CMD204C3

DC-20 GHz SPST Non-reflective Switch

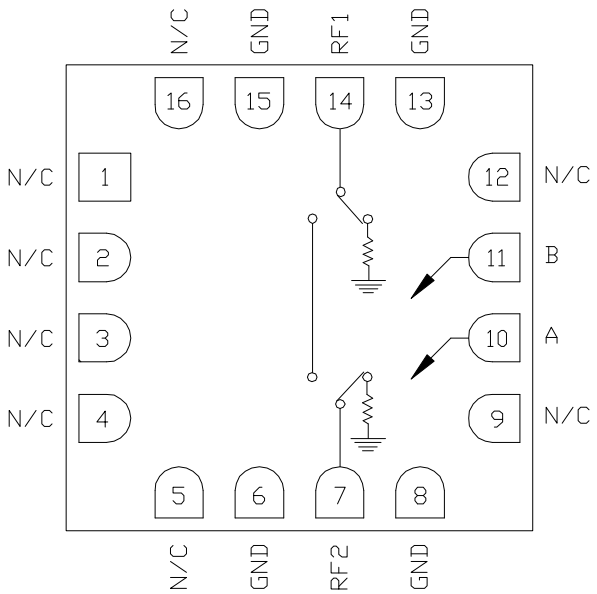
Features

- Low loss broadband performance
- High isolation
- Fast switching speed
- Non-reflective design - RF1 and RF2
- Pb-free RoHS compliant 3x3 SMT package

Description

The CMD204C3 is a general purpose broadband high isolation non-reflective MMIC SPST switch housed in a leadless 3x3 mm surface mount package. Covering DC to 20 GHz, the CMD204C3 features a low insertion loss of 1.3 dB and high isolation of 48 dB at 10 GHz. The CMD204C3 operates using complementary control voltage logic lines of 0/-5 V and requires no bias supply.

Functional Block Diagram



Electrical Performance - V_{ctl} = 0/-5 V, T_A = 25 °C, F = 10 GHz

Parameter	Min	Typ	Max	Units
Frequency Range		DC - 20		GHz
Insertion Loss		1.3		dB
Isolation		48		dB
Return Loss - On State		15		dB
Return Loss - Off State		22		dB
Input P0.1dB		25		dBm
Switching Speed		1.8		ns

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Specifications

Absolute Maximum Ratings

Parameter	Rating
RF Input Power	+27 dBm
Control Voltage Range (A,B)	+0.5V to -7.5V
Channel Temperature, Tch	150 °C
Operating Temperature	-40 to 85 °C
Storage Temperature	-55 to 150 °C

Operation of this device outside the maximum ratings may cause permanent damage.

Control Voltages

State	Bias Condition
Low	0 to -0.5V @ 1 uA Typ
High	-3V @ 1 uA Typ to -7V @ 6 uA Typ

Truth Table

Control Input		Signal Path State
A	B	RF1to RF2
High	Low	On
Low	High	Off

Electrical Specifications - V_{ctl} = 0/-5 V, T_A = 25 °C

Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	DC - 10			10 - 18			GHz
Insertion Loss		1.0	1.7		1.5	2.0	dB
Isolation	43	50		35	43		dB
Return Loss - On State		20			12		dB
Return Loss - RF1, 2 - Off State		18			18		dB
Input P0.1dB		24			22		dBm
Input IP3		38			37		dBm
Switching Speed		1.8			1.8		ns

