

# Industrial Solid-State Relays Selection Guide



Dual Output



Single Phase



Three Phase



PCB Mount



DIN-Rail

Quad Output

Motor Controllers

AC or DC



**TELEDYNE  
RELAYS**  
Everywhereyoulook™



RoHS or Non-RoHS:  
Your Choice!



# Switching Solutions

**Teledyne Relays** has been providing industrial power solid-state relays for over 50 years. The company offers a broad range of products, from standard off-the-shelf single-, dual-, three- and quad-output relays to custom products with diagnostics and phase monitoring. These relays are used in numerous applications, including food equipment, heating, lighting, medical equipment, motor control, refrigeration, temp control and mil-aero applications. Teledyne's selection of high-quality components results in reduced EMI and lower start-up surges. The rugged design, including the direct-bond copper (DBC) and wirebond assembly, offers the most reliable and thermally efficient product on the market. Teledyne is also the world's innovative leader in manufacturing hermetically sealed solid-state and electromechanical relays. Teledyne Relays' industrial SSRs, mil-aero SSRs, electromechanical relays and coaxial switches offer switching solutions across a wide range of markets and applications.

## Markets

- Industrial Power & Motion Control
- Temperature Control
- Lighting
- Motor Control
- Power Supplies
- Medical Equipment
- Commercial & Military Aviation
- Defense & Aerospace
- Telecom/Communications (Wireless)
- Instrumentation & Test

## Product Assurance

Under an aggressive Total Quality Management (TQM) program, Teledyne Relays has embraced a "continuous improvement" culture. With recognized certifications such as Boeing D6-82479, MIL-STD-790, AS/EN/JISQ9100:2009 (Rev C) and ISO 9001:2008, Teledyne Relays has become a primary supplier of switching solutions with the highest quality and reliability to industry leaders around the world.

## Technical Service & Customer Support

Teledyne Relays provides easy access to technical service and customer support. An innovative, integrated website makes it easy to find technical information, buy relays and even get e-mail responses within 24 hours.



# Selection Matrix

- DIN Rail
- Pin-PCB
- Panel/Chassis

CURRENT									
									≤ 125A
									≤ 95A
									≤ 75A
									≤ 50A
									≤ 35A
									≤ 25A
									≤ 12A
									≤ 9A
									≤ 4A

AC	LINE VOLTAGE	CURRENT																	
		≤ 30Vac/ Vdc	240Vac (≤ 280Vac)	480Vac (≤ 520Vac)	600Vac (≤ 690Vac)	≤ 36Vdc	≤ 60Vdc	≤ 130Vdc	≤ 220Vdc	≤ 350Vdc	≤ 4A	≤ 9A	≤ 12A	≤ 25A	≤ 35A	≤ 50A	≤ 75A	≤ 95A	≤ 125A
			AS4																
			BS	STH	STH	STH	STH												
			PS	S	S		SHP												
				ST	ST														
							SF												
							SD												
				FS	FS														
					L, DH														
					LS														
					C3P														
					SQ														
			AS4	G	DR3P	SH	SH	SH	SH	SH									
				S3P															
					S		S	S	S	S									
						DH													
							SD												
						XV	E3P	E3P											
				E3PT			E3PT	E3PT											
			AS4		LS	LS	SH	SH	SH	SH									
			BS			STH	STH	STH											
							S	S	S	S									
				ST	ST		ST	ST											
							SD												
							E3PT	SD											
				E3P	E3P		E3P	E3P											
			SDS	LS10															
			PS																
			SDS																
			DX																
			DS																
							S20												S20
			DX																
			DS																
							SI	SI	S60										SI
									SHI										

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MOTOR CONTROLLERS							
Part No.	Load Current	Control Voltage	Part No.	Max. Motor Power @40°C			
				Star (Y)		Delta (D)	
				400Vac	230Vac	400Vac	230Vac
EMCRT48D50	8.5A	12-30Vdc	EMC48S50-04	15kW	8.6kW	26kW	15kW
EMCRT48D75	16A	12-30Vdc					

# SINGLE-PHASE AC SOLID-STATE RELAYS

## Series SH High Industrial Performance (HIPpak)

### AC Solid-State Relays with Covers

Series SH relays offer high performance in a flexible and innovative package. Designed for all types of loads, they provide output to 125A, 690Vac. They incorporate removable touch-proof terminal covers for versatile, easy, and quick connections. SH relays feature a metal baseplate and built-in LED. They are up to 30% lighter than standard relays.

- Random and zero-cross models available
- Low zero-cross turn-on voltage
- Input and output protection and control LED
- IP20 touch-proof terminal covers
- Heat sinks available



Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
SH24D25	25A	12–275 Vac	600 Vpeak	Zero Cross	3–32 Vdc	600 A <sup>2</sup> s	2.3 x 1.77 x 1.18 in. 58.5 x 45 x 30 mm
SH24A25	25A	12–275 Vac	600 Vpeak	Zero Cross	20–265 Vac/Vdc	600 A <sup>2</sup> s	
SH24D50	50A	12–275 Vac	600 Vpeak	Zero Cross	3–32 Vdc	2800 A <sup>2</sup> s	
SH24R50	50A	12–275 Vac	600 Vpeak	Random	3–32 Vdc	2500 A <sup>2</sup> s	
SH48D35	35A	24–510 Vac	1200 Vpeak	Zero Cross	3.5–32 Vdc	1250 A <sup>2</sup> s	
SH48D50	50A	24–510 Vac	1200 Vpeak	Zero Cross	3.5–32 Vdc	2500 A <sup>2</sup> s	
SH48A50	50A	24–510 Vac	1200 Vpeak	Zero Cross	20–265 Vac/Vdc	2500 A <sup>2</sup> s	
SH48D95	95A	24–510 Vac	1200 Vpeak	Zero Cross	3.5–32 Vdc	14400 A <sup>2</sup> s	
SH48A95	95A	24–510 Vac	1200 Vpeak	Zero Cross	20–265 Vac/Vdc	14400 A <sup>2</sup> s	
SH48R125	125A	24–510 Vac	1200 Vpeak	Random	3.5–32 Vdc	24000 A <sup>2</sup> s	
SH48D125	125A	24–510 Vac	1200 Vpeak	Zero Cross	3.5–32 Vdc	24000 A <sup>2</sup> s	
SH48A125	125A	24–510 Vac	1200 Vpeak	Zero Cross	20–265 Vac/Vdc	24000 A <sup>2</sup> s	
SH60D50	50A	24–690 Vac	1600 Vpeak	Zero Cross	3.5–32 Vdc	2500 A <sup>2</sup> s	
SH60D125	125A	24–690 Vac	1600 Vpeak	Zero Cross	3.5–32 Vdc	24000 A <sup>2</sup> s	



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See Appendix for heat-sink information and other options.

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For SH48D75, contact factory for availability.

## Series STH High Industrial Performance (HIPpak) AC Solid-State Relays

Series STH relays offer high performance in a flexible and innovative package. Designed for all types of loads, they deliver output to 75A, 600Vac for resistive loads. They have removable touch-proof terminal covers for versatile, easy, and quick connections. STH relays feature a metal baseplate and are up to 30% lighter than standard relays.

- Regulated input current
- Low zero-cross turn-on voltage
- Input protection and control LED standard
- IP20 touch-proof terminal covers optional
- Heat sinks available



Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
STH24D12	12A	12–280 Vac	600 Vpeak	Zero Cross	3–32 Vdc	128 A <sup>2</sup> s	2.3 x 1.77 x 1.18 in. 58.5 x 45 x 30 mm
STH24D25	25A	12–280 Vac	600 Vpeak	Zero Cross	3–32 Vdc	600 A <sup>2</sup> s	
STH24D35	35A	12–280 Vac	600 Vpeak	Zero Cross	3–32 Vdc	1250 A <sup>2</sup> s	
STH48D50	50A	24–600 Vac	1200 Vpeak	Zero Cross	3–32 Vdc	2500 A <sup>2</sup> s	
STH24D50	50A	12–280 Vac	600 Vpeak	Zero Cross	3–32 Vdc	2800 A <sup>2</sup> s	



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See Appendix for heat-sink information and other options.

