

High Speed Infrared Emitting Diodes, 940 nm, GaAlAs, DH

VSMB2000X01



VSMB2020X01



DESCRIPTION

VSMB2000X01 series are infrared, 940 nm emitting diodes in GaAlAs (DH) technology with high radiant power and high speed, molded in clear, untinted plastic packages (with lens) for surface mounting (SMD).

APPLICATIONS

- IrDA compatible data transmission
- Miniature light barrier
- Photointerrupters
- Optical switch
- Control and drive circuits
- Shaft encoders

FEATURES

- Package type: surface-mount
- Package form: GW, RGW
- Dimensions (L x W x H in mm): 2.3 x 2.3 x 2.8
- AEC-Q101 qualified
- Peak wavelength: $\lambda_p = 940$ nm
- High reliability
- High radiant power
- High radiant intensity
- Angle of half intensity: $\phi = \pm 12^\circ$
- Low forward voltage
- Suitable for high pulse current operation
- Terminal configurations: gullwing or reserve gullwing
- Package matches with detector VEMD2000X01 series
- Floor life: 4 weeks, MSL 2a, according to J-STD-020
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

AUTOMOTIVE
GRADE

RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

PRODUCT SUMMARY

COMPONENT	I_e (mW/sr)	ϕ (°)	λ_p (nm)	t_r (ns)
VSMB2000X01	40	± 12	940	15
VSMB2020X01	40	± 12	940	15

Note

- Test conditions see table "Basic Characteristics"

ORDERING INFORMATION

ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM
VSMB2000X01	Tape and reel	MOQ: 6000 pcs, 6000 pcs/reel	Reverse gullwing
VSMB2020X01	Tape and reel	MOQ: 6000 pcs, 6000 pcs/reel	Gullwing

Note

- MOQ: minimum order quantity

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

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_R	5	V
Forward current		I_F	100	mA
Peak forward current	$t_p/T = 0.5$, $t_p = 100 \mu\text{s}$	I_{FM}	200	mA
Surge forward current	$t_p = 100 \mu\text{s}$	I_{FSM}	1	A
Power dissipation		P_V	160	mW
Junction temperature		T_j	100	$^\circ\text{C}$
Operating temperature range		T_{amb}	-40 to +85	$^\circ\text{C}$
Storage temperature range		T_{stg}	-40 to +100	$^\circ\text{C}$
Soldering temperature	$t \leq 5$ s	T_{sd}	260	$^\circ\text{C}$
Thermal resistance junction to ambient	J-STD-051, leads 7 mm, soldered on PCB	R_{thJA}	250	K/W

