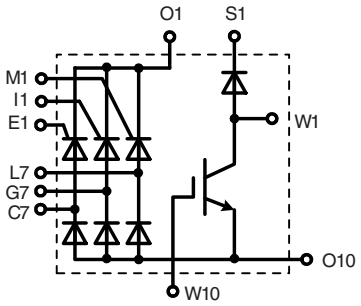
Three Phase Half Controlled Rectifier Bridge

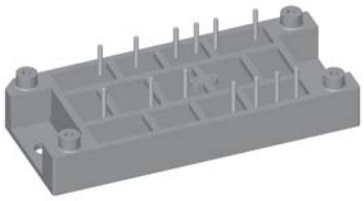
with IGBT and Fast Recovery Diode for Braking System

V_{RRM} = 1200/1600 V
I_{dAV} = 120 A

Preliminary data

V_{RRM} V	Type
1200	VVZB 120-12 io2
1600	VVZB 120-16 io2





Symbol		Conditions		Maximum Ratings	
I_{dAV}	Rectifier Bridge	T_{case}= 80°C, sinusoidal 120°		120	A
I_{FRMS}/I_{TRMS}		T_{case}= 80°C, per leg		77	A
I_{FSM}/I_{TSM}		T_{VJ} = 25°C,	t = 10 ms, V_R = 0 V	750	A
		T_{VJ} = 150°C,	t = 10 ms, V_R = 0 V	670	A
I^2t		T_{VJ} = 25°C,	t = 10 ms, V_R = 0 V	2810	A
		T_{VJ} = 150°C,	t = 10 ms, V_R = 0V	2240	A
$(di/dt)_{cr}$		$T_{VJ} = T_{VJM}$ f = 50 Hz, t_P = 200 µs	repetitive, I_T = 150 A	150	A/µs
		$V_D = {}^2/_3 V_{DRM}$ I_G = 0.45 A, di_G/dt = 0.45 A/µs	non repetitive, $I_T = I_{d(AV)}/3$	500	A/µs
$(dv/dt)_{cr}$		$T_{VJ} = T_{VJM}$; $V_{DR} = {}^2/_3 V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise)		1000	V/µs
P_{GM}		$T_{VJ} = T_{VJM}$ $I_T = I_{d(AV)}/3$	t_P = 30 µs	10	W
			t_P = 300 µs	5	W
			t_P = 10 ms	1	W
P_{GAVM}				0.5	W
V_{CES}	IGBT	T_{VJ} = 25°C to 150°C		1200	V
V_{GE}		Continuous		± 20	V
I_{C25}		T_{case} = 25°C, DC		140	A
I_{C80}		T_{case} = 80°C, DC		100	A
I_{CM}		t_p = Pulse width limited by T_{VJM}		280	A
P_{tot}		T_{case} = 80°C		570	W
V_{RRM}	Fast Recovery Diode			1200	V
$I_{F(AV)}$		T_{case} = 80°C, rectangular d = 0.5		27	A
$I_{F(RMS)}$		T_{case} = 80°C, rectangular d = 0.5		38	A
I_{FRM}		T_{case} = 80°C, t_P = 10 µs, f = 5 kHz		tbd	A
I_{FSM}		T_{VJ} = 45°C,	t = 10 ms	200	A
		T_{VJ} = 150°C,	t = 10 ms	180	A
P_{tot}		T_{case} = 80°C		64	W

Data according to IEC 60747
IXYS reserves the right to change limits, test conditions and dimensions.

Features

- Soldering connections for PCB mounting
- Isolation voltage 3600 V~
- Ultrafast freewheel diode
- Convenient package outline

Applications

- Drive Inverters with brake system

Advantages

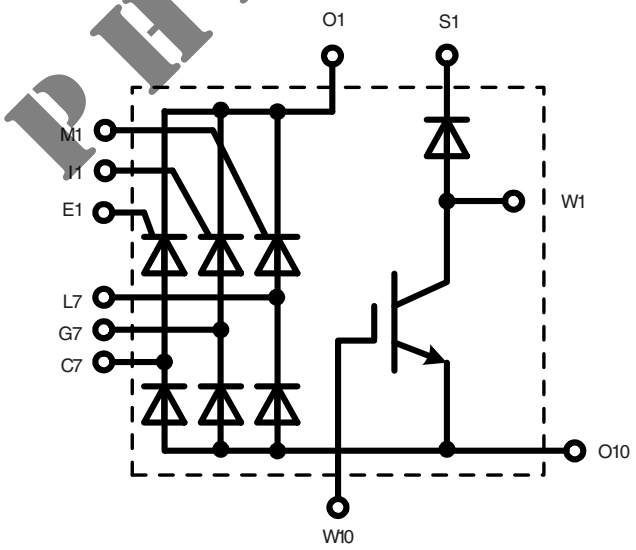
- 2 functions in one package
- No external isolation
- Easy to mount with two screws
- Suitable for wave soldering
- High temperature and power cycling capability

