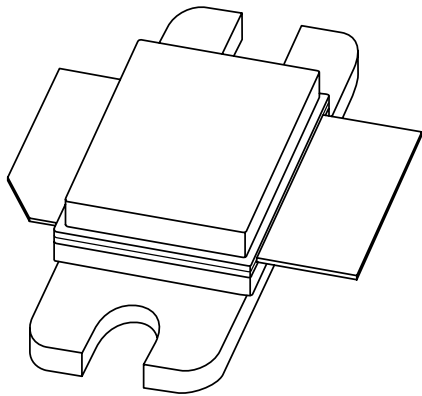


# DATA SHEET



**BLS2731-110**

**Microwave power transistor**

Product specification  
Supersedes data of 1998 Jan 30

2001 Dec 05

# Microwave power transistor

# BLS2731-110

### FEATURES

- Suitable for short and medium pulse applications
- Internal input and output matching networks for an easy circuit design
- Emitter ballasting resistors improve ruggedness
- Gold metallization ensures excellent reliability
- Interdigitated emitter-base structure provides high emitter efficiency
- Multicell geometry improves power sharing and reduces thermal resistance.

### APPLICATIONS

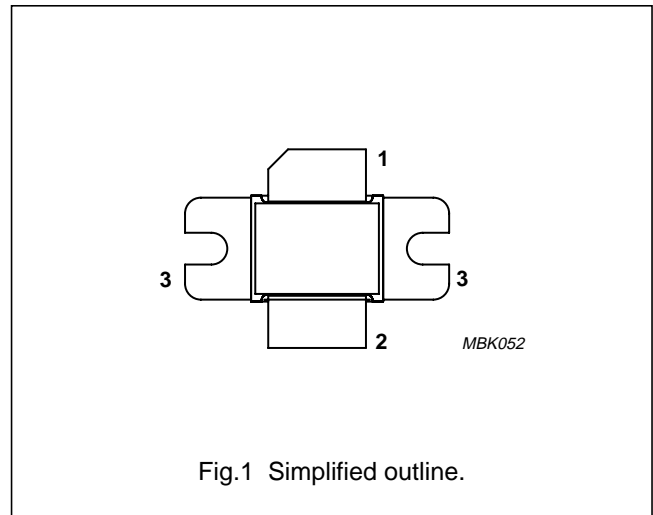
- Common base class-C pulsed power amplifiers for radar applications in the 2.7 to 3.1 GHz band.

### DESCRIPTION

NPN silicon planar epitaxial microwave power transistor in a 2-lead rectangular flange package with a ceramic cap (SOT423A) with the common base connected to the flange.

### PINNING - SOT423A

PIN	DESCRIPTION
1	collector
2	emitter
3	base; connected to flange



### QUICK REFERENCE DATA

RF performance at  $T_h = 25\text{ }^\circ\text{C}$  in a common base class-C test circuit.

MODE OF OPERATION	f (GHz)	$V_{CB}$ (V)	$P_L$ (W)	$G_p$ (dB)	$\eta_c$ (%)
Pulsed class-C	2.7 to 3.1	40	>110	>7	>35

### WARNING

Product and environmental safety - toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO disc is not damaged. All persons who handle, use or dispose of this product should be aware of its nature and of the necessary safety precautions. After use, dispose of as chemical or special waste according to the regulations applying at the location of the user. It must never be thrown out with the general or domestic waste.

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**LIMITING VALUES**

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	75	V
$V_{CES}$	collector-emitter voltage	$R_{BE} = 0$	–	75	V
$V_{EBO}$	emitter-base voltage	open collector	–	2	V
$I_{CM}$	peak collector current	$t_p \leq 100 \mu\text{s}$ ; $\delta \leq 10\%$	–	12	A
$P_{tot}$	total power dissipation	$t_p = 100 \mu\text{s}$ ; $\delta = 10\%$ ; $T_{mb} = 25 \text{ }^\circ\text{C}$	–	500	W
$T_{stg}$	storage temperature		–65	+200	$^\circ\text{C}$
$T_j$	operating junction temperature		–	200	$^\circ\text{C}$
$T_{sld}$	soldering temperature	up to 0.2 mm from ceramic cap; $t \leq 10 \text{ s}$	–	235	$^\circ\text{C}$

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$Z_{th\ j-h}$	thermal impedance from junction to heatsink	$t_p = 100 \mu\text{s}$ ; $\delta = 10\%$ ; note 1	0.24	K/W

