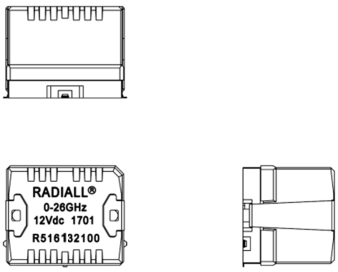
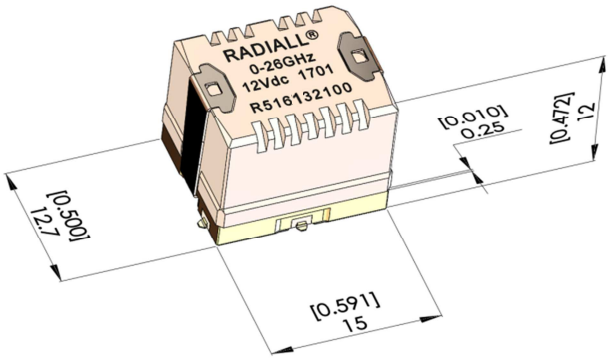
R516 series: the RAMSES concept merges with the SLIM LINE technology, breaking up the frequency limits of SMT switches :

- **FULL SMT TECHNOLOGY COMPATIBLE**
- High frequency
- High life span
- High repeatability
- High power applications

(All dimensions are in mm [inches])



ACTUAL SIZE



TYPICAL OUTLINE DRAWING

PART NUMBER SELECTION

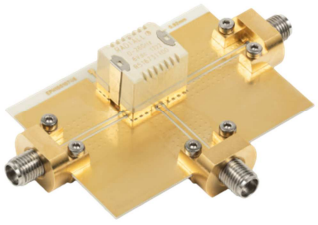
R 516 _ _ _ 1 0 _

Frequency range :
3 : DC – 8GHz
4 : DC – 18GHz
7 : DC – 26.5GHz

TYPE :
1 : Failsafe
9 : Failsafe, inverted RF path (1)

ACTUATOR VOLTAGE (3) :
2 : 12Vdc
3 : 24Vdc

Actuator terminals :
0 : Not soldered
T : Soldered on a connectorized test fixture (2)



(1): Can be combined with a failsafe model, so as to achieve the “BYPASS” function (see application details on page 5)
(2): See details about test fixture dimensions on page 3
(3): 6V version available upon request

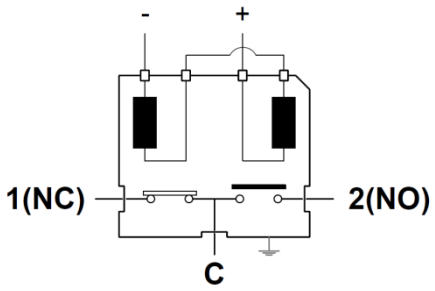
GENERAL SPECIFICATION

Operating mode		**Failsafe (Type 1 & 9)**		
Nominal operating voltage (Vdc) (1) (across operating temperature range)		**6 (1)** (5.3 to 6.6)	**12** (10.5 to 13)	**24** (21.5 to 30)
Coil resistance (+/-10%) (Ohms)		49	195	710
Operating current at 23°C (mA)		123	61	34
RF and command ports		gold plated access, infrared reflow, forced air oven or hand soldering (Compatible with "lead free" soldering processes)		
Switching time (Nomial voltage)	**Making contacts**	Max 5ms, including contact bounce time		
	Breaking contacts	3ms		
Life	**Cold switching (Max 120 cycles/min)**	2 million cycles		
	Hot switching (Max 20 cycles/min)	500.000 cycles (1W, impedance 50Ω , V.S.W.R. <1.25)		
Insulation		Dielectric test voltage	300Vrms	
		Insulation resistance at 500Vdc	> 100MOhms	
Environmental protection		"LEAD FREE » construction" Waterproofness according to IEC 60529 / IP64		
Mass		7.5g		
Operating temperature range (°C) (With no icing nor condensation)		-40 to +70 (2)		
Storage temperature range (°C)		-55 to +85		
Shocks (According to MIL STD 202, method 213B, Cond C)		100g / 6ms, ½ sine No change of state		
Sine vibration (MIL STD 202, method 204)		Condition D : 10-2000Hz, 20g Operating Condition G : 10-2000Hz, 30g Non operating		

