TM1016 6GHz Low Power Consumption Power Amplifier MMIC

General Description

The TM1016 is manufactured on Gallium Arsenide Heterojunction Bipolar Transistor (GaAs HBT) process. The device is a low cost, high linearity, low power consumption, high efficiency amplifier IC designed for IEEE 802.11a, ETC, Wireless Audio/Video and other application in the 5.8GHz ISM band. The device also features analog power control to optimize transmit power while maximizing battery life in portable equipment. The device includes an integrated power control circuit for closed loop control of output power. The TM1016 is packaged in a compact 2mm by 2mm DFN package with a backside ground.

Features

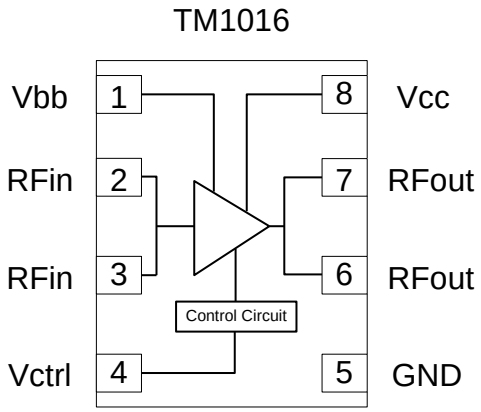
- Analog power Control
- DFN-8L 2x2 mm with thermal ground
- RoHS compliant
- MSL 1

Applications

- WLAN 802.11 a
- Wireless Audi/Video
- 5.8Ghz ETC
- Wireless Data Terminal
- Cordless Handset
- Portable Battery Powered Equipment

Functional Block Diagram

ToP View



Absolute Maximum Ratings

Parameter	Maximum Rating	Unit
VCC Supply Voltage	0 to 6	V
APC Control Voltage	0 to 6	V
RF Input Power	+ 5	dBm
Operating Temperature	-40 to +85	^{o}C
Storage Temperature	-55 to +150	^{o}C

Notes:

1. Operation of this device in excess of any maximum rating as specified above may cause permanent damage to the device.
2. **Caution! ESD Sensitive Device.**

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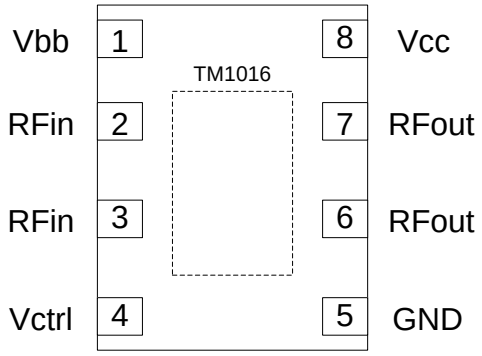
Specification Summary

TM1016 Evaluation Board Testing Results, VCC=Vbb=+3.3V, Vctrl=+2.9V, TA=+25℃, unless otherwise noted.

Parameter	Min.	Typical	Max.	Unit	Conditions
Operating Frequency Range	4.9		5.85	GHz	
P1dB at 4.9GHz		20		dBm	Pin=7 dBm, Icc=63mA, Gain=13.dB, PAE=53%
P1dB at 5.4GHz		19		dBm	Pin=7dBm, Icc=52mA, Gain=12dB, PAE=45%
P1dB at 5.85GHz		17		dBm	Pin=7dBm, Icc=43mA, Gain=10dB, PAE=32%
S21 at 4.9GHz		14		dB	Pin=-30dBm
S21 at 5.4GHz		13		dB	
S21 at 5.85GHz		10.8		dB	
S11		-8		dB	
S22		-8		dB	
Harmonics: 2Fo, 3Fo		-45, -40		dBc	
V Control Voltage	0		5	V	

Pin Configuration

ToP View



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Functional Pin Description

Name	Pin #	Description
Vbb	1	Bias Voltage to Power Amplifier
RFin	2,3	RF input for the Power Amplifier required a DC-blocking capacitor
Vctrl	4	Bias control voltage about output power.
GND	5	GND to GND plan
RFout	6,7	RF output for the power amplifier. This pin requires a DC-blocking capacitor.
Vcc	8	DC supply voltage for Amplifier.
Die Pad	-	This pad should be connected to the ground plane by vias directly under this pad.

