

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 ² s
	60 Hz	23	94	
$I^2\sqrt{t}$		363	856	I ² √s
V_{RRM}	Range	50 to 400 ⁽¹⁾	50 to 400 ⁽¹⁾	V
t_r		See Recovery Characteristics table	See Recovery Characteristics table	ns
T_J	Range	-65 to +150	-65 to +150	°C

Note

⁽¹⁾ JEDEC® registered values



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 ² t for fusing	I ² t	t = 10 ms	No voltage reapplied		36	145	A ² s
		t = 8.3 ms			33	130	
		t = 10 ms	100 % V _{RRM} reapplied		26	103	
		t = 8.3 ms			23	94	
Maximum I ² √t for fusing	I ² √t	t = 0.1 ms to 10 ms, no voltage reapplied			363	1452	A ² √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 × rated I _{F(AV)}			1.5 ⁽¹⁾	1.5 ⁽¹⁾	

Note

(1) JEDEC® registered values



RECOVERY CHARACTERISTICS					
PARAMETER	SYMBOL	TEST CONDITIONS	1N3879(R) TO 1N3883(R)	1N3889(R) TO 1N3893(R)	UNITS
Maximum reverse recovery time	t_{rr}	$T_J = 25\text{ }^\circ\text{C}$, $I_F = 1\text{ A}$ to $V_R = 30\text{ V}$, $di_F/dt = 100\text{ A}/\mu\text{s}$	150	150	ns
		$T_J = 25\text{ }^\circ\text{C}$, $di_F/dt = 25\text{ A}/\mu\text{s}$, $I_{FM} = \pi \times \text{rated } I_{F(AV)}$	300 ⁽¹⁾	300 ⁽¹⁾	
Maximum peak recovery current	$I_{RM(REC)}$	$I_{FM} = \pi \times \text{rated } I_{F(AV)}$	4 ⁽¹⁾	5 ⁽¹⁾	-
Maximum reverse recovery charge	Q_{rr}	$T_J = 25\text{ }^\circ\text{C}$, $I_F = 1\text{ A}$ to $V_R = 30\text{ V}$, $di_F/dt = 100\text{ A}/\mu\text{s}$	400	350	nC
		$T_J = 25\text{ }^\circ\text{C}$, $di_F/dt = 25\text{ A}/\mu\text{s}$, $I_{FM} = \pi \times \text{rated } I_{F(AV)}$	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	$T_J = 150\text{ }^\circ\text{C}$	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



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

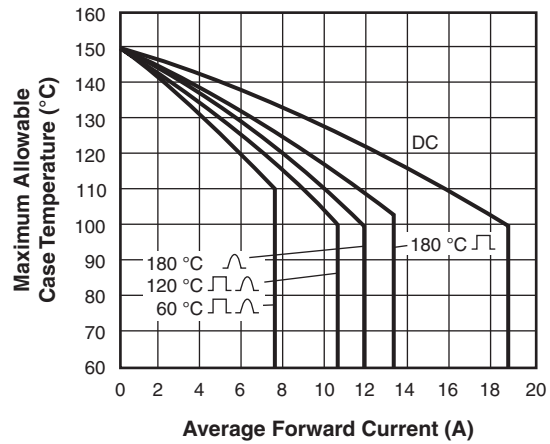
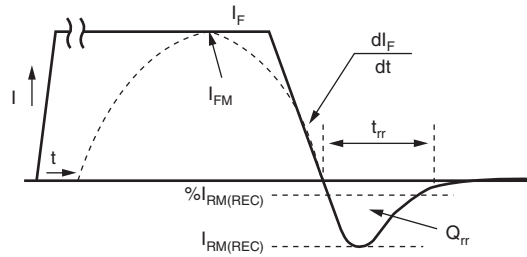


Fig. 2 - Average Forward Current vs. Maximum Allowable Case Temperature, 1N3889 Series



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 - ϕ	ΔR - K/W
180°	0.58
120°	0.60
60°	1.28
30°	2.20

