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L293DD013TR

STMicroelectronics

Motor / Motion / Ignition Controllers & Drivers Push-Pull 4-
Channel

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PUSH-PULL FOUR CHANNEL DRIVER WITH DIODES

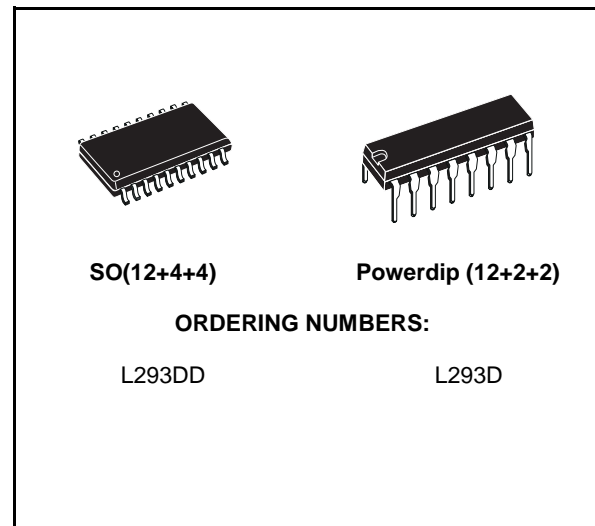
- 600mA OUTPUT CURRENT CAPABILITY PER CHANNEL
- 1.2A PEAK OUTPUT CURRENT (non repetitive) PER CHANNEL
- ENABLE FACILITY
- OVERTEMPERATURE PROTECTION
- LOGICAL "0" INPUT VOLTAGE UP TO 1.5 V (HIGH NOISE IMMUNITY)
- INTERNAL CLAMP DIODES

DESCRIPTION

The Device is a monolithic integrated high voltage, high current four channel driver designed to accept standard DTL or TTL logic levels and drive inductive loads (such as relays solenoids, DC and stepping motors) and switching power transistors.

To simplify use as two bridges each pair of channels is equipped with an enable input. A separate supply input is provided for the logic, allowing operation at a lower voltage and internal clamp diodes are included.

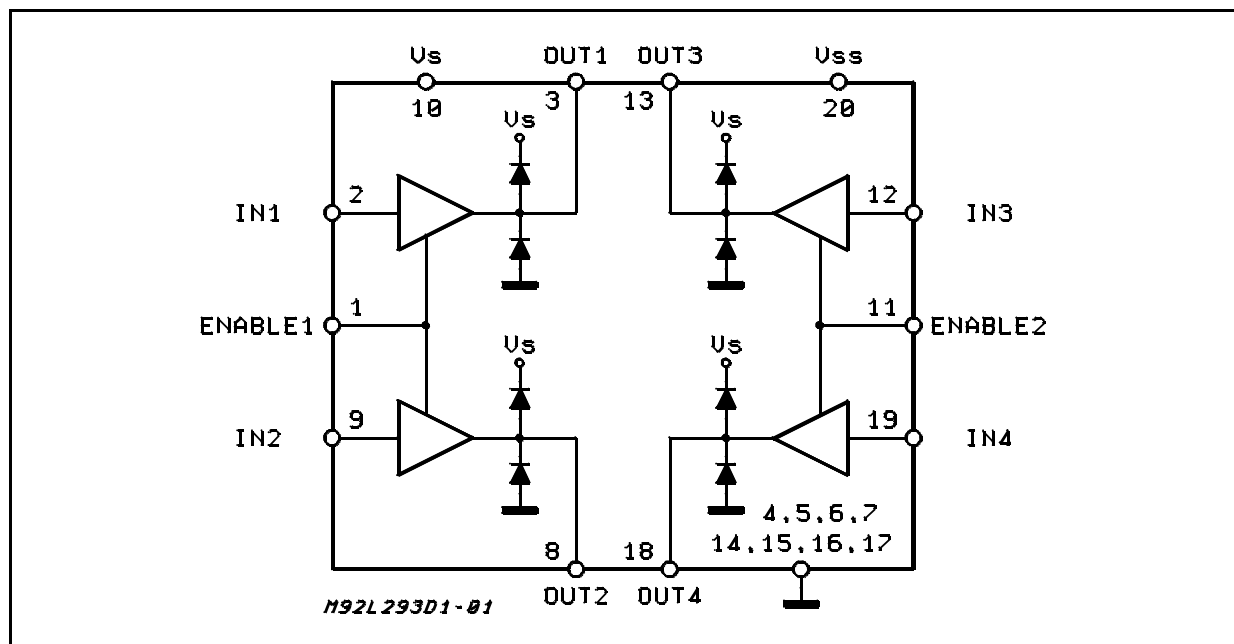
This device is suitable for use in switching applications at frequencies up to 5 kHz.



