FAST SOFT-RECOVERY RECTIFIER DIODES

Also available to BS9331-F028

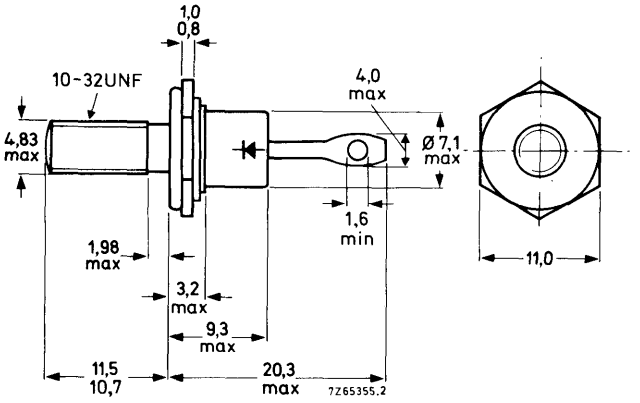
Silicon diodes in DO-4 metal envelopes, intended for use in high-frequency power supplies, thyristor inverters and multi-phase power rectifier applications. The series consists of the following types:
Normal polarity (cathode to stud): BYX50-200, 300
Reverse polarity (anode to stud): BYX50-200R, 300R
These devices feature non-snap-off characteristics.

QUICK REFERENCE DATA

			BYX50-200(R)	300(R)	
Repetitive peak reverse voltage	V_{RRM}	max.	200	300	V
Average forward current	$I_{F(AV)}$	max.	7		A
Non-repetitive peak forward current	I_{FSM}	max.	80		A
Reverse recovery time	t_{rr}	<	100		ns

MECHANICAL DATA Dimensions in mm

DO-4, Supplied with device: 1 nut, 1 lock washer
Nut dimensions across the flats: 9.5 mm



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)

Torque on nut: min. 0.9 Nm (9 kg cm)
max. 1.7 Nm (17 kg cm)

The mark shown applies to the normal polarity types.

RATINGS Limiting values in accordance with the Absolute Maximum System (IEC 134)

Voltages			BYX50-200(R)	300(R)	
Non-repetitive peak reverse voltage; $t \leq 10$ ms	V_{RSM}	max.	250	350	V
Repetitive peak reverse voltage	V_{RRM}	max.	200	300	V
Crest working reverse voltage	V_{RWM}	max.	200	300	V
Continuous reverse voltage	V_R	max.	200	300	V

Currents				
Average on-state current assuming zero switching losses (averaged over any 20 ms period)				
up to T_{mb} = 103 °C	$I_{F(AV)}$	max.	7	A
at T_{mb} = 125 °C	$I_{F(AV)}$	max.	4	A
R.M.S. forward current	$I_{F(RMS)}$	max.	11	A
Repetitive peak forward current	I_{FRM}	max.	80	A
Non-repetitive peak forward current t = 10 ms; T_j = 150 °C prior to surge with reapplied V_{RWMmax}	I_{FSM}	max.	80	A
I^2t for fusing (t = 10 ms)	I^2t	max.	32	A^2s
Rate of change of commutation current	See nomogram on page 5			

Temperatures				
Storage temperature	T_{stg}	−55 to +150		°C
Junction temperature	T_j	max.	150	°C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j-a}$	=	50	°C/W
From junction to mounting base	$R_{th\ j-mb}$	=	3,5	°C/W
From mounting base to heatsink	$R_{th\ mb-h}$	=	0,5	°C/W
Transient thermal impedance; t = 1 ms	$Z_{th\ j-mb}$	=	1	°C/W

CHARACTERISTICS

Forward voltage

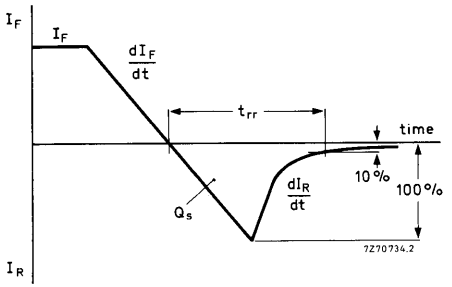
I_F = 20 A; T_j = 25 °C	V_F	<	1,95	V [1]

