Breakover Diode Modules
(BOD1)

V_{BO} = 1200 - 4200 V
I_{AVM} = 0.2 - 1.25 A

Number of BODs	Types
2	IXBOD1-12R(D) ... IXBOD1-19R(D)
3	IXBOD1-20R(D) ... IXBOD1-32R(D)
4	IXBOD1-34R ... IXBOD1-42R

A

K

Version R

K o——⊲——o A

Version RD

K o——————o A
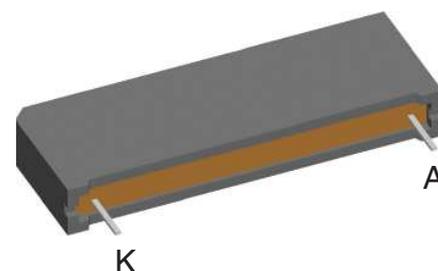
Features / Advantages:

• Fast turn on
• Low temperature dependence
• Low leakage current

Applications:

• High voltage circuit protection
• Transient voltage protection
• Trigger device
• Power pulse generators
• Lightning and arcing protection
• Energy discharge circuits
• Battery overvoltage protection
• Solar array protection

Package: BOD-Package

• Industry standard outline
• RoHS compliant
• Epoxy meets UL 94V-0
• Soldering pins for PCB mounting
• Reduced weight

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IXBOD1 several values

Symbol	Definitions	Conditions		min.	typ.	max.	
I_D	drain current	$V_D = 0.8 \cdot V_{BO}$	$T_{VJ} = 125°C$			100	µA
I_{BO}	breakover current		$T_{VJ} = 25°C$			15	mA
I_H	holding current		$T_{VJ} = 25°C$			30	mA
V_H	holding voltage		$T_{VJ} = 25°C$	4		8	V
$(di/dt)_C$	maximum pulsed source current	$V_D = V_{BO}$; $I_T = 80$ A; f = 50 Hz	$T_{VJ} = 125°C$			200	A/µs
t_q	turn-off time	$V_D = 0.67 \cdot V_{BO}$; $V_R = 0$ V; $I_T = 80$A $dv/dt_{(lin.)} = 200$ V/µs; di/dt = -10 A/µs	$T_{VJ} = 125°C$		150		µs
K_T	temperature coefficient of V_{BO}					$2 \cdot 10^{-3}$	K^{-1}
K_P	coefficient for energy per pulse E_P	(material constant)				700	K/Ws

IXBOD1 - 12R... - 19R (2 Elements)

Symbol	Definitions	Conditions		min.	typ.	max.	
V_{BO}	breakover voltage	$V_{BO} (T_{VJ}) = V_{BO, 25°C} [1 + K_T (T_{VJ} - 25°C)]$					
		IXBOD 1 -12R		1150	1200	1250	V
		IXBOD 1 -13R		1250	1300	1350	V
		IXBOD 1 -14R		1350	1400	1450	V
		IXBOD 1 -15R		1450	1500	1550	V
		IXBOD 1 -16R		1550	1600	1650	V
		IXBOD 1 -17R		1650	1700	1750	V
		IXBOD 1 -18R		1750	1800	1850	V
		IXBOD 1 -19R		1850	1900	1950	V
I_{RMS}	RMS current	f = 50 Hz pins soldered to printed circuit (conductor 0.035x2mm)	$T_{amb} = 50°C$			2.0	A
I_{FAVM}	maximum average forward current					1.25	A
I_{SM}	maximum pulsed source current	$t_p = 0.1$ ms; non repetitive	$T_{amb} = 50°C$			200	A
I^2t	I^2t value for fusing	$t_p = 0.1$ ms	$T_{amb} = 50°C$			2	A^2s
V_T	forward voltage drop	$I_T = 5$ A	$T_{VJ} = 125°C$			3.4	V
V_{T0} r_T	threshold voltage slope resistance	for power-loss calculation only				2.2 0.24	V Ω

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IXBOD1 - 12RD... - 19RD (2 Elements)

