

Vishay High Power Products

Fast Recovery Diodes (Stud Version), 6/12/16 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
- · RoHS compliant

TYPICAL APPLICATIONS

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

PRODUCT SUMMARY	7
I _{F(AV)}	6/12/16 A

MAJOR RATINGS AND CHARACTERISTICS								
SYMBOL	CHARACTERISTICS	1N3879. TO 1N3883.	1N3889. TO 1N3893.	6FL	12FL	16FL	UNITS	
I _{F(AV)}	T _C = 100 °C	6 ⁽¹⁾	12 ⁽¹⁾	6	12	16	Α	
I _{F(RMS)}		9.5	19	9.5	19	25	Α	
	50 Hz	72	145	110	145	180		
I _{FSM}	60 Hz	75 ⁽¹⁾	150 ⁽¹⁾	115	150	190	Α	
l ² t	50 Hz	26	103	60	103	160	A 2 -	
1-1	60 Hz	23	94	55	94	150	- A ² s	
I ² √t		363	856	1452	1452	2290	I ² √s	
V _{RRM}	Range	50 to 400 ⁽¹⁾ 50 to 1000						
t _{rr}		See Recovery Characteristics table						
T _J	Range	- 65 to 150						

Note

(1) JEDEC registered values

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ELECTRICAL SPECIFICATIONS

VOLTAG	E RATING	GS					
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 μΑ	I _{RRM} MAXIMUM AT T _J = 100 °C mA	I _{RRM} MAXIMUM AT T _J = 150 °C mA	
1N3879.		50	75				
1N3880.		100	150				
1N3881.	-	200	250	15 ⁽¹⁾	1.0 ⁽¹⁾	3.0 (1)	
1N3882.		300	350				
1N3883.		400	450	1			
1N3889.		50	75				
1N3890.		100	150				
1N3891.	-	200	250	25 ⁽¹⁾	3.0 (1)	5.0 ⁽¹⁾	
1N3892.		300	350				
1N3893.		400	450	1			
	5	50	75				
	10	100	150				
6FL	20	200	275	1			
12FL	40	400	500	50	-	6.0	
16FL	60	600	725	1			
	80	800	950	1			
	100	1000	1250				

Note

⁽¹⁾ JEDEC registered values

FORWARD CONDUCTION									
PARAMETER	SYMBOL	Т	1N3879. 1N3883.	6FL	1N3889. 1N3893. 12FL	16FL	UNITS		
Maximum average forward current	l=o	180° condu	uction, half sine	wave	6 ⁽¹⁾	6	12 ⁽¹⁾	16	Α
at case temperature	I _{F(AV)}	DC			100	100	100	100	ç
Maximum RMS current	I _{F(RMS)}				9.5	9.5	19	25	
Maximum peak, one-cycle non-repetitive forward current	I _{FSM}	t = 10 ms	No voltage		85	130	170	215	
		t = 8.3 ms	reapplied		90	135	180	225	Α
		t = 10 ms	roopplied	Sinusoidal	72	110	145	180	
		t = 8.3 ms		half wave,	75 ⁽¹⁾	115	150 ⁽¹⁾	190	
		t = 10 ms	No voltage	initial	36	86	145	230	
Marrian and 124 for the size of	l ² t	t = 8.3 ms	reapplied	$T_J = 150 ^{\circ}\text{C}$	33	78	130	210	A ² s
Maximum I ² t for fusing		t = 10 ms	100 % V _{RRM}		26	60	103	160	A ² S
		t = 8.3 ms	reapplied		23	55	94	150	
Maximum I²√t for fusing	I²√t	t = 0.1 to 10 ms, no voltage reapplied			363	856	1452	2290	A²√s
Manipulation of a superior of the second second	V	T _J = 25 °C	$T_J = 25$ °C; $I_F = Rated I_{F(AV)}$ (DC)			1.4	1.4 (1)	1.4	V
Maximum forward voltage drop	V_{FM}	T _C = 100 °	$T_C = 100 ^{\circ}C; I_{FM} = \pi \text{ x rated } I_{F(AV)}$			1.5	1.5 ⁽¹⁾	1.5	V