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Performance Data

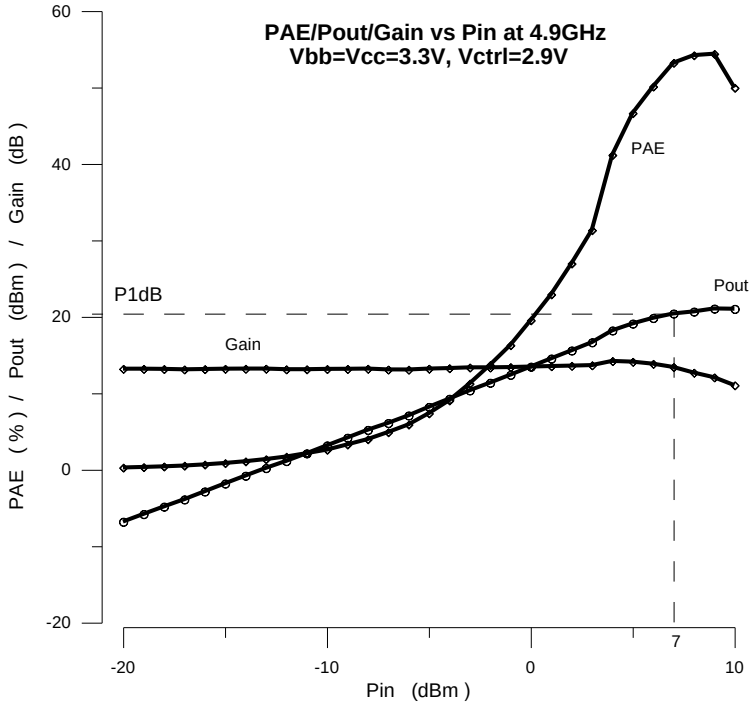

Fig 1, PAE/Pout/Gain vs Pin at 4.9GHz

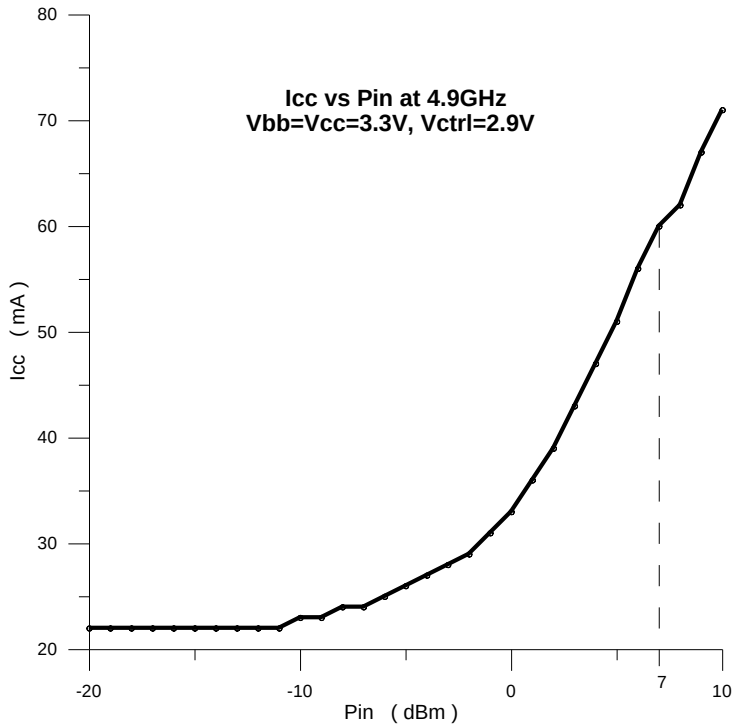

Fig 2, Icc vs Pin at 4.9GHz

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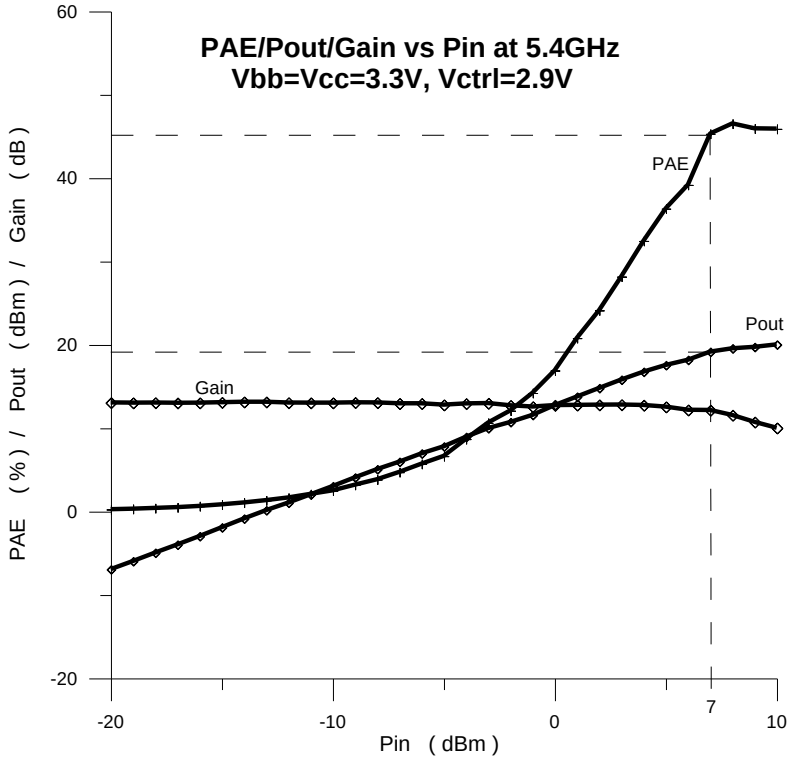

