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Data Sheet No. PD-2.030D

INTERNATIONAL RECTIFIER



1N3879, 1N3889, 6FL, 12FL, 16FL SERIES

**6A, 12A and 16A Fast
Recovery Rectifiers**

Major Ratings and Characteristics

	1N3879 —1N3883	1N3889 —1N3893	6FL...	12FL...	16FL...	Unit
$I_{F(AV)}^{\dagger}$	6*	12*	6	12	16	A
I_{FSM}	50Hz 72	145	110	145	180	A
	60Hz 75*	150*	115	150	190	A
I_t^2	50Hz 26	103	60	103	160	A ² s
	60Hz 23	94	55	94	150	A ² s
$I_A^2 t$	363	1452	855	1452	2290	A ² √s
t_{rr} range	see table					ns
V_{RRM} range	50 — 400*		50 — 1000			V
T_J range	—65 to 150					°C

* JEDEC registered values.

† At max. $T_C = 100^\circ\text{C}$.

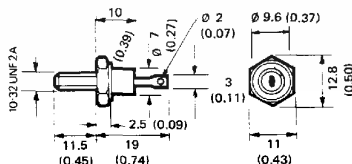
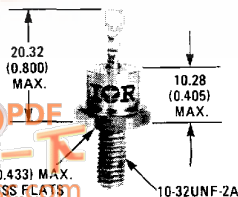
Description

This range of fast recovery diodes is designed for applications in DC power supplies, inverters, converters, choppers, ultrasonic systems and for use as free wheel diodes.

Features

- Short reverse recovery time
- Low stored charge
- Wide current range
- Excellent surge capabilities
- Standard JEDEC types
- Stud cathode and stud anode versions
- Types up to 1000V V_{RRM}
- Fully characterised reverse recovery conditions

CASE STYLE AND DIMENSIONS



Conforms to JEDEC: DO-203AA (DO-4)

IEC 191-2: A3U

BS 3934: SO-10A

DIN 41885: 101 C 2

All dimensions in millimetres (inches)

REVERSE VOLTAGE RATINGS

Part Number ① ①			VRRM — Max. Repetitive Peak Reverse Voltage V	VRRM — Max. Non-Repetitive Peak Reverse Voltage V _p ≤ 5 ms	IR — Max. Reverse Current At Rated V _R		
					T _J = 25°C	T _J = 100°C	T _J = 150°C
			V	V	mA	mA	mA
1N3879			50	75	0.015*	1.0*	3.0*
1N3880			100	150	0.015*	1.0*	3.0*
1N3891			200	250	0.015*	1.0*	3.0*
1N3882			300	350	0.015*	1.0*	3.0*
1N3883			400	450	0.015*	1.0*	3.0*
1N3889			50	75	0.025*	3.0*	5.0*
1N3890			100	150	0.025*	3.0*	5.0*
1N3891			200	250	0.025*	3.0*	5.0*
1N3892			300	350	0.025*	3.0*	5.0*
1N3893			400	450	0.025*	3.0*	5.0*
**6FL5S02			50	75	0.050	—	6.0
6FL10S02			100	150	0.050	—	6.0
6FL20S02			200	275	0.050	—	6.0
6FL40S02			400	500	0.050	—	6.0
6FL60S02			600	725	0.050	—	6.0
—			800	950	0.050	—	6.0
—			1000	1250	0.050	—	6.0
**12FL5S02			50	75	0.050	—	6.0
12FL10S02			100	150	0.050	—	6.0
12FL20S02			200	275	0.050	—	6.0
12FL40S02			400	500	0.050	—	6.0
12FL60S02			600	725	0.050	—	6.0
—			800	950	0.050	—	6.0
—			1000	1250	0.050	—	6.0
**16FL5S02			50	75	0.050	—	6.0
16FL10S02			100	150	0.050	—	6.0
16FL20S02			200	275	0.050	—	6.0
16FL40S02			400	500	0.050	—	6.0
16FL60S02			600	725	0.050	—	6.0
—			800	950	0.050	—	6.0
—			1000	1250	0.050	—	6.0