Note

(1) JEDEC registered values



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RECOVERY	CHARAC	TERISTICS						
PARAMETER	SYMBOL	TEST CONDITIONS	1N3879. 1N3883.	1N3889. 1N3893.	121	L FL FL	UNITS	
					S02	S05		
Maximum reverse		$T_J = 25 ^{\circ}\text{C}$, $I_F = 1 \text{A}$ to $V_R = 30 \text{V}$, $dI_F/dt = 100 \text{A/}\mu\text{s}$	150	150	1	-	ns	I _{FM}
recovery time t _{rr}	^t rr	$T_J = 25$ °C, $dI_F/dt = 25$ A/ μ s, $I_{FM} = \pi x \text{ rated } I_{F(AV)}$	300 (1)	300 (1)	200	500	115	dir
Maximum peak recovery current	I _{RM(REC)}	$I_{FM} = \pi x \text{ rated } I_{F(AV)}$	4 (1)	5 (1)		-	-	dir/ dt/
Maximum reverse	0	$T_J = 25 ^{\circ}\text{C}$, $I_F = 1 \text{A}$ to $V_R = 30 \text{V}$, $dI_F/dt = 100 \text{A}/\mu\text{s}$	400	350	1	-	nC	
recovery charge	Q _{rr}	$T_J = 25$ °C, $dI_F/dt = 25$ A/ μ s, $I_{FM} = \pi$ x rated $I_{F(AV)}$	400	400	-	-	IIC	

Note

⁽¹⁾ JEDEC registered values

THERMAL AND MECHANICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CONDITIONS	1N3879. 1N3883. 6FL	1N3889. 1N3893. 12FL	16FL	UNITS	
Maximum junction operating temperature range	T _J		- 65 to 150		°C		
Maximum storage temperature range	T _{Stg}						
Maximum thermal resistance, junction to case	R _{thJC}	DC operation	2.5	2.0	1.6	°C/W	
Maximum thermal resistance, case to heatsink	R _{thCS}	Mounting surface, smooth, flat and greased 0.5				O/ VV	
Allowable mounting toward	Not lubricated threads 1.5 + 0 - 10 % (13)					N ⋅ m (lbf ⋅ in)	
Allowable mounting torque	ble mounting torque		1.2 + ^{0 - 10} % (10)				
Approximate weight			7			g	
Approximate weight				0.25		OZ.	
Case style		JEDEC		DO-203A	A (DO-4)		

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△R _{thJC} CONDUCTION									
CONDUCTION ANGLE	1N3879. 1N3883. 6FL	1N3889. 1N3893. 12FL	16FL	1N3879. 1N3883. 6FL	1N3889. 1N3893. 12FL	16FL	TEST CONDITIONS	UNITS	
	SINUSOIL	DAL COND	UCTION	RECTAN	GULAR CON	IDUCTION	7		
180°	0.58	0.46	0.37	0.33	0.26	0.21			
120°	0.60	0.48	0.39	0.58	0.46	0.37	T - 150°C	K/W	
60°	1.28	1.02	0.82	1.28	1.02	0.82	T _J = 150 °C	r\/ vv	
30°	2.20	1.76	1.41	2.20	1.76	1.41			

Note

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

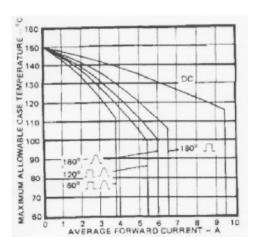


Fig. 1 - Average Forward Current vs.

