

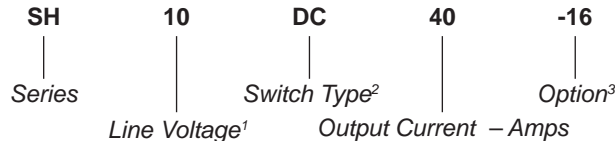
**FEATURES/BENEFITS**

- Latest generation MOSFET technology
- Ultra low on-state resistance
- Low output leakage current
- Built-in overvoltage protection
- Reverse protected triggered control input to avoid linear control risks
- No radiated or conducted disturbances
- IP20 touch-proof flaps



Part Number	Description
SH10DC40	40A, 100 Vdc Solid-State Relay
SH10DC40-16	40A, 60 Vdc Solid-State Relay
SH20DC15-T1	20A, 200 Vdc Solid-State Relay

**Part Number Explanation**



**NOTES**

- 1) Line Voltage (peak): 10 = 100 Vdc
- 2) Switch Type: DC = DC
- 3) Option: Internal Voltage Protection

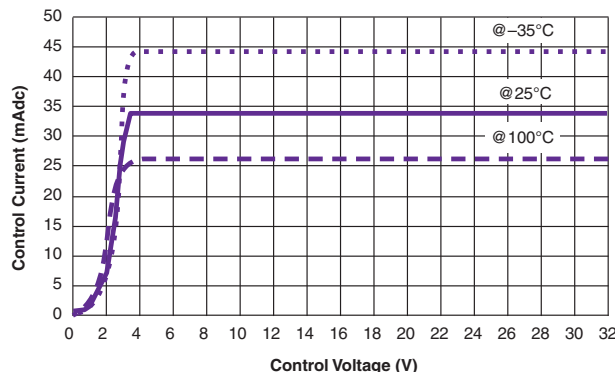
**ELECTRICAL SPECIFICATIONS**

(+25°C ambient temperature unless otherwise specified)

**INPUT (CONTROL) SPECIFICATIONS**

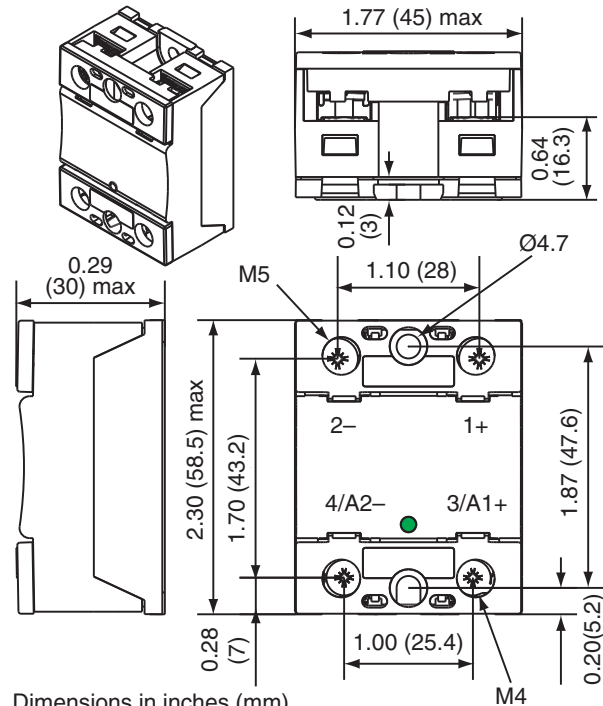
	Min	Max	Units
Control Range	3.5	32	Vdc
Must Turn-Off Voltage	1		Vdc
Reverse Voltage		32	Vdc

