

SPDT RF SWITCH

50Ω DC-3000 MHz

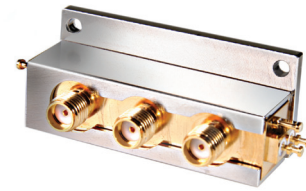
Absorptive RF Switch with internal driver.
Single Supply Voltage

Product Features

- Low Insertion loss over entire frequency range
- Super High Isolation over entire frequency range
- High Input IP3, +55 dBm typ.
- Single positive supply voltage, +2.7V to +5V
- Unique design-simultaneous switch off of RF1&RF2
- Rigid unibody case

Typical Applications

- Lab
- Instrumentation
- Test equipment



ZX80-DR230+

CASE STYLE: HL1162

| Connectors | Order P/N | Price | Qty. |
|------------|---------------|-------------|-------|
| SMA | ZX80-DR230-S+ | \$59.95 ea. | (1-9) |

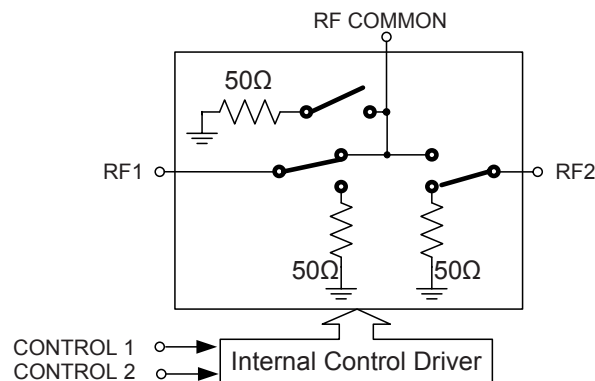
+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

General Description

The ZX80-DR230+ is a 50Ω high isolation SPDT RF switch designed for wireless applications, covering a broad frequency range from DC up to 3GHz with low insertion loss. The ZX80-DR230+ operates on a single supply voltage from +2.7V to +5V. This unit includes an internal CMOS control driver with two-pins control. The ZX80-DR230+ is produced using a unique case package for ruggedness and operation in tough environments.

Functional Diagram



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ISO 9001 ISO 14001 AS 9100 CERTIFIED

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For detailed performance specs
& shopping online see web site

Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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.

Rev. A
M139856
EDR-7744
ZX80-DR230+
121219
Page 1 of 7

| Parameter | Condition | Min. | Typ. | Max. | Units |
|---|------------------|------------------------|------|------|-------|
| Operating Frequency | | DC ^(note 3) | | 3000 | MHz |
| Insertion Loss | 1 GHz | | 0.7 | 1.3 | dB |
| | 2 GHz | | 0.9 | 1.6 | |
| | 3 GHz | | 1.2 | 1.8 | |
| Isolation between Common port and RF1/RF2 ports | 1 GHz | 55 | 64 | | dB |
| | 2 GHz | 46 | 50 | | |
| | 3 GHz | 35 | 44 | | |
| Isolation between RF1 and RF2 ports | 1 GHz | 60 | 63 | | dB |
| | 2 GHz | 54 | 60 | | |
| | 3 GHz | 37 | 48 | | |
| Return Loss @ Common port | 1 GHz | | 20 | | dB |
| | 2 GHz | | 17 | | |
| | 3 GHz | | 15 | | |
| Return Loss @ RF1/RF2 ports | 1 GHz | | 17 | | dB |
| | 2 GHz | | 15 | | |
| | 3 GHz | | 15 | | |
| Input IP ₂ (note 1) | 5 MHz - 1000 MHz | | +80 | | dBm |
| Input IP ₃ (note 1) | 10 MHz - 3000MHz | | +55 | | dBm |
| Input 1dB Compression ^(note 1,2) | 1000 MHz | +28 | +31 | | dBm |

Notes:

1. Device linearity degrades below 1 MHz.
2. Note absolute maximum ratings for input power.
3. Lowest Freq. determined by value of coupling capacitors at RF ports.

