

Fast Recovery Epitaxial Diode (FRED)

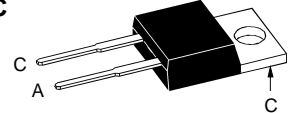
DSEI 12

$I_{FAVM} = 11\text{ A}$
 $V_{RRM} = 1200\text{ V}$
 $t_{rr} = 50\text{ ns}$

V_{RSM}	V_{RRM}	Type
V	V	
1200	1200	DSEI 12-12A



TO-220 AC



A = Anode, C = Cathode

Symbol	Test Conditions	Maximum Ratings	
I_{FRMS}	$T_{VJ} = T_{VJM}$	25	A
I_{FAVM} ①	$T_C = 100^\circ\text{C}$; rectangular, $d = 0.5$	11	A
I_{FRM}	$t_p < 10\ \mu\text{s}$; rep. rating, pulse width limited by T_{VJM}	150	A
I_{FSM}	$T_{VJ} = 45^\circ\text{C}$; $t = 10\text{ ms (50 Hz, sine)}$ $t = 8.3\text{ ms (60 Hz, sine)}$	75	A
		80	A
	$T_{VJ} = 150^\circ\text{C}$; $t = 10\text{ ms (50 Hz, sine)}$ $t = 8.3\text{ ms (60 Hz, sine)}$	65	A
		70	A
I^2t	$T_{VJ} = 45^\circ\text{C}$; $t = 10\text{ ms (50 Hz, sine)}$ $t = 8.3\text{ ms (60 Hz, sine)}$	28	A^2s
		27	A^2s
	$T_{VJ} = 150^\circ\text{C}$; $t = 10\text{ ms (50 Hz, sine)}$ $t = 8.3\text{ ms (60 Hz, sine)}$	21	A^2s
		20	A^2s
T_{VJ}		-40...+150	$^\circ\text{C}$
T_{VJM}		150	$^\circ\text{C}$
T_{stg}		-40...+150	$^\circ\text{C}$
P_{tot}	$T_C = 25^\circ\text{C}$	78	W
M_d	Mounting torque	0.4...0.6	Nm
Weight		2	g

Features

- International standard package JEDEC TO-220 AC
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
- Low I_{RM} -values
- Soft recovery behaviour
- Epoxy meets UL 94V-0

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

Symbol	Test Conditions	Characteristic Values	
		typ.	max.
I_R	$T_{VJ} = 25^\circ\text{C}$	$V_R = V_{RRM}$	250 μA
	$T_{VJ} = 25^\circ\text{C}$	$V_R = 0.8 \cdot V_{RRM}$	150 μA
	$T_{VJ} = 125^\circ\text{C}$	$V_R = 0.8 \cdot V_{RRM}$	4 mA
V_F	$I_F = 12\text{ A}$; $T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$		2.2 V
			2.6 V
V_{T0}	For power-loss calculations only		1.65 V
r_T	$T_{VJ} = T_{VJM}$		46.2 $\text{m}\Omega$
R_{thJC}	0.5		1.6 K/W
R_{thCK}		K/W	
R_{thJA}		60 K/W	
t_{rr}	$I_F = 1\text{ A}$; $-di/dt = 50\text{ A}/\mu\text{s}$; $V_R = 30\text{ V}$; $T_{VJ} = 25^\circ\text{C}$	50	70 ns
I_{RM}	$V_R = 540\text{ V}$; $I_F = 12\text{ A}$; $-di_F/dt = 100\text{ A}/\mu\text{s}$ $L \leq 0.05\ \mu\text{H}$; $T_{VJ} = 100^\circ\text{C}$	6.5	7.2 A

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

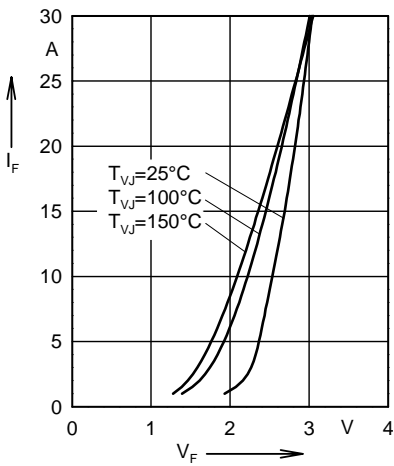


Fig. 1 Forward current versus voltage drop.

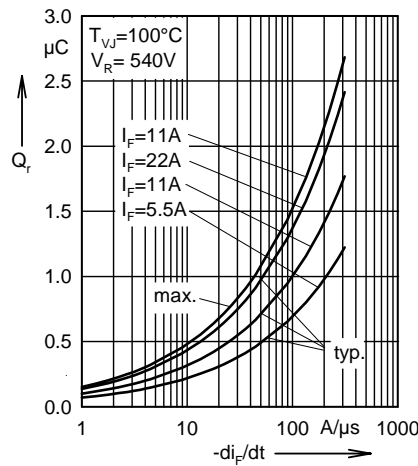


Fig. 2 Recovery charge versus $-di_F/dt$.