REVERSE RECOVERY CHARACTERISTICS

	1N3879— 1N3883		6FL...			12FL...			16FL...			Unit	Conditions
	150	150	S02	S05	S10	S02	S05	S10	S02	S05	S10		
t _{rr} Max. reverse recovery time	150	150	110	285	490	100	250	430	90	225	390	ns	T _J = 25°C, I _F = 1A to V _R = 30V dI _F /dt = 100 A/μs
	300*	300*	200	500	1000	200	500	1000	200	500	1000	ns	T _J = 25°C, dI _F /dt = 25 A/μs, I _{FM} = π × rated I _F (AV)
I _{RM} (REC) Max. peak reverse recovery current	4*	5*	—	—	—	—	—	—	—	—	—	—	I _{FM} = π × rated I _F (AV)
Q _{RR} Max. reverse recovered charge	400	350	230	1700	5000	200	1300	3800	150	1100	3000	nC	T _J = 25°C, I _F = 1A to V _R = 30V dI _F /dt = 100 A/μs
	400	400	200	1200	5000	200	1200	5000	200	1200	5000	nC	T _J = 25°C, dI _F /dt = 25 A/μs I _{FM} = π × rated I _F (AV)

ELECTRICAL SPECIFICATIONS

	1N3879— 1N3883	6FL...	1N3889— 1N3893	12FL...	16FL...	Unit	Conditions		
FORWARD CONDUCTION									
I _F (AV) Max. average forward current	6*	6	12*	16	A	180° conduction, half sine wave, T _C = 100°C			
I _F (RMS) Max. r.m.s. forward current	9.5	9.5	19	25	A				
I _{FSM} Max. peak one-cycle non-repetitive forward current	72	110	145	180	A	t = 10 ms	With rated V _{RRM}	Sinusoidal half wave, initial T _J = 150°C	
	75*	115	150*	190		t = 8.3 ms			
	85	130	170	215		t = 10 ms			
	90	135	180	225		t = 8.3 ms			
i _{2t} Max. i _{2t} for fusing	26	60	103	160	A ₂	t = 10 ms	With rated V _{RRM}	Initial T _J = 150°C	
	23	55	94	150		t = 8.3 ms			
	36	86	145	230		t = 10 ms			
	33	78	130	210		t = 8.3 ms			
i ₂ √t Max. i ₂ √t for individual device fusing	363	856	1452	2290	i ₂ √s	t = 0.1 to 10 ms			
V _{FM} Max. peak forward voltage	1.4*	1.4	1.4*	1.4	V	T _J = 25°C, I _F = rated I _F (AV) (D.C.)			
	1.5*	1.5	1.5*	1.5		T _C = 100°C, I _{FM} = π × rated I _F (AV)			

* JEDEC registered value

① I_R(AV) @ rated I_F(AV) and V_{RRM}, and T_C = 100°C.

Thermal and mechanical specifications

		1N3879 -1N3883 6FL...	1N3889 -1N3893 12FL...	16FL...	Units	Conditions
T _J	Junction operating temperature range	-65 to 150			°C	
T _{stg}	Storage temperature range	-65 to 175			°C	
R _{thJC}	Maximum internal thermal resistance, junction to case	2.5	2.0	1.6	deg C/W	DC operation
R _{thCS}	Maximum thermal resistance, case to heatsink	0.5			deg C/W	Mounting surface flat, smooth and greased.
T	Mounting torque to nut ± 10%	10.5			lb.f.in	Lubricated threads (Non-lubricated threads)
		0.12			kgf.m	
		1.2			Nm	
	to device	11.5 (13.5)			lb.f.in	
		0.13 (0.155)			kgf.m	
wt	Approximate weight	1.3 (1.35)			Nm	
		7			g	
		0.25			oz	
Case style		DO-203AA (DO-4)				JEDEC

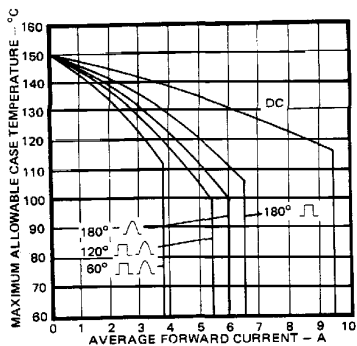


Fig. 1 - Average Forward Current Vs. Maximum Allowable Case Temperature, 1N3879 and 6FL Series

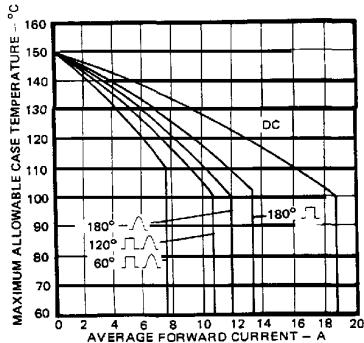
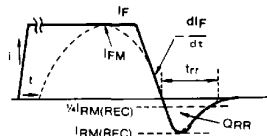
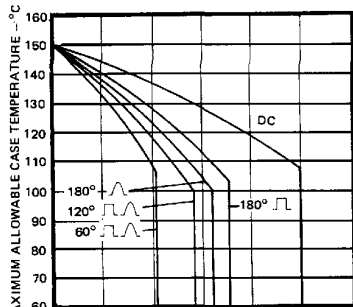