Symbol	Definitions	Conditions		min.	typ.	max.	
V_{BO}	breakover voltage	$V_{BO}(T_{VJ}) = V_{BO, 25°C}[1 + K_T(T_{VJ} - 25°C)]$					
		IXBOD 1 -12RD		1150	1200	1250	V
		IXBOD 1 -13RD		1250	1300	1350	V
		IXBOD 1 -14RD		1350	1400	1450	V
		IXBOD 1 -15RD		1450	1500	1550	V
		IXBOD 1 -16RD		1550	1600	1650	V
		IXBOD 1 -17RD		1650	1700	1750	V
		IXBOD 1 -18RD		1750	1800	1850	V
		IXBOD 1 -19RD		1850	1900	1950	V
I_{RMS}	RMS current	f = 50 Hz $T_{amb} = 50°C$ pins soldered to printed circuit (conductor 0.035x2mm)				0.3	A
I_{FAVM}	maximum average forward current					0.2	A
I_{SM}	maximum pulsed source current	$t_p = 0.1$ ms; non repetitive $T_{amb} = 50°C$				50	A
I^2t	I^2t value for fusing	$t_p = 0.1$ ms $T_{amb} = 50°C$				0.125	A^2s
V_T	forward voltage drop	$I_T = 5$ A $T_{VJ} = 125°C$				27	V
V_{T0} r_T	threshold voltage slope resistance	for power-loss calculation only				17.5 3	V Ω

Ratings

IXBOD1 - 20R... - 32R (3 Elements)

Symbol	Definitions	Conditions		min.	typ.	max.	
V_{BO}	breakover voltage	$V_{BO}(T_{VJ}) = V_{BO, 25°C}[1 + K_T(T_{VJ} - 25°C)]$					
		IXBOD 1 -20R		1950	2000	2050	V
		IXBOD 1 -21R		2050	2100	2150	V
		IXBOD 1 -22R		2150	2200	2250	V
		IXBOD 1 -23R		2250	2300	2350	V
		IXBOD 1 -24R		2350	2400	2450	V
		IXBOD 1 -25R		2450	2500	2550	V
		IXBOD 1 -26R		2500	2600	2700	V
		IXBOD 1 -28R		2700	2800	2900	V
		IXBOD 1 -30R		2900	3000	3100	V
		IXBOD 1 -32R		3100	3200	3300	V
I_{RMS}	RMS current	f = 50 Hz $T_{amb} = 50°C$ pins soldered to printed circuit (conductor 0.035x2mm)				1.4	A
I_{FAVM}	maximum average forward current					0.9	A
I_{SM}	maximum pulsed source current	$t_p = 0.1$ ms; non repetitive $T_{amb} = 50°C$				200	A
I^2t	I^2t value for fusing	$t_p = 0.1$ ms $T_{amb} = 50°C$				2	A^2s
V_T	forward voltage drop	$I_T = 5$ A $T_{VJ} = 125°C$				5.1	V
V_{T0} r_T	threshold voltage slope resistance	for power-loss calculation only				3.3 0.36	V Ω

Ratings

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IXBOD1 - 20RD... - 32RD (3 Elements)

Symbol	Definitions	Conditions		min.	typ.	max.	
V_{BO}	breakover voltage	$V_{BO}(T_{VJ}) = V_{BO,\,25°C}[1 + K_T(T_{VJ} - 25°C)]$					
		IXBOD 1 -20RD		1950	2000	2050	V
		IXBOD 1 -21RD		2050	2100	2150	V
		IXBOD 1 -22RD		2150	2200	2250	V
		IXBOD 1 -23RD		2250	2300	2350	V
		IXBOD 1 -24RD		2350	2400	2450	V
		IXBOD 1 -25RD		2450	2500	2550	V
		IXBOD 1 -26RD		2500	2600	2700	V
		IXBOD 1 -28RD		2700	2800	2900	V
		IXBOD 1 -30RD		2900	3000	3100	V
		IXBOD 1 -32RD		3100	3200	3300	V
I_{RMS}	RMS current	f = 50 Hz	T_{amb} = 50°C			0.3	A
		pins soldered to printed circuit (conductor 0.035x2mm)					
I_{FAVM}	maximum average forward current					0.2	A
I_{SM}	maximum pulsed source current	t_p = 0.1 ms; non repetitive	T_{amb} = 50°C			50	A
I²t	I²t value for fusing	t_p = 0.1 ms	T_{amb} = 50°C			0.125	A²s
V_T	forward voltage drop	I_T = 5 A	T_{VJ} = 125°C			27	V
V_{T0}	threshold voltage	for power-loss calculation only				17.5	V
r_T	slope resistance					3	Ω

Ratings

IXBOD1 - 34... - 42R (4 Elements)

