Contents

Rectifier Bridges incorporating Fast Diodes

Power switching semiconductors are used in inverter systems with DC-Link. Due to high switching frequencies, harmonics and line distortion may be generated. It is important that the new designs reduce these influences and fulfill the EMI filtering requirements according to EMI/EMC VDE 0871 and other.

The noise level can be **reduced by up to 10dB** when the input rectifier is equipped with Semi-fast diodes and is therefore optimised for turn off; resulting in a lower peak recovery current compared to non-optimised and normal rectifier diodes.

The noise level can be further **reduced** approximately by **another 5dB** when using rectifier bridges equipped with Fast Recovery Epitaxial Diodes (FRED) like module types VBE (single phase bridge) or VUE (three phase bridge). However these are more expensive but may be necessary in some applications to fulfill the VDE or other standards.

This behaviour has a direct influence on the design of the EMI filter networks with its capacitors and inductors of which the size and costs can be reduced.

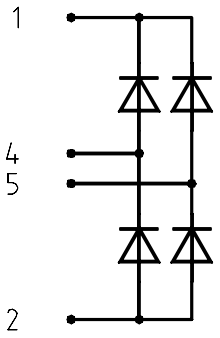
More detailed information is available in the IXYS application note D98005E "Input Rectifiers with Semi-fast Diodes for DC Link“ on www.ixys.com.

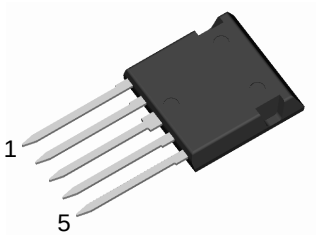
Fast Single Phase Rectifier Bridge

in ISOPLUS i4-PAC™

FBE 22-06N1

V_{RRM} = 600 V
$I_{D(AV)M}$ = 20 A
t_{rr} = 80 ns





Input Rectifier Bridge

Symbol	Conditions	Maximum Ratings	
V_{RRM}		600	V
I_{FAV}	T_C = 90°C; sine 180° (per diode)	10	A
$I_{D(AV)M}$	T_C = 90°C	20	A
I_{FSM}	T_{VJ} = 25°C; t = 10 ms; sine 50 Hz	40	A
E_{AS}	I_{AS}= 0.9 A; L_{AS}=180 µH; T_C = 25°C; non repetitive	0.1	mJ
P_{tot}	T_C = 25°C (per diode)	35	W

Symbol	Conditions	Characteristic Values (T_{VJ} = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	I_F = 15 A; T_{VJ} = 25°C		2.0	2.2	V
	T_{VJ} = 125°C		1.5		V
I_R	V_R = V_{RRM}; T_{VJ} = 25°C			0.06	mA
	T_{VJ} = 125°C		0.1		mA
I_{RM}	I_F = 10 A; di_F/dt = -400 A/µs; T_{VJ} = 125°C		11		A
t_{rr}	V_R = 300 V		80		ns
R_{thJC}	(per diode)			3.5	K/W

Data according to IEC 60747 and refer to a single diode unless otherwise stated.

Features

- HiPerFRED™ Epitaxial Diodes
  - fast and soft reverse recovery – low switching losses
  - avalanche rated
  - low leakage current
- ISOPLUS i4-PAC™ package
  - isolated back surface
  - enlarged creepage towards heatsink
  - application friendly pinout
  - high reliability
  - industry standard outline

Applications

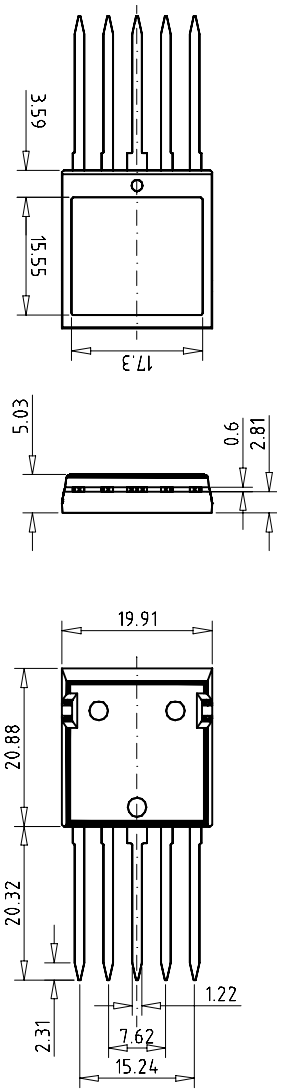
- high frequency rectifiers, output rectifiers of switched mode power supplies
- single phase mains rectifiers with minimized electromagnetic emissions
- power factor correction in conjunction with boost chopper (FID.../FMD... type)

Component

Symbol	Conditions	Maximum Ratings	
T_{VJ}		-55...+150	°C
T_{stg}		-55...+125	°C
V_{ISOL}	$I_{ISOL} \leq 1$ mA; 50/60 Hz	2500	V~
F_C	mounting force with clip	20...120	N

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
d_S,d_A	pin - pin	1.7		mm
d_S,d_A	pin - backside metal	5.5		mm
R_{thCH}	with heatsink compound		0.15	K/W
Weight			9	g

Dimensions in mm (1 mm = 0.0394")

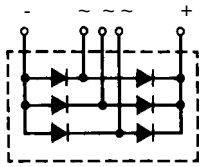


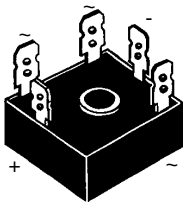
Three Phase Rectifier Bridges with Semi Fast Diodes

I_{dAVM} = 18 A
V_{RRM} = 1200-1600 V

Preliminary Data

V_{RSM} V	V_{RRM} V	Type
1200	1200	VUO 18-12DT8
1400	1400	VUO 18-14DT8
1600	1600	VUO 18-16DT8





Symbol	Test Conditions		Maximum Ratings	
I_{dAV}	T_C = 85°C, module		14	A
I_{dAVM}	T_C = 63°C, module		18	A
I_{FSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	300	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	330	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	270	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	300	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	450	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	460	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	365	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	380	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+150	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	2500	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3000	V~
M_d	Mounting torque	(M5)	2 ± 10 %	Nm
		(10-32 UNF)	18 ± 10 %	lb.in.
Weight	typ.		22	g

Symbol	Test Conditions	Characteristic Values	
I_R	T_{VJ} = 25°C; $V_R = V_{RRM}$	≤ 0.3	mA
	T_{VJ} = 125°C; $V_R = V_{RRM}$	≤ 5.0	mA
V_F	I_F = 55 A; T_{VJ} = 25°C	≤ 1.85	V
V_{T0}	For power-loss calculations only	1.2	V
r_T	$T_{VJ} = T_{VJM}$	16	mΩ
t_{rr}	T_{VJ} = 25°C; I_F = 10 A; -di/dt = 10 A/µs, V_R = 1/2 V_{RRM}	≤ 1.5	µs
R_{thJC}	per diode; 120° el	9.3	K/W
	per module	1.55	K/W
R_{thJK}	per diode; 120° e	10.2	K/W
	per module	1.7	K/W
d_S	Creeping distance on surface	12.7	mm
d_A	Creepage distance in air	9.4	mm
a	Max. allowable acceleration	50	m/s^2

Data according to IEC 60747

Features

- Package with 1/4" fast-on terminals
- Isolation voltage 3000 V~
- Planar passivated chips
- Blocking voltage up to 1600 V
- Low forward voltage drop
- UL registered E 72873

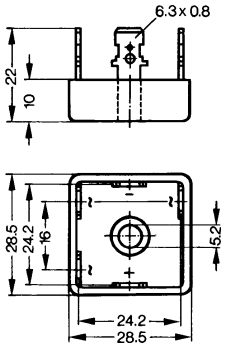
Applications

- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

Advantages

- Easy to mount with one screw
- Space and weight savings
- Improved temperature and power cycling
- **Up to 10 dB lower EMI/RFI compared to standard rectifier**

Dimensions in mm (1 mm = 0.0394")



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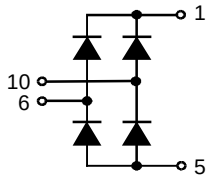
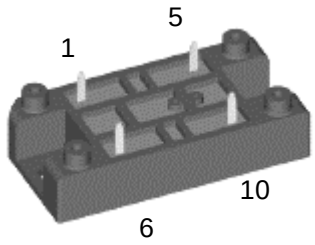
Single Phase Rectifier Bridge

with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 20 A
V_{RRM} = 2000 V
t_{rr} = 70 ns

V_{RSM} V	V_{RRM} V	Type
2000	2000	VBE 20-20NO1





Symbol	Conditions		Maximum Ratings	
I_{dAV}	T_C = 65°C, module		20	A
I_{FSM}	T_{VJ} = 45°C; V_R = 0	t = 10 ms (50 Hz), sine	75	A
	T_{VJ} = T_{VJM} V_R = 0	t = 10 ms (50 Hz), sine	65	A
I^2dt	T_{VJ} = 45°C V_R = 0	t = 10 ms (50 Hz), sine	28	A^2s
	T_{VJ} = T_{VJM} V_R = 0	t = 10 ms (50 Hz), sine	21	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque (M5)		2 - 2.5	Nm
		(10-32UNF)	18 - 22	lb.in.
Weight	typ.		35	g

Symbol	Conditions		Characteristic Values typ.	max	
I_R	V_R = V_{RRM}	T_{VJ} = 25°C		0.75	mA
	V_R = 0.8 V_{RRM}	T_{VJ} = 125°C	4	7	mA
V_F	I_F = 12 A	T_{VJ} = 25°C		5.41	V
V_{T0}	For power-loss calculations only			3.3	V
r_T				93	mΩ
R_{thJC}	per diode, DC			1.7	K/W
R_{thCH}			0.3		K/W
I_{RM}	I_F = 12 A, -di_F/dt = 100 A/ms V_R = 540 V, L ≤ 0.05 mH, T_{VJ} = 100°C		9	12	A
t_{rr}	I_F = 1 A; -di/dt = 100 A/ms; V_R = 30 V, T_{VJ} = 25°C		70	90	ns
d_S	Creeping distance on surface			12.7	mm
d_A	Creepage distance in air			9.4	mm
a	Max. allowable acceleration			50	m/s^2

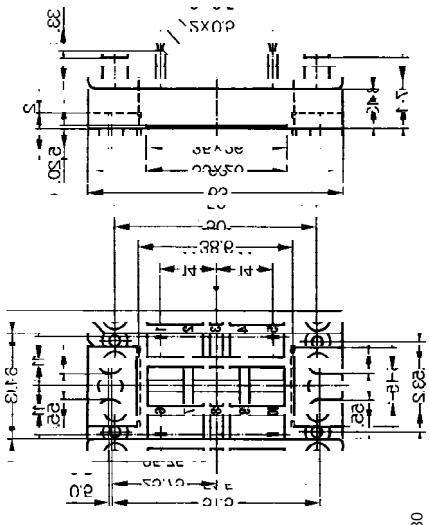
Data according to IEC 60747 and refer to a single diode unless otherwise stated.

Features
- Package with DCB ceramic base plate
- Isolation voltage 3600 V~
- Planar passivated chips
- Leads suitable for PC board soldering
- Creeping and creepage-distance fulfil UL 508/CSA 22.2NO14 and VDE 0160 requirements
- Epoxy meets UL94V-O
- UL listing applied for

Applications
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Output filter for PWM inverter

Advantages
- Reduced EMI/RFI
- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling

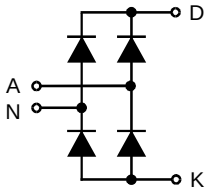
Dimensions in mm (1 mm = 0.0394")



ECO-PAC ™
Single Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 27 A
V_{RRM} = 600 V
t_{rr} = 35 ns

V_{RSM} V	V_{RRM} V	Typ
600	600	VBE 17-06NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 85°C, module		27	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	50	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	55	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	45	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	50	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	15	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	15	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	10	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	10	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		17	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	$V_R = V_{RRM}$	T_{VJ} = 25°C		0.06	mA
	$V_R = V_{RRM}$	$T_{VJ} = T_{VJM}$		0.25	mA
V_F	I_F = 10 A	T_{VJ} = 25°C		2.09	V
V_{T0}	for power-loss calculations only			1.18	V
r_T				22	mΩ
R_{thJC}	per diode; DC current			2.5	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 12 A, -diF/dt = 100 A/µs		4	4.4	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 50 A/µs; V_R = 30 V, T_{VJ} = 25°C		35	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

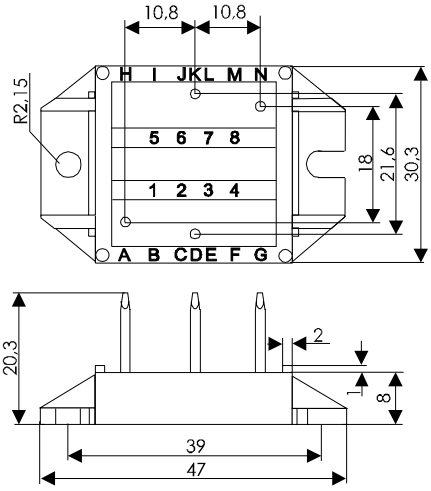
Data according to IEC 60747 refer to a single diode unless otherwise stated
① for resistive load at bridge output.

Features
- Package with DCB ceramic base plate in low profile
- Isolation voltage 3000 V~
- Planar passivated chips
- Low forward voltage drop
- Leads suitable for PC board soldering

Applications
- Supplies for DC power equipment
- Input and output rectifiers for high frequency
- Battery DC power supplies
- Field supply for DC motors

Advantages
- Space and weight savings
- Improved temperature and power cycling capability
- Small and light weight
- Low noise switching

Dimensions in mm (1 mm = 0.0394")



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

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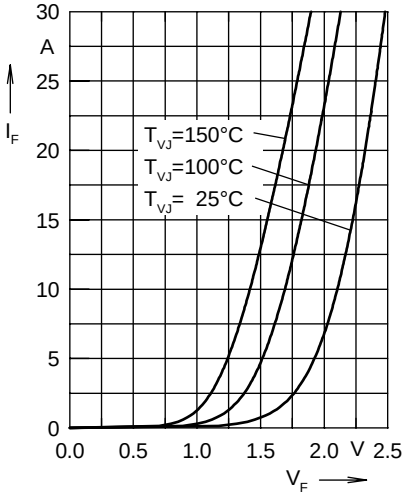