The L293D is assembled in a 16 lead plastic package which has 4 center pins connected together and used for heatsinking

The L293DD is assembled in a 20 lead surface mount which has 8 center pins connected together and used for heatsinking.

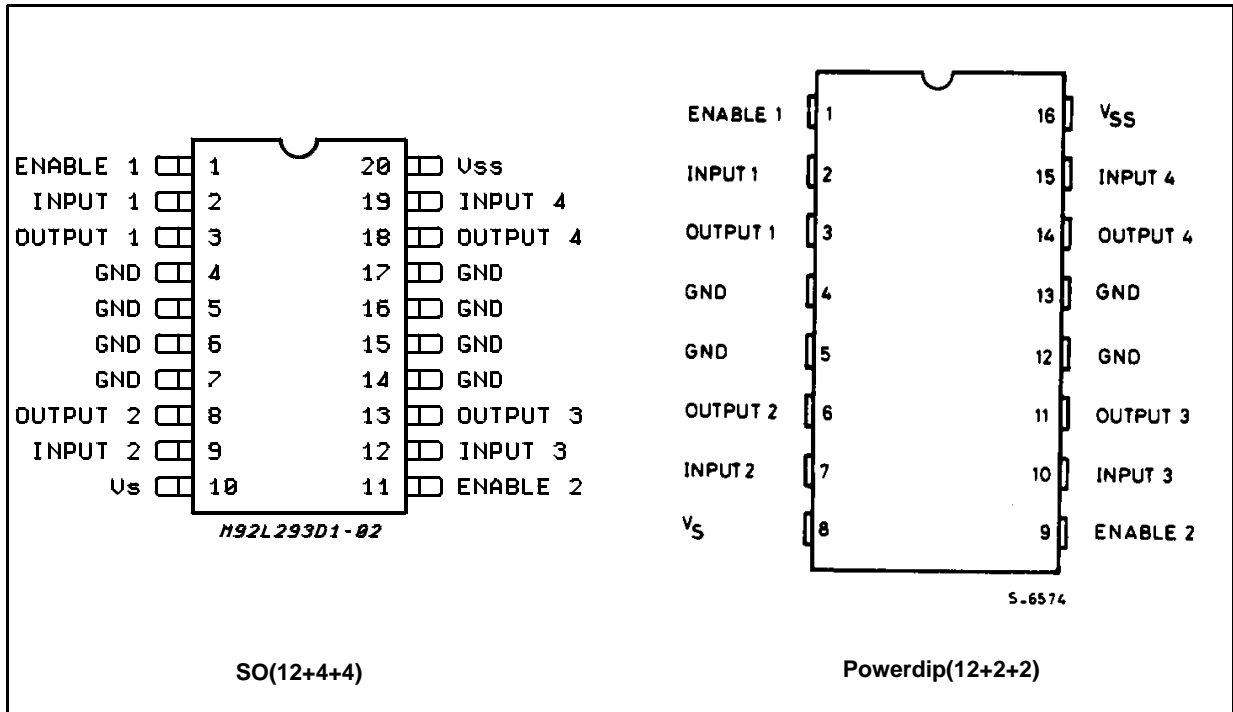
BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _S	Supply Voltage	36	V
V _{SS}	Logic Supply Voltage	36	V
V _i	Input Voltage	7	V
V _{en}	Enable Voltage	7	V
I _o	Peak Output Current (100 μs non repetitive)	1.2	A
P _{tot}	Total Power Dissipation at T _{pins} = 90 °C	4	W
T _{stg} , T _j	Storage and Junction Temperature	- 40 to 150	°C

PIN CONNECTIONS (Top view)



THERMAL DATA

Symbol	Description	DIP	SO	Unit
R _{th j-pins}	Thermal Resistance Junction-pins	max.	14	°C/W
R _{th j-amb}	Thermal Resistance junction-ambient	max.	50 (*)	°C/W
R _{th j-case}	Thermal Resistance Junction-case	max.	-	

(*) With 6sq. cm on board heatsink.