Symbol	Definitions	Conditions		min.	typ.	max.	
V_{BO}	breakover voltage	$V_{BO}(T_{VJ}) = V_{BO,\,25°C}[1 + K_T(T_{VJ} - 25°C)]$					
		IXBOD 1 -34R		3300	3400	3500	V
		IXBOD 1 -36R		3500	3600	3700	V
		IXBOD 1 -38R		3700	3800	4000	V
		IXBOD 1 -40R		3900	4000	4100	V
		IXBOD 1 -42R		4100	4200	4300	V
I_{RMS}	RMS current	f = 50 Hz	T_{amb} = 50°C			1.1	A
		pins soldered to printed circuit (conductor 0.035x2mm)					
I_{FAVM}	maximum average forward current					0.7	A
I_{SM}	maximum pulsed source current	t_p = 0.1 ms; non repetitive	T_{amb} = 50°C			200	A
I²t	I²t value for fusing	t_p = 0.1 ms	T_{amb} = 50°C			2	A²s
V_T	forward voltage drop	I_T = 5 A	T_{VJ} = 125°C			6.8	V
V_{T0}	threshold voltage	for power-loss calculation only				4.4	V
r_T	slope resistance					0.48	Ω

Ratings

Package FP-Case

Symbol	Definitions	Conditions	min.	typ.	max.	
				Ratings		
T_amb	*ambient temperature (cooling medium)*		-40		125	°C
T_stg	*storage temperature*		-40		125	°C
T_VJM	*maximum virtual junction temperature*		-40		125	°C
R_thJA	*thermal resistance junction to ambient*	natural convection			20	K/W
		with air speed 2 m/s			16	K/W
Weight				14		g

Outlines FP-case

Version RD

K ○—▷|◁—○ A

Version R

K ○—▷|—○ A
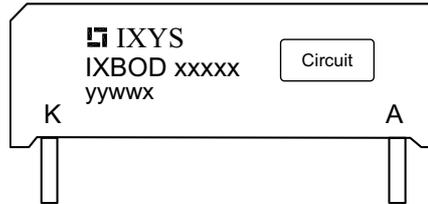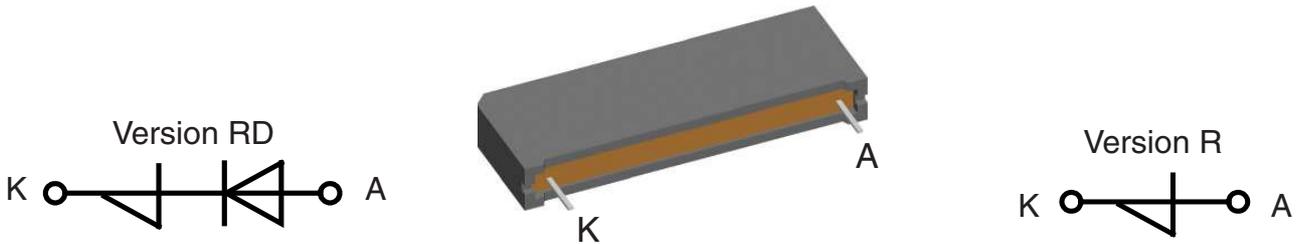
Dimensions in mm (1 mm = 0.0394")