Fig. 1 Forward current I_F versus V_F

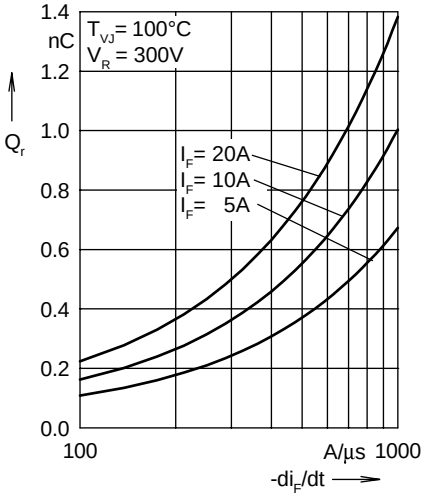


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

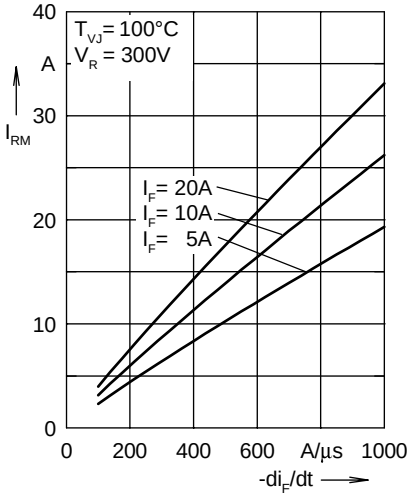


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

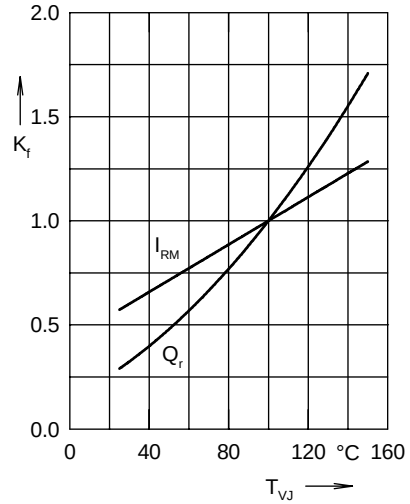


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

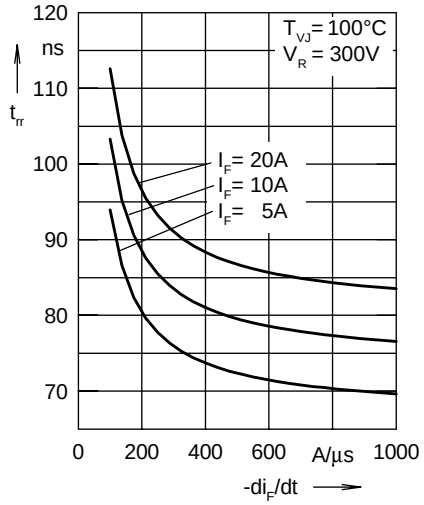


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

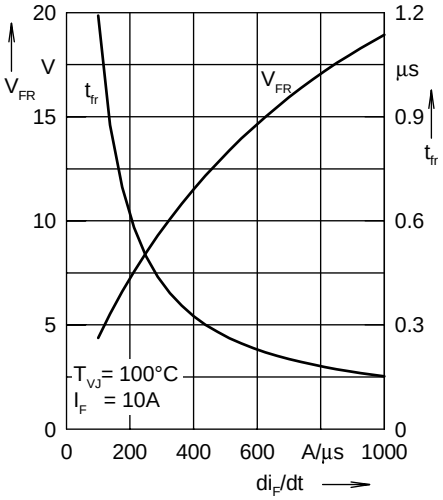


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

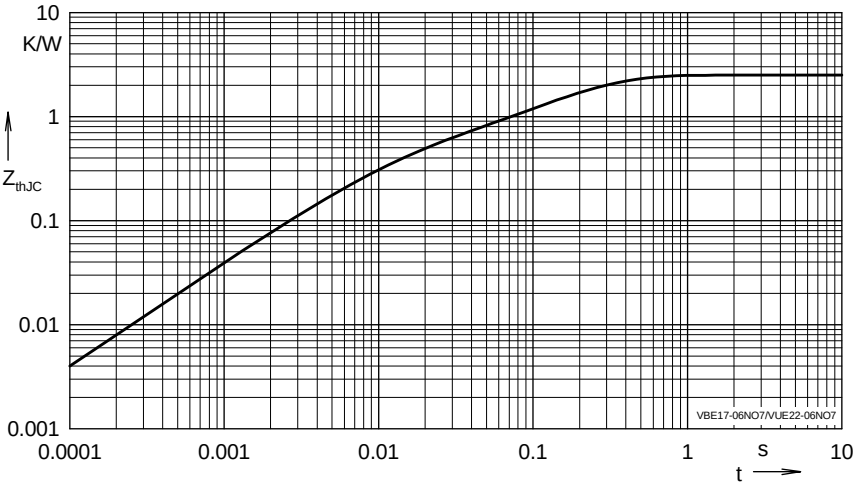


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

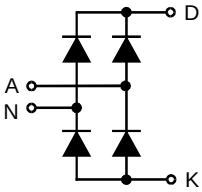
i	R_{thi} (K/W)	t_i (s)
1	0.8776	0.0052
2	0.3378	0.0003
3	0.0678	0.0004
4	1.2168	0.0092

NOTE: Fig. 2 to Fig. 6 shows typical values

ECO-PAC ™
Single Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 19 A
V_{RRM} = 1200 V
t_{rr} = 40 ns

V_{RSM} V	V_{RRM} V	Typ
1200	1200	VBE 17-12NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 85°C, module		19	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	40	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	45	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	35	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	40	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	10	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	10	A^2s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	5	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	5	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		19	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	V_R = V_{RRM}	T_{VJ} = 25°C		0.06	mA
	V_R = V_{RRM}	T_{VJ} = T_{VJM}		0.25	mA
V_F	I_F = 10 A	T_{VJ} = 25°C		2.92	V
V_{T0}	for power-loss calculations only			1.32	V
r_T				30	mΩ
R_{thJC}	per diode; DC current			2.5	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 12 A, -diF/dt = 100 A/µs		4	8.5	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 50 A/µs; V_R = 30 V, T_{VJ} = 25°C		40	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

Data according to IEC 60747 refer to a single diode unless otherwise stated
① for resistive load at bridge output.

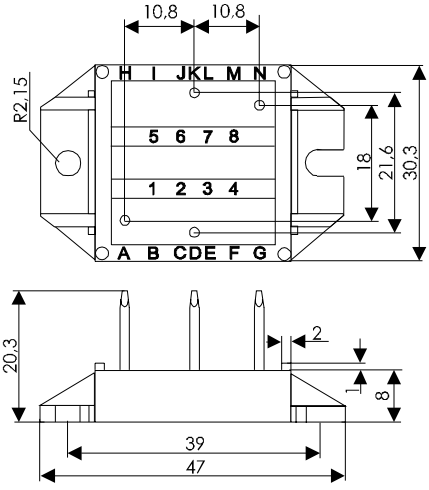
IXYS reserves the right to change limits, test conditions and dimensions.

Features
- Package with DCB ceramic base plate in low profile
- Isolation voltage 3000 V~
- Planar passivated chips
- Low forward voltage drop
- Leads suitable for PC board soldering

Applications
- Supplies for DC power equipment
- Input and output rectifiers for high frequency
- Battery DC power supplies
- Field supply for DC motors

Advantages
- Space and weight savings
- Improved temperature and power cycling capability
- Small and light weight
- Low noise switching

Dimensions in mm (1 mm = 0.0394")



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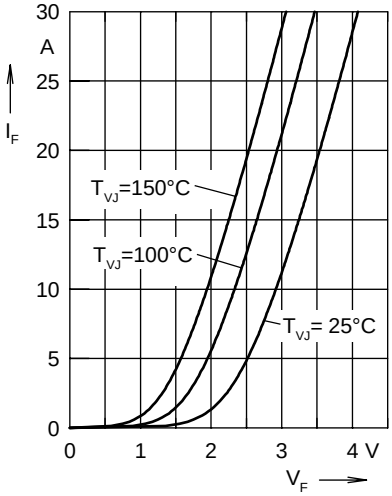


Fig. 1 Forward current I_F versus V_F

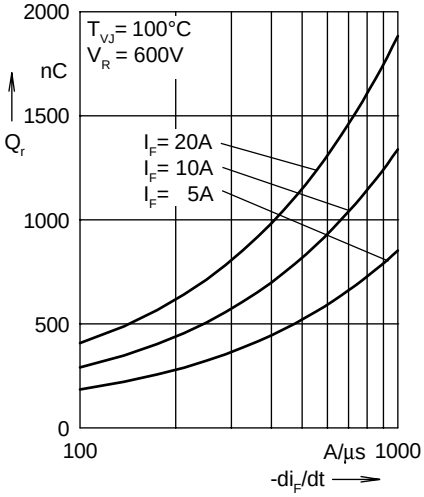


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

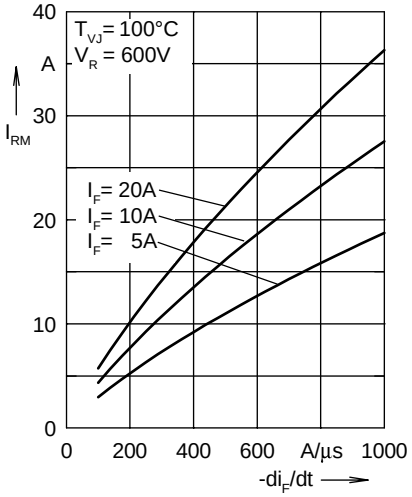


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

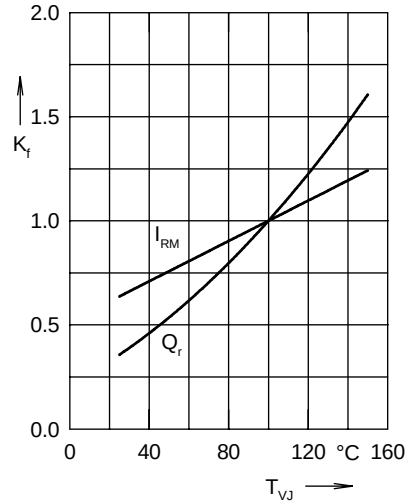


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

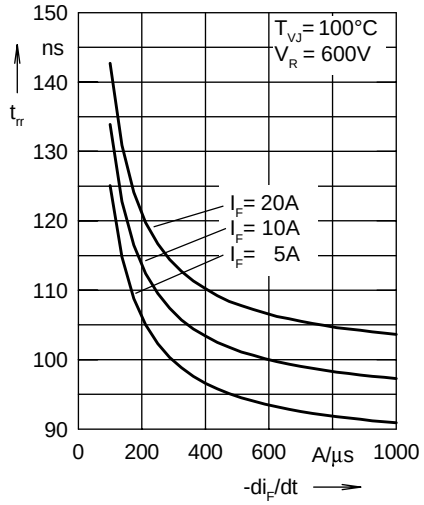


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

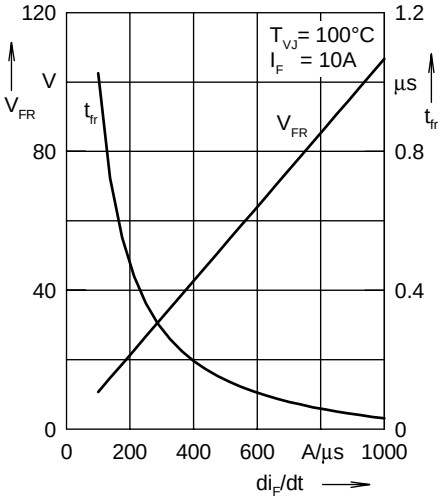


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

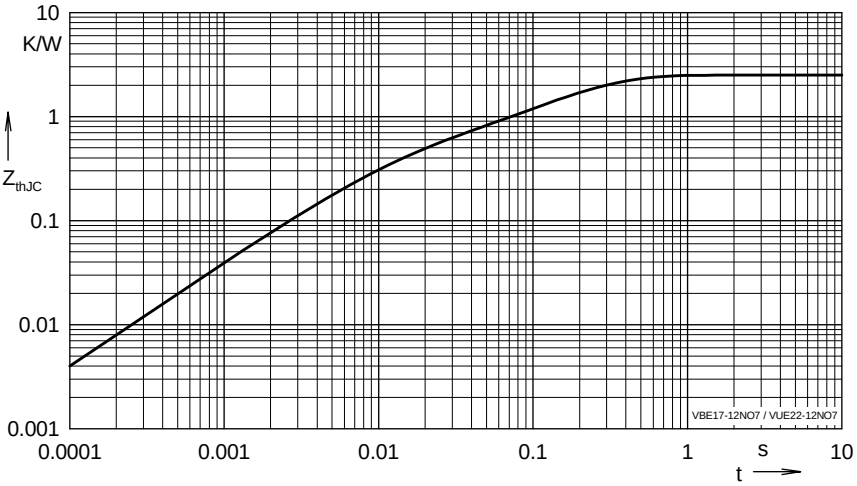


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

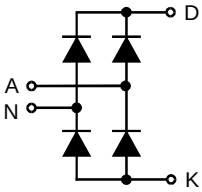
i	R_{thi} (K/W)	t_i (s)
1	0.8776	0.0052
2	0.3378	0.0003
3	0.0678	0.0004
4	1.2168	0.0092

NOTE: Fig. 2 to Fig. 6 shows typical values

ECO-PAC ™
Single Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 44 A
V_{RRM} = 600 V
t_{rr} = 35 ns

V_{RSM} V	V_{RRM} V	Typ
600	600	VBE 26-06NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 85°C, module		44	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	110	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	120	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	95	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	105	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	60	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	60	A^2s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	45	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	45	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		19	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	V_R = V_{RRM}	T_{VJ} = 25°C		0.1	mA
	V_R = V_{RRM}	T_{VJ} = T_{VJM}		0.5	mA
V_F	I_F = 15 A	T_{VJ} = 25°C		2.01	V
V_{T0}	for power-loss calculations only			1.13	V
r_T				13	mΩ
R_{thJC}	per diode; DC current			1.6	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 25 A, -diF/dt = 100 A/µs		4	4.9	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 100 A/µs; V_R = 30 V, T_{VJ} = 25°C		35	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

Data according to IEC 60747 refer to a single diode unless otherwise stated
① for resistive load at bridge output.

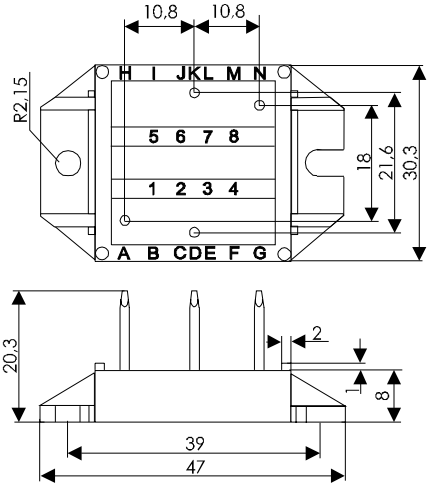
IXYS reserves the right to change limits, test conditions and dimensions.

