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Preliminary

SPD-2226Z

40MHz to 1000MHz DUAL GaAs HFET AMPLIFIER

RFMD Green, RoHS Compliant, Pb-Free
Package: SOF-26

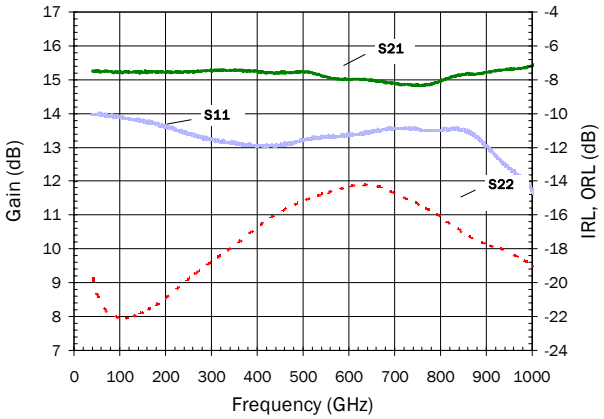
Product Description

RFMD's SPD-2226Z is a high performance AlGaAs/GaAs Heterostructure FET (HFET) housed in a low-cost surface-mount plastic package. The HFET technology improves breakdown voltage while minimizing Schottky leakage current resulting in higher PAE and improved linearity. The active bias network provides stable current over temperature and process Beta variations. The SPD-2226Z product contains two amplifiers for use in Push-Pull CATV amplifiers requiring excellent second order performance.

Optimum Technology Matching® Applied

- ☐ GaAs HBT
- ☐ GaAs MESFET
- ☐ InGaP HBT
- ☐ SiGe BiCMOS
- ☐ Si BiCMOS
- ☐ SiGe HBT
- ☐ GaAs pHEMT
- ☐ Si CMOS
- ☐ Si BJT
- ☐ GaN HEMT
- ☐ RF MEMS

SPD-2226Z Gain,Return Loss, T=+25°C



Features

- Low Distortion: 65/70dBc CTB/CSO
- 5V, 6V, 7V Supply
- Robust 1000V ESD, Class 1C

Applications

- CATV Network Amplifiers
- CATV Drop Amplifiers
- Optical Rx/Tx
- FTTH Video Solutions

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
Small Signal Gain		15.0		dB	500MHz
Output Power at 1dB Compression		28.0		dBm	500MHz
Third Order Intercept Point		46.0		dBc	500MHz
CSO		70		dBc	79CH., Flat Tilt, +40dBmV
CTB		65		dBc	79CH., Flat Tilt, +40dBmV
XMOD		75		dBc	79CH., Flat Tilt, +40dBmV
Worst Case Input Return Loss		9.5		dB	40MHz to 1000MHz
Worst Case Output Return Loss		10.0		dB	40MHz to 1000MHz
Reverse Isolation		23.5		dB	40MHz to 1000MHz
Noise Figure		2.25		dB	500MHz
Device Operating Voltage		7.0		V	
Device Gate Voltage		-1.0		V	
Device Operating Current		400		mA	
Thermal Resistance		21.0		°C/W	junction - lead

Test Conditions: V_D=5V, I_D=400mA Typ., OIP_3 Tone Spacing=1MHz, P_{OUT} per tone=13dBm, V_g=-1V, I_g=5uA Typ, T_L=25°C, Z_S=Z_L=50Ω, Tested with App Circuit

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Absolute Maximum Ratings

Parameter	Rating	Unit
Drain Current (I_{DS})	800	mA
Forward Gate Current (I_{GSF})	4.2	mA
Reverse Gate Current (I_{GSR})	4.2	mA
Drain-to-Source Voltage (V_{DS})	+9.0	V
Gate-to-Source Voltage (V_{GS})	<-5 or >0	V
RF Input Power (P_{IN})	800	mW
Operating Lead Temperature	See P_{DC} Formula	°C
Storage Lead Temperature	-40 to +165	°C
Power Dissipation	See P_{DC} Formula	W
Channel Temperature (T_J)	+165	°C

Note: Absolute Max ratings are for the entire device operating in a balanced circuit configuration

