Fast Recovery Diodes (Stud Version), 6 A, 12 A

DO-203AA (DO-4)

FEATURES

- Short reverse recovery time
- Low stored charge
- Wide current range
- Excellent surge capabilities
- Standard JEDEC® types
- Stud cathode and stud anode versions
- Fully characterized reverse recovery conditions
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

TYPICAL APPLICATIONS

- DC power supplies
- Inverters
- Converters
- Choppers
- Ultrasonic systems
- Freewheeling diodes

PRODUCT SUMMARY	
$I_{F(AV)}$	6 A, 12 A
Package	DO-203AA (DO-4)
Circuit configuration	Single diode

MAJOR RATINGS AND CHARACTERISTICS				
SYMBOL	TEST CONDITIONS	1N3879(R) TO 1N3883(R)	1N3889(R) TO 1N3893(R)	UNITS
$I_{F(AV)}$		6 (1)	12 (1)	A
	T_C maximum	100	100	°C
$I_{F(RMS)}$		9.5	19	A
I_{FSM}	50 Hz	72	145	A
	60 Hz	75 (1)	150 (1)	
I^2t	50 Hz	26	103	A^2s
	60 Hz	23	94	
$I^2\sqrt{t}$		363	856	$I^2\sqrt{s}$
V_{RRM}	Range	50 to 400 (1)	50 to 400 (1)	V
t_{rr}		See Recovery Characteristics table	See Recovery Characteristics table	ns
T_J	Range	-65 to +150	-65 to +150	°C

Note

(1) JEDEC® registered values

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ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS

TYPE NUMBER	VOLTAGE CODE	V_{RRM}, MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V	V_{RSM}, MAXIMUM NON-REPETITIVE PEAK VOLTAGE V	I_{RRM} MAXIMUM AT T_J = 25 °C µA	I_{RRM} MAXIMUM AT T_J = 100 °C mA	I_{RRM} MAXIMUM AT T_J = 150 °C mA
1N3879(R)	-	50	75	15 (1)	1.0 (1)	3.0 (1)
1N3880(R)		100	150			
1N3881(R)		200	250			
1N3882(R)		300	350			
1N3883(R)		400	450			
1N3889(R)	-	50	75	25 (1)	3.0 (1)	5.0 (1)
1N3890(R)		100	150			
1N3891(R)		200	250			
1N3892(R)		300	350			
1N3893(R)		400	450			

Note

(1) JEDEC® registered values

FORWARD CONDUCTION

PARAMETER	SYMBOL	TEST CONDITIONS			1N3879(R) TO 1N3883(R)	1N3889(R) TO 1N3893(R)	UNITS
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave DC			6 (1)	12 (1)	A
					100	100	°C
Maximum RMS current	$I_{F(RMS)}$				9.5	19	A
Maximum peak, one-cycle non-repetitive forward current	I_{FSM}	t = 10 ms	No voltage reapplied	Sinusoidal half wave, initial T_J = 150 °C	85	170	
		t = 8.3 ms			90	180	
		t = 10 ms	100 % V_{RRM} reapplied		72	145	
		t = 8.3 ms			75 (1)	150 (1)	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied		36	145	A^2s
		t = 8.3 ms			33	130	
		t = 10 ms	100 % V_{RRM} reapplied		26	103	
		t = 8.3 ms			23	94	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied			363	1452	$A^2\sqrt{s}$
Maximum forward voltage drop	V_{FM}	T_J = 25 °C; I_F = Rated $I_{F(AV)}$ (DC)			1.4 (1)	1.4 (1)	V
		T_C = 100 °C; I_{FM} = π x rated $I_{F(AV)}$			1.5 (1)	1.5 (1)	

Note

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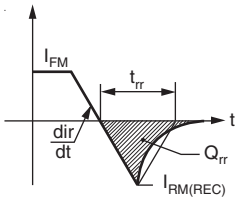
RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	1N3879(R) TO 1N3883(R)	1N3889(R) TO 1N3893(R)	UNITS
Maximum reverse recovery time	t_{rr}	T_J = 25 °C, I_F = 1 A to V_R = 30 V, dI_F/dt = 100 A/μs	150	150	ns
		T_J = 25 °C, dI_F/dt = 25 A/μs, I_{FM} = π x rated $I_{F(AV)}$	300 (1)	300 (1)	
Maximum peak recovery current	$I_{RM(REC)}$	I_{FM} = π x rated $I_{F(AV)}$	4 (1)	5 (1)	-
Maximum reverse recovery charge	Q_{rr}	T_J = 25 °C, I_F = 1 A to V_R = 30 V, dI_F/dt = 100 A/μs	400	350	nC
		T_J = 25 °C, dI_F/dt = 25 A/μs, I_{FM} = π x rated $I_{F(AV)}$	400	400	



