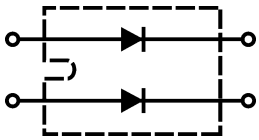
Fast Recovery Epitaxial Diode (FRED)

DSEI 2x 61

I_{FAVM} = 2x 71 A
V_{RRM} = 200 V
t_{rr} = 35 ns

V_{RSM} V	V_{RRM} V	Type
200	200	DSEI 2x 61-02A



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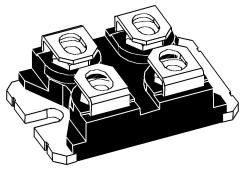
E72873



Symbol	Test Conditions		Maximum Ratings (per diode)	
I_{FRMS}	$T_{VJ} = T_{VJM}$		100	A
I_{FAVM} ①	T_C = 85°C; rectangular, d = 0.5		71	A
I_{FRM}	t_P < 10 µs; rep. rating, pulse width limited by T_{VJM}		800	A
I_{FSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	950	A
		t = 8.3 ms (60 Hz), sine	1020	A
	T_{VJ} = 150°C;	t = 10 ms (50 Hz), sine	800	A
		t = 8.3 ms (60 Hz), sine	870	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	4500	A^2s
		t = 8.3 ms (60 Hz), sine	4300	A^2s
	T_{VJ} = 150°C;	t = 10 ms (50 Hz), sine	3200	A^2s
		t = 8.3 ms (60 Hz), sine	3140	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+150	°C
P_{tot}	T_C = 25°C		150	W
V_{ISOL}	50/60 Hz, RMS $I_{ISOL} \leq$ 1 mA		2500	V~
M_d	Mounting torque		1.1-1.5/9-13	Nm/lb.in.
	Terminal connection torque (M4)		1.1-1.5/9-13	Nm/lb.in.
Weight			30	g

Symbol	Test Conditions		Characteristic Values (per diode) typ.	max.	
I_R	T_{VJ} = 25°C	$V_R = V_{RRM}$		50	µA
	T_{VJ} = 25°C	V_R = 0.8 • V_{RRM}		40	µA
	T_{VJ} = 125°C	V_R = 0.8 • V_{RRM}		11	mA
V_F	I_F = 60 A;	T_{VJ} = 150°C		0.88	V
		T_{VJ} = 25°C		1.08	V
V_{T0}	For power-loss calculations only			0.7	V
r_T	$T_{VJ} = T_{VJM}$			3.0	mΩ
R_{thJC}				0.8	K/W
R_{thCK}			0.05		K/W
t_{rr}	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V; T_{VJ} = 25°C		35	50	ns
I_{RM}	V_R = 100 V; I_F = 60 A; $-di_F/dt$ = 200 A/µs L ≤ 0.05 mH; T_{VJ} = 100°C		8	10	A

Features

- International standard package miniBLOC (ISOTOP compatible)
- Isolation voltage 2500 V~
- 2 independent FRED in 1 package
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
- Low I_{RM}-values
- Soft recovery behaviour

Applications

- Antiparallel diode for high frequency switching devices
- Anti saturation diode
- Snubber diode
- Free wheeling diode in converters and motor control circuits
- Rectifiers in switch mode power supplies (SMPS)
- Inductive heating and melting
- Uninterruptible power supplies (UPS)
- Ultrasonic cleaners and welders

Advantages

- High reliability circuit operation
- Low voltage peaks for reduced protection circuits
- Low noise switching
- Low losses
- Operating at lower temperature or space saving by reduced cooling

① I_{FAVM} rating includes reverse blocking losses at T_{VJM}, V_R = 0.8 V_{RRM}, duty cycle d = 0.5
Data according to IEC 60747
IXYS reserves the right to change limits, test conditions and dimensions