Reverse current

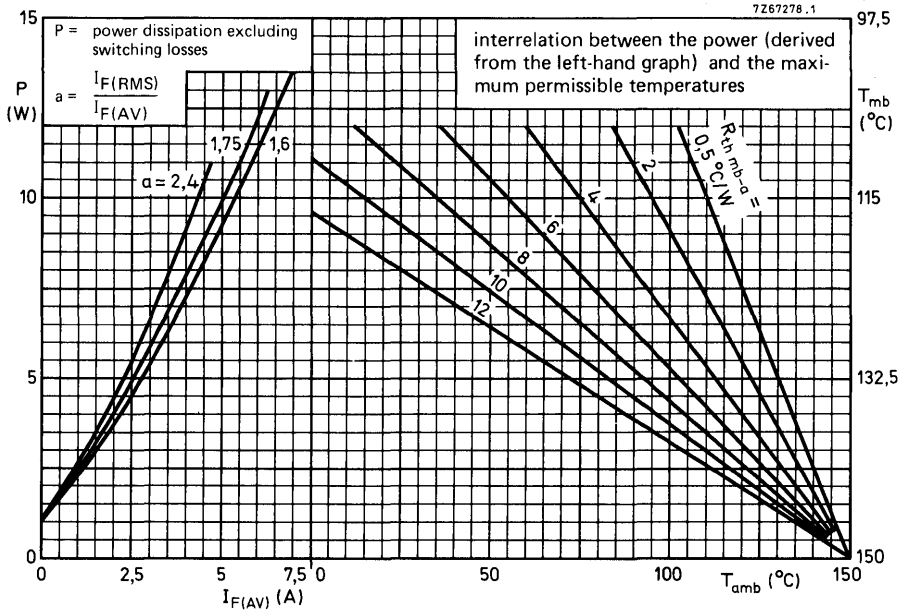
$V_R = V_{RWMmax}$; T_j = 125 °C	I_R	<	3	mA

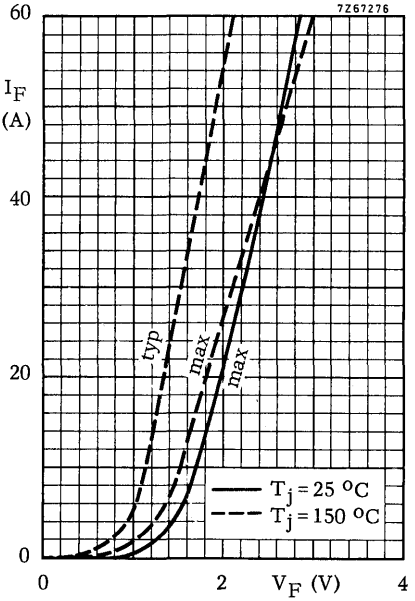
Reverse recovery when switched from

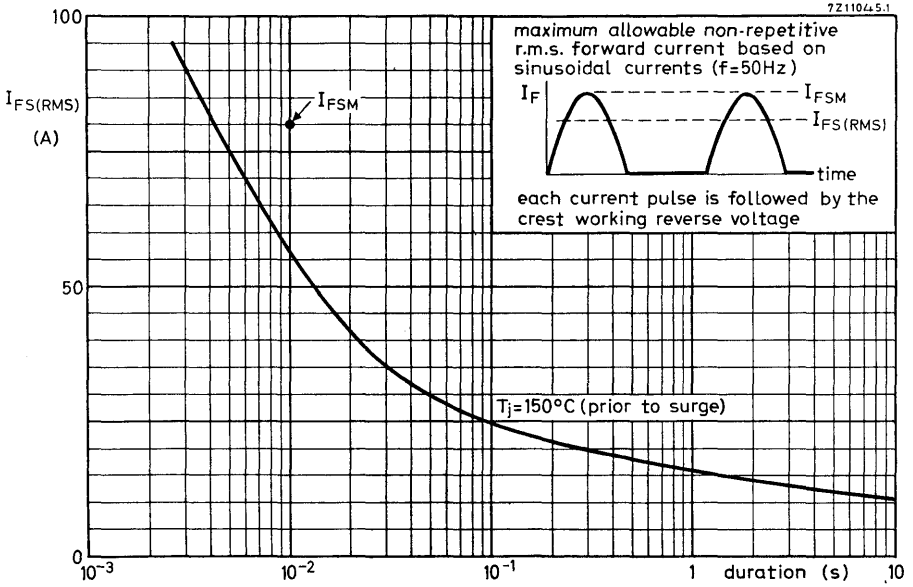
I_F = 1 A to V_R = 30 V; $-dI_F/dt$ = 100 A/µs; T_j = 25 °C Recovery time	t_{rr}	<	100	ns
I_F = 1 A to V_R = 30 V; $-dI_F/dt$ = 35 A/µs; T_j = 25 °C Recovery time	t_{rr}	<	150	ns
I_F = 2 A to V_R = 30 V; $-dI_F/dt$ = 20 A/µs; T_j = 25 °C Recovered charge	Q_s	<	250	nC
I_F = 2 A to V_R = 50 V; $-dI_F/dt$ = 2 A/µs; T_j = 25 °C Max. slope of the reverse recovery current	$\|dI_R/dt\|$	<	5	A/µs

