

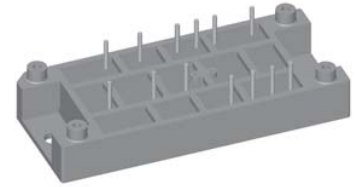
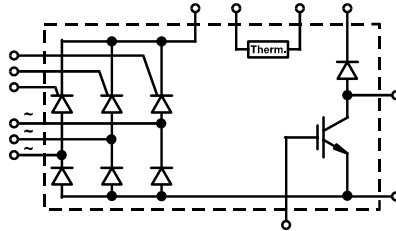
Three Phase Half Controlled Rectifier Bridge with IGBT and Fast Recovery Diode for Braking System

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

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	
	$V_D = 2/3 V_{DRM}$ $I_G = 0.45 \text{ A}$, non repetitive, $I_T = I_{d(AV)}/3$ $di_G/dt = 0.45 \text{ A}/\mu\text{s}$	500	A/ μs	
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; $V_{DR} = 2/3 V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise)	1000	V/ μs	
P_{GM}	$T_{VJ} = T_{VJM}$ $t_p = 30 \mu\text{s}$	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} V_{GE}	$T_{VJ} = 25^\circ\text{C}$ to 150°C	1200	V	
	Continuous	± 20	V	
I_{C25} I_{C80} I_{CM} P_{tot}	IGBT	$T_{case} = 25^\circ\text{C}$, DC	140	A
		$T_{case} = 80^\circ\text{C}$, DC	100	A
		$t_p =$ Pulse width limited by T_{VJM}	280	A
		$T_{case} = 80^\circ\text{C}$	570	W
V_{RRM}	Fast Recovery Diode		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.

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Symbol	Conditions	Characteristic Values		
		(T _{VJ} = 25°C, unless otherwise specified)		
		min.	typ.	max.
I _R , I _D	V _R = V _{RRM} /V _{DRM} ,			0.3 mA
	V _R = V _{RRM} /V _{DRM} , T _{VJ} = 150°C			5 mA
V _F , V _T	I _F = 100 A,			1.47 V
V _{T0}	For power-loss calculations only			0.85 V
r _T	T _{VJ} = 150°C			5 mΩ
V _{GT}	V _D = 6 V; T _{VJ} = 25°C			1.5 V
I _{GT}	T _{VJ} = -40°C			1.6 V
	V _D = 6 V; T _{VJ} = 25°C			100 mA
V _{GD}	T _{VJ} = -40°C			200 mA
	T _{VJ} = T _{VJM} ; V _D = 2/3 V _{DRM}			0.2 V
I _{GD}	T _{VJ} = T _{VJM} ; V _D = 2/3 V _{DRM}			10 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} = ∞			200 mA
t _{gd}	V _D = 1/2 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	} T _{VJ} = T _{VJM} -di/dt = 0.64 A/μs; I _T /I _F = 50 A			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 V, I _C = 1 mA	1200		V
V _{GE(th)}	I _C = 4 mA	4.5		6.5 V
I _{GES}	V _{GE} = ± 20 V			500 nA
I _{CES}	V _{CE} = V _{CES}			0.2 mA
	V _{CE} = V _{CES} , T _{VJ} = 125°C			1 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)}	} 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	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°C, unless otherwise specified)		
		min.	typ.	max.
I _R	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 _{TO}	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}		-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) (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	
			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")

