

**INTERNATIONAL RECTIFIER**

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

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

### Major Ratings and Characteristics

|                     | 1N3879<br>—1N3883 | 1N3889<br>—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                |
| $I^2t$              | 50Hz 26           | 103               | 60        | 103     | 160     | A <sup>2</sup> s |
|                     | 60Hz 23           | 94                | 55        | 94      | 150     | A <sup>2</sup> s |
| $I_A\sqrt{t}$       | 363               | 1452              | 855       | 1452    | 2290    | A $\sqrt{s}$     |
| $t_{rr}$ range      | see table         |                   |           |         |         | ns               |
| $V_{RRM}$ range     | 50 — 400*         |                   | 50 — 1000 |         |         | V                |
| $T_J$ range         | —65 to 150        |                   |           |         |         | °C               |

\*JEDEC registered values.

† At max.  $T_C = 100^\circ\text{C}$ .

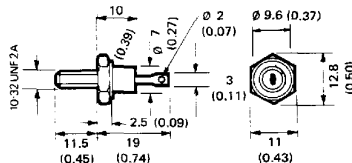
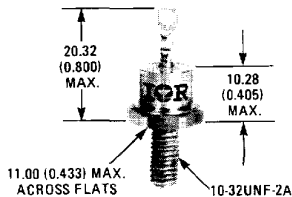
### Description

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 ② | VRRM — Max. Repetitive Peak Reverse Voltage |            | VRRM — Max. Non-Repetitive Peak Reverse Voltage $t_p \leq 5$ ms |      | IR — Max. Reverse Current At Rated VR |                           |                           |
|-----------------|---------------------------------------------|------------|-----------------------------------------------------------------|------|---------------------------------------|---------------------------|---------------------------|
|                 | V                                           |            | V                                                               |      | $T_J = 25^\circ\text{C}$              | $T_J = 100^\circ\text{C}$ | $T_J = 150^\circ\text{C}$ |
| 1N3879          | 50                                          |            | 75                                                              | mA   | 0.015*                                | 1.0*                      | 3.0*                      |
| 1N3880          | 100                                         |            | 150                                                             |      | 0.015*                                | 1.0*                      | 3.0*                      |
| 1N3881          | 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*                      |
| **6FL6S02       | 6FL6S05                                     | 6FL6S10    | 50                                                              | 75   | 0.050                                 | —                         | 6.0                       |
| 6FL10S02        | 6FL10S05                                    | 6FL10S10   | 100                                                             | 150  | 0.050                                 | —                         | 6.0                       |
| 6FL20S02        | 6FL20S05                                    | 6FL20S10   | 200                                                             | 275  | 0.050                                 | —                         | 6.0                       |
| 6FL40S02        | 6FL40S05                                    | 6FL40S10   | 400                                                             | 500  | 0.050                                 | —                         | 6.0                       |
| 6FL60S02        | 6FL60S05                                    | 6FL60S10   | 600                                                             | 725  | 0.050                                 | —                         | 6.0                       |
| —               | 6FL80S05                                    | 6FL80S10   | 800                                                             | 950  | 0.050                                 | —                         | 6.0                       |
| —               | 6FL100S05                                   | 6FL100S10  | 1000                                                            | 1250 | 0.050                                 | —                         | 6.0                       |
| **12FL6S02      | 12FL6S05                                    | 12FL6S10   | 50                                                              | 75   | 0.050                                 | —                         | 6.0                       |
| 12FL10S02       | 12FL10S05                                   | 12FL10S10  | 100                                                             | 150  | 0.050                                 | —                         | 6.0                       |
| 12FL20S02       | 12FL20S05                                   | 12FL20S10  | 200                                                             | 275  | 0.050                                 | —                         | 6.0                       |
| 12FL40S02       | 12FL40S05                                   | 12FL40S10  | 400                                                             | 500  | 0.050                                 | —                         | 6.0                       |
| 12FL60S02       | 12FL60S05                                   | 12FL60S10  | 600                                                             | 725  | 0.050                                 | —                         | 6.0                       |
| —               | 12FL80S05                                   | 12FL80S10  | 800                                                             | 950  | 0.050                                 | —                         | 6.0                       |
| —               | 12FL100S05                                  | 12FL100S10 | 1000                                                            | 1250 | 0.050                                 | —                         | 6.0                       |
| **16FL6S02      | 16FL6S05                                    | 16FL6S10   | 50                                                              | 75   | 0.050                                 | —                         | 6.0                       |
| 16FL10S02       | 16FL10S05                                   | 16FL10S10  | 100                                                             | 150  | 0.050                                 | —                         | 6.0                       |
| 16FL20S02       | 16FL20S05                                   | 16FL20S10  | 200                                                             | 275  | 0.050                                 | —                         | 6.0                       |
| 16FL40S02       | 16FL40S05                                   | 16FL40S10  | 400                                                             | 500  | 0.050                                 | —                         | 6.0                       |
| 16FL60S02       | 16FL60S05                                   | 16FL60S10  | 600                                                             | 725  | 0.050                                 | —                         | 6.0                       |
| —               | 16FL80S05                                   | 16FL80S10  | 800                                                             | 950  | 0.050                                 | —                         | 6.0                       |
| —               | 16FL100S05                                  | 16FL100S10 | 1000                                                            | 1250 | 0.050                                 | —                         | 6.0                       |

