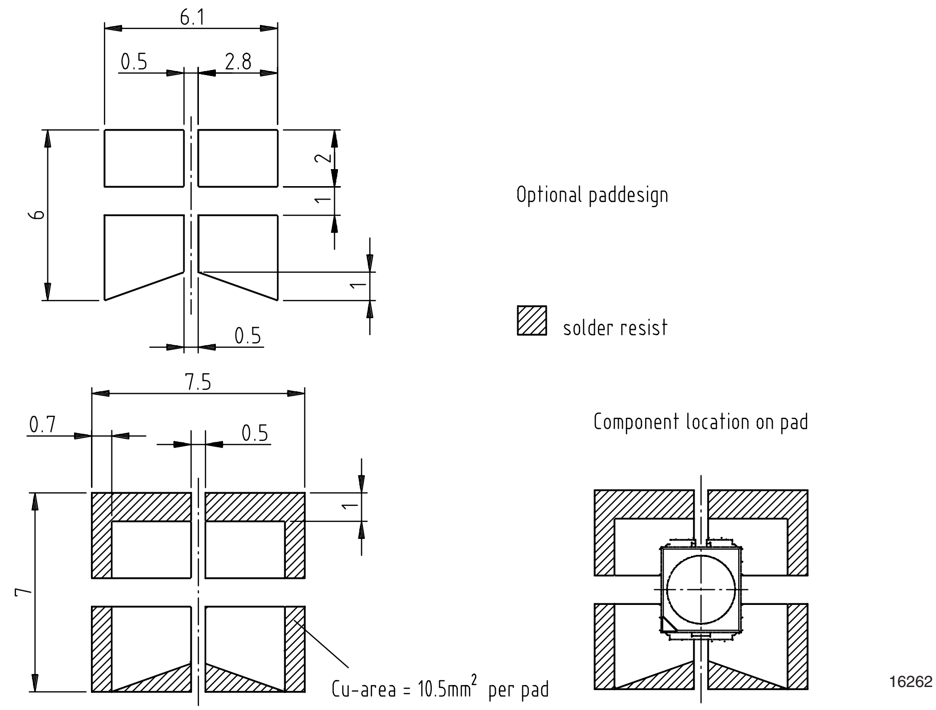
RECOMMENDED PAD DESIGN in millimeters
(Wave-Soldering), R_{thJA} = 270 K/W



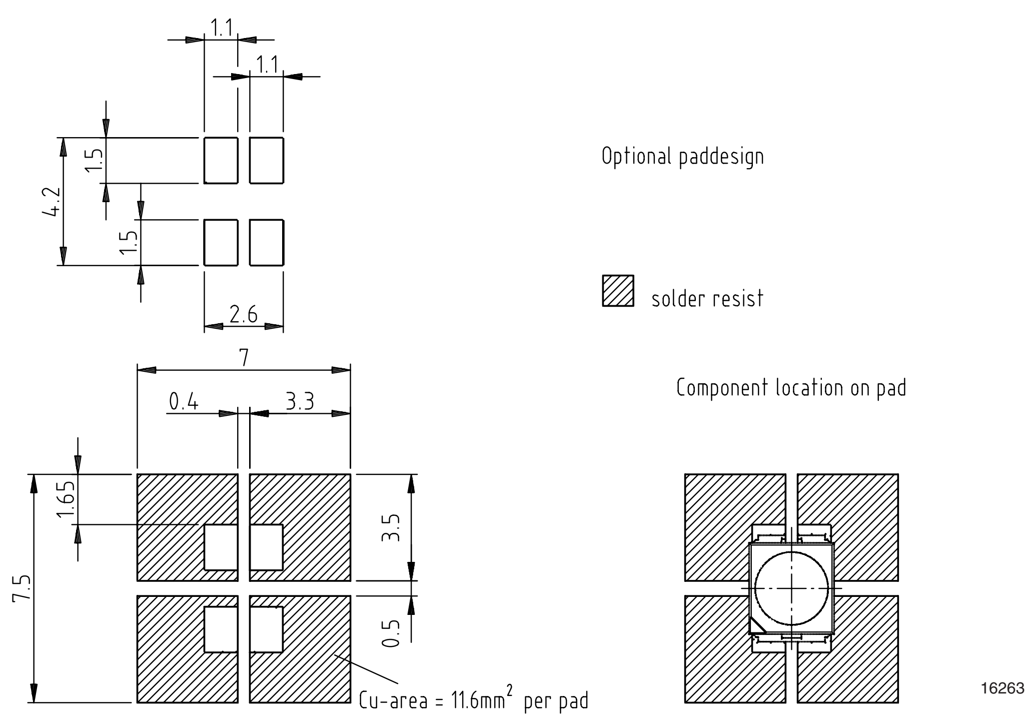
RECOMMENDED PAD DESIGN in millimeters
(Reflow-Soldering), R_{thJA} = 270 K/W



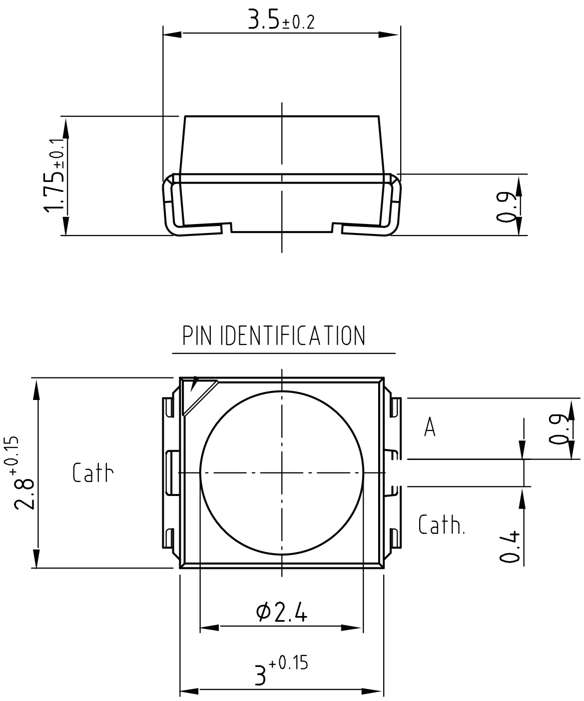
OPTIONAL PAD DESIGN in millimeters
(Wave-Soldering), R_{thJA} = 290 K/W

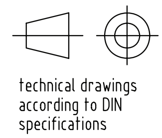


OPTIONAL PAD DESIGN in millimeters
(Reflow-Soldering), R_{thJA} = 290 K/W

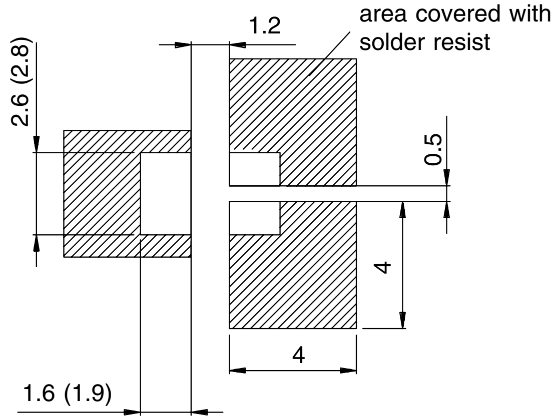


PACKAGE DIMENSIONS in millimeters





Mounting Pad Layout



Dimensions: IR and Vaporphase
(Wave Soldering)

Drawing-No. : 6.541-5054.01-4
Issue: 2; 02.12.05
16276_1

Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany

Disclaimer

All product specifications and data are subject to change without notice.

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