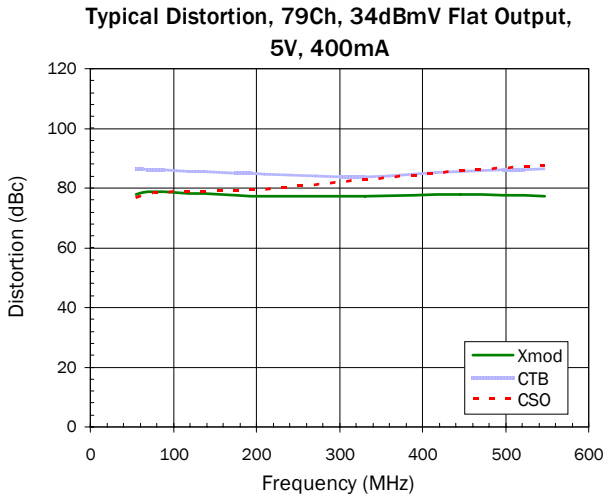
Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation, the device voltage and current must not exceed the maximum operating values specified in the table on page one.

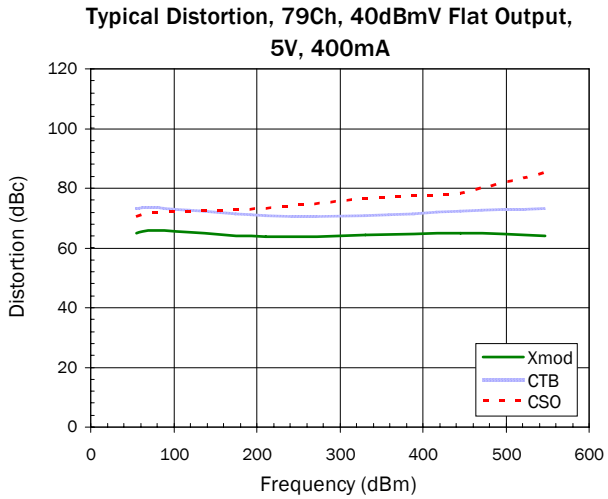
Caution! ESD sensitive device.

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

RoHS status based on EUDirective2002/95/EC (at time of this document revision).

CSO/CTB/XMOD Typical Unit Performance V_D=5V, I_D=400mA, T=+25°C, 79 Channel Plan





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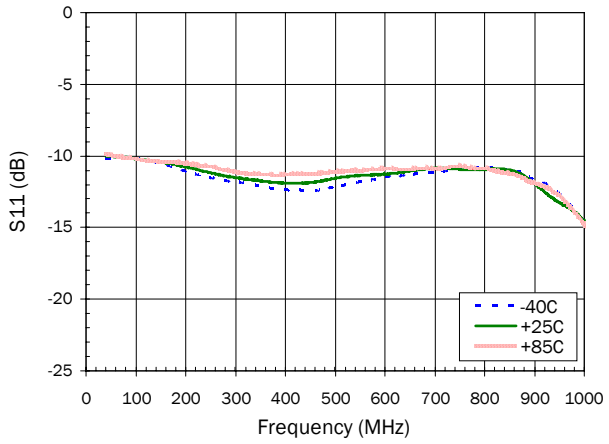
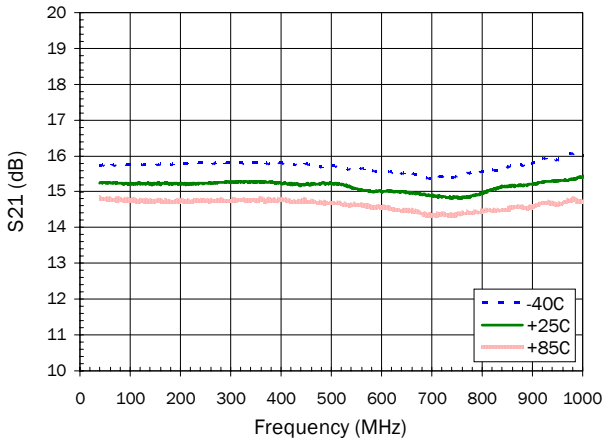
Typical Unit S-Parameters versus Temperature

