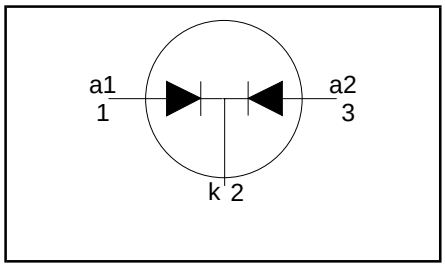
Rectifier diodes ultrafast, rugged

BYQ60EW series

FEATURES

- Low forward volt drop
- Fast switching
- Soft recovery characteristic
- Reverse surge capability
- High thermal cycling performance
- Low thermal resistance

SYMBOL



QUICK REFERENCE DATA

V_R = 150 V/ 200 V

$V_F \leq 0.85$ V

$I_{O(AV)}$ = 60 A

$I_{RRM} \leq 0.2$ A

$t_{rr} \leq 35$ ns

GENERAL DESCRIPTION

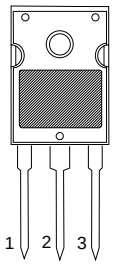
Dual, common cathode, ultra-fast, epitaxial rectifier diodes intended for use as output rectifiers in high frequency switched mode power supplies.

The BYQ60EW series is supplied in the conventional leaded SOT429 (TO247) package.

PINNING

PIN	DESCRIPTION
1	anode 1
2	cathode
3	anode 2
tab	cathode

SOT429 (TO247)



LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.		UNIT
		BYQ60EW		**-150**	**-200**	
V_{RRM}	Peak repetitive reverse voltage		-	150	200	V
V_{RWM}	Crest working reverse voltage		-	150	200	V
V_R	Continuous reverse voltage		-	150	200	V
$I_{O(AV)}$	Average rectified output current (both diodes conducting)	square wave $\delta = 0.5$; $T_{mb} \leq 82$ ˚C	-	60		A
I_{FRM}	Repetitive peak forward current per diode	t = 25 µs; $\delta = 0.5$; $T_{mb} \leq 82$ ˚C	-	60		A
I_{FSM}	Non-repetitive peak forward current per diode	t = 10 ms	-	380		A
		t = 8.3 ms sinusoidal; with reapplied $V_{RWM(max)}$	-	414		A
I_{RRM}	Repetitive peak reverse current per diode	t_p = 2 µs; $\delta = 0.001$	-	0.2		A
I_{RSM}	Non-repetitive peak reverse current per diode	t_p = 100 µs	-	0.2		A
T_{stg}	Storage temperature		-40	150		˚C
T_j	Operating junction temperature		-	150		˚C

ESD LIMITING VALUE

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_C	Electrostatic discharge capacitor voltage	Human body model; C = 250 pF; R = 1.5 kΩ	-	8	kV

THERMAL RESISTANCES

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$R_{th\ j\text{-}mb}$	Thermal resistance junction to mounting base	per diode	-	-	0.85	K/W
		both diodes conducting	-	-	0.6	K/W
$R_{th\ j\text{-}a}$	Thermal resistance junction to ambient	in free air	-	45	-	K/W

ELECTRICAL CHARACTERISTICS

characteristics arre per diode at T_j = 25 ˚C unless otherwise stated

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_F	Forward voltage	I_F = 30 A; T_j = 150˚C	-	0.73	0.85	V
		I_F = 30 A	-	0.95	1.1	V
		I_F = 60 A	-	1.07	1.2	V
I_R	Reverse current	$V_R = V_{RWM}$	-	10	200	µA
		$V_R = V_{RWM}$; T_j = 100 ˚C	-	1	2	mA
Q_s	Reverse recovery charge	I_F = 2 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 20 A/µs	-	10	20	nC
t_{rr}	Reverse recovery time	I_F = 1 A; $V_R \geq$ 30 V; $-dI_F/dt$ = 100 A/µs	-	27	35	ns
V_{fr}	Forward recovery voltage	I_F = 1 A; dI_F/dt = 10 A/µs	-	0.7	-	V