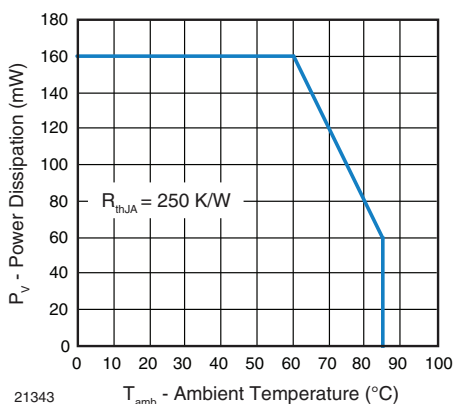


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

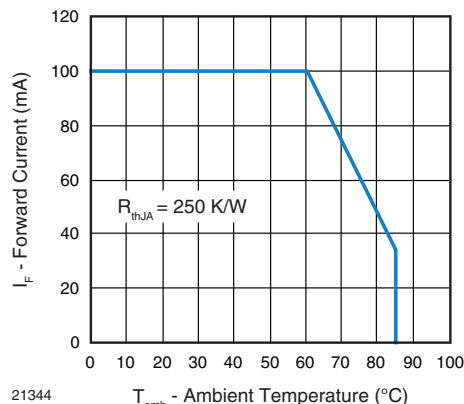


Fig. 2 - Forward Current Limit vs. Ambient Temperature

BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)						
PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Forward voltage	$I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$	V_F	1.15	1.35	1.6	V
	$I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$	V_F	-	2.2	-	V
Temperature coefficient of V_F	$I_F = 1\text{ mA}$	TK_{V_F}	-	-1.8	-	mV/K
	$I_F = 100\text{ mA}$	TK_{V_F}	-	-1.1	-	mV/K
Reverse current	$V_R = 5\text{ V}$	I_R	-	-	10	μA
Junction capacitance	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0\text{ mW/cm}^2$	C_J	-	70	-	pF
Radiant intensity	$I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$	I_e	20	40	60	mW/sr
	$I_F = 1\text{ A}$, $t_p = 100\text{ }\mu\text{s}$	I_e	-	330	-	mW/sr
Radiant power	$I_F = 100\text{ mA}$, $t_p = 20\text{ ms}$	ϕ_e	-	40	-	mW
Temperature coefficient of radiant power	$I_F = 1\text{ mA}$	TK_{ϕ_e}	-	-1.1	-	%/K
	$I_F = 100\text{ mA}$	TK_{ϕ_e}	-	-0.51	-	%/K
Angle of half intensity		ϕ	-	± 12	-	$^{\circ}$
Peak wavelength	$I_F = 30\text{ mA}$	λ_p	920	940	960	nm
Spectral bandwidth	$I_F = 30\text{ mA}$	$\Delta\lambda$	-	25	-	nm
Temperature coefficient of λ_p	$I_F = 30\text{ mA}$	TK_{λ_p}	-	0.25	-	nm/K
Rise time	$I_F = 100\text{ mA}$, 20 % to 80 %	t_r	-	15	-	ns
Fall time	$I_F = 100\text{ mA}$, 20 % to 80 %	t_f	-	15	-	ns
Cut-off frequency	$I_{DC} = 70\text{ mA}$, $I_{AC} = 30\text{ mA}_{pp}$	f_c	-	23	-	MHz
Virtual source diameter		d	-	1.5	-	mm