Recommended replacement:

VVZB120-16ioX

Symbol		Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
I_R, I_D	Rectifier Bridge	$V_R = V_{RRM}/V_{DRM}$ $V_R = V_{RRM}/V_{DRM}$; T_{VJ} = 150°C		0.3	mA 5	mA
V_F, V_T		I_F = 100 A			1.47	V
V_{T0} r_T		For power-loss calculations only T_{VJ} = 150°C			0.85 5	V mΩ
V_{GT} I_{GT}		V_D = 6 V; T_{VJ} = 25°C T_{VJ} = -40°C V_D = 6 V; T_{VJ} = 25°C T_{VJ} = -40°C			1.5 1.6 100 200	V V mA mA
V_{GD} I_{GD}		$T_{VJ} = T_{VJM}$; $V_D = {}^2/_3\ V_{DRM}$ $T_{VJ} = T_{VJM}$; $V_D = {}^2/_3\ V_{DRM}$			0.2 10	V mA
I_L		V_D = 6 V; t_G = 30 µs di_G/dt = 0.45 A/µs; I_G = 0.45 A			450	mA
I_H		$T_{VJ} = T_{VJM}$; V_D = 6 V; $R_{GK} = \infty$			200	mA
t_{gd}		$V_D = ½\ V_{DRM}$ di_G/dt = 0.45 A/µs; I_G = 0.45 A			2	µs
t_q		$T_{VJ} = T_{VJM}$; V_R = 100 V; $V_D = {}^2/_3\ V_{DRM}$; t_P = 200 µs dv/dt = 10 V/µs; I_T = 120 A; -di/dt = 10 A/µs			150	µs
Q_S I_{RM}		$T_{VJ} = T_{VJM}$ -di/dt = 0.64 A/µs; I_T/I_F = 50 A			90 11	µC A
R_{thJC} R_{thJH}		per thyristor/diode; sine 120° el. per thyristor/diode; sine 120° el.			1 1.3	K/W K/W
$V_{BR(CES)}$ $V_{GE(th)}$	IGBT	V_{GS} = 0 V; I_C = 1 mA I_C = 4 mA	1200 4.5		 6.5	V V
I_{GES}		$V_{GE} = \pm 20$ V			500	nA
I_{CES}		$V_{CE} = V_{CES}$ $V_{CE} = V_{CES}$; T_{VJ} = 125°C			0.2 1	mA mA
V_{CEsat}		V_{GE} = 15 V; I_C = 50 A			2.1	V
t_{SC} (SCSOA)		V_{GE} = 15 V; V_{CE} = 900 V; T_{VJ} = 125°C R_G = 15 Ω; non repetitive			10	µs
RBSOA		V_{GE} = 15 V; V_{CE} = 1200 V; T_{VJ} = 125°C R_G = 15 Ω; Clamped Inductive load; L = 100 µH			150	A
C_{ies}		V_{CE} = 25 V; f = 1 MHz; V_{GE} = 0 V		5.7		nF
$t_{d(on)}$ $t_{d(off)}$ E_{on} E_{off}		V_{CE} = 600 V; I_C = 50 A V_{GE} = 15 V; R_G = 15 Ω Inductive load; L = 100 µH T_{VJ} = 125°C		170 680 11 8		ns ns mJ mJ
R_{thJC} R_{thCH}				 0.1	0.22	K/W K/W

Symbol		Conditions		Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
I_R	Fast Recovery Diode	$V_R = V_{RRM}$;	T_{VJ} = 25°C			0.75	mA
		$V_R = 0.8\ V_{RRM}$;	T_{VJ} = 150°C		3	7	mA
V_F		I_F = 30 A;	T_{VJ} = 25°C			2.55	V
V_{T0}		For power-loss calculations only				1.65	V
r_T		T_{VJ} = 150°C				18.2	mΩ
I_{RM}		I_F = 30 A; $-di_F/dt$ = 240 A/µs V_R = 100 V			16	18	A
t_{rr}		I_F = 1 A; $-di_F/dt$ = 100 A/µs V_R = 30 V			40	60	ns
R_{thJC}						1.1	K/W
R_{thJH}						1.5	K/W
		Common Specification				**Maximum Ratings**	
T_{VJ}	Module					-40...+150	°C
T_{VJM}						150	°C
T_{stg}						-40...+125	°C
V_{ISOL}		50/60 Hz	t = 1 min			3000	V~
		$I_{ISOL} \le$ 1 mA	t = 1 s			3600	V~
M_d		Mounting torque	(M5)			2-2.5	Nm
			(10-32 UNF)			18-22	lb.in.
Weight		typ.				80	g
d_S		Creep distance on surface				12.7	mm
d_A		Strike distance in air				11	mm
a		Maximum allowable acceleration				50	m/s^2



Dimensions in mm (1 mm = 0.0394")