**Note**

1. Equivalent thermal impedance under pulsed microwave operating conditions.

**CHARACTERISTICS** $T_j = 25 \text{ }^\circ\text{C}$  unless otherwise specified.

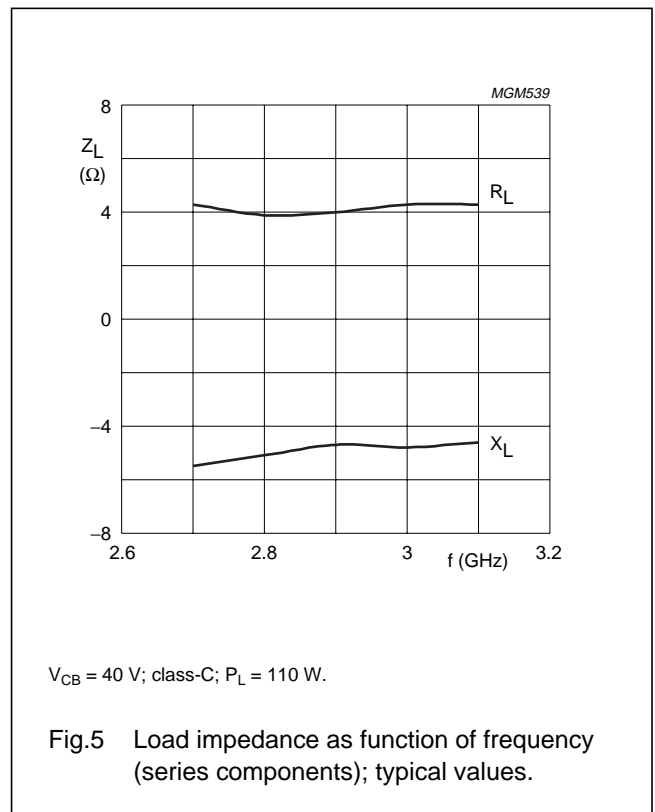
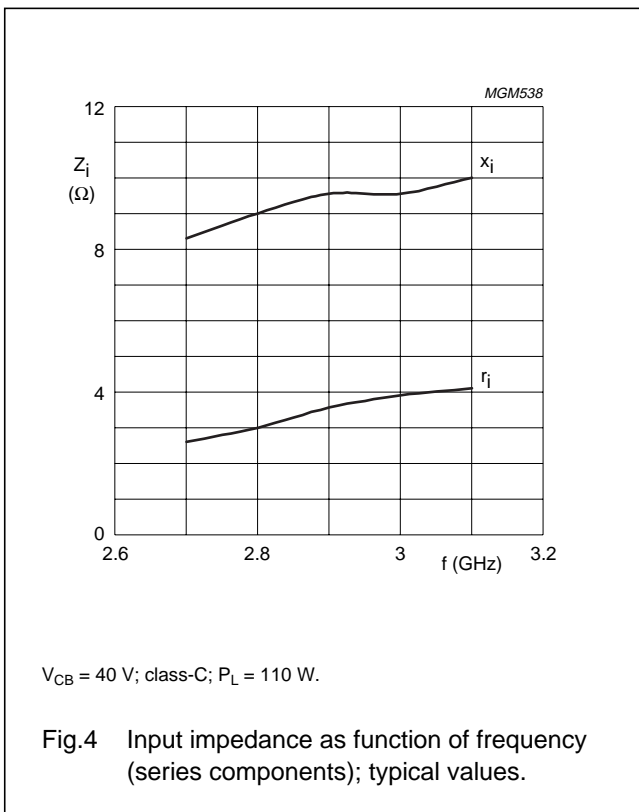
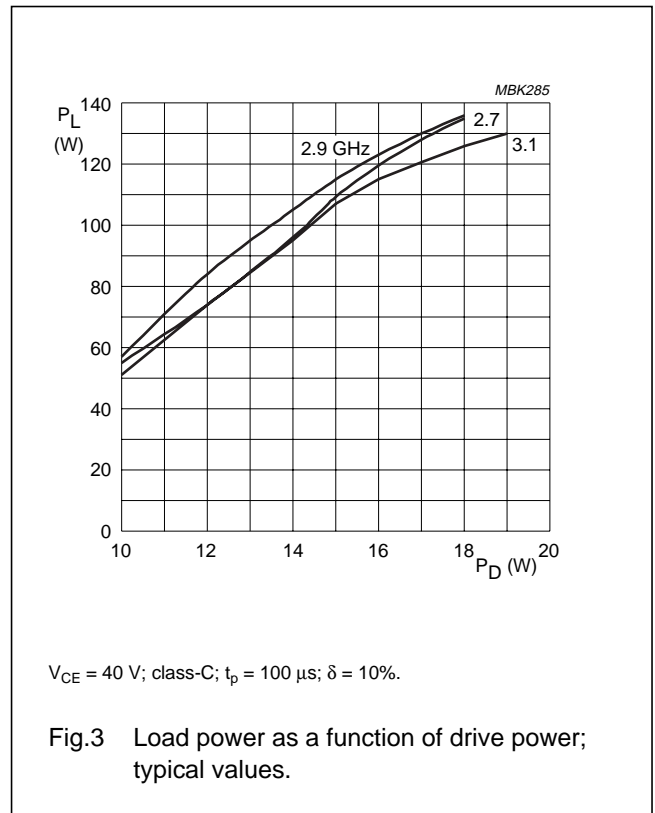
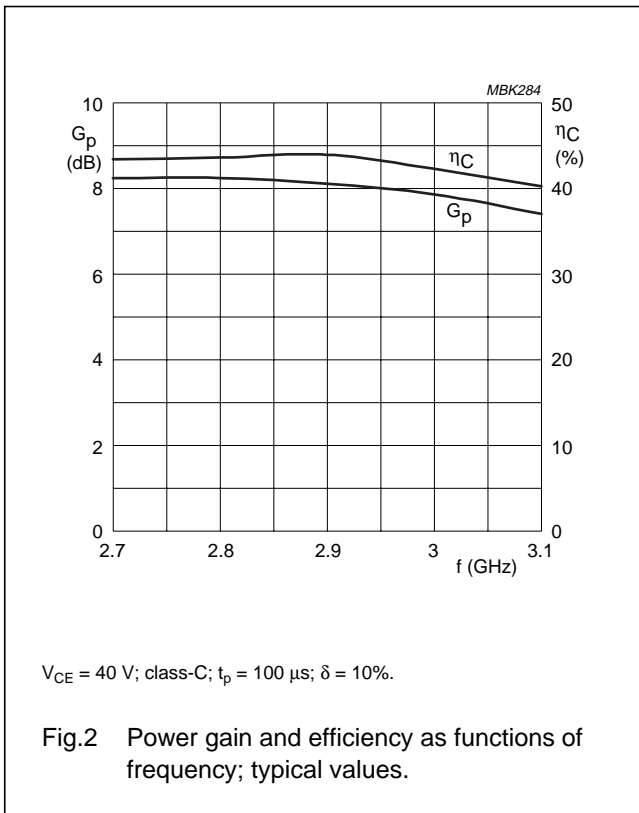
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	$I_C = 30 \text{ mA}$ ; open emitter	75	–	V
$V_{(BR)CES}$	collector-emitter breakdown voltage	$I_C = 30 \text{ mA}$ ; $V_{BE} = 0$	75	–	V
$I_{CBO}$	collector leakage current	$V_{CB} = 40 \text{ V}$ ; $I_E = 0$	–	3	mA
$I_{CES}$	collector leakage current	$V_{CE} = 40 \text{ V}$ ; $V_{BE} = 0$	–	6	mA
$I_{EBO}$	emitter leakage current	$V_{EB} = 1.5 \text{ V}$ ; $I_C = 0$	–	0.6	mA
$h_{FE}$	DC current gain	$V_{CE} = 5 \text{ V}$ ; $I_C = 3 \text{ A}$	40	100	

