

Automotive AHS Series



Features

- Products meet applicable automotive industry standards
- Compatible with high-volume electronics assembly
- Resettable solution against overcurrent and short-circuit
- AEC-Q200 qualified, RoHS compliant, and ISO/TS16949 certified
- Surface-mount form factor

Additional Information



Datasheet



Resources



Samples

Description

Helping to reduce weight of wire harnesses. PPTC devices distributed in a circuit can allow the use of smaller wire sizes with the resulting harnesses. Forego looping back and forth around a fuse box and place your protection wherever you see fit. The solid state composition of PPTC devices helps provide reliability.

Applications

- Automotive and industrial transportation
- Actuators and medium motors
- Trace protection
- Harness/junction box protection
- Powered outputs
- Electronic control modules
- Telematics/Infotainment

Benefits

- Expertise from the world's leading resettable overcurrent protection manufacturer
- Wide range of dedicated automotive surface-mount and radial-leaded resettable overcurrent devices
- High performance transient voltage protection devices

Electrical Characteristics

Part Number	$I_H(A)@$	$I_H(A)@$	I_T	V_{MAX}	I_{MAX}	$P_{D\ TYP}$	Max Time-to-trip		R_{MIN}	R_{1MAX}	R_{aMAX}
	(R_{1MAX})	(R_{aMAX})	(A)	(V_{DC})	(A)	(W)	(A)	(s)	(Ω)	(Ω)	(Ω)
AHS (High Temperature) – 16V											
AHS080-2018	0.80	0.80	2.00	16	70	1.5	8.0	9.0	0.130	0.550	0.550
AHS120	1.20	1.20	2.30	16	50	2.2	8.0	2.0	0.150	0.340	0.340
AHS160	1.60	1.60	3.20	16	70	2.2	8.0	15.0	0.050	0.150	0.150
AHS200	2.00	2.00	4.00	16	70	2.3	8.0	13.4	0.050	0.140	0.140
AHS300	3.00	3.00	6.00	16	70	3.0	15.0	8.0	0.024	0.083	0.083

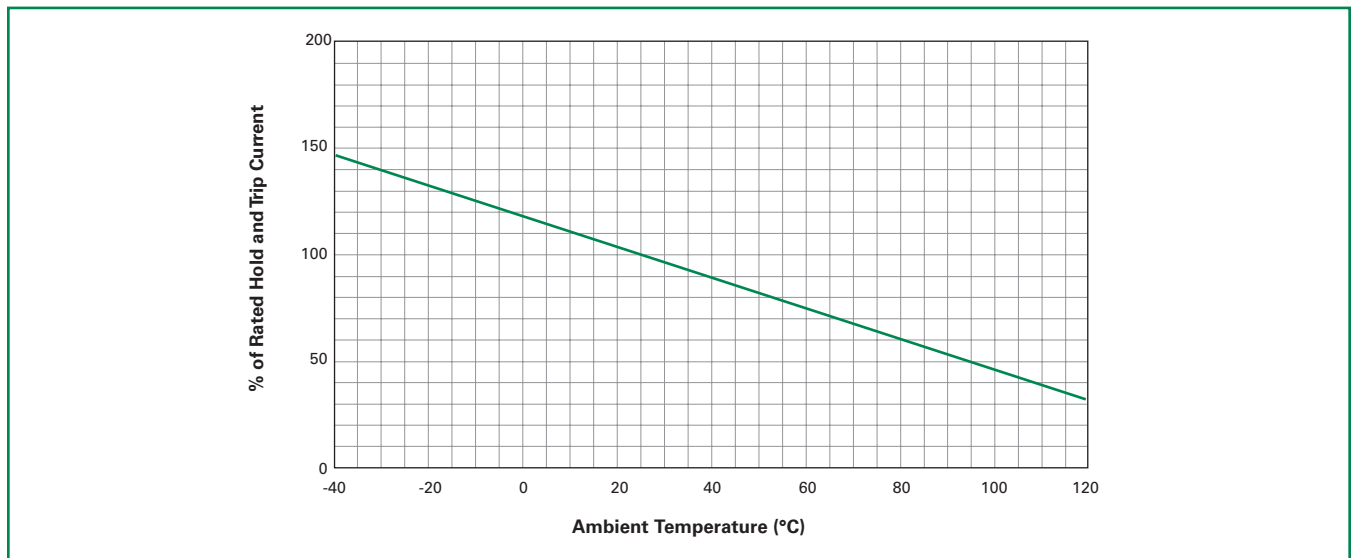
Notes:

- I_H : Hold current: maximum current device will pass without interruption in 25°C, unless otherwise specified
- I_T : Trip current: minimum current that will switch the device from low-resistance to high-resistance in 25°C still air, unless otherwise specified.
- V_{MAX} : Maximum voltage device can withstand without damage at rated current.
- I_{MAX} : Maximum fault current device can withstand without damage at rated voltage.
- P_D : Power dissipated from device when in the tripped state in 25°C still air, unless otherwise specified.
- R_{MIN} : Minimum resistance of device as supplied at 25°C, unless otherwise specified.
- R_{1MAX} : Maximum resistance of device when measured one hour post reflow, unless otherwise specified.
- R_{aMAX} : Maximum functional resistance of device after being subjected to the stresses described in PS400 at 25°C, unless otherwise specified.

Temperature Derating

Maximum Ambient Temperature											
Part Number	-40°C	-20°C	0°C	20°C	25°C	40°C	50°C	60°C	70°C	85°C	125°C
Hold Current (A)											
AHS (High Temperature) – 16V											
AHS080-2018	1.20	1.04	0.90	0.8	0.77	0.68	0.62	0.60	0.53	0.46	0.26
AHS120	1.72	1.54	1.36	1.2	1.14	1.01	0.92	0.83	0.74	0.61	0.25
AHS160	2.15	1.96	1.78	1.6	1.55	1.42	1.33	1.24	1.15	1.01	0.64
AHS200	2.90	2.50	2.20	2.0	1.94	1.80	1.75	1.70	1.40	1.18	0.67
AHS300	4.20	3.80	3.70	3.0	2.92	2.63	2.44	2.10	2.00	1.76	1.00

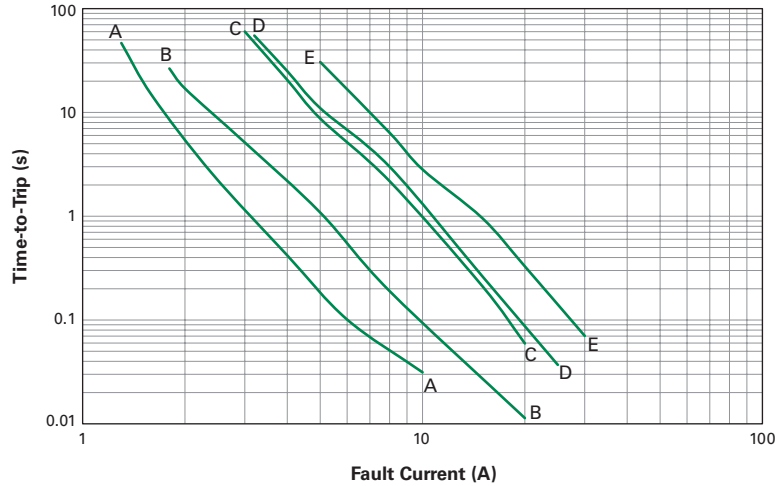
Temperature Derating Curve



Typical Time-to-Trip Curves at 25°C

AHS

- A = AHS080-2018
- B = AHS120
- C = AHS160
- D = AHS200
- E = AHS300



Physical Specifications

Lead Material	Tin-plated Brass to MIL-T-10727B
Soldering Characteristics	Solderability per ANSI-J-STD-002 Category 1
Solder Heat Withstand	per IEC 60068-2-20, Test Tb, Section 5, Method 1a
Flammability	per IEC 60695-11-5 Needle Flame Test for 20 seconds
Operation Temperature	-40°C~125°C

Note: See PS400 for other physical specifications.