Features
- Package with DCB ceramic base plate in low profile
- Isolation voltage 3000 V~
- Planar passivated chips
- Low forward voltage drop
- Leads suitable for PC board soldering

Applications
- Supplies for DC power equipment
- Input and output rectifiers for high frequency
- Battery DC power supplies
- Field supply for DC motors

Advantages
- Space and weight savings
- Improved temperature and power cycling capability
- Small and light weight
- Low noise switching

Dimensions in mm (1 mm = 0.0394")



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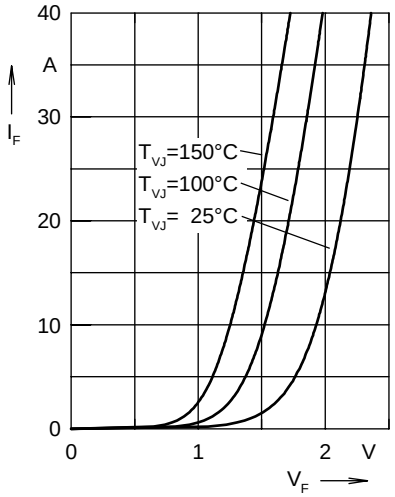


Fig. 1 Forward current I_F versus V_F

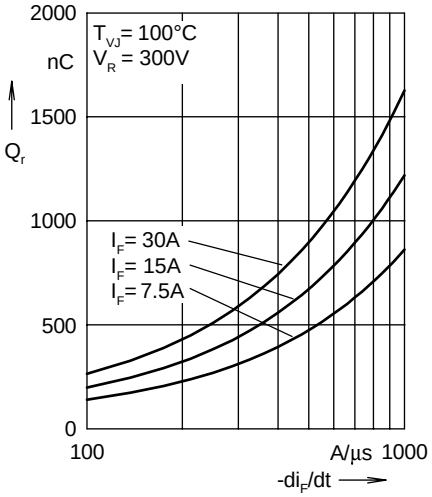


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

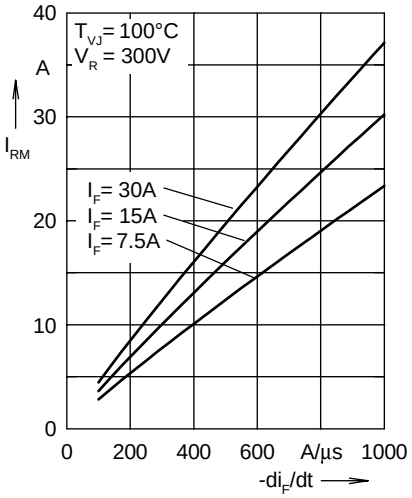


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

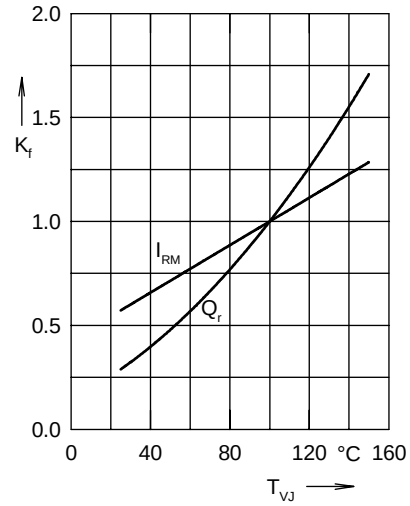


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

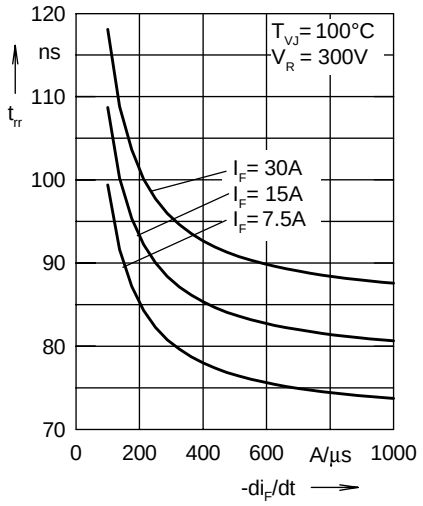


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

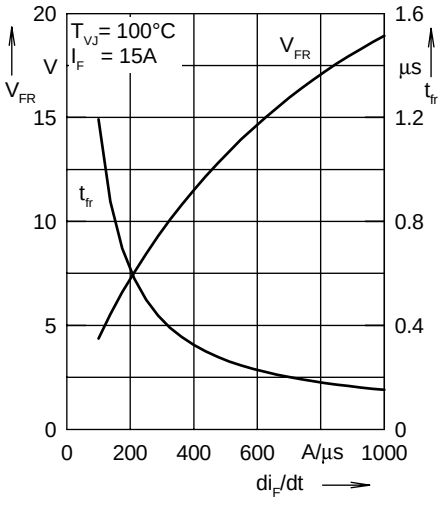


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

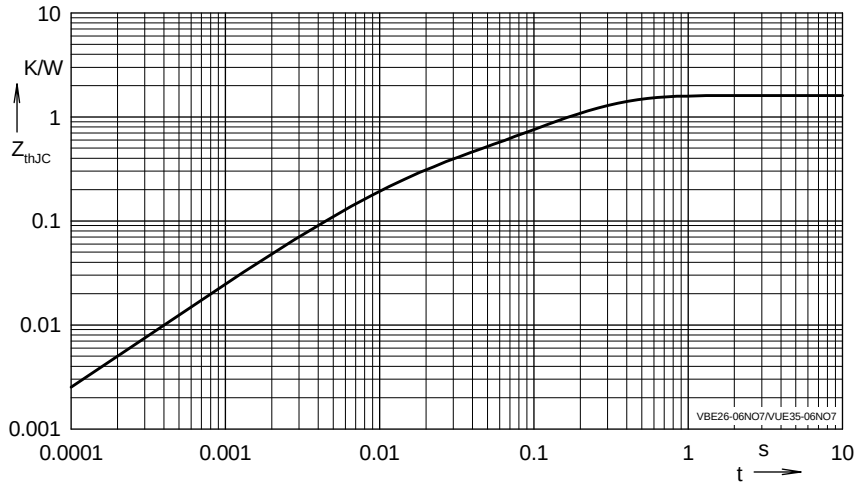


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

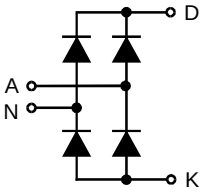
i	R_{thi} (K/W)	t_i (s)
1	0.5464	0.0052
2	0.2104	0.0003
3	0.0432	0.0004
4	0.8	0.0092

NOTE: Fig. 2 to Fig. 6 shows typical values

ECO-PAC ™
Single Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 32 A
V_{RRM} = 1200 V
t_{rr} = 40 ns

V_{RSM} V	V_{RRM} V	Typ
1200	1200	VBE 26-12NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 85°C, module		32	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	90	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	100	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	75	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	85	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	40	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	40	A^2s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	30	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	30	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		19	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	V_R = V_{RRM}	T_{VJ} = 25°C		0.1	mA
	V_R = V_{RRM}	T_{VJ} = T_{VJM}		0.5	mA
V_F	I_F = 15 A	T_{VJ} = 25°C		2.73	V
V_{T0}	for power-loss calculations only			1.32	V
r_T				30	mΩ
R_{thJC}	per diode; DC current			1.6	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 25 A, -diF/dt = 100 A/µs		5	9.7	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 100 A/µs; V_R = 30 V, T_{VJ} = 25°C		40	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

Data according to IEC 60747 refer to a single diode unless otherwise stated
① for resistive load at bridge output.

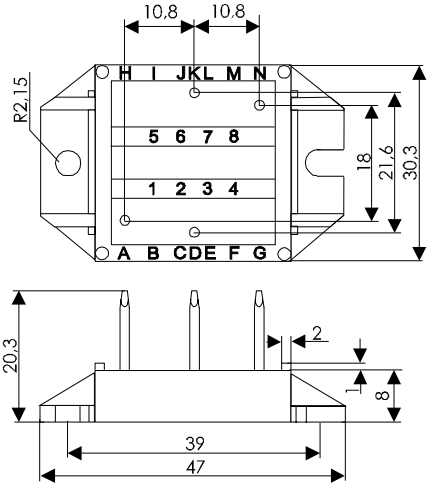
IXYS reserves the right to change limits, test conditions and dimensions.

Features
- Package with DCB ceramic base plate in low profile
- Isolation voltage 3000 V~
- Planar passivated chips
- Low forward voltage drop
- Leads suitable for PC board soldering

Applications
- Supplies for DC power equipment
- Input and output rectifiers for high frequency
- Battery DC power supplies
- Field supply for DC motors

Advantages
- Space and weight savings
- Improved temperature and power cycling capability
- Small and light weight
- Low noise switching

Dimensions in mm (1 mm = 0.0394")



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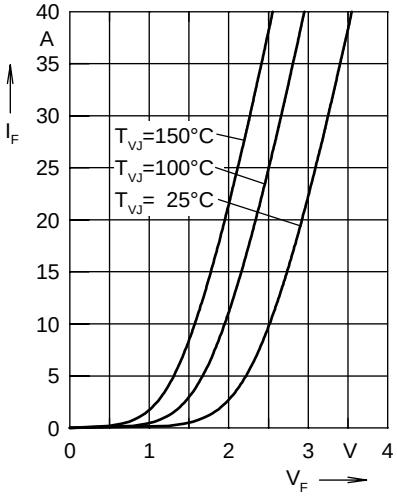


Fig. 1 Forward current I_F versus V_F

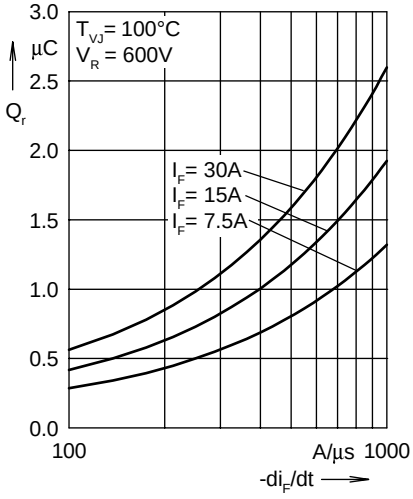


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

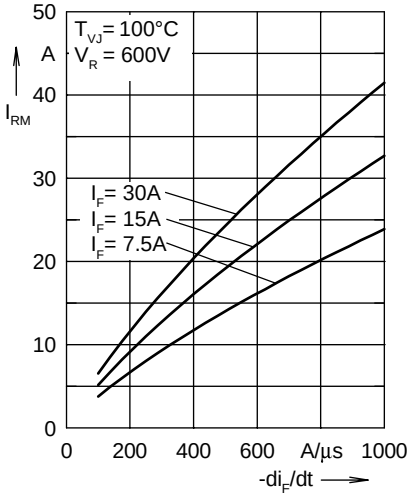


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

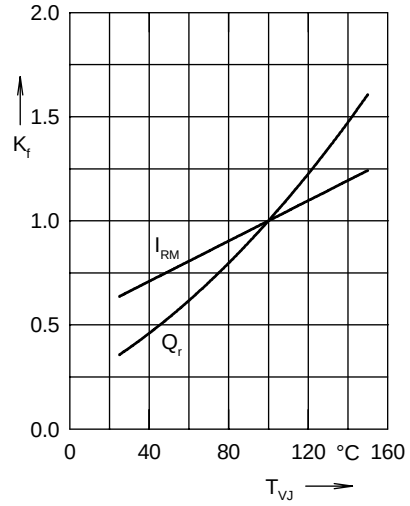


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

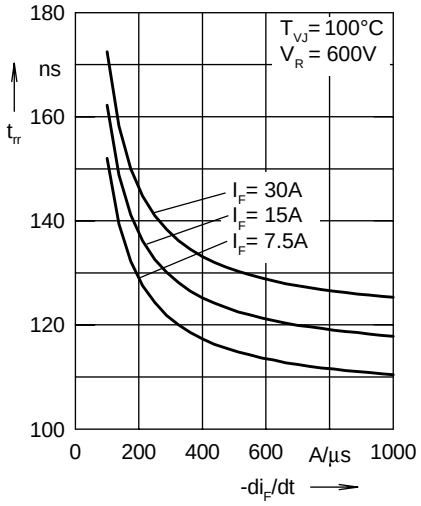


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

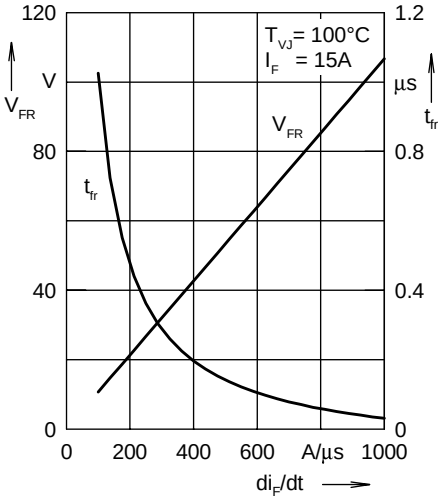


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

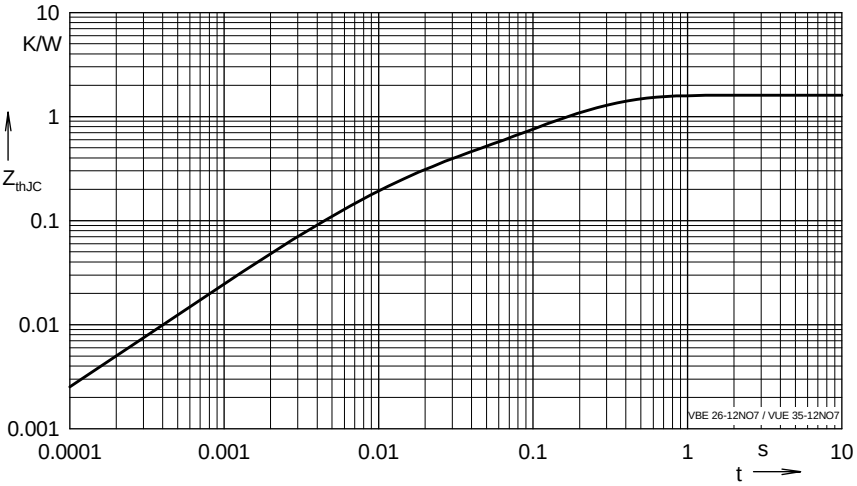


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

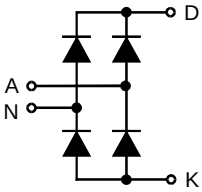
i	R_{thi} (K/W)	t_i (s)
1	0.5464	0.0052
2	0.2104	0.0003
3	0.0432	0.0004
4	0.8	0.0092

NOTE: Fig. 2 to Fig. 6 shows typical values

ECO-PAC ™
Single Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 68 A
V_{RRM} = 600 V
t_{rr} = 35 ns

V_{RSM} V	V_{RRM} V	Typ
1200	1200	VBE 55-06NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 100°C, module		68	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	250	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	275	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	215	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	235	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	315	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	320	A^2s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	230	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	230	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		19	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	V_R = V_{RRM}	T_{VJ} = 25°C		0.25	mA
	V_R = V_{RRM}	T_{VJ} = T_{VJM}		1.0	mA
V_F	I_F = 30 A	T_{VJ} = 25°C		1.57	V
V_{T0}	for power-loss calculations only			0.98	V
r_T				8	mΩ
R_{thJC}	per diode; DC current			0.9	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 50 A, -diF/dt = 100 A/µs		6	tbd	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V, T_{VJ} = 25°C		35	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

Data according to IEC 60747 refer to a single diode unless otherwise stated
① for resistive load at bridge output.

