

FAST SOFT-RECOVERY RECTIFIER DIODES



Silicon diodes, each in a DO-4 metal envelope, featuring non-snap-off characteristics, and intended for use in high-frequency power supplies, thyristor inverters and multi-phase power rectifier applications.

The series consists of the following types:

Normal polarity (cathode to stud): 1N3889, 1N3890, 1N3891 and 1N3892.

Reverse polarity (anode to stud): 1N3889R, 1N3890R, 1N3891R and 1N3892R.

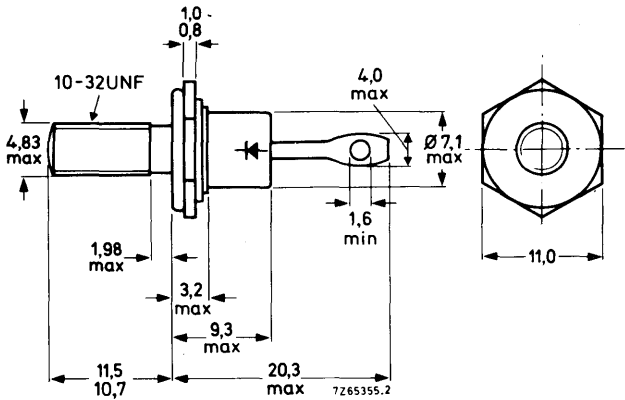
QUICK REFERENCE DATA

		1N3889(R)	1N3890(R)	1N3891(R)	1N3892(R)
Repetitive peak reverse voltage	V_{RRM}	max. 50	100	200	300 V
Average forward current			$I_F(AV)$	max. 12	A
Non-repetitive peak forward current			I_{FSM}	max. 150	A
Reverse recovery time			t_{rr}	< 200	ns

MECHANICAL DATA

Dimensions in mm

DO-4



Net mass: 6 g

Diameter of clearance hole: max. 5,2 mm

Accessories supplied on request:

56295 (PTFE bush, 2 mica washers, plain washer, tag)

Supplied with device: 1 nut, 1 lock washer

Nut dimensions across the flats: 9,5 mm

The mark shown applies to the normal polarity types.

Torque on nut: min. 0,9 Nm

(9 kg cm)

max. 1,7 Nm

(17 kg cm)

RATINGS Limiting values in accordance with the Absolute Maximum System (IEC134)

Voltages

		1N3889(R)	1N3890(R)	1N3891(R)	1N3892(R)
Non-repetitive peak reverse voltage ($t \leq 10$ ms)	V_{RSM} max.	100	150	250	350 V
Repetitive peak reverse voltage ($\delta \leq 0,01$)	V_{RRM} max.	50	100	200	300 V
Crest working reverse voltage	V_{RWM} max.	50	100	200	300 V

Currents

Average on-state current assuming zero

switching losses (averaged over any 20 ms period)

up to $T_{mb} = 100$ °C

at $T_{mb} = 125$ °C

$I_F(AV)$	max.	12 A
$I_F(AV)$	max.	7 A

R.M.S. forward current

$I_F(RMS)$	max.	20 A
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Repetitive peak forward current

I_{FRM}	max.	140 A
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Non-repetitive peak forward current

$T_j = 150$ °C prior to surge;

half sine-wave with reapplied V_{RWMmax} ;

$t = 10$ ms

$t = 8,3$ ms

I_{FSM}	max.	140 A
I_{FSM}	max.	150 A

I^2t for fusing ($t = 10$ ms)

I^2t	max.	100 A ² s
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Temperatures

Storage temperature

T_{stg}	-65 to +175 °C
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Operating junction temperature

T_j	max. 150 °C
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THERMAL RESISTANCE

From junction to ambient in free air

$R_{th j-a}$	=	50 °C/W
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From junction to mounting base

$R_{th j-mb}$	=	2,2 °C/W
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From mounting base to heatsink

$R_{th mb-h}$	=	0,5 °C/W
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Transient thermal impedance; $t = 1$ ms; $\delta = 0$

$Z_{th j-mb}$	=	0,8 °C/W
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CHARACTERISTICS

