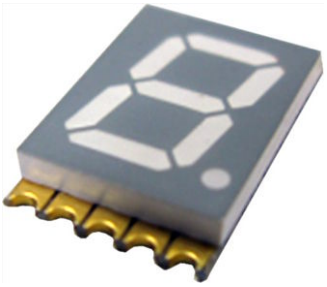
Standard 7-Segment SMD Display 10 mm



FEATURES

- Evenly lighted segments
- Grey package surface
- Untinted segments
- Luminous intensity categorized
- Yellow, green, and soft orange categorized for color
- Wide viewing angle
- Suitable for DC and high peak current
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e4

RoHS COMPLIANT

DESCRIPTION

The VDM.10A1 series are 10 mm SMD seven segment LED displays in a very compact package.

The devices utilize AlInGaP on GaAs chip technology.

PRODUCT GROUP AND PACKAGE DATA

- Product group: Display
- Package: 10 mm
- Product series: SMD
- Angle of half intensity: ± 50°

APPLICATIONS

- Panel meters
- Test- and measure-equipment
- Point-of-sale terminals
- Control units

PARTS TABLE

PART	COLOR	LUMINOUS INTENSITY (µcd)			at I_F (mA)	WAVELENGTH (nm)			at I_F (mA)	FORWARD VOLTAGE (V)			at I_F (mA)	CIRCUITRY
		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		
VDMR10A1	Super red	450	1600	-	1	-	631	-	20	-	2.0	2.6	20	Common anode
VDMO10A1	Soft orange	180	650	-	1	-	605	-	20	-	2.0	2.6	20	Common anode
VDMY10A1	Yellow	450	1600	-	1	-	587	-	20	-	2.0	2.6	20	Common anode
VDMG10A1	Green	110	500	-	1	-	572	-	20	-	2.0	2.6	20	Common anode

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)
VDMR10A1, VDMO10A1, VDMY10A1, VDMG10A1

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Power dissipation per segment		P_V	70	mW
Peak forward current per segment (frequency 1 kHz, 10 % duty cycle)		I_F	60	mA
Continous forward current per segment		I_F	25	mA
Forward current derating from 25 °C			0.28	mA/°C
Operating temperature range		T_{amb}	-35 to +105	°C
Storage temperature range		T_{stg}	-35 to +105	°C
Iron soldering conditions: 1/16" below seating plane for 3 s at 260 °C				

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
VDMR10A1, SUPER RED

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity (1)	I_F = 1 mA	VDMR10A1	I_V	450	1600	-	µcd
	I_F = 10 mA	VDMR10A1	I_V	-	20 800	-	µcd
Dominant wavelength	I_F = 20 mA	VDMR10A1	λ_d	-	631	-	nm
Peak emmision wavelength	I_F = 20 mA		λ_p	-	639	-	nm
Spectral line half-width	I_F = 20 mA		$\Delta\lambda$	-	20	-	
Forward voltage per segment	I_F = 20 mA		V_F	-	2.0	2.6	V
Reverse current per segment (2)	V_R = 5 V		I_R	-	-	100	µA
Luminous intensity matching ratio	I_F = 10 mA		I_{v-m}	-	-	2:1	

Notes
(1) Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
(2) Reverse voltage is only for IR test.It can not continue to operate at this situation.
(3) Cross talk specification ≤ 2.5 %.

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
VDMO10A1, SOFT ORANGE

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity (1)	I_F = 1 mA	VDMO10A1	I_V	180	650	-	µcd
	I_F = 10 mA	VDMO10A1	I_V	-	8250	-	µcd
Dominant wavelength	I_F = 20 mA	VDMO10A1	λ_d	-	605	-	nm
Peak emmision wavelength	I_F = 20 mA		λ_p	-	611	-	nm
Spectral line half-width	I_F = 20 mA		$\Delta\lambda$	-	17	-	
Forward voltage per segment	I_F = 20 mA		V_F	-	2.0	2.6	V
Reverse current per segment (2)	V_R = 5 V		I_R	-	-	100	µA
Luminous intensity matching ratio	I_F = 10 mA		I_{v-m}	-	-	2:1	

Notes
(1) Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
(2) Reverse voltage is only for IR test.It can not continue to operate at this situation.
(3) Cross talk specification ≤ 2.5 %.