54.5

19

6

45.7

0.8

7.4

7.5

Data according ot IEC 60747 and per semiconductor unless otherwise specified

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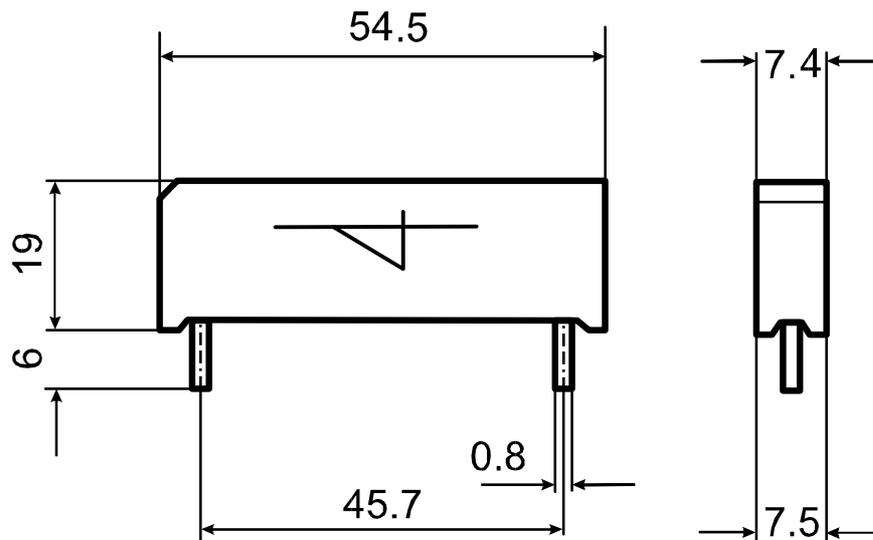
Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Ordering Code
Standard	IXBOD 1 -12R	IXBOD 1 -12R	Box	20	468649
Standard	IXBOD 1 -12RD	IXBOD 1 -12RD	Box	20	472948
Standard	IXBOD 1 -13R	IXBOD 1 -13R	Box	20	468657
Standard	IXBOD 1 -13RD	IXBOD 1 -13RD	Box	20	472956
Standard	IXBOD 1 -14R	IXBOD 1 -14R	Box	20	468665
Standard	IXBOD 1 -14RD	IXBOD 1 -14RD	Box	20	472964
Standard	IXBOD 1 -15R	IXBOD 1 -15R	Box	20	468673
Standard	IXBOD 1 -15RD	IXBOD 1 -15RD	Box	20	472972
Standard	IXBOD 1 -16R	IXBOD 1 -16R	Box	20	468681
Standard	IXBOD 1 -16RD	IXBOD 1 -16RD	Box	20	472794
Standard	IXBOD 1 -17R	IXBOD 1 -17R	Box	20	468703
Standard	IXBOD 1 -17RD	IXBOD 1 -17RD	Box	20	472980
Standard	IXBOD 1 -18R	IXBOD 1 -18R	Box	20	468711
Standard	IXBOD 1 -18RD	IXBOD 1 -18RD	Box	20	472999
Standard	IXBOD 1 -19R	IXBOD 1 -19R	Box	20	468738
Standard	IXBOD 1 -19RD	IXBOD 1 -19RD	Box	20	473006
Standard	IXBOD 1 -20R	IXBOD 1 -20R	Box	20	468746
Standard	IXBOD 1 -20RD	IXBOD 1 -20RD	Box	20	473014
Standard	IXBOD 1 -21R	IXBOD 1 -21R	Box	20	468754
Standard	IXBOD 1 -21RD	IXBOD 1 -21RD	Box	20	473022
Standard	IXBOD 1 -22R	IXBOD 1 -22R	Box	20	468762
Standard	IXBOD 1 -22RD	IXBOD 1 -22RD	Box	20	473030
Standard	IXBOD 1 -23R	IXBOD 1 -23R	Box	20	468770
Standard	IXBOD 1 -23RD	IXBOD 1 -23RD	Box	20	472786
Standard	IXBOD 1 -24R	IXBOD 1 -24R	Box	20	468789
Standard	IXBOD 1 -24RD	IXBOD 1 -24RD	Box	20	473049
Standard	IXBOD 1 -25R	IXBOD 1 -25R	Box	20	468797
Standard	IXBOD 1 -25RD	IXBOD 1 -25RD	Box	20	473057
Standard	IXBOD 1 -26R	IXBOD 1 -26R	Box	20	468800
Standard	IXBOD 1 -26RD	IXBOD 1 -26RD	Box	20	473065
Standard	IXBOD 1 -28R	IXBOD 1 -28R	Box	20	468819
Standard	IXBOD 1 -28RD	IXBOD 1 -28RD	Box	20	473073
Standard	IXBOD 1 -30R	IXBOD 1 -30R	Box	20	468827
Standard	IXBOD 1 -30RD	IXBOD 1 -30RD	Box	20	473081
Standard	IXBOD 1 -32R	IXBOD 1 -32R	Box	20	468835
Standard	IXBOD 1 -32RD	IXBOD 1 -32RD	Box	20	473103
Standard	IXBOD 1 -34R	IXBOD 1 -34R	Box	20	468843
Standard	IXBOD 1 -36R	IXBOD 1 -36R	Box	20	468851
Standard	IXBOD 1 -38R	IXBOD 1 -38R	Box	20	468878
Standard	IXBOD 1 -40R	IXBOD 1 -40R	Box	20	468886
Standard	IXBOD 1 -42R	IXBOD 1 -42R	Box	20	468894

