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

RoHS COMPLIANT

TYPICAL APPLICATIONS

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

PRODUCT SUMMARY	
$I_{F(AV)}$	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	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^2t	50 Hz	26	103	60	103	160	A^2s
	60 Hz	23	94	55	94	150	
$I^2\sqrt{t}$		363	856	1452	1452	2290	$I^2\sqrt{s}$
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

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.	-	50	75	15 (1)	1.0 (1)	3.0 (1)
1N3880.		100	150			
1N3881.		200	250			
1N3882.		300	350			
1N3883.		400	450			
1N3889.	-	50	75	25 (1)	3.0 (1)	5.0 (1)
1N3890.		100	150			
1N3891.		200	250			
1N3892.		300	350			
1N3893.		400	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

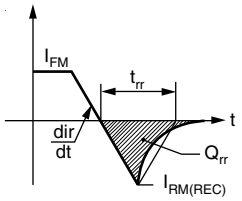
PARAMETER	SYMBOL	TEST CONDITIONS			1N3879. 1N3883.	6FL..	1N3889. 1N3893. 12FL..	16FL..	UNITS
Maximum average forward current at case temperature	$I_{F(AV)}$	180° conduction, half sine wave			6 (1)	6	12 (1)	16	A
		DC			100	100	100	100	°C
Maximum RMS current	$I_{F(RMS)}$				9.5	9.5	19	25	A
Maximum peak,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

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)			

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

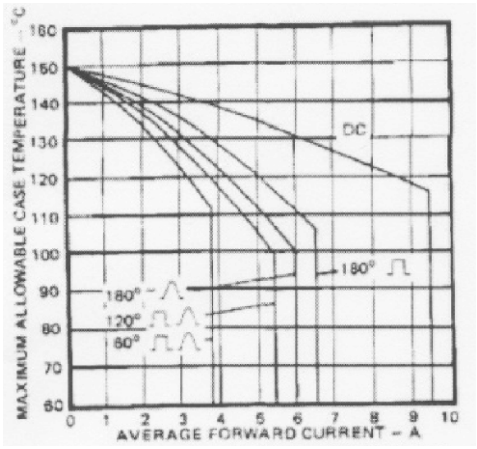


Fig. 1 - Average Forward Current vs. Maximum Allowable Case Temperature, 1N3879 and 6FL Series

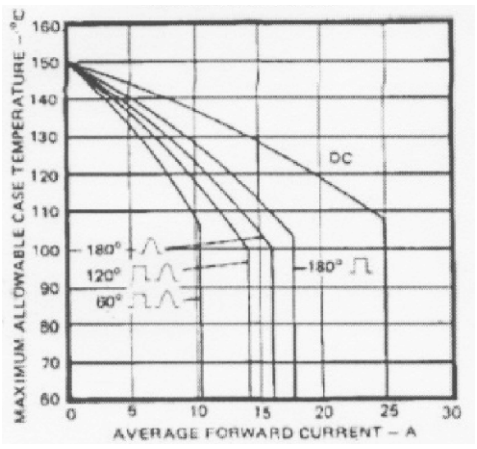


Fig. 3 - Average Forward Current vs. Maximum Allowable Case Temperature, 16FL Series

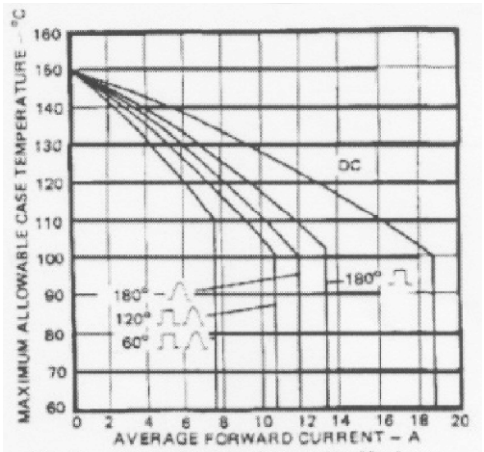


Fig. 2 - Average Forward Current vs. Maximum Allowable Case Temperature, 1N3889 and 12FL Series

