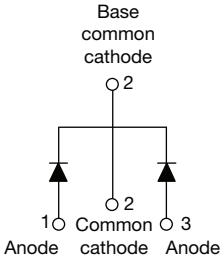
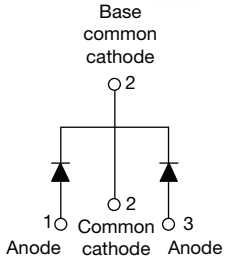
High Performance Schottky Rectifier, 2 x 10 A

D²PAK (TO-263AB)



VS-MBRB20...CTHM3

TO-262AA



VS-MBR20 ...CT-1HM3

FEATURES

- 150 °C T_J operation
- Low forward voltage drop
- High frequency operation
- Center tap D²PAK and TO-262 packages
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified, meets JESD 201 class 1 whisker test
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT
HALOGEN FREE

PRIMARY CHARACTERISTICS	
Package	D²PAK (TO-263AB), TO-262AA
$I_{F(AV)}$	2 x 10 A
V_R	80 V, 90 V, 100 V
V_F at I_F	0.70 V
I_{RM}	6 mA at 125 °C
T_J max.	150 °C
Diode variation	Common cathode
E_{AS}	24 mJ

DESCRIPTION

This center tap Schottky rectifier has been optimized for low reverse leakage at high temperature. The proprietary barrier technology allows for reliable operation up to 150 °C junction temperature. Typical applications are in switching power supplies, converters, freewheeling diodes, and reverse battery protection.

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform (per device)	20	A
I_{FRM}	T_C = 133 °C (per leg)	20	
V_{RRM}		80 to 100	V
I_{FSM}	t_p = 5 µs sine	850	A
V_F	10 A_{pk}, T_J = 125 °C	0.70	V
T_J	Range	-55 to +150	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	VS-MBRB2080CTHM3 VS-MBR2080CT-1HM3	VS-MBRB2090CTHM3 VS-MBR2090CT-1HM3	VS-MBRB20100CTHM3 VS-MBR20100CT-1HM3	UNITS
Maximum DC reverse voltage	V_R	80	90	100	V
Maximum working peak reverse voltage	V_{RWM}				

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ABSOLUTE MAXIMUM RATINGS					
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	per leg	$I_{F(AV)}$	T_C = 133 °C, rated V_R	10	A
	per device			20	
Peak repetitive forward current per leg		I_{FRM}	Rated V_R, square wave, 20 kHz, T_C = 133 °C	20	
Non-repetitive peak surge current		I_{FSM}	5 µs sine or 3 µs rect. pulse; Following any rated load condition and with rated V_{RRM} applied	850	
			Surge applied at rated load conditions half wave, single phase, 60 Hz	150	
Peak repetitive reverse surge current		I_{RRM}	2.0 µs, 1.0 kHz	0.5	
Non-repetitive avalanche energy per leg		E_{AS}	T_J = 25 °C, I_{AS} = 2 A, L = 12 mH	24	mJ

ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM} (1)	10 A	T_J = 25 °C	0.80	V
		20 A		0.95	
		10 A	T_J = 125 °C	0.70	
		20 A		0.85	
Maximum instantaneous reverse current	I_{RM} (1)	T_J = 25 °C	Rated DC voltage	0.10	mA
		T_J = 125 °C		6	
Threshold voltage	$V_{F(TO)}$	T_J = T_J maximum		0.433	V
Forward slope resistance	r_t			15.8	mΩ
Maximum junction capacitance	C_T	V_R = 5 V_{DC} (test signal range 100 kHz to 1 MHz), 25 °C		400	pF
Typical series inductance	L_S	Measured from top of terminal to mounting plane		8.0	nH
Maximum voltage rate of change	dV/dt	Rated V_R		10 000	V/µs

Note

(1) Pulse width < 300 µs, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS					
PARAMETER		SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range		T_J		-55 to +150	°C
Maximum storage temperature range		T_{Stg}		-65 to +150	
Maximum thermal resistance, junction to case per leg		R_{thJC}	DC operation	2.0	°C/W
Typical thermal resistance, case to heatsink		R_{thCS}	Mounting surface, smooth and greased	0.50	
Maximum thermal resistance, junction to ambient		R_{thJA}	DC operation	50	
Approximate weight				2	g
				0.07	oz.
Mounting torque	minimum		Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device			Case style D^2PAK (TO-263AB)	MBRB2090CTH	
				MBRB2080CTH	
				MBRB20100CTH	
			Case style TO-262AA	MBR2090CT-1H	
				MBR2080CT-1H	
				MBR20100CT-1H	