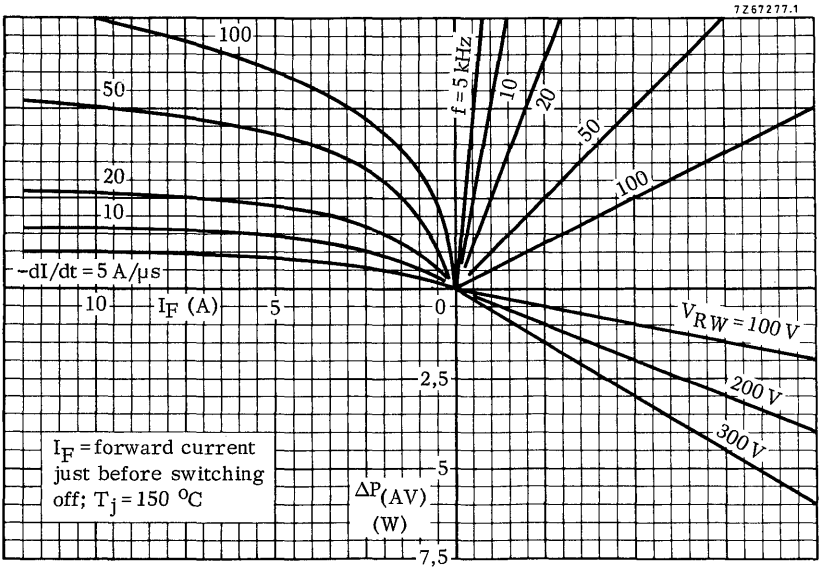


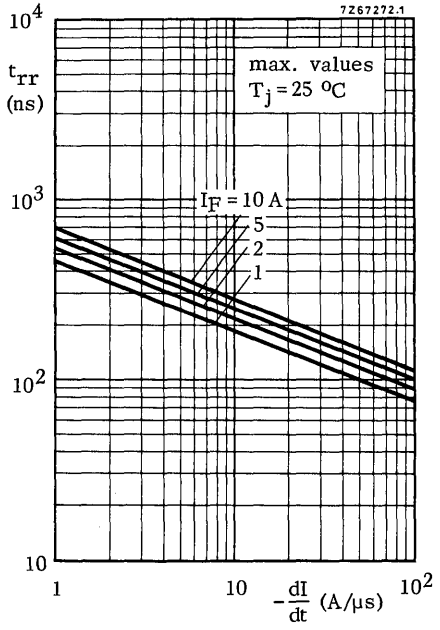
[1]) Measured under pulse conditions to avoid excessive dissipation.