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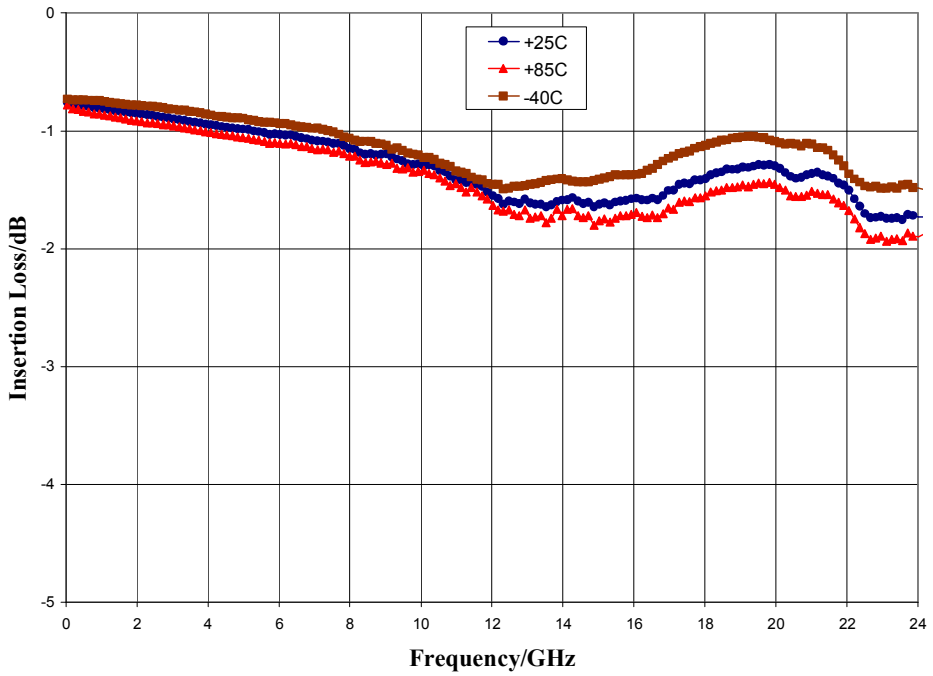
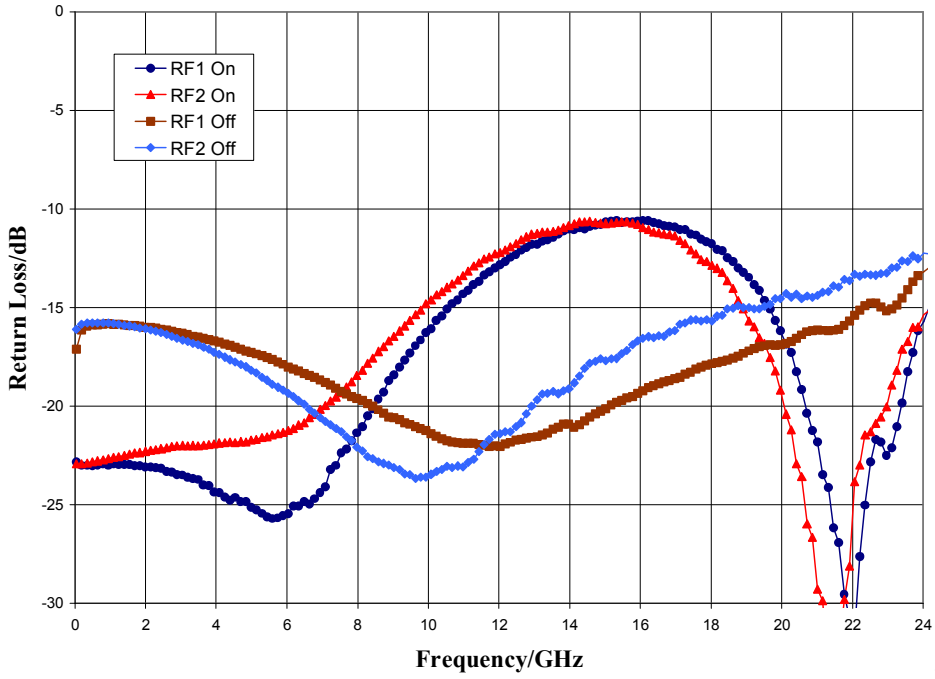
Typical Performance

