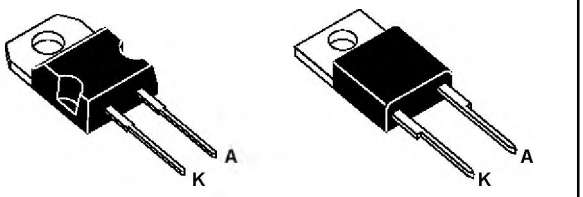
SGS-THOMSON MICROELECTRONICS

BYW81P/PI

HIGH EFFICIENCY FAST RECOVERY RECTIFIER DIODES

FEATURES

- SUITED FOR SMPS
- VERY LOW FORWARD LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- HIGH SURGE CURRENT CAPABILITY
- HIGH AVALANCHE ENERGY CAPABILITY
- INSULATED VERSION :
  Insulating voltage = 2500 V_{RMS}
  Capacitance = 7 pF



TO220AC (Plastic) — **BYW81P-200**

isolated TO220AC (Plastic) — **BYW81PI-200**

DESCRIPTION

Single chip rectifier suited for switchmode power supply and high frequency DC to DC converters. Packaged in TO220AC this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter			Value	Unit
$I_{F(RMS)}$	RMS forward current			35	A
$I_{F(AV)}$	Average forward current $\delta = 0.5$	BYW81P	Tc=115°C	15	A
		BYW81PI	Tc=90°C	15	
I_{FSM}	Surge non repetitive forward current		tp=10ms sinusoidal	200	A
Tstg Tj	Storage and junction temperature range			- 40 to + 150 - 40 to + 150	°C °C

Symbol	Parameter	BYW81P-/PI-				Unit
		50	100	150	200	
V_{RRM}	Repetitive peak reverse voltage	50	100	150	200	V

THERMAL RESISTANCE

Symbol	Parameter		Value	Unit
Rth (j-c)	Junction to case	BYW81P	2.0	°C/W
		BYW81PI	3.5	

ELECTRICAL CHARACTERISTICS
STATIC CHARACTERISTICS

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
I_R *	T_j = 25°C	$V_R = V_{RRM}$			20	µA
	T_j = 100°C				1.5	mA
V_F **	T_j = 125°C	I_F = 12 A			0.85	V
	T_j = 125°C	I_F = 25 A			1.05	
	T_j = 25°C	I_F = 25 A			1.15	

Pulse test : * tp = 5 ms, duty cycle < 2 %
** tp = 380 µs, duty cycle < 2 %

To evaluate the conduction losses use the following equation :
$P = 0.65 \times I_{F(AV)} + 0.016 \times I_{F^2(RMS)}$

RECOVERY CHARACTERISTICS

Symbol	Test Conditions			Min.	Typ.	Max.	Unit
trr	T_j = 25°C	I_F = 0.5A I_R = 1A	Irr = 0.25A			25	ns
		I_F = 1A V_R = 30V	dI_F/dt = -50A/µs			40	
tfr	T_j = 25°C	I_F = 1A $V_{FR} = 1.1 \times V_F$	tr = 10 ns		15		ns
V_{FP}	T_j = 25°C	I_F = 1A	tr = 10 ns		2		V

Fig.1 : Average forward power dissipation versus average forward current.

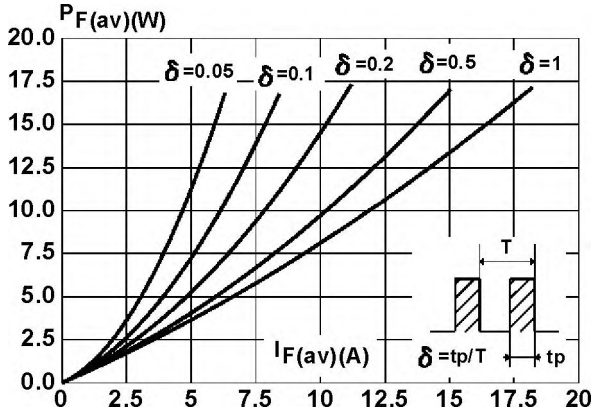


Fig.2 : Peak current versus form factor.

