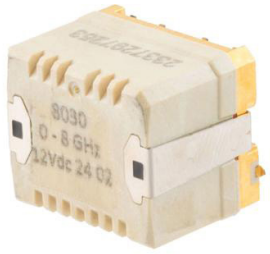
SPDT Electromechanical Relay Failsafe Switch, DC to 8 GHz, up to 70W, 12V, Hot Switching, SMT, 2M Lifecycles



PE71S8030

Features

- Single Pole Double Throw SMT Relay Switch
- DC to 8 GHz Frequency Range
- 2M Cycle Typical Operating LIfe
- 70W Average Power for Cold Switching @ 8 GHz
- Hot Switching Capability
- -25°C to +70°C
- Isolation 60 dB typ
- Insertion Loss 0.25 dB Typ
- VSWR 1.1:1 Typ
- +12Vdc @ 61 mA
- EAR99 Export Compliance
- RoHS & Reach Compliant

Applications

- High Performance Relay Switch
- Military Commuinications
- Communications Systems
- Test & Measurement

Description

The PE71S8030 is a single pole double throw electromechanical relay switch that operates from DC to 8 GHz. The design features a Failsafe actuator with 2 coils and has a long and reliable lifespan up to 2M lifecycles typical (at low level) with excellent repeatability and thermal resistance. The innovative micro-mechanical design is in a miniature true surface mount package that's ideal for space limited applications. RF and command ports have gold plated access and the package can be mounted to a PWB using infrared reflow, forced air oven, or hand soldering processes. Impressive typical performance includes 0.25 dB insertion loss, 1.1:1 VSWR, and up to 60 dB isolation. Input power handling for hot switching is rated up to 40W, and operating voltage is +12 Vdc with 61 mA operating current. Performance is guaranteed over -25°C to +70°C and the switch assembly is RoHS and REACH compliant.

Electrical Specifications (TA = +25°C, DC Voltage = 12 Vdc)

Switch Type	SPDT
Actuator Type	Failsafe
Switching Sequence	Break before Make
Actuator Options	Hot Switching

Description	Min	Typ	Max	Units
Frequency Range	DC		8	GHz
Impedance		50		
Operating Voltage	10.5	12	13	Volts
Actuating Current @ 12 Volts		61		mA
VSWR		1.1:1	1.4:1	
Insertion Loss		0.25	0.5	
Isolation	40	60		dB
Coil Resistance*		195		Ohms
Third Order Intermodulation**		-110		dBc
Input Power (CW) (Average Power for Cold Switching (Reference RF Power Rating Table for Cold Switching))		100		Watts

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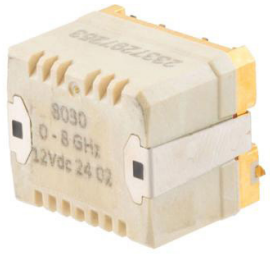

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Performance by Frequency

Description	F1	F2	F3	F4	F5	Units
Frequency Range	DC to 3	3 to 6	6 to 8			GHz
VSWR, Max	1.2:1	1.35:1	1.4:1			
Insertion Loss, Max	0.2	0.4	0.5			dB
Isolation, Min	50	40	40			dB
Input Power, Typ (Hot Switching)	40	25	5			Watts

Electrical Specification Notes:
Temperature: +23°C
*Coil Resistance: +/-10%
**Third Order Intermodulation @ 1730 MHz (2 carries 20W)
CAUTION:At high frequency, manual soldering may generate spikes and RF characteristics degradation, due to air gaps between PC board and relay grounds

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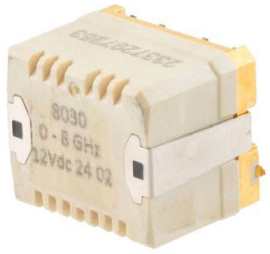