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
VDMY10A1, YELLOW

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity (1)	I_F = 1 mA	VDMY10A1	I_V	450	1600	-	µcd
	I_F = 10 mA	VDMY10A1	I_V	-	17 600	-	µcd
Dominant wavelength	I_F = 20 mA	VDMY10A1	λ_d	-	587	-	nm
Peak emmision wavelength	I_F = 20 mA		λ_p	-	588	-	nm
Spectral line half-width	I_F = 20 mA		$\Delta\lambda$	-	15	-	
Forward voltage per segment	I_F = 20 mA		V_F	-	2.0	2.6	V
Reverse current per segment (2)	V_R = 5 V		I_R	-	-	100	µA
Luminous intensity matching ratio	I_F = 10 mA		I_{v-m}	-	-	2:1	

Notes
(1) Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
(2) Reverse voltage is only for IR test.It can not continue to operate at this situation.
(3) Cross talk specification ≤ 2.5 %.

OPTICAL AND ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)
VDMG10A1, GREEN

PARAMETER	TEST CONDITION	PART	SYMBOL	MIN.	TYP.	MAX.	UNIT
Luminous intensity (1)	I_F = 1 mA	VDMG10A1	I_V	110	500	-	µcd
	I_F = 10 mA	VDMG10A1	I_V	-	5500	-	µcd
Dominant wavelength	I_F = 20 mA	VDMG10A1	λ_d	-	572	-	nm
Peak emmision wavelength	I_F = 20 mA		λ_p	-	571	-	nm
Spectral line half-width	I_F = 20 mA		$\Delta\lambda$	-	15	-	
Forward voltage per segment	I_F = 20 mA		V_F	-	2.0	2.6	V
Reverse current per segment (2)	V_R = 5 V		I_R	-	-	100	µA
Luminous intensity matching ratio	I_F = 10 mA		$I_{v\text{-}m}$	-	-	2:1	

Notes

(1) Luminous intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.

(2) Reverse voltage is only for IR test.It can not continue to operate at this situation.

(3) Cross talk specification ≤ 2.5 %.

LUMINOUS INTENSITY CLASSIFICATION

GROUP	LIGHT INTENSITY (µcd)	
STANDARD	MIN.	MAX.
D	110	220
E	180	360
F	280	560
G	450	900
H	700	1400
I	1100	2200
K	1800	3600
L	2800	5600
M	4500	9000
N	7000	14 000
P	11 000	22 000
Q	18 000	36 000
R	28 000	56 000
S	45 000	90 000

Note

- The above type numbers represent the order groups which include only a few brightness groups. Only one group will be shipped in one tube (there will be no mixing of two groups in one tube).
  In order to ensure availability, single brightness groups will not be orderable.

COLOR CLASSIFICATION

GROUP	SOFT ORANGE		YELLOW		GREEN	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
1	598	601	581	584	-	-
2	600	603	583	586	-	-
3	602	605	585	588	562	565
4	604	607	587	590	564	567
5	606	609	589	592	566	569
6	608	611	591	594	568	571
7	-	-	-	-	570	573
8	-	-	-	-	572	575

Note

- Wavelengths are tested at a current pulse duration of 25 ms.

TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

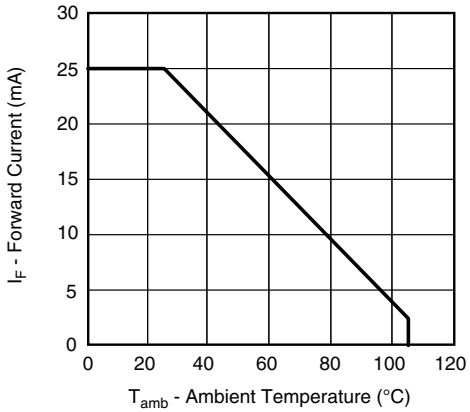


Fig. 1 - Forward Current vs. Ambient Temperature

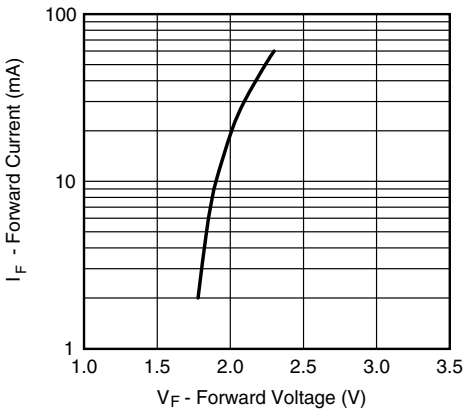


Fig. 4 - Forward Current vs. Forward Voltage

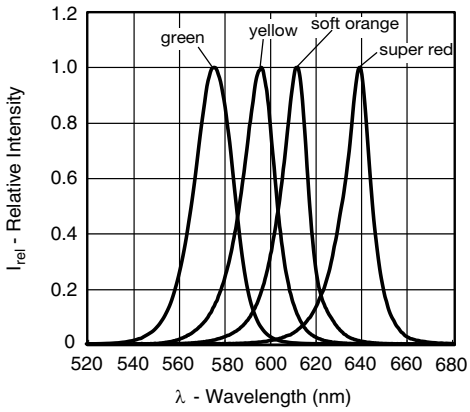


Fig. 2 - Relative Intensity vs. Wavelength

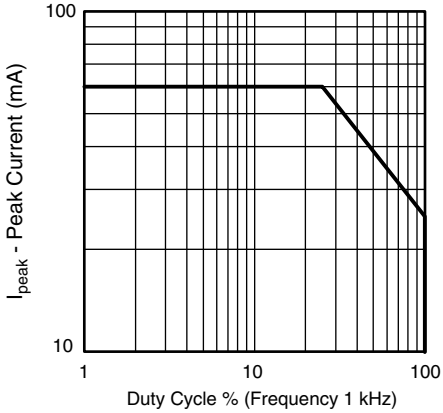


Fig. 5 - Peak Current vs. Duty Cycle

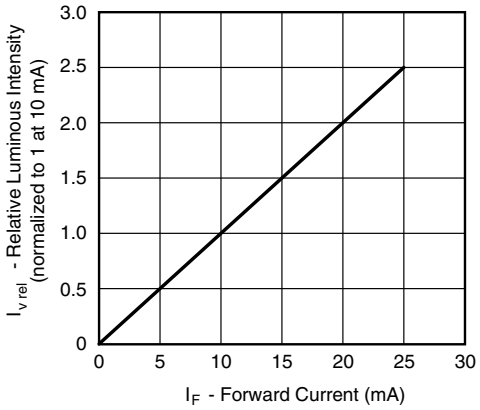
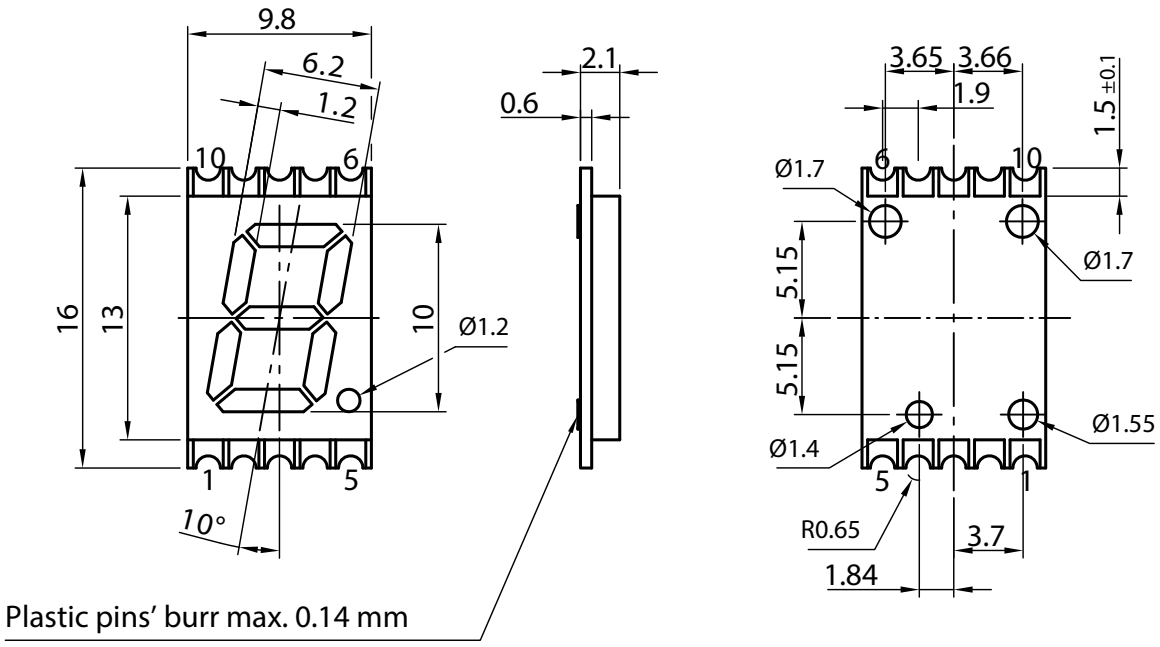
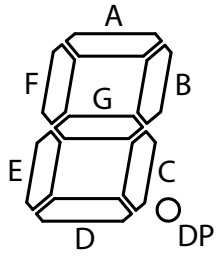
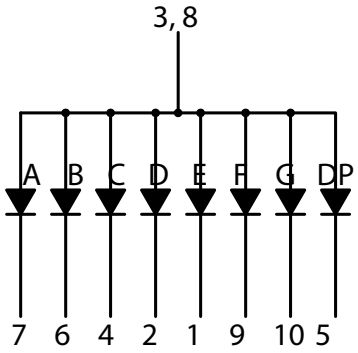


