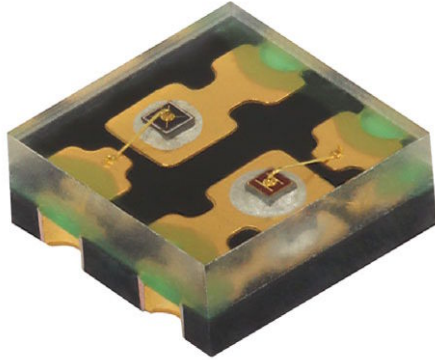


## Dual Color Emitting Diodes, 660 nm and 940 nm



### FEATURES

- Package type: surface mount
- Package form: square PCB
- Dimensions (L x W x H in mm): 2 x 2 x 0.87
- Peak wavelength:  $\lambda_p = 660$  nm and 940 nm
- High reliability
- High radiant power
- Angle of half intensity:  $\phi = \pm 60^\circ$
- Floor life: 168 h, MSL 3, according to J-STD-020
- Lead (Pb)-free reflow soldering
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### DESCRIPTION

VSMD66694 is a dual color emitting device with 660 nm and 940 nm peak wavelength. The emitters are based on the [SurfLight™](#) technology, providing high radiant power.

### APPLICATIONS

- Wearables
- Health monitoring
- Pulse oximetry

### PRODUCT SUMMARY

COMPONENT	COLOR	$I_e$ (mW/sr)	$\phi$ (deg)	$\lambda_p$ (nm)	$t_r$ (ns)
VSMD66694	Red	2.3	$\pm 60$	660	10
	IR	1.5		940	

#### Note

- Test conditions see table “Basic Characteristics“

### ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMD66694	Tape and reel	MOQ: 3000 pcs, 3000 pcs/reel	square PCB

#### Note

- MOQ: minimum order quantity

### ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	COLOR	VALUE	UNIT
Reverse voltage		$V_R$		5	V
Forward current		$I_F$	Red	70	mA
			IR	70	
Peak forward current	$t_p/T = 0.1, t_p = 100 \mu\text{s}$	$I_{FM}$	Red	140	mA
			IR	140	
Surge forward current	$t_p = 100 \mu\text{s}$	$I_{FSM}$	Red	1	A
			IR	1	
Power dissipation		$P_V$	Red	161	mW
			IR	119	
Junction temperature		$T_j$		100	$^\circ\text{C}$
Operating temperature range		$T_{amb}$		-25 to +85	$^\circ\text{C}$
Storage temperature range		$T_{stg}$		-25 to +85	$^\circ\text{C}$
Soldering temperature	According fig. 10, J-STD-020	$T_{sd}$		260	$^\circ\text{C}$
Thermal resistance junction / ambient	J-STD-051	$R_{thJA}$		390	K/W

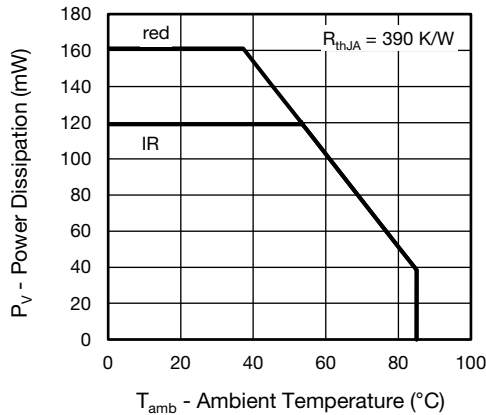


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

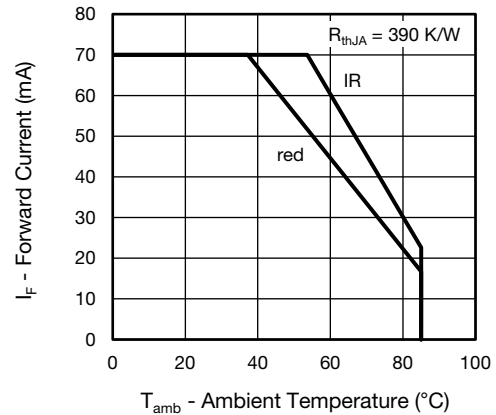
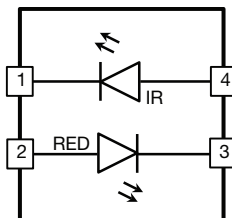


