

Three Phase Half Controlled Rectifier Bridge

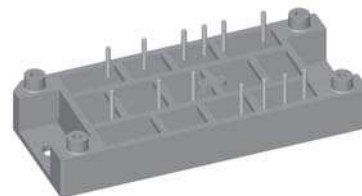
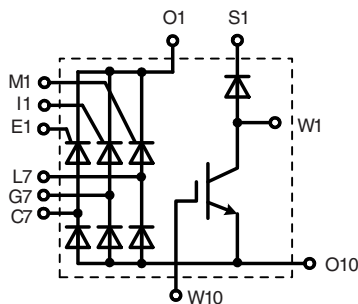
with IGBT and Fast Recovery Diode for Braking System

$$V_{RRM} = 1200/1600 \text{ V}$$

$$I_{dAV} = 120 \text{ A}$$

Preliminary data

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



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

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

Data according to IEC 60747

IXYS reserves the right to change limits, test conditions and dimensions.

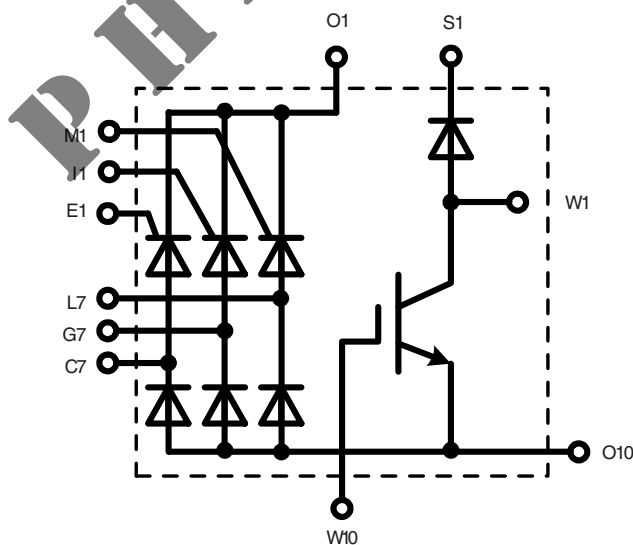
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Symbol	Conditions	Characteristic Values ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)		
		min.	typ.	max.
I_R, I_D	$V_R = V_{RRM}/V_{DRM}$ $V_R = V_{RRM}/V_{DRM}; T_{VJ} = 150^{\circ}\text{C}$	0.3		mA 5 mA
V_F, V_T	$I_F = 100 \text{ A}$			1.47 V
V_{T0}	For power-loss calculations only			0.85 V
r_T	$T_{VJ} = 150^{\circ}\text{C}$			5 m Ω
V_{GT}	$V_D = 6 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = -40^{\circ}\text{C}$			1.5 V 1.6 V
I_{GT}	$V_D = 6 \text{ V}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = -40^{\circ}\text{C}$			100 mA 200 mA
V_{GD}	$T_{VJ} = T_{VJM}; V_D = \frac{2}{3} V_{DRM}$			0.2 V
I_{GD}	$T_{VJ} = T_{VJM}; V_D = \frac{2}{3} V_{DRM}$			10 mA
I_L	$V_D = 6 \text{ V}; t_G = 30 \mu\text{s}$ $di_G/dt = 0.45 \text{ A}/\mu\text{s}; I_G = 0.45 \text{ A}$			450 mA
I_H	$T_{VJ} = T_{VJM}; V_D = 6 \text{ V}; R_{GK} = \infty$			200 mA
t_{gd}	$V_D = \frac{1}{2} V_{DRM}$ $di_G/dt = 0.45 \text{ A}/\mu\text{s}; I_G = 0.45 \text{ A}$			2 μs
t_q	$T_{VJ} = T_{VJM}; V_R = 100 \text{ V}; V_D = \frac{2}{3} V_{DRM}; t_p = 200 \mu\text{s}$ $dv/dt = 10 \text{ V}/\mu\text{s}; I_T = 120 \text{ A}; -di/dt = 10 \text{ A}/\mu\text{s}$			150 μs
Q_S	$\left\{ \begin{array}{l} T_{VJ} = T_{VJM} \\ -di/dt = 0.64 \text{ A}/\mu\text{s}; I_T/I_F = 50 \text{ A} \end{array} \right.$			90 μC
I_{RM}				11 A
R_{thJC}	per thyristor/diode; sine 120° el.			1 K/W
R_{thJH}	per thyristor/diode; sine 120° el.			1.3 K/W
$V_{BR(CES)}$	$V_{GS} = 0 \text{ V}; I_C = 1 \text{ mA}$	1200		V
$V_{GE(th)}$	$I_C = 4 \text{ mA}$	4.5		V
I_{GES}	$V_{GE} = \pm 20 \text{ V}$			500 nA
I_{CES}	$V_{CE} = V_{CES}$ $V_{CE} = V_{CES}; T_{VJ} = 125^{\circ}\text{C}$			0.2 mA 1 mA
V_{CESat}	$V_{GE} = 15 \text{ V}; I_C = 50 \text{ A}$			2.1 V
t_{sc} (SCSOA)	$V_{GE} = 15 \text{ V}; V_{CE} = 900 \text{ V}; T_{VJ} = 125^{\circ}\text{C}$ $R_G = 15 \Omega$; non repetitive			10 μs
RBSOA	$V_{GE} = 15 \text{ V}; V_{CE} = 1200 \text{ V}; T_{VJ} = 125^{\circ}\text{C}$ $R_G = 15 \Omega$; Clamped Inductive load; $L = 100 \mu\text{H}$			150 A
C_{ies}	$V_{CE} = 25 \text{ V}; f = 1 \text{ MHz}; V_{GE} = 0 \text{ V}$	5.7		nF
$t_{d(on)}$	$\left\{ \begin{array}{l} V_{CE} = 600 \text{ V}; I_C = 50 \text{ A} \\ V_{GE} = 15 \text{ V}; R_G = 15 \Omega \\ \text{Inductive load; } L = 100 \mu\text{H} \\ T_{VJ} = 125^{\circ}\text{C} \end{array} \right.$	170		ns
$t_{d(off)}$		680		ns
E_{on}		11		mJ
E_{off}		8		mJ
R_{thJC}				0.22 K/W
R_{thCH}		0.1		K/W