Forward voltage¹⁾

$$I_F = 12 \text{ A}; T_j = 25^\circ \text{C}$$

$$V_F < 1,4 \text{ V}$$

Reverse current

$$V_R = V_{RWMmax}; T_j = 125^\circ \text{C}$$

$$I_R < 3 \text{ mA}$$

Reverse recovery when switched from

$$I_F = 1 \text{ A to } V_R = 30 \text{ V};$$

$$-dI_F/dt = 35 \text{ A}/\mu\text{s}; T_j = 25^\circ \text{C}$$

Recovery time

$$t_{rr} < 200 \text{ ns}$$

$$I_F = 2 \text{ A to } V_R = 30 \text{ V};$$

$$-dI_F/dt = 20 \text{ A}/\mu\text{s}; T_j = 25^\circ \text{C}$$

Recovery charge

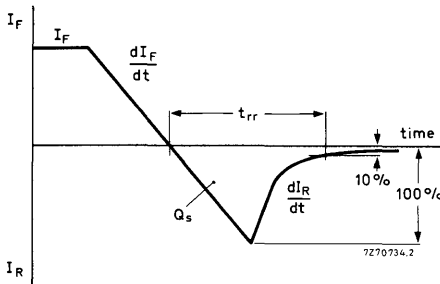
$$Q_s < 250 \text{ nC}$$

$$I_F = 1 \text{ A to } V_R = 30 \text{ V};$$

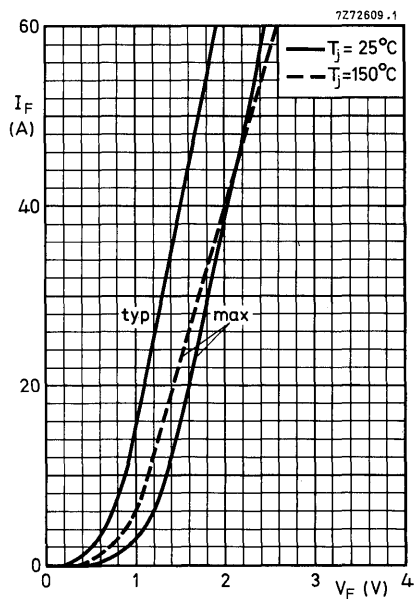
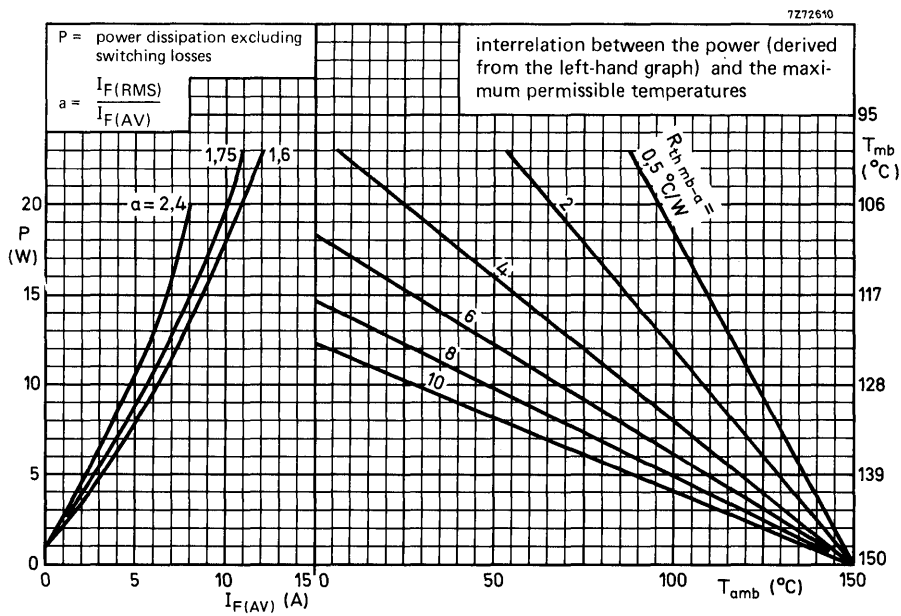
$$-dI_F/dt = 2 \text{ A}/\mu\text{s}; T_j = 25^\circ \text{C}$$

