

Modular Surge Protective Devices (SPDs) for Data & Signal Lines



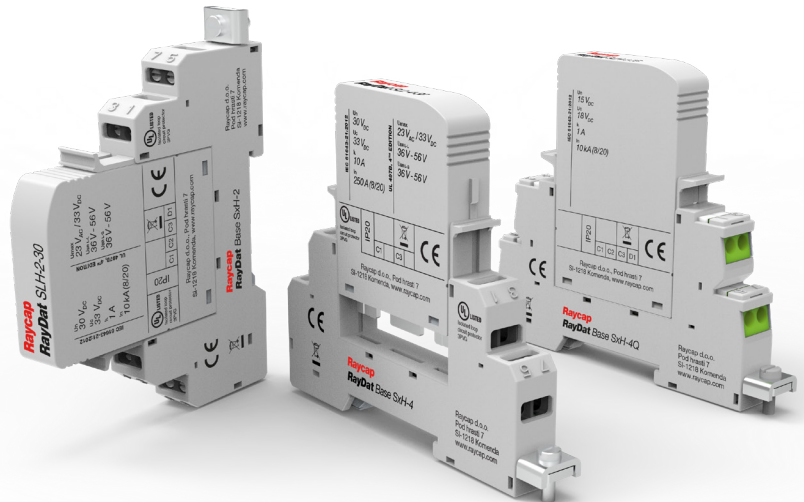
RayDat SL Series

Special features:

- Very high surge ratings
- The connection lines remain enabled during module replacement
- High density – up to 4 protected lines at only 12mm width
- Equipped with Screw or Quick connect (spring loaded) terminals

RayDat SLH-2*
RayDat SLH-4*
RayDat SSH-3*
RayDat SLL-4*
RayDat SUI-4*

*UL Listed



Symbol Legend:



DIN Rail Mounting



Screw Connect Terminals



Quick Connect Terminals



Modular design



Shield Directly Grounded



Shield Indirectly Grounded

These efficient overvoltage barriers (except RayDat SLL) contain both, coarse and fine protection stages, and provide longitudinal and a transverse surge protection, while RayDat SLL contains fine protection stage only.

The initial protection stage comprises a three-pole gas discharge tube (GDT) that is designed to divert the primary surge energy. The subsequent fine protection stage is carried out using fast bi-directional silicon avalanche diodes (SAD). Care is taken in the design of the fine protection stage to avoid capacitive line loading, thereby ensuring a low insertion loss and wide operating frequency range.

Series line impedances ensure energy coordination between the coarse and a fine protection stages at all levels of a surge incident. To protect against the hazards of electric shock and fire, which often results when power frequency (or lines frequency) contact occurs between power and communication lines (often called mains incursion), a thermo-clip is included on the primary protection stage to divert the power frequency current to ground.

The plug-in module/base design facilitates replacement of a failed module without the need to remove system wiring. If the module is unplugged from the base, the connection lines remain enabled.

DATA SHEET

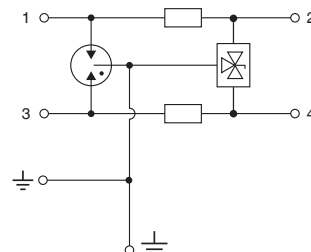
Modular SPD for Single Pair RayDat SLH-2 Series D1 • C1 • C2 • C3

*UL Listed



IEC/EN Category: D1/C1/C2/C3
Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA, I_{imp} : 2.5 kA
Voltages: 5, 12, 15, 24, 30*, 48, 60 V DC
Frequency Range: 30 MHz
Housing: Modular Design
Compliance: IEC/EN 61643-21
UL 497B 4th Edition

Configuration:



Technical Data

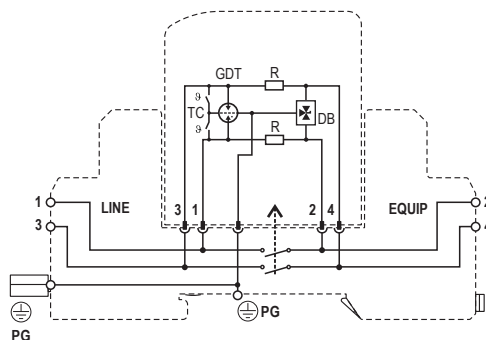
SLH-2 Series		5	12	15	24	30*	48	60
Electrical								
Lines Protected		1 (2 Conductors)						
Nominal Operating Voltage (DC)	U _n	5V	12V	15V	24V	30V	48V	60V
Maximum Continuous Operating Voltage (DC)	U _c	6V	15V	18V	28V	33V	52V	64V
Rated Load Current at 25°C	I _L	1 A						
C2 Nominal Discharge Current (8/20µs)	I _n	10kA						
Maximum Discharge Current (8/20µs)	I _{max}	20kA						
D1 Impulse Current (10/350µs)	I _{imp}	2.5kA						
Residual Voltage at 5kA (8/20µs)	U _{res}	<22V	<42V	<48V	<70V	<80V	<140V	<160V
Rated Spark Overvoltage	(Line-Ground)	7-10V	16-21V	21-25V	31-37V	36-44V	57-69V	68-84V
	(Line-Line)	7-10V	16-21V	21-25V	31-37V	36-44V	57-69V	68-84V
Response Time Overvoltage Protection	t _A	< 1 ns						
Thermal Protection		Yes						
Insulation Resistance of the Protection	R _{iso}	≥ 6 KΩ	≥ 15 MΩ	≥ 18 MΩ	≥ 28 MΩ	≥ 33 MΩ	≥ 52 MΩ	≥ 64 MΩ
Serial Resistance per Path	R	1.6-2.0Ω						
Transverse Capacitance	C	50pF						
Cut-off Frequency	f _G	30 MHz						
Mechanical								
Temperature Range				-40 °F to +176 °F [-40 °C to +80 °C]				
Terminal Cross Section Multi-strand (max.)				12 AWG [4 mm², 2.5 mm² Q Version]				
Terminal Screw Torque				4.5 lbf-in [0.5Nm]				
Degree of Protection IEC/EN 60529				IP 20 (built-in)				
Housing Material				Thermoplastic; Grey; Extinguishing Degree V-0				
Mounting IEC/EN 60715				35 mm DIN Rail				
Order Information								
Order Code		5	12	15	24	30*	48	60
SLH-2-xxx		7086.33	7086.34	7086.35	7086.36	7082.80	7086.37	7086.38
SLH-2-xxxQ (Quick Connect Terminals)		7085.05	7085.06	7085.07	7085.08	7085.09	7085.10	7085.11
SLH-2-xxxM (module)		7086.40	7086.41	7086.42	7086.43	7082.81	7086.44	7086.45

RayDat SLH-2 Series

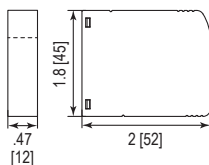
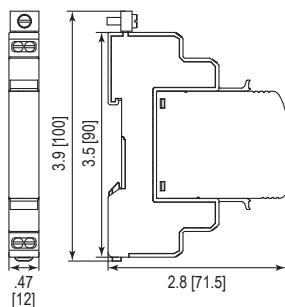
Internal Configuration

Legend

- DB Diode Block
- GDT Gas Discharge Tube
- PG Protective Grounding
- R Resistor
- TC Thermo-clip



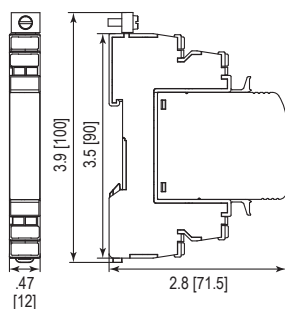
Dimensions & Packaging



SLH-2 Series	5	12	15	24	30	48	60
Dimensions							
Weight per Unit	1.83 oz [52 g]						
Dimensions DIN 43880	2/3 TE						
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]						
Minimum Package Quantity	15 pieces						

SLH-2-xxxM Series	5	12	15	24	30	48	60
Dimensions							
Weight per Unit	.84 oz [24 g]						
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]						
Minimum Package Quantity	15 pieces						