Environmental Specifications

Test	Conditions	Resistance Change
Passive Aging	70°C, 1000 hrs	±3% Typical
	85°C, 1000 hrs	±5% Typical
Humidity Aging	85°C, 85% R.H., 1000 hrs	±1.2% Typical
Thermal Shock	125°C, -40°C 20 times	-33% Typical
Solvent Resistance	Freon	No change
	Trichloroethane	No change
	Hydrocarbons	No change

Note: See PS400 for other environmental specifications.

Moisture Resistance Level	Level 2a, J-STD-020
Storage Conditions	40°C max, 70% RH max; devices should remain in original sealed bags prior to use. Devices may not meet specified values if these storage conditions are exceeded.

Dimension Figures

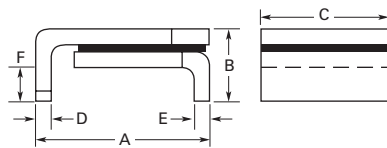


Figure 1

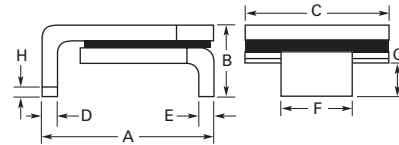


Figure 2

Dimensions

Part Number	Dimensions in Millimeters (Inches)																Figure
	A		B		C		D		E		F		G		H		
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
AHS (High Temperature) – 16V																	
AHS080-2018	4.72 (0.186)	5.44 (0.214)	—	1.52 (0.060)	4.22 (0.166)	4.93 (0.194)	0.25 (0.010)	0.36 (0.014)	0.25 (0.010)	0.36 (0.014)	0.30 (0.012)	0.46 (0.018)	—	—	—	—	1
AHS120	6.73 (0.265)	7.98 (0.314)	—	3.00 (0.118)	4.8 (0.19)	5.44 (0.214)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	2.16 (0.085)	2.41 (0.095)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)	—	2
AHS160	8.00 (0.315)	9.40 (0.370)	—	3.00 (0.118)	6.0 (0.24)	6.71 (0.264)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	3.68 (0.145)	3.94 (0.155)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)	—	2
AHS200	8.00 (0.315)	9.40 (0.370)	—	3.00 (0.118)	6.0 (0.240)	6.71 (0.264)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	3.68 (0.145)	3.94 (0.155)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)	—	2
AHS300	8.00 (0.315)	9.40 (0.370)	—	3.00 (0.118)	6.0 (0.240)	6.71 (0.264)	0.56 (0.022)	0.71 (0.028)	0.56 (0.022)	0.71 (0.028)	3.68 (0.145)	3.94 (0.155)	0.66 (0.026)	1.37 (0.054)	0.43 (0.017)	—	2

Recommended Pad Layout



Packaging and Marking Information

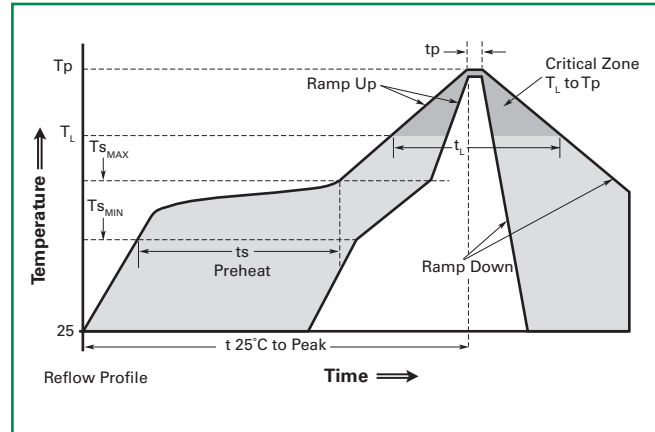
Part Number	Tape and Reel Quantity	Standard Package	Part Marking	Recommended Pad Layout Figures [mm (in)]		
				Dimension A (Min*/Nom)	Dimension B (Nom)	Dimension C (Nom)
AHS (High Temperature) – 16V						
AHS080-2018	4,000	20,000	H08	4.6 (0.18)	1.5 (0.06)	3.4 (0.134)
AHS120	2,000	10,000	H12	3.1 (0.12)	2.3 (0.09)	5.1 (0.201)
AHS160	1,500	7,500	160	4.6 (0.18)	2.3 (0.09)	6.1 (0.240)
AHS200	1,500	7,500	H200	4.6 (0.18)	2.3 (0.09)	6.1 (0.240)
AHS300	1,500	7,500	H300	4.6 (0.18)	2.3 (0.09)	6.1 (0.240)