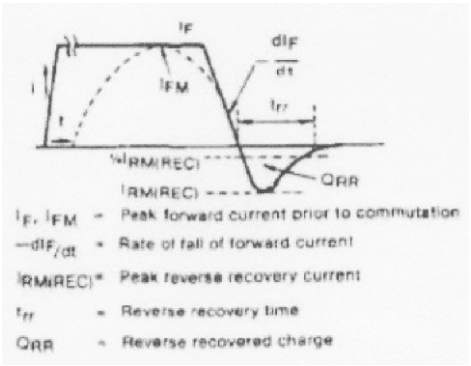


Fig. 4 - Reverse Recovery Time Test Waveform

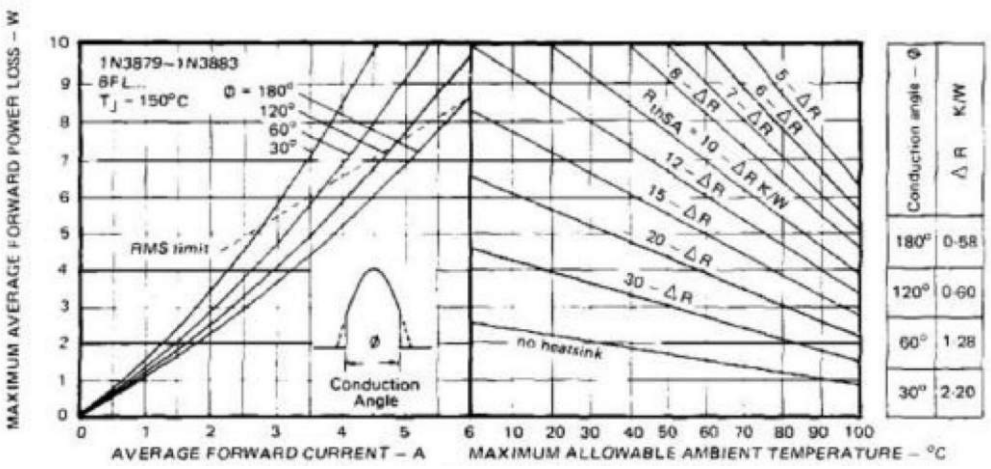


Fig. 5 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3879 and 6FL Series

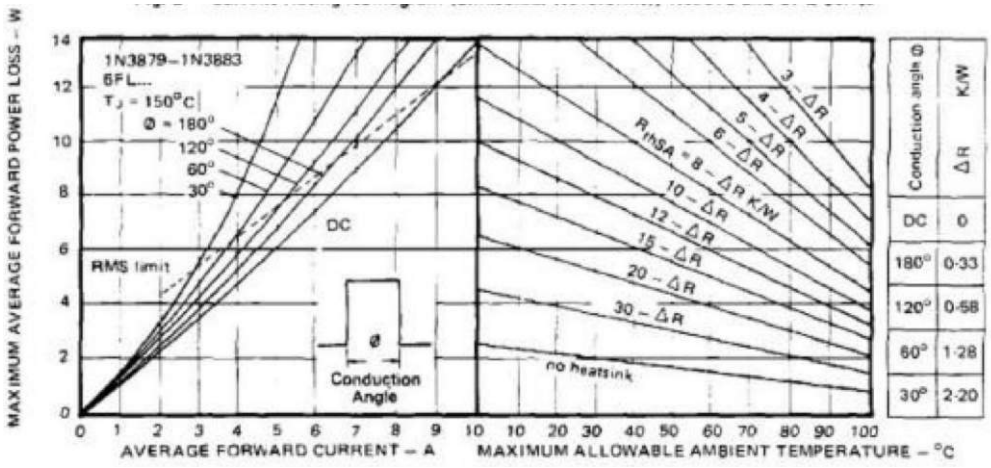


Fig. 6 - Current Rating Nomogram (Rectangular Waveforms), 1N3879 and 6FL Series

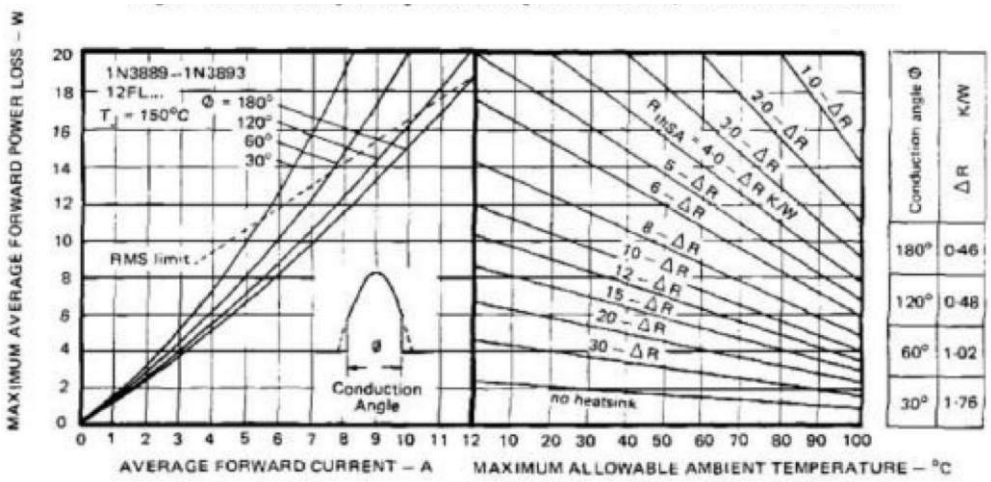