IP20 touchproof covers option: -17

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For STH48D35, contact factory for availability.

### TELEDYNE'S INNOVATIVE CONSTRUCTION

**New construction method offers low profile, less weight, touchproof terminal covers and higher reliability.**

Teledyne's new HIPpak housing offers a new metallic base for screw terminals versus plastic to improve the ruggedness. The housing also offers hinged, removable terminal covers for opening and closing. Internal components are now surface mount, allowing for a lower profile. The power device continues to utilize a DBC (Direct Bond Copper) process between the copper and alumina substrate. The DBC process offers the most efficient means of transferring thermal energy out of the device. The construction also incorporates wirebonds versus clips and jumpers. This feature reduces the thermal stress improving the reliability of the relay (see chart, page 20).



HIPpak interior

# SINGLE-PHASE AC SOLID-STATE RELAYS



## Series S AC Hockey Puck Solid-State Relays

The Series S single-phase relays are designed for all types of loads. The design incorporates an SCR or triac output. The relays utilize optical isolation to protect the control from load transients. All contain an internal snubber for output protection. High-current models are excellent for motor and UPS control.

- Low zero-cross turn-on voltage for low EMI
- AC or DC control available
- Excellent thermal performance
- High immunity to surges
- Internal snubber (except S60 models)

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
S24A12	12A	12–280 Vrms	600 Vpeak	Zero Cross	90–240 Vac	72 A <sup>2</sup> s	2.29 x 1.75 x 1.06 in. 58.2 x 44.5 x 27 mm
S24D25	25A	12–280 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	288 A <sup>2</sup> s	
S24R40	40A	12–280 Vrms	600 Vpeak	Random	3–30 Vdc	612 A <sup>2</sup> s	
S24D40	40A	12–280 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	612 A <sup>2</sup> s	
S24A40	40A	12–280 Vrms	600 Vpeak	Zero Cross	90–240 Vac/Vdc	612 A <sup>2</sup> s	
S48R25	25A	24–520 Vrms	1200 Vpeak	Random	4–30 Vdc	265 A <sup>2</sup> s	
S48D25	25A	24–520 Vrms	1200 Vpeak	Zero Cross	5–30 Vdc	265 A <sup>2</sup> s	
S48R50	50A	24–520 Vrms	1200 Vpeak	Random	4–30 Vdc	1500 A <sup>2</sup> s	
S48D50	50A	24–520 Vrms	1200 Vpeak	Zero Cross	5–30 Vdc	1500 A <sup>2</sup> s	
S48A50	50A	24–520 Vrms	1200 Vpeak	Zero Cross	90–240 Vac/Vdc	1500 A <sup>2</sup> s	
S48R75	75A	24–520 Vrms	1200 Vpeak	Zero Cross	90–240 Vac/Vdc	1500 A <sup>2</sup> s	
S48A50-22/R**	50A	24–520 Vrms	1200 Vpeak	Zero Cross	17–80 Vac/Vdc	1500 A <sup>2</sup> s	
S48R125	125A	24–520 Vrms	1200 Vpeak	Random	4–30 Vdc	20000 A <sup>2</sup> s	
S48A125	125A	24–520 Vrms	1200 Vpeak	Zero Cross	90–240 Vac/Vdc	20000 A <sup>2</sup> s	
S60D50	50A	24–690 Vrms	1600 Vpeak	Zero Cross	7–30 Vdc	1500 A <sup>2</sup> s	
S60D125	125A	24–660 Vrms	1600 Vpeak	Zero Cross	7–30 Vdc	20000 A <sup>2</sup> s	



See Appendix for heat-sink information and other options.  
RoHS Compliant \*\*.S48A50-22 available with /R option



## Series ST AC Hockey Puck Solid-State Relays

Series ST relays are designed for high-power applications. The design incorporates an SCR or triac output. The relays utilize optical isolation to protect the control from load transients. A control LED is available on certain models. All Series ST relays are zero crossing. Internal MOV is also available on ST24D 25A and 50A models.

- Tight zero-cross window for low EMI
- AC or DC control available
- Excellent thermal performance
- Internal MOV (certain models)
- Control LED (certain models)

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
ST24D12	12A	12–280 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	72 A <sup>2</sup> s	2.29 x 1.75 x 1.06 in. 58.2 x 44.5 x 27 mm
ST24D12-02	12A	12–280 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	72 A <sup>2</sup> s	
ST24D25	25A	12–280 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	288 A <sup>2</sup> s	
ST24D50-16	50A	12–280 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	1500 A <sup>2</sup> s	
ST48D50	50A	24–600 Vrms	1200 Vpeak	Zero Cross	5–30 Vdc	1500 A <sup>2</sup> s	
ST48D50-02	50A	24–520Vrms	1200 Vpeak	Zero Cross	5–30 Vdc	1500 A <sup>2</sup> s	



-02 = Control LED; -16 = Internal MOV; -22 = 24 Vac control  
See Appendix for heat-sink information and other options.  
RoHS Compliant

# SINGLE-PHASE AC SOLID-STATE RELAYS



## Series FS Miniature AC Solid-State Relays

Series FS relays are designed for medium-power loads. The relays incorporate a triac output and utilize optical isolation to protect the control from load transients. The package is available with faston or PCB terminals. The compact size of the FS makes it ideal for designs where space is limited. The FS has excellent thermal performance.

- Miniature package
- Faston or PCB terminals available
- Tight zero-cross window for low EMI
- Excellent thermal performance
- High immunity to surges

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
FS24D10-06	10A	12–280 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	72 A <sup>2</sup> s	1.18 x .83 x .59 in. 30 x 21 x 15 mm
FS24D10	10A	12–280 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	72 A <sup>2</sup> s	
FS24D20-06	20A	12–280 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	200 A <sup>2</sup> s	

-06 = Faston  
RoHS Compliant available with option: /R



## Series G AC Solid-State Relays

Series G relays are designed for medium-power loads. The design incorporates a thyristor output. Series G relays utilize optical isolation to protect the control from load transients. An internal MOV is also provided to protect against load transient voltages. The compact size makes it ideal for designs where space is limited.

- Miniature size package
- Power and control connections by Faston terminals
- Internal MOV protection
- Excellent thermal performance
- High immunity to surges

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
G24R12-06	12 Arms	12–320 Vrms	520 Vpeak	Random	3–32 Vdc	340 A <sup>2</sup> s	2.63 x 1.50 x .87 in. 56.9 x 38 x 22 mm
G24D12-06	12 Arms	12–320 Vrms	520 Vpeak	Zero Cross	4–32 Vdc	340 A <sup>2</sup> s	

-06 = Faston  
RoHS Compliant



## Series XV No Heat Sink AC Hybrid Relays

Series XV relays combine the best of solid-state and electromechanical technology. The relay is designed in a touch-proof hockey-puck package. The XV relay switches current up to 30A without a heat sink. Visual control status is provided as a standard. Elimination of the heat sink conserves space and makes the XV ideal for many applications.

- Industry-standard package
- Requires no heat sink
- Low zero-cross turn-on voltage for low EMI
- Control LED
- High immunity to surges

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
XV46D30K	30A	12–420 Vrms	800 Vpeak	Zero Cross	20–30 Vdc	288 A <sup>2</sup> s	2.41 x 1.75 x 1.77 in. 61.3 x 44.5 x 45 mm

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# SINGLE-PHASE AC SOLID-STATE RELAYS



Series SHPXXNXXR



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## Series SHP Phase-Control AC Solid-State Relays

The Series SHP phase-angle controller provides analog switching. It features an internal microcontroller and overvoltage protection. Choose relays with either removeable input spring connectors or IP20 touch-proof flaps. The relays are designed in conformity with EN60947-4-3 (IEC947-4-3) and EN60950/VDE0805 (Reinforced Insulation).