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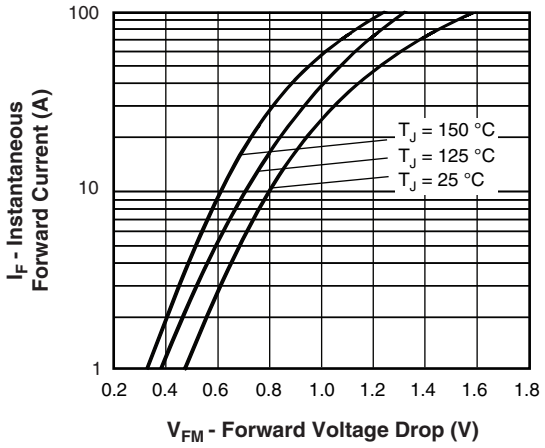

Fig. 1 - Maximum Forward Voltage Drop Characteristics (Per Leg)

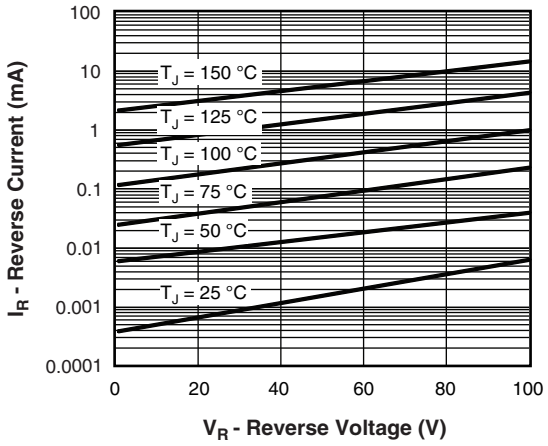

Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage (Per Leg)

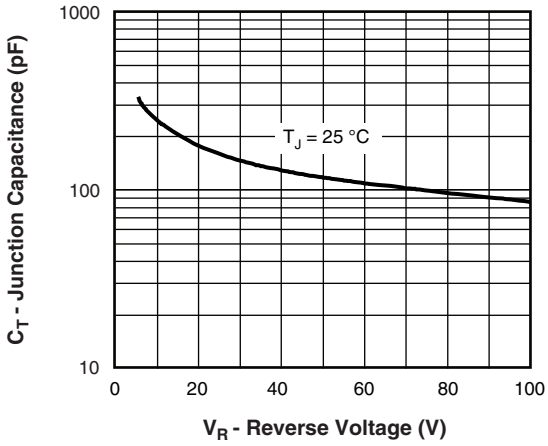

Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage (Per Leg)

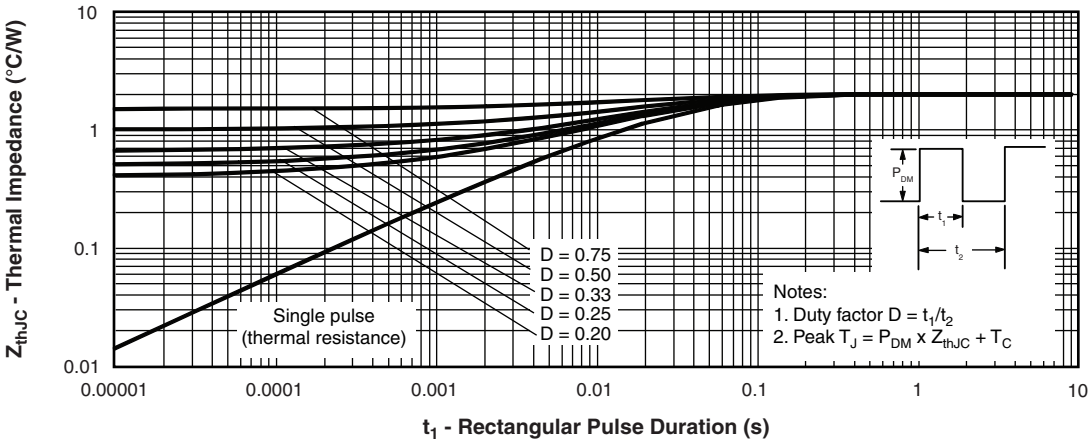

Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics (Per Leg)

