



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

$I_{F(AV)}$	6/12/16 A
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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	A
I _{F(RMS)}		9.5	19	9.5	19	25	A
I _{FSM}	50 Hz	72	145	110	145	180	A
	60 Hz	75 ⁽¹⁾	150 ⁽¹⁾	115	150	190	
I ² t	50 Hz	26	103	60	103	160	A ² s
	60 Hz	23	94	55	94	150	
I ² √t		363	856	1452	1452	2290	I ² √s
V _{RRM}	Range	50 to 400 ⁽¹⁾		50 to 1000			V
t _{rr}		See Recovery Characteristics table					ns
T _J	Range	- 65 to 150					°C

Note

⁽¹⁾ JEDEC registered values

1N3879(R), 1N3889(R), 6/12/16FL(R) Series

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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. 1N3880. 1N3881. 1N3882. 1N3883.	-	50 100 200 300 400	75 150 250 350 450	15 ⁽¹⁾	1.0 ⁽¹⁾	3.0 ⁽¹⁾
1N3889. 1N3890. 1N3891. 1N3892. 1N3893.	-	50 100 200 300 400	75 150 250 350 450			
6FL.. 12FL.. 16FL..	5	50	75	50	-	6.0
	10	100	150			
	20	200	275			
	40	400	500			
	60	600	725			
	80	800	950			
	100	1000	1250			

Note

⁽¹⁾ JEDEC registered values

FORWARD CONDUCTION										
PARAMETER	SYMBOL	TEST CONDITIONS			1N3879. 1N3883.	6FL..	1N3889. 1N3893. 12FL..	16FL.. UNITS		
Maximum average forward current at case temperature	I _{F(AV)}	180° conduction, half sine wave DC			6 ⁽¹⁾	6	12 ⁽¹⁾	16	A	
					100	100	100	100	°C	
Maximum RMS current	I _{F(RMS)}				9.5	9.5	19	25	A	
Maximum peak, one-cycle non-repetitive forward current	I _{FSM}	t = 10 ms	No voltage reappplied	Sinusoidal half wave, initial T _J = 150 °C	85	130	170	215		
		t = 8.3 ms			90	135	180	225		
		t = 10 ms	100 % V _{RRM} reappplied		72	110	145	180		
		t = 8.3 ms			75 ⁽¹⁾	115	150 ⁽¹⁾	190		
Maximum I ² t for fusing	I ² t	t = 10 ms	No voltage reappplied		36	86	145	230	A ² s	
		t = 8.3 ms			33	78	130	210		
		t = 10 ms	100 % V _{RRM} reappplied		26	60	103	160		
		t = 8.3 ms			23	55	94	150		
Maximum I ² √t for fusing	I ² √t	t = 0.1 to 10 ms, no voltage reappplied			363	856	1452	2290		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	1.4 ⁽¹⁾	1.4	V	
		T _C = 100 °C; I _{FM} = π x rated I _{F(AV)}			1.5 ⁽¹⁾	1.5	1.5 ⁽¹⁾	1.5	V	

Note

⁽¹⁾ JEDEC registered values

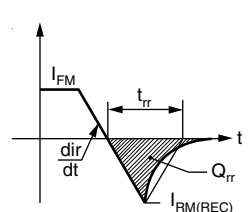


1N3879(R), 1N3889(R), 6/12/16FL(R) Series

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RECOVERY CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	1N3879. 1N3883.	1N3889. 1N3893.	6FL.. 12FL.. 16FL..		UNITS
					S02	S05	
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)	200	500	
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. 1N3883. 6FL..	1N3889. 1N3893. 12FL..	16FL..	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	1.6	°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)			

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ΔR_{thJC} CONDUCTION								
CONDUCTION ANGLE	1N3879. 1N3883. 6FL..	1N3889. 1N3893. 12FL..	16FL..	1N3879. 1N3883. 6FL..	1N3889. 1N3893. 12FL..	16FL..	TEST CONDITIONS	UNITS
	SINUSOIDAL CONDUCTION			RECTANGULAR CONDUCTION				
180°	0.58	0.46	0.37	0.33	0.26	0.21	T _J = 150 °C	K/W
120°	0.60	0.48	0.39	0.58	0.46	0.37		
60°	1.28	1.02	0.82	1.28	1.02	0.82		
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