- Microcontroller inside
- Analog switching
- Overvoltage protection by varistor
- Green LED for input visualization
- Short-circuit protection

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Range	I <sup>2</sup> t	Dimensions LxWxH
SHP24N50R	50A	90–280 Vac	600 Vpeak	Phase Angle	4–20 mA	2500 A <sup>2</sup> s	1.77 x 2.30 x 1.18 in. 45 x 58.5 x 30 mm
SHP24N50A	50A	100–280 Vac	600 Vpeak	Phase Angle	8–30Vdc	2500 A <sup>2</sup> s	1.77 x 2.30 x 1.18 in. 45 x 58.5 x 30 mm

RoHS Compliant



RoHS Compliant

## Series L Ultraminiature AC Solid-State Relays

Series L relays are designed to control medium-power AC loads, while occupying minimal board space. The Series L is an excellent choice for a PCB-mount power-switching relay. A thermal pad is available to eliminate thermal grease when mounting it on to a heat sink. The relay's optical isolation protects the control from load transients.

- Ultraminiature package
- Zero-cross turn-on voltage
- Designed for PC board mounting
- Optional thermal pad available
- High immunity to transients

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
L24D25C	25 Arms	24–280 Vrms	600 Vpeak	Zero Cross	3.5–15 Vdc	260 A <sup>2</sup> s	1.37 x 1.12 x .37 in.
L24D40G	40 Arms	24–280 Vrms	600 Vpeak	Zero Cross	12.5–32 Vdc	612 A <sup>2</sup> s	35 x 28.3 x 9.4 mm

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For L24D25G, contact factory for availability.



LS with HS1 heat sink

## Series LS AC Solid-State Relays with Optional Heat Sinks

Series LS single-inline package (SIP) relays are designed for mounting on printed circuit boards. LS relays facilitate heat sinking by providing an metallic interface surface. The relays use a direct-bonded copper substrate for thermal efficiency, thermal stress performance and long-life expectancy. Optional heat sinks are available.

- Compact SIP package
- Designed for external heat-sink attachment
- Over-sized thyristor ratings (up to 50A)
- Direct-copper bonding technology
- Optional heat sinks available

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
LS24D16C	16A	12–280 Vrms	600 Vpeak	Zero Cross	4–14 Vdc	128 A <sup>2</sup> s	LS: 1.72 x .96 x .25 in. 43.6 x 24.5 x 6.3 mm
LS24D16C-HS1	16A	12–280 Vrms	600 Vpeak	Zero Cross	4–14 Vdc	128 A <sup>2</sup> s	
LS60D22C	22A	24–600 Vrms	1200 Vpeak	Zero Cross	4–14 Vdc	450 A <sup>2</sup> s	LS with H1 Heat Sink: 1.72 x 1.4 x .87 in. 43.6 x 35.7 x 22 mm
LS60D22C-HS1	22A	24–600 Vrms	1200 Vpeak	Zero Cross	4–14 Vdc	450 A <sup>2</sup> s	
LS24D27C	27A	12–280 Vrms	600 Vpeak	Zero Cross	4–14 Vdc	1800 A <sup>2</sup> s	
LS60D30C	30A	24–600 Vrms	1200 Vpeak	Zero Cross	4–14 Vdc	5000 A <sup>2</sup> s	



-HS1 = With heat sink  
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# SINGLE-PHASE AC SOLID-STATE RELAYS



## Series AS4 Single-Inline Package AC Solid-State Relays

Series AS4 solid-state single inline (SIP) four-pin relays are designed for mounting on a printed circuit board. The relays offer built-in voltage protection and can withstand very high current overloads. The relays have a low zero-cross window. The compact size and triac output make the AS relay the perfect retrofit for electromechanical relays.

- Industry-standard package
- Tight zero-cross window for low EMI
- Low input current draw
- Integral transient voltage protection
- DIN rail available

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
AS24D4E/R	4 Arms	12–275 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	50 A <sup>2</sup> s	1.70 x 1.0 x .39 in. 43.2 x 25.4 x 10.2 mm
AS46D4E	4 Arms	12–460 Vrms	900 Vpeak	Zero Cross	4–30 Vdc	50 A <sup>2</sup> s	
AS60D4E	5 Arms	24–600 Vrms	1200 Vpeak	Zero Cross	5–30 Vdc	72 A <sup>2</sup> s	
A24D4E-X1	4 Arms	12–275 Vrms	600 Vpeak	Zero Cross	6–30 Vdc	50 A <sup>2</sup> s	
AS46D4E/R	5 Arms	12–460 Vrms	800 Vpeak	Zero Cross	4–30 Vdc	72 A <sup>2</sup> s	

-02 = LED; X1 = DIN rail clip with LED; X2 = DIN rail clip without LED  
RoHS Compliant



## Series BS Single-Inline Package AC Solid-State Relays

Series BS 4-amp solid-state single inline (SIP) four-pin relays are designed for mounting on a printed circuit board. BS relays can withstand very high current overloads. The compact size and triac output make the BS relay an excellent choice for switching medium-power resistive loads.

- Industry-standard package
- High in-rush capabilities
- Low input current draw
- Low zero-cross turn-on voltage for low EMI
- Up to 600Vrms load voltage

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
BS24D4A	4 Arms	15–280 Vrms	600 Vpeak	Zero Cross	3–10 Vdc	50 A <sup>2</sup> s	1.70 x 1.0 x .39 in. 43.2 x 25.4 x 10.2 mm
BS24D4F	4 Arms	15–280 Vrms	600 Vpeak	Zero Cross	8–30 Vdc	50 A <sup>2</sup> s	

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## Series DH (slimpac) AC Solid State Relays

Series DH relays are designed for all types of loads. These relays feature our new high efficiency back-to-back thyristors for long lifetime expectancy. The relays utilize optical isolation to protect the control from load transients. All relays offer a green control LED.

- New High Efficiency Back-to-Back Thyristors
- Zero-cross models designed for resistive loads
- Input protection and control LED standard
- IP20 protective cover
- Up to 600Vrms load voltage



Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
DH24D25	25 Arms	12–280 Vrms	600 Vpeak	Zero Cross	3–32 Vdc	340 A <sup>2</sup> s	3.58 x .89 x 1.65 in. 91 x 22.5 x 42 mm
DH48D35	35 Arms	24–600 Vrms	1200 Vpeak	Zero Cross	3.5–32 Vdc	882 A <sup>2</sup> s	

RoHS Compliant



# SINGLE-PHASE AC SOLID-STATE RELAYS



Series PS

## Series TS and PS AC Solid-State Relays

Series TS and Series PS relays provide AC/DC switching in a compact size. They also provide AC/DC control. These relays can withstand high surge currents. TS and PS relays are pin-to-pin compatible with electromechanical relays and may be used as replacements. Applications include: vending machines, lighting and fans.