(1) : 6V version available upon request

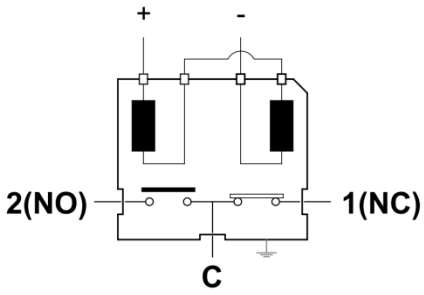
(2) : If coil remains permanently supplied under 0°C, internal condensation may occur and generate contact failures. For such applications down to -25°C or -40°C, a specific failsafe part number must be ordered. Please contact us.

PIN IDENTIFICATION (TOP VIEW)



Failsafe model (Type 1)

Voltage	RF Continuity
De-energized	C ↔ 1 (NC)
Energized	C ↔ 2 (NO)



Inverted Failsafe model for Bypass application (type 9)

Voltage	RF Continuity
De-energized	C ↔ 1 (NC)
Energized	C ↔ 2 (NO)

RF PERFORMANCES (1)

Frequency Range (GHz)		V.S.W.R (max)	IL (max) dB	Isolation (min) dB	Average power W hot switching	Third order Inter modulation	Impedance Ohms
DC – 8 DC – 18 DC – 26.5	DC – 3	1.20	0.20	50	40	-110 dBc Typical @ 1730 MHz (2 carriers 20W)	50
	3 – 6	1.35	0.40	40	25		
	6 – 8	1.40	0.50	40	5		
	8 – 12.4	1.50	0.60	40	3		
	12.4 – 18	1.70	1.00	40	1		
	18 – 26.5	2.00	1.60	40	1		

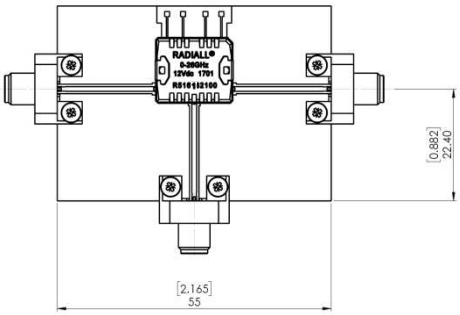
(1) : at high frequency, manual soldering may generate spikes and RF characteristics degradation, due to air gaps between PC board and relay ground.

TYPICAL RF PERFORMANCE - MEASUREMENT METHOD USING ***UOSM 2.92mm CALIBRATION*** (2)

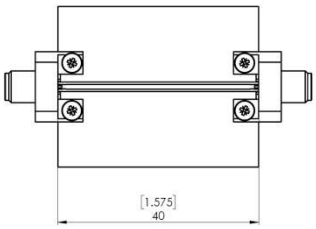
Inputs/Outputs of the calibration board and test fixture are equipped with coaxial type receptacle connectors. The length of the RF tracks is the same on the calibration board and the test fixture circuits. The insertion loss of the relay itself is calculated by subtracting the insertion loss of the "calibration board" to the insertion loss of the "relay welded on the test fixture".

(2): Relay soldered on Test Fixture is available. To order, please use the suffix "T" (part number R516 - - - - - T), as explained in page 1.