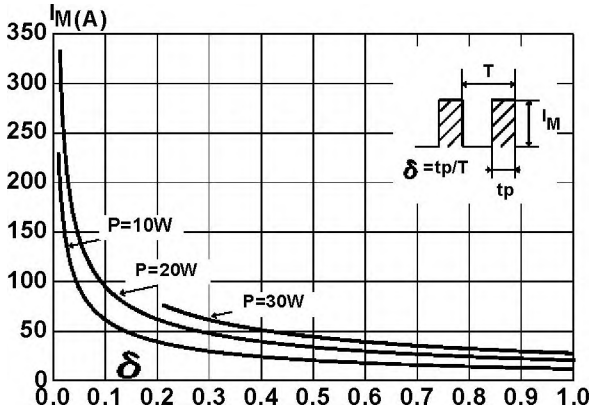


Fig.3 : Forward voltage drop versus forward current (maximum values).

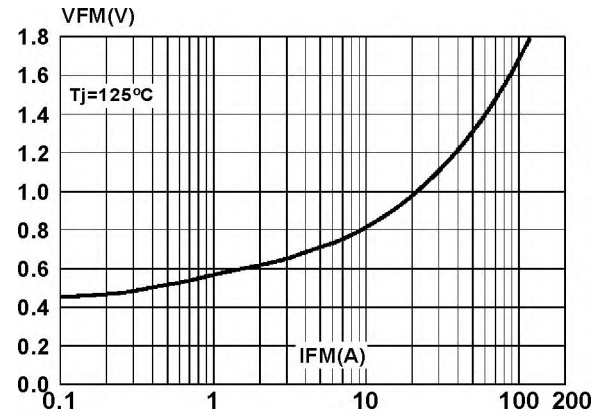


Fig.4 : Relative variation of thermal impedance junction to case versus pulse duration.

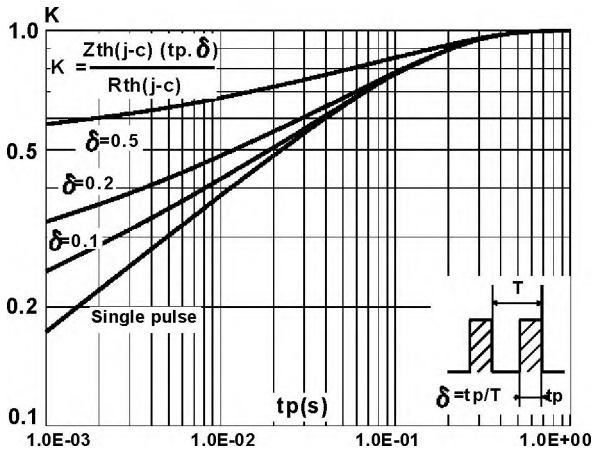


Fig.5 : Non repetitive surge peak forward current versus overload duration.
(BYW81P)

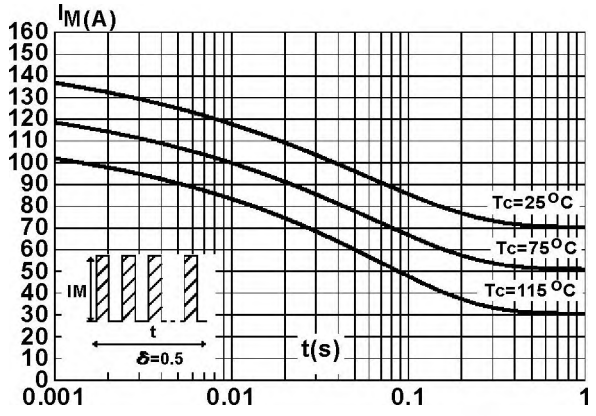


Fig.6 : Non repetitive surge peak forward current versus overload duration.
(BYW81PI)

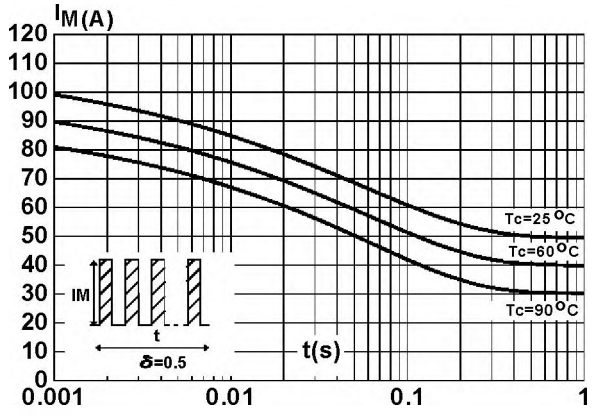


Fig.7 : Average current versus ambient temperature.
(duty cycle : 0.5) (BYW81P)