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Curves
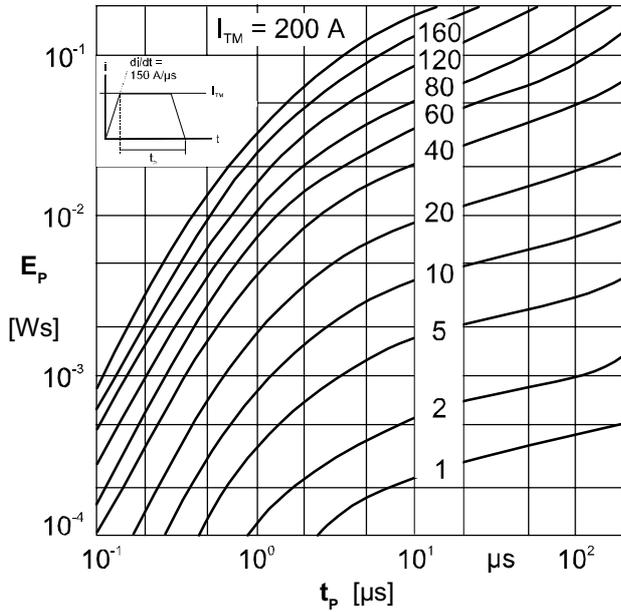
Fig. 1 Energy per pulse for single BOD element for trapezoidal wave current. E_P must be multiplied by number of elements for total energy
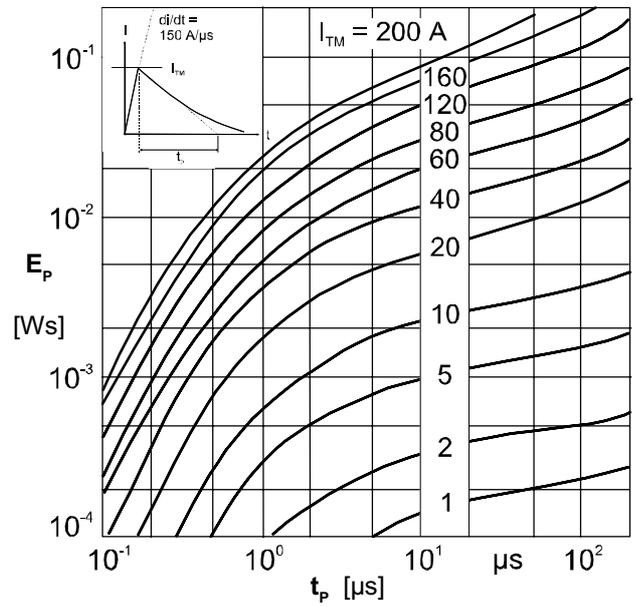

Fig. 2 Energy per pulse for single BOD element for exponentially decaying current pulse. E_P must be multiplied by number of elements for total energy
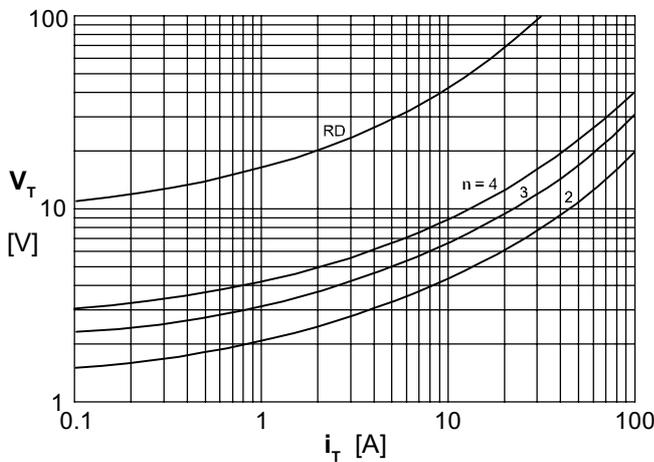

Fig. 3 On-state voltage at $T_{VJ} = 125°C$
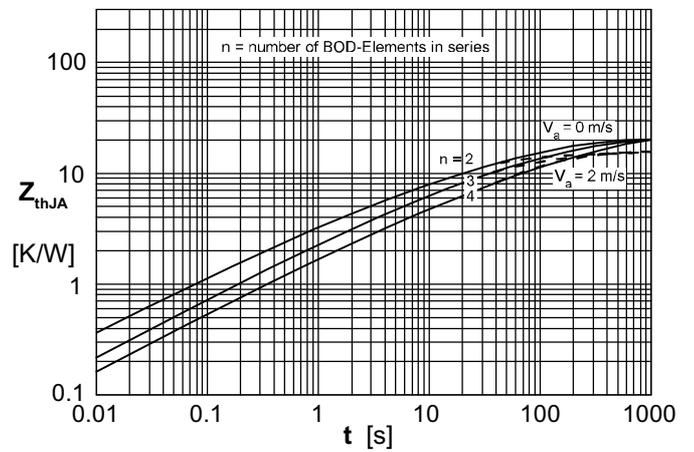
Fig. 4 Transient thermal resistance

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