## REVERSE RECOVERY CHARACTERISTICS

| REVERSE RECOVERY CHARACTERISTICS |                                    |                 |      |        |      |      |         |      |      |         |      |      |      |                                                                                                              |  |  |
|----------------------------------|------------------------------------|-----------------|------|--------|------|------|---------|------|------|---------|------|------|------|--------------------------------------------------------------------------------------------------------------|--|--|
|                                  |                                    | 1N3879 – 1N3883 |      | 6FL... |      |      | 12FL... |      |      | 16FL... |      |      | Unit | Conditions                                                                                                   |  |  |
|                                  |                                    | 1N3889 – 1N3893 |      | 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   | $T_J = 25^{\circ}\text{C}, I_F = 1\text{ A to } V_R = 30\text{ V}$<br>$dI_F/dt = 100\text{ A}/\mu\text{s}$   |  |  |
|                                  |                                    | 300*            | 300* | 200    | 500  | 1000 | 200     | 500  | 1000 | 200     | 500  | 1000 | ns   | $T_J = 25^{\circ}\text{C}, dI_F/dt = 25\text{ A}/\mu\text{s}$ .                                              |  |  |
| $I_{RM}(REC)$                    | Max. peak reverse recovery current | 4*              | 5*   | —      | —    | —    | —       | —    | —    | —       | —    | —    | —    | $I_{FM} = \pi \times \text{rated } I_F(AV)$                                                                  |  |  |
| $Q_{RR}$                         | Max. reverse recovered charge      | 400             | 350  | 230    | 1700 | 5000 | 200     | 1300 | 3800 | 150     | 1100 | 3000 | nC   | $T_J = 25^{\circ}\text{C}, I_F = 1\text{ A to } V_R = 30\text{ V}$<br>$dI_F/dt = 100\text{ A}/\mu\text{s}$   |  |  |
|                                  |                                    | 400             | 400  | 200    | 1200 | 5000 | 200     | 1200 | 5000 | 200     | 1200 | 5000 | nC   | $T_J = 25^{\circ}\text{C}, dI_F/dt = 25\text{ A}/\mu\text{s}$<br>$I_{FM} = \pi \times \text{rated } I_F(AV)$ |  |  |