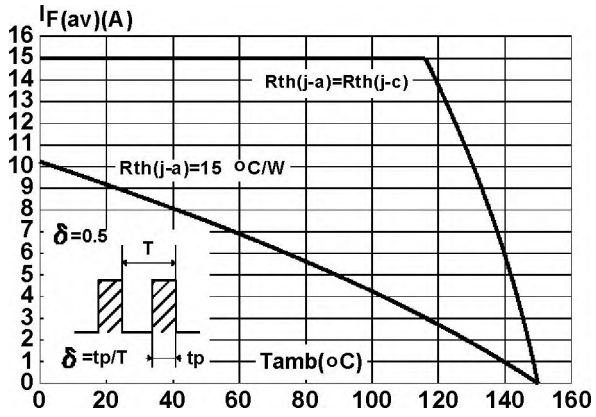


Fig.8 : Average current versus ambient temperature.
(duty cycle : 0.5) (BYW81PI)

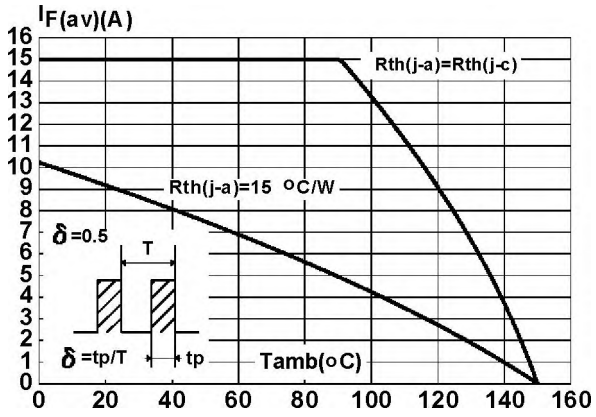


Fig.9 : Junction capacitance versus reverse voltage applied (Typical values).

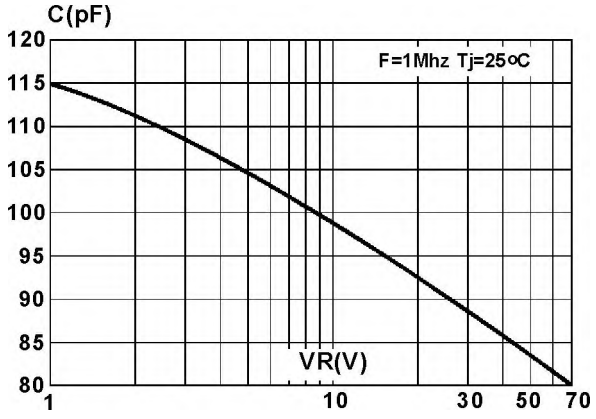


Fig.10 : Recovery charges versus dI_F/dt.

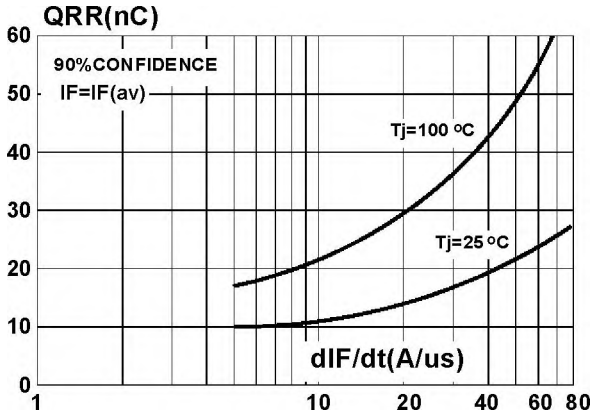


Fig.11 : Peak reverse current versus dIF/dt.