DC Electrical Specifications

| Parameter | Min. | Typ. | Max. | Units |
|---------------------------------------|------|------|-----------------|-------|
| V _{DD} , Supply Voltage | 2.7 | - | 5.0 | V |
| Supply Current (V _{DD} = 5V) | — | 0.5 | 1.0 | mA |
| Control Voltage Low | 0 | — | 0.4 | V |
| Control Voltage High | 2.4 | — | V _{DD} | V |
| Control Current (per pin) | — | 0.5 | 1.0 | mA |

Switching Specifications

| Parameter | Min. | Typ. | Max. | Units |
|---|------|------|------|-------------------|
| Switching Time, 50% CTRL to 90/10% RF | — | 2.0 | — | μSec |
| Video Feedthrough, 5 MHz - 1000 MHz ^(note 4) | — | — | 15 | mV _{p-p} |

Note 4: Measured with a 1 nSec risetime, 0/3V pulse and 500 MHz bandwidth.

Absolute Maximum Ratings

| Parameter | Ratings |
|---|--------------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| V _{DD} , Supply Voltage | -0.3V Min. 6V Max. |
| Control Voltage | -0.3V Min. 6V Max. |
| ESD, HBM | 1000V |
| RF input power: (note 5) | |
| When the common port is connected to the RF port (RF1 or RF2) | +33dBm |
| When the RF port (RF1 or RF2) is not connected to the common port | +24dBm |
| When the common port is not connected to either RF1 or RF2 | +24dBm |

Note 5: See Truth Table on page 3.

The RF switch control bits select the desired switch-state, as shown in **Table 1**: Truth Table.

Table 1: Truth Table.

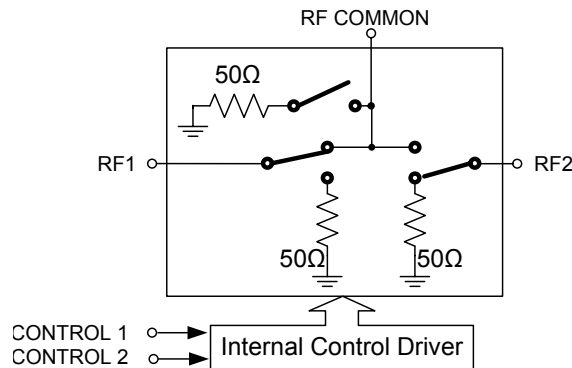
| STATE | Control Input | | RF Input / Output | |
|-------|---------------|-----------|-------------------|------------------|
| | Control 1 | Control 2 | RF1 to RF COMMON | RF2 to RF COMMON |
| 1 | Low | Low | OFF | OFF |
| 2 | Low | High | OFF | ON |
| 3 | High | Low | ON | OFF |
| 4 | High | High | N/A | N/A |

General notes:

1. When either of the RF1 or RF2 ports is closed (**ON** state), the closed port is connected to the RF Common port.
2. When either of the RF1 or RF2 ports is open (**OFF** state), the open port is connected to an internal 50Ω termination.
3. When both RF1 and RF2 ports are open (**OFF** state), the all three RF ports are connected to an internal 50Ω termination.

EXAMPLE OF STATE 3

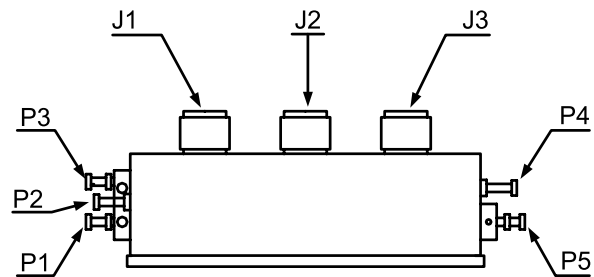
Functional Diagram



Pin Description

| Function | Connection Number | Description |
|-----------|-------------------|--------------------|
| RF2 | J1 | RF I/O (note 1) |
| RF COM | J2 | RF Common (note 1) |
| RF1 | J3 | RF I/O (note 1) |
| Control 1 | P1 | Control 1 |
| GND | P2 | Ground |
| Control 2 | P3 | Control 2 |
| GND | P4 | Ground |
| VDD | P5 | Supply voltage |

Pin Configuration



Note 1: RF ports J1, J2 and J3 must be at 0 VDC. The RF ports do not require DC blocking capacitors for proper operation if the 0 VDC requirement is met.