* These devices are intended for use in automotive applications.

Solder Reflow Recommendations

Profile Feature	Pb-Free Assembly
Average ramp up rate (T_{s_MAX} to T_p)	3°C/s max
Preheat	
• Temperature min (T_{s_MIN})	150°C
• Temperature max (T_{s_MAX})	200°C
• Time (t_{s_MIN} to t_{s_MAX})	60-120 s
Time maintained above:	
• Temperature (T_L)	217°C
• Time (t_L)	60-150 s
Peak/Classification temperature (T_p)	260°C
Time within 5°C of actual peak temperature	
Time (t_p)	30 s max
Ramp down rate	3°C/s max
Time 25°C to peak temperature	8 min max

Note: All temperatures refer to topside of the package, measured on the package body surface.



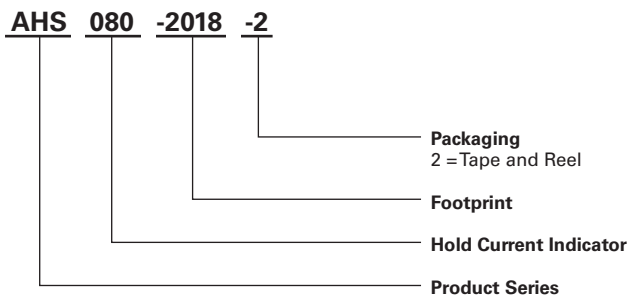
Solder Reflow

- Recommended reflow method: IR, hot air, nitrogen.
- Recommended maximum paste thickness: 0.25mm (0.010in)
- Devices can be cleaned using standard methods and aqueous solvents.
- Experience has shown the optimum conditions for forming acceptable solder fillets occur when a reasonable amount of solder paste is placed underneath each device's termination. As such, we request that customers comply with our recommended solder pad layouts.
- Customer should validate that the solder paste amount and reflow recommendations meet its application.
- We request that customer board layouts refrain from placing raised features (e.g. vias, nomenclature, traces, etc.) underneath PolySwitch devices. It is possible that raised features could negatively impact solderability performance of our devices.

Rework

- Standard industry practices. (Please also avoid direct contact to the device.)

Part Ordering Number System



Tape and Reel Specifications

Description	AHS EIA 481-2		
	AHS080-2018	AHS120	AHS160 AHS200 AHS300
W	16.0 ± 0.30	16.0 ± 0.30	16.0 ± 0.30
P₀	4.0 ± 0.10	4.0 ± 0.10	4.0 ± 0.10
P₁	8.0 ± 0.10	8.0 ± 0.10	12.0 ± 0.10
P₂	2.0 ± 0.10	2.0 ± 0.10	2.0 ± 0.10
A₀	5.11 ± 0.15	5.6 ± 0.23	6.9 ± 0.23
B₀	5.6 ± 0.23	8.1 ± 0.15	9.6 ± 0.15
B₁ max	12.1	12.1	12.1
D₀	1.5 + 0.10/-.00	1.5 + 0.10/-.00	1.5 + 0.10/-.00
F	750 ± 0.10	750 ± 0.10	750 ± 0.10
E₁	1.75 ± 0.10	1.75 ± 0.10	1.75 ± 0.10
E₂ min	14.25	14.25	14.25
T max	0.4	0.4	0.4
T₁ max	0.1	0.1	0.1
K₀	1.8 ± 0.15	3.2 ± 0.15	3.4 ± 0.15
A max	330	330	330
N min	50	50	50
W₁	16.4 + 2.0/-.00	16.4 + 2.0/-.00	16.4 + 2.0/-.00
W₂ max	22.4	22.4	22.4

