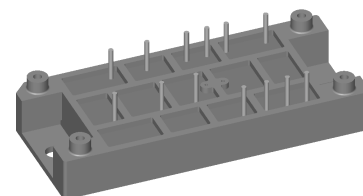
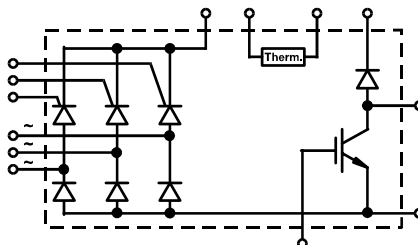


Three Phase Half Controlled Rectifier Bridge

with IGBT and Fast Recovery Diode for Braking System

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

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}	$T_{case} = 80^{\circ}\text{C}$, 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	78	A
I_{C80}	$T_{case} = 80^{\circ}\text{C}$, DC	52	A
I_{CM}	$t_p = \text{Pulse width limited by } T_{VJM}$	140	A
P_{tot}	$T_{case} = 80^{\circ}\text{C}$	222	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

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}	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}	$T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$			0.2 V
I_{GD}	$T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$			10 mA
I_L	$V_D = 6 \text{ V}; t_G = 30 \mu\text{s}$ $di_G/dt = 0.45 \text{ A}/\mu\text{s}; I_G = 0.45 \text{ A}$			450 mA
I_H	$T_{VJ} = T_{VJM}; V_D = 6 \text{ V}; R_{GK} = \infty$			200 mA
t_{gd}	$V_D = 1/2 V_{DRM}$ $di_G/dt = 0.45 \text{ A}/\mu\text{s}; I_G = 0.45 \text{ A}$			2 μs
t_q	$T_{VJ} = T_{VJM}; V_R = 100 \text{ V}; V_D = 2/3 V_{DRM}; t_p = 200 \mu\text{s}$ $dv/dt = 10 \text{ V}/\mu\text{s}; I_T = 120 \text{ A}; -di/dt = 10 \text{ A}/\mu\text{s}$			150 μs
Q_S	$T_{VJ} = T_{VJM}$ $-di/dt = 0.64 \text{ A}/\mu\text{s}; I_T/I_F = 50 \text{ A}$			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
$V_{BR(CES)}$	$V_{GS} = 0 \text{ V}, I_C = 1 \text{ mA}$	1200		V
$V_{GE(th)}$	$I_C = 10 \text{ mA}$	5		8 V
I_{GES}	$V_{GE} = \pm 20 \text{ V}$			500 nA
I_{CES}	$V_{CE} = 0.8 V_{CES}$ $V_{CE} = 0.8 V_{CES}, T_{VJ} = 150^{\circ}\text{C}$			0.5 mA 3 mA
V_{CESat}	$V_{GE} = 15 \text{ V}, I_C = 50 \text{ A}$			3.35 V
t_{SC} (SCSOA)	$V_{GE} = 15 \text{ V}, V_{CE} = 0.6 V_{CES}, T_{VJ} = 125^{\circ}\text{C},$ $R_G = 11 \Omega$, non repetitive			10 μs
RBSOA	$V_{GE} = 15 \text{ V}, V_{CE} = 0.8 V_{CES}, T_{VJ} = 125^{\circ}\text{C},$ $R_G = 11 \Omega$, Clamped Inductive load, $L = 100 \mu\text{H}$			100 A
C_{ies}	$V_{CE} = 25 \text{ V}, f = 1 \text{ MHz}, V_{GE} = 0 \text{ V}$		9	nF
$t_{d(on)}$	$V_{CE} = 0.6 V_{CES}, I_C = 25 \text{ A}$ $V_{GE} = 15 \text{ V}, R_G = 11 \Omega$ Inductive load; $L = 100 \mu\text{H}$ $T_{VJ} = 125^{\circ}\text{C}$		65	ns
$t_{d(off)}$			200	ns
t_{ri}			tbd	ns
t_{fi}			tbd	ns
E_{on}			4.1	mJ
E_{off}			5.7	mJ
R_{thJC}				0.32 K/W
R_{thJH}				0.45 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 I _{ISOL} ≤ 1 mA	t = 1 min 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
R ₂₅	Thermistor		2.1	kΩ
B _{25/100}			3560	K

Dimensions in mm (1 mm = 0.0394")