**CONTROL CHARACTERISTIC**



**Figure 2**

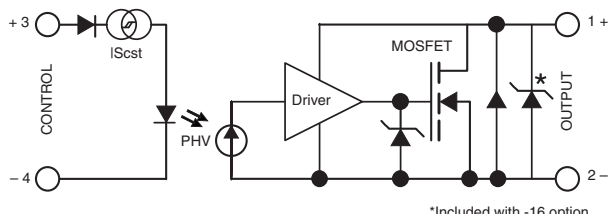
**MECHANICAL SPECIFICATION**



Dimensions in inches (mm)  
Weight: 2.82 oz. (80g)

**Figure 1**

**BLOCK DIAGRAM**



**Figure 3**

**ELECTRICAL SPECIFICATIONS**  
(+25°C ambient temperature unless otherwise specified)

**OUTPUT (LOAD) SPECIFICATIONS**

	Min	Max	Units
<b>Operating Range</b>			
SH10DC40	5	100	Vdc
SH10DC40-16	5	60	Vdc
SH20DC20-16	5	110	Vdc
<b>Peak Voltage</b>			
SH10DC40		100	Vdc
SH10DC40-16		100	Vdc
SH20DC20-16		200	Vdc
<b>Overvoltage Protection (Built-In)</b>			
SH10DC40-16		56V (TVS) <sup>1</sup>	
SH20DCXX-16		75V (MOV Size 20) <sup>2</sup>	
<small>1) Transient Voltage Suppressor; 2) Metal Oxide Varistor</small>			
<b>Reverse Voltage Drop</b>			
SH10DC40-16		1.3	V
SH20DCXX-16		1.5	V
<b>Nominal Current (Resistive)</b>			
SH10		40	A
SH20DC20-16		20	A
<b>Non-Repetitive Peak Overload Current</b>			
SH10		320	A
SH20DC20-16		160	A

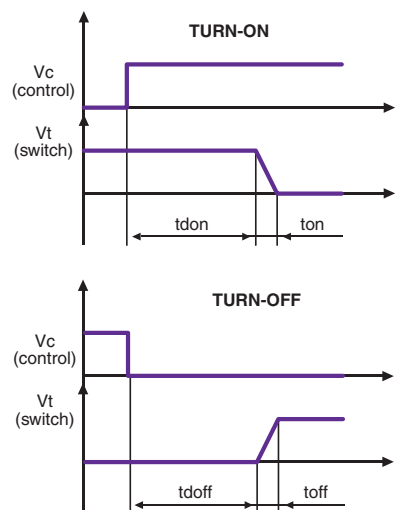
**ELECTRICAL SPECIFICATIONS (continued)**  
(+25°C ambient temperature unless otherwise specified)

**OUTPUT (LOAD) SPECIFICATIONS**

	Min	Max	Units
Leakage Current		3	mA
On-State Resistance	@25 °C	@125 °C	
SH10	15	30	mΩ
SH20DC20-16	45	90	mΩ
<b>Output Capacitance (Typical)</b>			
SH10	0.7		nF
SH20DC20-16	0.6		nF
<b>Junction-Case Thermal Resistance</b>			
SH10		0.9	°C/W
SH20DC20-16		1.2	°C/W
<b>Built-In Heat Sink Thermal Resistance (Vertically Mounted)</b>			
		10	°C/W
<b>Heat Sink Thermal Time Constant</b>			
		10	min
<b>Control Inputs/Power Outputs</b>			
Insulation Voltage		2.5	kV
Turn-On Time		20	μs
Turn-On Delay		20	μs
Turn-Off Time		20	μs
Turn-Off Delay		20	μs
On-Off Frequency		1000*	Hz

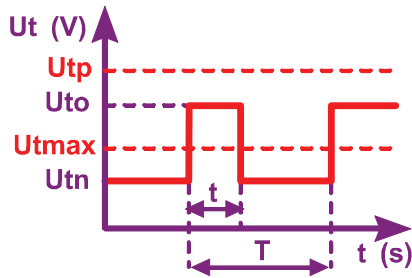
\*For high frequency, take two times the load current to calculate the heat sink.