Fig. 7 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3889 and 12FL Series

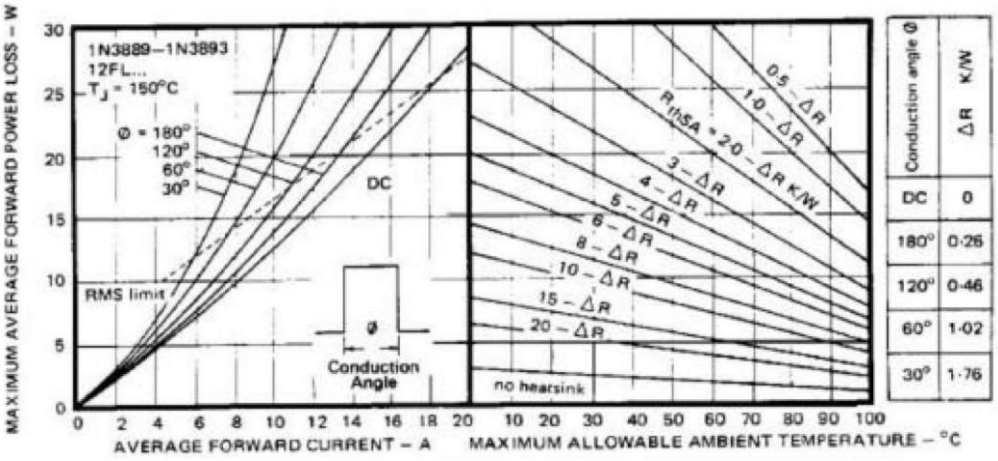


Fig. 8 - Current Rating Nomogram (Rectangular Waveforms), 1N3889 and 12FL Series

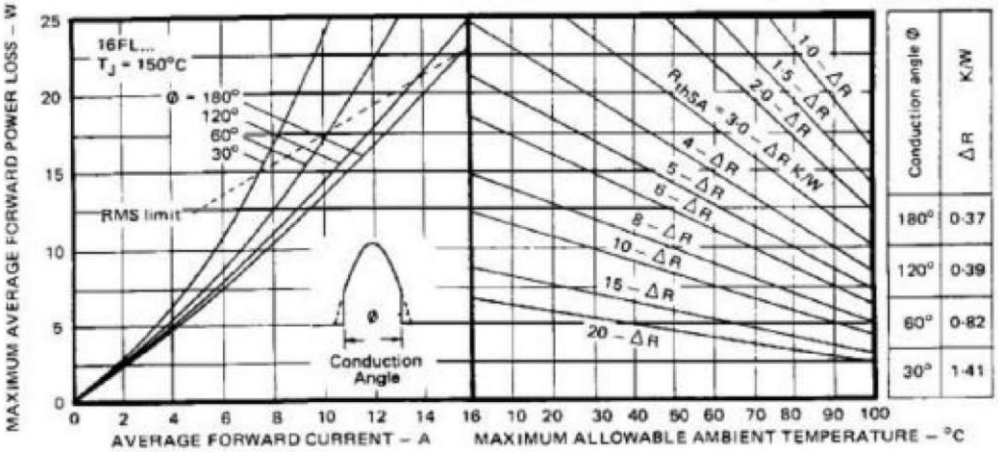


Fig. 9 - Current Rating Nomogram (Sinusoidal Waveforms), 16FL Series

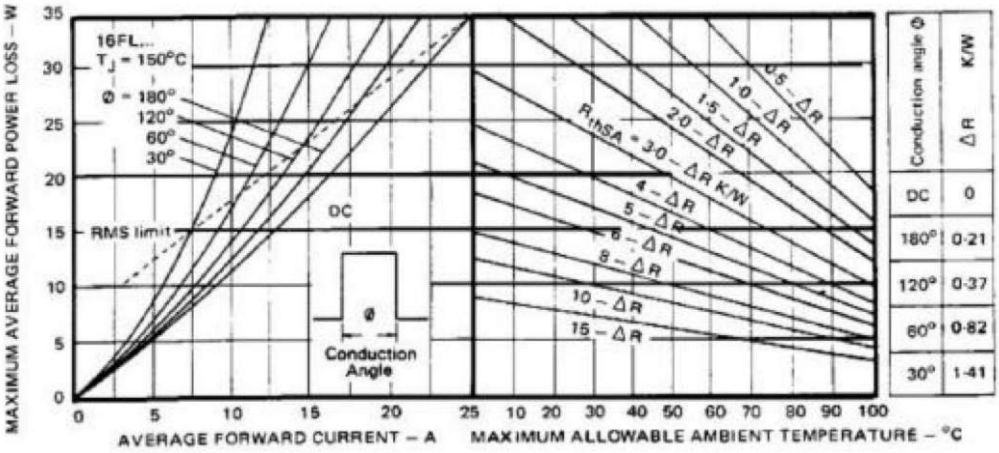


Fig. 10 - Current Rating Nomogram (Rectangular Waveforms), 16FL Series