600

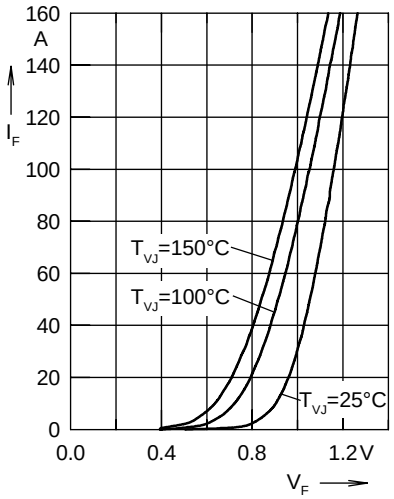


Fig. 1 Forward current I_F versus V_F

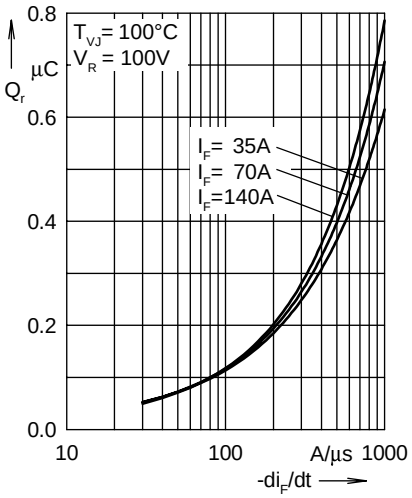


Fig. 2 Typ. reverse recovery charge Q_r versus -di_F/dt

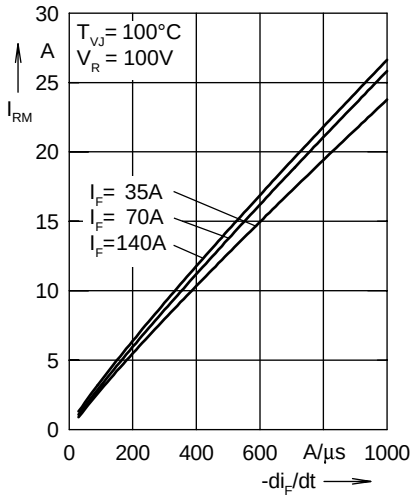


Fig. 3 Typ. peak reverse current I_{RM} versus -di_F/dt

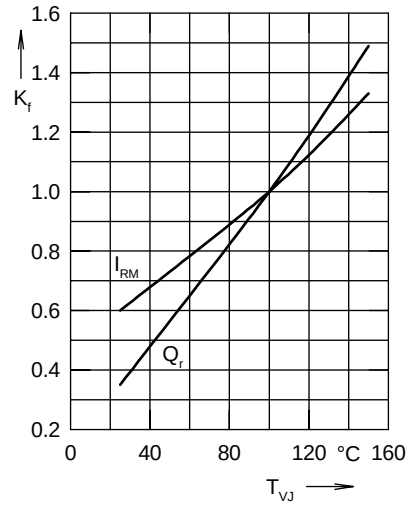


Fig. 4 Dynamic parameters Q_r, I_{RM} versus T_{VJ}

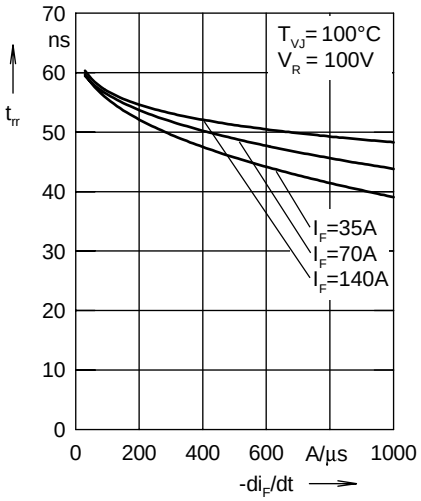


Fig. 5 Typ. recovery time t_{rr} versus -di_F/dt

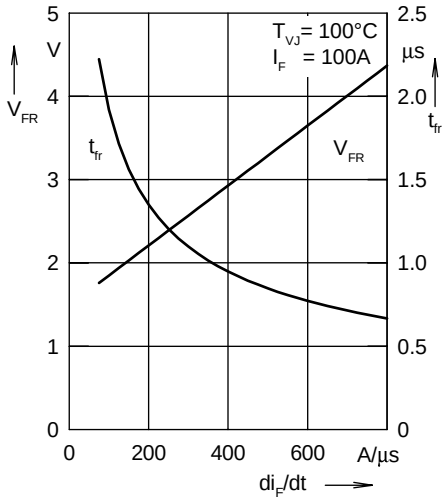


Fig. 6 Typ. peak forward voltage V_{FR} and t_{fr} versus di_F/dt

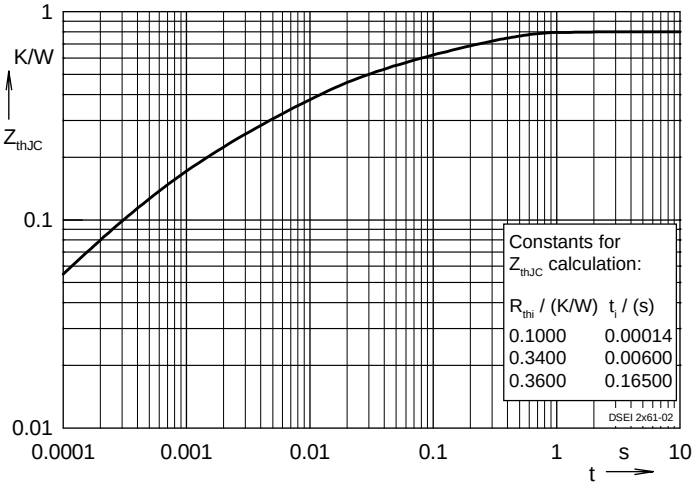
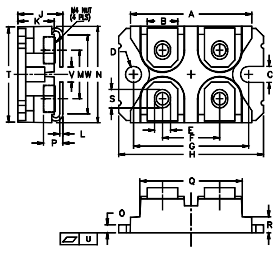