Maximum Allowable Case Temperature,

1N3879 and 6FL Series

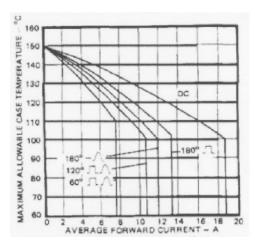


Fig. 2 - Average Forward Current vs. Maximum Allowable Case Temperature, 1N3889 and 12FL Series

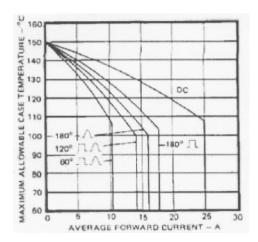


Fig. 3 - Average Forward Current vs.

Maximum Allowable Case Temperature, 16FL Series

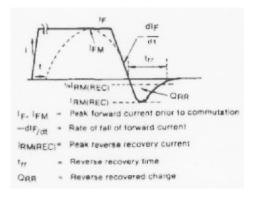


Fig. 4 - Reverse Recovery Time Test Waveform

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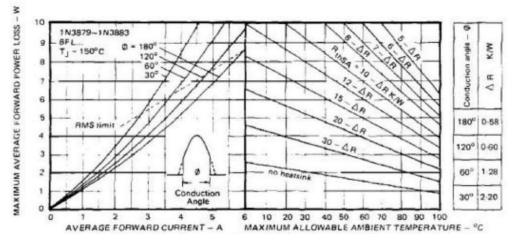


Fig. 5 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3879 and 6FL Series

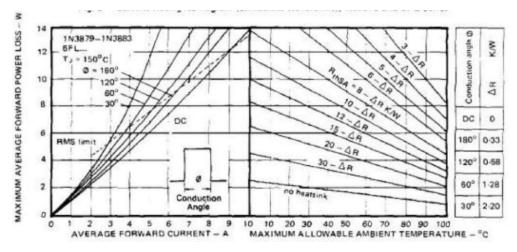


Fig. 6 - Current Rating Nomogram (Rectangular Waveforms), 1N3879 and 6FL Series

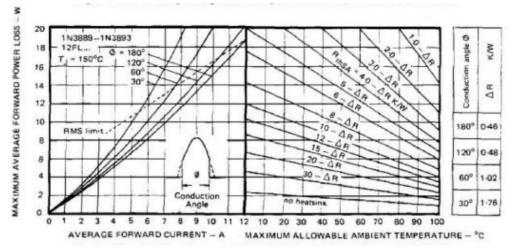


Fig. 7 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3889 and 12FL Series

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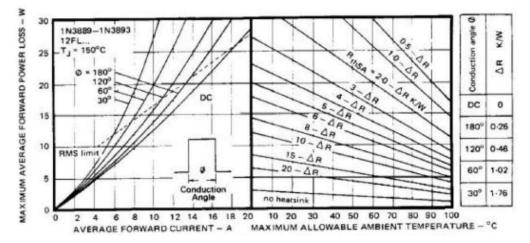


Fig. 8 - Current Rating Nomogram (Rectangular Waveforms), 1N3889 and 12FL Series

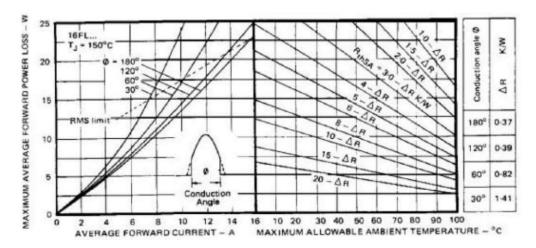


Fig. 9 - Current Rating Nomogram (Sinusoidal Waveforms), 16FL Series

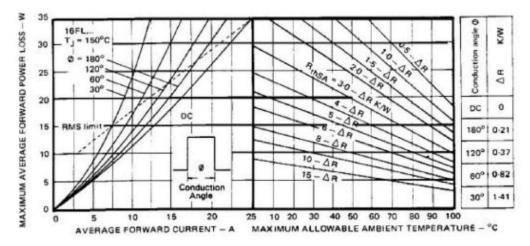


Fig. 10 - Current Rating Nomogram (Rectangular Waveforms), 16FL Series



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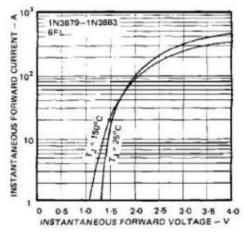