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

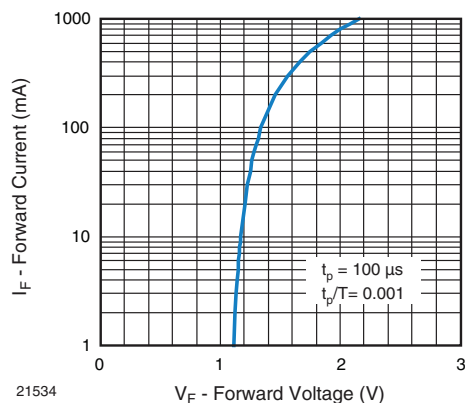


Fig. 3 - Forward Current vs. Forward Voltage

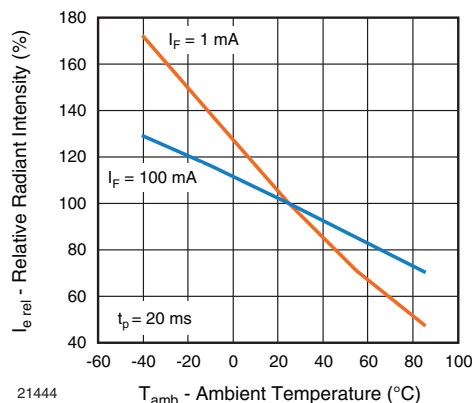


Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

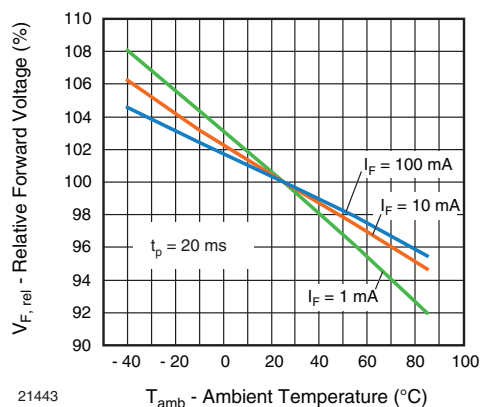


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

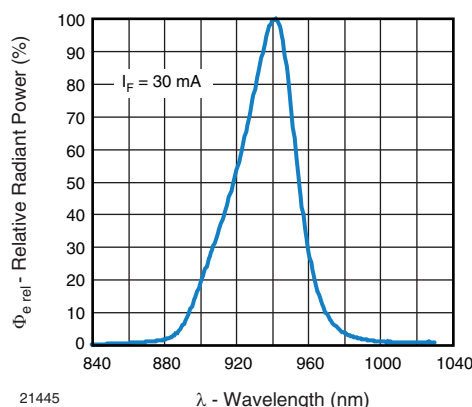


Fig. 7 - Relative Radiant Power vs. Wavelength

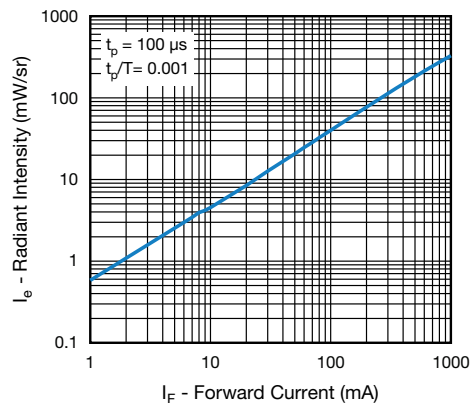


Fig. 5 - Radiant Intensity vs. Forward Current

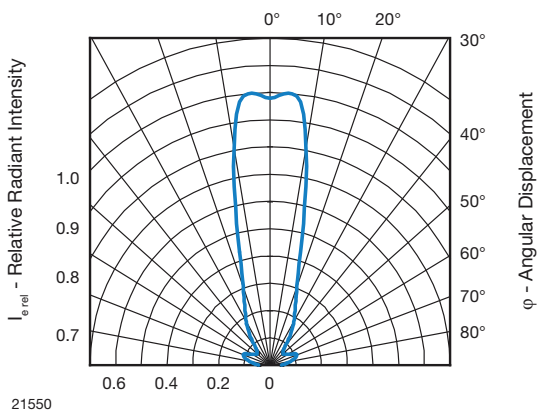
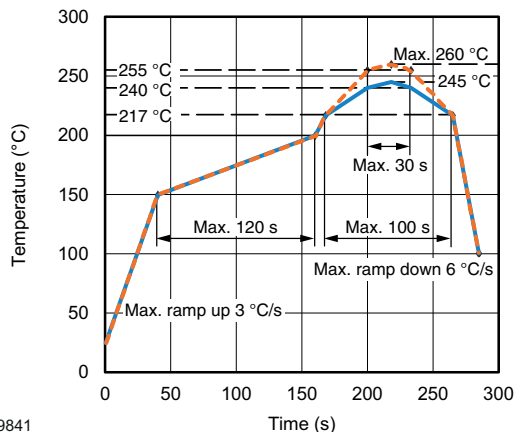