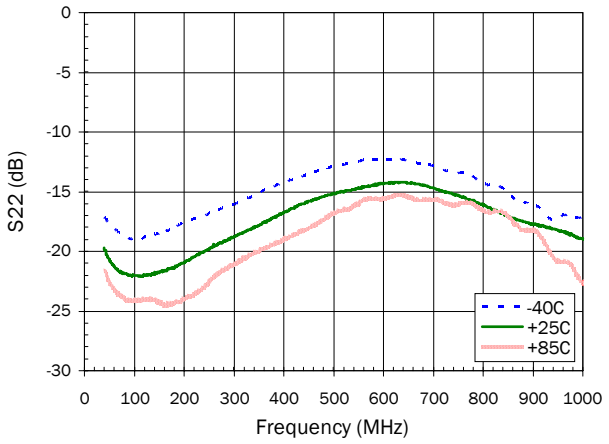
Input Return Loss versus Temperature



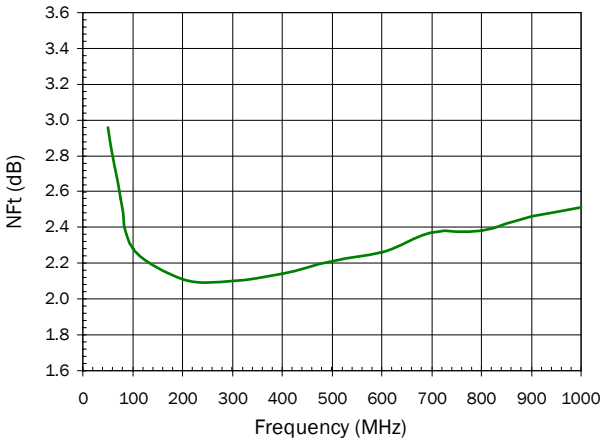
Forward Gain versus Temperature



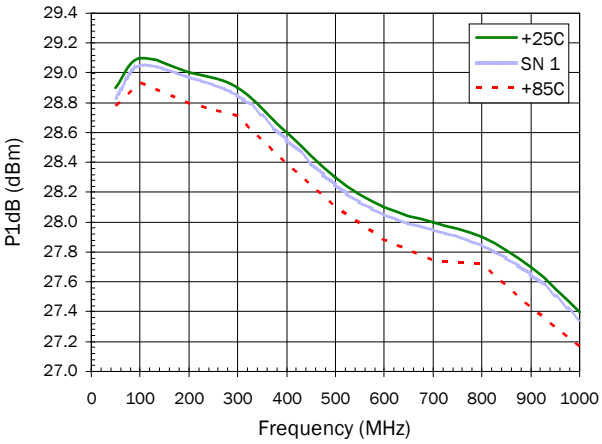
Output Return Loss versus Temperature



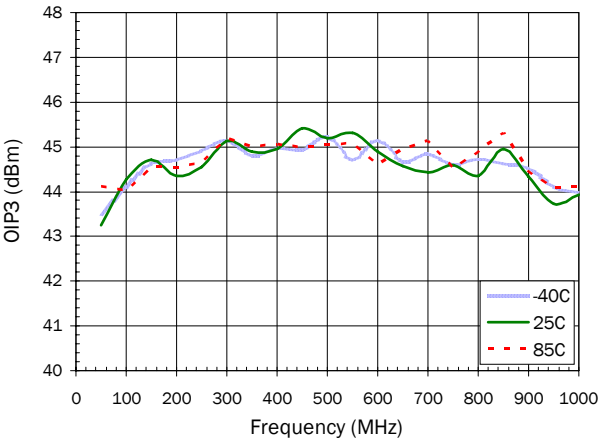
Noise Figure versus Frequency, T=25°C



P1dB versus Temperature

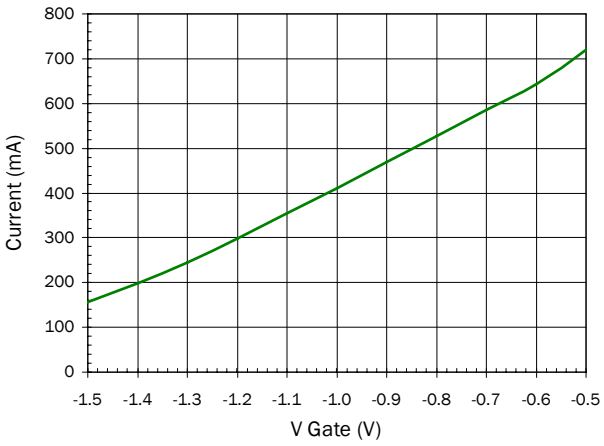


OIP3, 1MHz Spacing vs. Temp

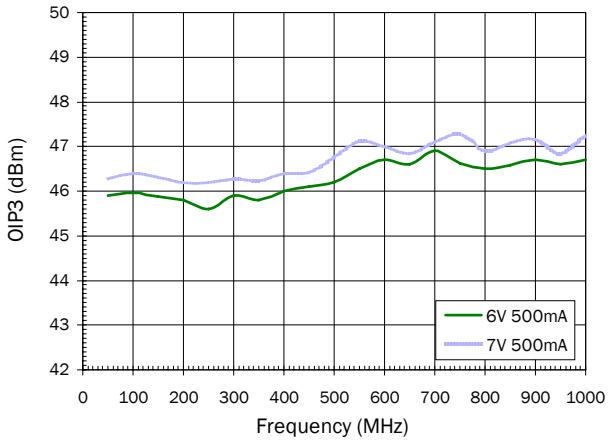


Typical Unit S-Parameters versus Temperature

I versus Gate Bias at V_{CC}=5.0V, 25°C Typical



OIP3, 1MHz Spacing versus Voltage