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

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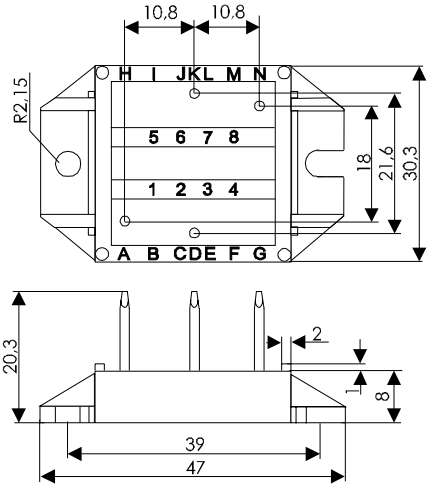
Dimensions in mm (1 mm = 0.0394")



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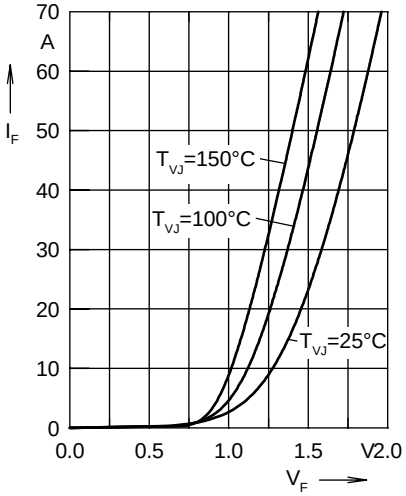


Fig. 1 Forward current I_F versus V_F

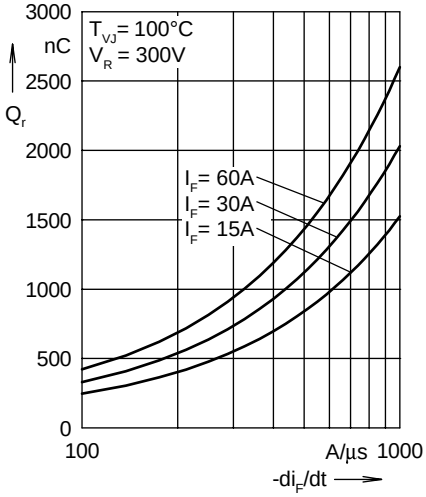


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

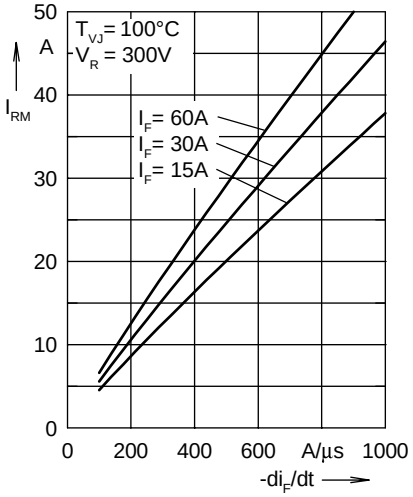


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

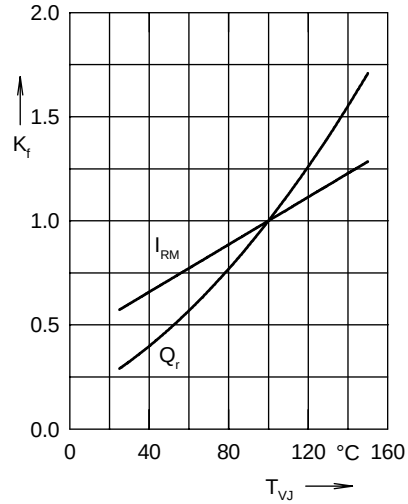


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

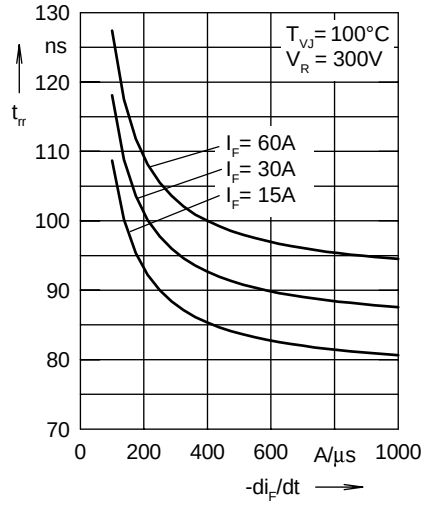


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

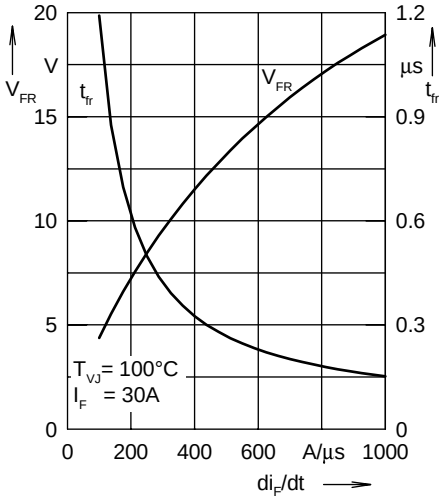


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

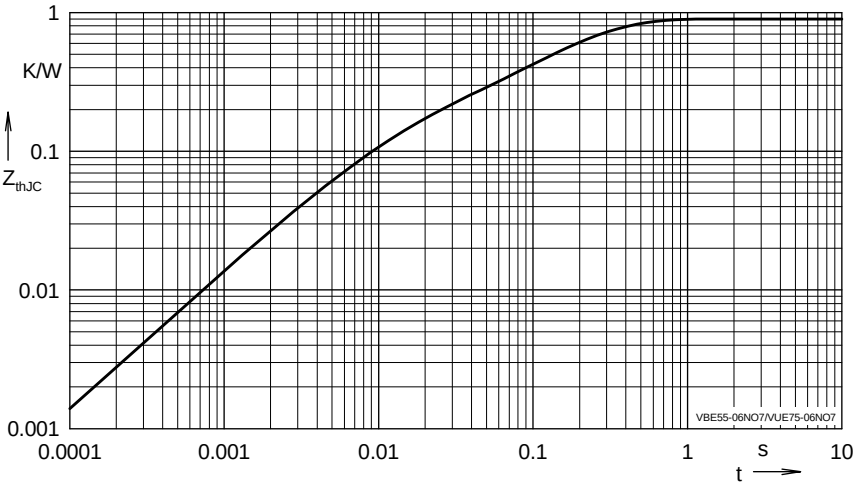


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

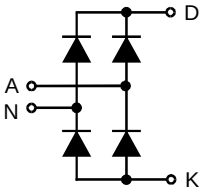
i	R_{thi} (K/W)	t_i (s)
1	0.3012	0.0052
2	0.116	0.0003
3	0.0241	0.0004
4	0.4586	0.0092

NOTE: Fig. 2 to Fig. 6 shows typical values

ECO-PAC ™
Single Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 59 A
V_{RRM} = 1200 V
t_{rr} = 40 ns

V_{RSM} V	V_{RRM} V	Typ
1200	1200	VBE 55-12NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 85°C, module		59	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	200	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	220	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	170	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	190	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	200	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	205	A^2s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	145	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	150	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		19	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	V_R = V_{RRM}	T_{VJ} = 25°C		0.25	mA
	V_R = V_{RRM}	T_{VJ} = T_{VJM}		1.0	mA
V_F	I_F = 30 A	T_{VJ} = 25°C		2.71	V
V_{T0}	for power-loss calculations only			1.31	V
r_T				15	mΩ
R_{thJC}	per diode; DC current			0.9	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 50 A, -diF/dt = 100 A/µs		6	11.4	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V, T_{VJ} = 25°C		40	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

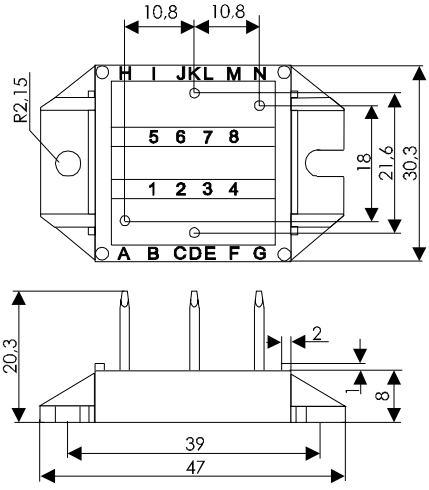
Data according to IEC 60747 refer to a single diode unless otherwise stated
① for resistive load at bridge output.

Features
- Package with DCB ceramic base plate in low profile
- Isolation voltage 3000 V~
- Planar passivated chips
- Low forward voltage drop
- Leads suitable for PC board soldering

Applications
- Supplies for DC power equipment
- Input and output rectifiers for high frequency
- Battery DC power supplies
- Field supply for DC motors

Advantages
- Space and weight savings
- Improved temperature and power cycling capability
- Small and light weight
- Low noise switching

Dimensions in mm (1 mm = 0.0394")



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

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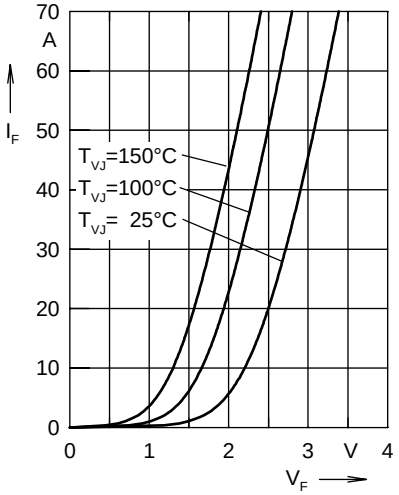


Fig. 1 Forward current I_F versus V_F

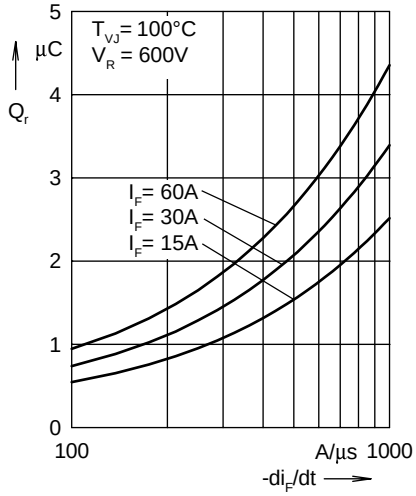


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

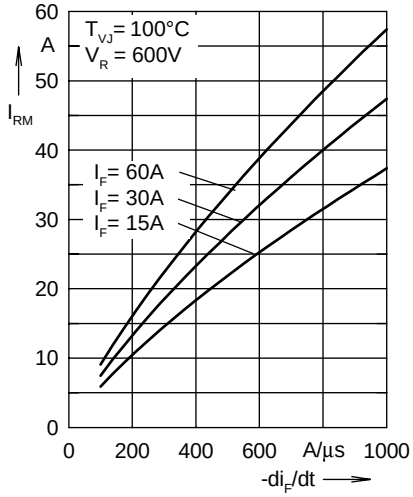


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

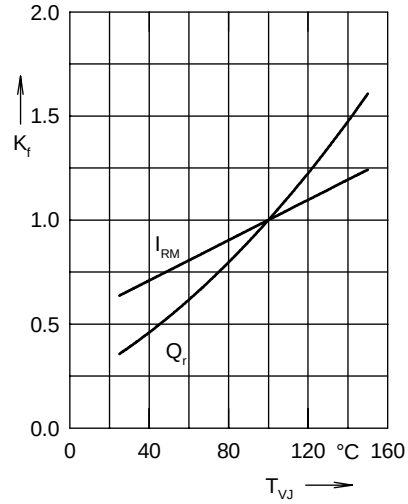


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

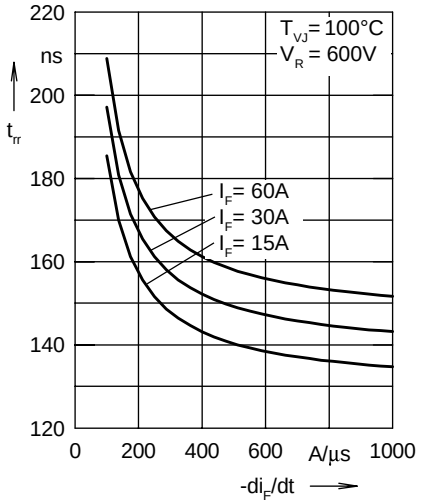


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

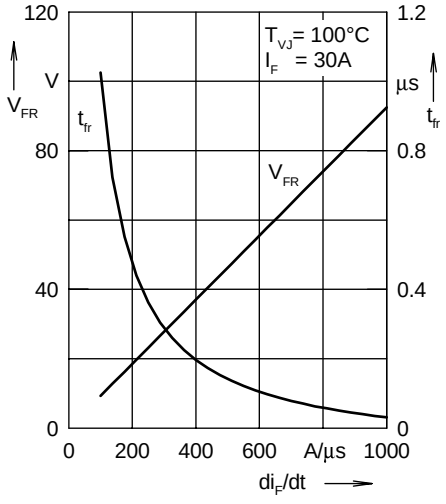


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

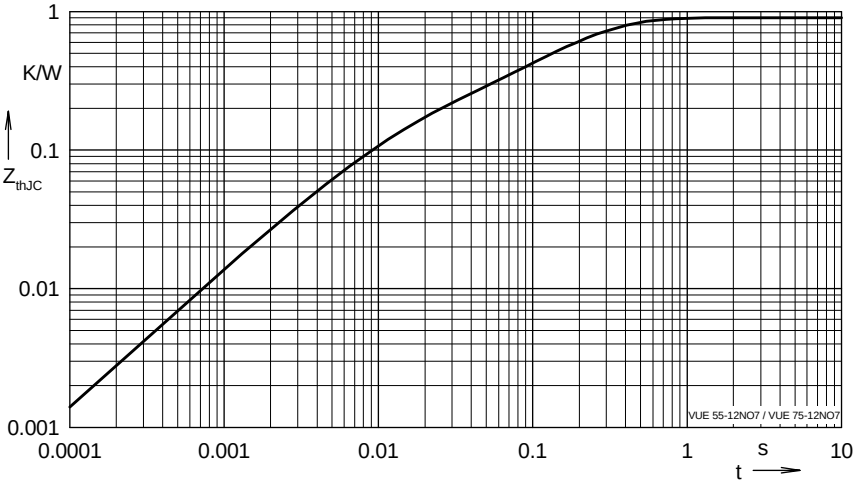


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.3012	0.0052
2	0.116	0.0003
3	0.0241	0.0004
4	0.4586	0.0092

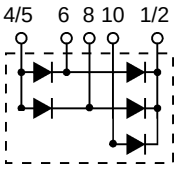
NOTE: Fig. 2 to Fig. 6 shows typical values

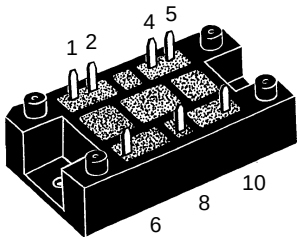
Single Phase Rectifier Bridge with Schottky Diodes

V_{RRM} = 150 V
I_{dAV} = 50 A

Preliminary Data

V_{RSM} V	V_{RRM} V	Type Single Phase
150	150	VBSD 50-015NO1





Symbol	Conditions	Maximum Ratings	
I_{dAV}	T_C = 110°C, module, 180° sine	50	A
I_{FSM}	T_{VJ} = 45°C	200	A
T_{VJ}		-40...+150	°C
T_{VJM}		150	°C
T_{stg}		-40...+125	°C
V_{ISOL}	50/60 Hz, RMS, t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA t = 1 s	3600	V~
M_d	Mounting torque (M5)	2 - 2.5	Nm
	(10-32UNF)	18-22	lb.in.
Weight	typ.	35	g

Symbol	Conditions		Characteristic Values typ.	max	
I_R	V_R = V_{RRM}	T_{VJ} = 25°C		0.5	mA
	V_R = V_{RRM}	T_{VJ} = 125°C		5	mA
V_F	I_F = 25 A	T_{VJ} = 25°C		0.88	V
	I_F = 25 A	T_{VJ} = 125°C		0.74	V
R_{thJC}	per diode, DC			1.4	K/W
R_{thCH}	per diode, DC		0.3		K/W
d_S	Creeping distance on surface			12.7	mm
d_A	Creepage distance in air			9.4	mm
a	Max. allowable acceleration			50	m/s^2

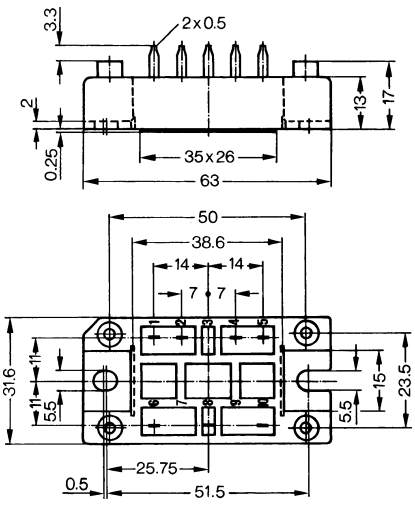
Data according to DIN/IEC 747
and refer to a single diode unless otherwise stated.