Insertion Loss vs. Temperature



Return Loss



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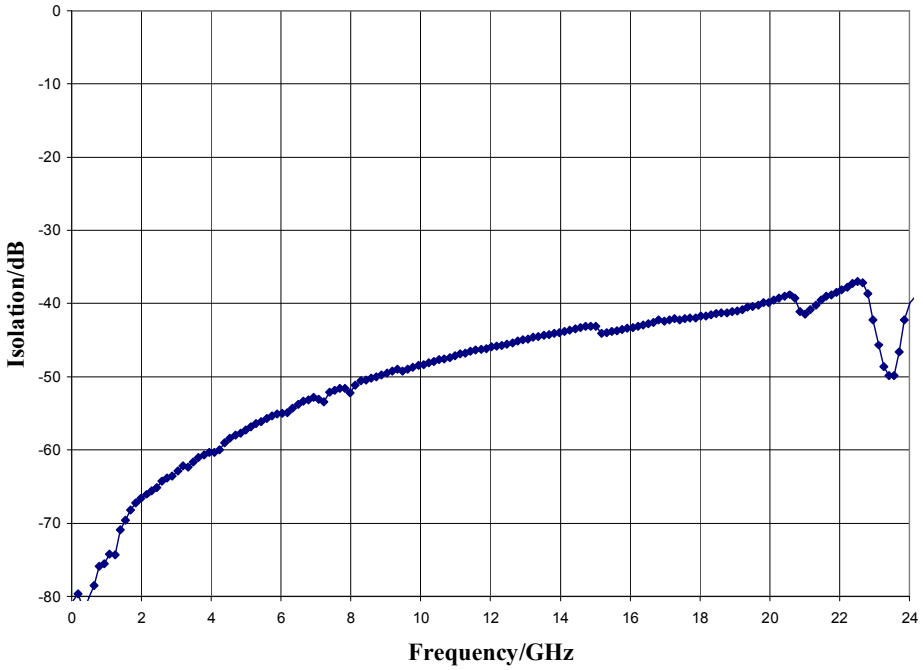
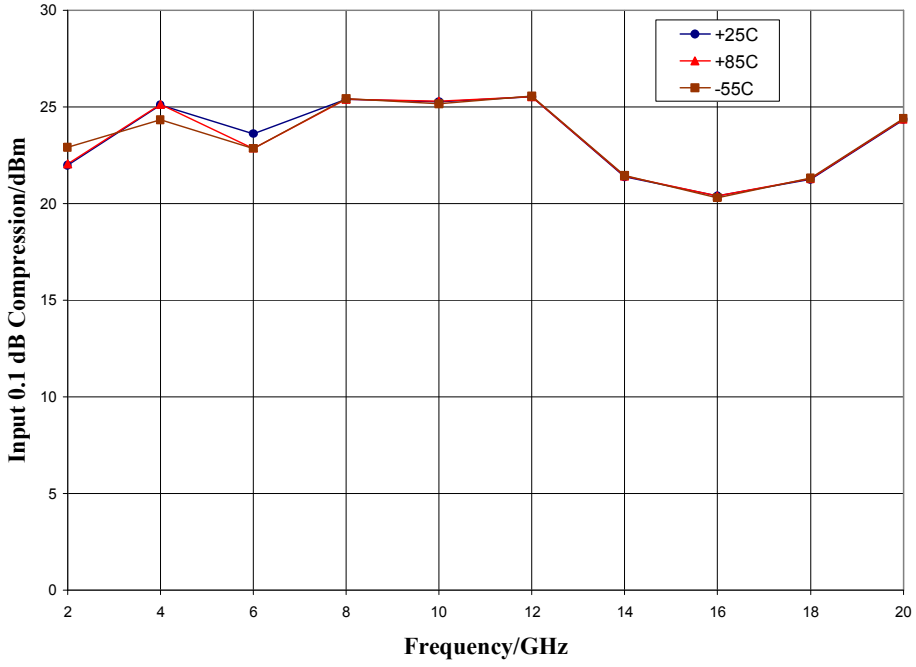
Typical Performance