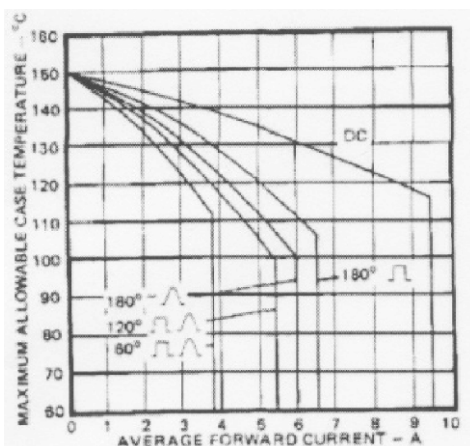


Fig. 1 - Average Forward Current vs. Maximum Allowable Case Temperature, 1N3879 and 6FL Series

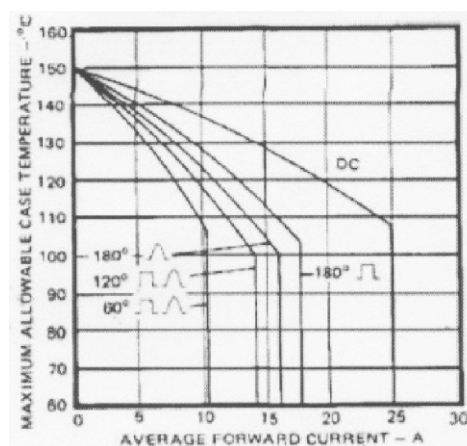


Fig. 3 - Average Forward Current vs. Maximum Allowable Case Temperature, 16FL Series

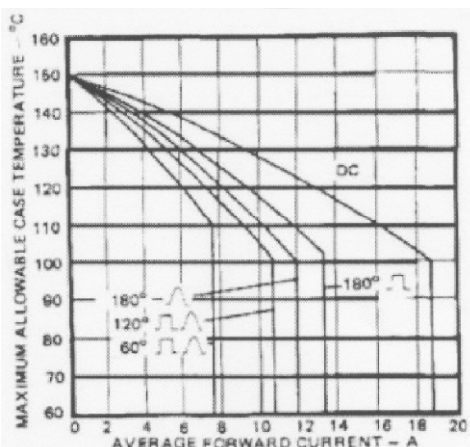


Fig. 2 - Average Forward Current vs. Maximum Allowable Case Temperature, 1N3889 and 12FL Series