Features
- Package with DCB ceramic base plate
- Isolation voltage 3600 V~
- Planar passivated chips
- Leads suitable for PC board soldering
- Creeping and creepage-distance fulfil UL 508/CSA 22.2NO14 and VDE 0160 requirements
- Epoxy meets UL94V-O
- UL listing applied for

Applications
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Output filter for PWM inverter

Advantages
- Reduced EMI/RFI
- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling

Dimensions in mm (1 mm = 0.0394")



032

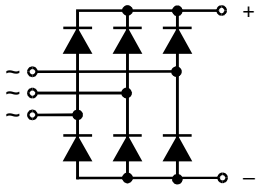
Three Phase Rectifier Bridge

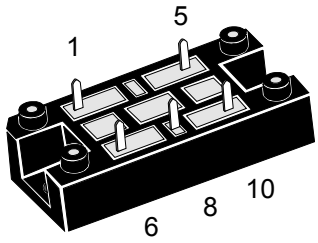
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 30 A
V_{RRM} = 2000 V
t_{rr} = 70 ns

Preliminary data

V_{RSM} V	V_{RRM} V	Type
2000	2000	VUE 30-20NO1





Symbol	Conditions		Maximum Ratings	
I_{dAV}	T_C = 65°C, module		30	A
I_{FSM}	T_{VJ} = 45°C; V_R = 0	t = 10 ms (50 Hz), sine	75	A
	$T_{VJ} = T_{VJM}$ V_R = 0	t = 10 ms (50 Hz), sine	65	A
I^2dt	T_{VJ} = 45°C V_R = 0	t = 10 ms (50 Hz), sine	28	A^2s
	$T_{VJ} = T_{VJM}$ V_R = 0	t = 10 ms (50 Hz), sine	21	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS $I_{ISOL} \le 1$ mA	t = 1 min t = 1 s	3000 3600	V~ V~
M_d	Mounting torque (M5) (10-32UNF)		2 - 2.5 18 - 22	Nm lb.in.
Weight	typ.		35	g

Symbol	Conditions		Characteristic Values typ.	max	
I_R	$V_R = V_{RRM}$ $V_R = 0.8\ V_{RRM}$	T_{VJ} = 25°C T_{VJ} = 125°C	 4	0.75 7	mA mA
V_F	I_F = 12 A	T_{VJ} = 25°C		5.41	V
V_{T0} r_T	For power-loss calculations only			3.3 93	V mΩ
R_{thJC} R_{thCH}	per diode, DC		 0.3	1.7	K/W K/W
I_{RM}	I_F = 12 A, -di$_F$/dt = 100 A/ms V_R = 540 V, L ≤ 0.05 mH, T_{VJ} = 100°C		9	12	A
t_{rr}	I_F = 1 A; -di/dt = 100 A/ms; V_R = 30 V, T_{VJ} = 25°C		70	90	ns
d_S	Creeping distance on surface			12.7	mm
d_A	Creepage distance in air			9.4	mm
a	Max. allowable acceleration			50	m/s^2

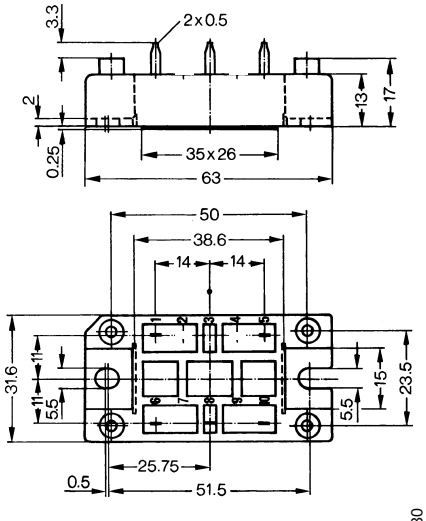
Data according to IEC 60747 and refer to a single diode unless otherwise stated.

Features
- Package with DCB ceramic base plate
- Isolation voltage 3600 V~
- Planar passivated chips
- Leads suitable for PC board soldering
- Creeping and creepage-distance fulfil UL 508/CSA 22.2NO14 and VDE 0160 requirements
- Epoxy meets UL94V-O
- UL registered E72873

Applications
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Output filter for PWM inverter

Advantages
- Reduced EMI/RFI
- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling

Dimensions in mm (1 mm = 0.0394")

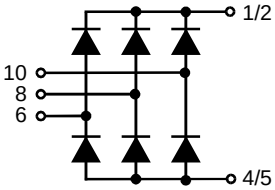


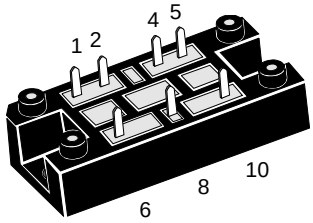
030

Three Phase Rectifier Bridge

V_{RRM} = 1200 V
I_{dAV} = 50 A
t_{rr} = 40 ns

V_{RSM} V	V_{RRM} V	Type
1200	1200	VUE 50-12NO1





Symbol	Test Conditions			Maximum Ratings	
I_{dAV}	T_K = 85°C, module			50	A
I_{FSM}	T_{VJ} = 45°C;	t = 10 ms	(50 Hz), sine	200	A
	V_R = 0	t = 8.3 ms	(60 Hz), sine	210	A
	$T_{VJ} = T_{VJM}$	t = 10 ms	(50 Hz), sine	185	A
	V_R = 0	t = 8.3 ms	(60 Hz), sine	195	A
I^2t	T_{VJ} = 45°C	t = 10 ms	(50 Hz), sine	200	A^2s
	V_R = 0	t = 8.3 ms	(60 Hz), sine	180	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms	(50 Hz), sine	170	A^2s
	V_R = 0	t = 8.3 ms	(60 Hz), sine	160	A^2s
T_{VJ}				-40...+150	°C
T_{VJM}				150	°C
T_{stg}				-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min		3000	V~
	$I_{ISOL} \le$ 1 mA	t = 1 s		3600	V~
M_d	Mounting torque	(M5)		2 - 2.5	Nm
		(10-32UNF)		18-22	lb.in.
Weight	typ.			35	g

Symbol	Test Conditions		Characteristic Values typ.	max	
I_R	$V_R = V_{RRM}$	T_{VJ} = 25°C		0.75	mA
	V_R = 0.8 V_{RRM}	T_{VJ} = 125°C	4	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				18.2	mΩ
R_{thJS}	per diode,	120° rect.		1.5	K/W
	per module,	120° rect.		0.25	K/W
I_{RM}	I_F = 30 A, -di_F/dt = 240 A/µs		16	18	A
	V_R = 540 V, L ≤ 0.05 µH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 100 A/µs; V_R = 30 V, T_{VJ} = 25°C		40	60	ns
d_S	Creeping distance on surface			12.7	mm
d_A	Creepage distance in air			9.4	mm
a	Max. allowable acceleration			50	m/s^2

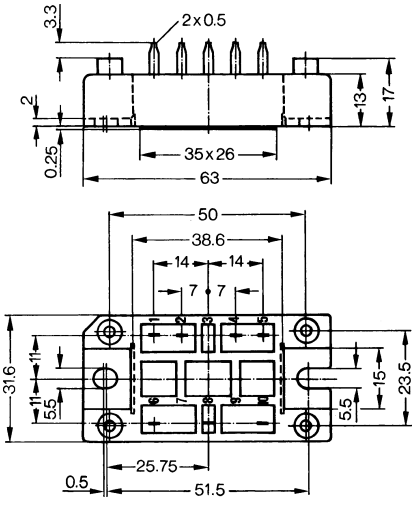
Data according to IEC 60747 and refer to a single diode unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions.

Features
- Package with DCB ceramic base plate
- Isolation voltage 3600 V~
- Planar passivated chips
- Leads suitable for PC board soldering
- Creeping and creepage-distance fulfils UL 508/CSA 22.2NO14 and VDE 0160 requirements
- Epoxy meet UL94V-O
- UL registered E72873

Applications
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Output filter for PWM inverter

Advantages
- Reduced EMI/RFI
- Easy to mount with two screws
- Space and weight savings
- Improved temperature and power cycling

Dimensions in mm (1 mm = 0.0394")



Use output terminals in parallel connections

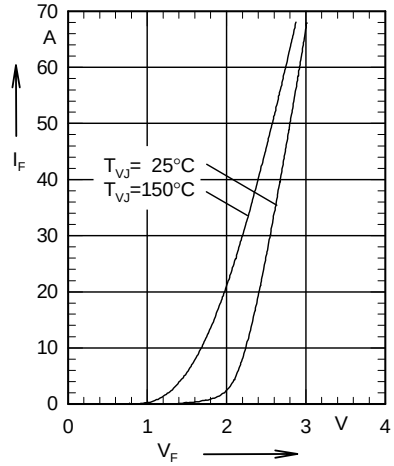


Fig. 1 Forward current versus voltage drop per diode.

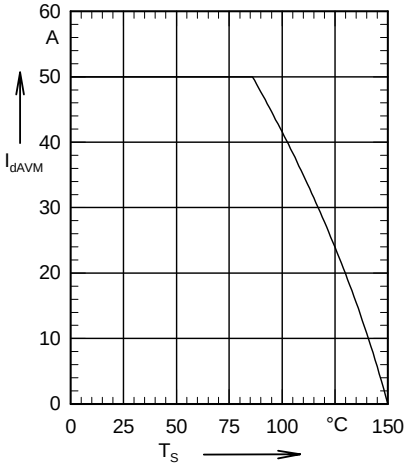


Fig. 2 Maximum forward current at heatsink temperature T_S.

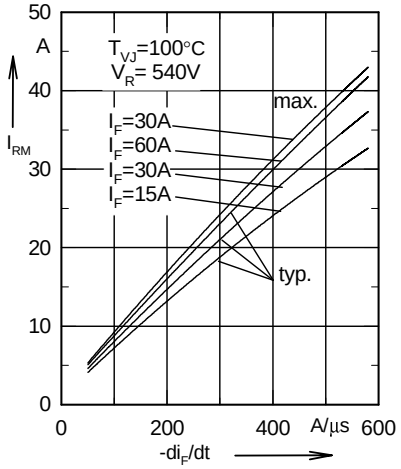


Fig. 3 Typical peak reverse current versus $-di_F/dt$.

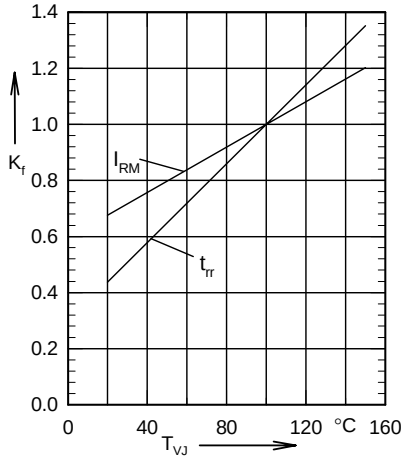


Fig. 4 Dynamic parameters versus junction temperature.

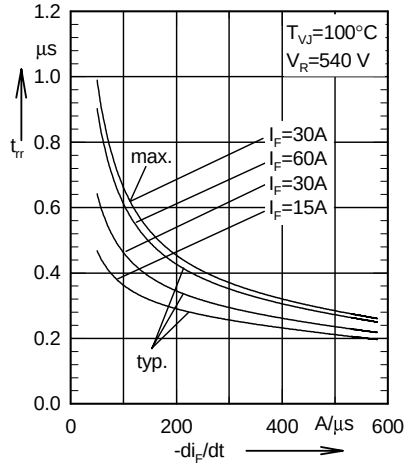


Fig. 5 Typical recovery time versus $-di_F/dt$.

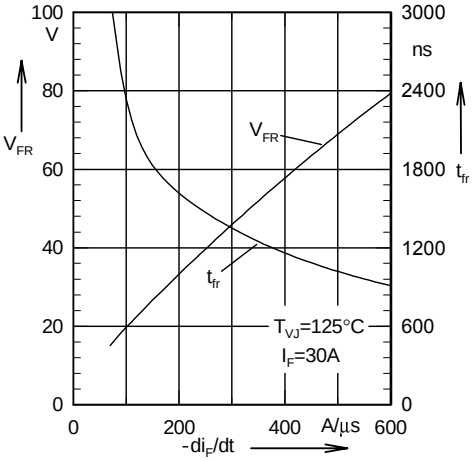


Fig. 6 Typical peak forward voltage and forward recovery time versus $-di_F/dt$.

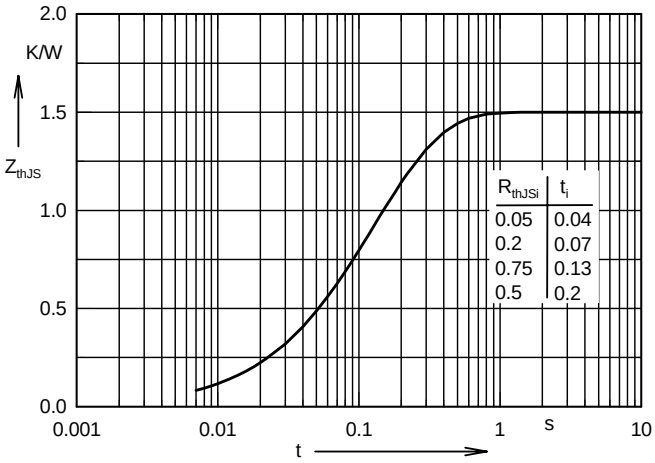


Fig. 7 Transient thermal impedance junction to heatsink

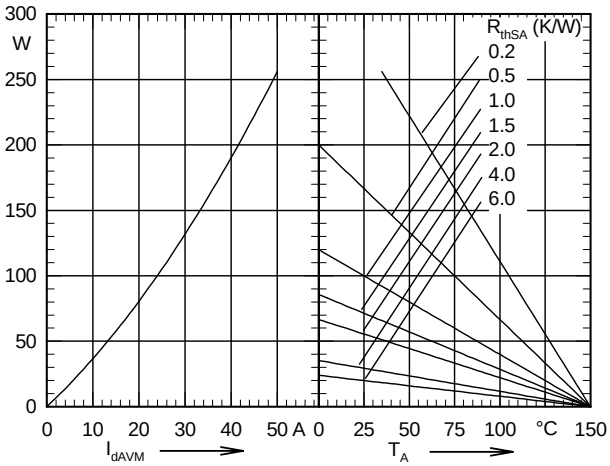
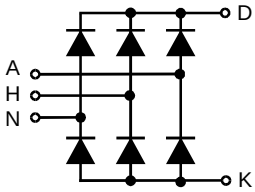


Fig. 8 Power dissipation versus direct output current and ambient temperature

ECO-PAC ™
Three Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 34 A
V_{RRM} = 600 V
t_{rr} = 35 ns

V_{RSM} V	V_{RRM} V	Typ
600	600	VUE 22-06NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 85°C, module		34	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	50	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	55	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	45	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	50	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	15	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	15	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	10	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	10	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		19	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	$V_R = V_{RRM}$	T_{VJ} = 25°C		0.06	mA
	$V_R = V_{RRM}$	$T_{VJ} = T_{VJM}$		0.25	mA
V_F	I_F = 10 A	T_{VJ} = 25°C		2.09	V
V_{T0}	for power-loss calculations only			1.18	V
r_T				22	mΩ
R_{thJC}	per diode; DC current			2.5	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 12 A, -diF/dt = 100 A/µs		4	4.4	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 50 A/µs; V_R = 30 V, T_{VJ} = 25°C		35	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

Data according to IEC 60747 refer to a single diode unless otherwise stated
① for resistive load at bridge output.