## ELECTRICAL SPECIFICATIONS

|                                                                     |                                           | 1N3879—<br>1N3883 |     | 6FL... |      | 1N3889—<br>1N3893 |  | 12FL...                                                                                                                              |                                       | 16FL...                                                    |  | Unit |  | Conditions |  |
|---------------------------------------------------------------------|-------------------------------------------|-------------------|-----|--------|------|-------------------|--|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------|--|------|--|------------|--|
| FORWARD CONDUCTION                                                  |                                           |                   |     |        |      |                   |  |                                                                                                                                      |                                       |                                                            |  |      |  |            |  |
| $I_F(AV)$ Max. average forward current                              |                                           | 6*                | 6   | 12*    | 16   | A                 |  | 180° conduction, half sine wave, $T_C = 100^\circ\text{C}$                                                                           |                                       |                                                            |  |      |  |            |  |
| $I_F(RMS)$ 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                 |  | $t = 10\text{ ms}$<br>$t = 8.3\text{ ms}$<br>$t = 10\text{ ms}$<br>$t = 8.3\text{ ms}$                                               | With rated $V_{RRM}$<br>$V_{RRM} = 0$ | Sinusoidal half wave,<br>initial $T_J = 150^\circ\text{C}$ |  |      |  |            |  |
|                                                                     |                                           | 75*               | 115 | 150*   | 190  |                   |  |                                                                                                                                      |                                       |                                                            |  |      |  |            |  |
|                                                                     |                                           | 85                | 130 | 170    | 215  |                   |  |                                                                                                                                      |                                       |                                                            |  |      |  |            |  |
|                                                                     |                                           | 90                | 135 | 180    | 225  |                   |  |                                                                                                                                      |                                       |                                                            |  |      |  |            |  |
| $i_2^2$ Max. $i_2^2$ for fusing                                     |                                           | 26                | 60  | 103    | 160  | $A^2$             |  | $t = 10\text{ ms}$<br>$t = 8.3\text{ ms}$<br>$t = 10\text{ ms}$<br>$t = 8.3\text{ ms}$                                               | With rated $V_{RRM}$<br>$V_{RRM} = 0$ | Initial $T_J = 150^\circ\text{C}$                          |  |      |  |            |  |
|                                                                     |                                           | 23                | 55  | 94     | 150  |                   |  |                                                                                                                                      |                                       |                                                            |  |      |  |            |  |
|                                                                     | Max. $i_2^2$ for individual device fusing | 36                | 86  | 145    | 230  |                   |  |                                                                                                                                      |                                       |                                                            |  |      |  |            |  |
|                                                                     |                                           | 33                | 78  | 130    | 210  |                   |  |                                                                                                                                      |                                       |                                                            |  |      |  |            |  |
| $i_2^2 \sqrt{t}$ Max. $i_2^2 \sqrt{t}$ for individual device fusing | ①                                         | 363               | 856 | 1452   | 2290 | $i_2^2 \sqrt{t}$  |  | $t = 0.1$ to 10 ms                                                                                                                   |                                       |                                                            |  |      |  |            |  |
| $V_{FM}$ Max. peak forward voltage                                  |                                           | 1.4*              | 1.4 | 1.4*   | 1.4  | V                 |  | $T_J = 25^\circ\text{C}, I_F = \text{rated } I_F(AV)$ (D.C.)<br>$T_C = 100^\circ\text{C}, I_{FM} = \pi \times \text{rated } I_F(AV)$ |                                       |                                                            |  |      |  |            |  |
|                                                                     |                                           | 1.5*              | 1.5 | 1.5*   | 1.5  |                   |  |                                                                                                                                      |                                       |                                                            |  |      |  |            |  |

\* JEDEC registered value

\*\* Suffix "S02" may be omitted, i.e., 12FL10 implies 12FL10S02, 12FLR60 implies 12FLR60S02.

① Types listed are cathode to case; for anode-to-case include "R" in code, i.e., 1N3879R, 6FLR20S10, 16FLR40S02.

②  $I_R(AV)$  @ rated  $I_F(AV)$  and  $V_{RRM}$ , and  $T_C = 100^\circ\text{C}$ .③  $I_{RM}$  @ rated  $V_{RRM}$  and  $T_J = 150^\circ\text{C}$ .④  $i_2^2$  for time  $t_x = i_2^2 \sqrt{t} \cdot \sqrt{x}$ 

⑤ When these devices are ordered without a suffix, e.g., 40HFL, the order will be filled with devices that meet the S02 specification.

## Thermal and mechanical specifications

|            |                                                       |           | 1N3879<br>-1N3883<br>6FL.... | 1N3889<br>-1N3893<br>12FL.... | 16FL... | Units              | Conditions                                     |
|------------|-------------------------------------------------------|-----------|------------------------------|-------------------------------|---------|--------------------|------------------------------------------------|
| $T_J$      | Junction operating temperature range                  |           | -65 to 150                   |                               |         | $^{\circ}\text{C}$ |                                                |
| $T_{stg}$  | Storage temperature range                             |           | -65 to 175                   |                               |         | $^{\circ}\text{C}$ |                                                |
| $R_{thJC}$ | 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<br>$\pm 10\%$                         | to nut    | 10.5                         |                               |         | lb·f·in            | Lubricated threads<br>(Non-lubricated threads) |
|            |                                                       |           | 0.12                         |                               |         | kgf·m              |                                                |
|            |                                                       |           | 1.2                          |                               |         | Nm                 |                                                |
|            |                                                       | to device | 11.5 (13.5)                  |                               |         | lb·f·in            |                                                |
|            |                                                       |           | 0.13 (0.156)                 |                               |         | kgf·m              |                                                |
| wt         | Approximate weight                                    |           | 1.3 (1.35)                   |                               |         | Nm                 |                                                |
|            |                                                       |           | 7                            |                               |         | g                  |                                                |
|            |                                                       |           | 0.25                         |                               |         | oz                 |                                                |
| Case style |                                                       |           | DO-203AA (DO-4)              |                               |         |                    | JEDEC                                          |