+25C



Pin	Function	Description
1, 3	RF IN	RF input pin. This pin requires the use of an external DC blocking capacitor chosen for the frequency of operation.
2, 5	GND	Connection to ground. Use via holes for best performance to reduce lead inductance as close to ground leads as possible.
4, 6	RF OUT/BIAS	RF output and bias pin. DC voltage is present on this pin, therefore a DC blocking capacitor is necessary for proper operation.

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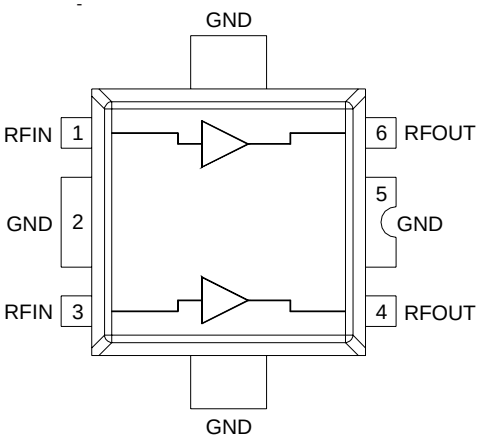
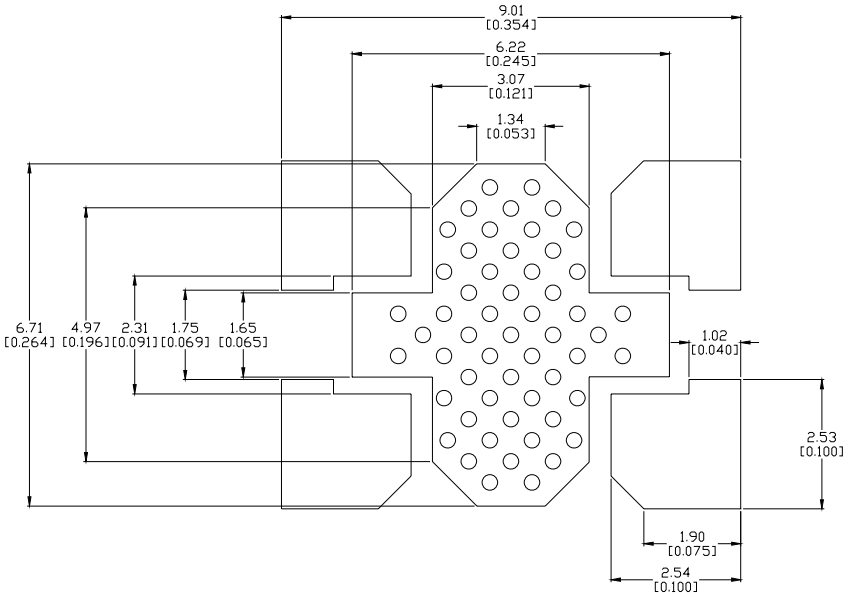
Simplified Device Schematic