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

Features

- Package with DCB ceramic base plate in low profile
- Isolation voltage 3000 V~
- Planar passivated chips
- Low forward voltage drop
- Leads suitable for PC board soldering

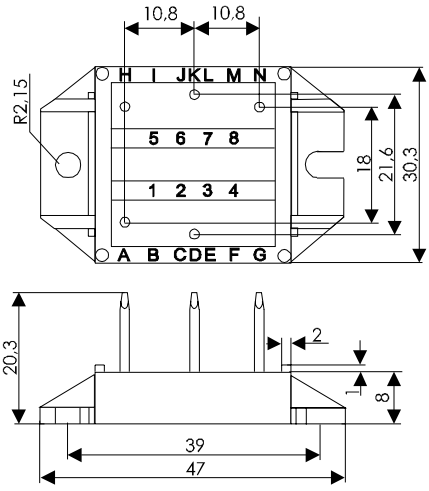
Applications

- Supplies for DC power equipment
- Input and output rectifiers for high frequency
- Battery DC power supplies
- Field supply for DC motors

Advantages

- Space and weight savings
- Improved temperature and power cycling capability
- Small and light weight
- Low noise switching

Dimensions in mm (1 mm = 0.0394")



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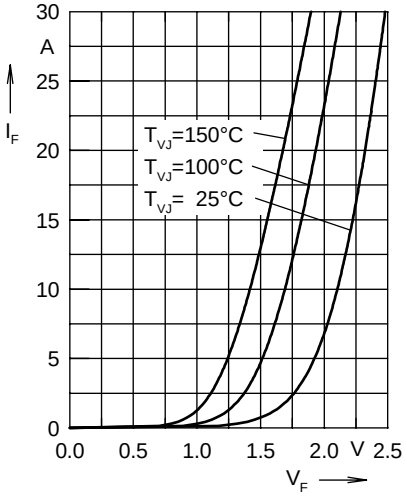


Fig. 1 Forward current I_F versus V_F

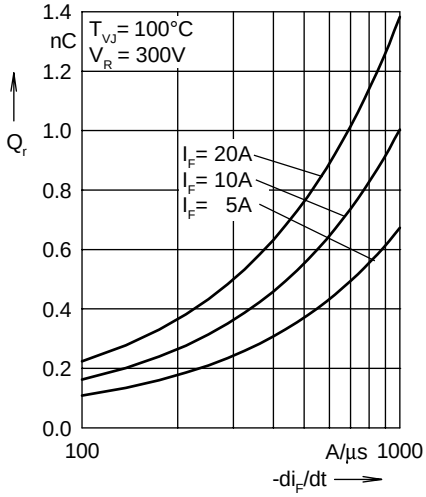


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

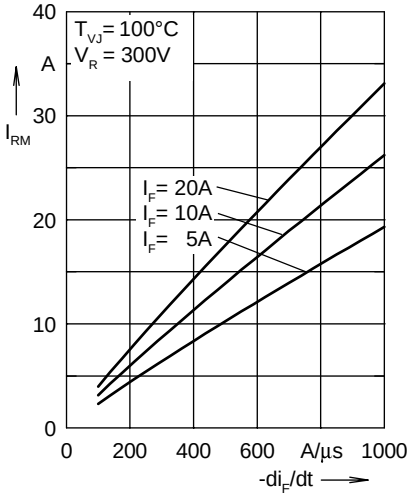


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

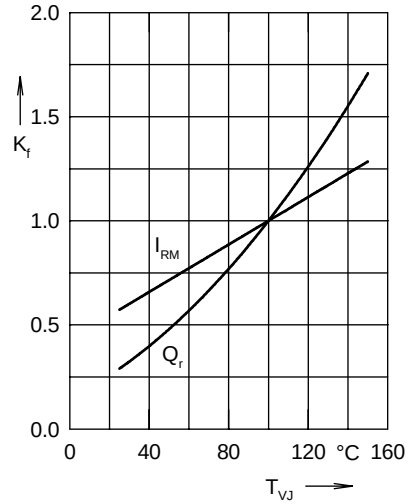


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

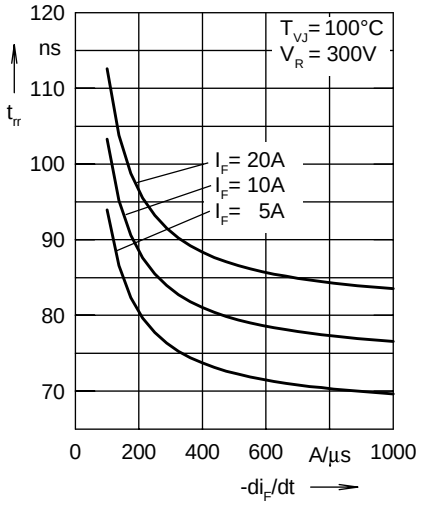


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

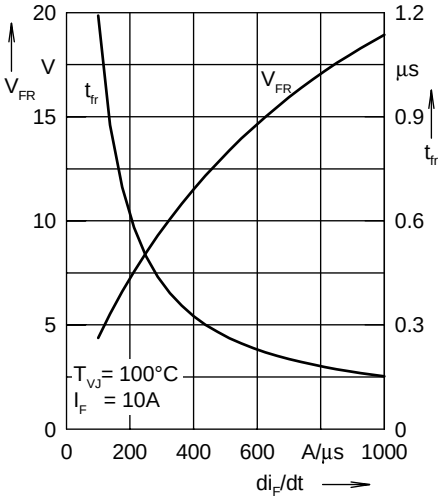


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

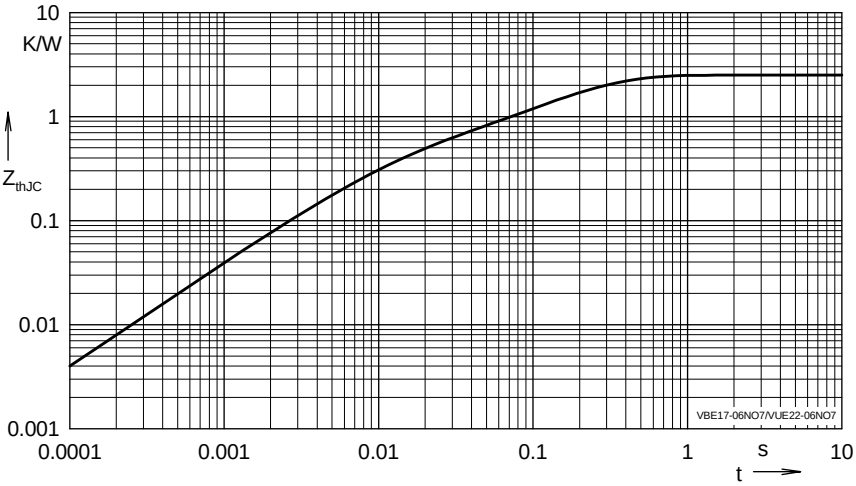


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

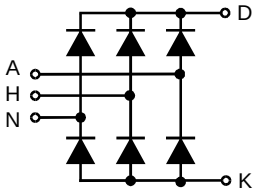
i	R_{thi} (K/W)	t_i (s)
1	0.8776	0.0052
2	0.3378	0.0003
3	0.0678	0.0004
4	1.2168	0.0092

NOTE: Fig. 2 to Fig. 6 shows typical values

ECO-PAC ™
Three Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 24 A
V_{RRM} = 1200 V
t_{rr} = 40 ns

V_{RSM} V	V_{RRM} V	Typ
1200	1200	VUE 22-12NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 85°C, module		24	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	40	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	45	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	35	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	40	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	10	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	10	A^2s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	5	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	5	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		19	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	V_R = V_{RRM}	T_{VJ} = 25°C		0.06	mA
	V_R = V_{RRM}	T_{VJ} = T_{VJM}		0.25	mA
V_F	I_F = 10 A	T_{VJ} = 25°C		2.92	V
V_{T0}	for power-loss calculations only			1.39	V
r_T				55	mΩ
R_{thJC}	per diode; DC current			2.5	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 12 A, -diF/dt = 100 A/µs		4	8.5	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 50 A/µs; V_R = 30 V, T_{VJ} = 25°C		40	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

Data according to IEC 60747 refer to a single diode unless otherwise stated
① for resistive load at bridge output.

Features
- Package with DCB ceramic base plate in low profile
- Isolation voltage 3000 V~
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- Field supply for DC motors

Advantages
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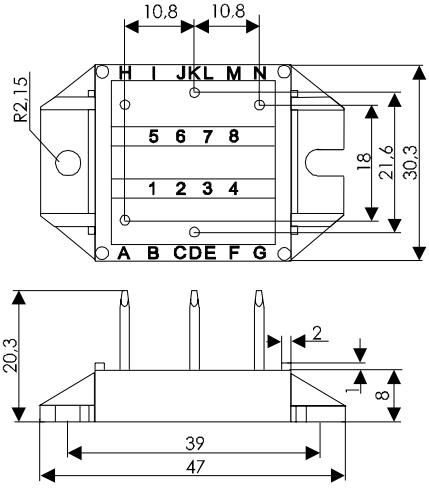
- Small and light weight
- Low noise switching

Dimensions in mm (1 mm = 0.0394")



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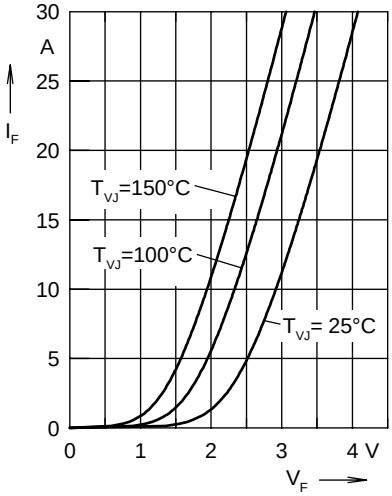


Fig. 1 Forward current I_F versus V_F

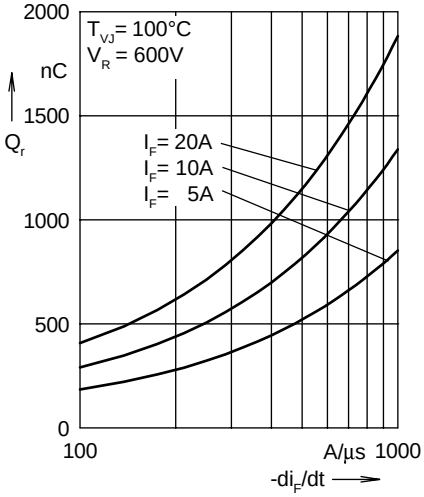


Fig. 2 Reverse recovery charge Q_r versus -di$_F$/dt

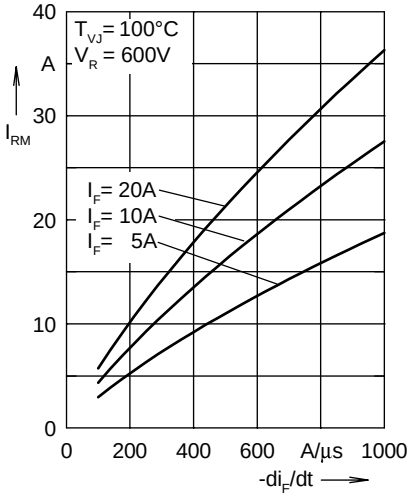


Fig. 3 Peak reverse current I_{RM} versus -di$_F$/dt

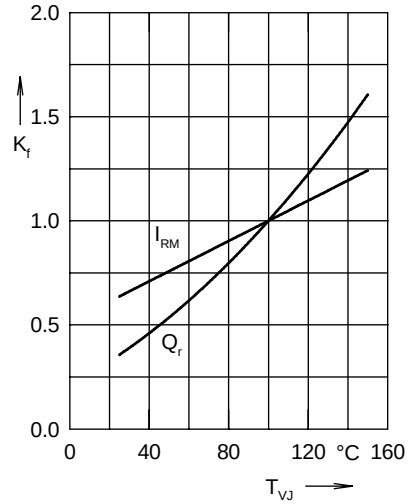


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

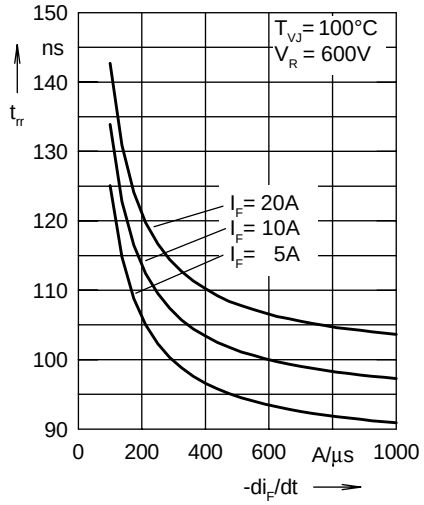


Fig. 5 Recovery time t_{rr} versus -di$_F$/dt

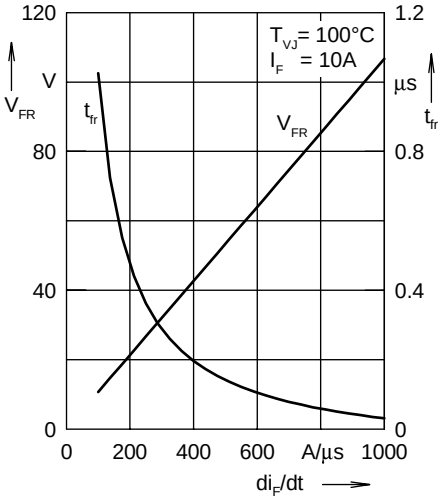


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di$_F$/dt

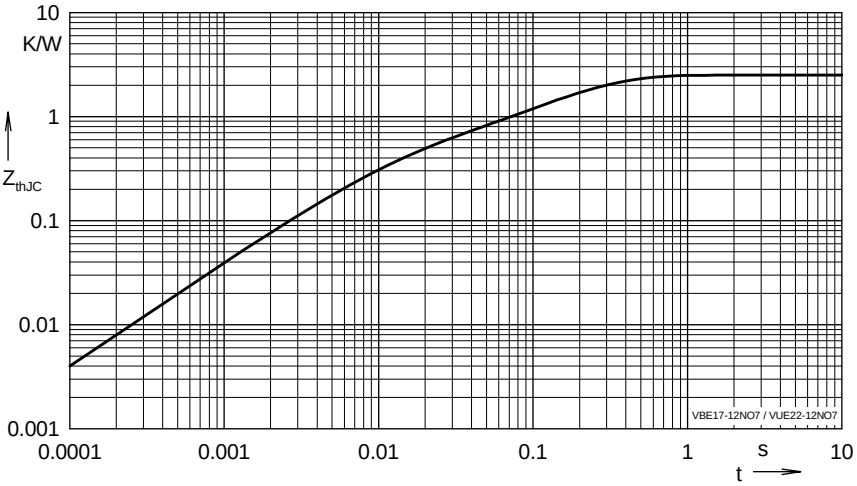


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

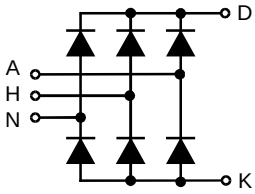
i	R_{thi} (K/W)	t_i (s)
1	0.8776	0.0052
2	0.3378	0.0003
3	0.0678	0.0004
4	1.2168	0.0092

NOTE: Fig. 2 to Fig. 6 shows typical values

ECO-PAC ™
Three Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 56 A
V_{RRM} = 600 V
t_{rr} = 35 ns

V_{RSM} V	V_{RRM} V	Typ
600	600	VUE 35-06NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 85°C, module		56	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	110	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	120	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	95	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	105	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	60	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	60	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	45	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	45	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		19	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	$V_R = V_{RRM}$	T_{VJ} = 25°C		0.1	mA
	$V_R = V_{RRM}$	$T_{VJ} = T_{VJM}$		0.5	mA
V_F	I_F = 15 A	T_{VJ} = 25°C		2.01	V
V_{T0}	for power-loss calculations only			1.13	V
r_T				13	mΩ
R_{thJC}	per diode; DC current			1.6	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 25 A, -diF/dt = 100 A/µs		4	4.9	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 100 A/µs; V_R = 30 V, T_{VJ} = 25°C		35	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

Data according to IEC 60747 refer to a single diode unless otherwise stated
① for resistive load at bridge output.