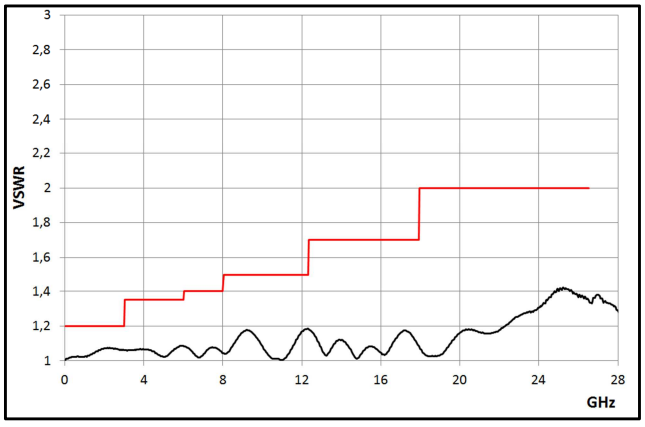
Relay soldered on test fixture (2)

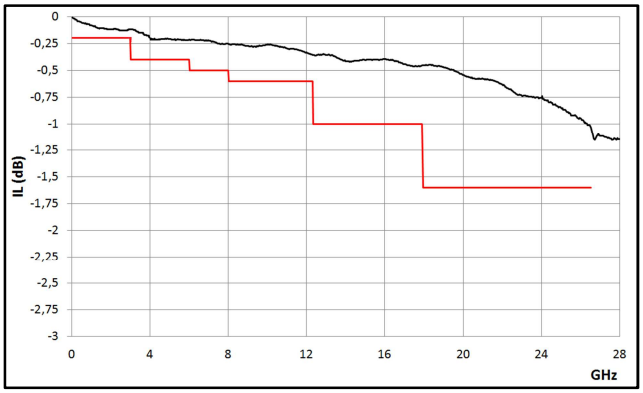


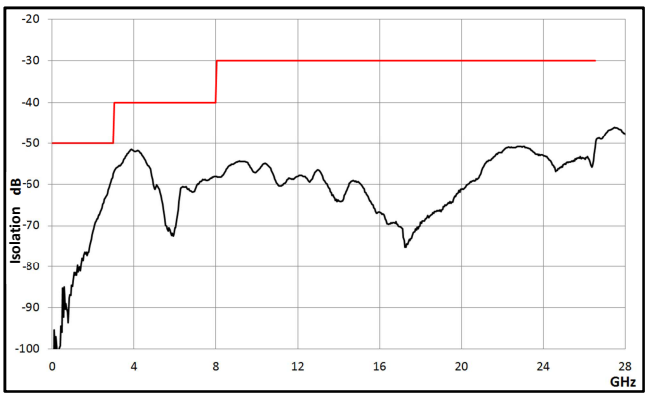
Calibration board



All dimensions are in millimeters [inches]



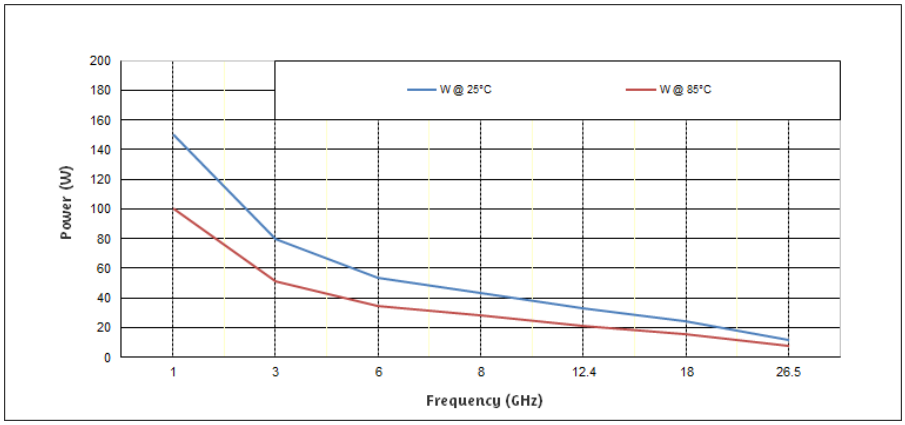




RF POWER RATING FOR COLD SWITCHING USE
(Impedance 50 Ohms, V.S.W.R. < 1.25)

Power level depends on environmental conditions :
- R516 series have been designed to be used without a cooling fan even for high power applications. However, the power capability may be still improved by using the appropriate cooling fan.