Fig. 7 Transient thermal impedance junction to case

Dimensions



miniBLOC SOT-227 B
M4 screws (4x) supplied

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.20	1.489	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004
V	3.30	4.57	0.130	0.180
W	0.780	0.830	19.81	21.08

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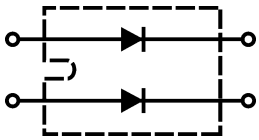
Fast Recovery Epitaxial Diode (FRED)

DSEI 2x 61

I_{FAVM} = 2x 60 A
V_{RRM} = 400/600 V
t_{rr} = 35 ns

V_{RSM} V	V_{RRM} V	Type
440	400	DSEI 2x 61-04C
640	600	DSEI 2x 61-06C



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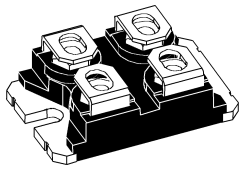

Symbol	Test Conditions	Maximum Ratings (per diode)	
I_{FRMS}	$T_{VJ} = T_{VJM}$	100	A
I_{FAVM} ①	T_C = 70°C; rectangular, d = 0.5	60	A
I_{FRM}	t_P < 10 µs; rep. rating, pulse width limited by T_{VJM}	800	A
I_{FSM}	T_{VJ} = 45°C; t = 10 ms (50 Hz), sine	550	A
	t = 8.3 ms (60 Hz), sine	600	A
	T_{VJ} = 150°C; t = 10 ms (50 Hz), sine	480	A
	t = 8.3 ms (60 Hz), sine	520	A
I^2t	T_{VJ} = 45°C t = 10 ms (50 Hz), sine	1510	A^2s
	t = 8.3 ms (60 Hz), sine	1490	A^2s
	T_{VJ} = 150°C; t = 10 ms (50 Hz), sine	1150	A^2s
	t = 8.3 ms (60 Hz), sine	1120	A^2s
T_{VJ}		-40...+150	°C
T_{VJM}		150	°C
T_{stg}		-40...+150	°C
P_{tot}	T_C = 25°C	180	W
V_{ISOL}	50/60 Hz, RMS	2500	V~
	$I_{ISOL} \leq$ 1 mA		
M_d	Mounting torque	1.5/13	Nm/lb.in.
	Terminal connection torque (M4)	1.5/13	Nm/lb.in.
Weight		30	g

Symbol	Test Conditions	Characteristic Values (per diode) typ.	max.	
I_R	T_{VJ} = 25°C $V_R = V_{RRM}$		200	µA
	T_{VJ} = 25°C $V_R = 0.8 \cdot V_{RRM}$		100	µA
	T_{VJ} = 125°C $V_R = 0.8 \cdot V_{RRM}$		14	mA
V_F	I_F = 60 A; T_{VJ} = 150°C		1.5	V
	T_{VJ} = 25°C		1.8	V
V_{T0}	For power-loss calculations only		1.13	V
r_T	$T_{VJ} = T_{VJM}$		4.7	mΩ
R_{thJC}		0.7		K/W
R_{thCK}		0.05		K/W
t_{rr}	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V; T_{VJ} = 25°C	35	50	ns
I_{RM}	V_R = 350 V; I_F = 60 A; $-di_F/dt$ = 480 A/µs	19	21	A
	L ≤ 0.05 µH; T_{VJ} = 100°C			

Features

- International standard package miniBLOC (ISOTOP compatible)
- Isolation voltage 2500 V~
- 2 independent FRED in 1 package
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
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- Snubber diode
- Free wheeling diode in converters and motor control circuits
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- Uninterruptible power supplies (UPS)
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- Low voltage peaks for reduced protection circuits
- Low noise switching
- Low losses
- Operating at lower temperature or space saving by reduced cooling

① I_{FAVM} rating includes reverse blocking losses at T_{VJM}, V_R = 0.8 V_{RRM}, duty cycle d = 0.5
Data according to IEC 60747
IXYS reserves the right to change limits, test conditions and dimensions

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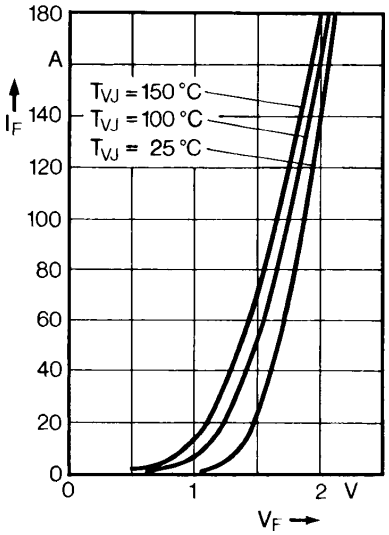


Fig. 1 Forward current versus voltage drop.