Note

(1) JEDEC® registered values

THERMAL AND MECHANICAL SPECIFICATIONS

PARAMETER	SYMBOL	TEST CONDITIONS	1N3879(R) TO 1N3883(R)	1N3889(R) TO 1N3893(R)	UNITS
Maximum junction operating temperature range	T_J		-65 to +150		°C
Maximum storage temperature range	T_{Stg}		-65 to +175		
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	2.5	2.0	°C/W
Maximum thermal resistance, case to heatsink	R_{thCS}	Mounting surface, smooth, flat and greased	0.5		
Allowable mounting torque		Not lubricated threads	1.5 + 0 - 10 % (13)		N · m (lbf · in)
		Lubricated threads	1.2 + 0 - 10 % (10)		
Approximate weight			7		g
			0.25		oz.
Case style		JEDEC®	DO-203AA (DO-4)		

ΔR_{thJC} CONDUCTION

CONDUCTION ANGLE	1N3879(R) TO 1N3883(R)	1N3889(R) TO 1N3893(R)	1N3879(R) TO 1N3883(R)	1N3889(R) TO 1N3893(R)	TEST CONDITIONS	UNITS
	SINUSOIDAL CONDUCTION		RECTANGULAR CONDUCTION			
180°	0.58	0.46	0.33	0.26	T_J = 150 °C	K/W
120°	0.60	0.48	0.58	0.46		
60°	1.28	1.02	1.28	1.02		
30°	2.20	1.76	2.20	1.76		

Note

- The table above shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC

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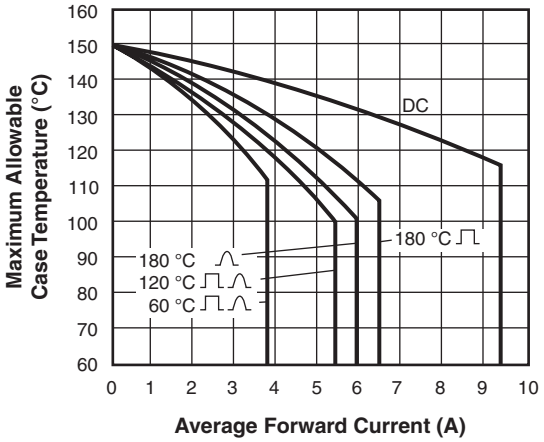


Fig. 1 - Average Forward Current vs.
Maximum Allowable Case Temperature, 1N3879 Series

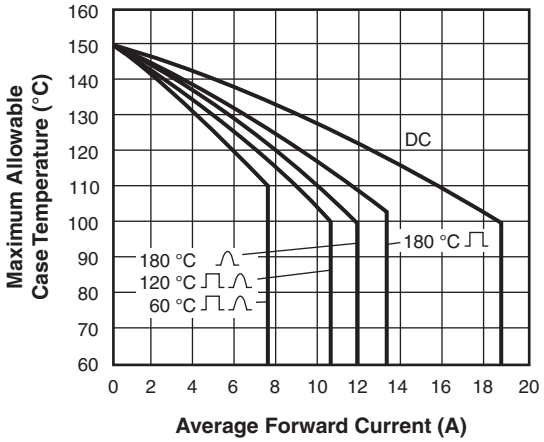
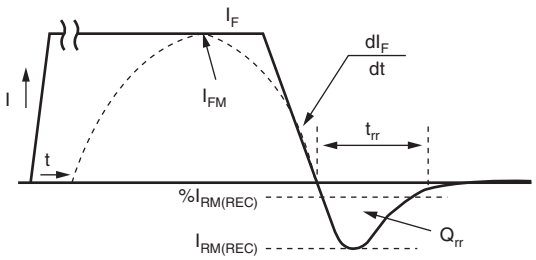
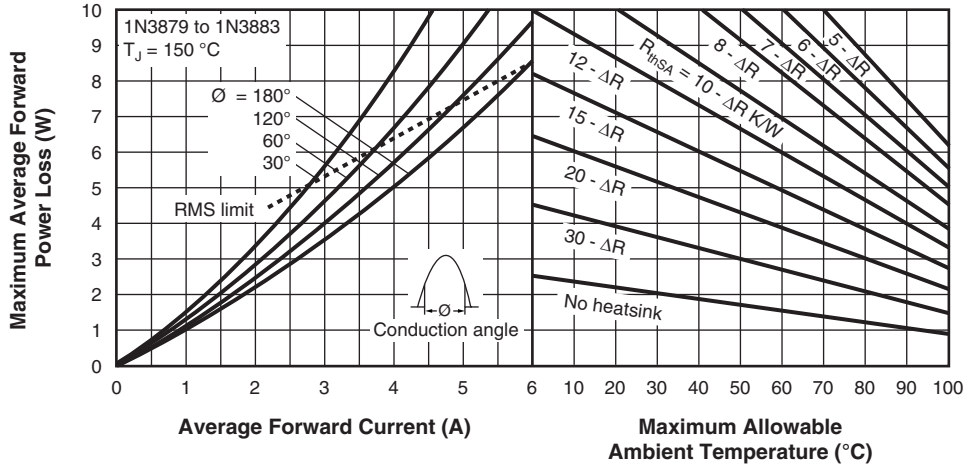