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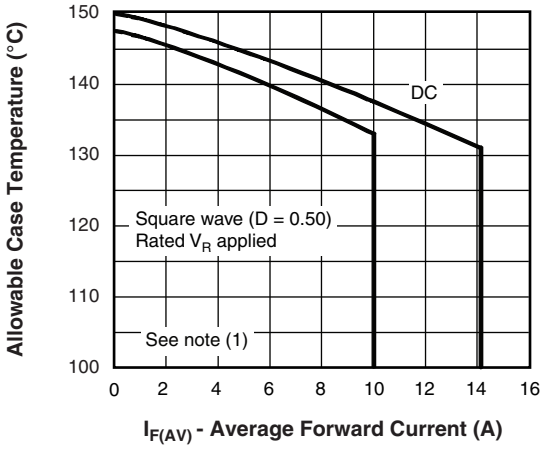

Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current (Per Leg)

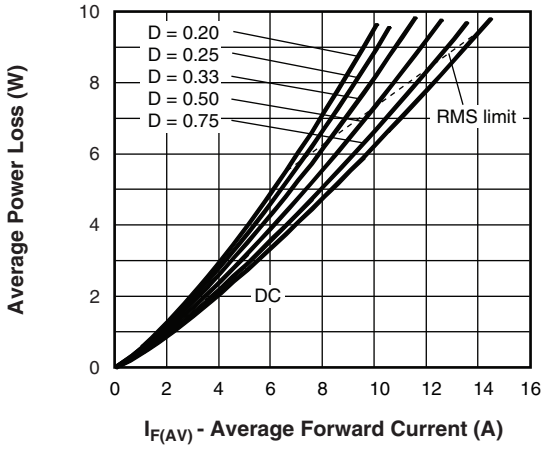

Fig. 6 - Forward Power Loss Characteristics (Per Leg)

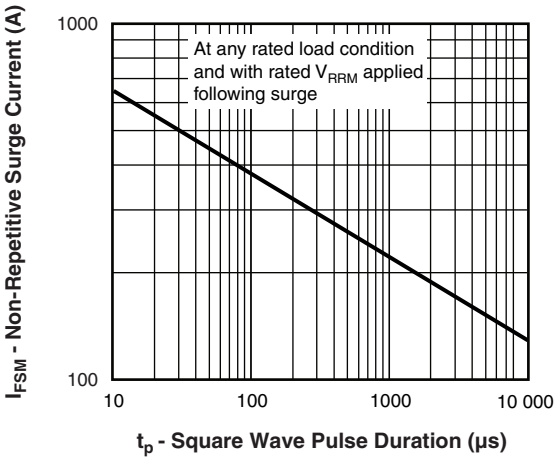

Fig. 7 - Maximum Non-Repetitive Surge Current (Per Leg)

Note

(1) Formula used: $T_C = T_J - (Pd + Pd_{REV}) \times R_{thJC}$;
Pd = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
Pd_{REV} = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at V_{R1} = Rated V_R

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ORDERING INFORMATION TABLE

Device code	VS-	MBR	B	20	100	CT	-1	L	H	M3
	1	2	3	4	5	6	7	8	9	10

1 - Vishay Semiconductors product

2 - Essential part number

3 - • B = D^2PAK 7 None
• None = TO-262 7 = -1

4 - Current rating (20 = 20 A)

5 - Voltage ratings — 80 = 80 V, 90 = 90 V, 100 = 100 V

6 - CT = common cathode

7 - • None = D^2PAK 3 = B
• -1 = TO-262 3 None

8 - • None = tube (50 pieces)
• L = tape and reel (left oriented - for D^2PAK only)
• R = tape and reel (right oriented - for D^2PAK only)

9 - • H = AEC-Q101 qualified

10 - • M3 = halogen-free, RoHS-compliant, and termination lead (Pb)-free

ORDERING INFORMATION (Example)

PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-MBRB2080CTHM3	50	1000	Antistatic plastic tube
VS-MBRB2090CTHM3	50	1000	Antistatic plastic tube
VS-MBRB20100CTHM3	50	1000	Antistatic plastic tube
VS-MBRB2080CTLHM3	800	800	13" diameter reel
VS-MBRB2090CTLHM3	800	800	13" diameter reel
VS-MBRB20100CTLHM3	800	800	13" diameter reel
VS-MBRB2080CTRHM3	800	800	13" diameter reel
VS-MBRB2090CTRHM3	800	800	13" diameter reel
VS-MBRB20100CTRHM3	800	800	13" diameter reel
VS-MBRB2080CT-1HM3	50	1000	Antistatic plastic tube
VS-MBRB2090CT-1HM3	50	1000	Antistatic plastic tube
VS-MBRB20100CT-1HM3	50	1000	Antistatic plastic tube