Fig 3, PAE/Pout/Gain vs Pin at 5.4GHz

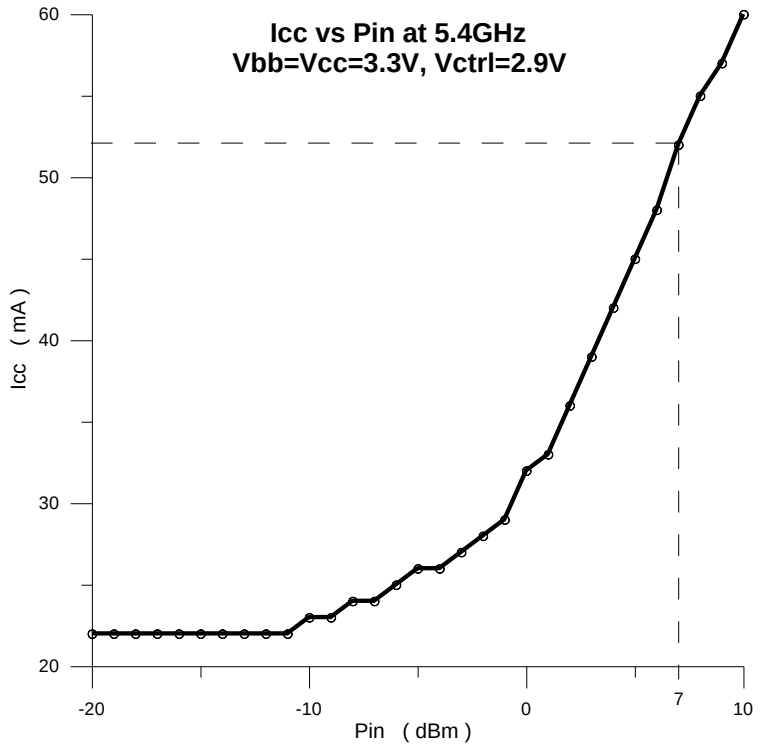

Fig 4, Icc vs Pin at 5.4GHz

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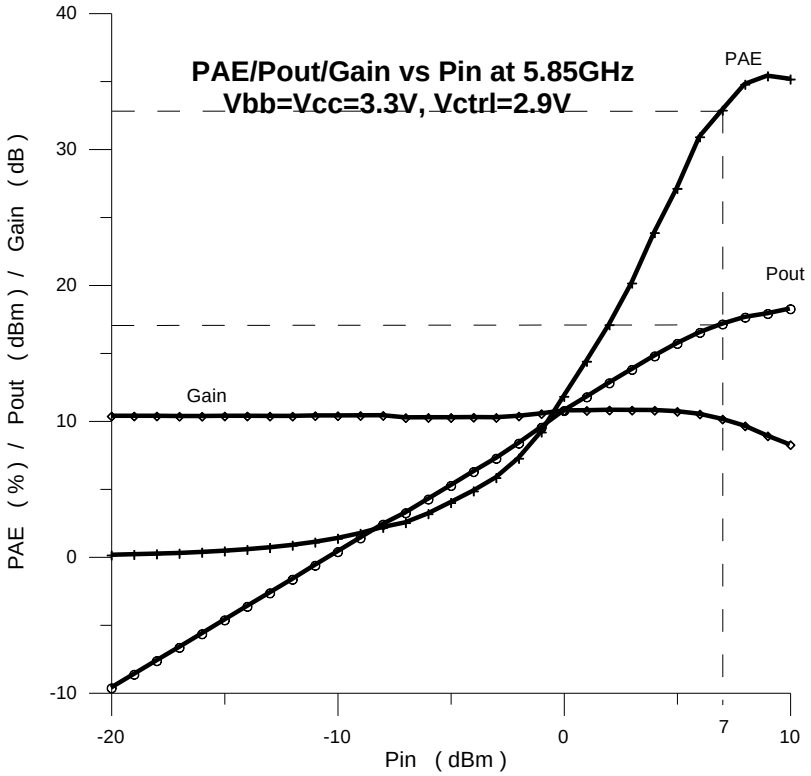