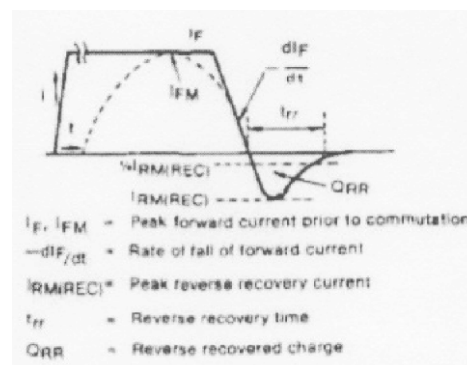


Fig. 4 - Reverse Recovery Time Test Waveform



1N3879(R), 1N3889(R), 6/12/16FL(R) Series

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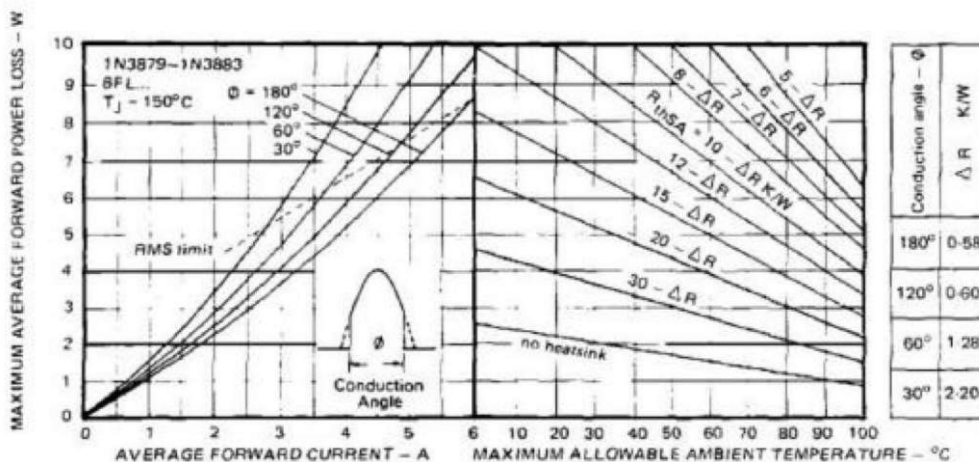