ELECTRICAL CHARACTERISTICS (for each channel, $V_S = 24\text{ V}$, $V_{SS} = 5\text{ V}$, $T_{amb} = 25\text{ }^\circ\text{C}$, unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_S	Supply Voltage (pin 10)		V_{SS}		36	V
V_{SS}	Logic Supply Voltage (pin 20)		4.5		36	V
I_S	Total Quiescent Supply Current (pin 10)	$V_i = L$; $I_O = 0$; $V_{en} = H$		2	6	mA
		$V_i = H$; $I_O = 0$; $V_{en} = H$		16	24	mA
		$V_{en} = L$			4	mA
I_{SS}	Total Quiescent Logic Supply Current (pin 20)	$V_i = L$; $I_O = 0$; $V_{en} = H$		44	60	mA
		$V_i = H$; $I_O = 0$; $V_{en} = H$		16	22	mA
		$V_{en} = L$		16	24	mA
V_{iL}	Input Low Voltage (pin 2, 9, 12, 19)		-0.3		1.5	V
V_{iH}	Input High Voltage (pin 2, 9, 12, 19)	$V_{SS} \leq 7\text{ V}$	2.3		V_{SS}	V
		$V_{SS} > 7\text{ V}$	2.3		7	V
I_{iL}	Low Voltage Input Current (pin 2, 9, 12, 19)	$V_{iL} = 1.5\text{ V}$			-10	μA
I_{iH}	High Voltage Input Current (pin 2, 9, 12, 19)	$2.3\text{ V} \leq V_{iH} \leq V_{SS} - 0.6\text{ V}$		30	100	μA
V_{enL}	Enable Low Voltage (pin 1, 11)		-0.3		1.5	V
V_{enH}	Enable High Voltage (pin 1, 11)	$V_{SS} \leq 7\text{ V}$	2.3		V_{SS}	V
		$V_{SS} > 7\text{ V}$	2.3		7	V
I_{enL}	Low Voltage Enable Current (pin 1, 11)	$V_{enL} = 1.5\text{ V}$		-30	-100	μA
I_{enH}	High Voltage Enable Current (pin 1, 11)	$2.3\text{ V} \leq V_{enH} \leq V_{SS} - 0.6\text{ V}$			± 10	μA
$V_{CE(sat)H}$	Source Output Saturation Voltage (pins 3, 8, 13, 18)	$I_O = -0.6\text{ A}$		1.4	1.8	V
$V_{CE(sat)L}$	Sink Output Saturation Voltage (pins 3, 8, 13, 18)	$I_O = +0.6\text{ A}$		1.2	1.8	V
V_F	Clamp Diode Forward Voltage	$I_O = 600\text{ nA}$		1.3		V
t_r	Rise Time (*)	0.1 to 0.9 V_O		250		ns
t_f	Fall Time (*)	0.9 to 0.1 V_O		250		ns
t_{on}	Turn-on Delay (*)	0.5 V_i to 0.5 V_O		750		ns
t_{off}	Turn-off Delay (*)	0.5 V_i to 0.5 V_O		200		ns

(*) See fig. 1.

TRUTH TABLE (one channel)