LINKS TO RELATED DOCUMENTS

Dimensions	D^2PAK (TO-263AB)	www.vishay.com/doc?95046
	TO-262AA	www.vishay.com/doc?95419
Part marking information	D^2PAK (TO-263AB)	www.vishay.com/doc?95444
	TO-262AA	www.vishay.com/doc?95443
Packaging information	D^2PAK (TO-263AB)	www.vishay.com/doc?95032

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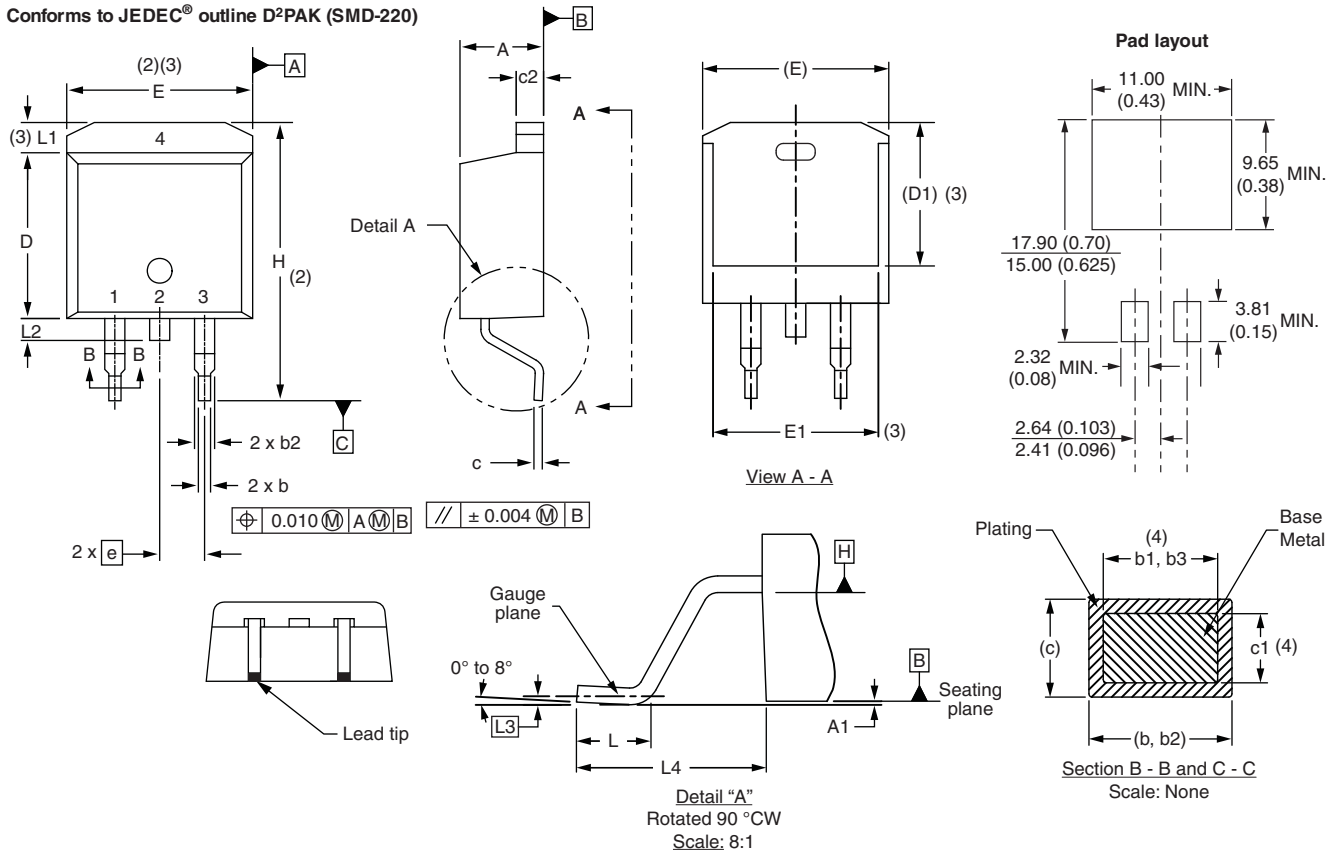
D²PAK