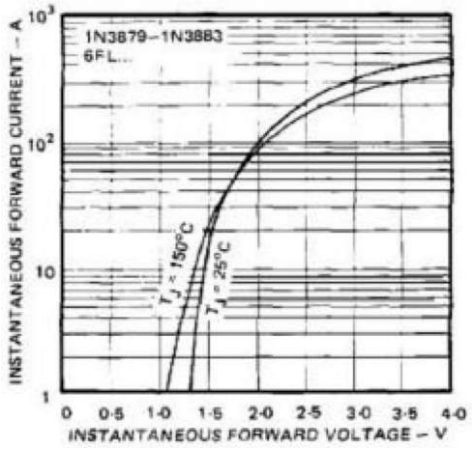


Fig. 11 - Maximum Forward Voltage vs. Forward Current,
1N3879 and 6FL Series

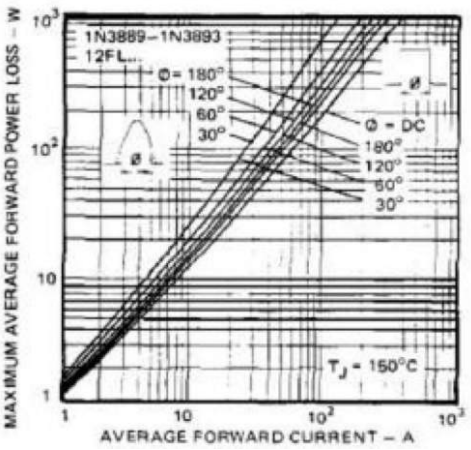


Fig. 14 - Maximum High Level Forward Power Loss vs.
Average Forward Current,
1N3889 and 12FL Series

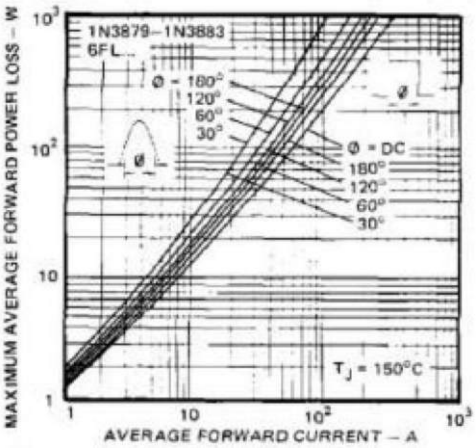


Fig. 12 - Maximum High Level Forward Power Loss vs.
Average Forward Current,
1N3879 and 6FL Series