Fig. 3 - Relative Luminous Intensity vs. Forward Current

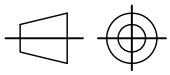
PACKAGE DIMENSIONS in millimeters







No.	Connection
1	Cathode E
2	Cathode D
3	Common Anode
4	Cathode C
5	Cathode DP
6	Cathode B
7	Cathode A
8	Common Anode
9	Cathode F
10	Cathode G

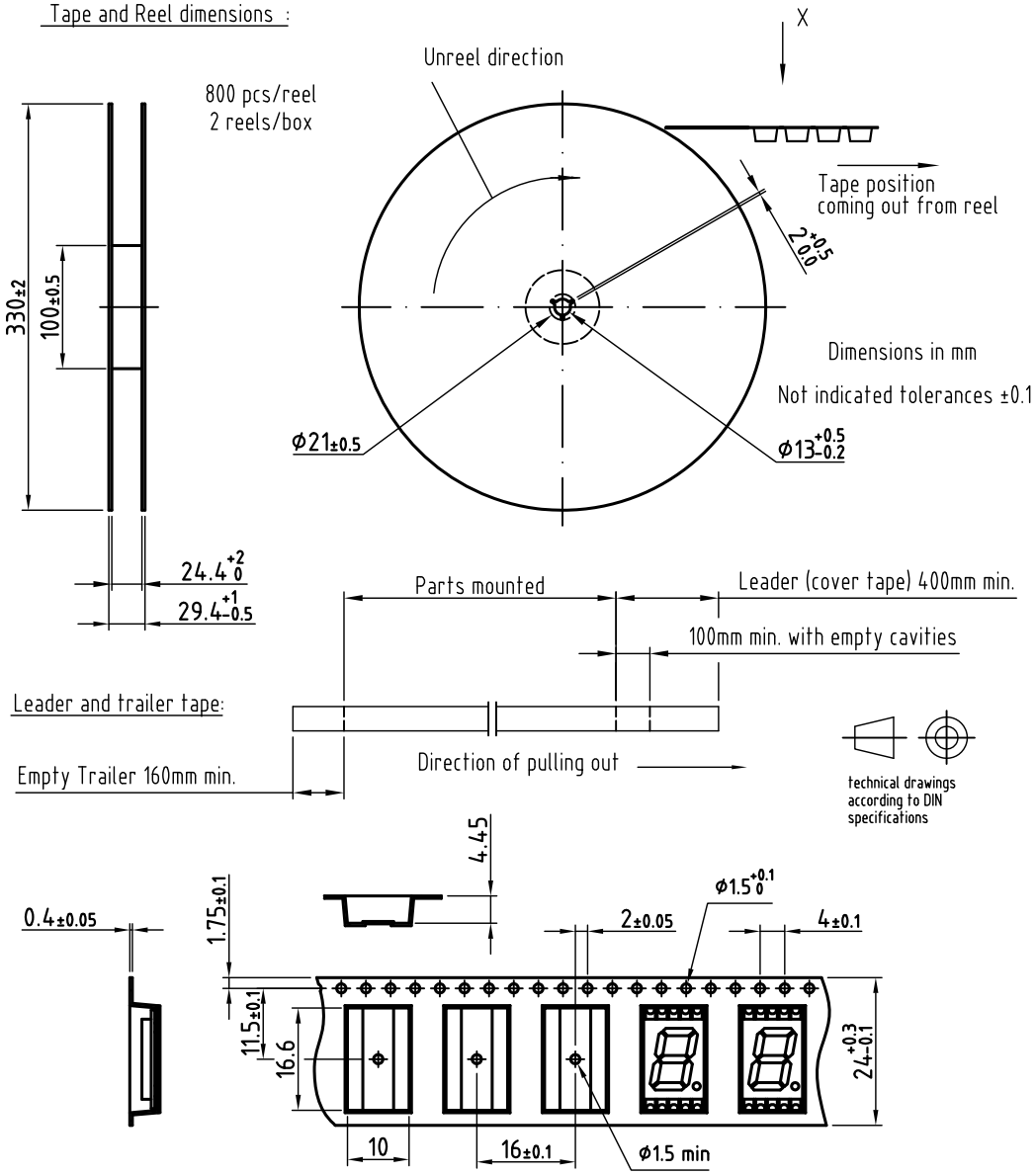


technical drawings according to DIN specifications

Tolerances are ± 0.25 mm unless otherwise mentioned

Drawing-No.: 6.544-5426.01-4
Issue: 2; 02.10.13

TAPE AND REEL DIMENSIONS in millimeters

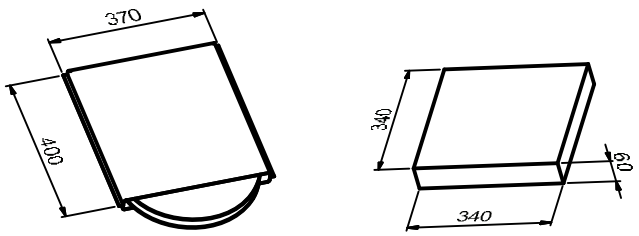


Drawing refers to following types: VDMx10x

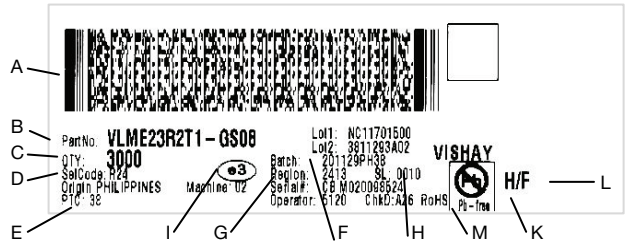
Reel dimensions and tape

Drawing-No.: 9.800-5125.01-4
Issue: prel; 10.04.13