- Compact size
- Pin-to-pin compatible with electromechanical relays
- AC and DC control; AC and DC output
- Random and zero-cross turn-on voltage
- High inrush capabilities



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Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
<b>TS24D2G</b>	2 Arms	12–275 Vrms	600 Vpeak	Zero Cross	12–30 Vac/Vdc	50 A <sup>2</sup> s	1.14 x .51 x 0.6 in 29.2 x 13 x 15.8 mm
<b>PS24D4G</b>	4 Arms	12–275 Vrms	600 Vpeak	Zero Cross	12–30 Vac/Vdc	50 A <sup>2</sup> s	1.14 x .50 x 1 in 29 x 12.7 x 25.4 mm

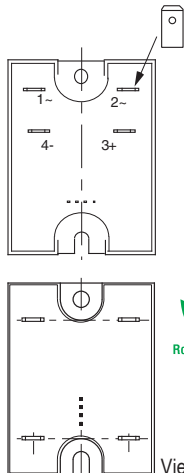
# DUAL-OUTPUT AC SOLID-STATE RELAYS



## Series SD Dual-Output AC Solid-State Relays

Series SD dual-phase relays are designed for all types of loads. The design incorporates two relays in a single package. The relays utilize optical isolation to protect the control from load transients. High-current models are excellent for motor and phase angle control. SD Series are available with faston or screw terminals.

- Designed for all types of loads
- Dual output (two relays in one package)
- Faston or screw terminals
- Tight zero-cross window for low EMI
- High immunity to surges



RoHS Compliant

-06 = Faston terminals See Appendix for heat-sink information and other options.  
RoHS Compliant

View data sheet for package detail.

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
<b>SD24D40-06</b>	40 Arms	12–280 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	612 A <sup>2</sup> s	2.28 x 1.75 x 1.26 in. 58 x 44.5 x 32 mm
<b>SD24R50</b>	50 Arms	12–280 Vrms	600 Vpeak	Random	4–30 Vdc	1500 A <sup>2</sup> s	2.28 x 1.75 x 1.06 in. 58 x 44.5 x 27 mm
<b>SD24D50-06</b>	50 Arms	12–280 Vrms	600 Vpeak	Zero Cross	4–30 Vdc	1500 A <sup>2</sup> s	2.28 x 1.75 x 1.26 in. 58 x 44.5 x 32 mm
<b>SD24R50-06</b>	50 Arms	12–280 Vrms	600 Vpeak	Random	4–30 Vdc	1500 A <sup>2</sup> s	2.28 x 1.75 x 1.26 in. 58 x 44.5 x 32 mm
<b>SD48D50A</b>	50 Arms	24–600 Vrms	1200 Vpeak	Zero Cross	10–30 Vdc	1500 A <sup>2</sup> s	2.28 x 1.75 x 1.06 in. 58 x 44.5 x 27 mm
<b>SD48D50A2</b>	50 Arms	24–600 Vrms	1200 Vpeak	Zero Cross	10–30 Vdc	1500 A <sup>2</sup> s	2.28 x 1.75 x 1.40 in. 58 x 44.5 x 35.6 mm
<b>SD48D40-06</b>	40 Arms	24–510 Vrms	1200 Vpeak	Zero Cross	5–30 Vdc	612 A <sup>2</sup> s	2.28 x 1.75 x 1.26 in. 58 x 44.5 x 32 mm

# THREE-PHASE AC SOLID-STATE RELAYS



## Series E3P Three-Phase AC Solid-State Relays

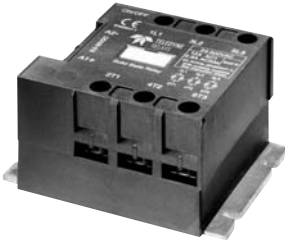
Series E3P three-phase relays are designed for all types of loads. The design incorporates an oversized thyristor output. Control status LED is standard on all models. Output protection is provided internally on certain models. The E3P is available in random and zero-cross turn-on. High-current models are ideal for motor control.

- Three-phase output
- AC or DC control
- Internal output protection
- Tight zero-cross window for low EMI
- High immunity to surges

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
E3P48A50	50A	24–600 Vrms	1200 Vpeak	Zero Cross	90-240 Vac	1500 A <sup>2</sup> s	3.94 x 2.89 x 1.56 in. 100 x 73.5 x 39.5 mm
E3P48A75	75A	24-600 Vrms	1200 Vpeak	Zero Cross	90-240 Vac	5000 A <sup>2</sup> s	
E3P48A75-22	75A	24-600 Vrms	1200 Vpeak	Zero Cross	10-30 Vac	5000 A <sup>2</sup> s	
E3P48D25	25A	24–600 Vrms	1200 Vpeak	Zero Cross	8.5–30 Vdc	265 A <sup>2</sup> s	
E3P48D50	50A	24–600 Vrms	1200 Vpeak	Zero Cross	8.5–30 Vdc	1500 A <sup>2</sup> s	
E3P48D75	75A	24–600 Vrms	1200 Vpeak	Zero Cross	8.5–30 Vdc	5000 A <sup>2</sup> s	
E3P48D75-16	75A	24–520 Vrms	1200 Vpeak	Zero Cross	8.5–30 Vdc	5000 A <sup>2</sup> s	



-16 = Internal protection  
RoHS Compliant.  
For E3P48R50-16, contact factory for availability.



## Series E3PT Three-Phase Touch-Proof AC Solid-State Relays

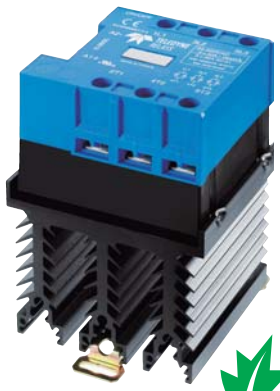
Series E3PT three-phase solid-state relays are designed for all types of loads. The E3PT relays include as a standard a control LED for visual status. The E3PT is touch-proof for user safety. An internal MOV and snubber circuit protect the output thyristor. The E3PT relays are highly immune to large current surges.

- Designed for all types of loads
- Tight zero-cross window for low EMI
- Control LED on all models
- Internal output transient protection
- IP20 touch-proof

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
E3PT48D50	50A	24–520 Vrms	1200 Vpeak	Zero Cross	8.5–30 Vdc	7200 A <sup>2</sup> s	3.94 x 2.99 x 2.22 in. 100 x 76 x 56.5 mm



H = High surge capability  
RoHS Compliant.  
For E3PT48D50H and E3PT48A50H, contact factory for availability.



## Series DR3P Three-Phase AC Solid-State Relays with Heat Sink and DIN Rail

Series DR3P solid-state relays provide three-phase output, offering both AC and DC control with a zero-cross turn-ON thyristor output. The DR3P provides an integrated heat sink, output transient suppression (MOV and snubber circuit) and LEDs that serve as status indicators for diagnostics. The relays are designed for DIN-rail or panel mounting.

- Three-phase solid-state relay with heat sink
- DIN rail or panel mounting
- AC/DC control voltage with input status LED
- Internal protection by integrated snubber MOV
- IP20 touch-proof

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
DR3P48A50	22A	24–520 Vrms	1200 Vpeak	Zero Cross	90–240 Vdc (DC) 90–240 Vac (AC)	2500 A <sup>2</sup> s	3.54 x 3.86 x 4.81 in. 89.8 x 98 x 122.2 mm
DR3P48D50	22A	24–520 Vrms	1200 Vpeak	Zero Cross	8.5–30 Vdc (DC) 10–30 Vac (AC)	2500 A <sup>2</sup> s	



RoHS Compliant

## THREE-PHASE AC SOLID-STATE RELAYS



### Series C3P Three-Phase AC Solid-State Relays

Series C3P relays control medium amounts of power in three-phase applications. Optical isolation ensures complete protection of the C3P's control circuit from load transients. The compact plastic housing provides a low-cost alternative to large metallic three-phase contactors. The ceramic baseplate provides excellent thermal performance.

- Three-phase relay in a compact single-inline package
- High-temperature plastic housing
- Tight zero-cross window for low EMI
- Exposed ceramic baseplate for reduced thermal resistance

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
<b>C3P24D25</b>	25 Arms	24–280 Vrms	600 Vpeak	Zero Cross	10–30 Vdc	260 A <sup>2</sup> s	3.2 x 1.09 x 0.32 in 81.9 x 27.7 x 8.3 mm
<b>C3P24D25C</b>	25 Arms	24–280 Vrms	600 Vpeak	Zero Cross	3.5–10 Vdc	260 A <sup>2</sup> s	

Lead forming available upon request.