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Operating mode		**Failsafe**	
Nominal operating voltage (Vdc) (across operating temperature range)		**12** (10.5 to 13)	
Coil resistance (+/-10%) (Ohms)		195	
Operating current at 23°C (mA)		61	
RF and command ports		gold plated access, infrared reflow, forced air oven or hand soldering (Compatible with "lead free" soldering processes)	
Switching time (Nominal voltage)	**Making contacts**	Max 5ms, including contact bounce time	
	Breaking contacts	3ms	
Life	**Cold switching (Max 120 cycles/min)**	1 million cycles (2 million cycles typical at low level)	
	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		RoHS compliant with the directive 2011/65 & its amendment 2015/863 Waterproofness according to IEC 60529 / IP64	
Mass		7.5g max.	
Operating temperature range (°C) (With no icing nor condensation)		-25 to +70 (1)	
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) : If coil remains permanently supplied under -25°C, internal condensation may occur and generate contact failures. For such special applications from -25°C to -40°C, please contact us.

Mechanical Specifications

Size

Length	0.591 in [15.01 mm]
Width/Diameter	0.5 in [12.7 mm]
Height	0.472 in [11.99 mm]
Weight	0.02 lbs [9.07 g]
Package Type	Surface Mount
Operating Life	2,000,000 Cycles

Connectors

RF Connector Type	SMT

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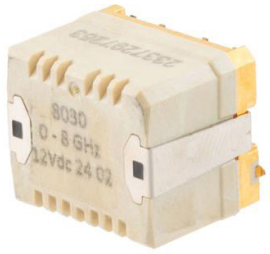


PE71S8030

Environmental Specifications

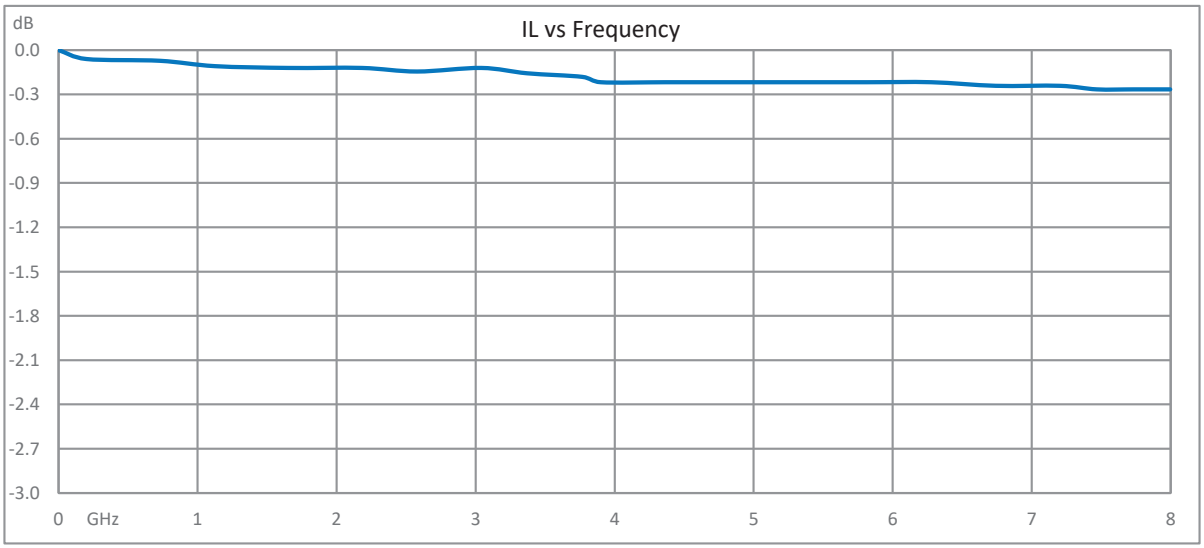
Temperature	
Operating Range	-25 to +70 deg C
Storage Range	-55 to +85 deg C
Construction	Waterproof IAW IEC60529 / IP64
Shock	MIL STD 202, method 213B, Cond C, 100g / 6ms, ½ sine No change of state
Sine Vibration	Condition D : 10-2000Hz, 20g Operating, Condition G : 10-2000Hz, 30g Non-operating