Fig. 11 - Maximum Forward Voltage vs. Forward Current, 1N3879 and 6FL Series

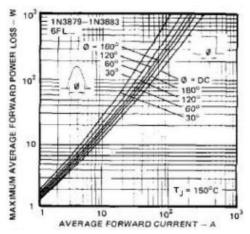


Fig. 12 - Maximum High Level Forward Power Loss vs.
Average Forward Current,
1N3879 and 6FL Series

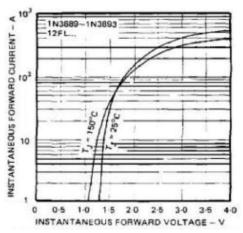


Fig. 13 - Maximum Forward Voltage vs. Forward Current, 1N3889 and 12FL Series

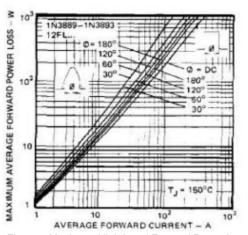


Fig. 14 - Maximum High Level Forward Power Loss vs.
Average Forward Current,
1N3889 and 12FL Series

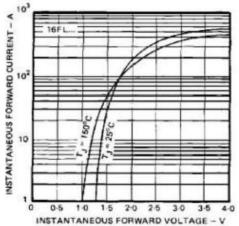


Fig. 15 - Maximum Forward Voltage vs. Forward Current, 16FL Series

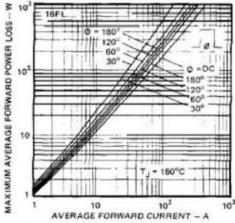


Fig. 16 - Maximum High Level Forward Power Loss vs.

Average Forward Current,

16FL Series

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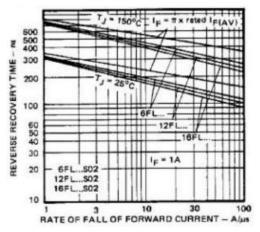


Fig. 17a - Typical Reverse Recovery Time vs. Rate of Fall of Forward Current, All Series ... S02

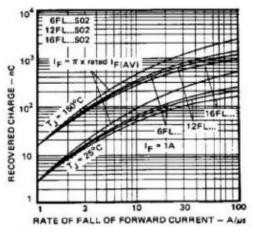


Fig. 17b - Typical Recovered Charge vs. Rate of Fall of Forward Current, All Series ... S02

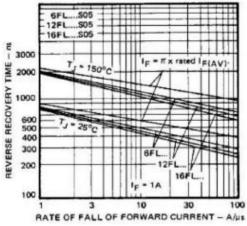


Fig. 18a - Typical Reverse Recovery Time vs. Rate of Fall of Forward Current, All Series ... S05

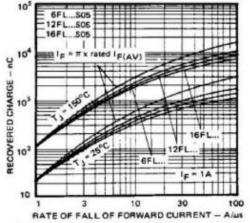


Fig. 18b - Typical Recovered Charge vs. Rate of Fall of Forward Current, All Series ...S05

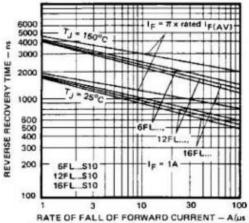


Fig. 19a - Typical Reverse Recovery Time vs.
Rate of Fall of Forward Current, All Series ...S10

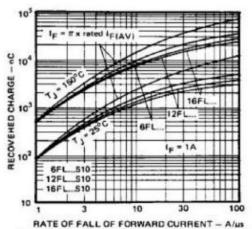


Fig. 19b - Typical Recovered Charge vs. Rate of Fall of Forward Current, All Series ...S10