Isolation Between Ports RF1 and RF2



Input P0.1dB Compression Point vs. Temperature



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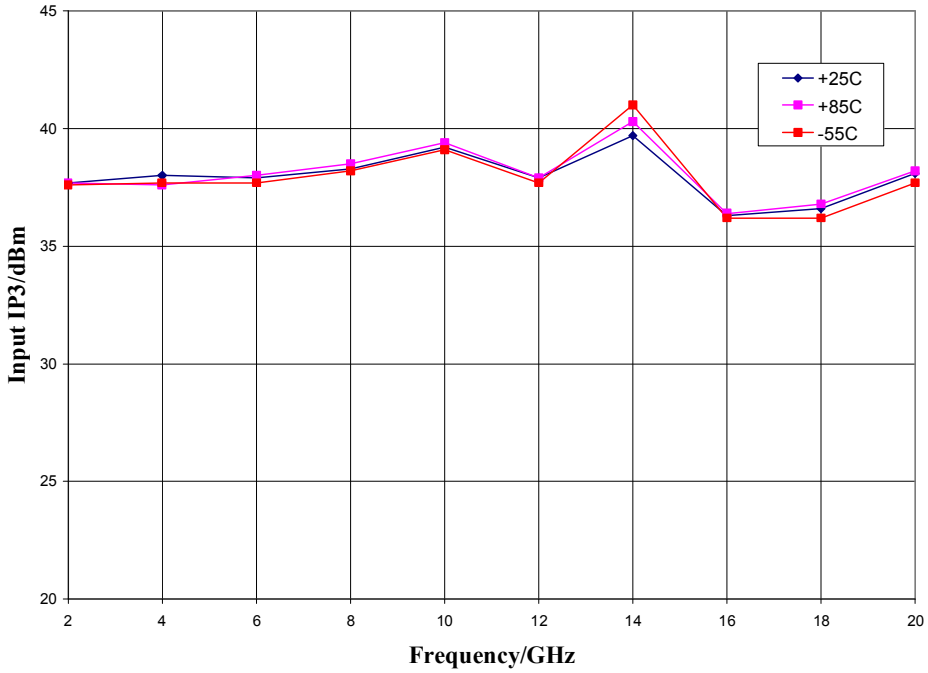
Typical Performance

Input Third Order Intercept Point vs. Temperature



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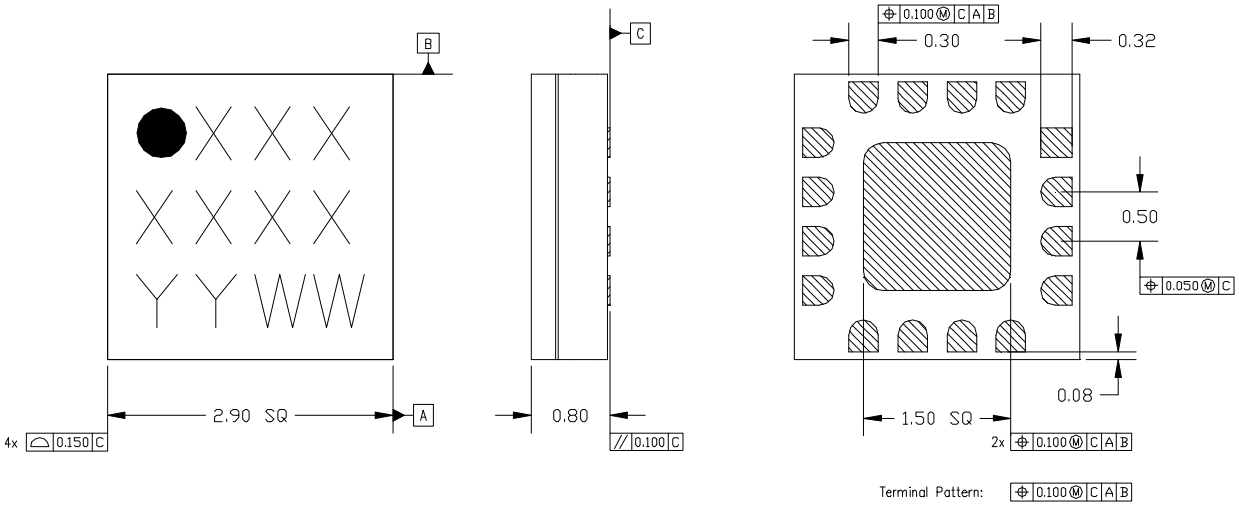
Mechanical Information