Compliance Certifications (see product page for current document)

Plotted and Other Data

Notes:

Typical Performance Data



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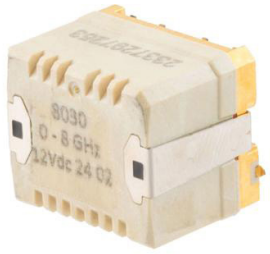

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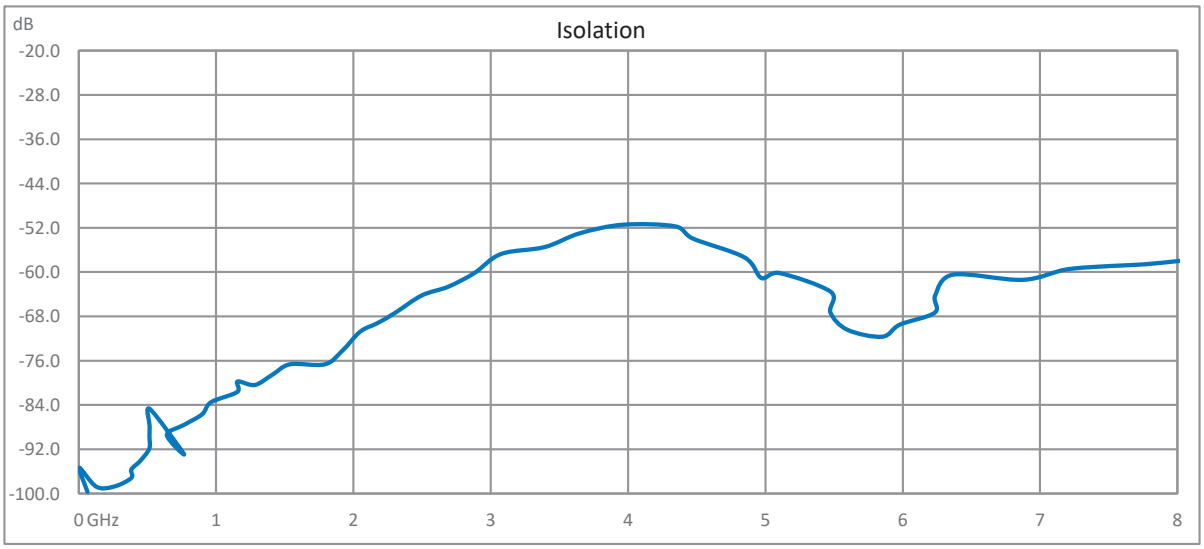

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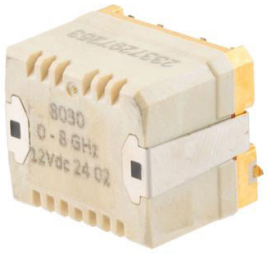

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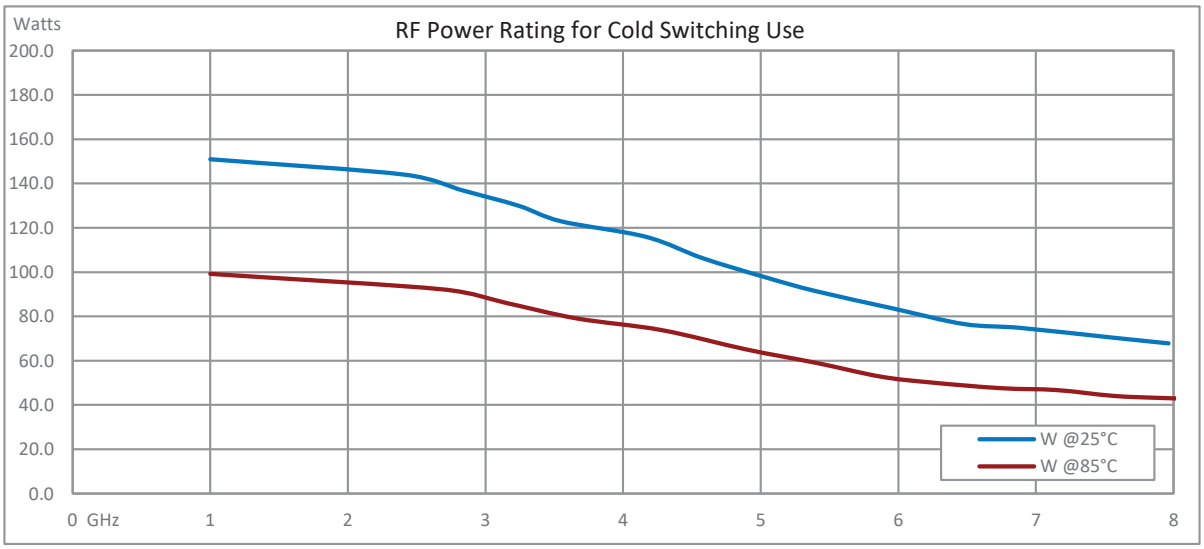