Quick Connect Terminals



SLH-2-xxxQ Series	5	12	15	24	30	48	60
Dimensions							
Weight per Unit	1.90 oz [54 g]						
Dimensions DIN 43880	2/3 TE						
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]						
Minimum Package Quantity	15 pieces						

inches
[mm]

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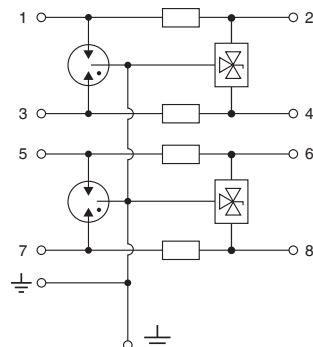
Modular SPD for Two Pair RayDat SLH-4 Series D1 • C1 • C2 • C3

*UL Listed



IEC/EN Category: D1/C1/C2/C3
Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA, I_{imp} : 5 kA
Voltages: 5, 12, 15, 24, 30*, 48, 60 V DC
Frequency Range: 30 MHz
Housing: Modular Design
Compliance: IEC/EN 61643-21
UL 497B 4th Edition

Configuration:



Technical Data

SLH-4 Series

5 12 15 24 30* 48 60

Electrical

Lines Protected		2 (4 Conductors)						
Nominal Operating Voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V
Rated Load Current at 25°C	I_L	1 A						
C2 Nominal Discharge Current (8/20µs)	I_n	10 kA						
Maximum Discharge Current (8/20µs)	I_{max}	20 kA						
D1 Impulse Current (10/350µs)	I_{imp}	5 kA						
Residual Voltage at 5 kA (8/20µs)	U_{res}	<22V	<42V	<48V	<70V	<80V	<140V	<160V
Rated Spark Overvoltage	(Line-Ground)	7-10V	17-21V	21-25V	31-37V	36-44V	57-69V	68-84V
	(Line-Line)	7-10V	17-21V	21-25V	31-37V	36-44V	57-69V	68-84V
Response Time Overvoltage Protection	t_A	< 1 ns						
Thermal Protection		Yes						
Insulation Resistance of the Protection	R_{iso}	≥ 6 KΩ	≥ 15 MΩ	≥ 18 MΩ	≥ 28 MΩ	≥ 33 MΩ	≥ 52 MΩ	≥ 64 MΩ
Serial Resistance per Path	R	1.6-2.0 Ω						
Transverse Capacitance	C	50 pF						
Cut-off Frequency	f_G	30 MHz						

Mechanical

Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]							
Terminal Cross Section Multi-strand (max.)	12 AWG [4 mm², 2.5 mm² Q Version]							
Terminal Screw Torque	4.5 lbf-in [0.5 Nm]							
Degree of Protection IEC/EN 60529	IP 20 (built-in)							
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0							
Mounting IEC/EN 60715	35 mm DIN Rail							

Order Information

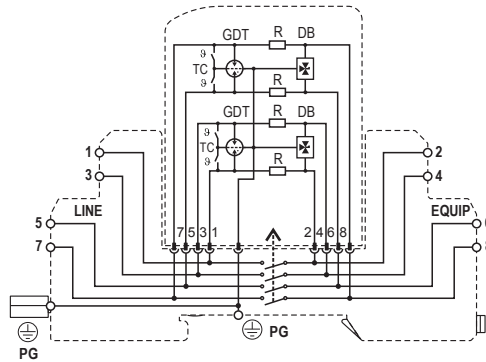
Order Code	5	12	15	24	30*	48	60
SLH-4-xxx	7086.47	7086.48	7086.49	7086.50	7082.78	7086.51	7086.52
SLH-4-xxxQ (Quick Connect Terminals)	7085.13	7085.14	7085.15	7085.16	7085.17	7085.18	7085.19
SLH-4-xxxM (module)	7086.54	7086.55	7086.56	7086.57	7082.79	7086.58	7086.59

RayDat SLH-4 Series

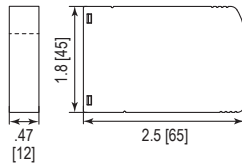
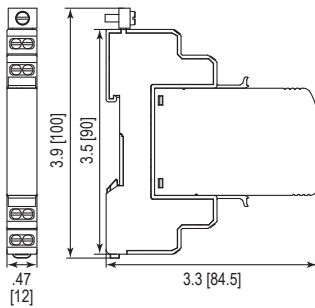
Internal Configuration