Input	Enable (*)	Output
H	H	H
L	H	L
H	L	Z
L	L	Z

Z = High output impedance
 (*) Relative to the considered channel

Figure 1: Switching Times

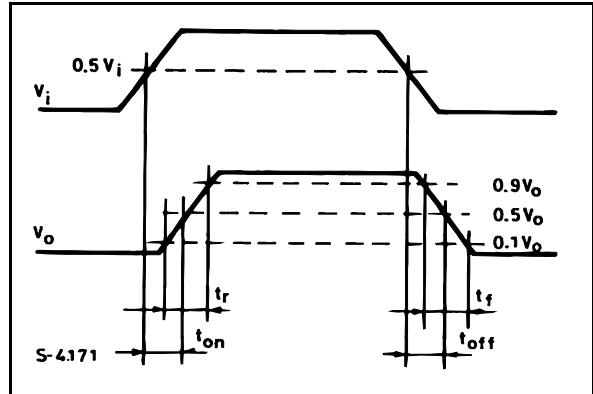
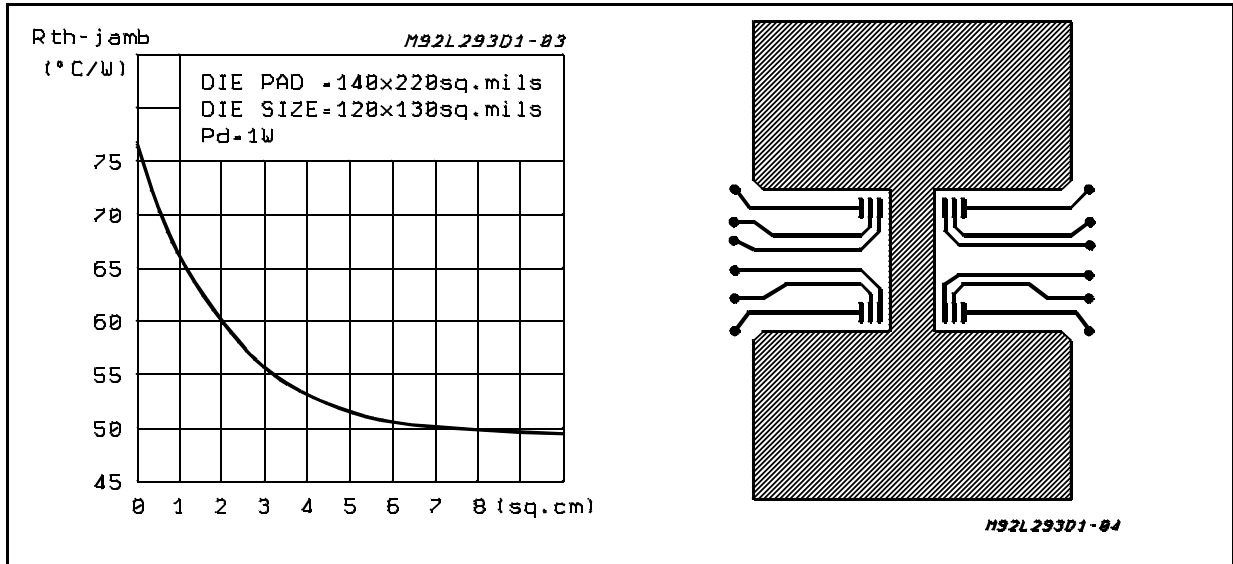
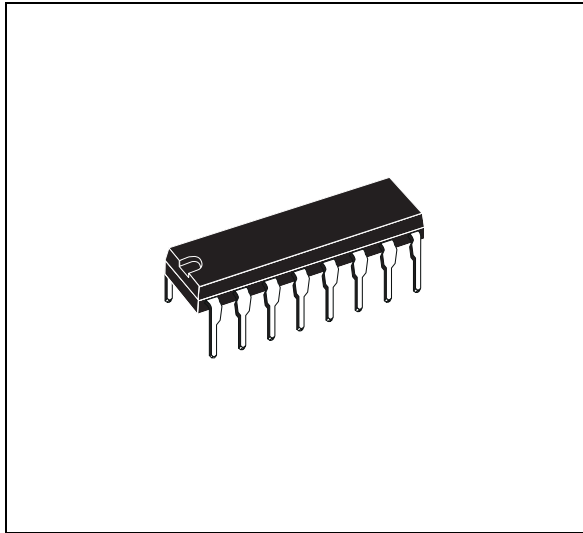


Figure 2: Junction to ambient thermal resistance vs. area on board heatsink (SO12+4+4 package)