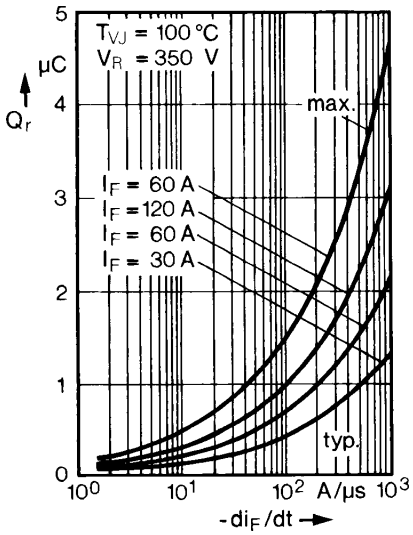


Fig. 2 Recovery charge versus $-di_F/dt$.

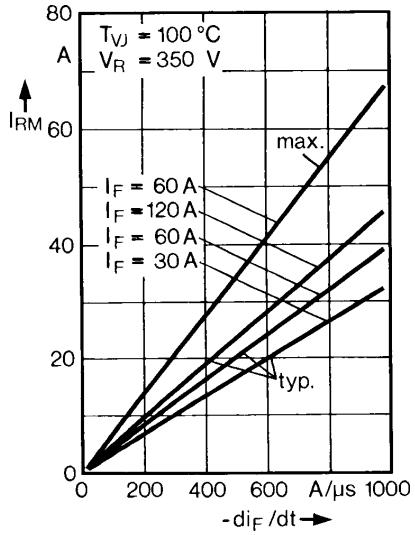


Fig. 3 Peak reverse current versus $-di_F/dt$.

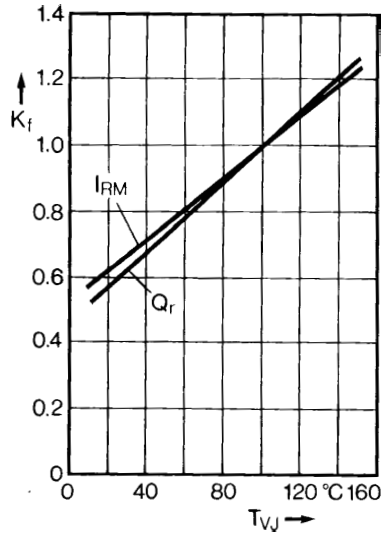


Fig. 4 Dynamic parameters versus junction temperature.

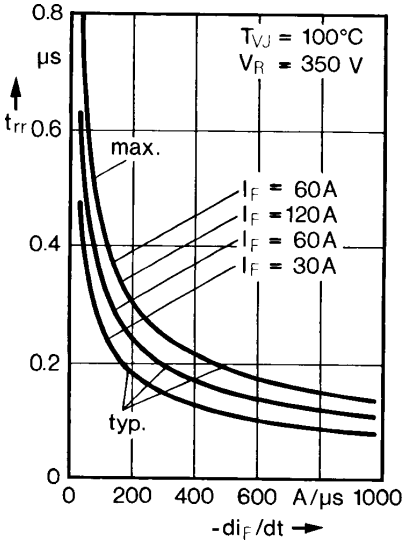


Fig. 5 Recovery time versus $-di_F/dt$.

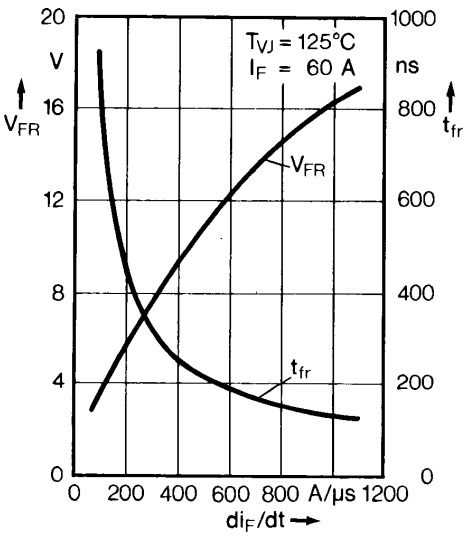


Fig. 6 Peak forward voltage versus di_F/dt.

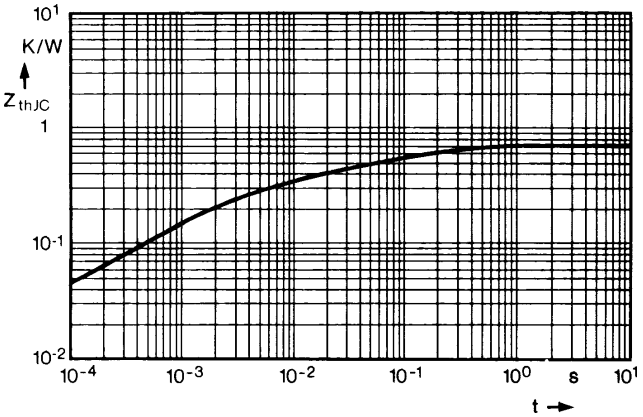
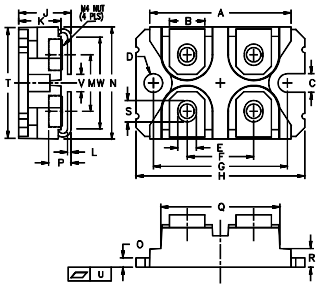


Fig. 7 Transient thermal impedance junction to case.