### Series S3P Three-Phase AC Solid-State Relays

Series S3P relays are made up of three separate relays controlled by a common DC voltage control. They are designed to control 10A AC loads such as resistors and small motors on a mains from 12 to 440 Vac, either single- or three-phase. They are well suited for applications requiring compact size and low cost.

- Industry-standard hockey-puck package
- Spring connectors
- Three relays in a single package
- Zero-cross and random turn-on options
- RoHS Compliant available with option -/R

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
<b>S3P44D10</b>	10 Arms	12–440 Vrms	850 Vpeak	Zero Cross	4–30 Vdc	72 A <sup>2</sup> s	2.3 x 1.75 x 1.14 in. 44.5 x 58.5 x 29 mm

See Appendix for heat-sink information and other options.  
RoHS Compliant

## QUAD-OUTPUT AC SOLID-STATE RELAYS



### Series SQ Quad-Output AC Solid-State Relays

Series SQ relay provides four independent 25A relays in a standard hockey-puck package. The SQ package conserves space while providing high-power switching. The tight zero-cross window reduces the EMI level. Optical isolation ensures complete protection of the control circuit from load transients.

- Four solid-state relays in a hockey puck package
- Tight zero-cross window for low EMI
- Constant current input for low current draw
- High Immunity to surges
- RoHS Compliant available with option -/R

Part No.	Load Current	Load Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
<b>SQ24D25</b>	25 Arms	12–280 Vrms	600 Vpeak	Zero Cross	3–32 Vdc	288 A <sup>2</sup> s	2.28 x 1.75 x 1.29 in. 58 x 44.5 x 33 mm
<b>SQ24R25</b>	25 Arms	12–280 Vrms	600 Vpeak	Random	4–30 Vdc	288 A <sup>2</sup> s	
<b>SQ24D25-02</b>	25 Arms	12–280 Vrms	600 Vpeak	Zero Cross	3–32 Vdc	288 A <sup>2</sup> s	

See Appendix for heat-sink information and other options.  
RoHS Compliant

## DC SOLID-STATE RELAYS



### Series S20, S60 and S75 DC Solid-State Relays

Series S20 and S60 relays switch medium- to high-power DC loads. These devices feature the latest-generation MOSFET technology as well as an innovative isolated driver to ensure fast power turn on and off. The relays feature triggered control input to avoid linear control risks and fast switching times. The relays also offer an LED for status.

- Low on-state resistance
- Low output leakage current
- Low control current consumption
- Triggered control input to avoid linear control risks
- Low conducted and radiated disturbances

Part No.	Load Current	Load Voltage	Peak Voltage	Turn-On Time	Control Voltage	ON Resistance	Dimensions LxWxH
<b>S20DC100</b>	100A	0–130 Vdc	200 Vpeak	10 μs	4.5–32 Vdc	22 mΩ	2.29 x 1.75 x 1.1 in. 58.2 x 44.5 x 28 mm
<b>S60DC40</b>	40A	0–350 Vdc*	600 Vpeak	10 μs	4.5–32 Vdc	70 mΩ	
<b>S20DC30</b>	30A	0–130 Vdc	200 Vpeak	10 μs	4.5–32 Vdc	164 mΩ	
<b>S75DC150</b>	150A	0–42 Vdc	75 Vpeak	10 μs	4.5–32 Vdc	2.25 mΩ	

\*275 Vrms size 20 varistor as protection across the output  
See Appendix for heat-sink information and other options.  
RoHS Compliant



### Series SI DC Solid-State Relays

Series SI relays are designed to switch high voltage (high power) DC loads. These devices feature the latest generation of High Voltage IGBT Technology as well as an innovative isolated driver to ensure fast power turn on and OFF. The relays feature triggered control input to avoid linear control risks and fast switching times. The relays also offer an LED for status.

- Latest generation of High Voltage IGBT Technology
- Ultra low output leakage current
- Low control current consumption
- Triggered control input to avoid linear control risks
- Low conducted and radiated disturbances

Part No.	Load Current	Load Voltage	Peak Voltage	Turn-On Time	Control Voltage	ON-State Voltage Drop	Dimensions LxWxH
<b>SI60DC100</b>	100A	0-500 Vdc	600 Vpeak	10 μs	4.5-32 Vdc	1.35 V	2.29 x 1.75 x 1.1 in. 58.2 x 44.5 x 28 mm
<b>SI120DC50</b>	50A	0-1000 Vdc	1200 Vpeak	10 μs	4.5-32 Vdc	1.5 V	
<b>SI170DC25</b>	25A	0-1400 Vdc	1700 Vpeak	10 μs	4.5-32 Vdc	3.3 V	

See Appendix for heat-sink information and other options.  
RoHS Compliant



### Series SH DC Solid-State Relays

Series SH relays offer high performance in a flexible, innovative package. They feature the latest-generation MOSFET technology as well as triggered control input to avoid linear control risks. The relays offer diagnostics, removable touch-proof terminal covers and a metal baseplate. They are up to 30% lighter than standard relays.

- Built-in diagnostics with status LED
- Ultra low on-state resistance
- Low output leakage current
- IP20 protection by terminal covers on load terminals
- No radiated or conducted disturbances

Part No.	Load Current	Load Voltage	Peak Voltage	Turn-On Time	Control Voltage	ON Resistance	Dimensions LxWxH
<b>SH10DC40</b>	40A	5–100 Vdc	100 Vpeak	20 μs	3.5–32 Vdc	30 mΩ	2.3 x 1.77 x 1.18 in. 58.5 x 45 x 30 mm
<b>SH10DC40-16</b>	40A	5–60 Vdc	100 Vpeak	20 μs	3.5–32 Vdc	30 mΩ	
<b>SH20DC20-16</b>	20A	5–110 Vdc	200 Vpeak	20 μs	3.5–32 Vdc	90 mΩ	

-16 = Internal protection  
See Appendix for heat-sink information and other options.  
RoHS Compliant



## Series LS10 DC Solid-State Relays

Series LS10 DC solid-state relays are designed for mounting on printed circuit boards. They facilitate heatsinking by providing an interface surface. They can switch loads with high starting currents. The nominal switched currents depend on the size of the heat sink. The relays use a direct-bonded copper substrate for thermal efficiency and long life.

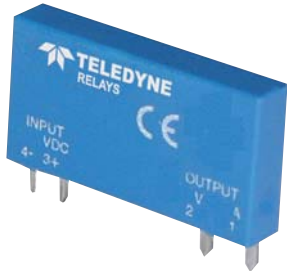
- Slim compact design
- Heatsinking capabilities
- Integrated voltage protection
- High surge handling capability
- MOSFET output



RoHS Compliant

Part No.	Load Current	Load Voltage	Peak Voltage	Turn-On Time	Control Voltage	ON Resistance	Dimensions LxWxH
<b>LS60DC10C-21</b>	10A	7–36 Vdc	60 Vpeak	10 μs	3–10 Vdc	20 mΩ	1.71 x 0.96 x 0.25 in. 43.6 x 24.5 x 6.3 mm
<b>LS60DC10F-21</b>	10A	7–36 Vdc	60 Vpeak	10 μs	7–30 Vdc	20 mΩ	

-21 = Self turn-on suppression  
RoHS Compliant



RoHS Compliant

## Series SDS Slim Single-Inline Package DC Solid-State Relays

The Series SDS slim single-inline package (SIP) relays save space on printed circuit boards. Designed for DC applications, they offer a 28Vdc 4A output and a 60Vdc 2.5A output. Several control ranges are available from 3 to 32Vdc. The low-cost plastic relays feature an integrated voltage clamp and high surge handling capability.