Fig. 5 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3879 and 6FL Series

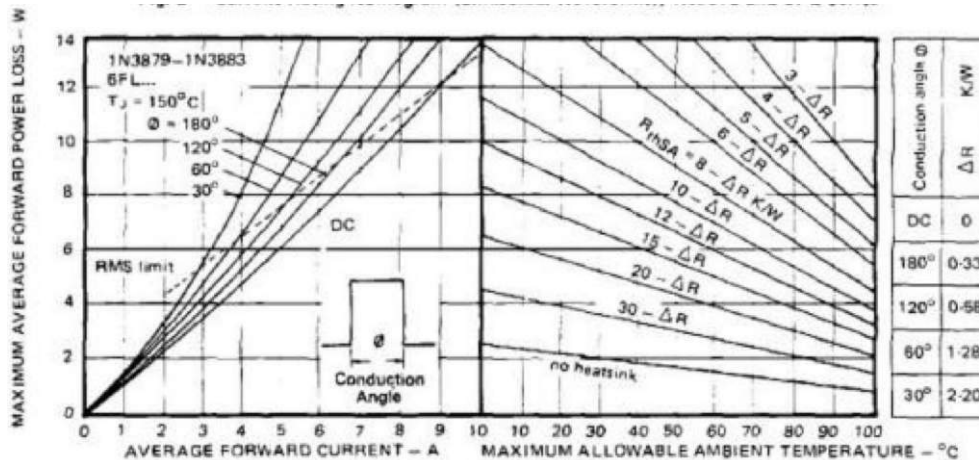


Fig. 6 - Current Rating Nomogram (Rectangular Waveforms), 1N3879 and 6FL Series

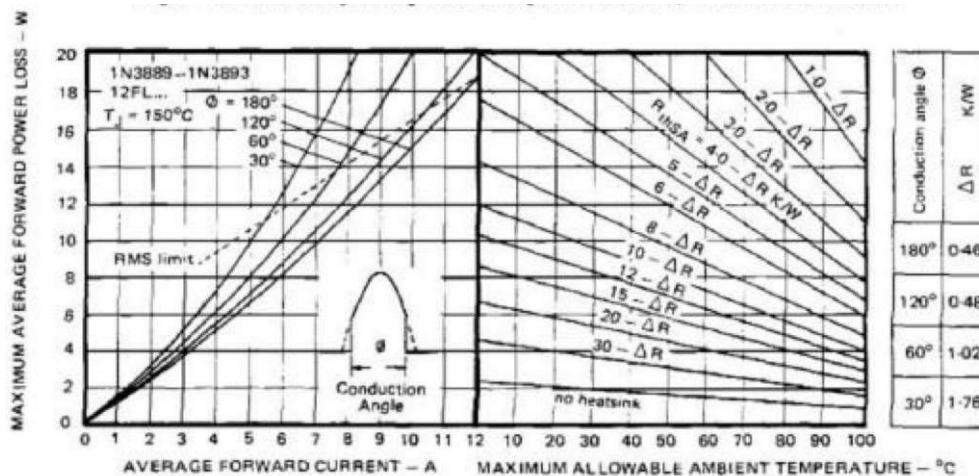


Fig. 7 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3889 and 12FL Series

1N3879(R), 1N3889(R), 6/12/16FL(R) Series

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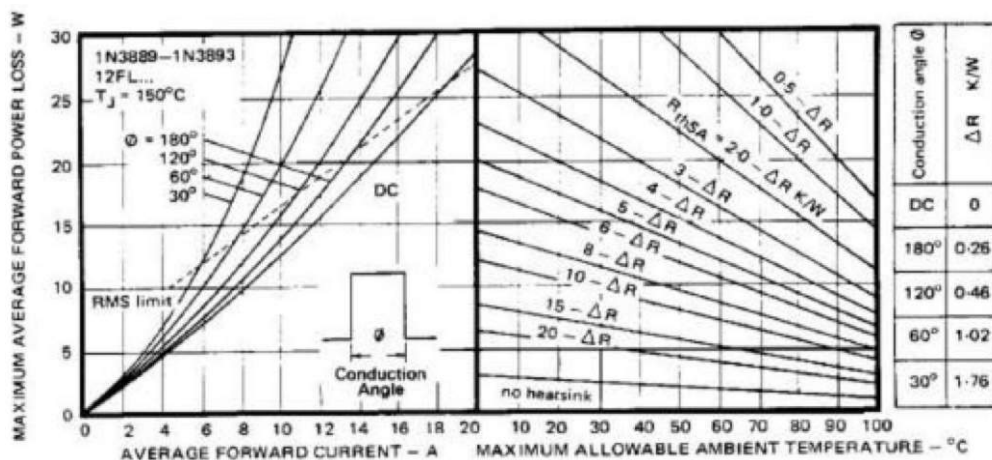


