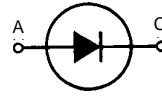


# Fast Recovery Epitaxial Diode (FRED)

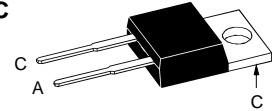
**DSEI 20**

**$I_{FAVM} = 17\text{ A}$**   
 **$V_{RRM} = 1200\text{ V}$**   
 **$t_{rr} = 40\text{ ns}$**

$V_{RSM}$	$V_{RRM}$	Type
V	V	
1200	1200	DSEI 20-12A



**TO-220 AC**



A = Anode, C = Cathode

Symbol	Test Conditions	Maximum Ratings	
$I_{FRMS}$	$T_{VJ} = T_{VJM}$	70	A
$I_{FAVM}$ ①	$T_C = 85^\circ\text{C}$ ; rectangular, $d = 0.5$	17	A
$I_{FRM}$	$t_p < 10\ \mu\text{s}$ ; rep. rating, pulse width limited by $T_{VJM}$	220	A
$I_{FSM}$	$T_{VJ} = 45^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine $t = 8.3\text{ ms}$ (60 Hz), sine	130	A
		140	A
	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine $t = 8.3\text{ ms}$ (60 Hz), sine	110	A
		120	A
$I^2t$	$T_{VJ} = 45^\circ\text{C}$ $t = 10\text{ ms}$ (50 Hz), sine $t = 8.3\text{ ms}$ (60 Hz), sine	85	A <sup>2</sup> s
		80	A <sup>2</sup> s
	$T_{VJ} = 150^\circ\text{C}$ ; $t = 10\text{ ms}$ (50 Hz), sine $t = 8.3\text{ ms}$ (60 Hz), sine	60	A <sup>2</sup> s
		60	A <sup>2</sup> s
$T_{VJ}$		-40...+150	°C
$T_{VJM}$		150	°C
$T_{stg}$		-40...+150	°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
- Glass passivated chips
- Very short recovery time
- Extremely low losses at high switching frequencies
- 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.
$I_R$	$T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$	750	$\mu\text{A}$
	$T_{VJ} = 25^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$	250	$\mu\text{A}$
	$T_{VJ} = 125^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$	7	mA
$V_F$	$I_F = 12\text{ A}$ ; $T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$	1.87	V
		2.15	V
$V_{TO}$	For power-loss calculations only	1.65	V
$r_T$	$T_{VJ} = T_{VJM}$	18.2	m $\Omega$
$R_{thJC}$		1.6	K/W
$R_{thJA}$		60	K/W
$t_{rr}$	$I_F = 1\text{ A}$ ; $-di/dt = 100\text{ A}/\mu\text{s}$ ; $V_R = 30\text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$	40	60 ns
$I_{RM}$	$V_R = 540\text{ V}$ ; $I_F = 20\text{ A}$ ; $-di_F/dt = 100\text{ A}/\mu\text{s}$ $L \leq 0.05\ \mu\text{H}$ ; $T_{VJ} = 100^\circ\text{C}$	7	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

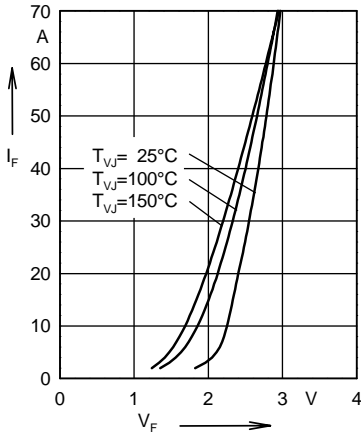


Fig. 1 Forward current versus voltage drop.

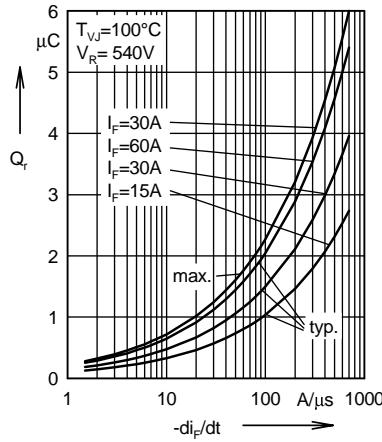


Fig. 2 Recovery charge versus  $-di_F/dt$ .