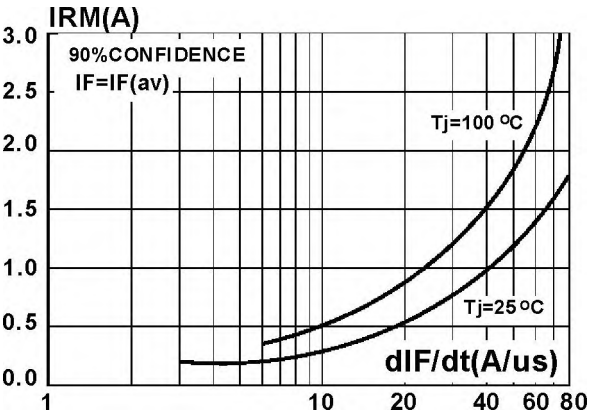
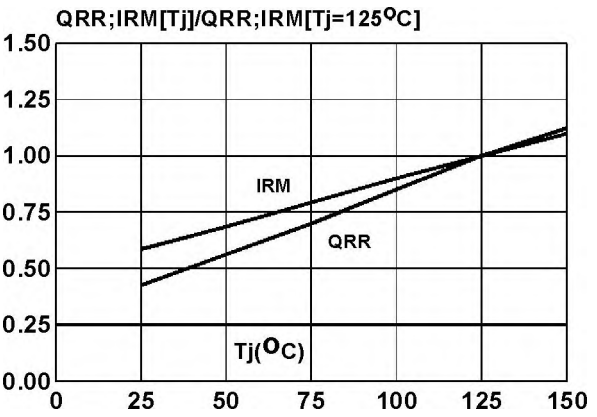
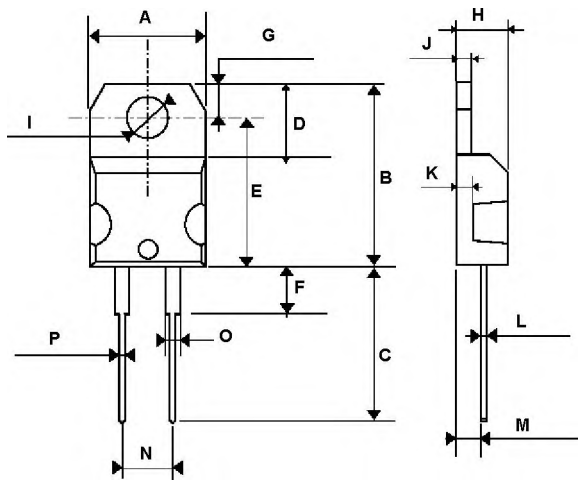


Fig.12 : Dynamic parameters versus junction temperature.



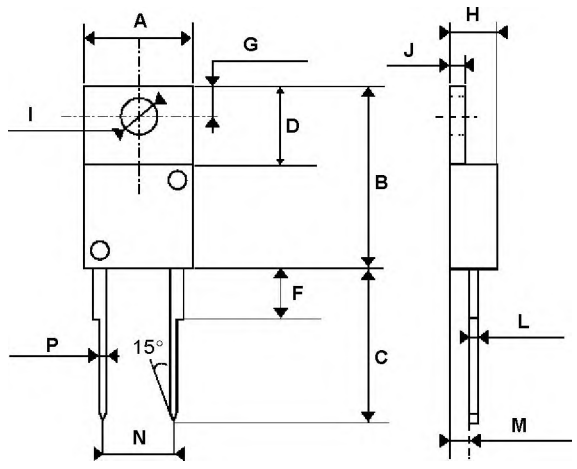
PACKAGE MECHANICAL DATA
TO220AC (JEDEC outline)



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	10	10.4	0.393	0.409
B	15.2	15.9	0.598	0.626
C	13	14	0.511	0.551
D	6.2	6.6	0.244	0.260
E	16.4 typ.		0.645 typ.	
F	3.5	4.2	0.137	0.165
G	2.65	2.95	0.104	0.116
H	4.4	4.6	0.173	0.181
I	3.75	3.85	0.147	0.151
J	1.23	1.32	0.048	0.051
K	1.27 typ.		0.050 typ.	
L	0.49	0.70	0.019	0.027
M	2.4	2.72	0.094	0.107
N	4.95	5.15	0.194	0.203
O	1.14	1.70	0.044	0.067
P	0.61	0.88	0.024	0.034

Cooling method : C
Marking : Type number
Weight : 1.9 g
Recommended torque value : 0.8m.N
Maximum torque value : 1.0m.N

PACKAGE MECHANICAL DATA
TO220AC (isoluted)



REF.	DIMENSIONS			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	10.20	10.40	0.401	0.401
B	14.23	15.87	0.560	0.625
C	12.70	14.70	0.500	0.579
D	5.85	6.85	0.230	0.270
F		4.50		0.178
G	2.54	3.00	0.100	0.119
H	4.48	4.82	0.176	0.190
I	3.55	4.00	0.139	0.158
J	1.15	1.39	0.045	0.055
L	0.35	0.65	0.013	0.026
M	2.10	2.70	0.082	0.107
N	4.58	5.58	0.18	0.22
P	0.64	0.96	0.025	0.038

Cooling method : C
Marking : Type number
Weight : 2.2 g
Recommended torque value : 0.8m.N
Maximum torque value : 1.0m.N