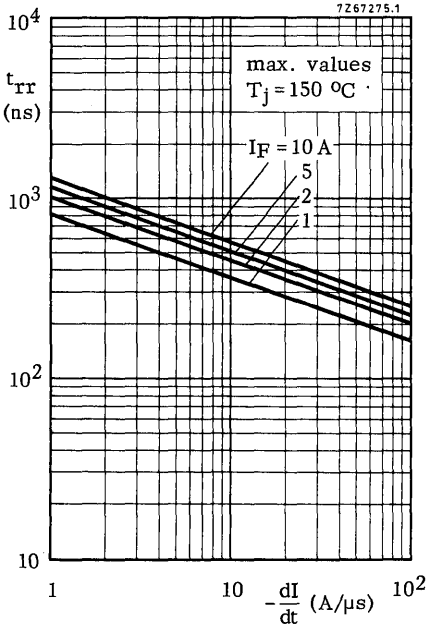

7Z67278.1
P = power dissipation excluding switching losses
a = $\frac{I_{F(RMS)}}{I_{F(AV)}}$
interrelation between the power (derived from the left-hand graph) and the maximum permissible temperatures
P (W)
T_{mb} (°C)
$I_{F(AV)}$ (A)
T_{amb} (°C)
a = 2,4
1,75
1,6
$R_{th\ mb-a}$ = 0,5 °C/W
2
4
6
8
10
12
15
10
5
0
97,5
115
132,5
150
0
2,5
5
7,5
50
100
150

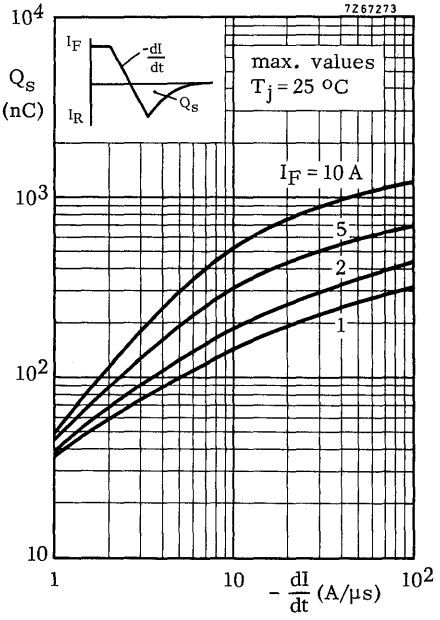

7Z67276
I_F (A)
V_F (V)
typ
max
max
T_j = 25 °C
T_j = 150 °C
60
40
20
0
0
2
4

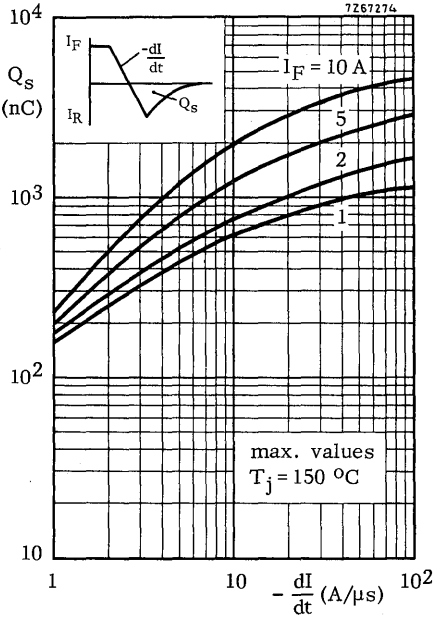

7Z11045.1
maximum allowable non-repetitive r.m.s. forward current based on sinusoidal currents (f=50Hz)
I_F
I_{FSM}
$I_{FS(RMS)}$
time
each current pulse is followed by the crest working reverse voltage
$I_{FS(RMS)}$ (A)
I_{FSM}
T_j=150°C (prior to surge)
duration (s)