**APPLICATION INFORMATION**RF performance at  $T_h = 25 \text{ }^\circ\text{C}$  in a common base test circuit.

MODE OF OPERATION	f (GHz)	$V_{CE}$ (V)	$P_L$ (W)	$G_p$ (dB)	$\eta_c$ (%)
Class-C; $t_p = 100 \mu\text{s}$ ; $\delta = 10\%$	2.7 to 3.1	40	$\geq 110$	$\geq 7$	$\geq 35$
	2.7 to 2.9	40	typ. 130	typ. 8	typ. 42
	2.9 to 3.1	40	typ. 120	typ. 7.5	typ. 40

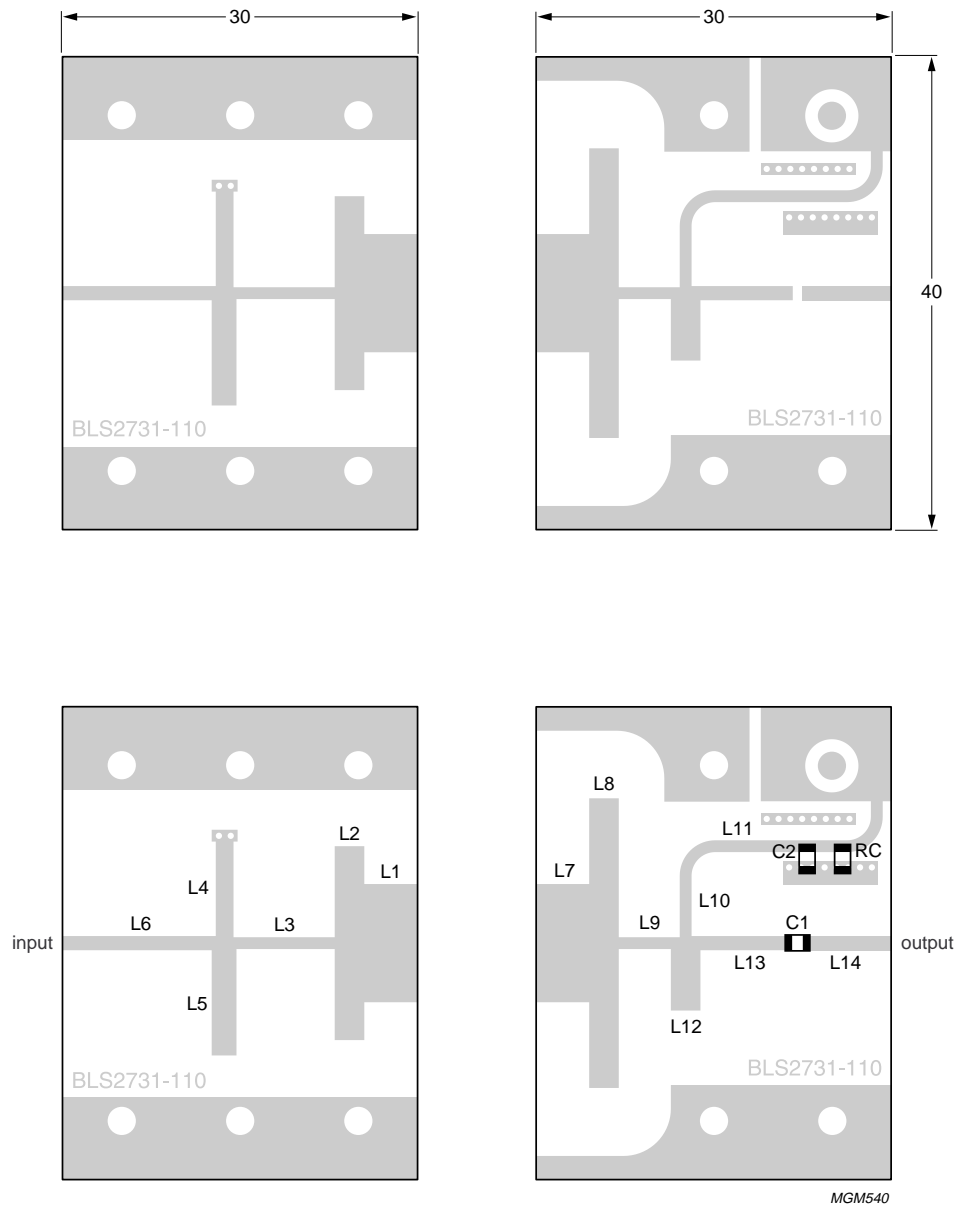
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Dimensions in mm.

The components are located on one side of the copper-clad printed-circuit board, the other side is unetched and serves as a ground plane. Earth connections from the component side to the ground plane are made by through metallization.

Fig.6 Component layout for 2.7 to 3.1 GHz class-C test circuit.

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## List of components (see Fig.6)

COMPONENT	DESCRIPTION	VALUE	DIMENSIONS
C1	multilayer ceramic chip capacitor; note 1	12 pF	
C2	multilayer ceramic chip capacitor; note 1	18 pF	
RC	multilayer ceramic chip capacitor in series with SMD resistor	100 nF + 5 $\Omega$	
L1	stripline; note 2		length 4.5 mm width 10 mm
L2	stripline; note 2		length 2.5 mm width 16.4 mm
L3	stripline; note 2		length 8.3 mm width 1 mm
L4	stripline; note 2		length 8 mm width 1.5 mm
L5	stripline; note 2		length 2 mm width 8.9 mm
L6	stripline; note 2		length 12.7 mm width 1.2 mm
L7	stripline; note 2		length 4.5 mm width 10 mm
L8	stripline; note 2		length 2.5 mm width 24.4 mm
L9	stripline; note 2		length 4.4 mm width 1 mm
L10	stripline; note 2		length 5.2 mm width 1 mm
L11	stripline; note 2		length 9.3 mm width 1 mm
L12	stripline; note 2		length 2.5 mm width 6 mm
L13	stripline; note 2		length 7.8 mm width 1.2 mm
L14	stripline; note 2		length 7.5 mm width 1.2 mm

## Notes

- American Technical Ceramics type 100A or capacitor of same quality.
- The striplines are on double-clad printed-circuit board with Duroid dielectric ( $\epsilon_r = 2.2$ ); thickness = 0.38 mm.