- Slim compact DC design
- Range for printed circuit board
- Integrated voltage clamp
- High surge handling capabilities
- Wide control range offerings

Part No.	Load Current	Load Voltage	Peak Voltage	Turn-On Time	Control Voltage	ON Resistance	Dimensions LxWxH
<b>SDS32R4K</b>	4A	0–32 V	60 Vpeak	20 μs	18–32 Vdc	120 mΩ	1.10 x 0.59 x 0.2 in. 28 x 15 x 5 mm
<b>SDS32R4A</b>	4A	0–32 V	60 Vpeak	50 μs	3–10 Vdc	120 mΩ	

RoHS Compliant



RoHS Compliant

## Series DX DIN-Rail DC Solid-State Relays

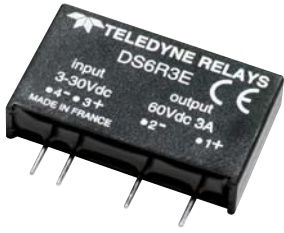
Series DX relays are designed for DIN-rail mounting. These solid-state relays include a control LED that provides visual control status. Its compact size and user-friendly package make the Series DX relay an excellent choice for designers. The DX series relays offers long life versus mechanical relays.

- Solid-state relays for DIN-rail mounting
- Control visualization by LED
- AC/DC control
- High immunity to surges
- Compact design

Part No.	Load Current	Load Voltage	Peak Voltage	Turn-On Time	Control Voltage	ON Resistance	Dimensions LxWxH
<b>DX6R3E-02</b>	3A	2–60 V	60 Vpeak	20 μs	3–30 Vdc	600 Ω	3.01 x 2.09 x 0.48 in. 76.4 x 53 x 12.2 mm
<b>DX6R3U-02</b>	3A	2–60 V	60 Vpeak	20 μs	90–240 Vac/Vdc	41 kΩ	

RoHS Compliant

## DC SOLID-STATE RELAYS



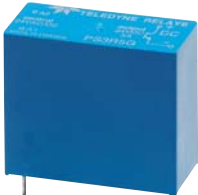
### Series DS Single-Inline Package DC Solid-State Relays

Series DS single inline package (SIP) four-pin relays are designed for mounting on printed circuit boards. The relays are designed for medium-power DC loads. The Series DS relay is an alternative to electromechanical and reed relays. The DS series relays offers a long life versus mechanical relays.

- Industry-standard package
- Surge tolerant
- Compact size
- Designed for medium-power DC loads
- Solid-state technology offering long life

Part No.	Load Current	Load Voltage	Peak Voltage	Turn-On Time	Control Voltage	ON Resistance	Dimensions LxWxH
DS6R3E	3A	2–60 V	60 V <sub>peak</sub>	200 μs	3–30 Vdc	1000 Ω	1.70 x 0.98 x 0.39 in. 43.2 x 25.4 x 10.2 mm

RoHS Compliant



Series PS



### Series TS and Series PS DC Solid-State Relays

Series TS and Series PS relays provide AC/DC switching in a compact size. They also provide AC/DC control. These relays can withstand high surge currents. TS and PS relays are pin-to-pin compatible with electromechanical relays and may be used as replacements. Applications include vending machines, lighting and fans.

- Compact size
- Pin-to-pin compatible with electromechanical relays
- AC and DC control; AC and DC output
- Random and zero-cross turn-on voltage
- High inrush capabilities

Part No.	Load Current	Load Voltage	Peak Voltage	Turn-On Time	Control Voltage	ON Resistance	Dimensions LxWxH
PS3R5G	5A	0–30 V	60 V <sub>peak</sub>	50 μs	10–30 Vdc	2100 Ω	1.14 x .50 x 1 in. 29 x 12.7 x 25.4 mm
TS3R2G	2.5A	0–30 V	60 V <sub>peak</sub>	50 μs	10–30 Vdc	2100 Ω	

RoHS Compliant



Series SHI

### NEW Series SHI DC Solid-State Relays

Series SHI relays are designed to switch high voltage (high power) DC loads. These devices feature the latest generation of High Voltage IGBT Technology. This SSR comes with built-in Diagnostic features. The SHI Series is built with many protection features including protection for transient voltage bursts, overload and short circuits of the load.

- Latest generation of IGBT Technology
- Ultra low drop out voltage
- Built-in protection against overvoltage and fast transient burst
- Built-in over-temperature protection
- Pluggable control connector with spring terminals

Part No.	Load Current	Load Voltage	Peak Voltage	Turn-On Time	Control Voltage	ON Resistance	Dimensions LxWxH
SHI75DC50-6	50A	12–940 Vdc	1270 V <sub>peak</sub>	50 μs	24-48 Vdc	35 Ω	5.67 x 2.67 x 3.27 in. 144 x 68 x 83 mm
SHI75DC50-9	50A	12–940 Vdc	1270 V <sub>peak</sub>	50 μs	72-110 Vdc	35 Ω	

## MOTOR CONTROLLERS



RoHS Compliant

### Series EMCRT Three-Phase Motor Reverser up to 7.5kW Motors

The Series EMCRT three-phase induction motor reverser can be used to turn on an industrial motor in either direction safely. It is designed to control and invert the direction of a three-phase motor. The reverser incorporates very-high-immunity components and can be mounted on a DIN rail or attached with screws.

- Controls and reverses three-phase motors without direct third leg (two legs)
- IP20 touch-proof housing
- Built-in snubber and MOV
- Forward/Reverse display LED

Part No.	Motor Current	Mains Voltage	Peak Voltage	Switch Type	Control Voltage	I <sup>2</sup> t	Dimensions LxWxH
EMCRT48D50	8.5A	24–520 Vac	1600 Vpeak	Zero Cross	12–30 Vdc	1500 A <sup>2</sup> s	3.94 x 2.99 x 2.22 in.
EMCRT48D75	16A	24–550 Vac	1600 Vpeak	Zero Cross	12–30 Vdc	5000 A <sup>2</sup> s	100 x 76 56.5 mm

RoHS Compliant



EMC48S50-04

### Series EMC Soft-Start Motor Controller up to 26kW Motors

The Series EMC motor controllers provide an alternative to costly and large variable speed controllers in pumps, fans, compressors and conveyors. Its six-thyristor structure, working like a full-wave phase angle controller, reduces the induction motor starting current as well as the motor starting torque to improve the efficiency of the power used.

- Controls both positive and negative cycles
- Avoids voltage fluctuations that lead to flicker
- Fits existing applications without modification of the wiring field configuration
- Features diagnostic and self-test functions

#### MAIN CHARACTERISTICS

Part No.	Max. Motor Power @40°C				IAC53a @40°C		Phase to Phase Voltage	Mains Frequency	Input	Operating Temperature
	Star (Y)		Delta (D)		Max.	EN60947-4-2				
	400Vac	230Vac	400Vac	230Vac						
EMC48S50-04	15kW	8.6kW	26kW	15kW	30A	22.5A	200 to 480Vac	40 to 65Hz	10 to 24Vdc	–40°C to +100°C



RoHS Compliant

## PROTECTION MODULES FOR DC SOLID-STATE RELAYS



RoHS Compliant

### Series PR Protection Module

Series PR is a protection module that helps protect DC solid-state relays against voltage transients due to inductive effects of lines and loads. The PR Series offer 2 types, one with additional output protection for DC relays that already have built-in MOV and one with a full protection scheme for relays that have no built-in protection. The PR Series also features IP20 touch-proof covers.