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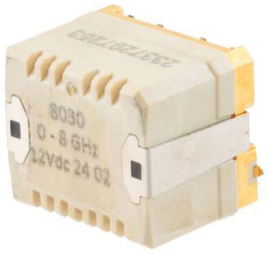
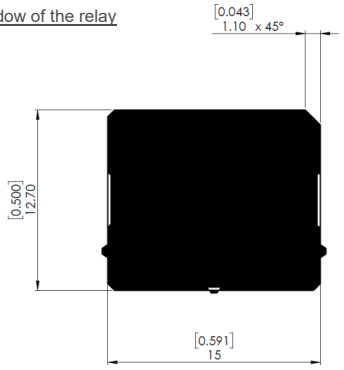
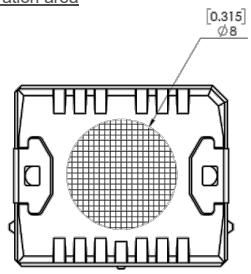


PE71S8030

Video shadow of the relay



Aspiration area



All dimensions are in millimeters [inches].

PC BOARD MOUNTING

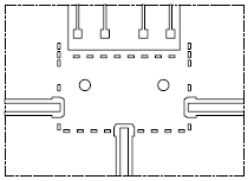
Substrate Types

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

Board layout general outline

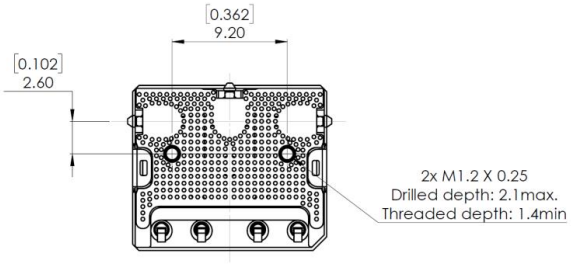
DXF or GERBER format file available upon request



Relay soldering

DXF format file available upon request

Optional fixing system : 2 screws M1.2



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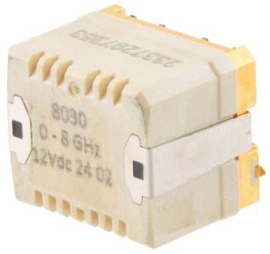

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RECOMMENDED SOLDERING PROCEDURE

A – Soldering procedure using automatic pick and place equipment

1-Solder paste :

R516 series are « Lead Free », and Lead Free Sn-Ag3.5-Cu0.7 solder cream may be used as well as standard Sn63–Pb35–Ag2. RADIALL recommends using a « no clean - low residue » solder cream (5% solid residue of flux quantity) that will permit the elimination of the cleaning operation step after soldering.
Note : Due to the gold plating of the switch PCB interface, it is important to use a paste made with silver. This will help in avoiding formation of intermetallics as part of the solder joint.

