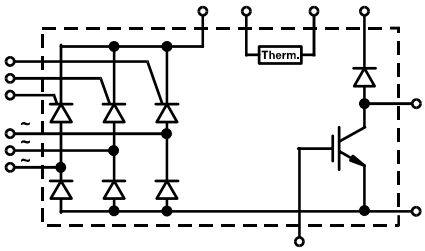
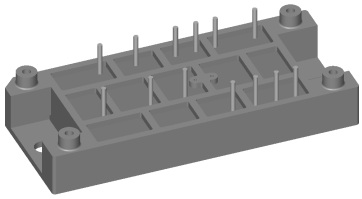
Three Phase Half Controlled Rectifier Bridge

with IGBT and Fast Recovery Diode for Braking System

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

V_{RRM} V	Type
1200	VVZB 120-12 io1
1400	VVZB 120-14 io1
1600	VVZB 120-16 io1





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; $V_D = {}^2/_3 V_{DRM}$; I_G = 0.45 A, di_G/dt = 0.45 A/µs	repetitive, I_T = 150 A	150	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		78	A
I_{C80}		T_{case} = 80°C, DC		52	A
I_{CM}		t_p = Pulse width limited by T_{VJM}		140	A
P_{tot}		T_{case} = 80°C		222	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

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.

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Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
	Rectifier Bridge				
I_R, I_D	$V_R = V_{RRM}/V_{DRM}$, $V_R = V_{RRM}/V_{DRM}$, 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
	IGBT				
$V_{BR(CES)}$ $V_{GE(th)}$	V_{GS} = 0 V, I_C = 1 mA I_C = 10 mA	1200 5		 8	V V
I_{GES}	$V_{GE} = \pm$ 20 V			500	nA
I_{CES}	V_{CE} = 0.8 V_{CES} V_{CE} = 0.8 V_{CES}, T_{VJ} = 150°C			0.5 3	mA mA
V_{CEsat}	V_{GE} = 15 V, I_C = 50 A			3.35	V
t_{SC} (SCSOA)	V_{GE} = 15 V, V_{CE} = 0.6 V_{CES}, T_{VJ} = 125°C, R_G = 11 Ω, non repetitive			10	µs
RBSOA	V_{GE} = 15 V, V_{CE} = 0.8 V_{CES}, T_{VJ} = 125°C, R_G = 11 Ω, Clamped Inductive load, L = 100 µH			100	A
C_{ies}	V_{CE} = 25 V, f = 1 MHz, V_{GE} = 0 V		9		nF
$t_{d(on)}$ $t_{d(off)}$ t_{ri} t_{fi} E_{on} E_{off}	V_{CE} = 0.6 V_{CES}, I_C = 25 A V_{GE} = 15 V, R_G = 11 Ω Inductive load; L = 100 µH T_{VJ} = 125°C		65 200 tbd tbd 4.1 5.7		ns ns ns ns mJ mJ
R_{thJC} R_{thJH}				0.32 0.45	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} ≤ 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
R_{25}		Thermistor		2.1	kΩ
$B_{25/100}$				3560	K

Dimensions in mm (1 mm = 0.0394")