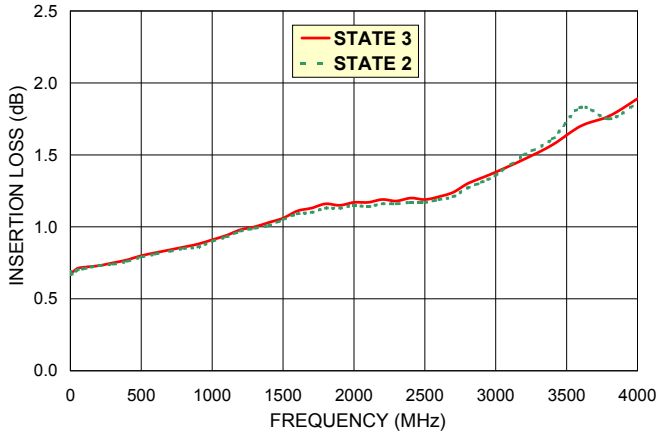
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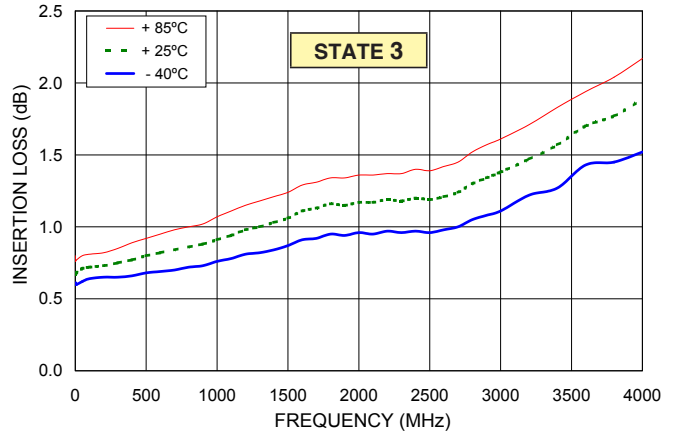
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Typical Performance Curves over various states. For switch state see Truth Table 1 on page 3.