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)							
PARAMETER	TEST CONDITION	SYMBOL	COLOR	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 20\text{ mA}$ , $t_p = 20\text{ ms}$	$V_F$	Red	-	2.0	2.3	V
			IR	-	1.4	1.7	
Temperature coefficient	$I_F = 20\text{ mA}$	$TK_{VF}$	Red	-	-2.3	-	mV/K
			IR	-	-2.3	-	
Reverse current		$I_R$	not designed for reverse operation				$\mu\text{A}$
Junction capacitance	$V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0\text{ mW/cm}^2$	$C_J$	Red	-	7	-	pF
			IR	-	5	-	
Radiant intensity	$I_F = 20\text{ mA}$	$I_e$	Red	1.9	2.3	-	mW/sr
			IR	0.8	1.5	-	
Radiant power	$I_F = 20\text{ mA}$	$\phi_e$	Red	-	9.5	-	mW
			IR	-	8.5	-	
Angle of half intensity	$I_F = 20\text{ mA}$	$\phi$		-	$\pm 60$	-	deg
Peak wavelength	$I_F = 20\text{ mA}$	$\lambda_p$	Red	650	660	670	nm
			IR	920	940	960	
Spectral bandwidth	$I_F = 20\text{ mA}$	$\Delta\lambda$	Red	-	20	-	nm
			IR	-	40	-	
Temperature coefficient of $\lambda_p$	$I_F = 20\text{ mA}$	$TK_{\lambda_p}$	Red	-	0.2	-	nm/K
			IR	-	0.3	-	
Rise time	$I_F = 20\text{ mA}$	$t_r$	Red	-	10	-	ns
			IR	-	10	-	
Fall time	$I_F = 20\text{ mA}$	$t_f$	Red	-	10	-	ns
			IR	-	10	-	