**TIME DIAGRAMS**



**Figure 4**

**BUILT IN OVERVOLTAGE PROTECTION CHARACTERISTICS**



$$U_{to} < U_{tp}$$

$$t_{max} = \frac{0.75}{(U_{to} - U_{tmax}) \times I_e}$$

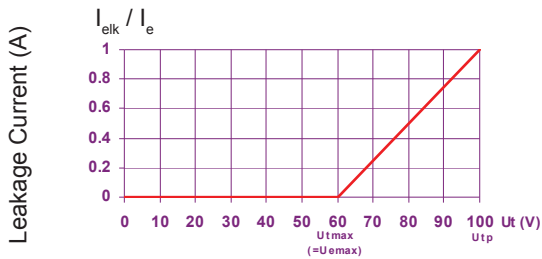
$$P_{(protection)} = I W_{max}$$

$$\Rightarrow \frac{(U_{to} - U_{tmax}) \times I_e \times t}{T} \leq 1$$

- $I_{elk}$  : Leakage current of relay
- $I_e$  : User load nominal current
- $U_{tp}$  : Relay max. non repetitive peak voltage
- $U_{tmax}$  : Max. nominal voltage of relay

- $U_{to}$  : Possible overvoltage above  $U_{tmax}$
- $U_{tn}$  : User power supply voltage
- $t$  : Overvoltage duration
- $T$  : Time between 2 overvoltages

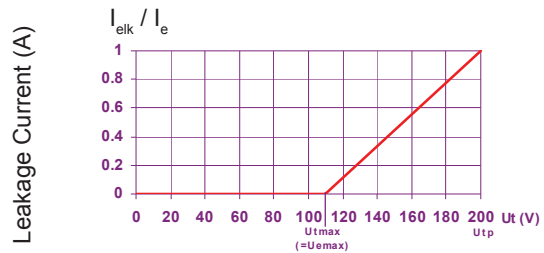
**SH10DC40-16**



Voltage (Vdc)

**Figure 5a**

**SH20DC20-16**



Voltage (Vdc)

**Figure 5b**

**HIGH SIDE WIRING DIAGRAM**  
(Load Connected to “-”)

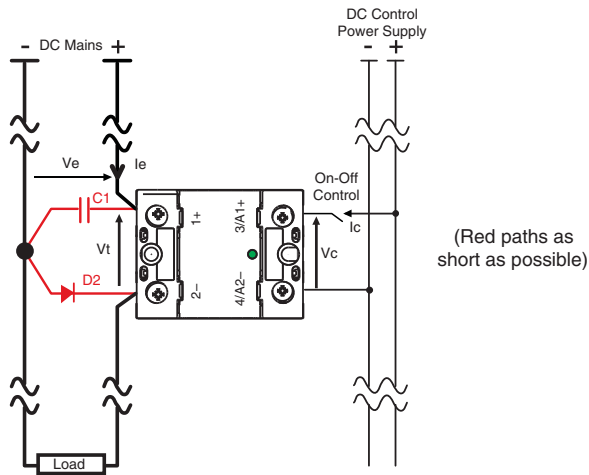


Figure 6a

**LOW SIDE WIRING DIAGRAM**  
(Load Connected to “+”)

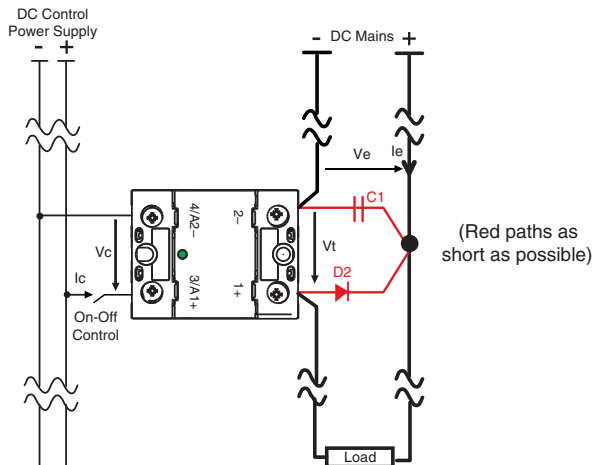


Figure 6b

**GENERAL SPECIFICATIONS**

(+25°C ambient temperature unless otherwise specified)