Dimensions



miniBLOC SOT-227 B
M4 screws (4x) supplied

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.20	1.489	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004
V	3.30	4.57	0.130	0.180
W	0.780	0.830	19.81	21.08

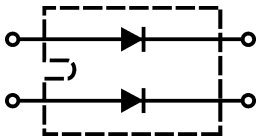
IXYS

Fast Recovery Epitaxial Diode (FRED)

DSEI 2x 61

I_{FAVM} = 2x 60 A
V_{RRM} = 1000 V
t_{rr} = 35 ns

V_{RSM} V	V_{RRM} V	Type
1000	1000	DSEI 2x 61-10B



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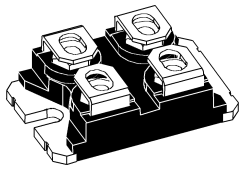

Symbol	Test Conditions		Maximum Ratings (per diode)	
I_{FRMS}	$T_{VJ} = T_{VJM}$		100	A
I_{FAVM} ①	T_C = 50°C; rectangular, d = 0.5		60	A
I_{FRM}	t_P < 10 µs; rep. rating, pulse width limited by T_{VJM}		800	A
I_{FSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	500	A
		t = 8.3 ms (60 Hz), sine	540	A
	T_{VJ} = 150°C;	t = 10 ms (50 Hz), sine	450	A
		t = 8.3 ms (60 Hz), sine	480	A
I^2t	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	1150	A^2s
		t = 8.3 ms (60 Hz), sine	1200	A^2s
	T_{VJ} = 150°C;	t = 10 ms (50 Hz), sine	1000	A^2s
		t = 8.3 ms (60 Hz), sine	950	A^2s
T_{VJ}			-40...+150	°C
T_{VJM}			150	°C
T_{stg}			-40...+150	°C
P_{tot}	T_C = 25°C		180	W
V_{ISOL}	50/60 Hz, RMS $I_{ISOL} \leq$ 1 mA		2500	V~
M_d	Mounting torque		1.5/13	Nm/lb.in.
	Terminal connection torque (M4)		1.5/13	Nm/lb.in.
Weight			30	g

Symbol	Test Conditions		Characteristic Values (per diode) typ.	max.	
I_R	T_{VJ} = 25°C	$V_R = V_{RRM}$		3	mA
	T_{VJ} = 25°C	$V_R = 0.8 \cdot V_{RRM}$		0.5	mA
	T_{VJ} = 125°C	$V_R = 0.8 \cdot V_{RRM}$		14	mA
V_F	I_F = 60 A;	T_{VJ} = 150°C		1.8	V
		T_{VJ} = 25°C		2.3	V
V_{T0}	For power-loss calculations only			1.43	V
r_T	$T_{VJ} = T_{VJM}$			6.1	mΩ
R_{thJC}			0.7		K/W
R_{thCK}			0.05		K/W
t_{rr}	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V; T_{VJ} = 25°C		35	50	ns
I_{RM}	V_R = 540 V; I_F = 60 A; $-di_F/dt$ = 480 A/µs L ≤ 0.05 µH; T_{VJ} = 100°C		32	36	A

Features

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① I_{FAVM} rating includes reverse blocking losses at T_{VJM}, $V_R = 0.8\ V_{RRM}$, duty cycle d = 0.5
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600

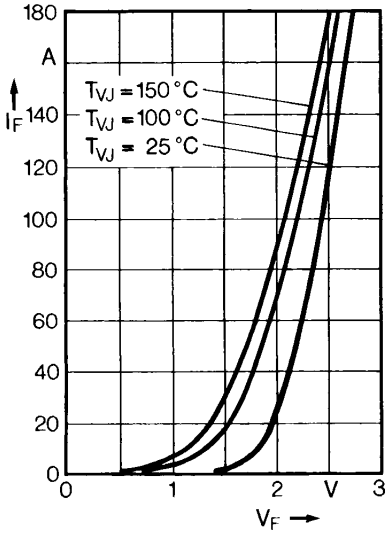


Fig. 1 Forward current versus voltage drop.

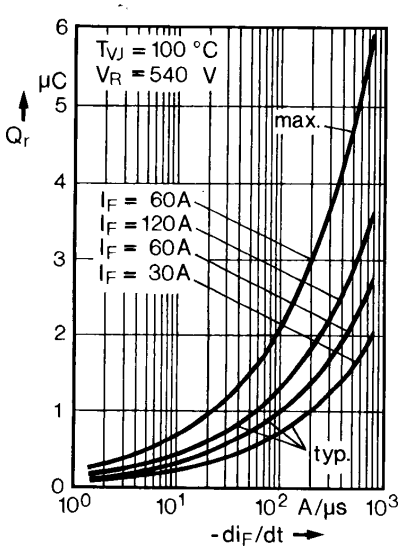


Fig. 2 Recovery charge versus $-di_F/dt$.