Fig. 8 - Current Rating Nomogram (Rectangular Waveforms), 1N3889 and 12FL Series

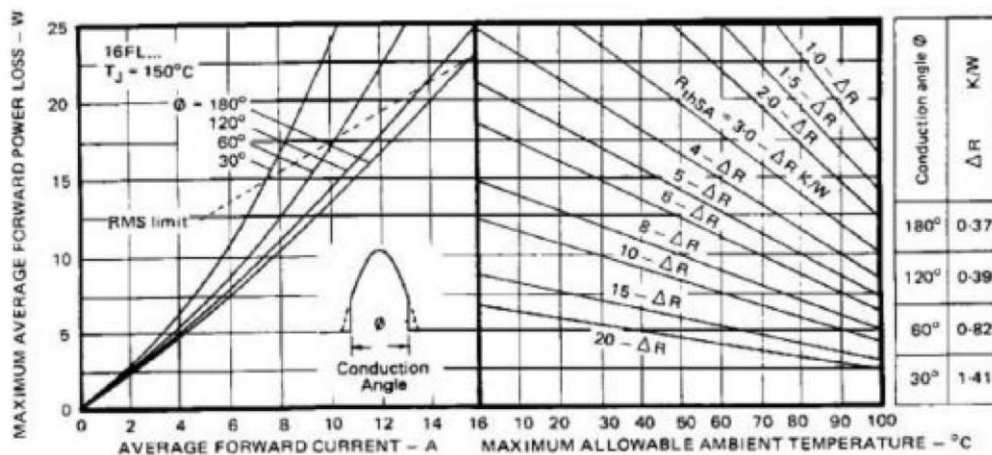


Fig. 9 - Current Rating Nomogram (Sinusoidal Waveforms), 16FL Series

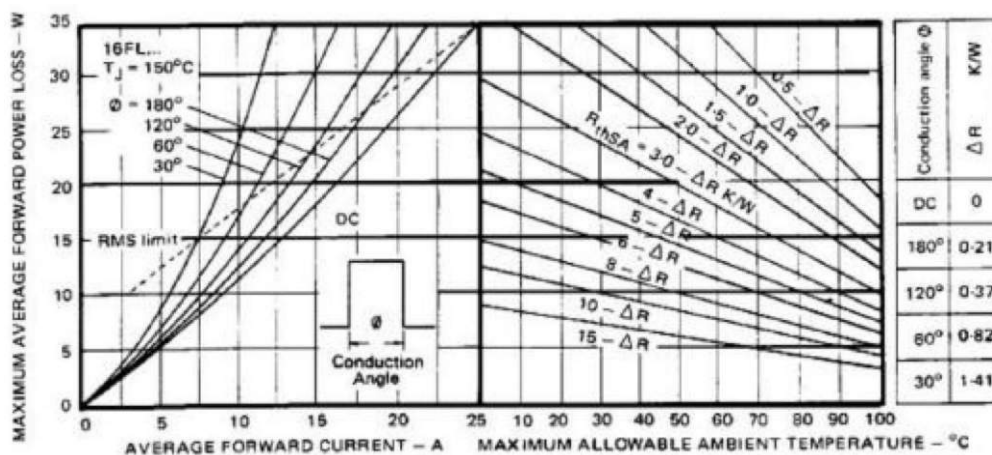


Fig. 10 - Current Rating Nomogram (Rectangular Waveforms), 16FL Series



1N3879(R), 1N3889(R), 6/12/16FL(R) Series

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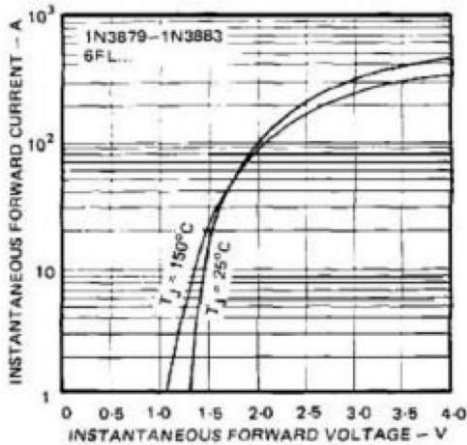


Fig. 11 - Maximum Forward Voltage vs. Forward Current, 1N3879 and 6FL Series

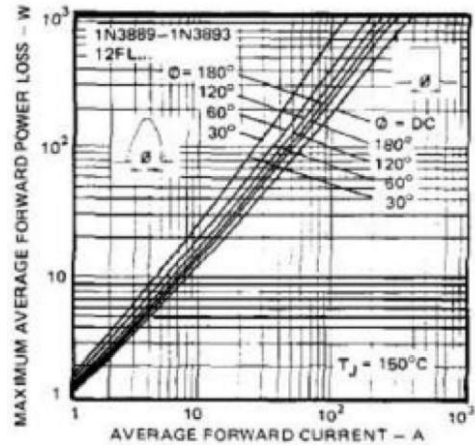


Fig. 14 - Maximum High Level Forward Power Loss vs. Average Forward Current, 1N3889 and 12FL Series

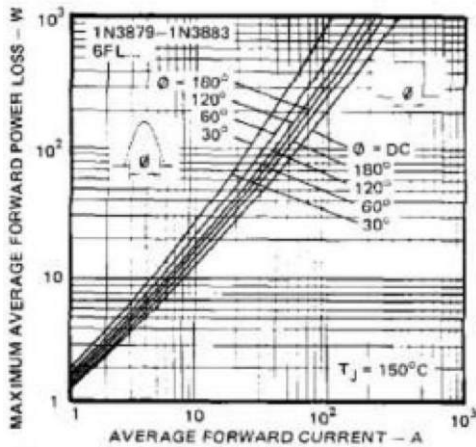


Fig. 12 - Maximum High Level Forward Power Loss vs. Average Forward Current, 1N3879 and 6FL Series