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

**SOLDER PROFILE**

19841

Fig. 9 - Lead (Pb)-free Reflow Solder Profile
According to J-STD-020

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

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

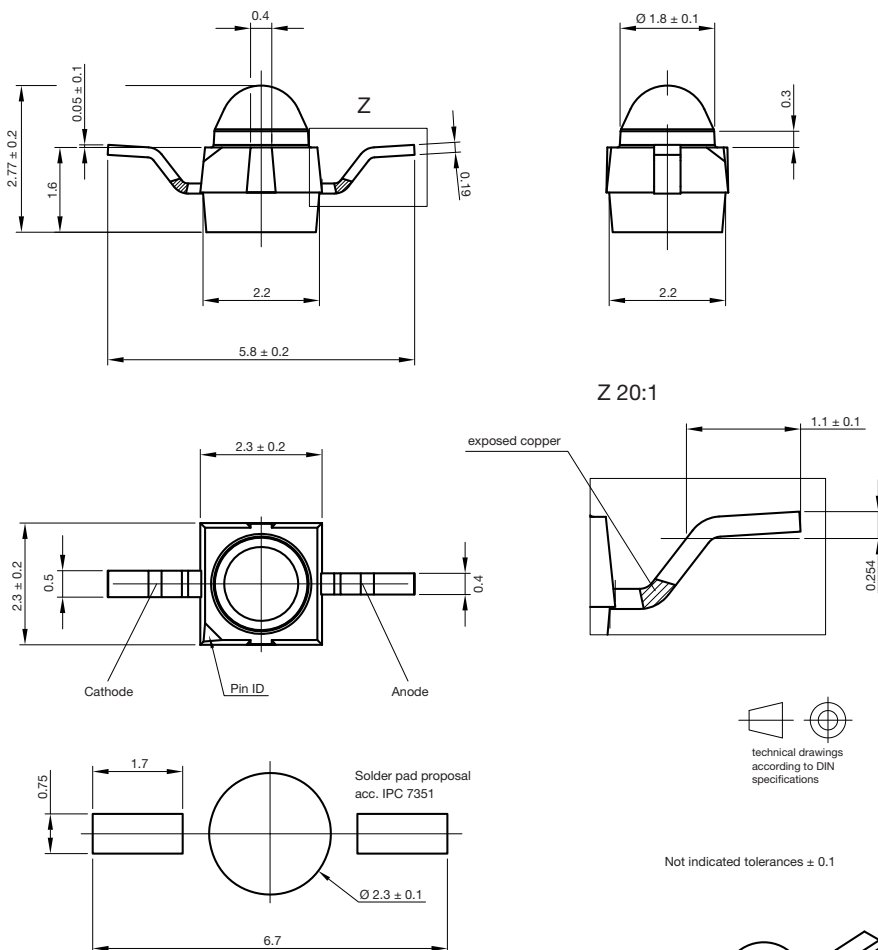
Floor life: 4 weeks

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

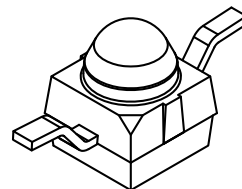
Moisture sensitivity level 2a, according to J-STD-020.

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°C (+ 5°C), $\text{RH} < 5\%$.

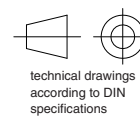
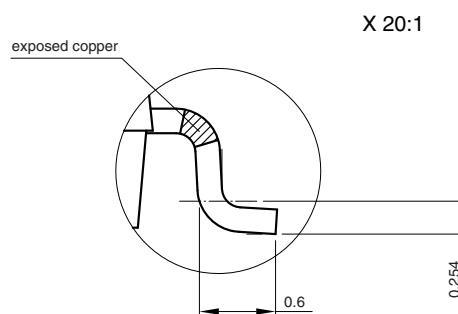
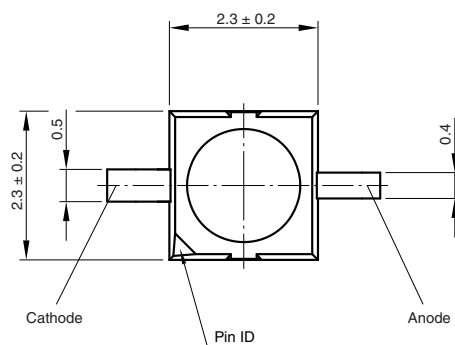
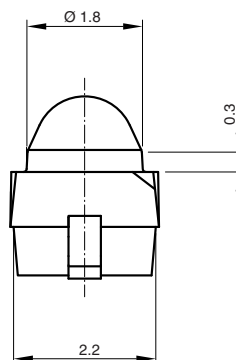
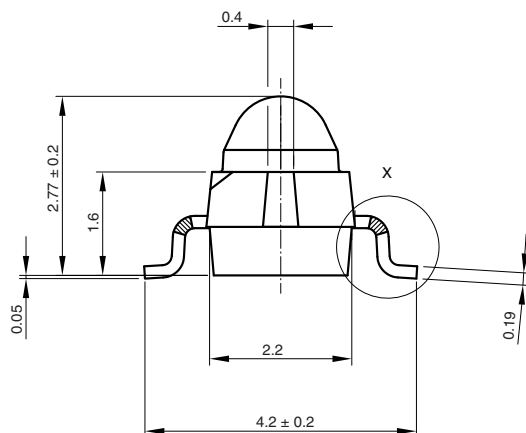
PACKAGE DIMENSIONS in millimeters: **VSMB2000X01**