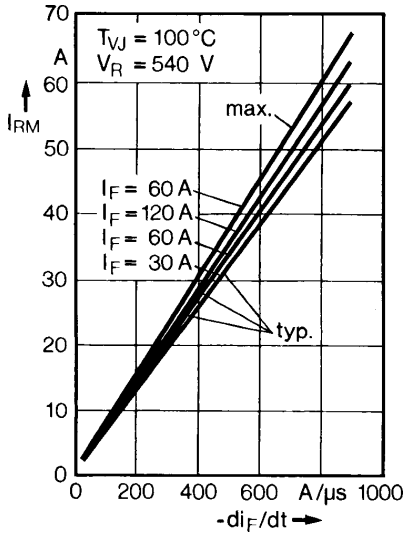


Fig. 3 Peak reverse current versus $-di_F/dt$.

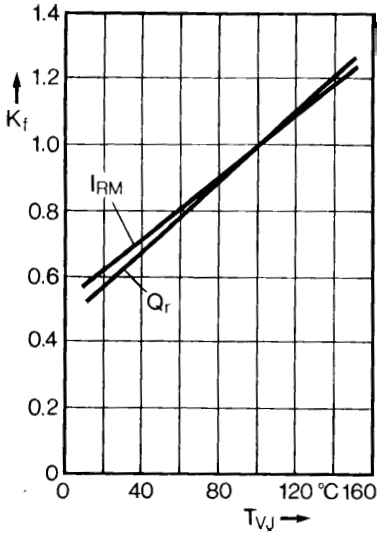


Fig. 4 Dynamic parameters versus junction temperature.

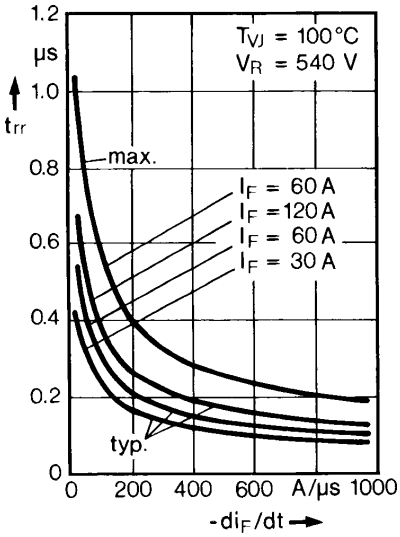


Fig. 5 Recovery time versus $-di_F/dt$.

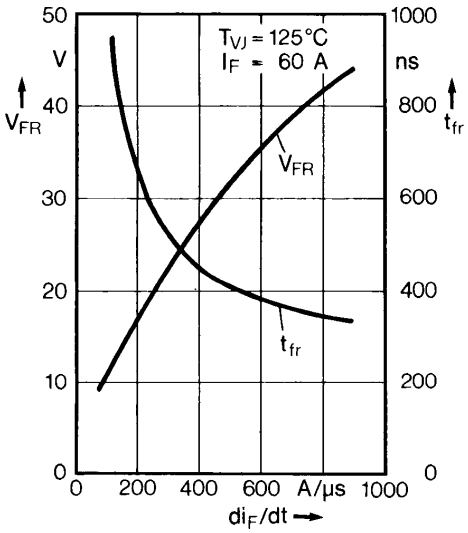


Fig. 6 Peak forward voltage versus di_F/dt.

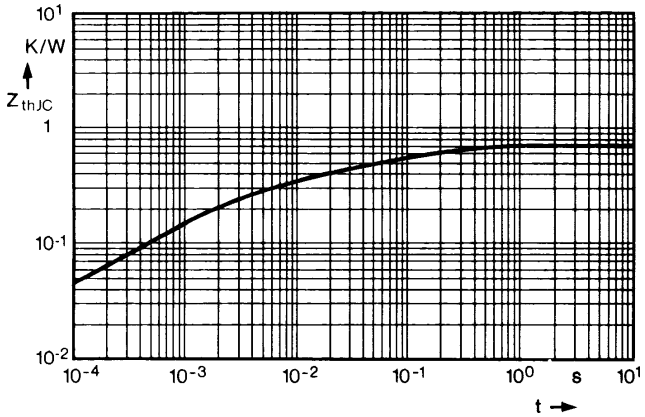
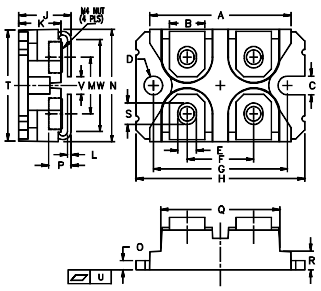


Fig. 7 Transient thermal impedance junction to case.