**CIRCUIT BLOCK DIAGRAM**


1	IR LED	IR cathode
2	RED LED	RED anode
3	RED LED	RED cathode
4	IR LED	IR anode

**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

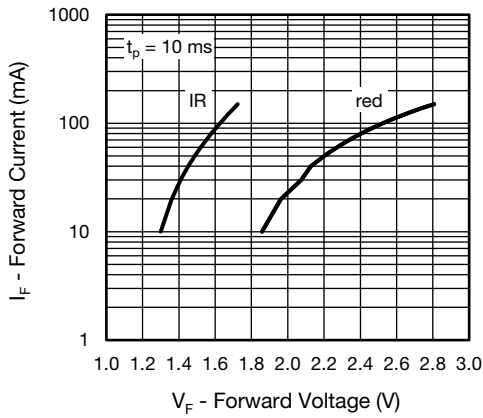


Fig. 3 - Forward Current vs. Forward Voltage

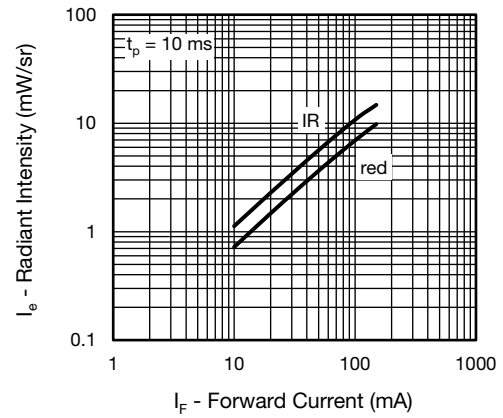


Fig. 6 - Radiant Intensity vs. Forward Current

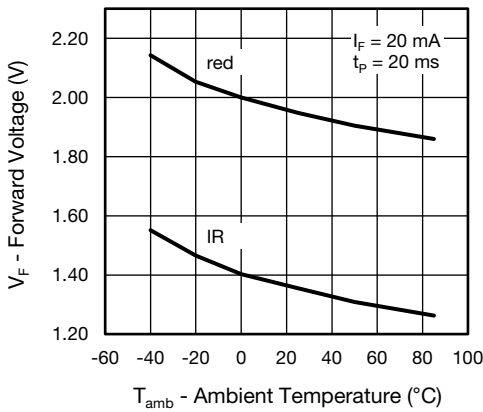


Fig. 4 - Forward Voltage vs. Ambient Temperature

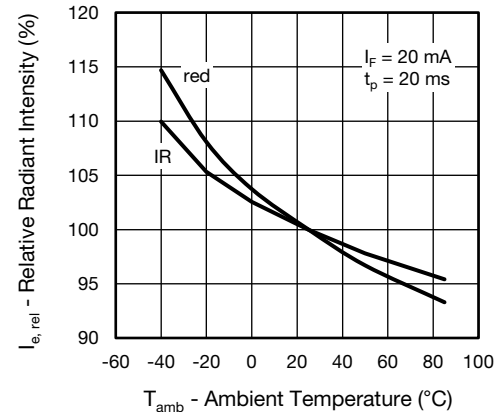


Fig. 7 - Relative Radiant Intensity vs. Ambient Temperature

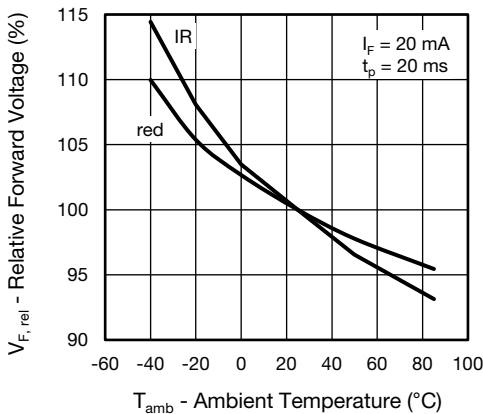


Fig. 5 - Relative Forward Voltage vs. Ambient Temperature

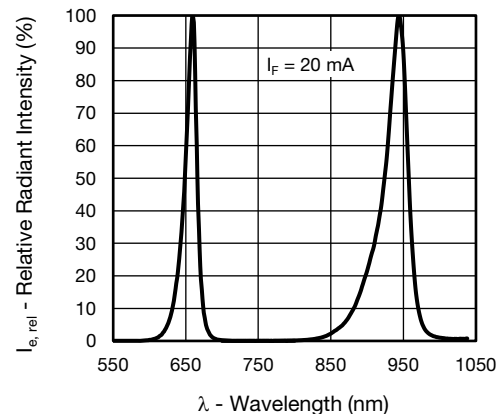


Fig. 8 - Relative Radiant Intensity vs. Wavelength

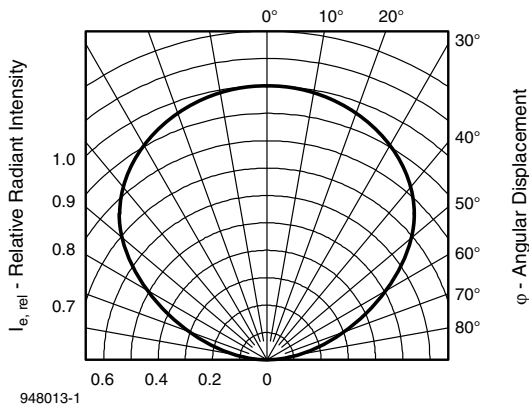


Fig. 9 - Relative Radiant Intensity vs. Angular Displacement

**DRYPACK**

Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

**FLOOR LIFE**

Time between soldering and removing from MBB must not exceed the time indicated in J-STD-020:

Moisture sensitivity: level 3

Floor life: 168 h

Conditions:  $T_{amb} < 30\text{ }^{\circ}\text{C}$ ,  $RH < 60\text{ }\%$

**DRYING**

In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at  $40\text{ }^{\circ}\text{C}$  (+  $5\text{ }^{\circ}\text{C}$ ),  $RH < 5\text{ }\%$ .