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



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

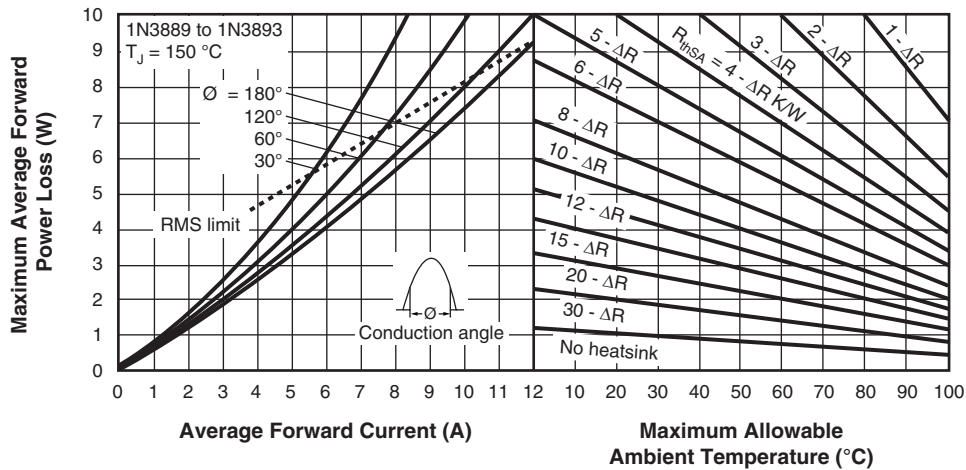


Fig. 6 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3889 Series

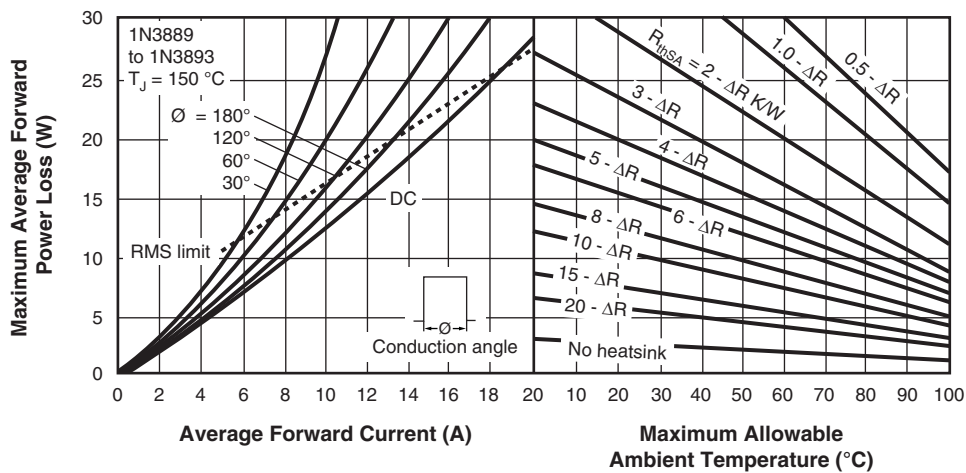


Fig. 7 - Current Rating Nomogram (Rectangular Waveforms), 1N3889 Series



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

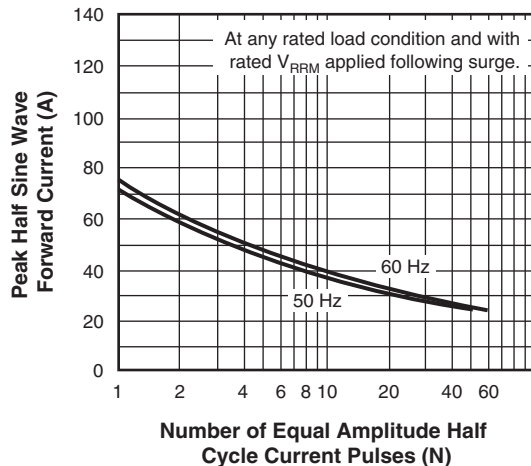


Fig. 12 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N3879 Series