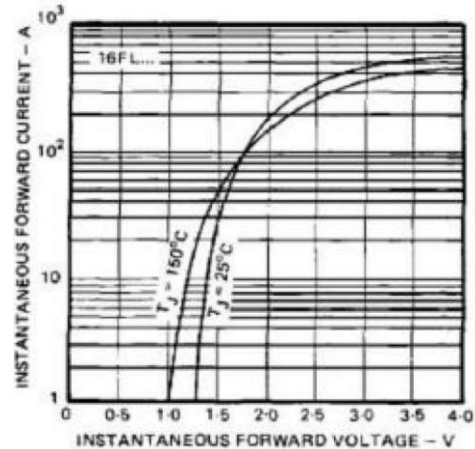


Fig. 15 - Maximum Forward Voltage vs. Forward Current, 16FL Series

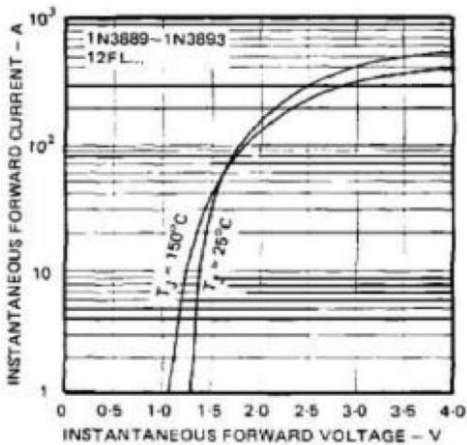


Fig. 13 - Maximum Forward Voltage vs. Forward Current, 1N3889 and 12FL Series

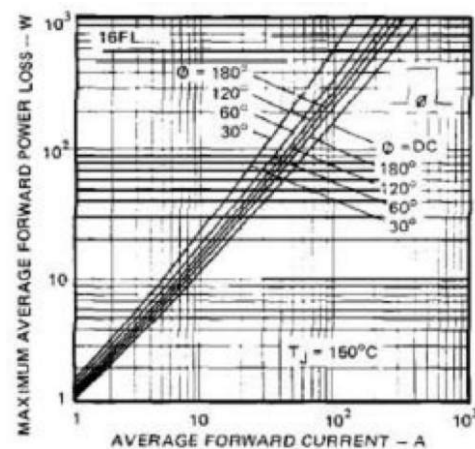


Fig. 16 - Maximum High Level Forward Power Loss vs. Average Forward Current, 16FL Series

1N3879(R), 1N3889(R), 6/12/16FL(R) Series

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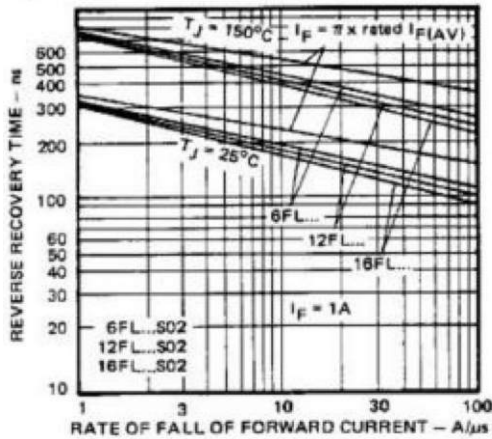


Fig. 17a - Typical Reverse Recovery Time vs. Rate of Fall of Forward Current, All Series ...S02

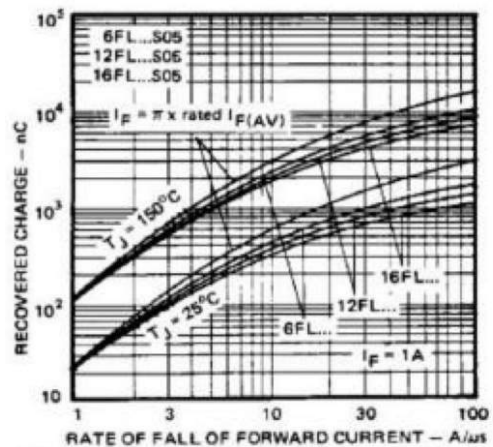


Fig. 18b - Typical Recovered Charge vs. Rate of Fall of Forward Current, All Series ...S05