- External protection for DC Solid-State Relays
- Fly wheel diode
- Decoupling capacitor and discharge resistor
- Clamping voltage function
- IP20 touch-proof flaps

Part No.	Load Current	Load Voltage	Peak Voltage	Recover Time	Vdrop During Fly Wheel	Discharge Time Constant	Dimensions LxWxH
PR20DC80	0-80A	0-130 Vdc	200 Vpeak	190 ns	1.2 V	2 s	2.3 x 1.77 x 1.18 in.
PR75DC80	0-80A	0-40 Vdc	75 Vpeak	190 ns	1.2 V	1 s	58.5 x 45 x 30 mm

See Appendix for heat-sink information and other options.

RoHS Compliant

### Hockey Puck Relay Options



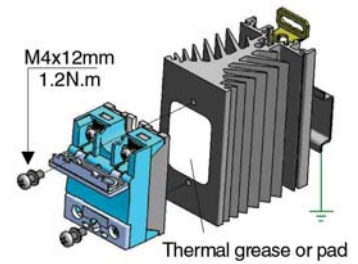
2–2.5°C/W  
Teledyne P/N FW151



1.1°C/W  
Teledyne P/N FW108



0.3°C/W  
Teledyne P/N FW031



Thermal grease or pad



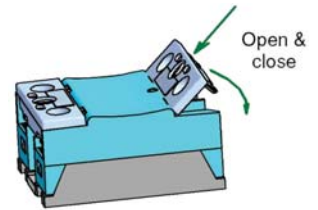
DIN Rail Adapter  
Teledyne P/N DL12

**Mounting**

Most SSRs must be mounted on heat sinks. A large range of heat sinks are available. For heat-sink mounting, use thermal grease or a thermal pad with high conductivity specified by Teledyne. See our website for additional heat sinks.



Thermal Pad  
Teledyne P/N –12



Removable IP20 touch-proof terminal covers on HIPpak

**Typical Loads (Random)**

HIPpak relays with random turn-on are designed for high inductive loads or phase angle control applications. Our data sheet lists nominal current of power thyristors corresponding to a resistive load (AC-51). Depending on the loads, check the inrush current at turn ON and possible overvoltages at turn OFF.

Main applications:

- AC-55b — Incandescent or infrared lamps. Inrush current is generally 10 times  $I_n$  during few 10ms. Random relays often use in-phase angle controllers or soft-starters with the right control.
  - AC-53 — Three-phase motors. 2 or 3 random turn-on relays can drive such motors.
  - AC-56a — Transformer loads. Very high inrush current up to 100 times  $I_n$ . Use a random turn-on SSR like the SH.
- The table below lists recommended current values for proper lifetime expectancy.

**Typical Loads (Zero-Cross)**

HIPpak relays with zero-cross turn-on are designed for most types of loads. Our data sheet lists the AC-51 current value corresponding to resistive loads.

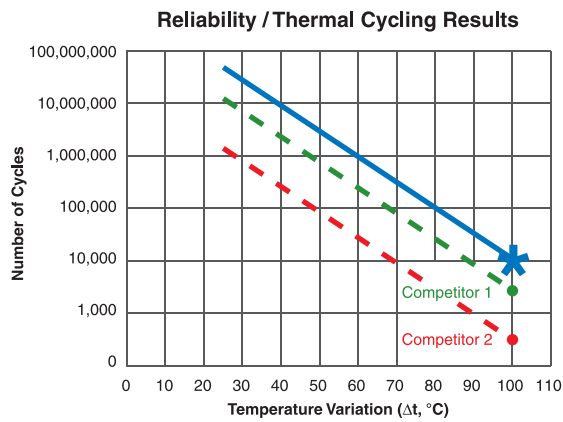
For other loads, check the inrush current at turn ON and possible overvoltages at turn OFF:

- AC-55b — Incandescent lamps. Inrush current is generally 10 times  $I_n$  during few 10ms.
- AC-55a — Electric discharge lamp. These loads often have overcurrent at turn ON and overvoltage at turn OFF, so use 400VAC SSR on 230VAC mains.
- AC-58 — One-pole motors. These loads often have overcurrent at turn ON and overvoltage at turn OFF, so use 400VAC SSR on 230VAC mains and adapt the SSR current to the starting current of the motor.
- AC-53 — Three-phase motors. 2 or 3 SH zero-cross relays can drive these motors, but generally use E3P/E3PT or other three-phase relays or SH random range.
- AC-56a — Transformer loads. Very high inrush current up to 100 times  $I_n$ . Use SH random relay or peak control SSR.
- AC-56b — Capacitor loads with very high current at turn ON and overvoltage at turn OFF. Our high-voltage relays are well adapted for high inrush current.

SSR Model	AC-53 Current (motor)	AC-55b Current (lamp)	AC-55b Current (transformer)	AC-55b Current (capacitor)
12A	2.5A	2.5A	0.4A	XXX
25A	5A	5A	1A	XXX
35A	9A	9A	2A	XXX
50A	12A	12A	3A	13A
75A	16A	16A	6A	24A
95A	24A	24A	9A	36A
125A	32A	32A	12A	48A



# Power Solid-State Relays Proven - Rugged - Reliable



\* Teledyne HIPpak relay versus competitive 50A relays

With more than 50 years of proven experience, Teledyne Relays delivers solutions second to none with features like built-in touch-proof covers, built-in heat sinks, miniature solutions, large I<sup>2</sup>t values for higher reliability, tight zero-cross window for less noise and lower in-rush currents. Our rugged design offers up to 2000A surge capability and excellent thermal characteristics.

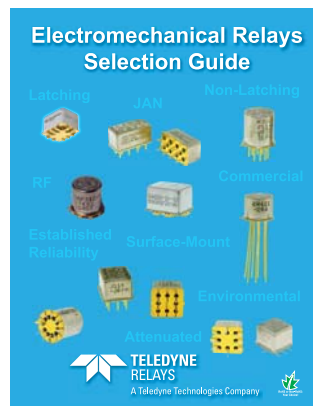
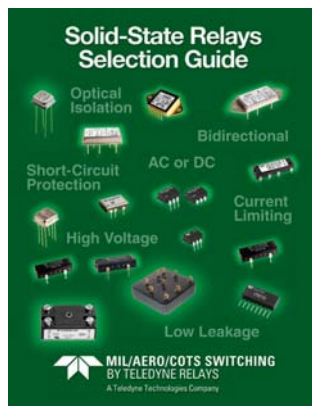
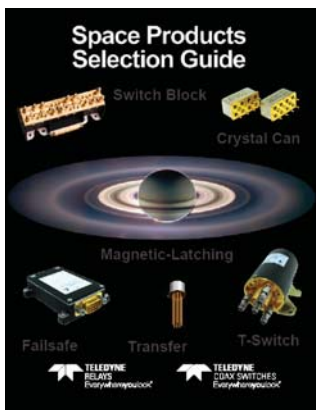


**TELEDYNE  
RELAYS**  
Everywhereyoulook™

(800) 594-5955 • [www.teledynereleys.com](http://www.teledynereleys.com)

## Can't Find What You Need?

Check out our full line of relays and switches. Order literature online at <http://www.teledynereleys.com/lit-request.asp>



## Teledyne Relays offers electromechanical relays for various markets?

### RF RELAYS

- Signal Integrity up to 40Gbps
- DC - 16GHz
- Surface-Mount
- DPDT, SPDT, 4PST and Loopback Relays



### MILITARY GRADE RELAYS

- Built and tested to meet MIL-PRF-39016
- Built and tested to meet MIL-PRF-28776
- Built-in Diodes, Transistor Driver and CMOS
- Low Power coils



### TELEDYNE ESTABLISHED RELIABILITY RELAYS

- Fully defined product requirements and screening levels
- Spacer/Spreader pad options not allowed by military specifications
- Reduced lead time and cost vs Military Grade



### HIGH PERFORMANCE RELAYS

- -65° C to +200° C
- Shock up to 4,000 g's
- Vibration up to 380 g's
- Non-Latching & Magnetic-Latching



### COMMERCIAL RELAYS

- Standard electrical tests at 25° C
- "Low cost" switching solutions
- Surface-Mount
- Short lead times



# Did you know...

Teledyne Coax Switches offers coaxial switches for ATE, Radar, Amplifier Switching, Etc.?