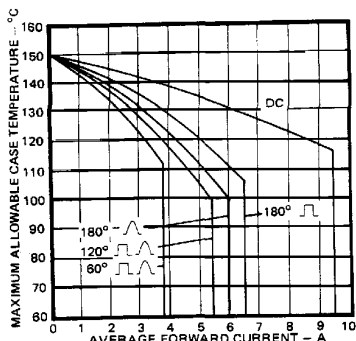


Fig. 1 - Average Forward Current Vs. Maximum Allowable Case Temperature, 1N3879 and 6FL Series

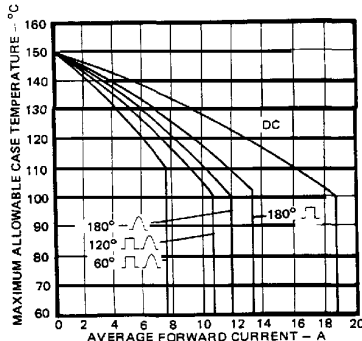


Fig. 2 - Average Forward Current Vs. Maximum Allowable Case Temperature, 1N3889 and 12FL Series

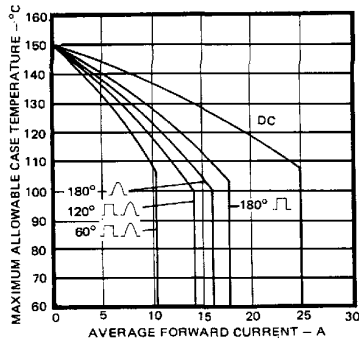
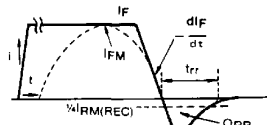


Fig. 3 - Average Forward Current Vs. Maximum Allowable Case Temperature, 16FL Series



- $I_F, I_{FM}$  = 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. 4 - Reverse Recovery Time Test Waveform