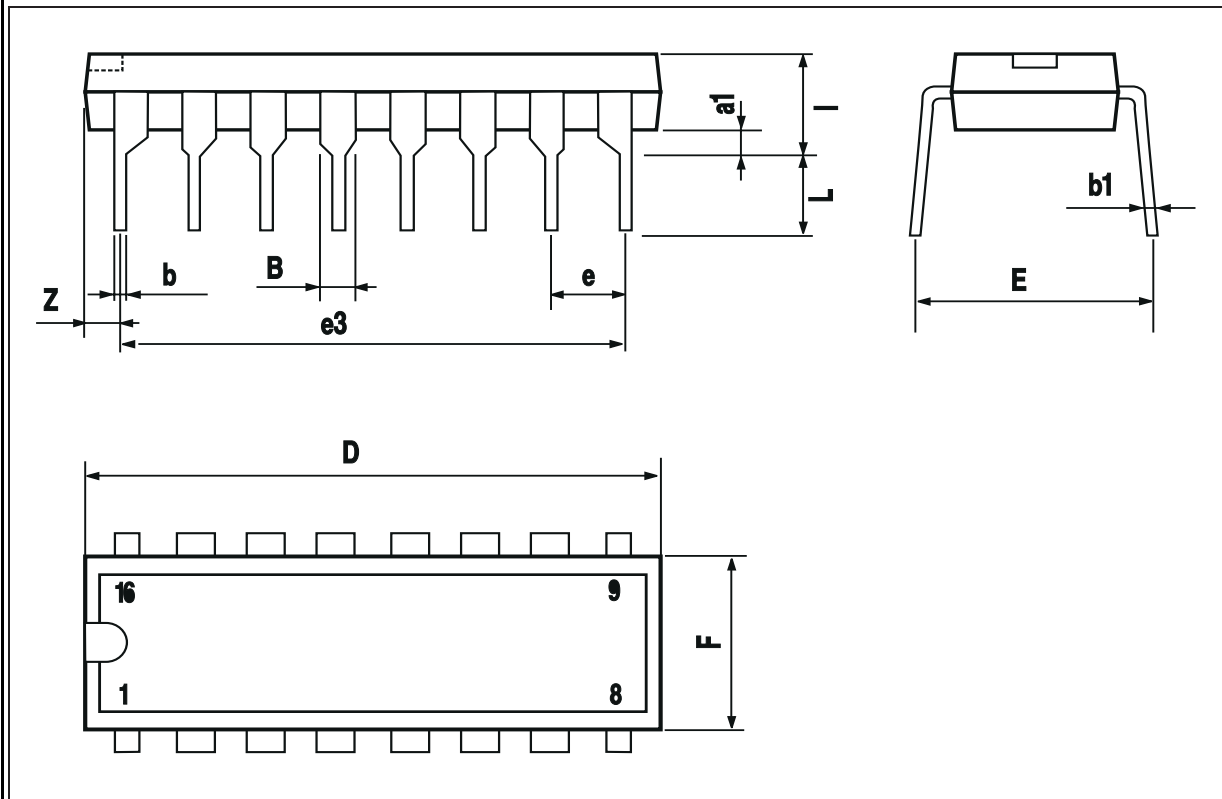


DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.85		1.40	0.033		0.055
b		0.50			0.020	
b1	0.38		0.50	0.015		0.020
D			20.0			0.787
E		8.80			0.346	
e		2.54			0.100	
e3		17.78			0.700	
F			7.10			0.280
I			5.10			0.201
L		3.30			0.130	
Z			1.27			0.050