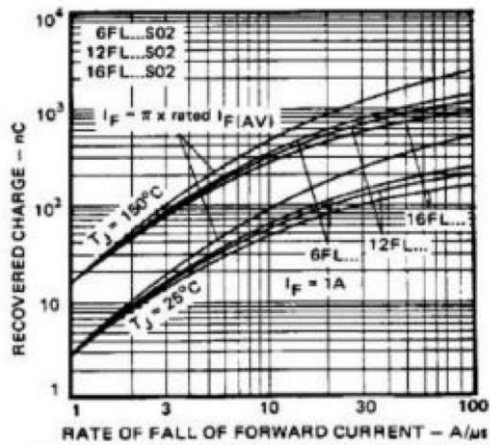


Fig. 17b - Typical Recovered Charge vs. Rate of Fall of Forward Current, All Series ...S02

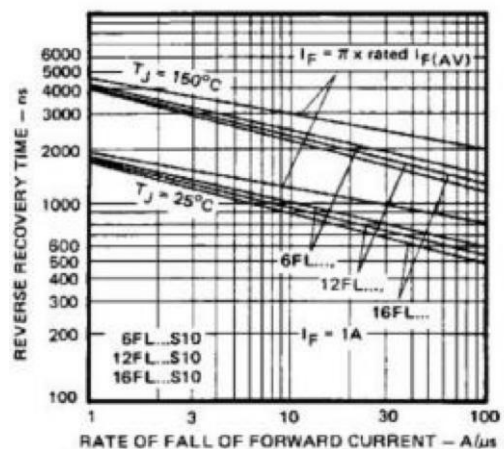


Fig. 19a - Typical Reverse Recovery Time vs. Rate of Fall of Forward Current, All Series ...S10

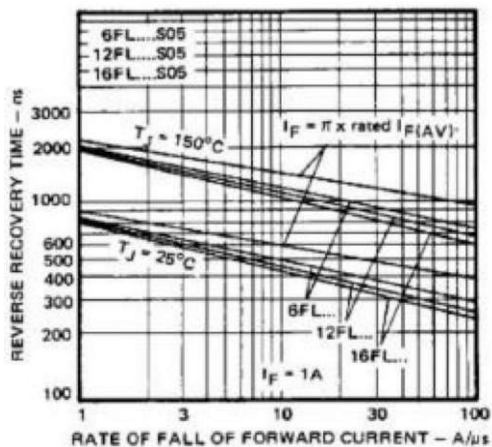


Fig. 18a - Typical Reverse Recovery Time vs. Rate of Fall of Forward Current, All Series ...S05

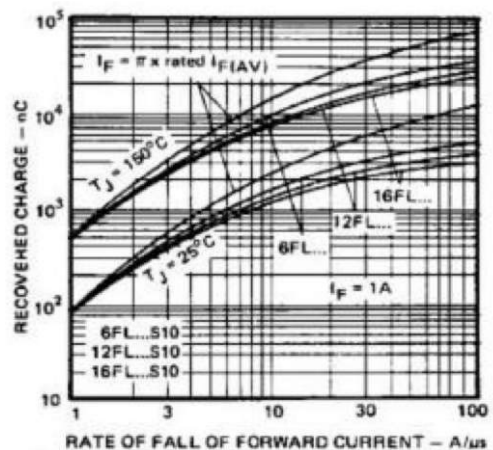


Fig. 19b - Typical Recovered Charge vs. Rate of Fall of Forward Current, All Series ...S10



1N3879(R), 1N3889(R), 6/12/16FL(R) Series

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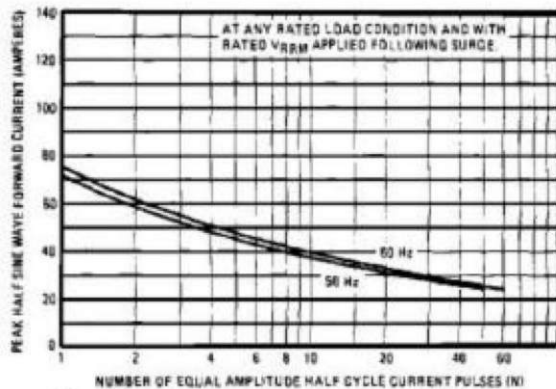