Fig. 2 - Average Forward Current vs.
Maximum Allowable Case Temperature, 1N3889 Series



I_F, I_{FM} - Peak forward current prior to commutation
$-dI_F/dt$ - Rate of fall of forward current
$I_{RM(REC)}$ - Peak reverse recovery current
t_{rr} - Reverse recovery time
Q_{rr} - Reverse recovered charge

Fig. 3 - Reverse Recovery Time Test Waveform



Conduction angle - Ø	ΔR - K/W
180°	0.58
120°	0.60
60°	1.28
30°	2.20

Fig. 4 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3879 Series

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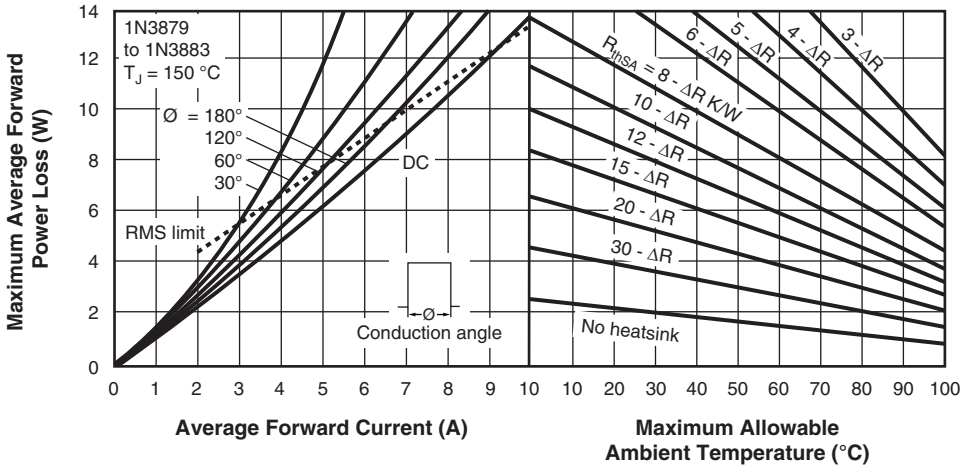
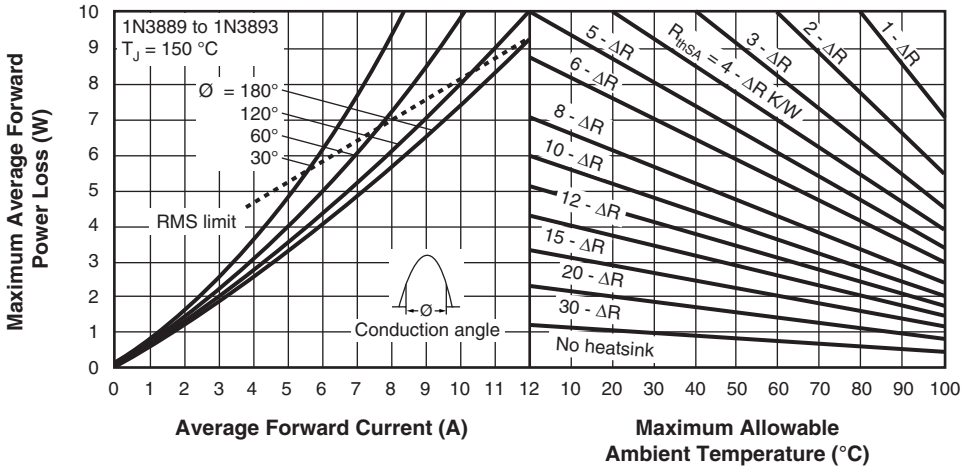