Fig. 2 - Average Forward Current Vs. Maximum Allowable Case Temperature, 1N3889 and 12FL Series


 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

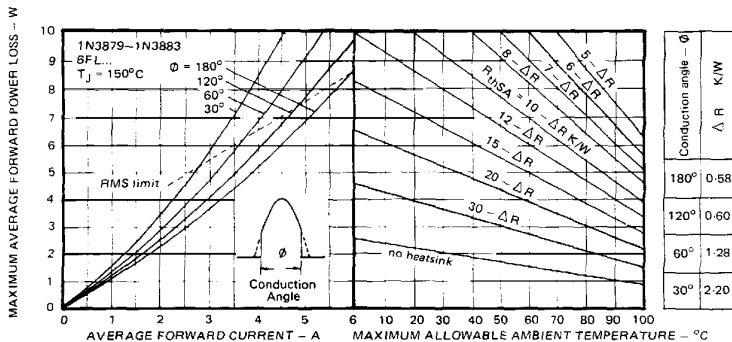


Fig. 5 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3879 and 6FL Series

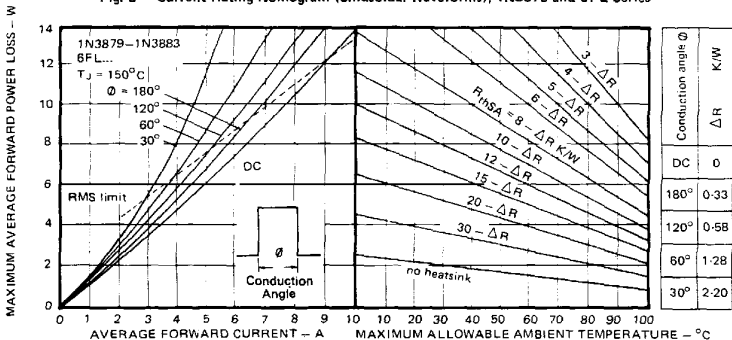
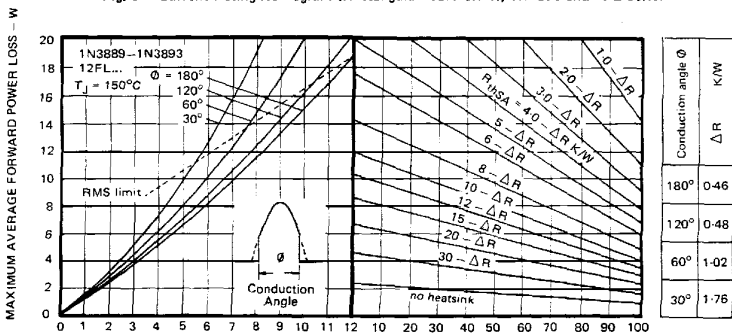