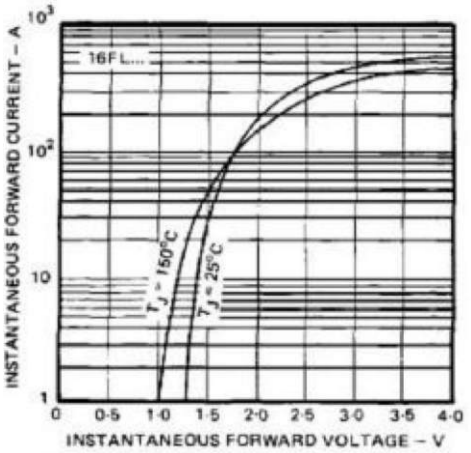


Fig. 15 - Maximum Forward Voltage vs. Forward Current,
16FL Series

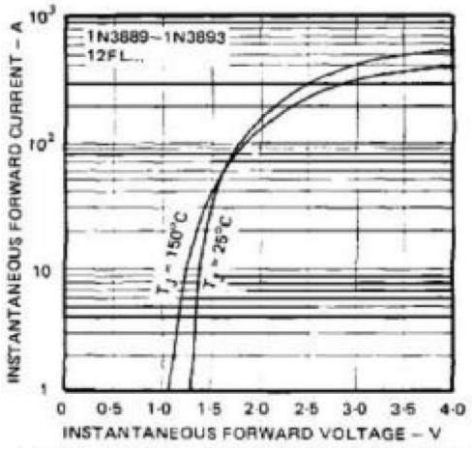


Fig. 13 - Maximum Forward Voltage vs. Forward Current,
1N3889 and 12FL Series

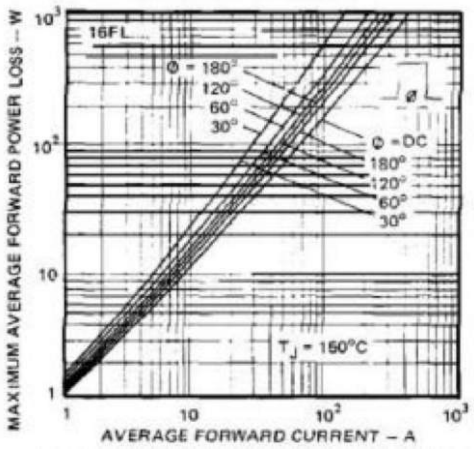


Fig. 16 - Maximum High Level Forward Power Loss vs.
Average Forward Current,
16FL Series

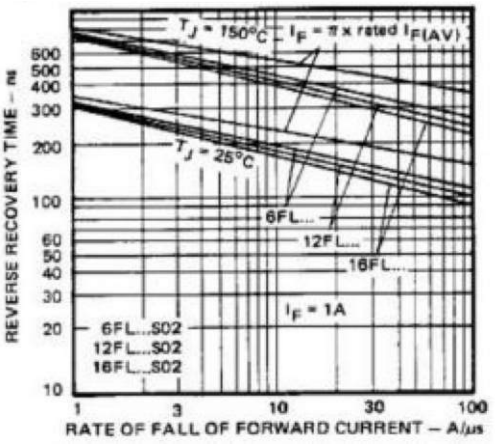


Fig. 17a - Typical Reverse Recovery Time vs.
Rate of Fall of Forward Current, All Series ...S02

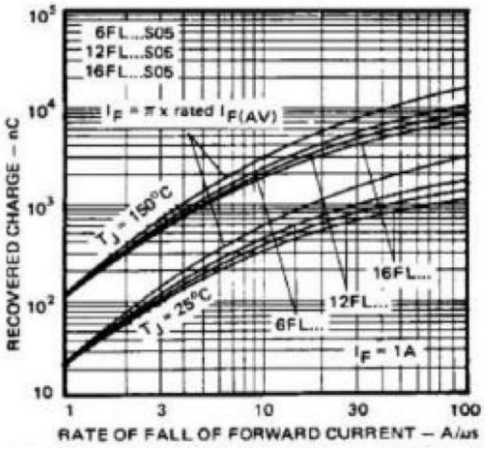


Fig. 18b - Typical Recovered Charge vs.
Rate of Fall of Forward Current, All Series ...S05

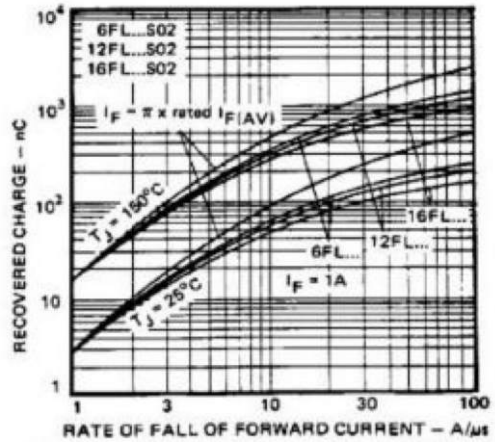


Fig. 17b - Typical Recovered Charge vs.
Rate of Fall of Forward Current, All Series ...S02