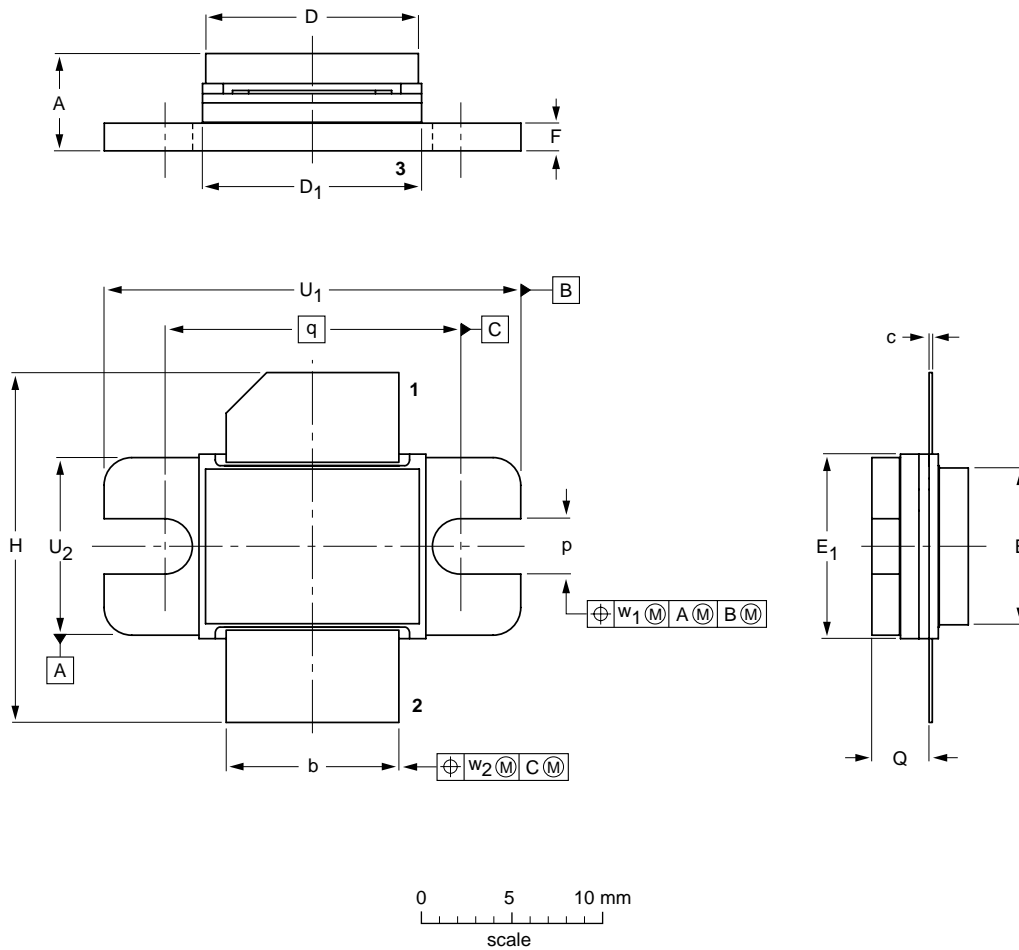
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PACKAGE OUTLINE

Flanged hermetic ceramic package; 2 mounting holes; 2 leads

SOT423A



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	b	c	D	D <sub>1</sub>	E	E <sub>1</sub>	F	H	p	Q	q	U <sub>1</sub>	U <sub>2</sub>	w <sub>1</sub>	w <sub>2</sub>
mm	5.72 4.90	9.53 9.27	0.10 0.05	12.09 11.71	12.83 12.57	8.84 8.56	10.29 10.03	1.58 1.47	19.81 18.29	3.43 3.18	3.35 2.95	16.51	22.99 22.73	9.91 9.65	0.25	0.76
inches	0.225 0.193	0.375 0.365	0.004 0.002	0.476 0.461	0.505 0.495	0.348 0.337	0.405 0.395	0.062 0.058	0.78 0.72	0.135 0.125	0.132 0.116	0.65	0.905 0.895	0.390 0.380	0.01	0.03

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT423A					99-03-29

## Microwave power transistor

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## DATA SHEET STATUS

DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITIONS
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A.

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2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

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This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.



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**NOTES**

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**NOTES**

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