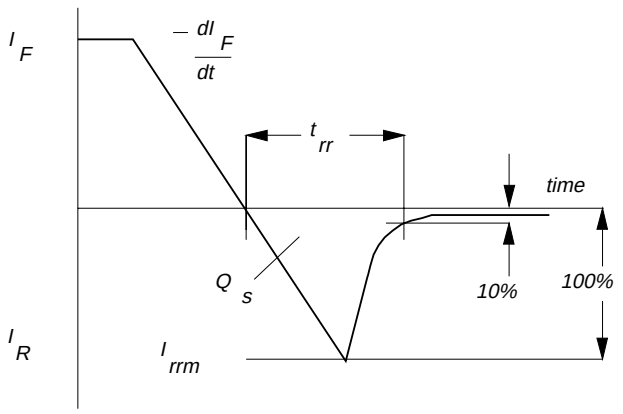


Fig.1. Definition of t_{rr}, Q_s and I_{rrm}

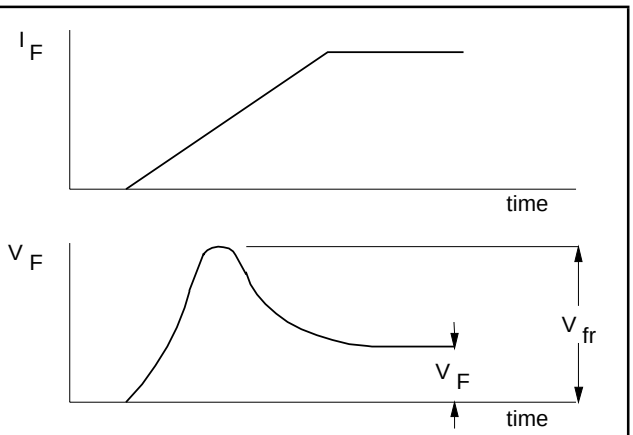


Fig.2. Definition of V_{fr}

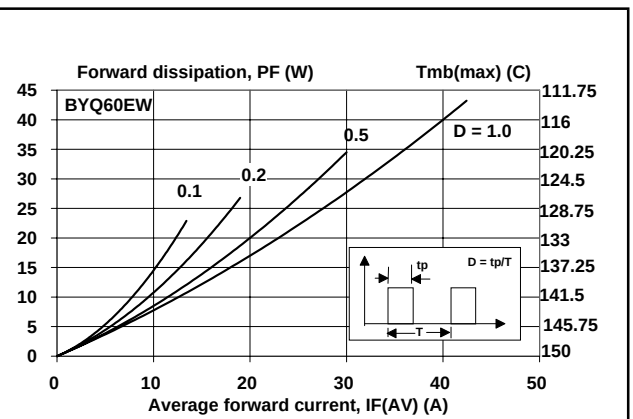


Fig.3. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; square current waveform where $I_{F(AV)} = I_{F(RMS)} \times \sqrt{D}$.

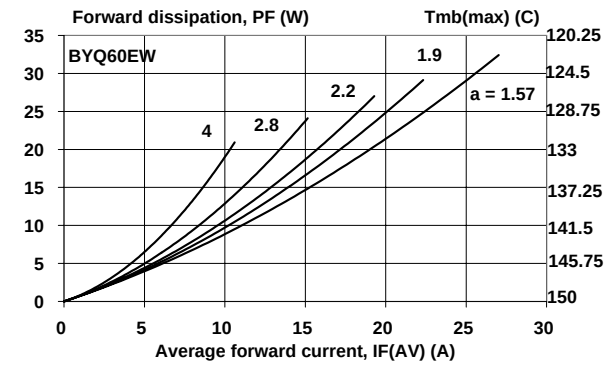


Fig.4. Maximum forward dissipation $P_F = f(I_{F(AV)})$ per diode; sinusoidal current waveform where a = form factor = $I_{F(RMS)} / I_{F(AV)}$.

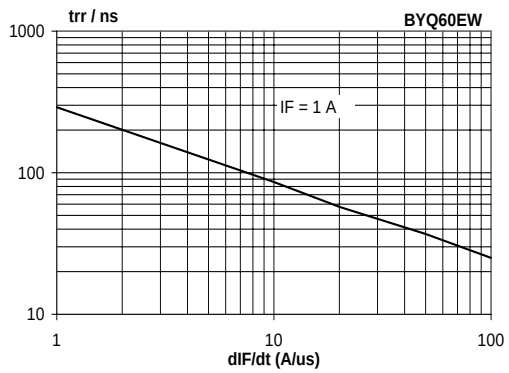


Fig.5. Typical t_{rr} at T_j = 25 ˚C.

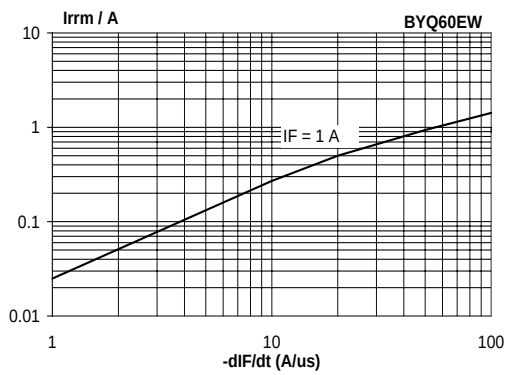


Fig.6. Typical I_{rrm} at T_j = 25 ˚C.