**ENVIRONMENTAL SPECIFICATIONS**

	Min	Max	Units
Operating Temperature	-25	+90	°C
Storage Temperature	-40	+100	°C
Input-Output Isolation		2.5	kV
Insulation Resistance	1		GΩ
Insulation Capacitance	8		pF
Junction Temperature			
Steady State		125	°C
Transient		175	°C
Case Temperature		100	°C

**CONNECTIONS**

	Power	Control
Screwdriver		POZIDRIV2
Tightening Torque	2 N.m	1.2 N.m
Insulated crimp terminals (Round Tabs, Eyelet Type)	M5	M4

**MISCELLANEOUS**

Display	Green LED (ON)
Housing	UL94V0
Mounting	2 screws (M4x12mm)
Noise Level	No audible noise

**GENERAL**

Standards	IEC60947-1
Protection Level	IP20
Protection Against Direct Touch	Yes
CE Marking	Yes

**E.M.C. EMISSION**

Radiated & Conducted Disturbances	Pending
-----------------------------------	---------

**ACCESSORIES**

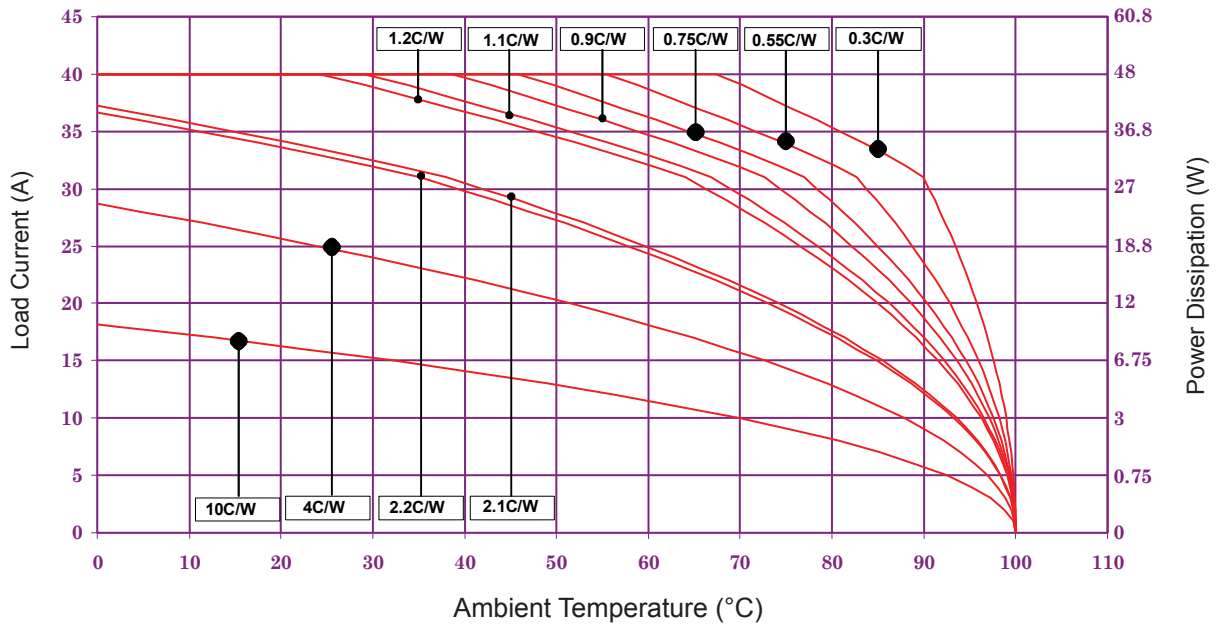
Faston: Contact Factory



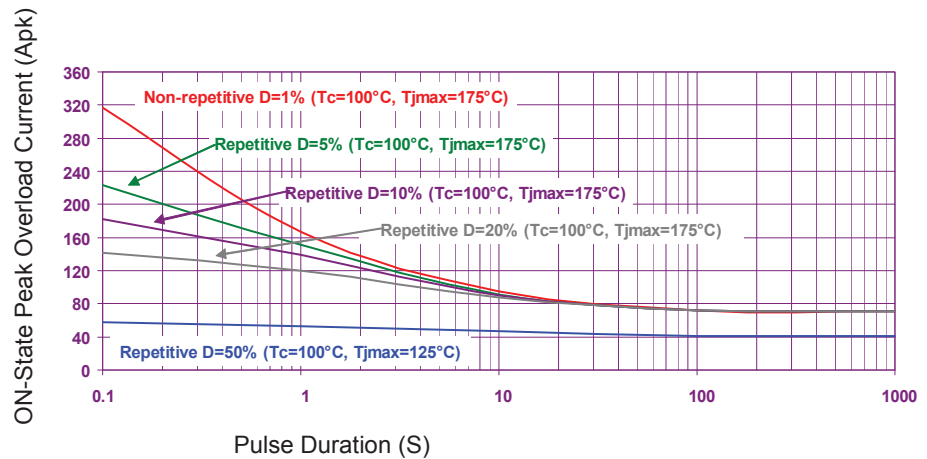
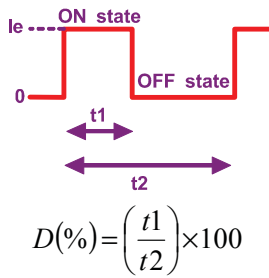
**NOTES**

1. For additional/custom options, contact factory.

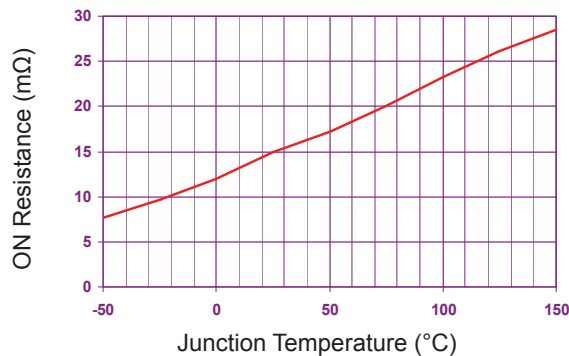
**OUTPUT RELAY CHARACTERISTIC CURVES FOR SH10DC40 & SH10DC40-16**