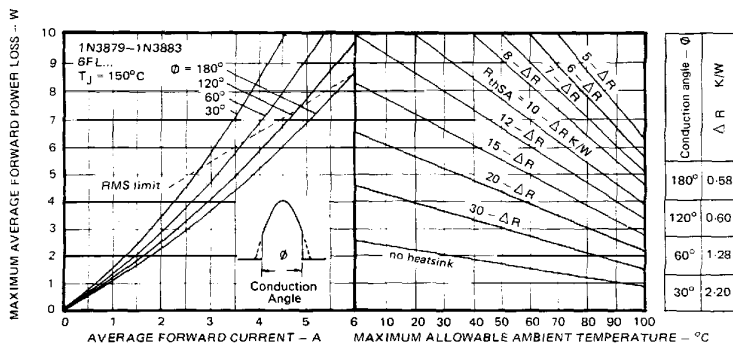


Fig. 5 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3879 and 6FL Series

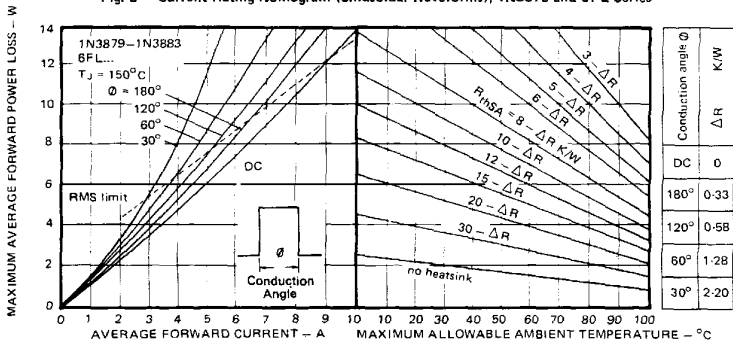


Fig. 6 - Current Rating Nomogram (Rectangular Waveforms), 1N3879 and 6FL Series

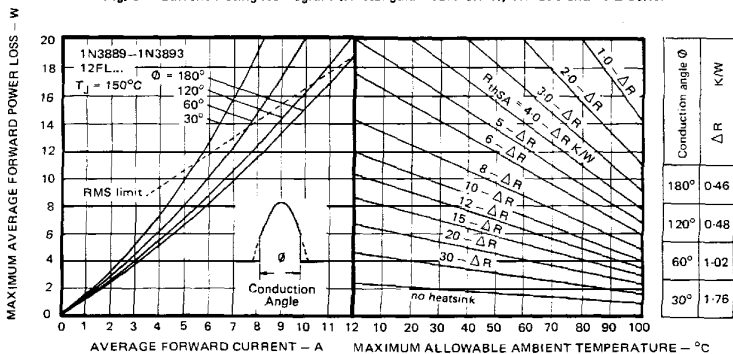
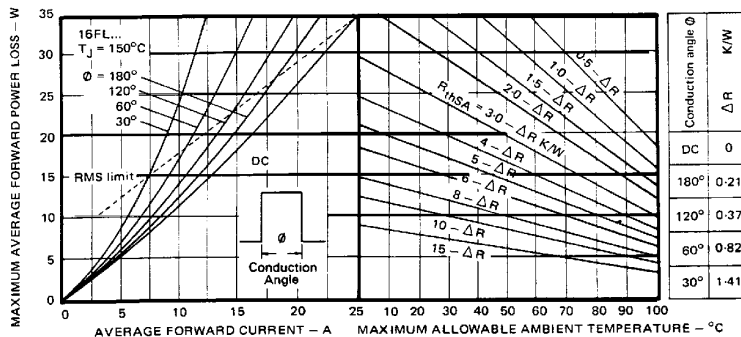
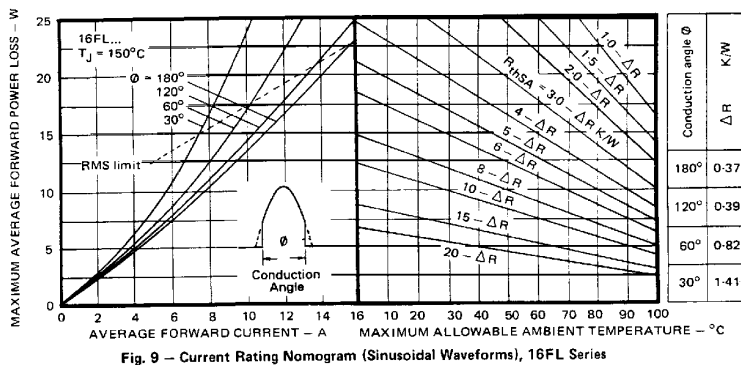
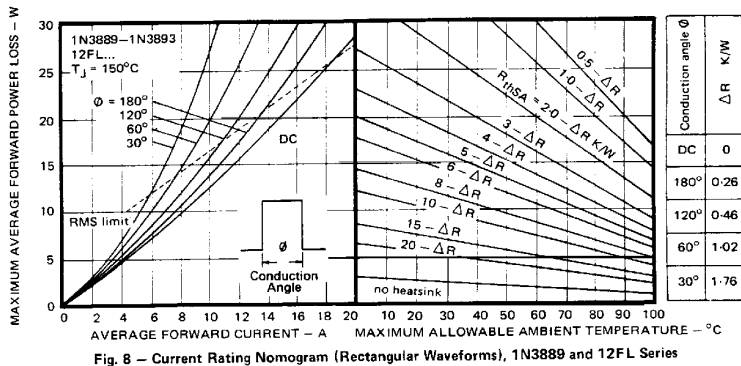


Fig. 7 - Current Rating Nomogram (Sinusoidal Waveforms), 1N3889 and 12FL Series



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

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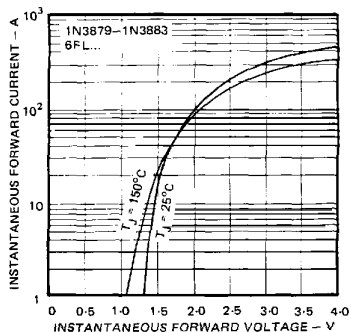