TAPE IN BOX



BAR CODE PRODUCT LABEL (example only)



A) 2D barcode
B) Vishay part number
C) Quantity
D) PTC = selection code (binning)
E) Code of manufacturing plant
F) Batch = date code: year/week/plant code
G) Region code
H) SL = sales location
I) Terminations finishing
K) Lead (Pb)-free symbol
L) Halogen-free symbol
M) RoHS symbol

SOLDERING PROFILE

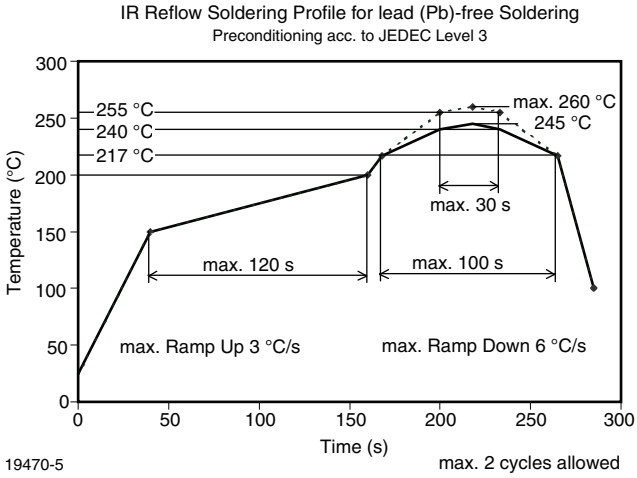
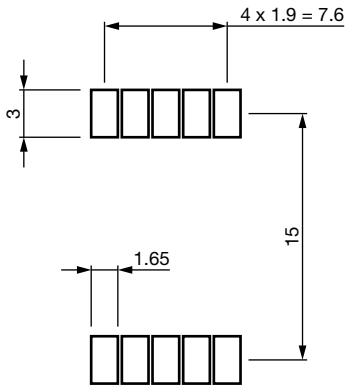


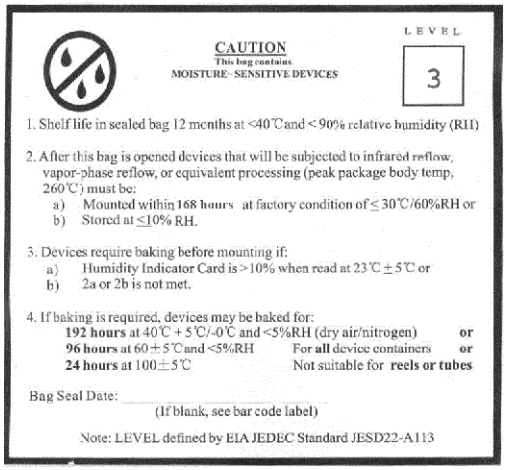
Fig. 6 - Vishay Lead (Pb)-free Reflow Soldering Profile (acc. to J-STD-020C)

SOLDERING IRON (one time only)	
Temperature	300 °C max.
Soldering time	3 s max.

RECOMMENDED SOLDER PAD



MSL LABEL



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