Legend

- DB Diode Block
- GDT Gas Discharge Tube
- PG Protective Grounding
- R Resistor
- TC Thermo-clip



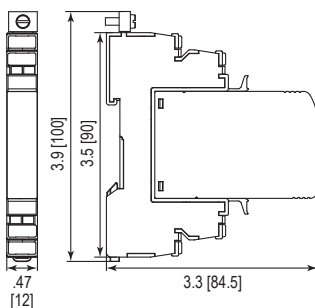
Dimensions & Packaging



SLH-4 Series	5	12	15	24	30	48	60
Dimensions							
Weight per Unit	2.32 oz [66 g]						
Dimensions DIN 43880	2/3 TE						
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]						
Minimum Package Quantity	15 pieces						

SLH-4-xxxM Series	5	12	15	24	30	48	60
Dimensions							
Weight per Unit	1.05 oz [30 g]						
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]						
Minimum Package Quantity	15 pieces						

Quick Connect Terminals



SLH-4-xxxQ Series	5	12	15	24	30	48	60
Dimensions							
Weight per Unit	2.32 oz [66 g]						
Dimensions DIN 43880	2/3 TE						
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]						
Minimum Package Quantity	15 pieces						

inches
[mm]

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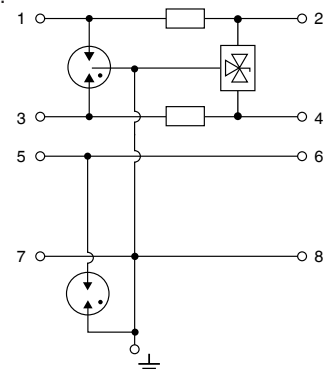
SPD for Shielded Cable RayDat SSH-3 Series D1 • C1 • C2 • C3

*UL Listed



IEC/EN Category: D1/C1/C2/C3
Surge Discharge Ratings: I_n : 10 kA, I_{max} : 20 kA, I_{imp} : 2.5 kA
Voltages: 5*, 12*, 15, 24, 30*, 48, 60 V DC
Frequency Range: 30 MHz
Housing: Modular Design
Compliance: IEC/EN 61643-21
UL 497B 4th Edition

Configuration:



Technical Data

SSH-3 Series

5* 12* 15 24 30* 48 60

Electrical

Lines Protected		1 (2 Conductors)						
Nominal Operating Voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V
Rated Load Current at 25°C	I_L	1 A						
C2 Nominal Discharge Current (8/20µs)	I_n	10 kA						
Maximum Discharge Current (8/20µs)	I_{max}	20 kA						
D1 Impulse Current (10/350µs)	I_{imp}	2.5 kA						
Residual Voltage at 5 kA (8/20µs)	(Line-Line) U_{res}	<22V	<42V	<48V	<70V	<80V	<140V	<160V
Rated Spark Overvoltage	(Shield-Ground)	184-276V						
	(Line-Line), (Line-Ground)	7-10V	16-21V	20-24V	30-36V	35-43V	55-68V	67-85V
Response Time Overvoltage Protection (Shield-Ground)	t_A	<100ns						
	(Line-Line), (Line-Ground)	<1 ns						
Insulation Resistance of the Protection (Shield-Ground)	R_{iso}	> 1 GΩ/100V						
	(Line-Line), (Line-Ground)	≥ 6 KΩ	≥ 15 MΩ	≥ 18 MΩ	≥ 28 MΩ	≥ 33 MΩ	≥ 52 MΩ	≥ 64 MΩ
Serial Resistance per Path	R	1.6-2.0Ω						
Transverse Capacitance (Shield-Ground)	C	5 pF						
	(Line-Line), (Line-Ground)	50 pF						
Cut-off Frequency	f_G	30 MHz						

Mechanical

Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]						
Terminal Cross Section Multi-strand (max.)	12 AWG [4 mm², 2.5 mm² Q Version]						
Terminal Screw Torque	4.5 lbf-in [0.5 Nm]						
Degree of Protection IEC/EN 60529	IP 20 (built-in)						
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0						
Mounting IEC/EN 60715	35 mm DIN Rail						