Fig. 20 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N3879 Series

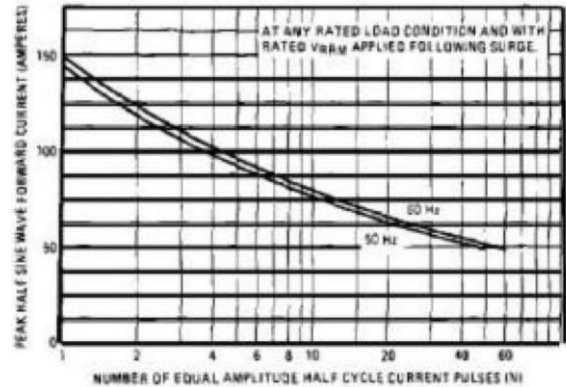


Fig. 22 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N3889 and 12FL Series

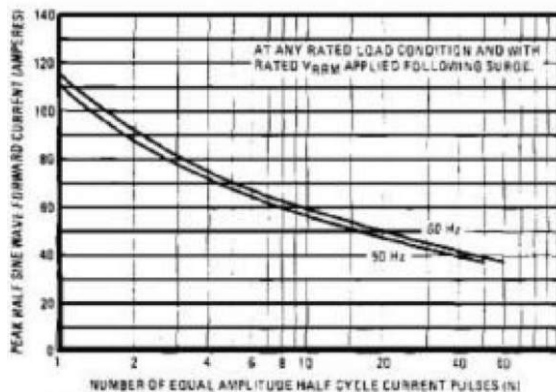


Fig. 21 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 6FL Series

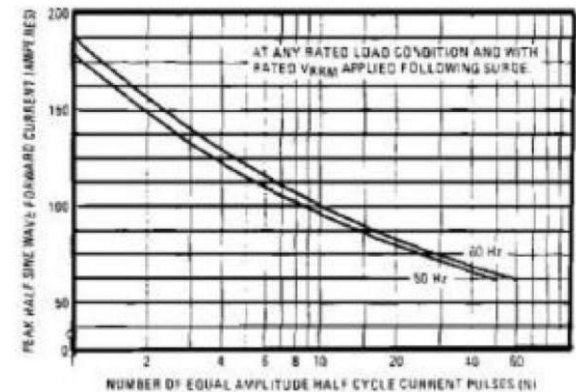


Fig. 23 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 16FL Series

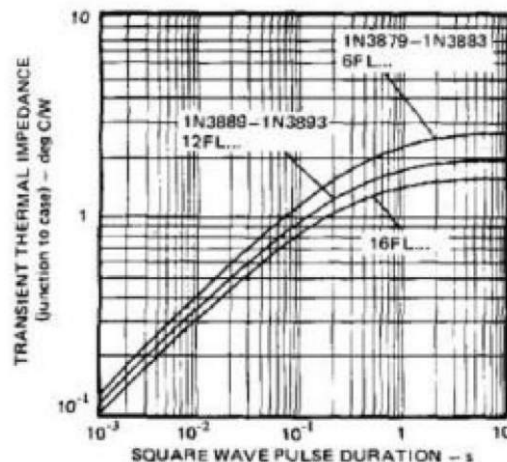


Fig. 24 - Maximum Transient Thermal Impedance, Junction to Case vs. Pulse Duration, All Series

1N3879(R), 1N3889(R), 6/12/16FL(R) Series

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ORDERING INFORMATION TABLE

Device code	16	F	L	R	60	M	S02
	①	②	③	④	⑤	⑥	⑦

- 1** - Current code $I_{(AVG)}$ = Exact current rating
- 2** - F = Diode
- 3** - Omit = Standard recovery diode
L = Only for fast diode
- 4** - Omit = Stud forward polarity
R = Stud reverse polarity
- 5** - Voltage code $\times 10 = V_{RRM}$ (see Voltage Ratings table)
- 6** - 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



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