Drawing-No.: 6.544-5391.02-4
Issue: 2; 18.03.10
21517

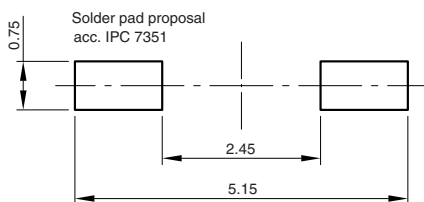




PACKAGE DIMENSIONS in millimeters: VSMB2020X01

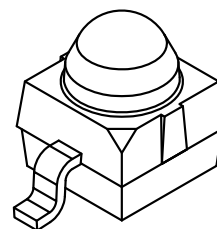


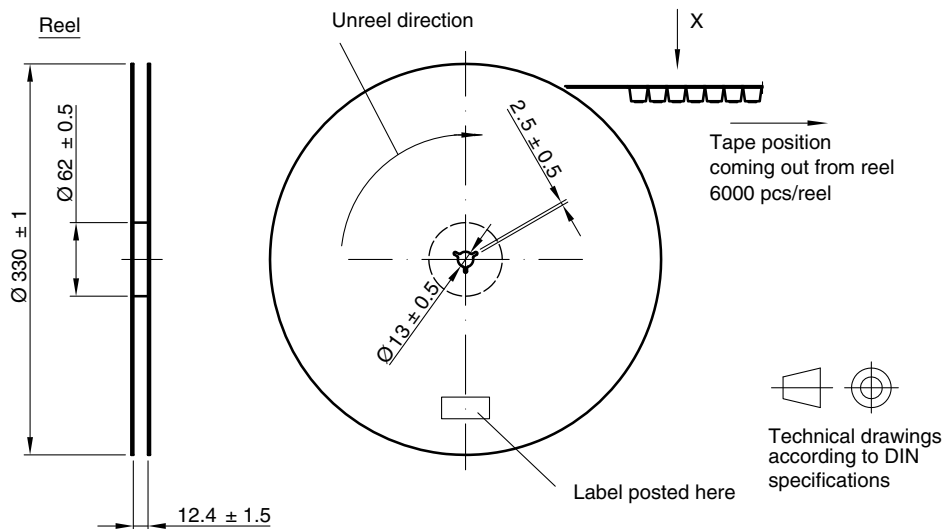
technical drawings
according to DIN
specifications



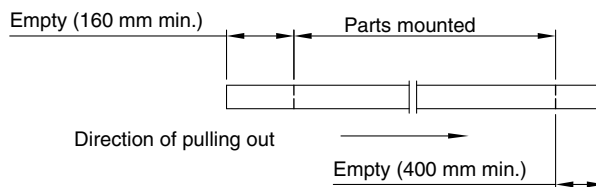
Not indicated tolerances ± 0.1

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Issue: 4; 18.03.10
21488



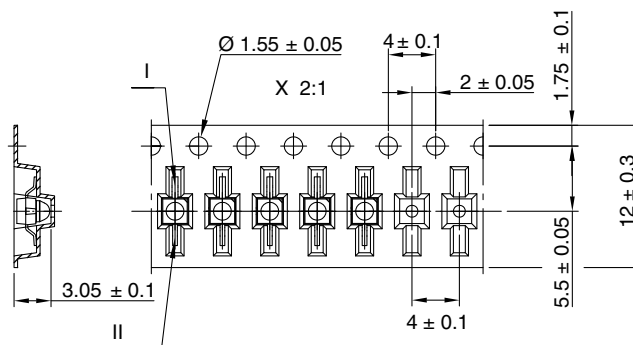
TAPING AND REEL DIMENSIONS in millimeters: VSMB2000X01