Fig. 6 - Current Rating Nomogram (Rectangular Waveforms), 1N3879 and 6FL Series



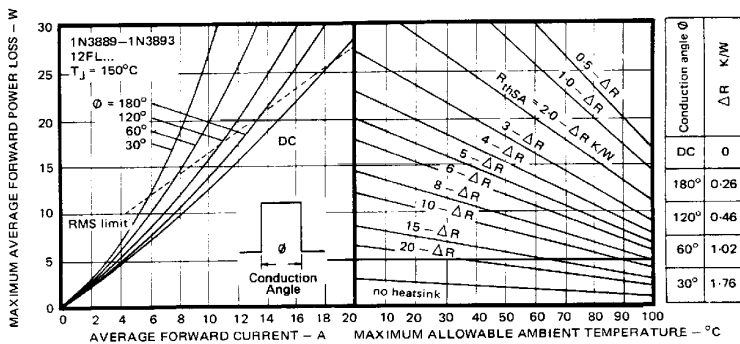


Fig. 8 - Current Rating Nomogram (Rectangular Waveforms), 1N3889 and 12FL Series

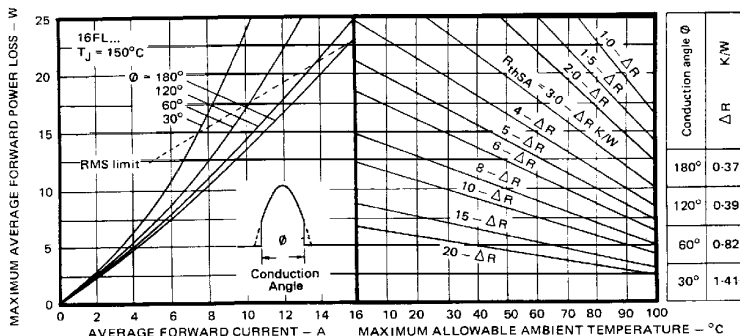
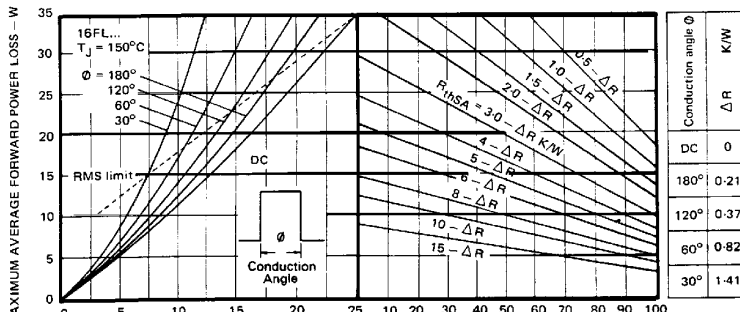


Fig. 9 - Current Rating Nomogram (Sinusoidal Waveforms), 16FL Series



1N3879, 1N3889, 6FL, 12FL, 16FL Series

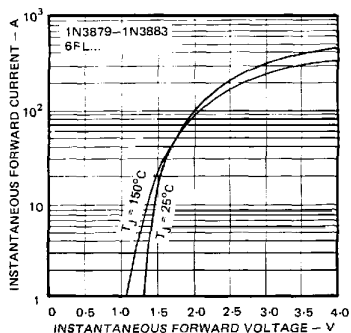


Fig. 11 - Maximum Forward Voltage Vs. Forward Current, 1N3879 and 6FL Series

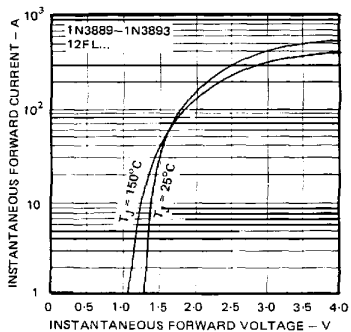
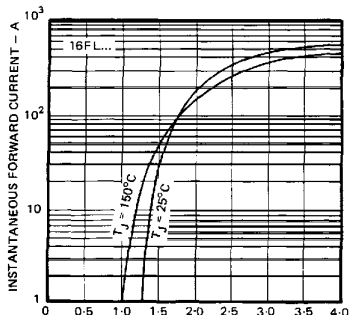


Fig. 13 - Maximum Forward Voltage Vs. Forward Current, 1N3889 and 12FL Series



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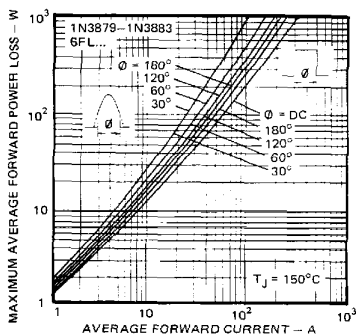


Fig. 12 - Maximum High Level Forward Power Loss Vs. Average Forward Current, 1N3879 and 6FL Series

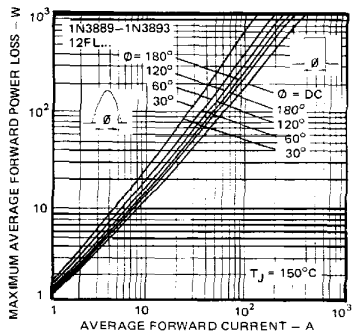
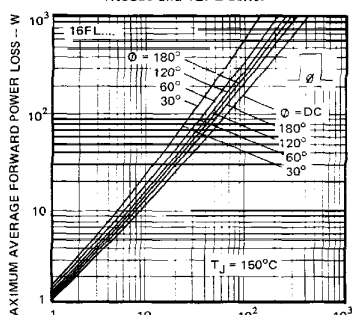


Fig. 14 - Maximum High Level Forward Power Loss Vs. Average Forward Current, 1N3889 and 12FL Series