Order Information

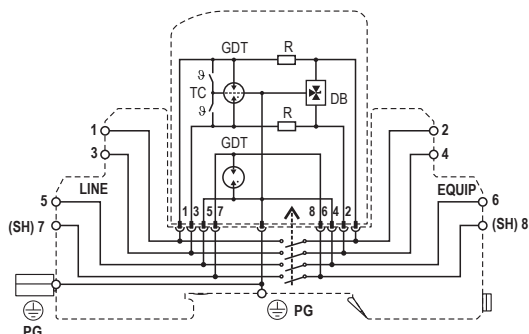
Order Code	5*	12*	15	24	30*	48	60
SSH-3-xxx	7086.01	7086.02	7086.03	7086.04	7086.05	7086.06	7086.07
SSH-3-xxxQ (Quick Connect Terminals)	7086.90	7086.91	7086.92	7086.93	7086.94	7086.95	7086.96
SSH-3-xxxM (module)	7086.09	7086.10	7086.11	7086.12	7086.13	7086.14	7086.15

RayDat SSH-3 Series

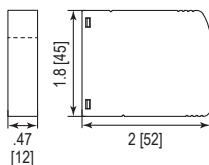
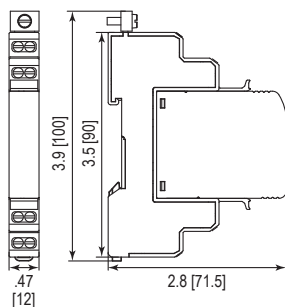
Internal Configuration

Legend

- DB Diode Block
- GDT Gas Discharge Tube
- PG Protective Grounding
- R Resistor
- SH Shielded
- TC Thermo-clip



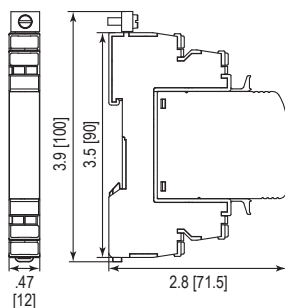
Dimensions & Packaging



SSH-3 Series	5	12	15	24	30	48	60
Dimensions							
Weight per Unit	2.11 oz [60 g]						
Dimensions DIN 43880	2/3 TE						
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]						
Minimum Package Quantity	15 pieces						

SSH-3-xxxM Series	5	12	15	24	30	48	60
Dimensions							
Weight per Unit	.91 oz [26 g]						
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]						
Minimum Package Quantity	15 pieces						

Quick Connect Terminals



SSH-3-xxxQ Series	5	12	15	24	30	48	60
Dimensions							
Weight per Unit	2.18 oz [62 g]						
Dimensions DIN 43880	2/3 TE						
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]						
Minimum Package Quantity	15 pieces						

inches
[mm]

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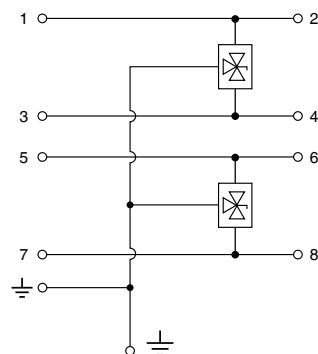
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IEC/EN Category: C1/C3
 Surge Discharge Ratings: I_n : 250 A
 Voltages: 30 V DC
 Frequency Range: 30 MHz
 Housing: Modular Design
 Compliance: IEC/EN 61643-21
 UL 497B 4th Edition

Configuration:

**Technical Data****SLL-4 Series****30****Electrical**

Lines Protected		2 (4 Conductors)
Nominal Operating Voltage (DC)	U_n	30 V
Maximum Continuous Operating Voltage (DC)	U_c	33 V
Rated Load Current at 25°C	I_L	10 A
C1 Nominal Discharge Current (8/20 μs)	I_n	250 A
Residual Voltage at 5 kA (8/20 μs)	(Line-Line) U_{res}	< 80 V
Rated Spark Overvoltage	(Line-Line)	36-44 V
	(Line-Ground)	36-44 V
Response Time Overvoltage Protection	(Line-Line) t_A	< 1 ns
	(Line-Ground)	< 1 ns
Insulation Resistance of the Protection	(Line-Line) R_{iso}	≥ 33 MΩ
	(Line-Ground)	≥ 33 MΩ
Serial Resistance per Path	R	0.1 Ω
Transverse Capacitance	(Line-Line) C	50 pF
	(Line-Line)	50 pF
Cut-off Frequency	f_G	30 MHz