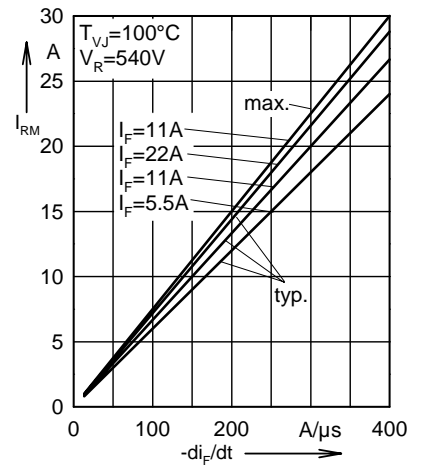


Fig. 3 Peak reverse current versus $-di_F/dt$.

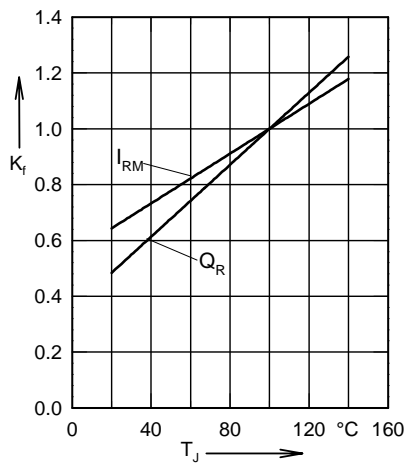


Fig. 4 Dynamic parameters versus junction temperature.

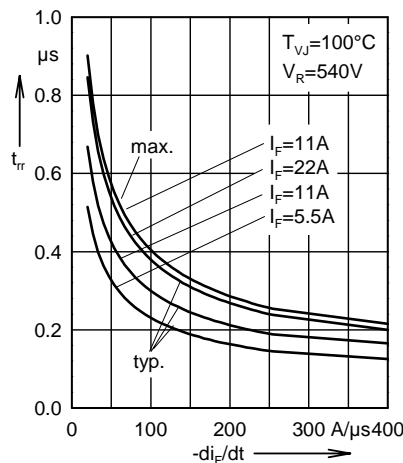


Fig. 5 Recovery time versus $-di_F/dt$.

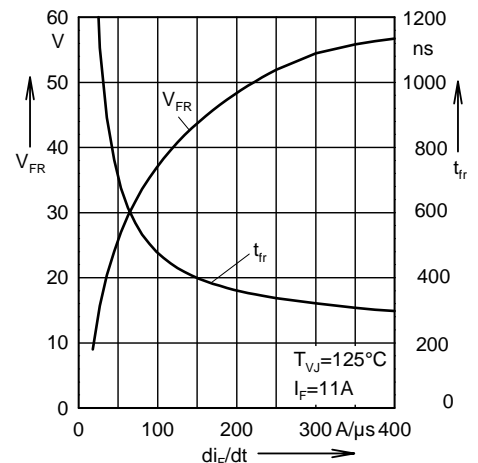


Fig. 6 Peak forward voltage versus di_F/dt .

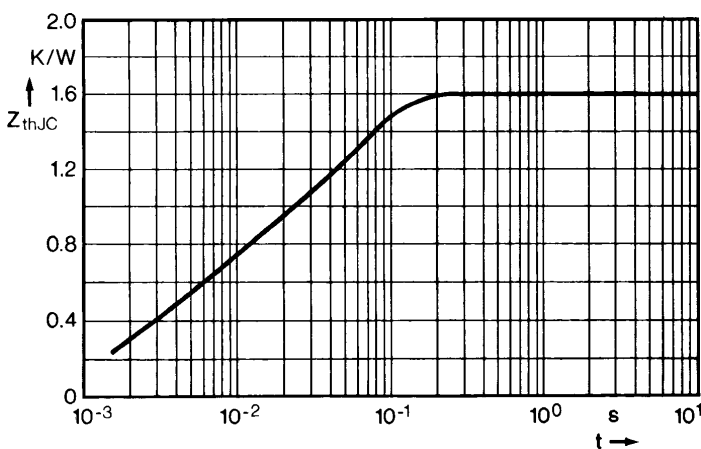
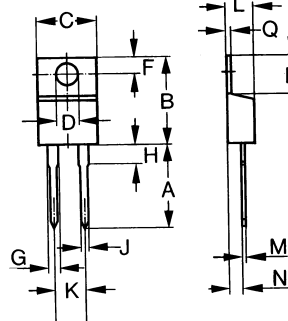


Fig. 7 Transient thermal impedance junction to case.

Dimensions



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	12.70	14.73	0.500	0.580
B	14.23	16.51	0.560	0.650
C	9.66	10.66	0.380	0.420
D	3.54	4.08	0.139	0.161
E	5.85	6.85	0.230	0.420
F	2.54	3.42	0.100	0.135
G	1.15	1.77	0.045	0.070
H	-	6.35	-	0.250
J	0.64	0.89	0.025	0.035
K	4.83	5.33	0.190	0.210
L	3.56	4.82	0.140	0.190
M	0.38	0.56	0.015	0.022
N	2.04	2.49	0.080	0.115
Q	0.64	1.39	0.025	0.055