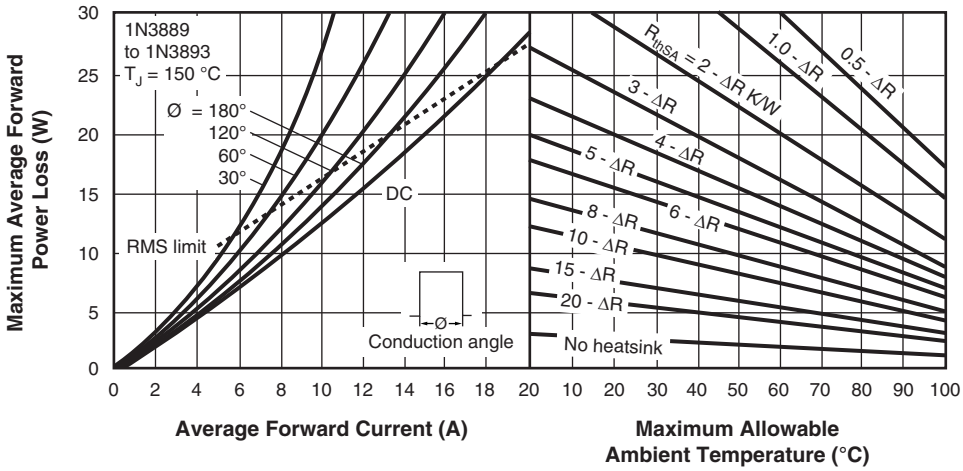
Conduction angle - Ø	ΔR - K/W
DC	0
180°	0.33
120°	0.58
60°	1.28
30°	2.20

Fig. 5 - Current Rating Nomogram (Rectangular Waveforms), 1N3879 Series



Conduction angle - Ø	ΔR - K/W
180°	0.46
120°	0.48
60°	1.02
30°	1.76

Fig. 6 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3889 Series



Conduction angle - Ø	ΔR - K/W
DC	0
180°	0.26
120°	0.46
60°	1.02
30°	1.76

Fig. 7 - Current Rating Nomogram (Rectangular Waveforms), 1N3889 Series

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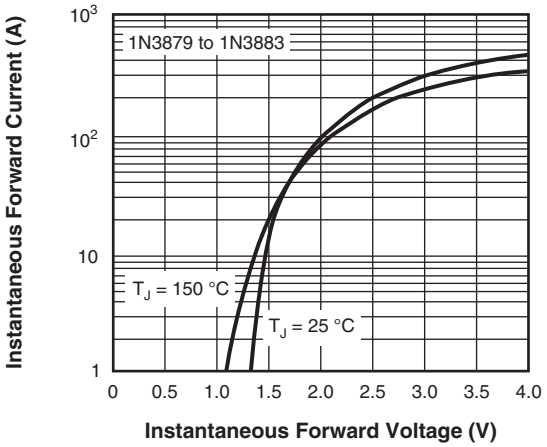

Fig. 8 - Maximum Forward Voltage vs. Forward Current, 1N3879 Series

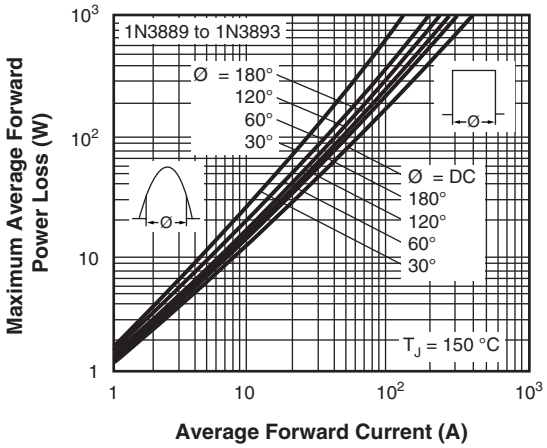

Fig. 11 - Maximum High Level Forward Power Loss vs. Average Forward Current, 1N3889 Series

