Three Phase Half Controlled Rectifier Bridge

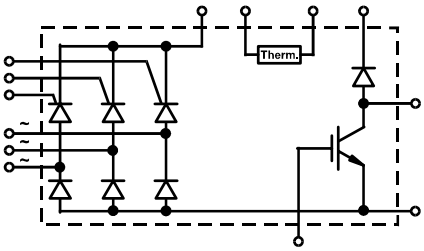
with IGBT and Fast Recovery Diode for Braking System

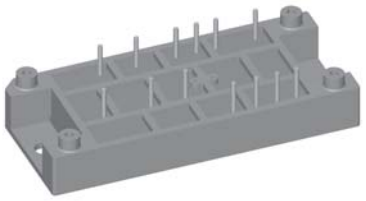
V_{RRM} = 1200/1600 V
I_{dAV} = 120 A

Preliminary data

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

(T) = NTC optional





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} = ∞; 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

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.

441

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 5	mA 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

441

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, I_{ISOL} ≤ 1 mA; t = 1 min			3000	V~
		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
			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")