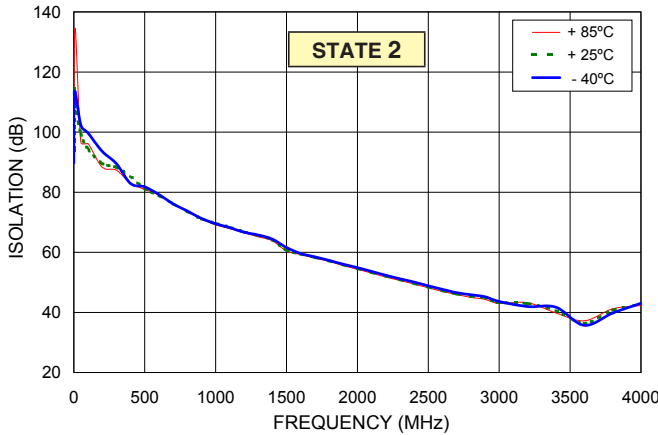
INSERTION LOSS Vs. FREQUENCY @ +25°C



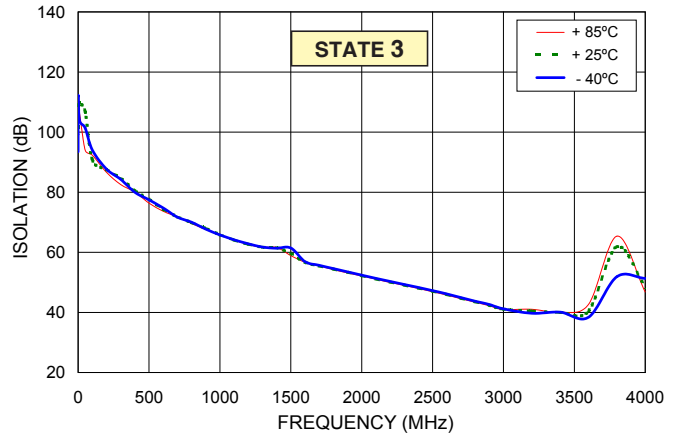
INSERTION LOSS Vs. FREQUENCY



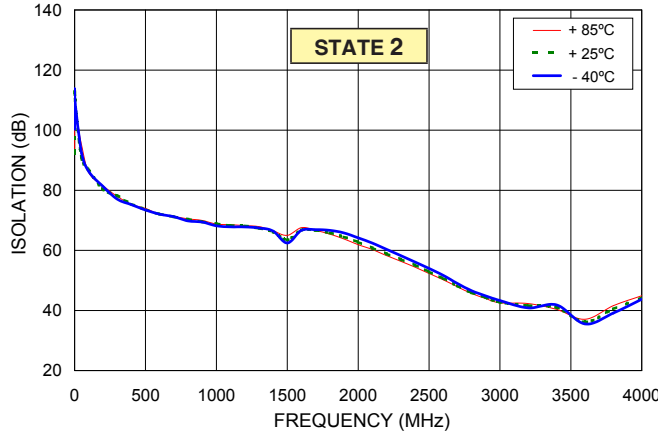
ISOLATION BETWEEN RF1 TO RF COM Vs. FREQUENCY



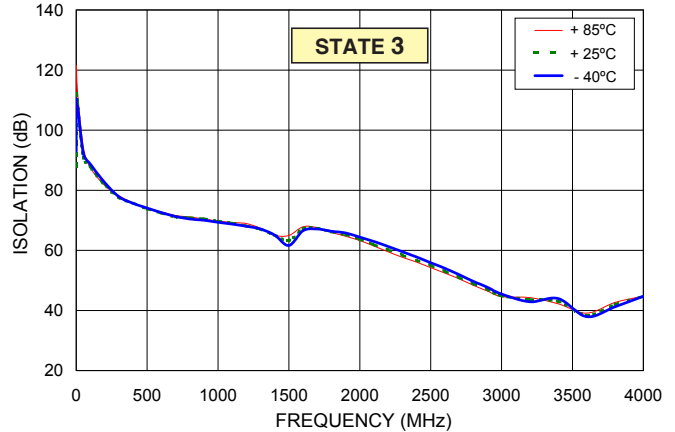
ISOLATION BETWEEN RF2 TO RF COM Vs. FREQUENCY