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

Features

- Package with DCB ceramic base plate in low profile
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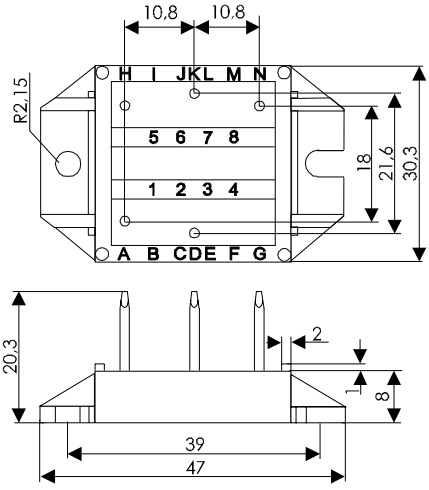

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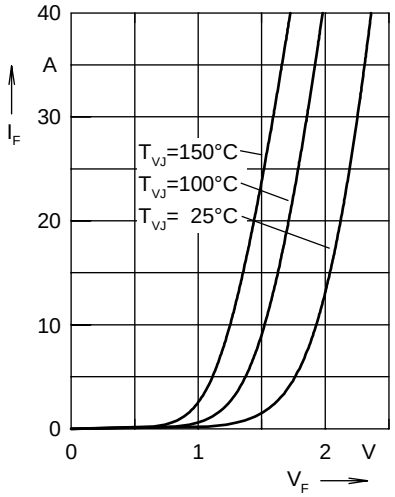


Fig. 1 Forward current I_F versus V_F

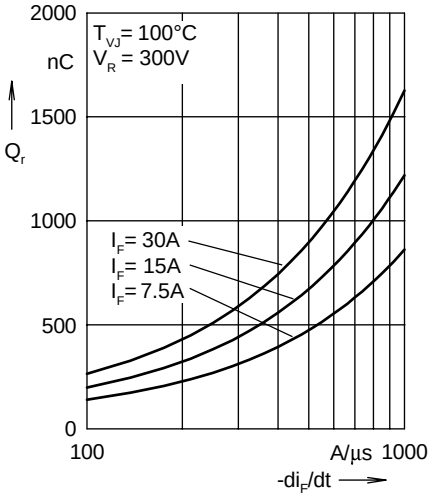


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

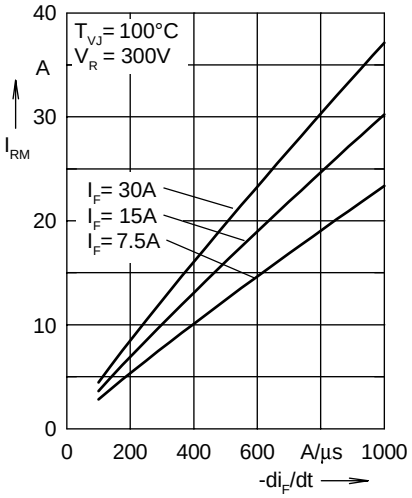


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

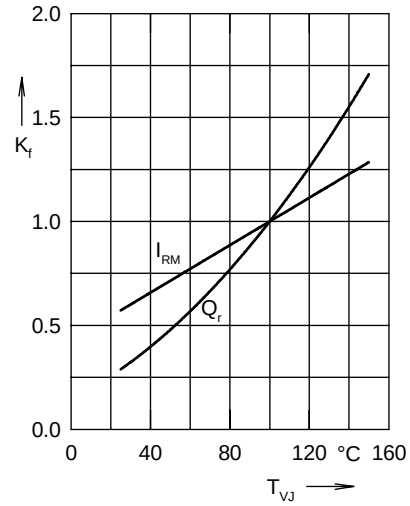


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

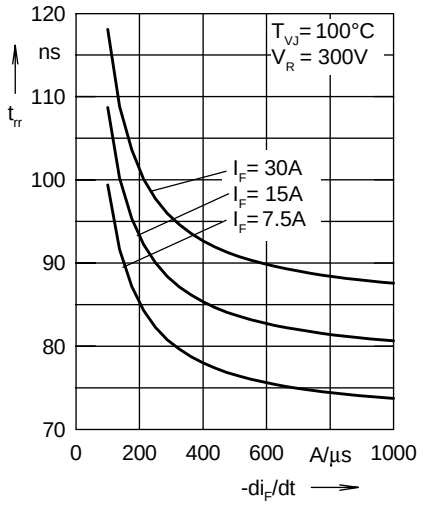


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

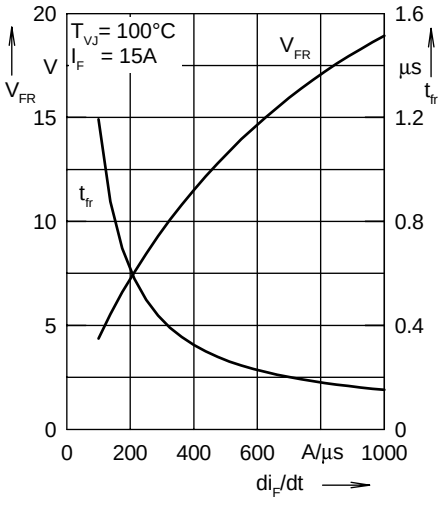


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

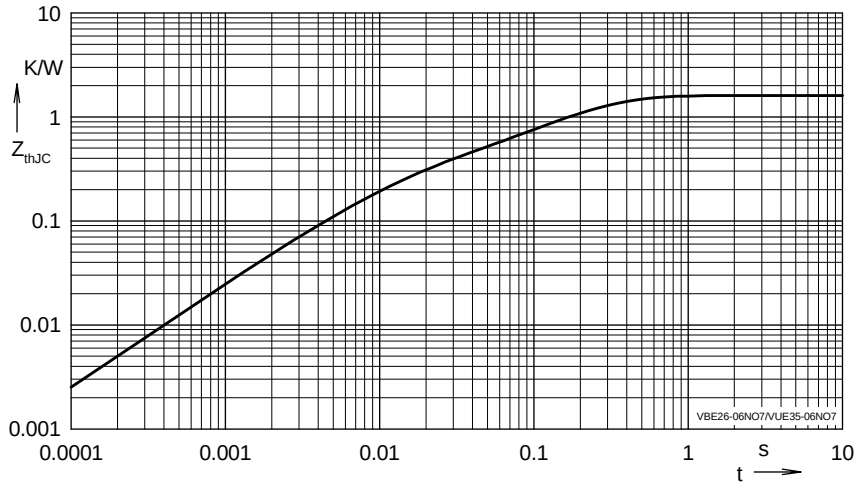


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

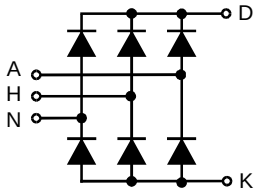
i	R_{thi} (K/W)	t_i (s)
1	0.5464	0.0052
2	0.2104	0.0003
3	0.0432	0.0004
4	0.8	0.0092

NOTE: Fig. 2 to Fig. 6 shows typical values

ECO-PAC ™
Three Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 40 A
V_{RRM} = 1200 V
t_{rr} = 40 ns

V_{RSM} V	V_{RRM} V	Typ
1200	1200	VUE 35-12NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 85°C, module		40	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	90	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	100	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	75	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	85	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	40	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	40	A^2s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	30	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	30	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		19	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	V_R = V_{RRM}	T_{VJ} = 25°C		0.1	mA
	V_R = V_{RRM}	T_{VJ} = T_{VJM}		0.5	mA
V_F	I_F = 15 A	T_{VJ} = 25°C		2.73	V
V_{T0}	for power-loss calculations only			1.32	V
r_T				30	mΩ
R_{thJC}	per diode; DC current			1.6	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 25 A, -diF/dt = 100 A/µs		5	9.7	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 100 A/µs; V_R = 30 V, T_{VJ} = 25°C		40	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

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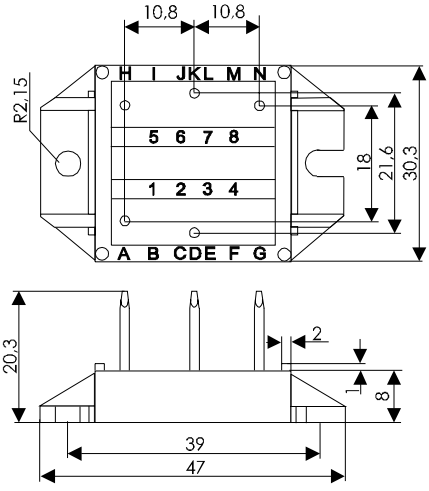
- Field supply for DC motors

Advantages
- Space and weight savings
- Improved temperature and power cycling capability
- Small and light weight
- Low noise switching

Dimensions in mm (1 mm = 0.0394")



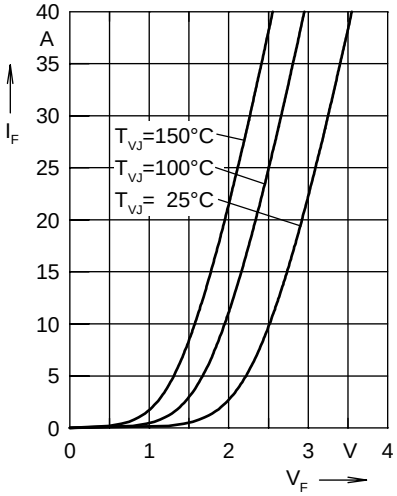


Fig. 1 Forward current I_F versus V_F

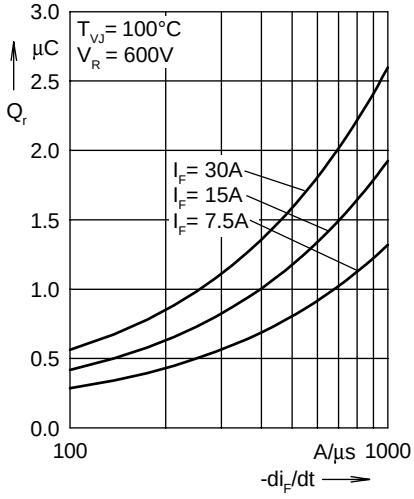


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

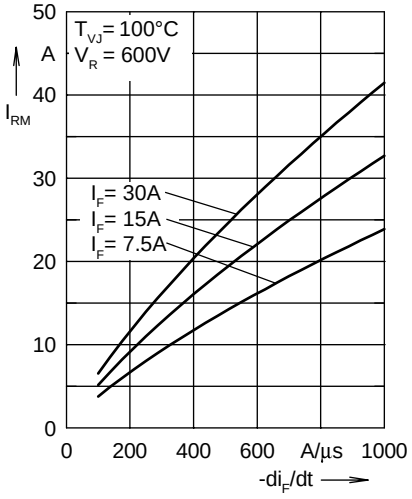


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

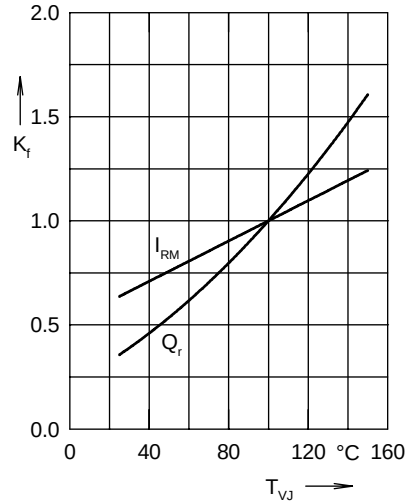


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

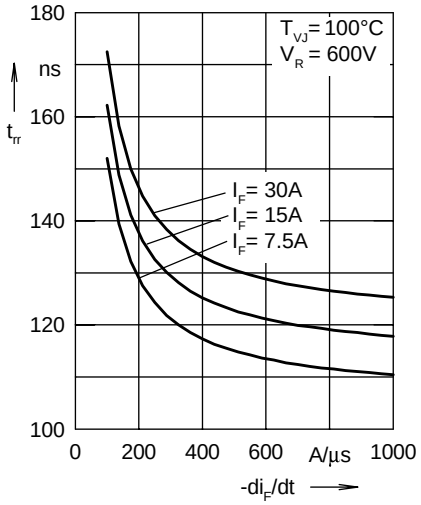


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

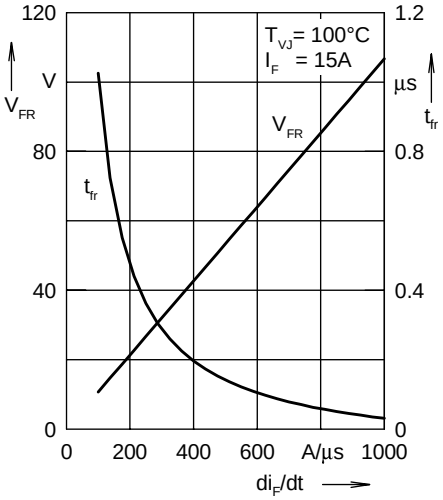


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

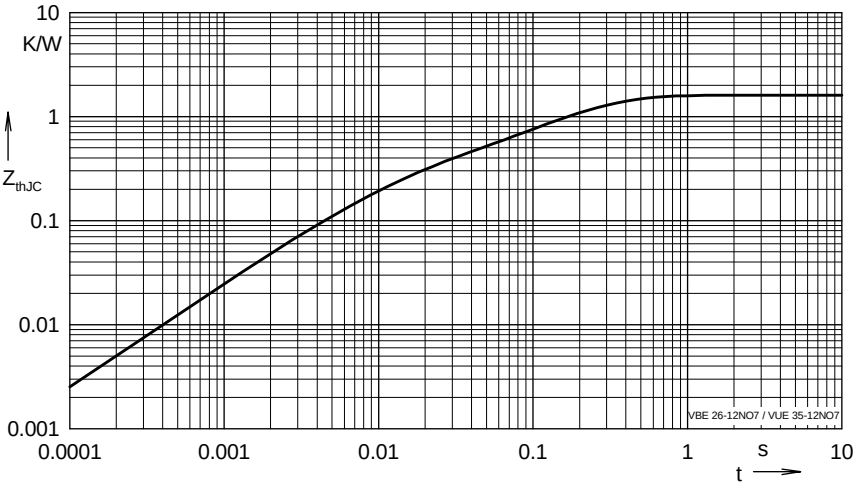


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

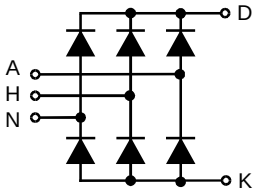
i	R_{thi} (K/W)	t_i (s)
1	0.5464	0.0052
2	0.2104	0.0003
3	0.0432	0.0004
4	0.8	0.0092

NOTE: Fig. 2 to Fig. 6 shows typical values

ECO-PAC ™
Three Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 86 A
V_{RRM} = 600 V
t_{rr} = 35 ns

V_{RSM} V	V_{RRM} V	Typ
600	600	VUE 75-06NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 100°C, module		86	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	250	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	275	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	215	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	235	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	315	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	320	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	230	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	230	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	$I_{ISOL} \leq$ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		19	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	$V_R = V_{RRM}$	T_{VJ} = 25°C		0.25	mA
	$V_R = V_{RRM}$	$T_{VJ} = T_{VJM}$		1.0	mA
V_F	I_F = 30 A	T_{VJ} = 25°C		1.57	V
V_{T0}	for power-loss calculations only			0.98	V
r_T				8	mΩ
R_{thJC}	per diode; DC current			0.9	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 50 A, -diF/dt = 100 A/µs		6	tbd	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V, T_{VJ} = 25°C		35	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

Data according to IEC 60747 refer to a single diode unless otherwise stated
① for resistive load at bridge output.