2-Solder paste deposition :

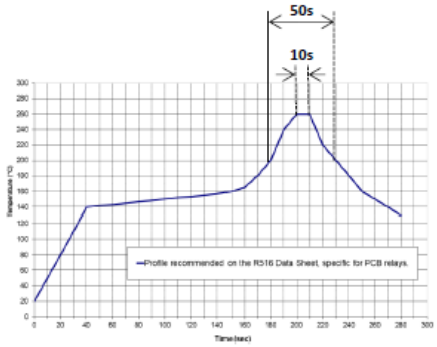
Solder cream may be applied on the board with screen printing or dispenser technologies. For either method, the solder paste must be coated to appropriate thickness and shapes to achieve good solder wetting. Please optically verify that the edges of the zone are clean and without contaminates, and that the PCB zoned areas have not oxydated. The design of the mounting pads and the stenciling area are available upon request, for a thickness of the silk-screen printing of **0.15 mm (0.006 '')**.

3-Placement of the component :

For small lightweight components such as chip components, a self-alignment effect can be expected if small placement errors exist. However, this effect is not as expected for relays components and they require a accurate positioning on their soldering pads, typically +/- 0.1mm (+/-0.004'').
Place the relay onto the PCB with automatic pick and place equipment. Various types of suction can be used.
RADIALL does not recommend using adhesive agents on the component or on the PCB.

4-Soldering : infra-red process

Please follow the RADIALL recommended max temperature profile for infra-red reflow or forced air convection :



Higher temperature (>260°C) and longer process duration would damage permanently the switches.

5-Cleaning procedure :

On miniature relays, high frequency cleaning may cause the contacts to stick. If cleaning is needed, please avoid ultrasonic cleaning and use alcohol based cleaning solutions.

In-line cleaning process, spraying, immersion, especially under temperature, may cause a risk of degradation of internal contacts. For such cleaning process please contact us.

6-Quality check :

Verify by visual inspection that the component is centred on the mounting pads.
Solder joints : verify by visual inspection that the formation of meniscus on the pads are proper.

B – Soldering procedure by manual operation

: manual soldering is not recommended for high frequencies, as it generates resonance and lower RF characteristics due to gaps between PC board and relay grounds,.

1-Solder paste and flux deposition :

Refer to chapter A – 1
Deposit a thin layer of flux on solder paste area.
Allow the flux to evaporate a few seconds before applying the solder paste, this will prevent dilution of the paste.

2-Solder paste deposition :

RADIALL recommends depositing a small amount of solder paste on solder pad area by syringe, according to the manual soldering pattern (available upon request).
Be careful, not to apply solder paste outside of the zone area.

3-Placement of the component :

During manipulation, avoid contaminating gold surfaces by contact with fingers.
Place the component on the mounting zone by pressing on the top of the relay lid.

4-Hand soldering :

Iron wattage 30 to 60 W.
To keep better RF characteristics, apply pressure on the relay lid during all the soldering stage, so as to reduce the air gap between the PC board and the relay.
If possible, fix the ground plane of the relay on the board with two M1.2 screws before the soldering stage. On each side of the central RF access, the RF body edge must be soldered to the ground of the PC board. To improve RF characteristics and avoid soldering the RF body on the ground, a conductive gasket may be used (please contact us for detailed application note).

5-Cleaning procedure :

Refer to chapter A – 5.

6-Quality check:

Verify by visual inspection that component is centred on the mounting pads.
Solder joints : verify by visual inspection that there is no solder excess on the RF pads.