Package Information and Dimensions



NOTES:
1. ALL DIMENSIONS SHOWN IN mm.
2. MATERIAL: BLACK ALUMINA
3. LEAD FINISH:
   3.1. Ni: 8.89um MAX, 1.27um MIN
   3.2. Pd: 0.17um MAX, 0.07um MIN
   3.3. Au: 0.254um MAX, 0.03um MIN
4. MARKING
   4.1. LINE 1: PART NUMBER
      4.1.1. EXAMPLE: CMD196C3 SHALL BE MARKED AS 196
   4.2. LINE 2: LOT NUMBER
   4.3. LINE 3: DATE CODE - LAST 2 DIGITS OF THE YEAR OF MANUFACTURE FOLLOWED BY A 2 DIGIT WEEK CODE
5. ALTERNATE PIN #1 IDENTIFIER IS A SINGLE SQUARE PAD
6. ALTERNATE DIE PADDLE MAY HAVE CHAMFERED CORNERS

Recommended PCB Land Pattern

Custom MMIC Design Services recommends that the user develop the land pattern that will provide the best design for proper solder reflow and device attach for their specific application. Please review Custom MMIC Application Note AN 105 for a recommended land pattern approach.

Recommended Solder Reflow Profile

Custom MMIC Design Services recommends screen printing with belt furnace reflow to ensure proper solder reflow and device attach. Please review Custom MMIC Application Note AN 102 for a recommended solder reflow profile.

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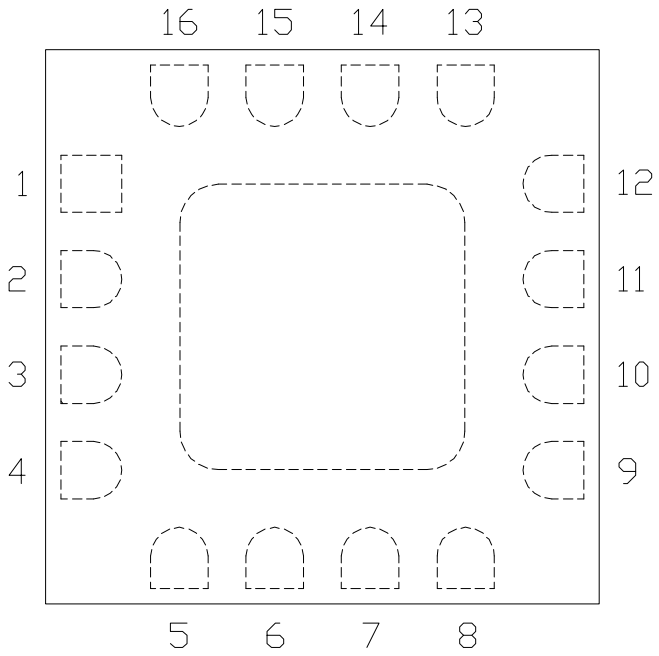
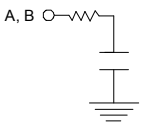
Pin Description

Pin Diagram



Functional Description

Pin	Function	Description	Schematic
1-5,9,12,16	N/C	No connection required. These pins may be connected to RF/DC ground	
6,8,13,15 and die paddle	Ground	Connect to RF / DC ground	
7,14	RF2, RF1	These pins are DC coupled and matched to 50 Ohm. Blocking capacitors are required if RF line potential is not equal to 0V	
10	CTLA	See truth table and control voltage table	
11	CTLB	See truth table and control voltage table	