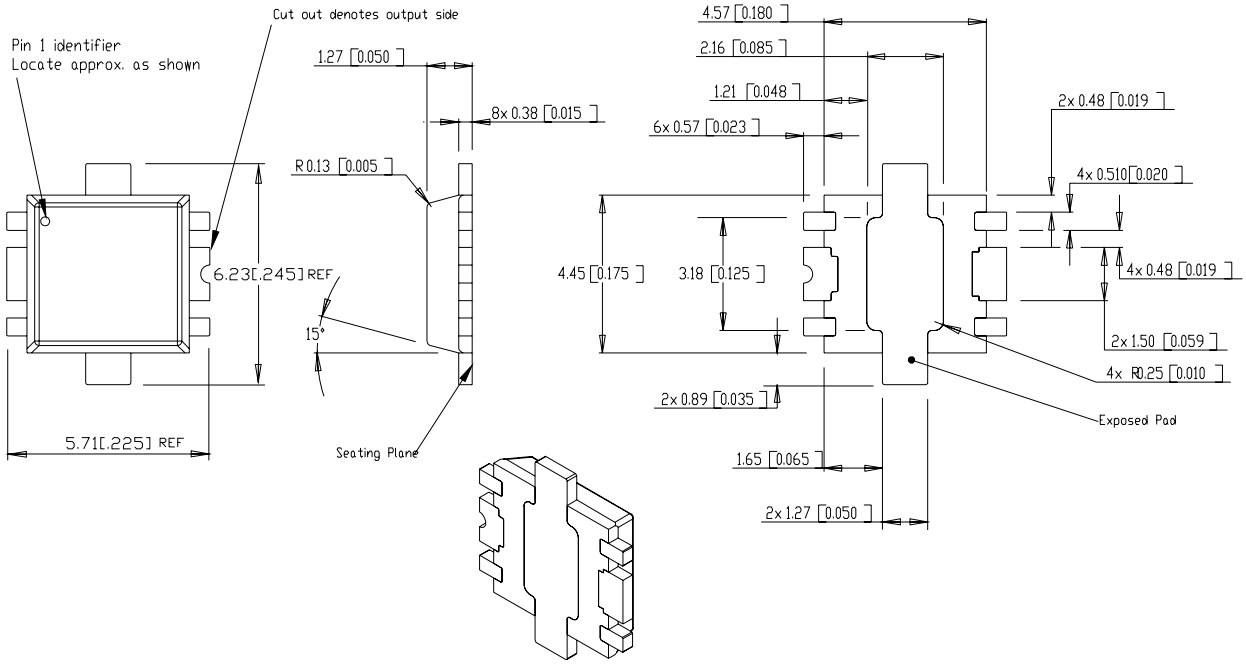


Suggested PCB Pad Layout

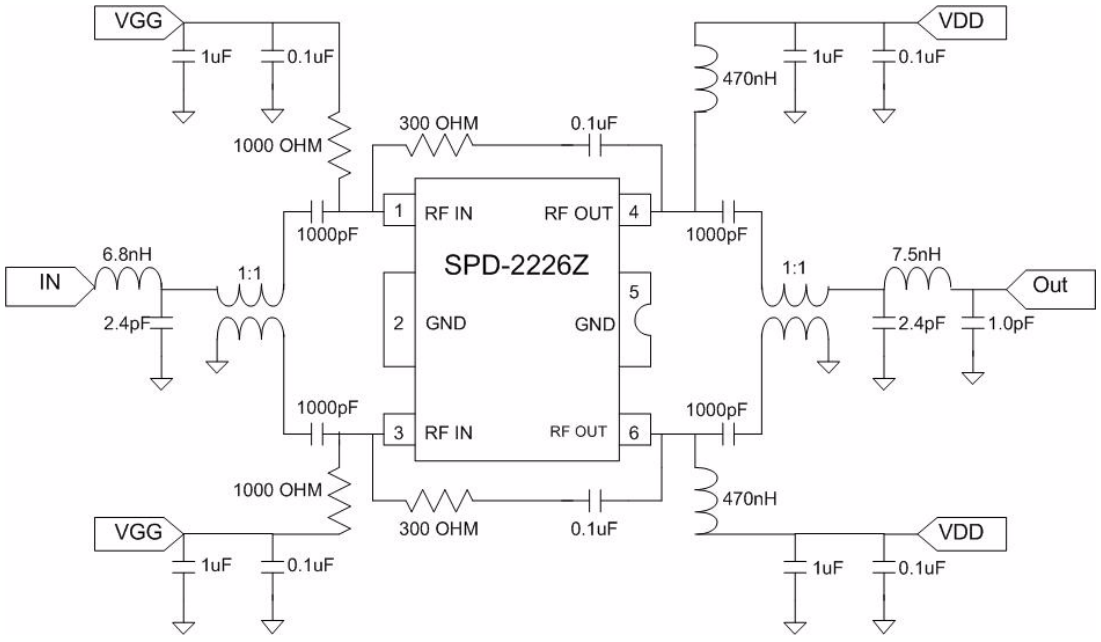


Package Drawing

Dimensions in inches (millimeters)
Refer to drawing posted at www.rfmd.com for tolerances.



Application Schematic



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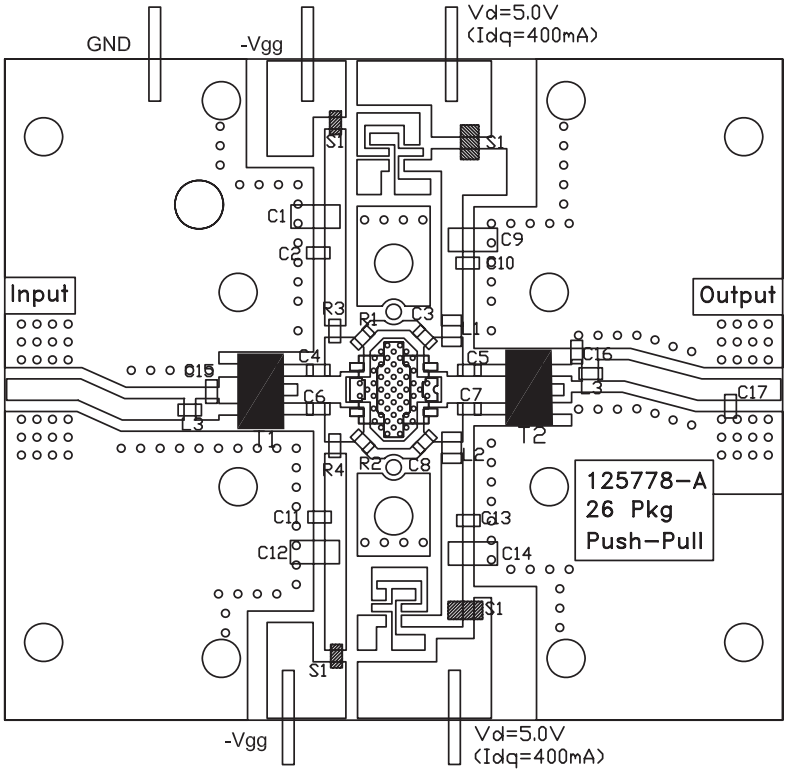
Evaluation Board Layout



Application Circuit Element Values

Reference Designator	Frequency 40MHz to 1000MHz
S_1	Short
R1, R2	300Ω
R3, R4	1000Ω
L_1, L_2	470nH, 0805
C1, C9, C12, C14	1uF16V Cap
C4, C5, C6, C7	1000pF, 0603
C2, C3, C8, C10, C11, C13	0.1uF, 0603
T1, T2	Transformer ETC1-1-13
C15, C16	2.4pF, 0603
C17	1.0pF, 0603
L3	6.8nH, 0603
L4	7.5nH, 0603

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