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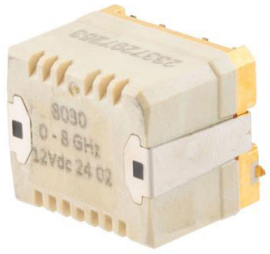

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Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: SPDT Electromechanical Relay Failsafe Switch, DC to 8 GHz, up to 70W, 12V, Hot Switching, SMT, 2M Lifecycles PE71S8030

URL: https://www.pasternack.com/spdt-electromechanical-relay-failsafe-switch-8-ghz-70w-12v-hot-switching-smt-pe71s8030-p.aspx

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PE71S8030 CAD Drawing

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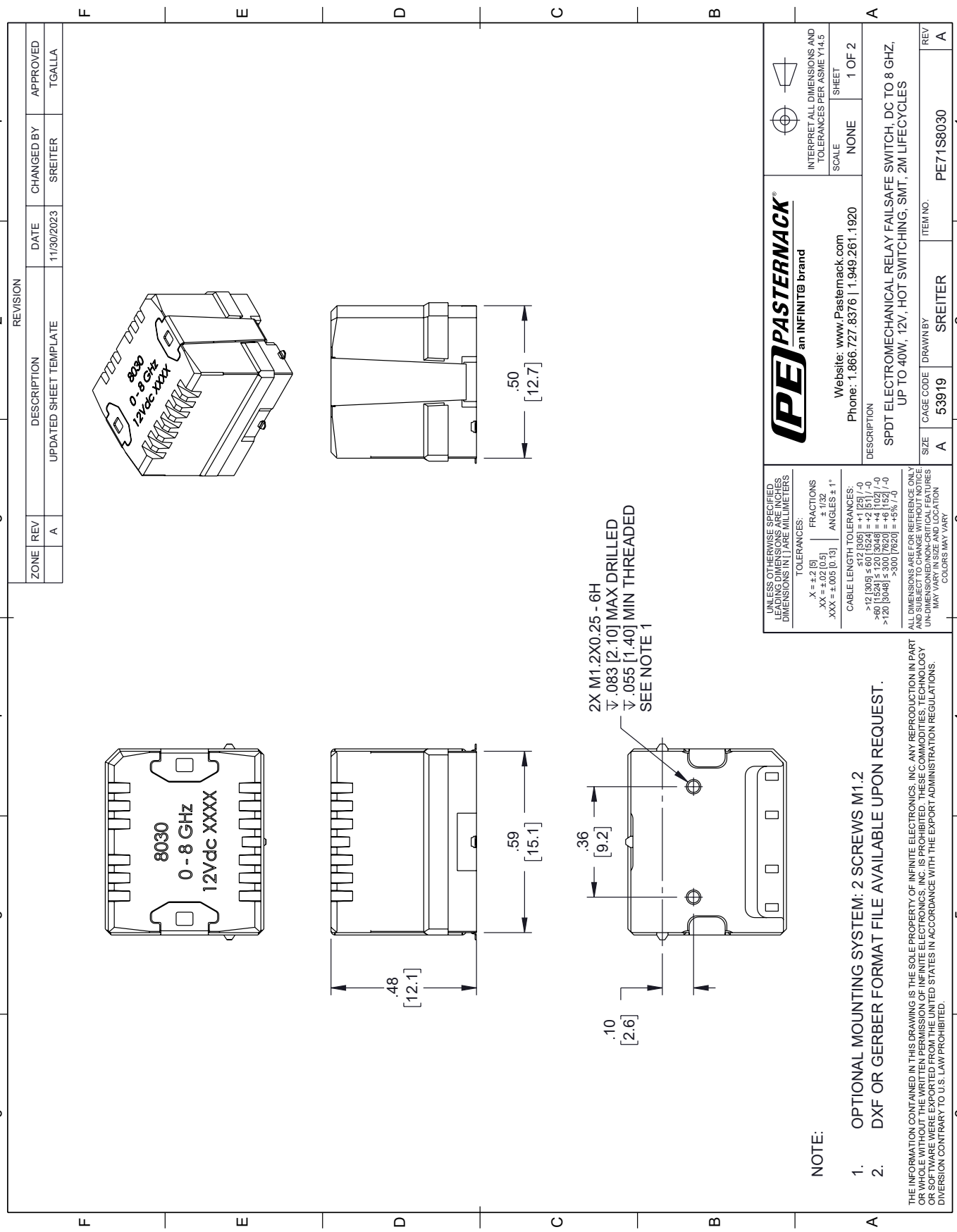

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