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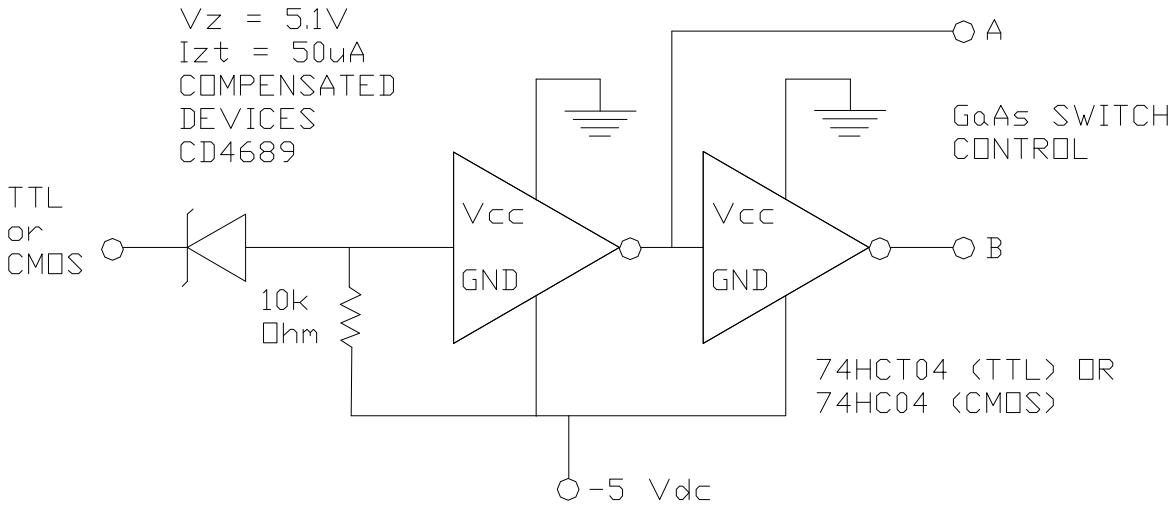
Applications Information

Suggested Driver Circuit



GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

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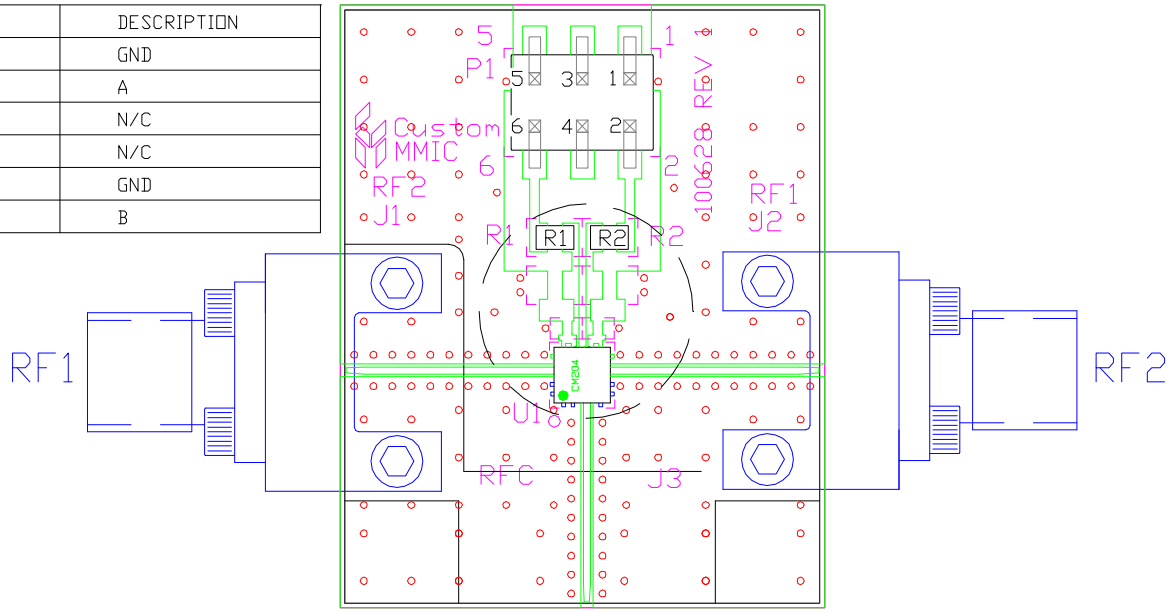
Applications Information

Evaluation Board

The circuit board shown has been developed for optimized assembly at CMDS. A sufficient number of via holes should be used to connect the top and bottom ground planes. As surface mount processes vary, careful process development is recommended.

P1	DESCRIPTION
1	GND
2	A
3	N/C
4	N/C
5	GND
6	B



Bill of Material

Designator	Value	Description
J1, J2		SMA End Launch Connector
P1		6 Pin Header
R1, R2	100 Ω	Resistor, 0805
U1		CMD204C3 SPST Switch
PCB		100628 Evaluation PCB

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