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

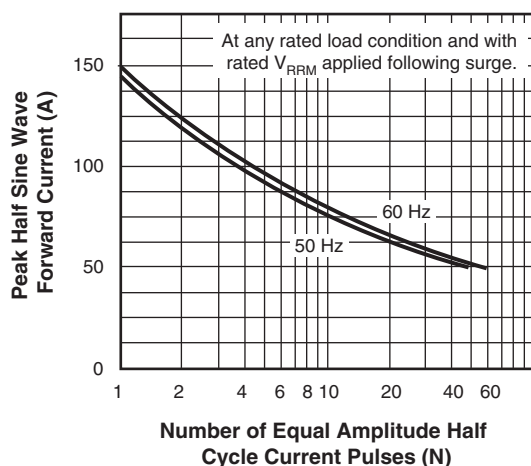


Fig. 13 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N3889 Series

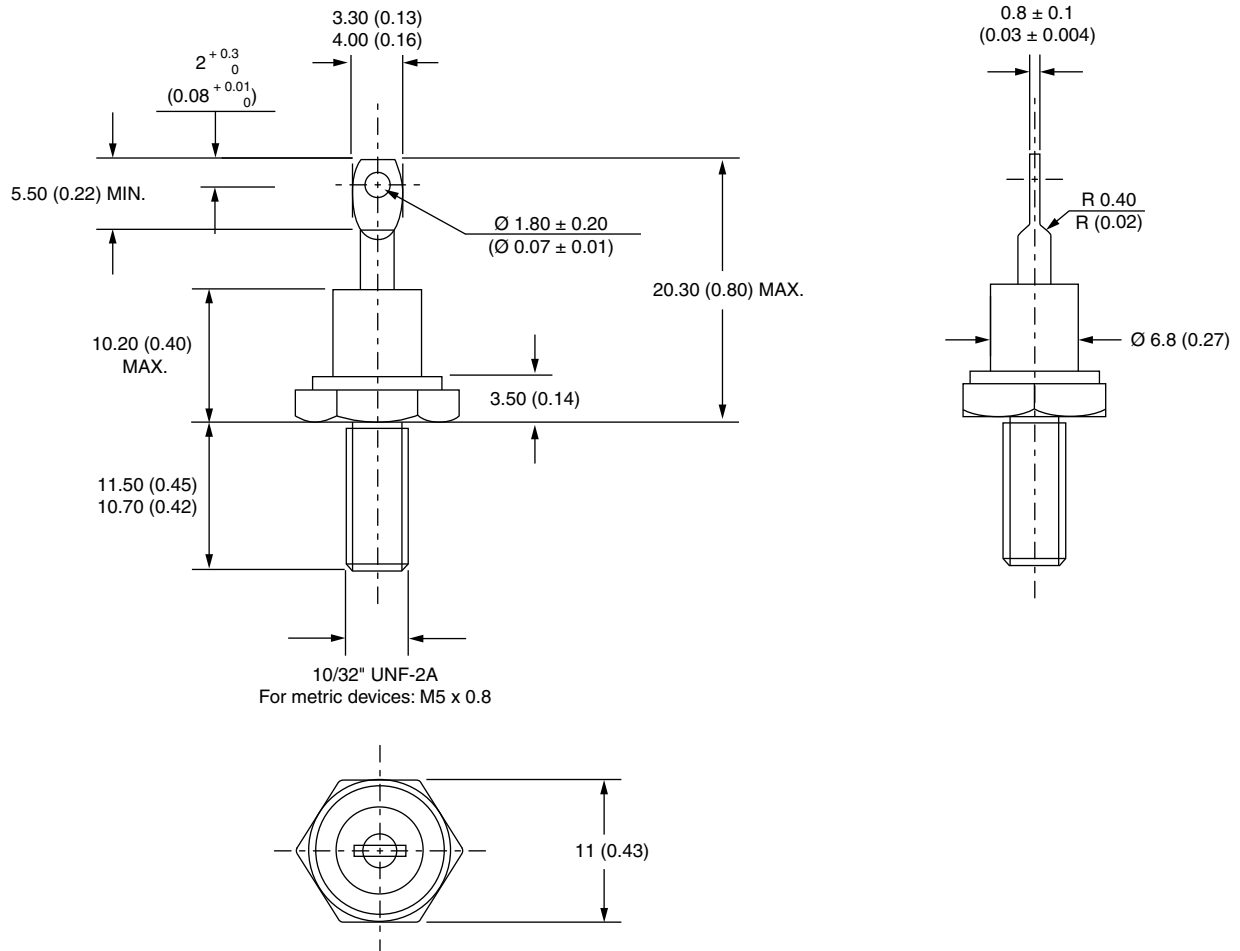


Fig. 14 - Maximum Transient Thermal Impedance, Junction to Case vs. Pulse Duration, All Series

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

DO-203AA (DO-4)

DIMENSIONS in millimeters (inches)





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