Fig 5, Pout/Gain/PAE vs Pin at 5.85GHz

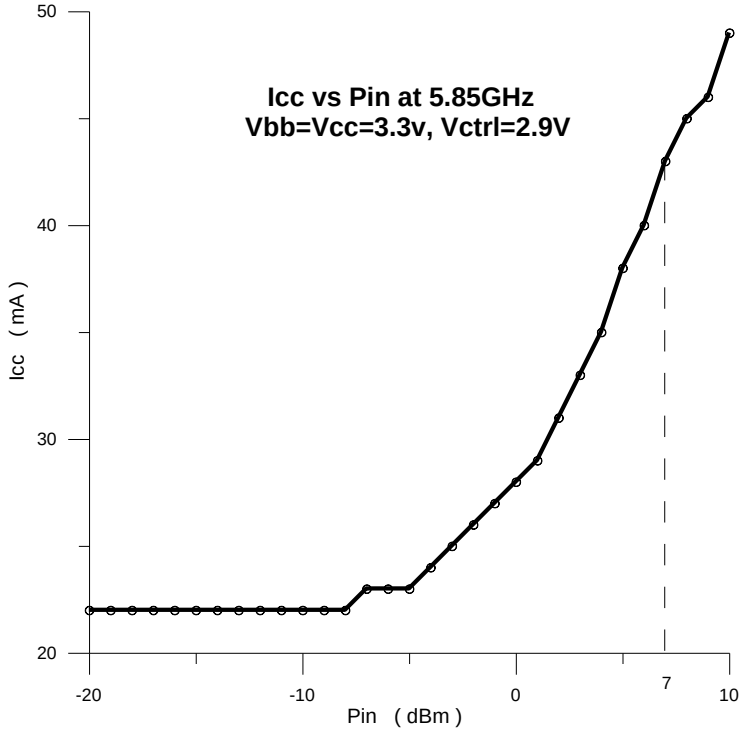

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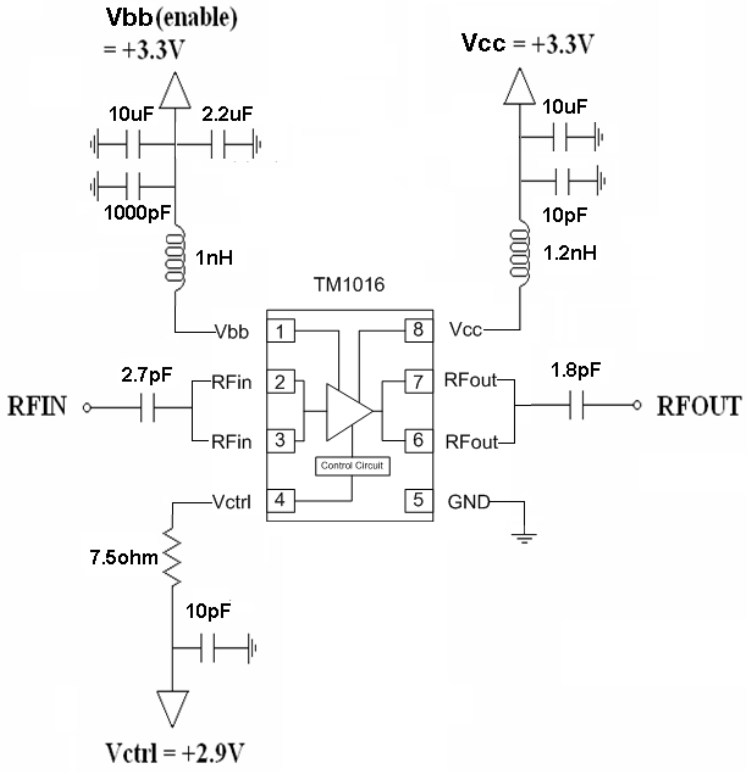
Fig 6, Icc vs Pin at 5.85GHz