OUTLINE AND MECHANICAL DATA



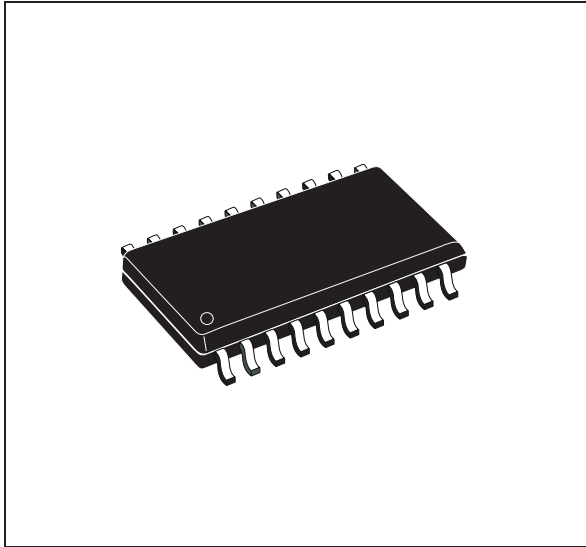
Powerdip 16



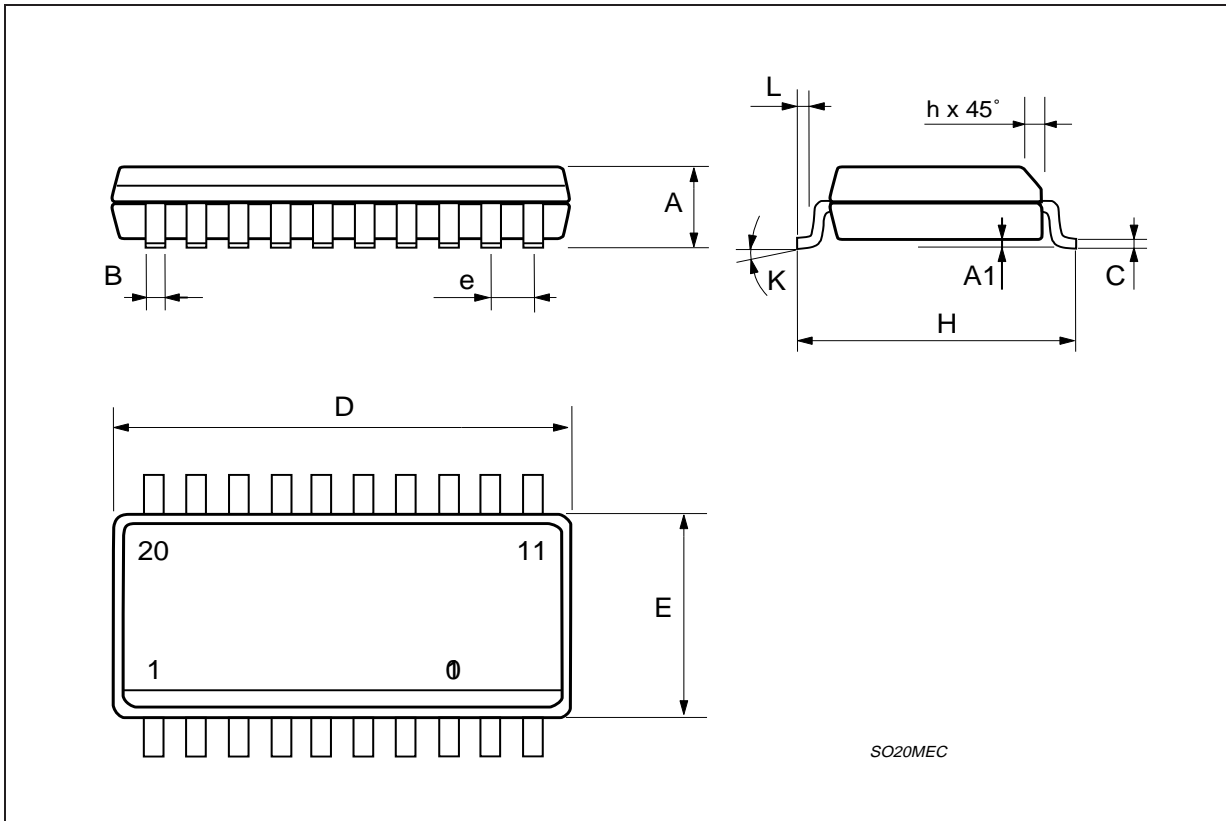
L293D - L293DD

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	2.35		2.65	0.093		0.104
A1	0.1		0.3	0.004		0.012
B	0.33		0.51	0.013		0.020
C	0.23		0.32	0.009		0.013
D	12.6		13	0.496		0.512
E	7.4		7.6	0.291		0.299
e		1.27			0.050	
H	10		10.65	0.394		0.419
h	0.25		0.75	0.010		0.030
L	0.4		1.27	0.016		0.050
K	0° (min.)8° (max.)					

OUTLINE AND MECHANICAL DATA



SO20



SO20MEC

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