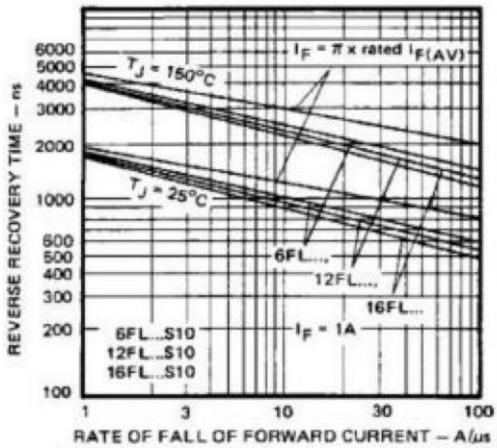


Fig. 19a - Typical Reverse Recovery Time vs.
Rate of Fall of Forward Current, All Series ...S10

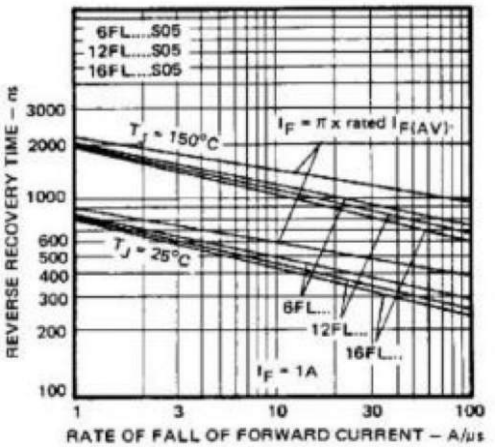


Fig. 18a - Typical Reverse Recovery Time vs.
Rate of Fall of Forward Current, All Series ...S05

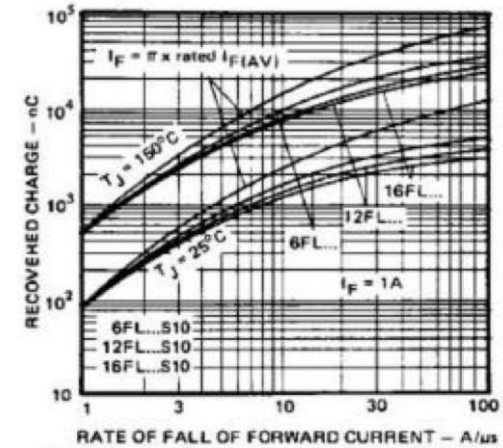


Fig. 19b - Typical Recovered Charge vs.
Rate of Fall of Forward Current, All Series ...S10

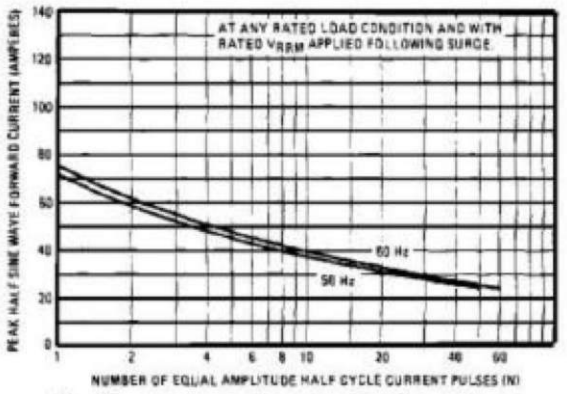


Fig. 20 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N3879 Series

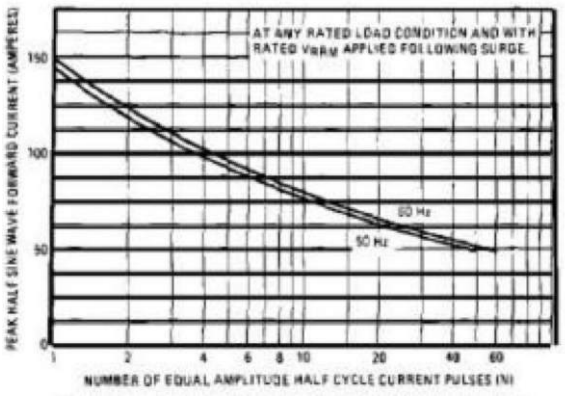


Fig. 22 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 1N3889 and 12FL Series