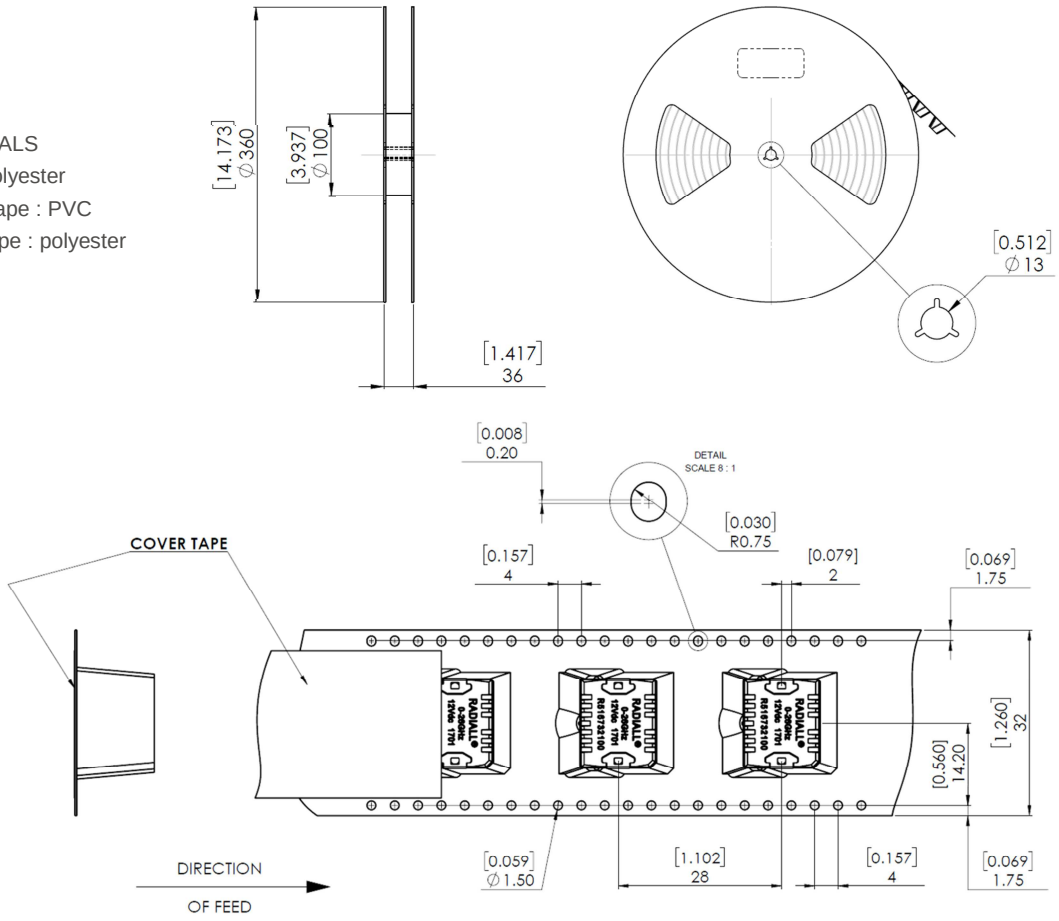
- For failsafe models used with coil permanently supplied (N/O position), the same power level as latching models may be applied.