Dimensions



miniBLOC SOT-227 B
M4 screws (4x) supplied

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	37.80	38.20	1.489	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004
V	3.30	4.57	0.130	0.180
W	0.780	0.830	19.81	21.08

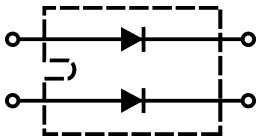
IXYS

Fast Recovery Epitaxial Diode (FRED)

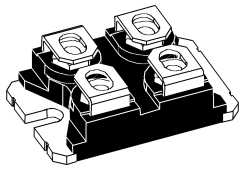
DSEI 2x 61

I_{FAVM} = 2x 52 A
V_{RRM} = 1200 V
t_{rr} = 40 ns

V_{RSM} V	V_{RRM} V	Type
1200	1200	DSEI 2x 61-12B



miniBLOC, SOT-227 B
E72873



Symbol	Test Conditions	Maximum Ratings (per diode)	
I_{FRMS}	$T_{VJ} = T_{VJM}$	100	A
I_{FAVM} ①	T_C = 50°C; rectangular, d = 0.5	52	A
I_{FRM}	t_P < 10 µs; rep. rating, pulse width limited by T_{VJM}	700	A
I_{FSM}	T_{VJ} = 45°C; t = 10 ms (50 Hz), sine	450	A
	t = 8.3 ms (60 Hz), sine	500	A
	T_{VJ} = 150°C; t = 10 ms (50 Hz), sine	400	A
	t = 8.3 ms (60 Hz), sine	440	A
I^2t	T_{VJ} = 45°C t = 10 ms (50 Hz), sine	1000	A^2s
	t = 8.3 ms (60 Hz), sine	1050	A^2s
	T_{VJ} = 150°C; t = 10 ms (50 Hz), sine	800	A^2s
	t = 8.3 ms (60 Hz), sine	810	A^2s
T_{VJ}		-40...+150	°C
T_{VJM}		150	°C
T_{stg}		-40...+150	°C
P_{tot}	T_C = 25°C	180	W
V_{ISOL}	50/60 Hz, RMS	2500	V~
	$I_{ISOL} \leq$ 1 mA		
M_d	Mounting torque	1.5/13	Nm/lb.in.
	Terminal connection torque (M4)	1.5/13	Nm/lb.in.
Weight		30	g

Symbol	Test Conditions	Characteristic Values (per diode) typ.	max.	
I_R	T_{VJ} = 25°C $V_R = V_{RRM}$		2.2	mA
	T_{VJ} = 25°C $V_R = 0.8 \cdot V_{RRM}$		0.5	mA
	T_{VJ} = 125°C $V_R = 0.8 \cdot V_{RRM}$		14	mA
V_F	I_F = 60 A; T_{VJ} = 150°C		2.15	V
	T_{VJ} = 25°C		2.50	V
V_{T0}	For power-loss calculations only		1.65	V
r_T	$T_{VJ} = T_{VJM}$		8.3	mΩ
R_{thJC}		0.7		K/W
R_{thCK}		0.05		K/W
t_{rr}	I_F = 1 A; -di/dt = 200 A/µs; V_R = 30 V; T_{VJ} = 25°C	40	60	ns
I_{RM}	V_R = 540 V; I_F = 60 A; $-di_F/dt$ = 480 A/µs	32	36	A
	L ≤ 0.05 µH; T_{VJ} = 100°C			

Features

- International standard package miniBLOC (ISOTOP compatible)
- Isolation voltage 2500 V~
- 2 independent FRED in 1 package
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
- Low I_{RM}-values
- Soft recovery behaviour

Applications

- Antiparallel diode for high frequency switching devices
- Anti saturation diode
- Snubber diode
- Free wheeling diode in converters and motor control circuits
- Rectifiers in switch mode power supplies (SMPS)
- Inductive heating and melting
- Uninterruptible power supplies (UPS)
- Ultrasonic cleaners and welders

Advantages

- High reliability circuit operation
- Low voltage peaks for reduced protection circuits
- Low noise switching
- Low losses
- Operating at lower temperature or space saving by reduced cooling

① I_{FAVM} rating includes reverse blocking losses at T_{VJM}, $V_R = 0.8\ V_{RRM}$, duty cycle d = 0.5
Data according to IEC 60747
IXYS reserves the right to change limits, test conditions and dimensions

600

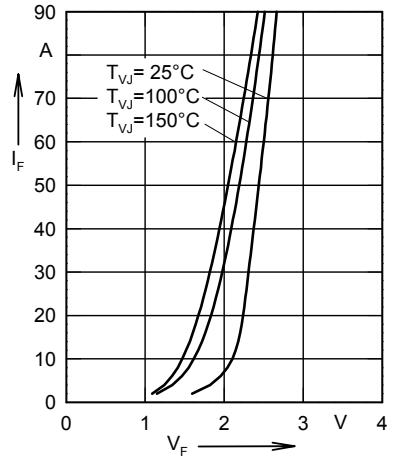


Fig. 1 Forward current versus voltage drop.