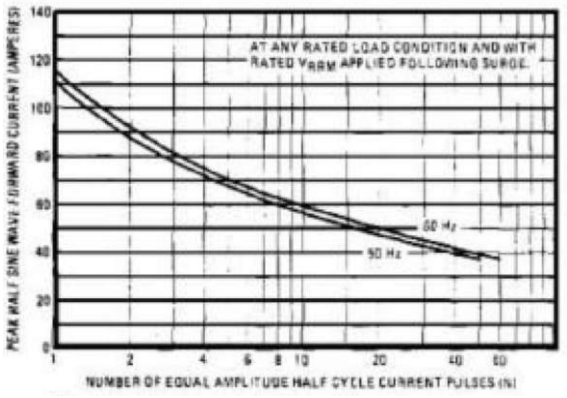


Fig. 21 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 6FL Series

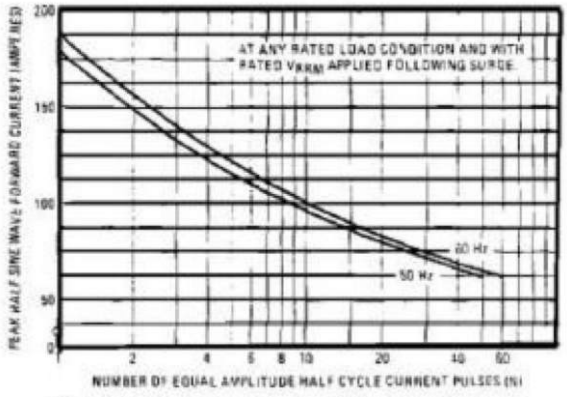


Fig. 23 - Maximum Non-Repetitive Surge Current vs. Number of Current Pulses, 16FL Series

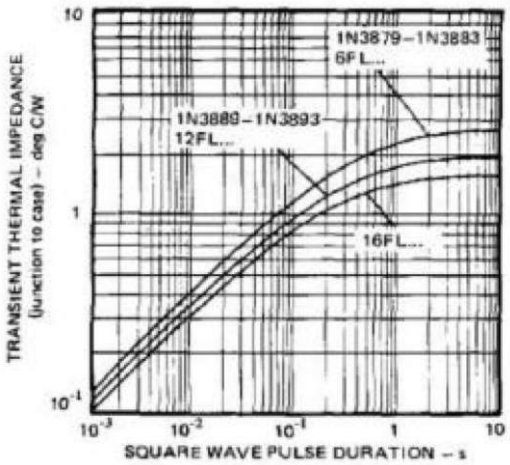


Fig. 24 - Maximum Transient Thermal Impedance, Junction to Case vs. Pulse Duration, All Series