ISOLATION BETWEEN RF1 TO RF2 Vs. FREQUENCY

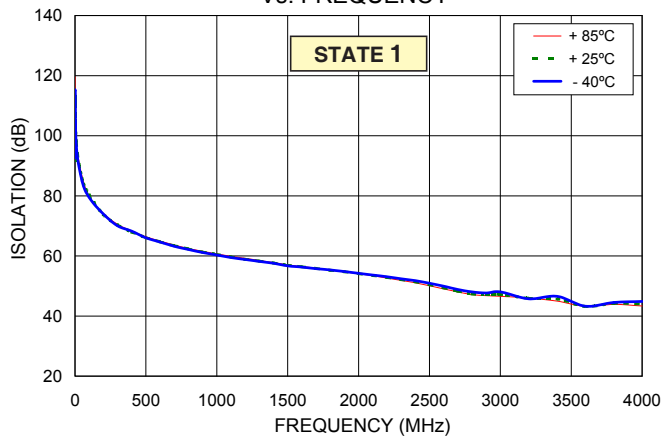


ISOLATION BETWEEN RF1 TO RF2 Vs. FREQUENCY

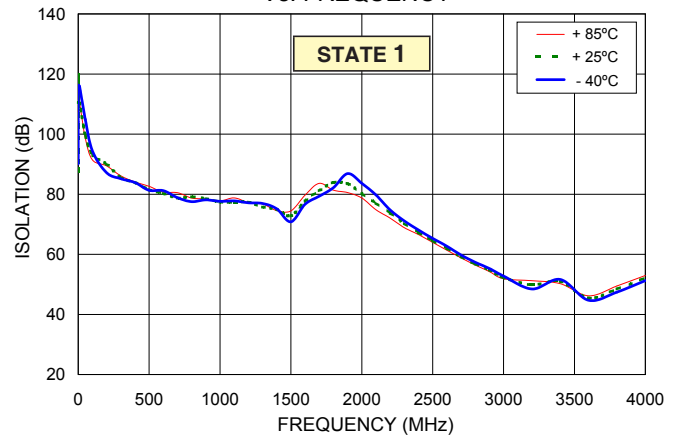


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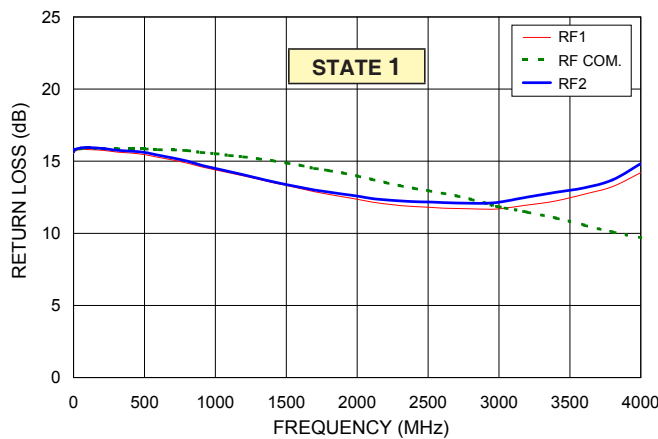
ISOLATION BETWEEN RF1/RF2 TO RF COM
Vs. FREQUENCY



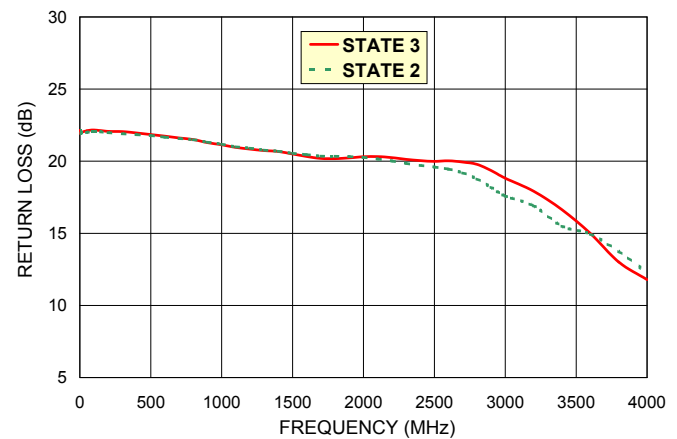
ISOLATION BETWEEN RF1 TO RF2
Vs. FREQUENCY