Fig. 11 - Maximum Forward Voltage Vs. Forward Current, 1N3879 and 6FL Series

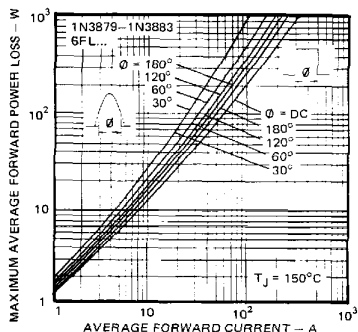


Fig. 12 - Maximum High Level Forward Power Loss Vs. Average Forward Current, 1N3879 and 6FL Series

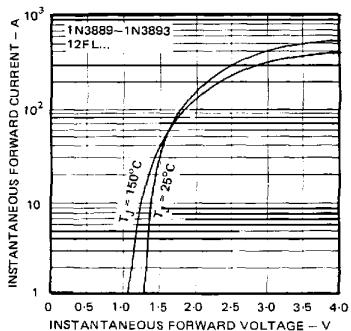


Fig. 13 - Maximum Forward Voltage Vs. Forward Current, 1N3889 and 12FL Series

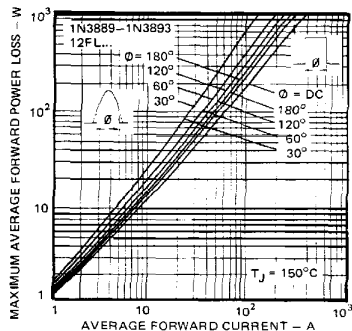


Fig. 14 - Maximum High Level Forward Power Loss Vs. Average Forward Current, 1N3889 and 12FL Series

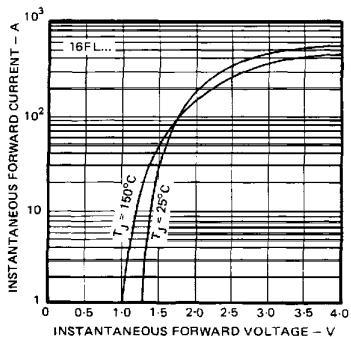


Fig. 15 - Maximum Forward Voltage Vs. Forward Current, 16FL Series

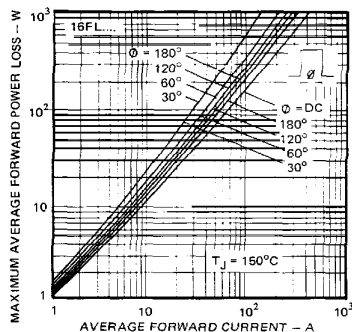


Fig. 16 - Maximum High Level Forward Power Loss Vs. Average Forward Current, 16FL Series



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

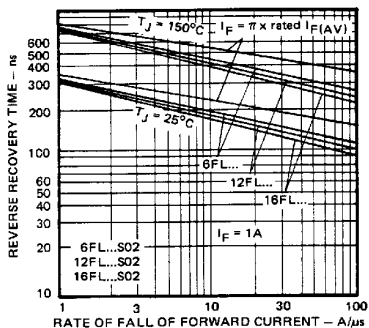


Fig. 17A - Maximum Reverse Recovery Time Vs. Rate of Fall of Forward Current, All Series \_\_S02

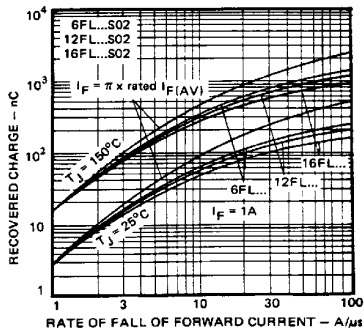


Fig. 17B - Maximum Recovered Charge Vs. Rate of Fall of Forward Current, All Series \_\_S02

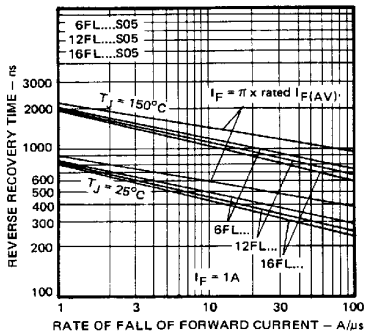


Fig. 18A - Maximum Reverse Recovery Time Vs. Rate of Fall of Forward Current, All Series \_\_S05