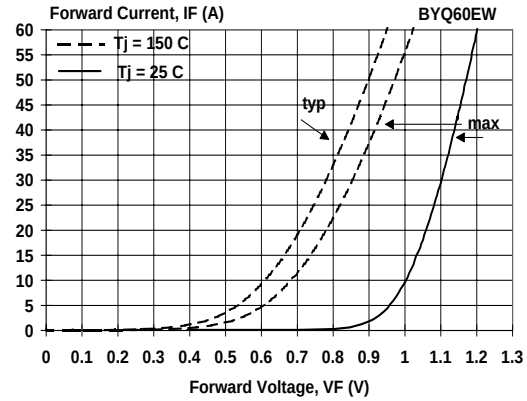


Fig.7. Typical and maximum forward characteristic $I_F = f(V_F)$; parameter T_j

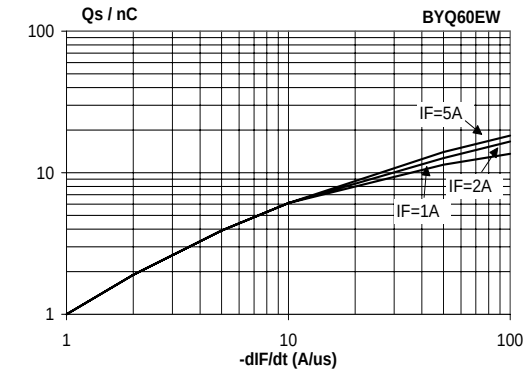


Fig.8. Typical Q_s at T_j = 25 ˚C.

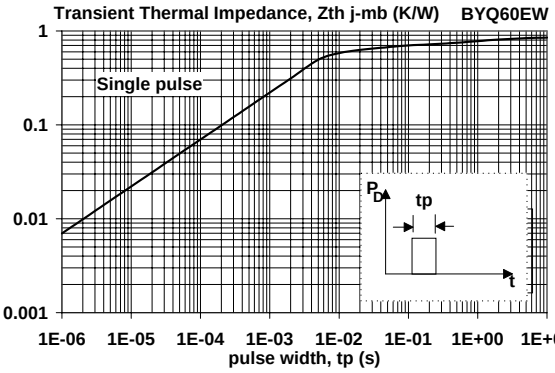


Fig.9. Transient thermal impedance; $Z_{th\ j\text{-}hs} = f(t_p)$.

MECHANICAL DATA

Dimensions in mm

Net Mass: 5 g

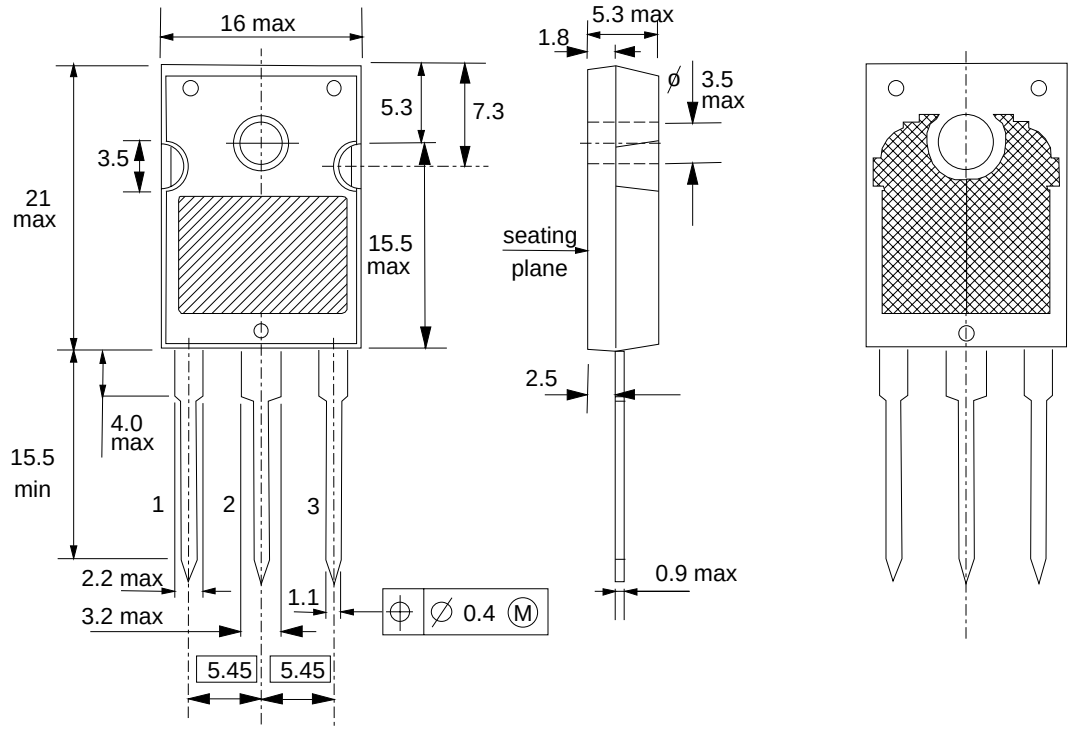


Fig.10. SOT429 (TO247); pin 2 connected to mounting base.

Notes
1. Refer to mounting instructions for SOT429 envelope.
2. Epoxy meets UL94 V0 at 1/8".

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values are given in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.