



Mini-Circuits

VNA CALIBRATION

N-type Calibration Kit **KSOLT-63-N+**



FEATURES

- Precision N-type calibration kit up to 6 GHz
- Works out of the box with Mini-Circuits' [eVNA-63+](#)
- Full set of Short / Open / Load standards (m and f)
- Full set of phase-equal Thru standards (f to f, f to m, m to m)
- Torque wrench included
- Wooden storage case



PRODUCT OVERVIEW

Mini-Circuits' KSOLT-63-N+ is a complete calibration kit intended for VNA measurements of any N-type DUT (device under test). The kit is supplied in a wooden storage and display case, containing a full set of SOL standards (Short, Open & Load, each with male and female options), full set of phase-equal Thru standards (female to female, female to male, male to male) and break-over torque wrench.

KSOLT kits are supported by Mini-Circuits [eVNA-63+](#) vector network analyzer right out of the box, with all calibration definitions pre-loaded within the eVNA Studio software. The kit can also be used as a cost-effective, high performance alternative to calibration kits from a wide range of other VNA suppliers.

KEY FEATURES

Feature	Advantages
Cost effective kit	Complete kit containing all required standards and torque wrench for performing reliable and repeatable VNA calibrations
Excellent return loss, 42 dB typ	Precision calibration standards with high return loss minimize the measurement errors within a VNA system
Phase-equal / swap-equal Thru standards	Thru standards with different N-type gender combinations but identical phase length can be swapped into the test setup in place of each other without affecting the integrity of the calibration, providing flexibility for measurements of non-insertable DUT.

REV. OR
ECO-011699
KSOL-63-N+
220201



**KIT CONTENTS**

Quantity	Model Name	Description
1	SOL-63-NF+	Short / Open / Load (N female)
1	SOL-63-NM+	Short / Open / Load (N male)
1	MTH-63-NFNF+	Phase Matched Thru (N female to female)
1	MTH-63-NFNM+	Phase Matched Thru (N female to male)
1	MTH-63-NMNM+	Phase Matched Thru (N male to male)
1	TRQ-N20-8	N-type break-over torque wrench

**ELECTRICAL SPECIFICATIONS AT 25°C**

Standard	Parameter	Min	Typ	Max	Units
	Frequency Range	DC		6	GHz
	Impedance		50		Ω
SHORT	Phase Error ¹		1.5	3.0	°
OPEN	Phase Error ¹		1.5	3.5	°
LOAD	Return Loss	36	42		dB
THRU	Insertion Loss		0.05	0.2	dB
	Return Loss	30	42		dB
	Phase Error ¹		0.15	0.45	°/GHz

1. Phase error is the phase deviation from the calkit model definition

MAXIMUM RATINGS²

Parameter	Ratings
Operating Temperature ³	20°C to 26°C
Storage Temperature	-20°C to 75°C

2. Permanent damage may occur if any of these limits are exceeded.

3. Operating temperature specified for optimal performance



CALKIT MODEL DEFINITION

P/N	Standard Label	Parameter	Value	Units	Additional Format
SOL-63-NF+	SHORT -F-	Offset Delay	42.7	ps	12.81 mm
		Offset Loss	1	GΩ/s	0.029 dB/√GHz
		Z0	50	Ω	50 Ω
		L0	0.000	(1E-12) H	0 pH
		L1	0.000	(1E-24) H/Hz	0 pH/GHz
		L2	0.000	(1E-33) H/Hz ²	0 pH/GHz ²
	OPEN -F-	L3	0.000	(1E-42) H/Hz ³	0 pH/GHz ³
		Offset Delay	42.7	ps	12.81 mm
		Offset Loss	1	GΩ/s	0.009 dB/√GHz
		Z0	50	Ω	50 Ω
		C0	-4.000	(1e-15) F	-4 fF
		C1	600.000	(1e-27) F/Hz	0.6 fF/GHz
	LOAD	C2	-10.000	(1e-36) F/Hz ²	0.01 fF/GHz ²
		C3	0.450	(1e-45) F/Hz ³	0.00045 fF/GHz ³
		Offset Delay	0	ps	0 mm
		Offset Loss	0	GΩ/s	0 dB/√GHz
		Z0	50	Ω	50 Ω
SOL-63-NM+	SHORT -M-	Offset Delay	59.44	ps	17.83 mm
		Offset Loss	1	GΩ/s	0.003 dB/√GHz
		Z0	50	Ω	50 Ω
		L0	0.000	(1E-12) H	0 pH
		L1	0.000	(1E-24) H/Hz	0 pH/GHz
		L2	0.000	(1E-33) H/Hz ²	0 pH/GHz ²
	OPEN -M-	L3	0.000	(1E-42) H/Hz ³	0 pH/GHz ³
		Offset Delay	59.44	ps	17.83 mm
		Offset Loss	1	GΩ/s	0.003 dB/√GHz
		Z0	50	Ω	50 Ω
		C0	-4.000	(1E-15) F	-4 fF
		C1	200.000	(1E-27) F/Hz	0.2 fF/GHz
	LOAD	C2	0.000	(1E-36) F/Hz ²	0 fF/GHz ²
		C3	1.100	(1E-45) F/Hz ³	0.0011 fF/GHz ³
		Offset Delay	0	ps	0 mm
		Offset Loss	0	GΩ/s	0 dB/√GHz
		Z0	50	Ω	50 Ω
MTH-63-N*N*+	THRU	Offset Delay	145.77	ps	43.7 mm
		Offset Loss	1	GΩ/s	0.013 dB/√GHz
		Z0	50	Ω	50 Ω

- NOTES**
- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
 - Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
 - The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard. Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/MCLStore/terms.jsp

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	20° to 26° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-20° to 75° C Ambient Environment	Individual Model Data Sheet