**REFLOW SOLDER PROFILE**

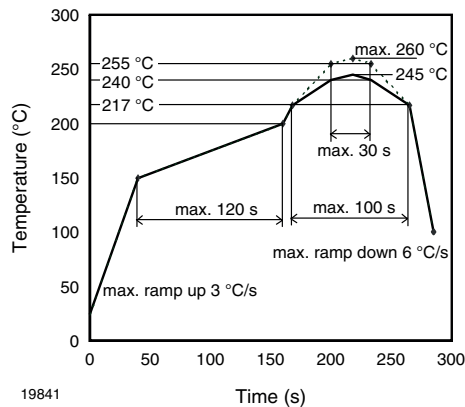
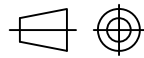
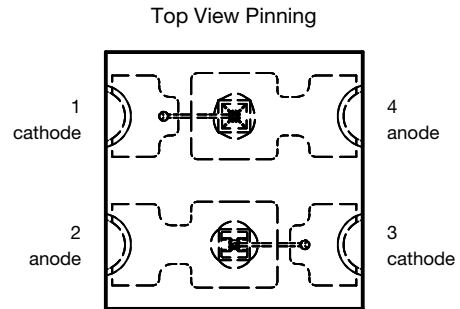
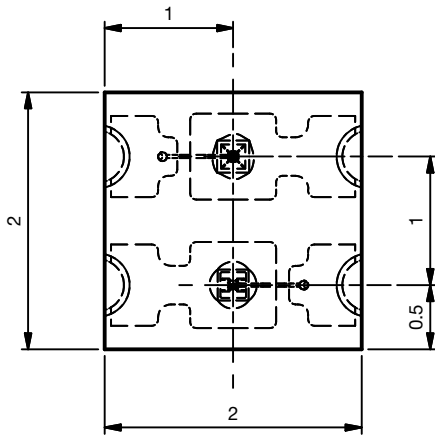
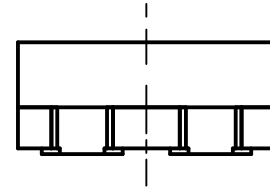
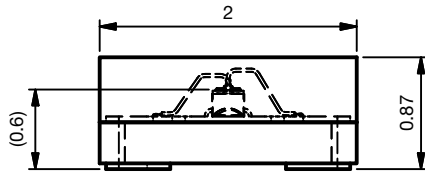
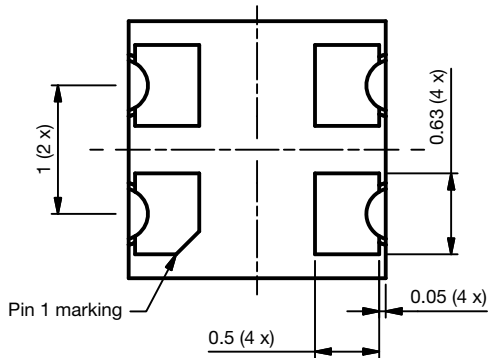


Fig. 10 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

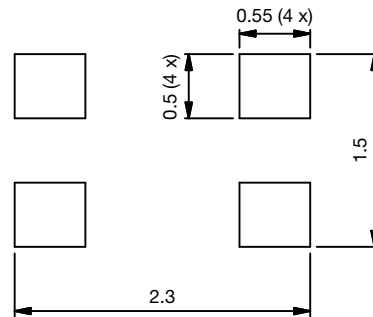
**PACKAGE DIMENSIONS** in millimeters



Technical drawings according to DIN specification



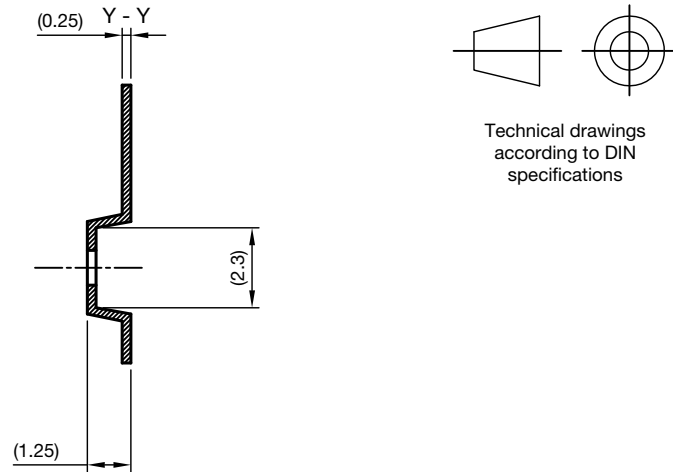
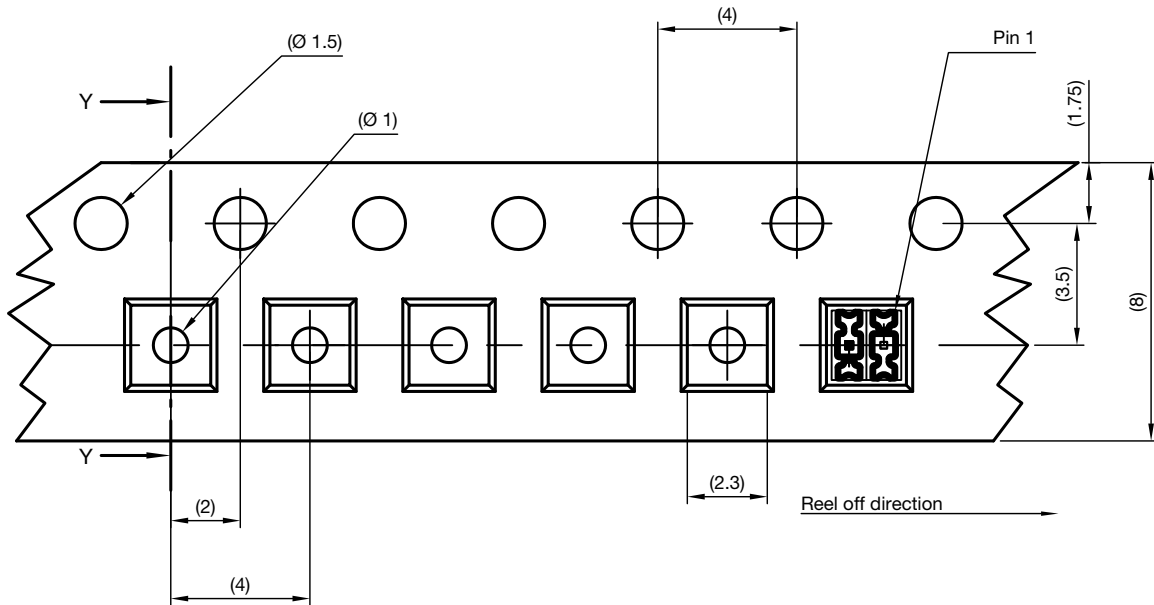
Recommended Footprint