ORDERING INFORMATION TABLE

Device code

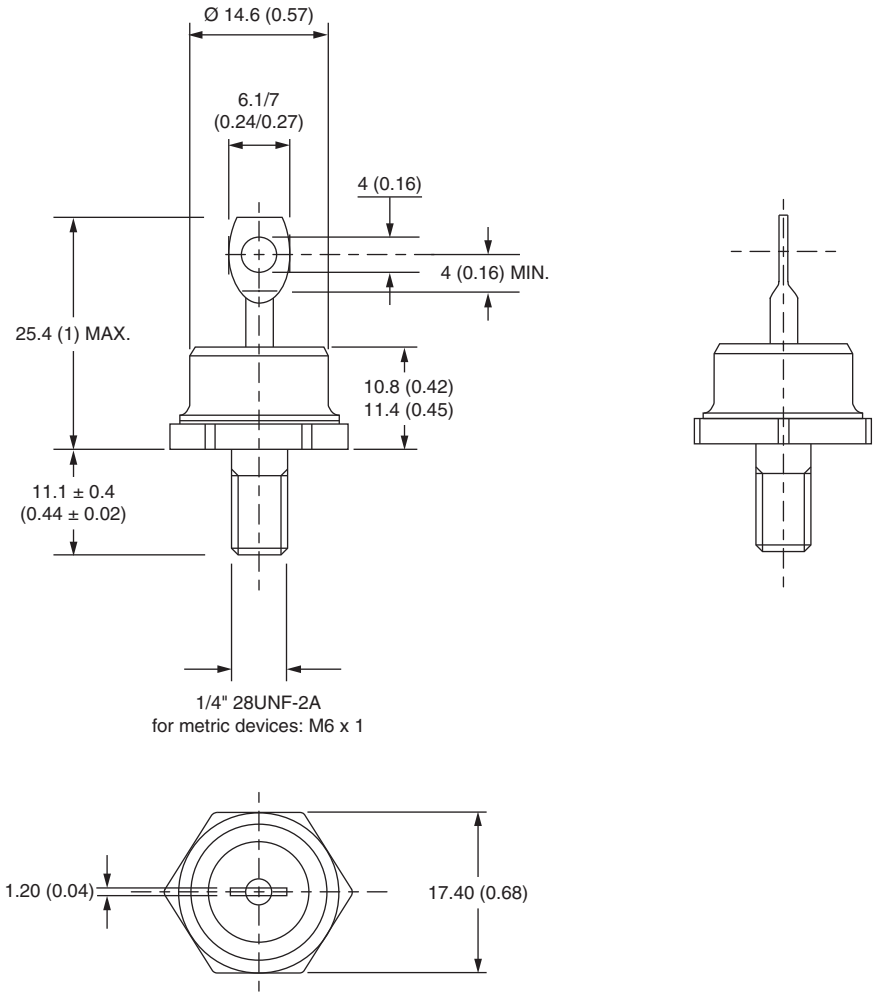
16	F	L	R	60	M	S02
①	②	③	④	⑤	⑥	⑦

- **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 x 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)

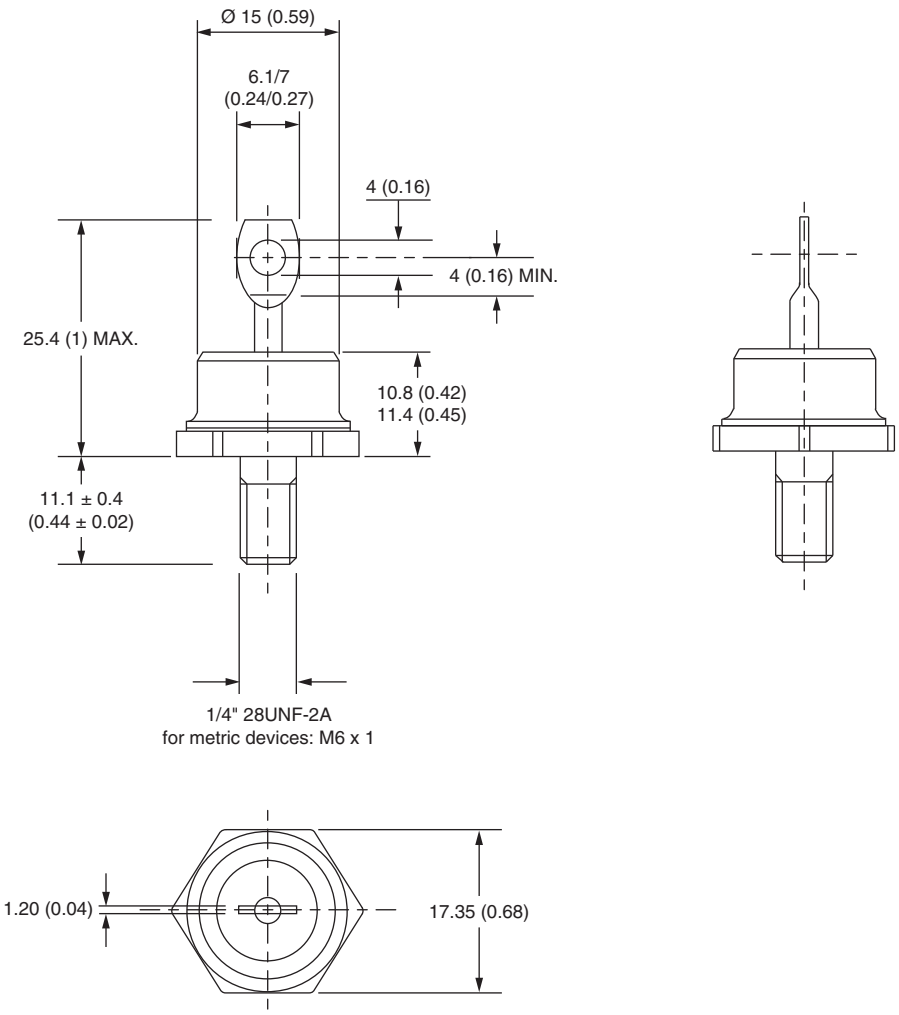
LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95311

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

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



DIMENSIONS FOR 85HFL in millimeters (inches)



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