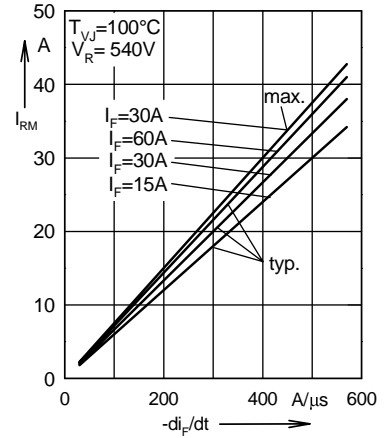


Fig. 3 Peak reverse current versus  $-di_F/dt$ .

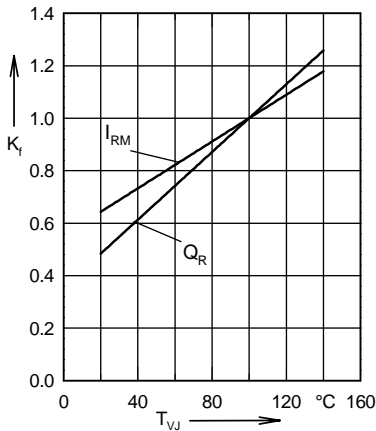


Fig. 4 Dynamic parameters versus junction temperature.

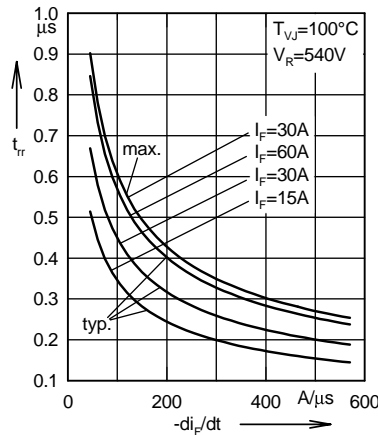


Fig. 5 Recovery time versus  $-di_F/dt$ .

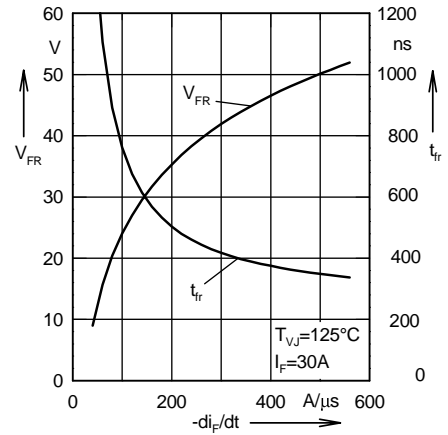


Fig. 6 Peak forward voltage versus  $di_F/dt$ .

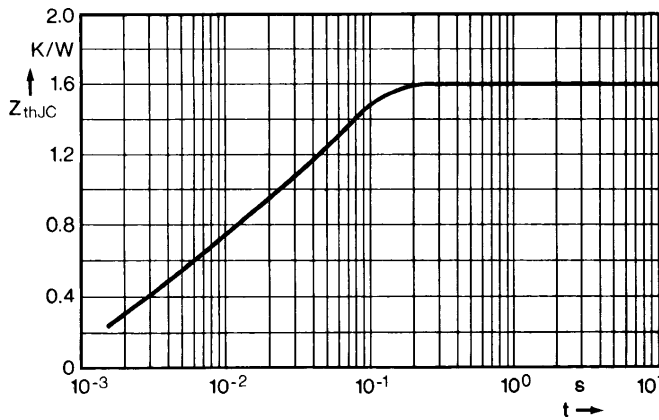
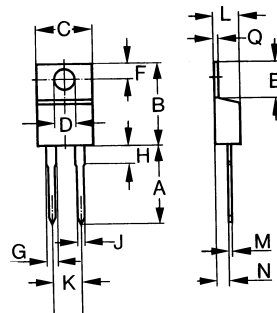


Fig. 7 Transient thermal impedance junction to case.

### 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