Drawing No.: 6.550-5347.01-4  
Issue: 1; 19.02.16

Not indicated tolerances  $\pm 0.1$

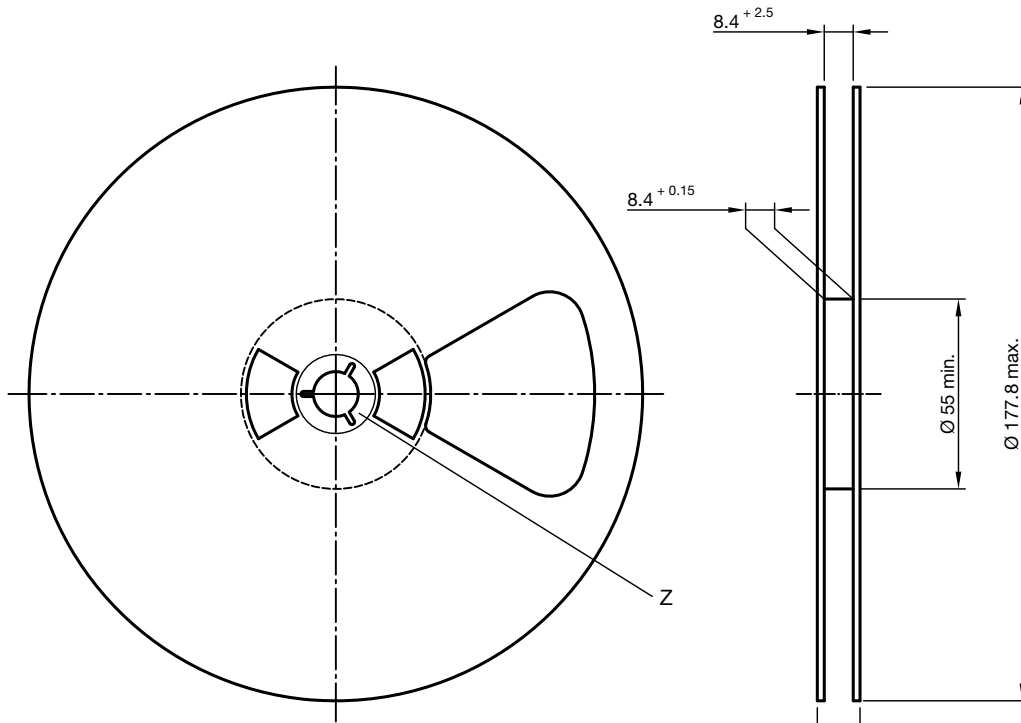
**TAPE DIMENSIONS** in millimeters



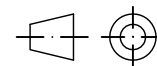
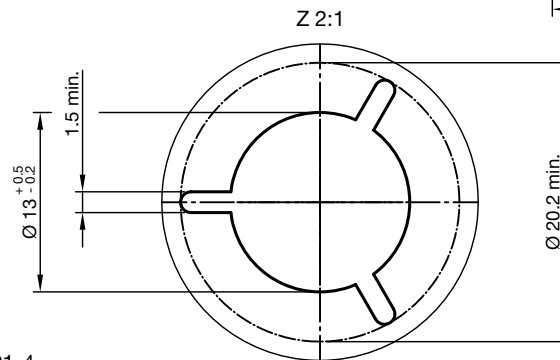
Drawing-No.: 9.700-5397.02-4  
Issue: 1; 19.02.16



REEL DIMENSIONS in millimeters



Form of the leave open of the wheel is supplier specific.



technical drawings according to DIN specifications

Drawing-No.: 9.800-5096.01-4

Issue: 4; 08.03.2016



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