Symbol **Conditions** **Characteristic Values**
 ($T_{VJ} = 25^{\circ}\text{C}$, unless otherwise specified)

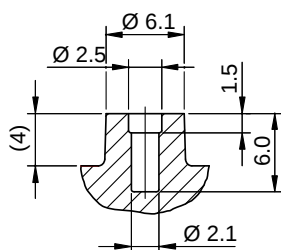
		min.	typ.	max.
I_R	$V_R = V_{RRM}; T_{VJ} = 25^{\circ}\text{C}$ $V_R = 0.8 V_{RRM}; T_{VJ} = 150^{\circ}\text{C}$		3	0.75 mA 7 mA
V_F	$I_F = 30 \text{ A}; T_{VJ} = 25^{\circ}\text{C}$			2.55 V
V_{T0}	For power-loss calculations only			1.65 V
r_T	$T_{VJ} = 150^{\circ}\text{C}$			18.2 mΩ
I_{RM}	$I_F = 30 \text{ A}; -di_F/dt = 240 \text{ A}/\mu\text{s}$ $V_R = 100 \text{ V}$	16		18 A
t_{rr}	$I_F = 1 \text{ A}; -di_F/dt = 100 \text{ A}/\mu\text{s}$ $V_R = 30 \text{ V}$	40		60 ns
R_{thJC}				1.1 K/W
R_{thJH}				1.5 K/W

	Common Specification		Maximum Ratings	
T_{VJ}			-40...+150	$^{\circ}\text{C}$
T_{VJM}			150	$^{\circ}\text{C}$
T_{stg}			-40...+125	$^{\circ}\text{C}$
V_{ISOL}	50/60 Hz $I_{ISOL} \leq 1 \text{ mA}$	$t = 1 \text{ min}$ $t = 1 \text{ s}$	3000 V~ 3600 V~	
M_d	Mounting torque	(M5) (10-32 UNF)	2-2.5 Nm 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")

Detail X M 2:1



Detail Y M 5:1