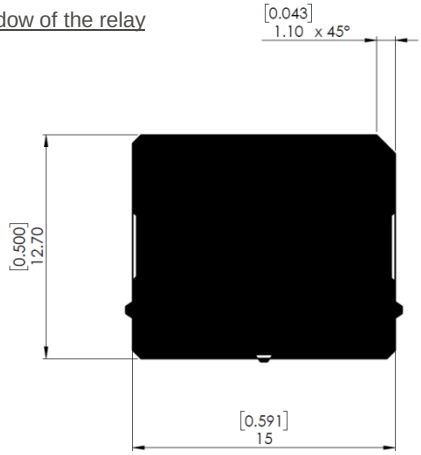
RELAY PACKAGING
According to IEC 286-3 standard

For quantities up to 50 relays: packaged in tape without reel
For upper quantities: packaged in tape and reel, maximum **200** relays per reel

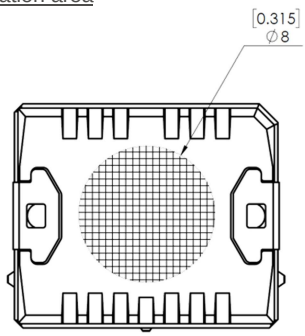
MATERIALS
Reel : polyester
Carrier tape : PVC
Cover tape : polyester



Video shadow of the relay

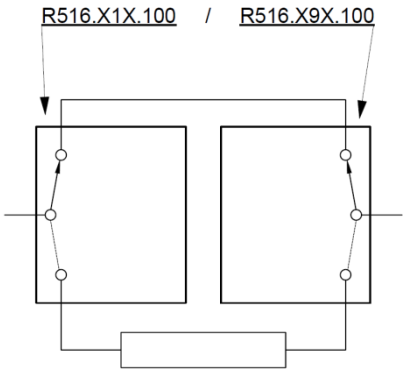


Aspiration area



All dimensions are in millimeters [inches].

BYPASS APPLICATION
Failsafe Micro-relay typical implantation



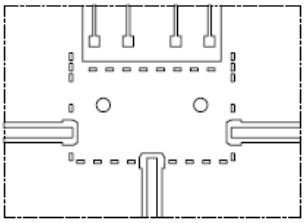
SPDT relays (Single Pole Double Throw) can be used to achieve a bypass switch function. For SMT applications, R516 series, relays are available in two failsafe versions, standard and inverted, to provide symmetric RF ports implantation possibility. The “side by side” implementation of these two versions on a PCB effectively produces the bypass function. The package size is reduced and interconnecting tracks are shortened. Required in order to protect the receiver for transmit/receive applications. RF performances of bypass switch assemblies depend on the distance between the two RF SMT relays.
DXF or GERBER format file available upon request.

PC BOARD MOUNTING

Substrate Types

Recommended substrates are ROGERS RO4003., Thickness 0.508 mm Cu double side 17.5µm. Recommended total thickness of RF tracks (copper over thickness + plating) : 40µm.

Other substrates may be used (1)

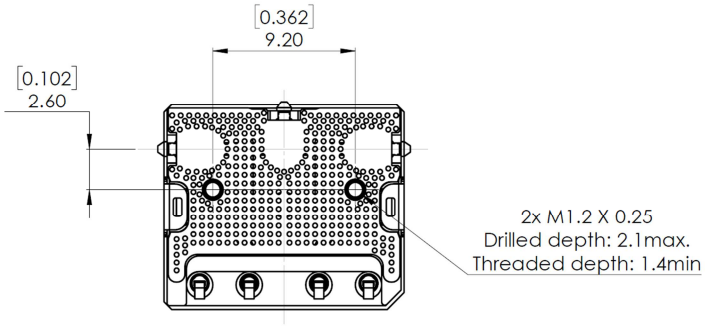


Board layout general outline

DXF or GERBER format file available upon request (1)

Relay soldering

DXF format file available upon request (1)



Optionnal fixing system : 2 screws M1.2
(see details on page 7 / B-4)

(1) : Please contact us by E-mail : switchingproducts@radiall.com

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