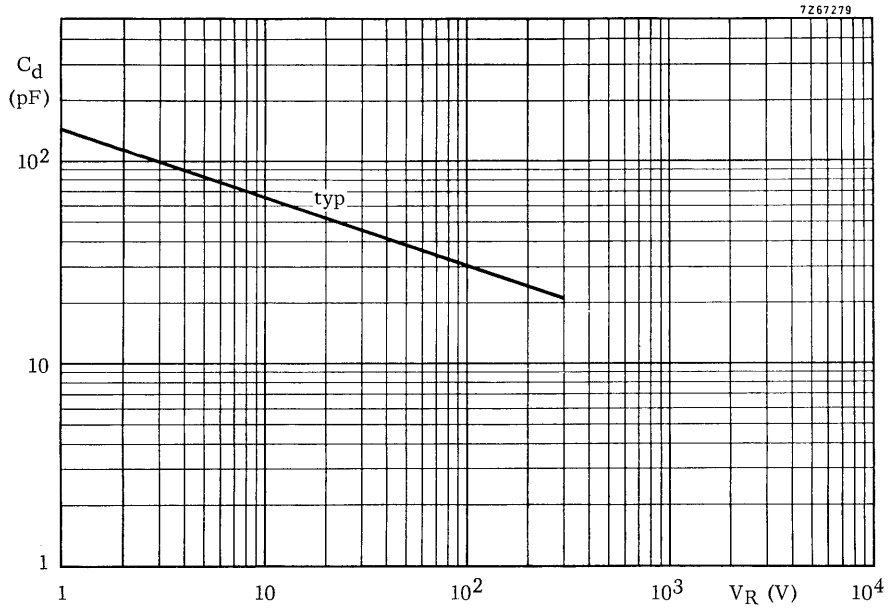

7Z67277.1
f = 5 kHz
-dI/dt = 5 A/μs
I_F (A)
V_{RW} = 100 V
200 V
300 V
I_F = forward current just before switching off; T_j = 150 °C
$\Delta P_{(AV)}$ (W)

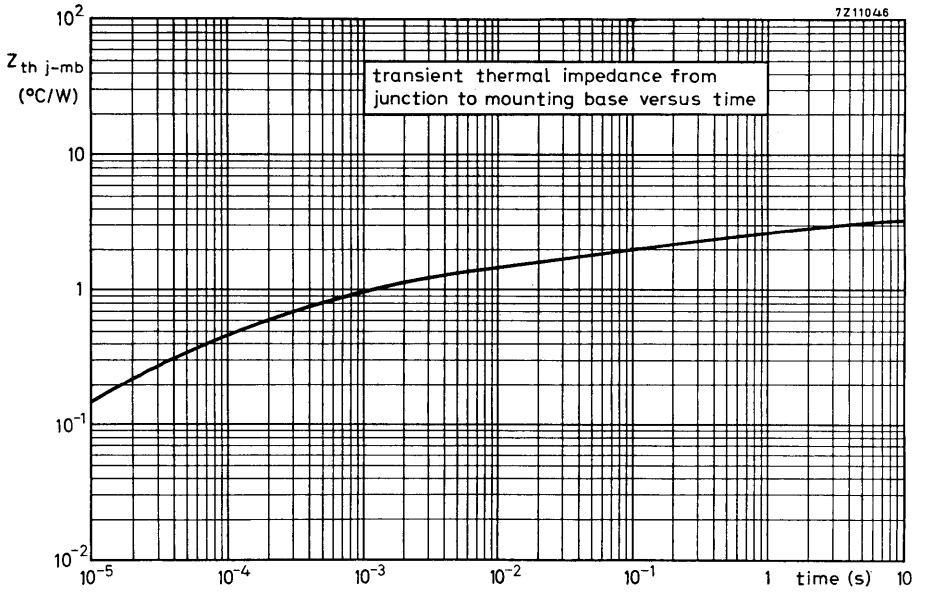

7Z67272.1
10^4
t_{rr} (ns)
10^3
10^2
10
max. values
T_j = 25 °C
I_F = 10 A
5
2
1
1
10
10^2
$-\frac{dI}{dt}$ (A/µs)


7Z67275.1
10^4
t_{rr} (ns)
10^3
10^2
10
max. values
T_j = 150 °C
I_F = 10 A
5
2
1
1
10
10^2
$-\frac{dI}{dt}$ (A/µs)


7Z67273
10^4
Q_s (nC)
10^3
10^2
10
I_F
$-\frac{dI}{dt}$
I_R
Q_s
max. values
T_j = 25 °C
I_F = 10 A
5
2
1
1
10
10^2
$-\frac{dI}{dt}$ (A/µs)


7Z67274
10^4
Q_s (nC)
10^3
10^2
10
I_F
$-\frac{dI}{dt}$
I_R
Q_s
I_F = 10 A
5
2
1
max. values
T_j = 150 °C
1
10
10^2
$-\frac{dI}{dt}$ (A/µs)


7Z67279
C_d (pF)
10^2
10
1
typ
1
10
10^2
10^3
V_R (V)
10^4


7Z11046
10^2
$Z_{th\ j\text{-}mb}$ (°C/W)
transient thermal impedance from junction to mounting base versus time
10
1
10^{-1}
10^{-2}
10^{-5}
10^{-4}
10^{-3}
10^{-2}
10^{-1}
1
time (s)
10