DIMENSIONS in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES		SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.				MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190			D1	6.86	8.00	0.270	0.315	3
A1	0.00	0.254	0.000	0.010			E	9.65	10.67	0.380	0.420	2, 3
b	0.51	0.99	0.020	0.039			E1	7.90	8.80	0.311	0.346	3
b1	0.51	0.89	0.020	0.035	4		e	2.54 BSC		0.100 BSC		
b2	1.14	1.78	0.045	0.070			H	14.61	15.88	0.575	0.625	
b3	1.14	1.73	0.045	0.068	4		L	1.78	2.79	0.070	0.110	
c	0.38	0.74	0.015	0.029			L1	-	1.65	-	0.066	3
c1	0.38	0.58	0.015	0.023	4		L2	1.27	1.78	0.050	0.070	
c2	1.14	1.65	0.045	0.065			L3	0.25 BSC		0.010 BSC		
D	8.51	9.65	0.335	0.380	2		L4	4.78	5.28	0.188	0.208	

Notes

(1) Dimensioning and tolerancing per ASME Y14.5 M-1994

(2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body

(3) Thermal pad contour optional within dimension E, L1, D1 and E1

(4) Dimension b1 and c1 apply to base metal only

(5) Datum A and B to be determined at datum plane H

(6) Controlling dimension: inch

(7) Outline conforms to JEDEC® outline TO-263AB

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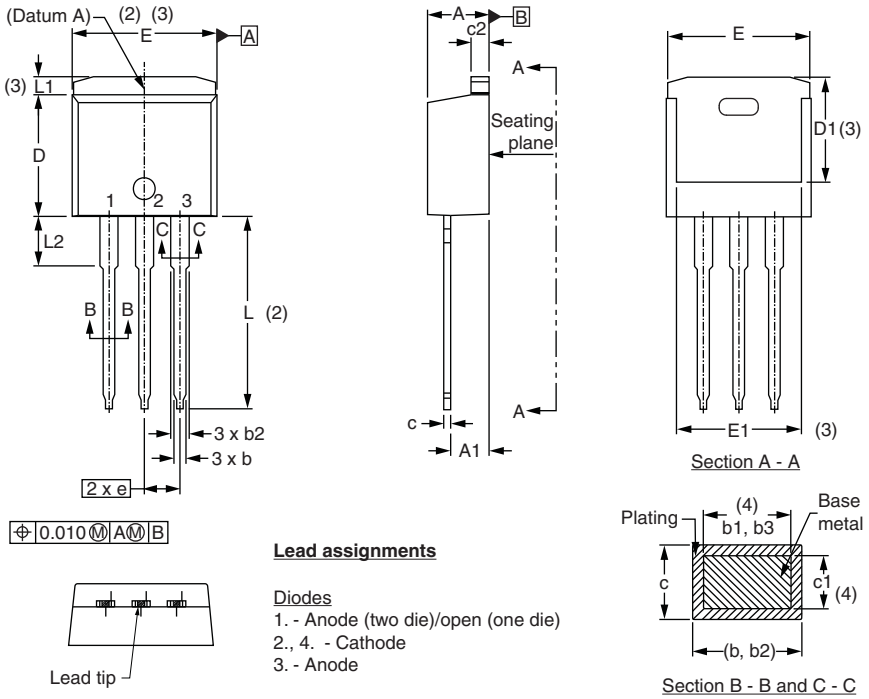
TO-262

DIMENSIONS in millimeters and inches

Modified JEDEC® outline TO-262



Lead assignments

Diodes
1. - Anode (two die)/open (one die)
2., 4. - Cathode
3. - Anode

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	2.03	3.02	0.080	0.119	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
L	13.46	14.10	0.530	0.555	
L1	-	1.65	-	0.065	3
L2	3.36	3.71	0.132	0.146	

Notes

(1) Dimensioning and tolerancing as per ASME Y14.5M-1994

(2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body

(3) Thermal pad contour optional within dimension E, L1, D1 and E1

(4) Dimension b1 and c1 apply to base metal only

(5) Controlling dimension: inches

(6) Outline conform to JEDEC TO-262 except A1 (maximum), b (minimum) , D1 (minimum) and L2 where dimensions derived the actual package outline

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