Application Circuit



Evaluation Board Layout

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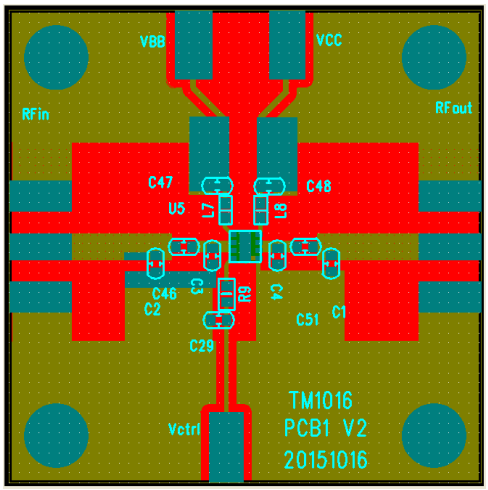
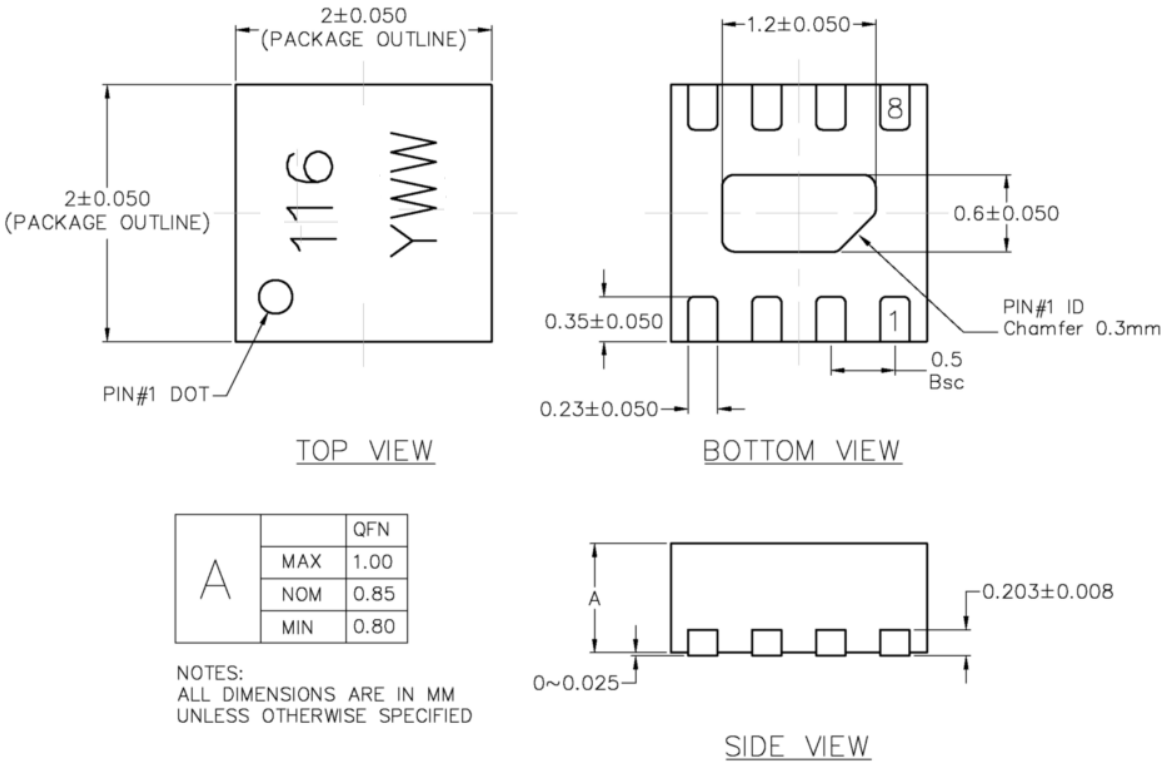