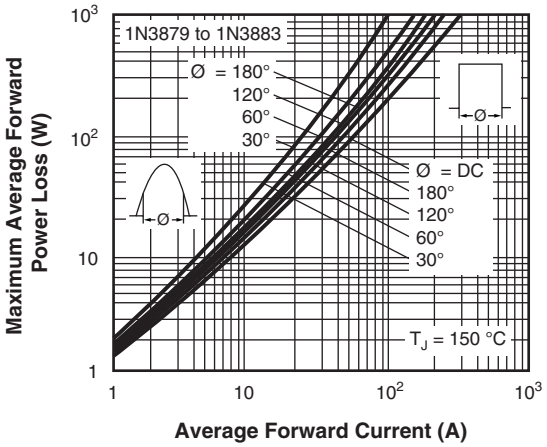

Fig. 9 - Maximum High Level Forward Power Loss vs. Average Forward Current, 1N3879 Series

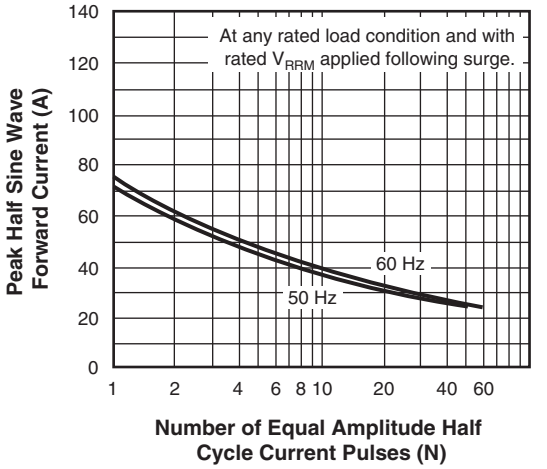

Fig. 12 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N3879 Series

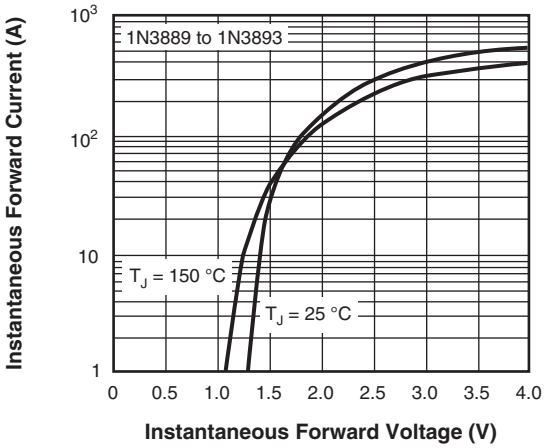

Fig. 10 - Maximum Forward Voltage vs. Forward Current, 1N3889 Series

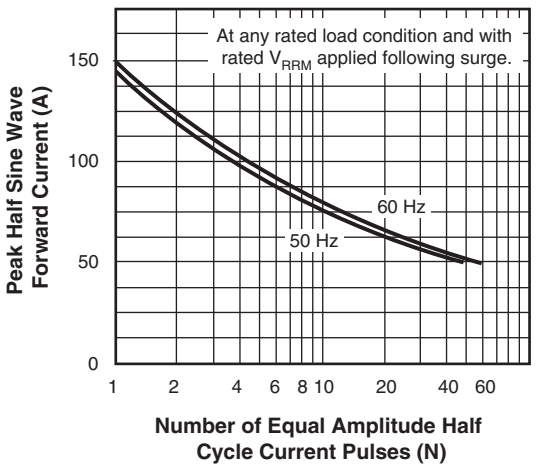

Fig. 13 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N3889 Series

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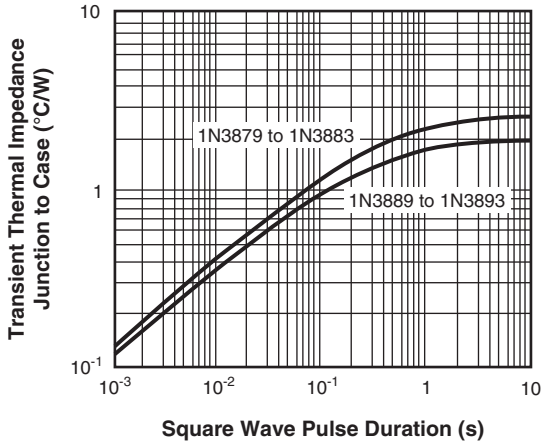