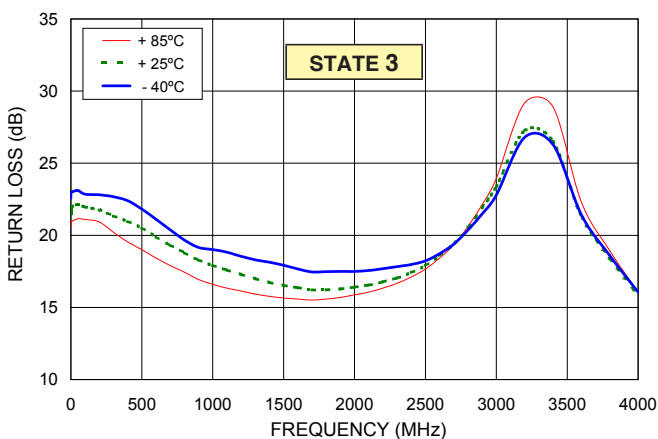
RF RETURN LOSS Vs. FREQUENCY @ +25°C



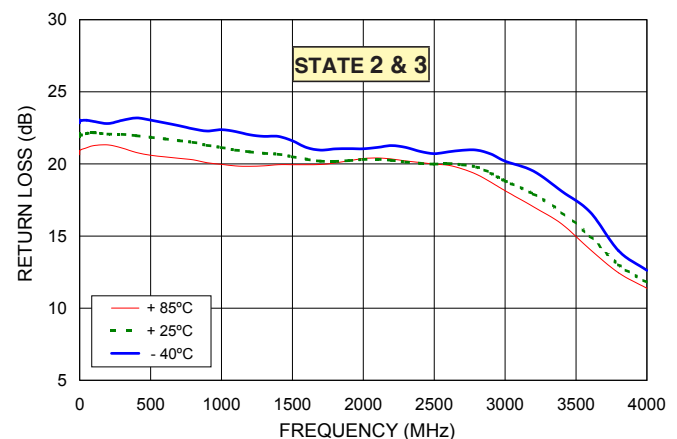
RF COM RETURN LOSS Vs. FREQUENCY @ +25°C



RF1 RETURN LOSS Vs. FREQUENCY



RF COM RETURN LOSS Vs. FREQUENCY



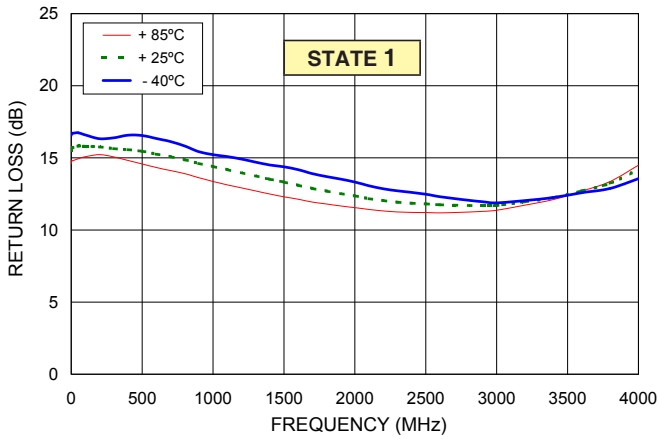
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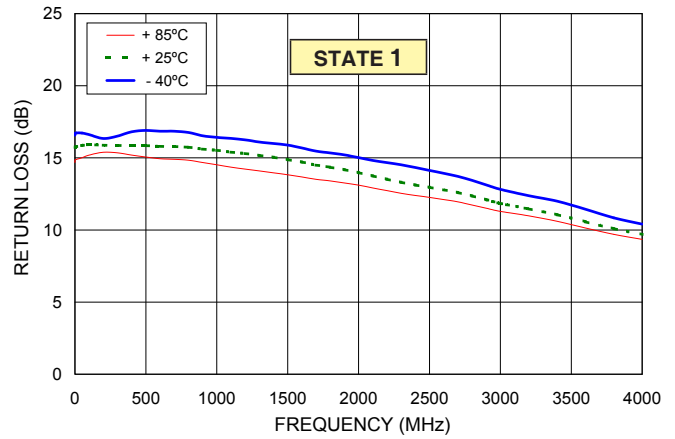
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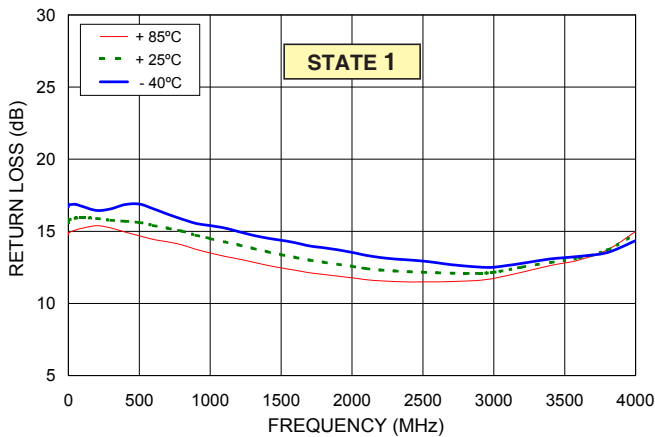
RF1 RETURN LOSS Vs. FREQUENCY