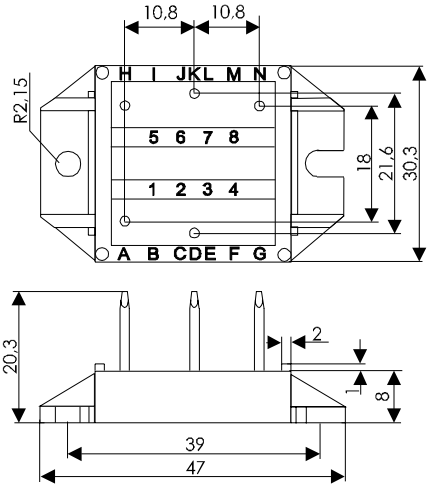
IXYS reserves the right to change limits, test conditions and dimensions.

Features
- Package with DCB ceramic base plate in low profile
- Isolation voltage 3000 V~
- Planar passivated chips
- Low forward voltage drop
- Leads suitable for PC board soldering

Applications
- Supplies for DC power equipment
- Input and output rectifiers for high frequency
- Battery DC power supplies
- Field supply for DC motors

Advantages
- Space and weight savings
- Improved temperature and power cycling capability
- Small and light weight
- Low noise switching

Dimensions in mm (1 mm = 0.0394")



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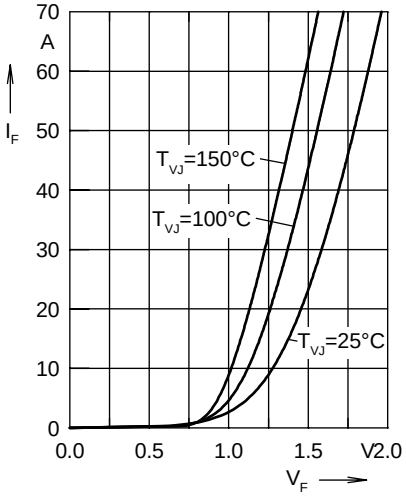


Fig. 1 Forward current I_F versus V_F

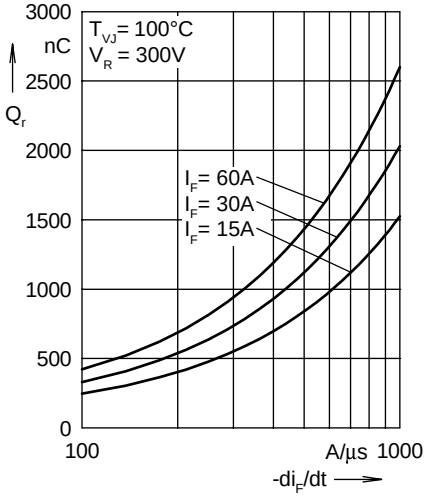


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

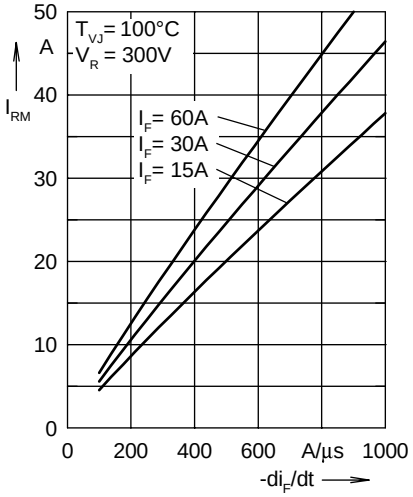


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

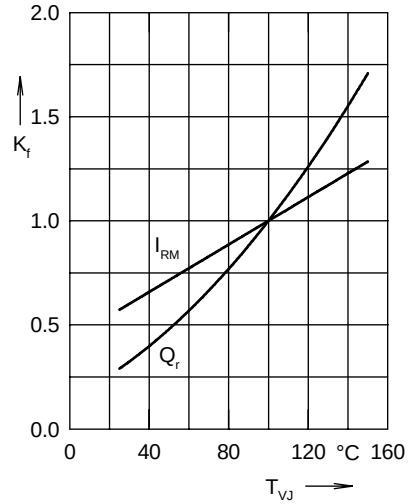


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

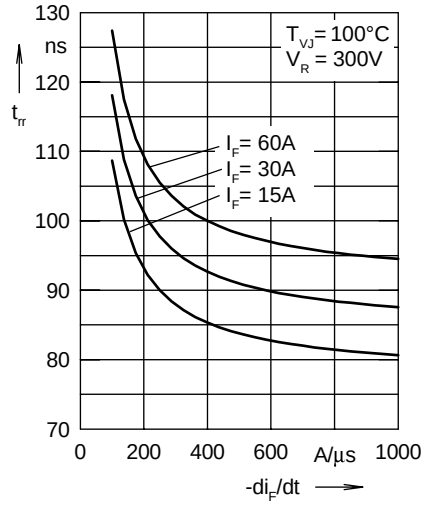


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

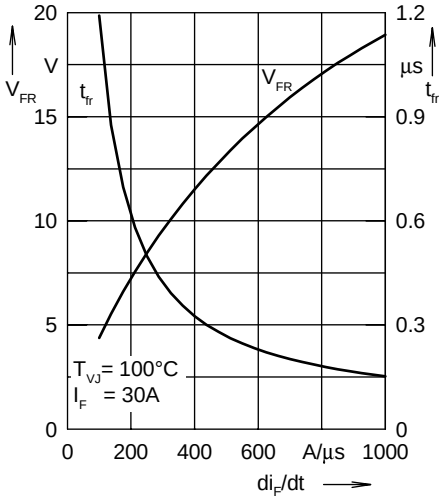


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

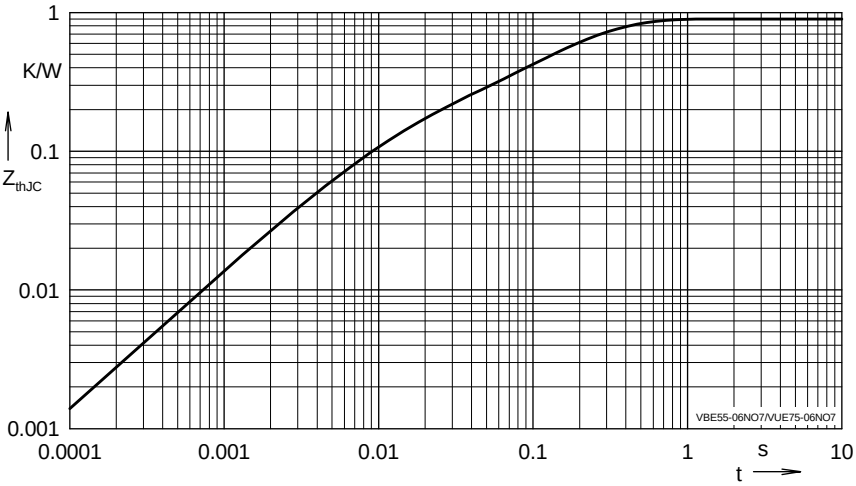


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

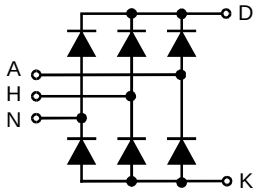
i	R_{thi} (K/W)	t_i (s)
1	0.3012	0.0052
2	0.116	0.0003
3	0.0241	0.0004
4	0.4586	0.0092

NOTE: Fig. 2 to Fig. 6 shows typical values

ECO-PAC ™
Threee Phase Rectifier Bridge
with Fast Recovery Epitaxial Diodes (FRED)

I_{dAV} = 74 A
V_{RRM} = 1200 V
t_{rr} = 40 ns

V_{RSM} V	V_{RRM} V	Typ
1200	1200	VUE 75-12NO7



Symbol	Conditions		Maximum Ratings	
I_{dAV} ①	T_C = 85°C, module		74	A
I_{dAVM}			90	A
I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	200	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	220	A
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	170	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	190	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	200	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	205	A^2s
	T_{VJ} = T_{VJM}	t = 10 ms (50 Hz), sine	145	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	150	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+125	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 min	3000	V~
	I_{ISOL} ≤ 1 mA	t = 1 s	3600	V~
M_d	Mounting torque	(M4)	1.5-2/14-18	Nm/lb.in.
Weight	typ.		19	g

Symbol	Conditions		Characteristic Values typ.	max.	
I_R	V_R = V_{RRM}	T_{VJ} = 25°C		0.25	mA
	V_R = V_{RRM}	T_{VJ} = T_{VJM}		1.0	mA
V_F	I_F = 30 A	T_{VJ} = 25°C		2.71	V
V_{T0}	for power-loss calculations only			1.31	V
r_T				15	mΩ
R_{thJC}	per diode; DC current			0.9	K/W
R_{thCH}	per diode, DC current, typ.			0.3	K/W
I_{RM}	I_F = 50 A, -diF/dt = 100 A/µs		6	11.4	A
	V_R = 100 V, L = 0.05 mH, T_{VJ} = 100°C				
t_{rr}	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V, T_{VJ} = 25°C		40	tbd	ns
a	Max. allowable acceleration		50		m/s^2
d_S	creeping distance on surface		11.2		mm
d_A	creepage distance in air		9.7		mm

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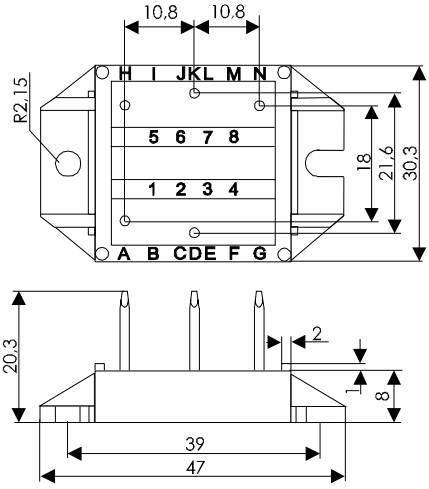

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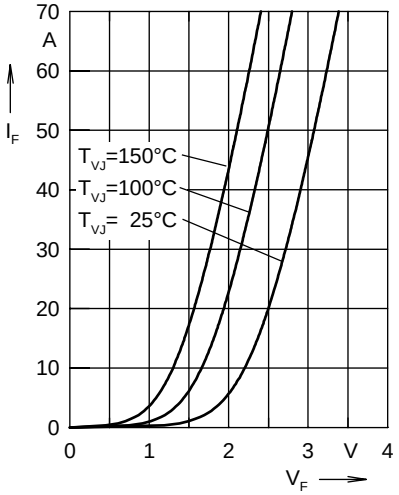

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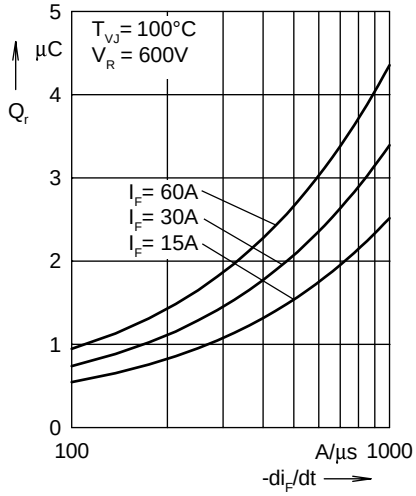


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

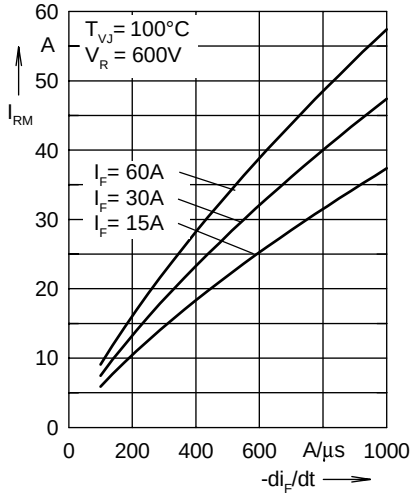


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

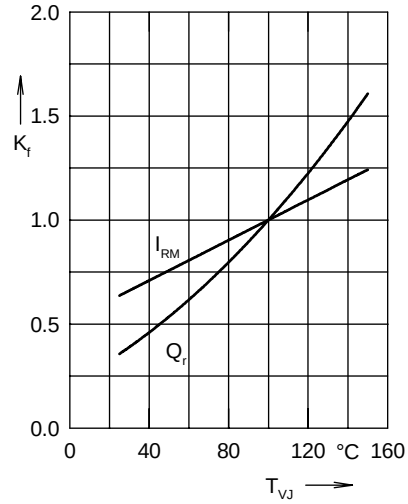


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

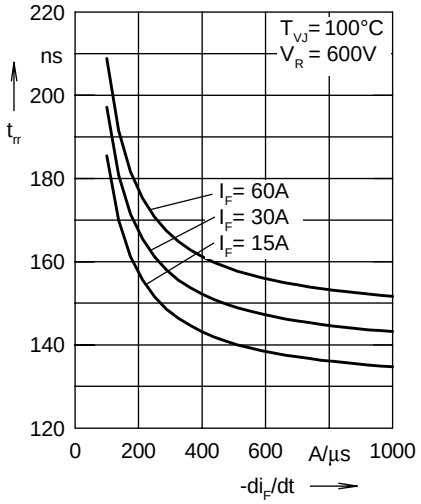
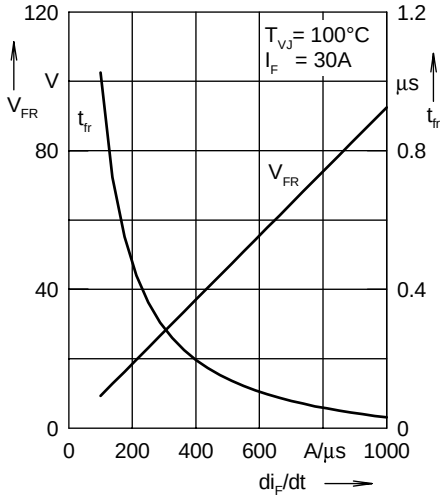


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$



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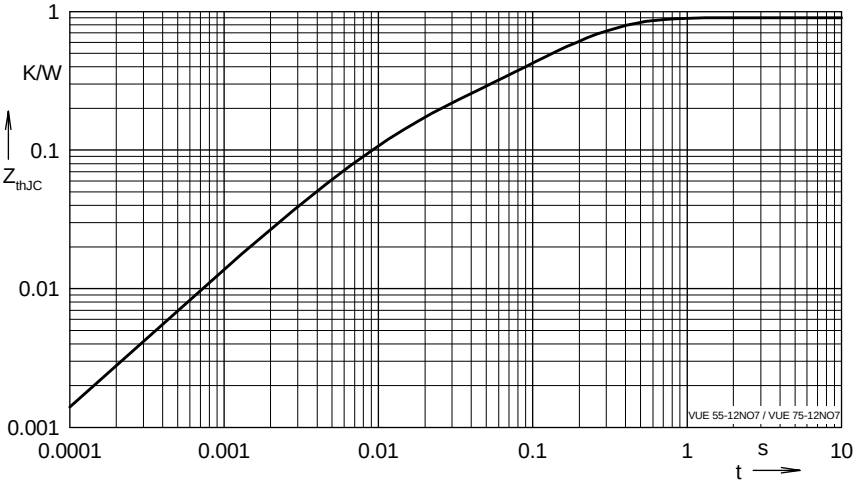

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