Package Information



Product Marking

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2nd Line : Assy date code.
Y : last character of year ; 2011, Y=1
WW : Working Week

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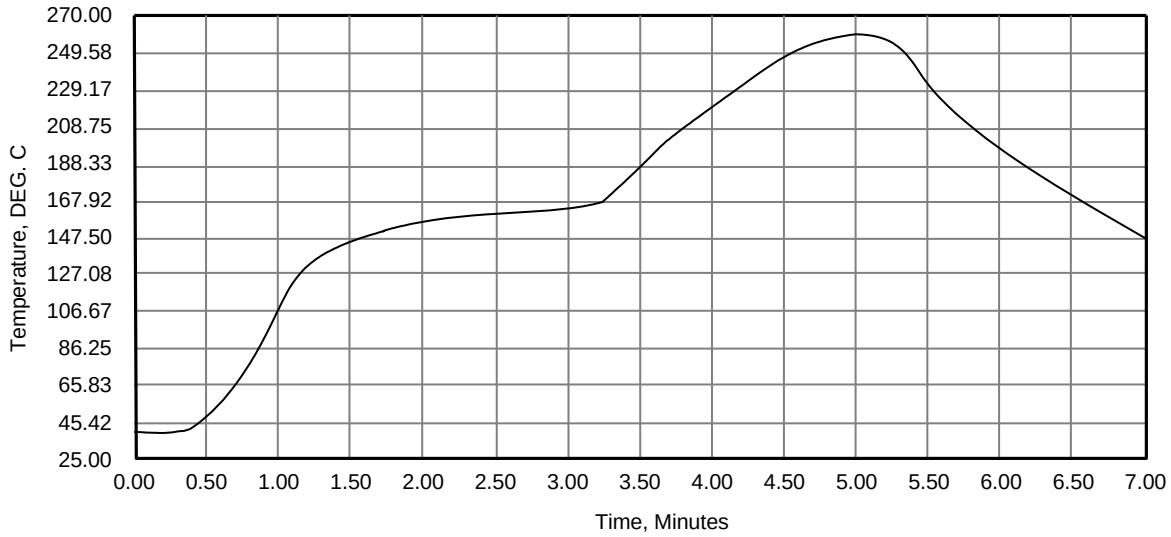
SMT Reflow Profile



SAFETY INFORMATION ON THIS PRODUCT

Cautions on using this product	The product contains Gallium-Arsenide (GaAs). GsAs vapor and power are hazardous to human health if inhaled or ingested. ● Do not destroy or burn the product. ● Do not cut or cleave off any part of the product. ● Do not crush or chemically dissolve the product. Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.

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Revision History

Rev.	History	Issue Date	Remark
0.1	Initial issue: written by Randall Lan	2012/1/18	Preliminary
1.0	Update the application circuit and components.	2017/12/13	

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