Fig. 14 - Maximum Transient Thermal Impedance, Junction to Case vs. Pulse Duration, All Series

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95311

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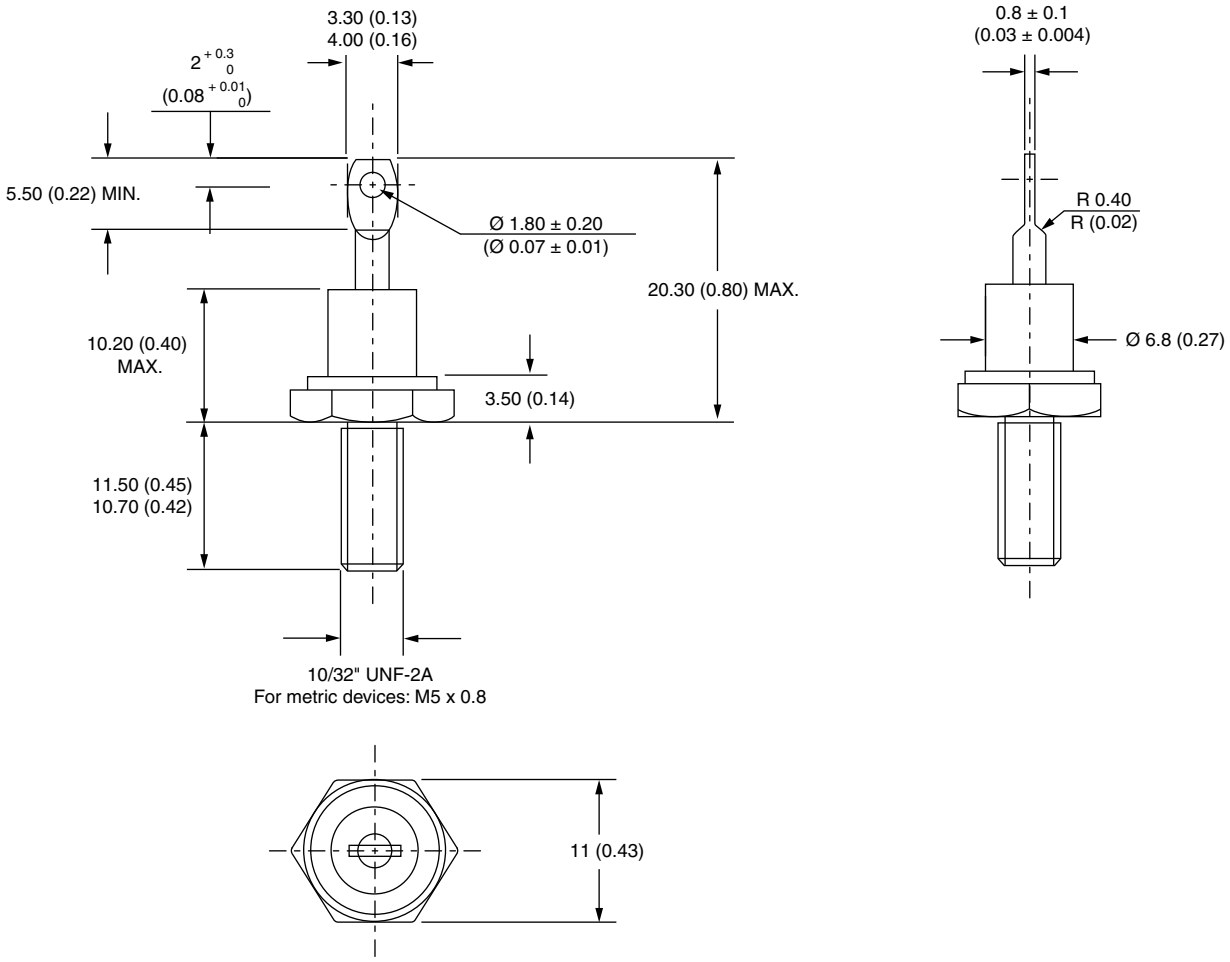
DO-203AA (DO-4)

DIMENSIONS in millimeters (inches)



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