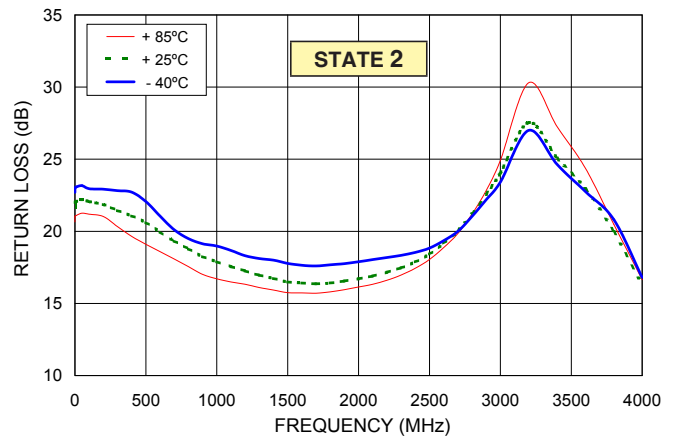
RF COM RETURN LOSS Vs. FREQUENCY



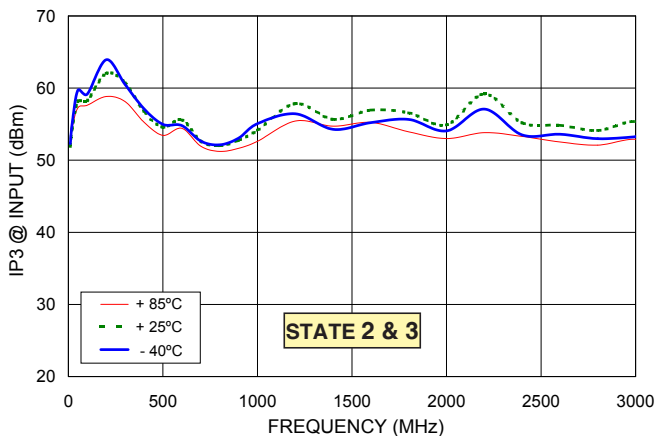
RF2 RETURN LOSS Vs. FREQUENCY



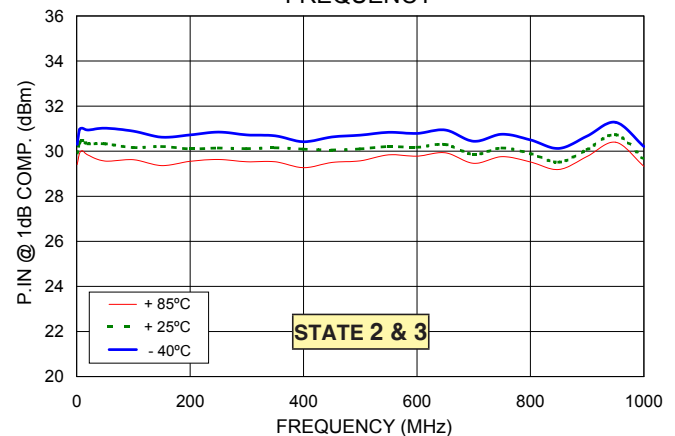
RF2 RETURN LOSS Vs. FREQUENCY



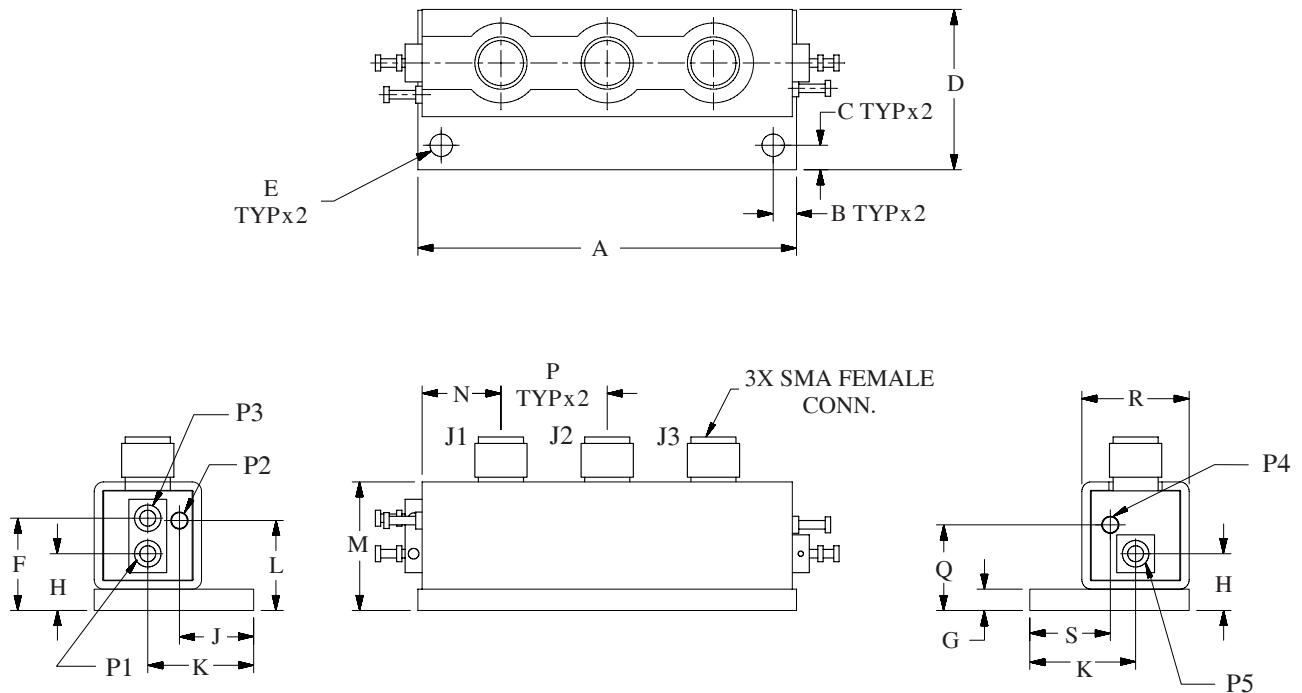
INPUT IP3 Vs. FREQUENCY



POWER IN @ 1dB COMPRESSION Vs. FREQUENCY



Outline Drawing (HL1162)



Outline Dimensions (inch / mm)

| A | B | C | D | E | F | G | H | J | K | L | M | N | P | Q | R | S | WT. GRAMS |
|-------|------|------|-------|------|-------|------|------|------|-------|-------|-------|------|-------|-------|-------|------|-----------|
| 1.780 | .110 | .115 | .750 | .106 | .430 | .100 | .270 | .350 | .500 | .420 | .610 | .370 | .500 | .400 | .500 | .380 | 56.0 |
| 45.21 | 2.79 | 2.92 | 19.05 | 2.69 | 10.92 | 2.54 | 6.86 | 8.89 | 12.70 | 10.67 | 15.49 | 9.39 | 12.70 | 10.16 | 12.70 | 9.65 | |