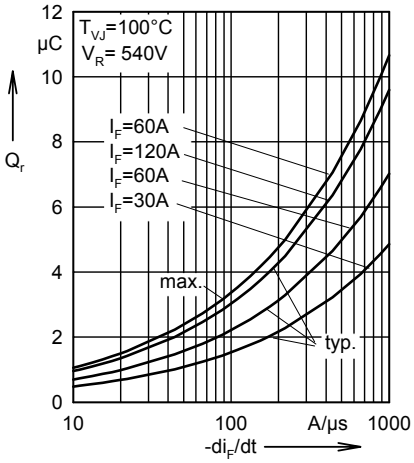


Fig. 2 Recovery charge versus $-di_F/dt$.

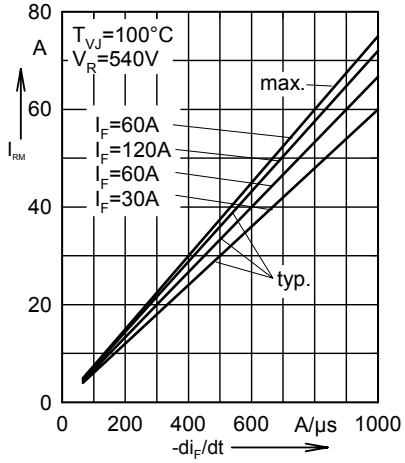


Fig. 3 Peak reverse current versus $-di_F/dt$.

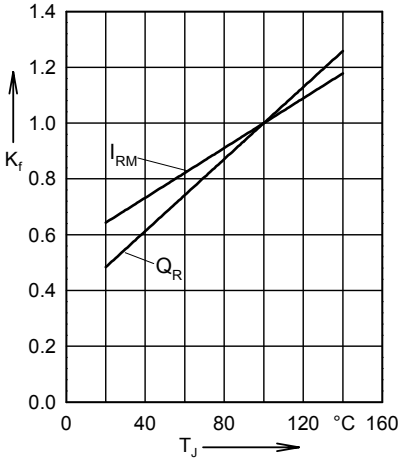
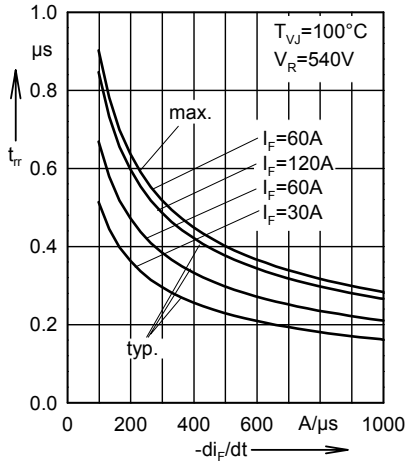


Fig. 4 Dynamic parameters versus junction temperature.



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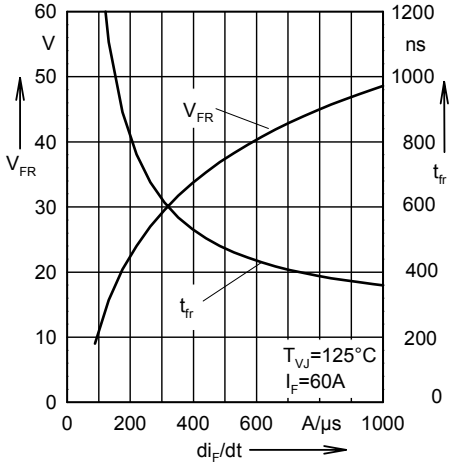
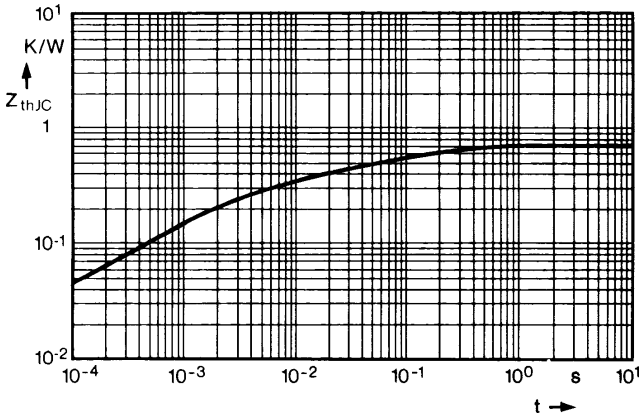


Fig. 6 Peak forward voltage versus di_F/dt.



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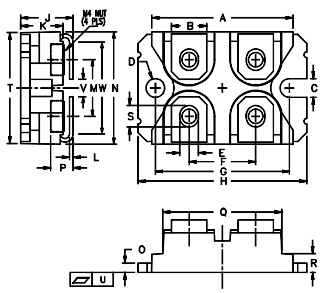

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