Leader and trailer tape:

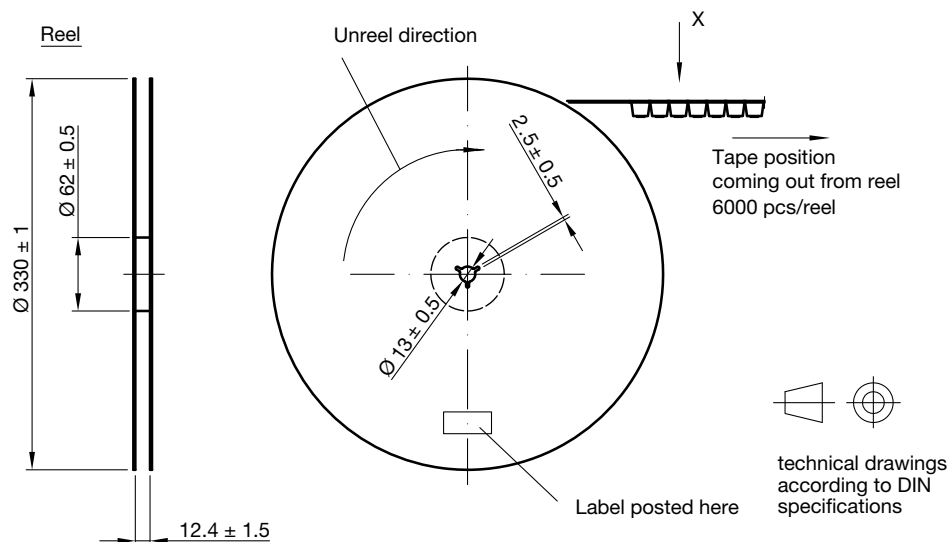
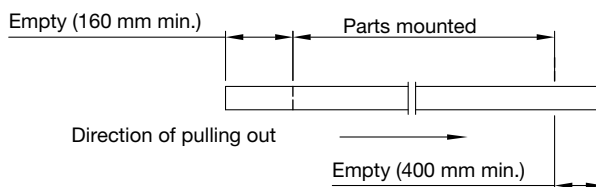


Terminal position in tape

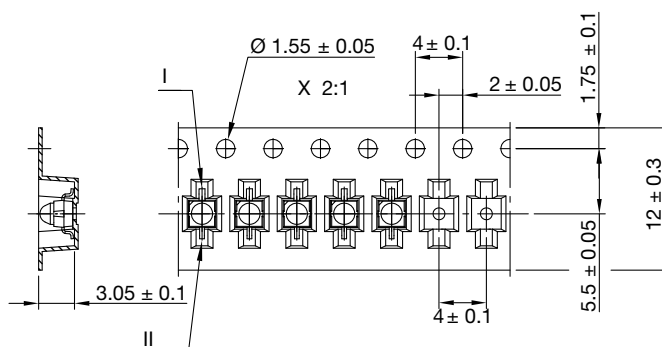
Device	Lead I	Lead II
VENT2000	Collector	Emitter
VENT2500		
VEMD2000	Cathode	Anode
VEMD2500		
VSMB2000		
VSMG2000	Anode	Cathode
VSMY2850RG		



Drawing-No.: 9.800-5100.01-4
Issue: 2; 18.03.10
21572

TAPING AND REEL DIMENSIONS in millimeters: VSMB2020X01

Leader and trailer tape:

Terminal position in tape

Device	Lead I	Lead II
VENT2020	Collector	Emitter
VENT2520		
VSMB2020	Cathode	Anode
VSMG2020		
VEMD2020		
VEMD2520		
VSMY2850G	Anode	Cathode
VSMB294008GC		



Drawing-No.: 9.800-5091.01-4

Issue: 3; 18.03.10

21571



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