Mechanical

Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]
Terminal Cross Section Multi-strand (max.)	12 AWG [4 mm², 2.5 mm² Q Version]
Terminal Screw Torque	4.5 lbf-in [0.5 Nm]
Degree of Protection IEC/EN 60529	IP 20 (built-in)
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0
Mounting IEC/EN 60715	35 mm DIN Rail

Order Information

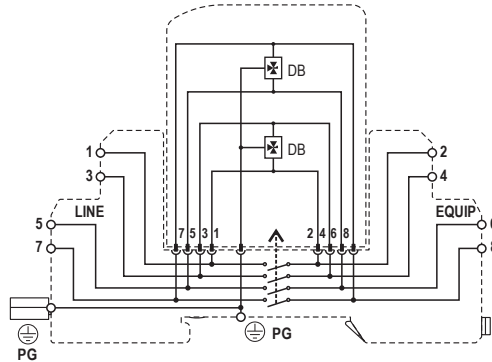
Order Code	30
SLL-4-xx	7082.92
SLL-4-xxQ (Quick Connect Terminals)	7085.27
SLL-4-xxM (module)	7082.93

RayDat SLL-4 Series

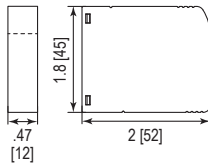
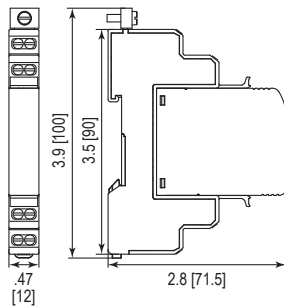
Internal Configuration

Legend

DB Diode Block
PG Protective Grounding



Dimensions & Packaging



SLL-4 Series

30

Dimensions

Weight per Unit	1.97 oz [56 g]
Dimensions DIN 43880	2/3 TE
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]
Minimum Package Quantity	15 pieces

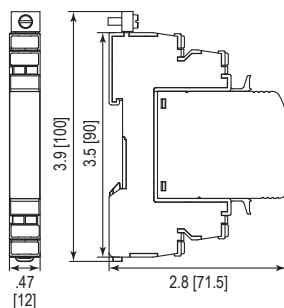
SLL-4-xxM Series

30

Dimensions

Weight per Unit	.77 oz [22 g]
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]
Minimum Package Quantity	15 pieces

Quick Connect Terminals



SLL-4-xxQ Series

30

Dimensions

Weight per Unit	2.04 oz [58 g]
Dimensions DIN 43880	2/3 TE
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]
Minimum Package Quantity	15 pieces

inches
[mm]

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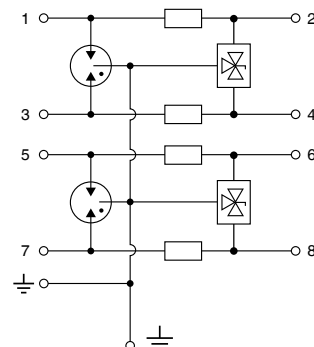
SPD for Two Pair Exposed Lines RayDat SUI-4 Series D1 • C1 • C2 • C3

*UL Listed



IEC/EN Category: D1/C1/C2/C3
Surge Discharge Ratings: I_n : 20 kA, I_{max} : 30 kA, I_{imp} : 5 kA
Voltages: 5, 12, 15, 24, 30*, 48, 60 V DC
Frequency Range: 30 MHz
Housing: Modular Design
Compliance: IEC/EN 61643-21
UL 497B 4th Edition

Configuration:



Technical Data

SUI-4 Series

5 12 15 24 30* 48 60

Electrical

Lines Protected		2 (4 Conductors)						
Nominal Operating Voltage (DC)	U_n	5V	12V	15V	24V	30V	48V	60V
Maximum Continuous Operating Voltage (DC)	U_c	6V	15V	18V	28V	33V	52V	64V
Rated Load Current at 25°C	I_L	1 A						
C2 Nominal Discharge Current (8/20µs)	I_n	20 kA						
Maximum Discharge Current (8/20µs)	I_{max}	30 kA						
D1 Impulse Current (10/350µs)	I_{imp}	5 kA						
Residual Voltage at 5 kA (8/20µs)	U_{res}	<22V	<42V	<48V	<70V	<80V	<140V	<160V
Rated Spark Overvoltage	(Line-Ground)	7-10V	16-21V	21-25V	31-37V	36-44V	57-69V	68-84V
	(Line-Line)	7-10V	16-21V	21-25V	31-37V	36-44V	57-69V	68-84V
Response Time Overvoltage Protection	t_A	< 1 ns						
Thermal Protection		Yes						
Insulation Resistance of the Protection	R_{iso}	≥ 6 KΩ	≥ 15 MΩ	≥ 18 MΩ	≥ 28 MΩ	≥ 33 MΩ	≥ 52 MΩ	≥ 64 MΩ
Serial Resistance per Path	R	1.6-2.0 Ω						
Transverse Capacitance	C	50 pF						
Cut-off Frequency	f_G	30 MHz						

Mechanical

Temperature Range	-40 °F to +176 °F [-40 °C to +80 °C]							
Terminal Cross Section Multi-strand (max.)	12 AWG [4 mm²]							
Terminal Screw Torque	4.5 lbf-in [0.5 Nm]							
Degree of Protection IEC/EN 60529	IP 20 (built-in)							
Housing Material	Thermoplastic; Grey; Extinguishing Degree V-0							
Mounting IEC/EN 60715	35 mm DIN Rail							

Order Information

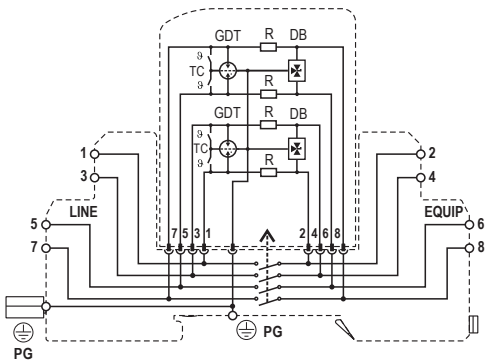
Order Code	5	12	15	24	30*	48	60
SUI-4-xxx	7083.21	7083.22	7083.23	7083.24	7083.25	7083.26	7083.27
SUI-4-xxxM (module)	7083.29	7083.30	7083.31	7083.32	7083.33	7083.34	7083.35

RayDat SUI-4 Series

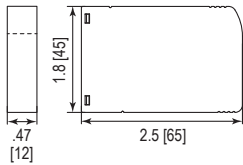
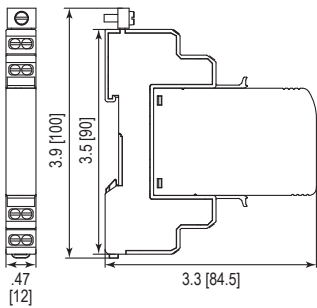
Internal Configuration

Legend

- DB Diode Block
- GDT Gas Discharge Tube
- PG Protective Grounding
- R Resistor
- TC Thermo-clip



Dimensions & Packaging



SUI-4 Series	5	12	15	24	30	48	60
Dimensions							
Weight per Unit	2.46 oz [70 g]						
Dimensions DIN 43880	2/3 TE						
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]						
Minimum Package Quantity	15 pieces						

SUI-4-xxxM Series	5	12	15	24	30	48	60
Dimensions							
Weight per Unit	1.05 oz [30 g]						
Packaging Dimensions (Single Unit)	3.4 x .59 x 4" [87 x 15 x 102 mm]						
Minimum Package Quantity	15 pieces						

inches
[mm]

Information contained in this document is subject to change at any time without notice.