**Figure 7a**

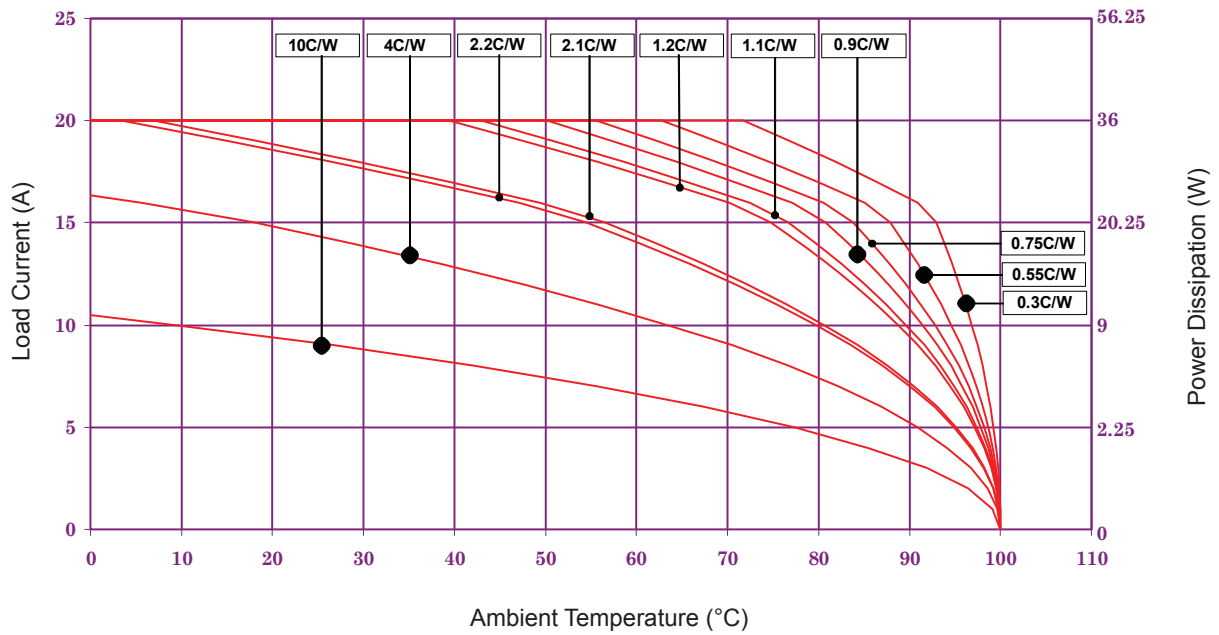


**Figure 7b**

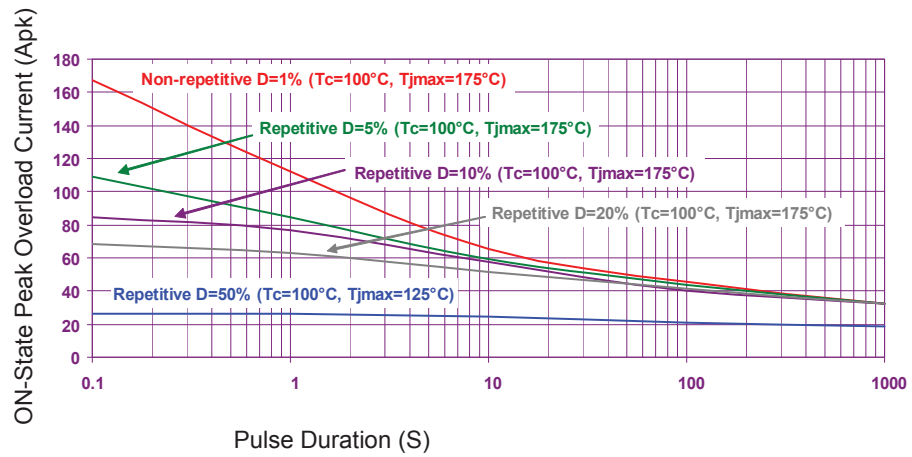
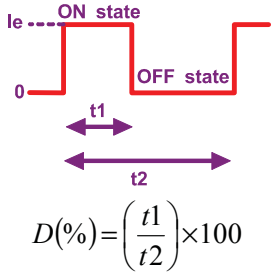


**Figure 7c**

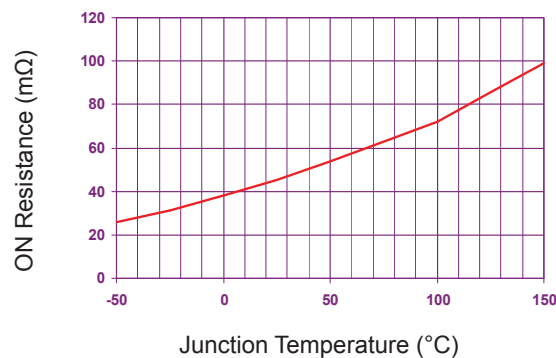
**OUTPUT RELAY CHARACTERISTIC CURVES FOR SH20DC20-16**



**Figure 8a**



**Figure 8b**



**Figure 8c**