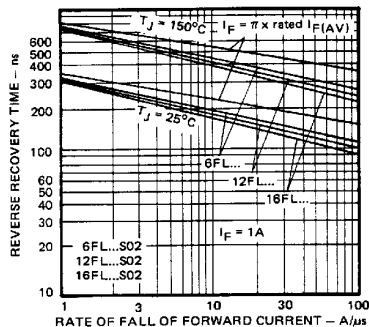


Fig. 17A - Maximum Reverse Recovery Time Vs. Rate of Fall of Forward Current, All Series __S02

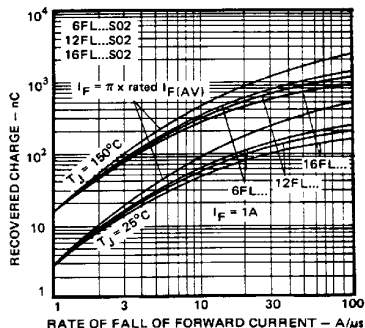


Fig. 17B - Maximum Recovered Charge Vs. Rate of Fall of Forward Current, All Series __S02

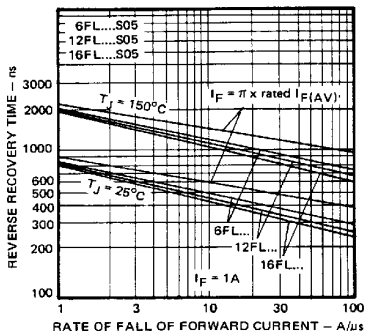


Fig. 18A - Maximum Reverse Recovery Time Vs. Rate of Fall of Forward Current, All Series __S05

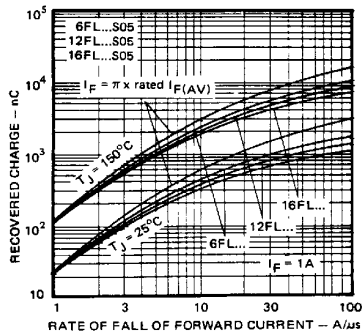
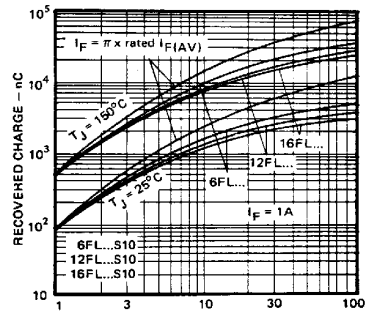
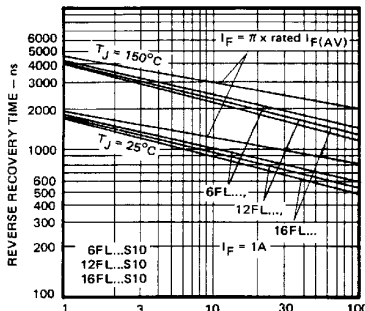


Fig. 18B - Maximum Recovered Charge Vs. Rate of Fall of Forward Current, All Series __S05



1N3879, 1N3889, 6FL, 12FL, 16FL Series

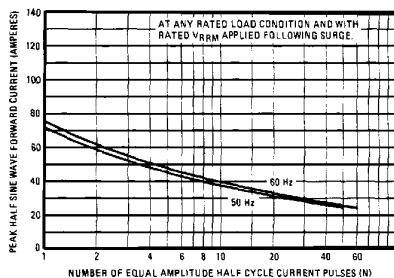


Fig. 20 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 1N3879 Series

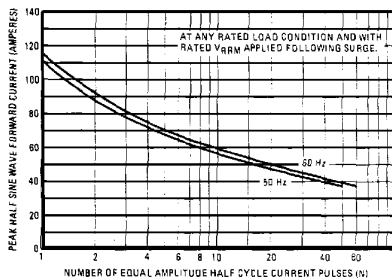


Fig. 21 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 6FL Series

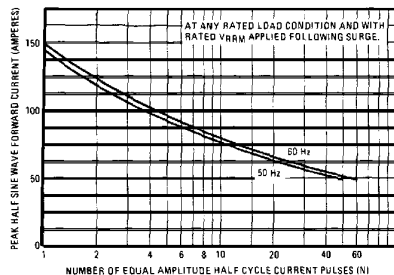


Fig. 22 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 1N3889 and 12FL Series

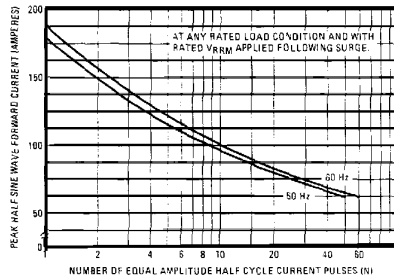


Fig. 23 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 16FL Series