Tape and Reel Diagrams

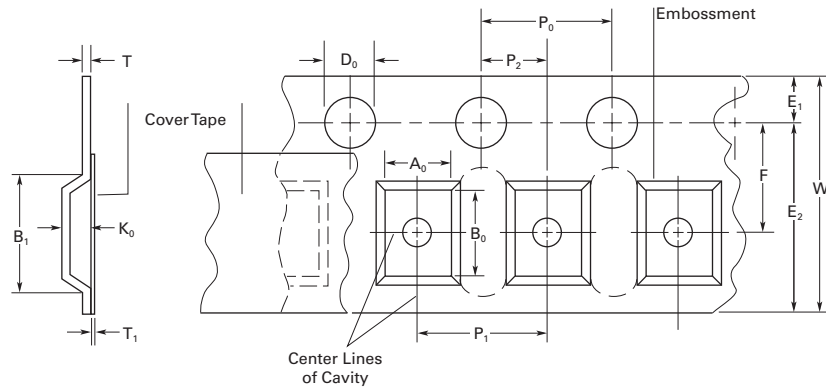


Figure 1

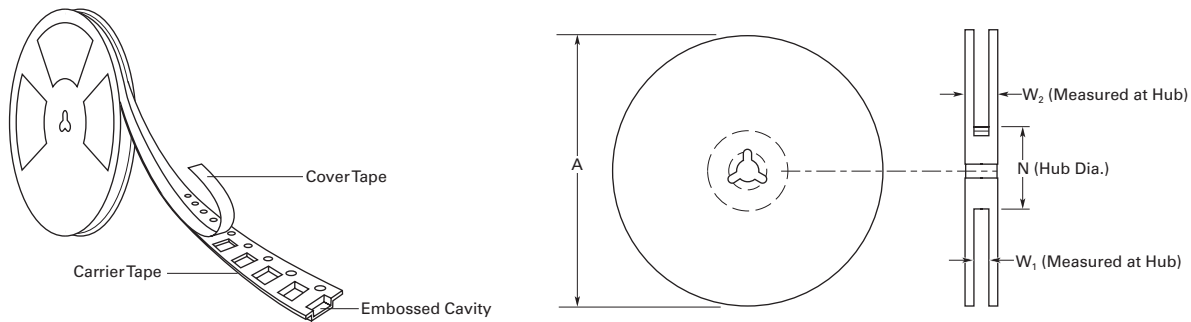


Figure 2

WARNING

- Users should independently evaluate the suitability of and test each product selected for their own application.
- Operation beyond the maximum ratings or improper use may result in device damage and possible electrical arcing and flame.
- These devices are intended for protection against damage caused by occasional overcurrent or overtemperature fault conditions and should not be used when repeated fault conditions or prolonged trip events are anticipated.
- Contamination of the PPTC material with certain silicone-based oils or some aggressive solvents can adversely impact the performance of the devices.
- Device performance can be impacted negatively if devices are handled in a manner inconsistent with recommended electronic, thermal, and mechanical procedures for electronic components.
- PPTC devices are not recommended for installation in applications where the device is constrained such that its PTC properties are inhibited, for example in rigid potting materials or in rigid housings, which lack adequate clearance to accommodate device expansion.
- Operation in circuits with a large inductance can generate a circuit voltage (Ldi/dt) above the rated voltage of the device.

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