

Three Phase Half Controlled Rectifier Bridge with IGBT and Fast Recovery Diode for Braking System

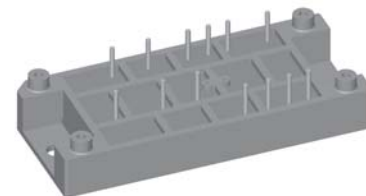
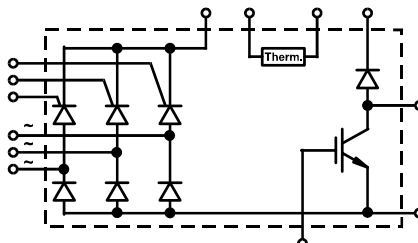
$$V_{RRM} = 1200/1600 \text{ V}$$

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

Preliminary data

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

(T) = NTC optional



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
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ repetitive, $I_T = 150 \text{ A}$ $f = 50 \text{ Hz}$, $t_p = 200 \mu\text{s}$	150	A/ μs
	$V_D = \frac{2}{3} V_{DRM}$ $I_G = 0.45 \text{ A}$, non repetitive, $I_T = I_{d(AV)}/3$ $di_G/dt = 0.45 \text{ A}/\mu\text{s}$	500	A/ μs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; $V_{DR} = \frac{2}{3} V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise)	1000	V/ μs
P_{GM}	$T_{VJ} = T_{VJM}$ $t_p = 30 \mu\text{s}$ $I_T = I_{d(AV)}/3$ $t_p = 300 \mu\text{s}$ $t_p = 10 \text{ ms}$	10 5 1	W W 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
- Optional NTC

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

Data according to IEC 60747

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

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} r_T	For power-loss calculations only $T_{VJ} = 150^{\circ}\text{C}$			0.85 V 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} I_{GD}	$T_{VJ} = T_{VJM}$; $V_D = \frac{2}{3} V_{DRM}$ $T_{VJ} = T_{VJM}$; $V_D = \frac{2}{3} V_{DRM}$			0.2 V 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 I_{RM}	$T_{VJ} = T_{VJM}$ $-di/dt = 0.64 \text{ A}/\mu\text{s}$; $I_T/I_F = 50 \text{ A}$			90 μC 11 A
R_{thJC} R_{thJH}	per thyristor / diode; sine 120° el. per thyristor / diode; sine 120° el.			1 K/W 1.3 K/W
$V_{BR(CES)}$ $V_{GE(th)}$	$V_{GS} = 0 \text{ V}$, $I_C = 1 \text{ mA}$ $I_C = 4 \text{ mA}$	1200 4.5		V 6.5 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
$t_{d(on)}$ $t_{d(off)}$ E_{on} E_{off}	$V_{CE} = 600 \text{ V}$, $I_C = 50 \text{ A}$ $V_{GE} = 15 \text{ V}$, $R_G = 15 \Omega$ Inductive load; $L = 100 \mu\text{H}$ $T_{VJ} = 125^{\circ}\text{C}$		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	V _R = V _{RRM} , T _{VJ} = 25°C V _R = 0.8 V _{RRM} , T _{VJ} = 150°C		3	0.75 mA 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
Fast Recovery Diode				
Common Specification		Maximum Ratings		
T _{VJ}		-40...+150		°C
T _{VJM}		150		°C
T _{stg}		-40...+125		°C
V _{ISOL}	50/60 Hz t = 1 min I _{ISOL} ≤ 1 mA t = 1 s	3000 3600		V~ V~
M _d	Mounting torque (M5) (10-32 unf)	2-2.5 18-22		Nm 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
		min.	typ.	max.
R ₂₅	Thermistor	4.75	5.0	5.25 kΩ
B _{25/100}			3375	K

Dimensions in mm (1 mm = 0.0394")