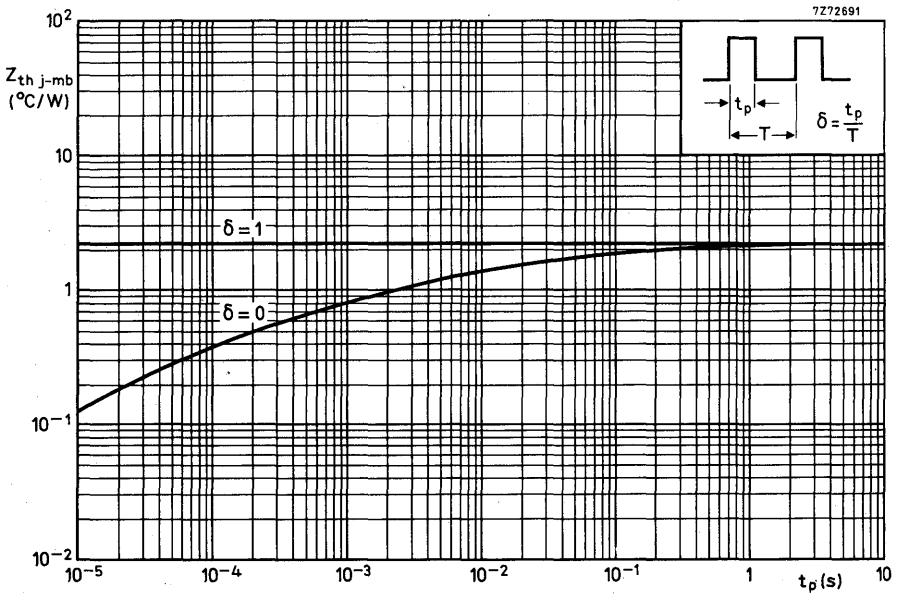
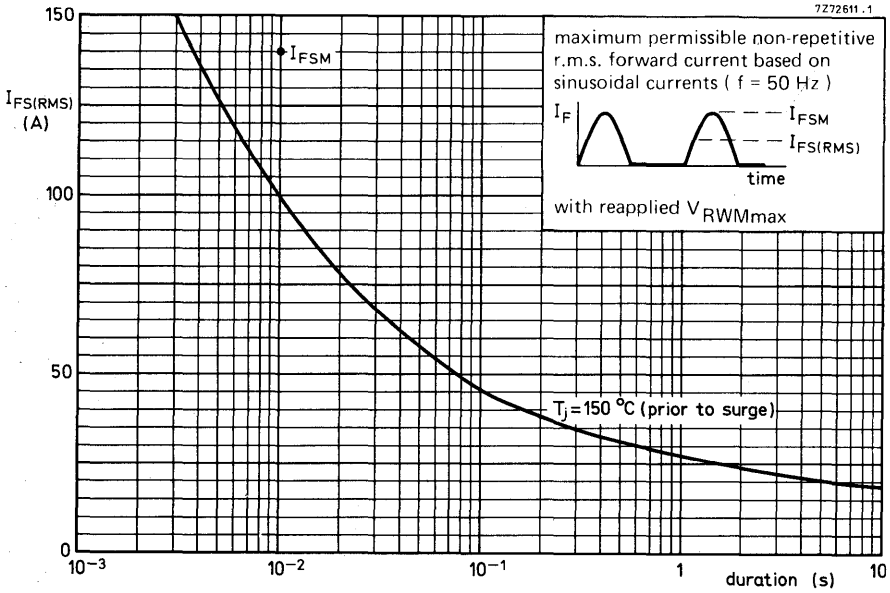
Max. slope of the reverse recovery current

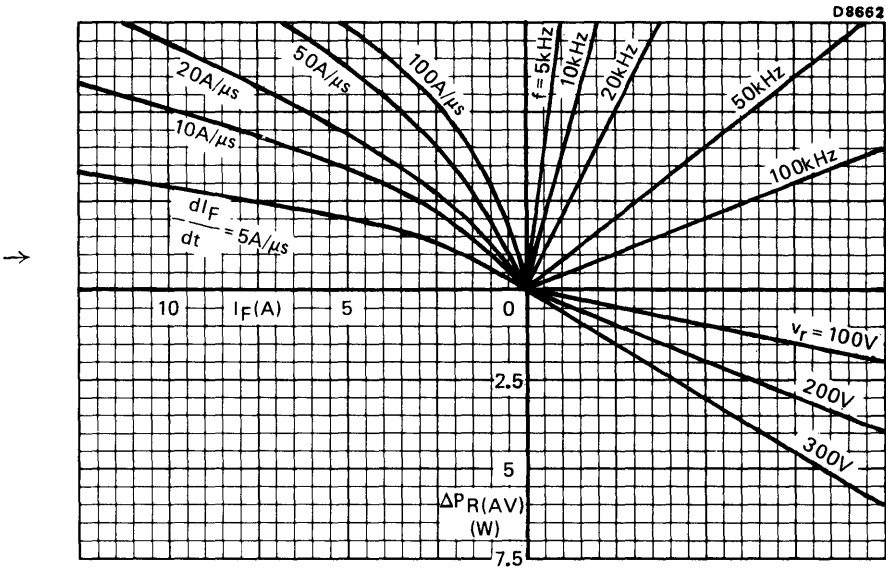
$$|dI_R/dt| < 5 \text{ A}/\mu$$



¹⁾ Measured under pulse conditions to avoid excessive dissipation.







NOMOGRAM

Power loss $\Delta P_R(AV)$ due to switching only (to be added to steady state power losses).

I_F = forward current just before switching off; $T_j = 150^\circ C$