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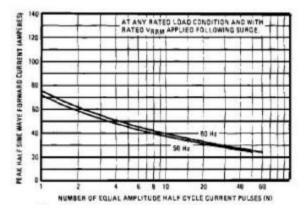


Fig. 20 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N3879 Series

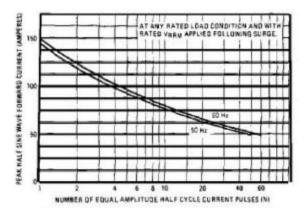


Fig. 22 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N3889 and 12FL Series

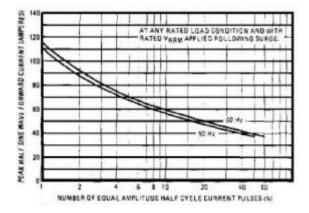


Fig. 21 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 6FL Series

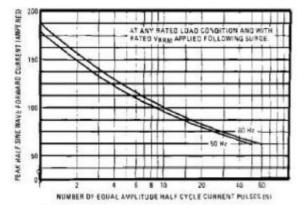


Fig. 23 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 16FL Series

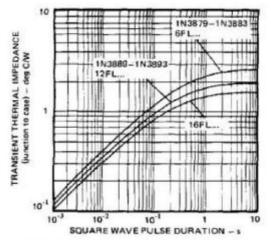


Fig. 24 - Maximum Transient Thermal Impedance, Junction to Case vs. Pulse Duration, All Series

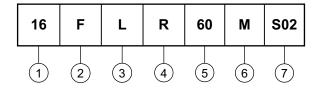
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ORDERING INFORMATION TABLE

Device code



- Current code I_(AVG) = Exact current rating
- 2 F = Diode
- Omit = Standard recovery diode
 L = Only for fast diode
- Omit = Stud forward polarity
 R = Stud reverse polarity
- 5 Voltage code x 10 = V_{RRM} (see Voltage Ratings table)
- Outlines:
 Omit = Stud base UNF thread
 M = Stud base metric thread
- 7 t_{rr} code only for fast diode (see Recovery Characteristics table)

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

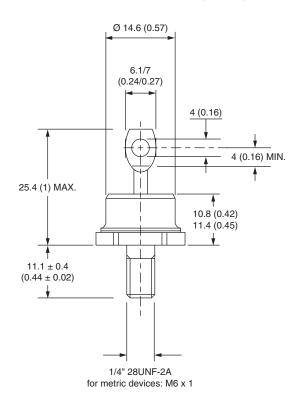
Document Number: 93138 Revision: 26-Sep-08

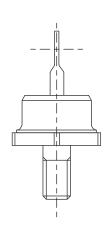


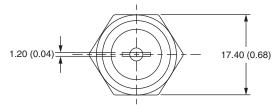
Vishay Semiconductors

DO-203AB (DO-5) for 40HFL, 70HFL and 85HFL

DIMENSIONS FOR 40HFL/70HFL in millimeters (inches)







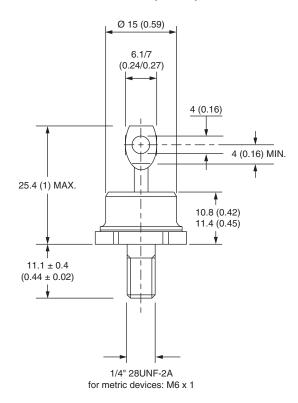
Outline Dimensions

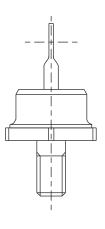
Vishay Semiconductors

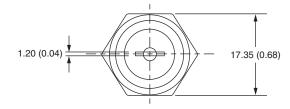
DO-203AB (DO-5) for 40HFL, 70HFL and 85HFL



DIMENSIONS FOR 85HFL in millimeters (inches)









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