## SPDT SWITCHES

- DC - 40GHz, Internal 50Ω Termination
- SMA, mini-SMB, TNC & N Connectors
- 5 Million Cycles
- High Power & Low PIM
- Failsafe & Latching



## TRANSFER SWITCHES

- DC - 18GHz
- SMA, TNC & N Connectors
- 5 Million Cycles
- High Power
- Failsafe & Latching



## MULTI-THROW SWITCHES

- DC - 40 GHz, Internal 50Ω Termination
- SMA, mini-SMB, TNC & N Connectors
- SP3T - SP10T
- 5 Million Cycles
- Normally Open & Latching



## LOW PIM SWITCHES

- DC - 3 GHz
- SMA, N and 7/16 D Connectors
- SPDT, Transfer and Multi-Throw
- Failsafe & Latching



## SPECIALTY SWITCHES

- DC - 40GHz
- 3-State Attenuated Switch
- Radiation Shielding
- Switch Blocks
- Redundant Diode Configuration



## Teledyne Relays offers Commercial/Industrial Solid State Relays?

### SINGLE PHASE AC SOLID STATE RELAYS

- Up to 690Vac, 125A
- Input & Output Protection
- Chassis, DIN Rail and PCB Mount
- Zero-Cross & Random Switching
- Touch-Proof Covers



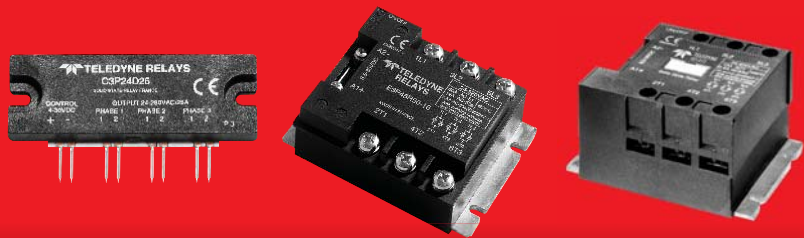
### DUAL-PHASE AC SOLID STATE RELAYS

- Up to 600Vac, 50A
- Output Protection
- Chassis and DIN Rail
- Zero-Cross & Random Switching
- Touch-Proof Covers



### 3 & 4 PHASE SOLID STATE RELAYS

- Up to 600Vac, 75A
- Output Protection
- Chassis and DIN Rail
- Zero-Cross & Random Switching
- DC & AC Control



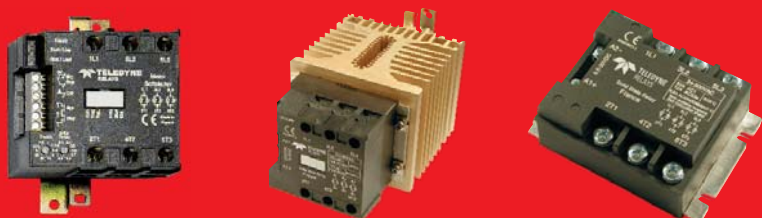
### DC SOLID STATE RELAYS

- Up to 1400Vdc, 100A
- Output Protection
- Chassis, DIN Rail and PCB Mount
- IGBT and MOSFET
- Touch-Proof Covers



### SOFT START MOTOR CONTROLLERS AND MOTOR REVERSERS

- Up to 26kW, 480Vac
- Star & Delta Configurations
- DIN Rail
- Output Protection
- Built-in Diagnostics and Self Test



# Did you know...

## Teledyne Relays offers Military Solid State Relays?

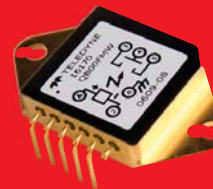
### DC SOLID STATE RELAYS

- Meet MIL-PRF-28750
- Tested Per MIL-STD-704
- Silicon Carbide MOSFET
- Up to 250Vdc, 1A
- Chassis and PCB Mount
- Short-Circuit Protection
- Plastic and Hermetically Sealed



### BI-DIRECTIONAL/AC SOLID STATE RELAYS

- Meet MIL-PRF-28750
- Tested Per MIL-STD-704
- Up to 250Vac, 25A
- Chassis and PCB Mount
- Short-Circuit Protection
- Plastic and Hermetically Sealed



### COMMERCIAL, LOW POWER, I/O MODULES

- Up to 250Vac, 10A
- Short-Circuit Protection
- Chassis and PCB Mount
- Zero-Cross & Random Switching
- Low Off-State Leakage Current



### SILICON CARBIDE TECHNOLOGY

- Up to 270Vdc, 20 A
- Meet MIL-PRF-28750
- Tested Per MIL-STD-704
- Low ON resistance
- Low Profile Hermetic Package



# Did you know...

**Teledyne Coax Switches offers coaxial switch matrices for ATE, Radar, Filter Switching, Airborne Surveillance Systems, Etc.?**

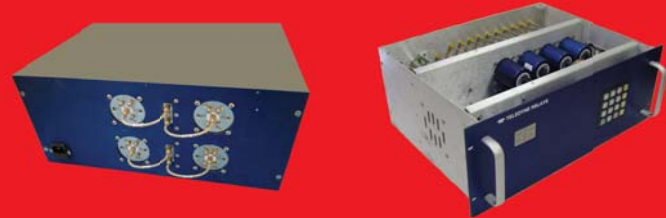
## MINI MATRICES

- Remote Control via USB and/or Ethernet
- GUI controllable
- Accepts ASCII code
- Available in 18, 26.5 and 40 GHz
- SPDT, Transfer and Multi-throw configurations



## MULTIPLEXOR/FANOUT SWITCH MATRICES

- Up to 1x1024 Switch Matrix
- SMA, mini-SMB, TNC & N Connectors
- Failsafe, Latching or Normally Open Configurations
- Switching Systems for 50Ω & 75Ω applications



## MIMO/BLOCKING AND MIMO SINGLE CONNECTION SWITCH MATRICES

- Up to 1x1024 Switch Matrix
- SMA, mini-SMB, TNC & N Connectors
- RS-232, TTL, USB, GPIB, TTL, Ethernet Control
- 1 Million Cycles
- Failsafe & Latching



## CUSTOMIZED SWITCH MATRICES

- EMI/RFI
- Transient Suppression
- Ballistic Shock Fatigue
- Crash Load
- Altitude

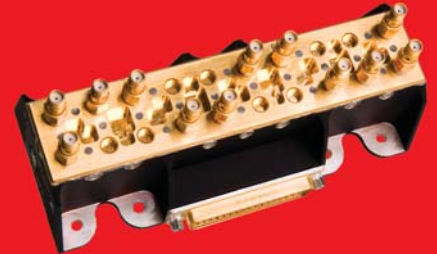


# Did you know...

## Teledyne Relays offers Space Qualified Switches?

### SPACE MARKET SEGMENTS SERVED

- *Deep-Space Probes*
- *Manned Programs*
- *Communications Satellites*
- *Launch Vehicles*
- *Earth Observatory / Weather Satellites*
- *Commercial / Military Satellites*



### CAPABILITIES

- *Logistic Infrastructure*
- *Chemical Analysis Lab*
- *Scanning Electro Microscope*
- *In-house Plating Shop*
- *Environment Test Lab*
- *Field Technical Support*



### ELECTROMECHANICAL RELAY SPECIFICATIONS

- *MIL-PRF-39016*
- *MIL-PRF-28776*
- *NASA/GSFC S-311-P-754*
- *NASA EEE-INST-002*
- *ESA/SCC 3601 & 3602*



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