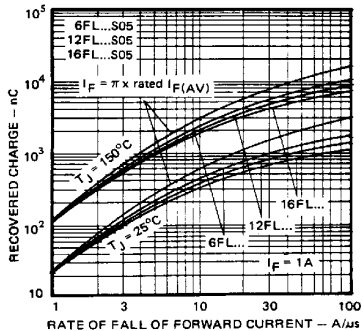


Fig. 18B - Maximum Recovered Charge Vs. Rate of Fall of Forward Current, All Series \_\_S05

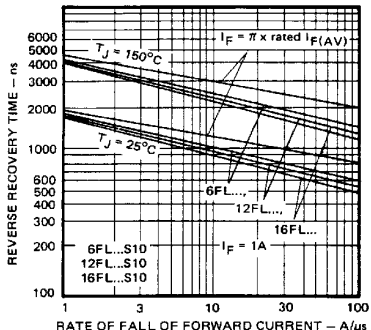


Fig. 19A - Maximum Reverse Recovery Time Vs. Rate of Fall of Forward Current, All Series \_\_S10

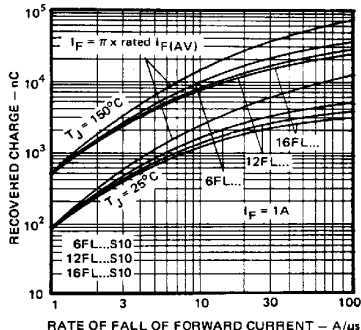


Fig. 19B - Maximum Recovered Charge Vs. Rate of Fall of Forward Current, All Series \_\_S10

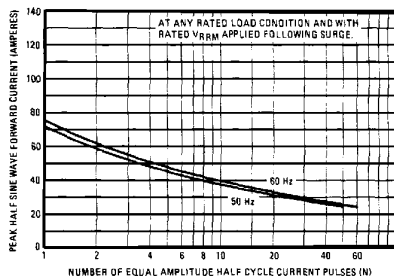


Fig. 20 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 1N3879 Series

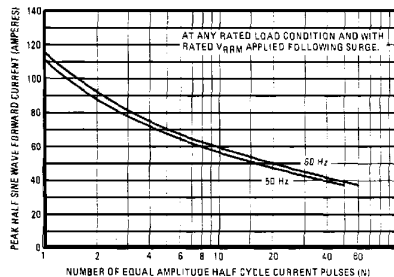


Fig. 21 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 6FL Series

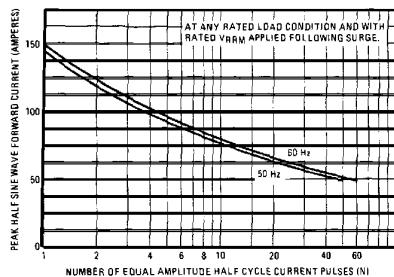


Fig. 22 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 1N3889 and 12FL Series

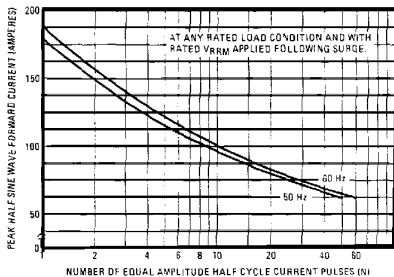


Fig. 23 - Maximum Non-Repetitive Surge Current Vs. Number of Current Pulses, 16FL Series

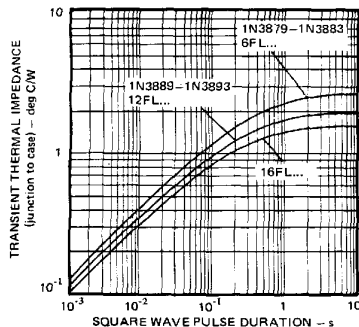


Fig. 24 - Maximum Transient Thermal Impedance, Junction-to-Case Vs. Pulse Duration, All Series.



**ООО «НИОКРсистемс»** - это оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов. Реализуемая нашей компанией продукция насчитывает более полумиллиона наименований.

Благодаря этому наша компания предлагает к поставке практически не ограниченный ассортимент компонентов как оптовыми, мелкооптовыми партиями, так и в розницу.

Благодаря развитой сети поставщиков, помогаем в поиске и приобретении экзотичных или снятых с производства компонентов.

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- Гарантия качества поставляемой продукции
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