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HiPerFRED™ Epitaxial Diode with soft recovery

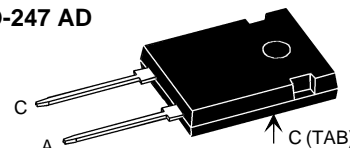
$I_{FAV} = 30\text{ A}$
 $V_{RRM} = 400\text{ V}$
 $t_{rr} = 30\text{ ns}$

Preliminary Data

V_{RSM} V	V_{RRM} V	Type
400	400	DSEP 30-04A



TO-247 AD



A = Anode, C = Cathode, TAB = Cathode

Symbol	Conditions	Maximum Ratings	
I_{FRMS}		70	A
I_{FAVM}	$T_C = 140^\circ\text{C}$; rectangular, $d = 0.5$	30	A
I_{FSM}	$T_{VJ} = 45^\circ\text{C}$; $t_p = 10\text{ ms}$ (50 Hz), sine	tbd	A
E_{AS}	$T_{VJ} = 25^\circ\text{C}$; non-repetitive $I_{AS} = \text{tbd A}$; $L = \text{tbd } \mu\text{H}$	tbd	mJ
I_{AR}	$V_A = 1.5 \cdot V_R$ typ.; $f = 10\text{ kHz}$; repetitive	tbd	A
T_{VJ}		-55...+175	$^\circ\text{C}$
T_{VJM}		175	$^\circ\text{C}$
T_{stg}		-55...+150	$^\circ\text{C}$
P_{tot}	$T_C = 25^\circ\text{C}$	165	W
M_d	mounting torque	0.8...1.2	Nm
Weight	typical	6	g

Features

- International standard package
- 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
- Antisaturation diode
- Snubber diode
- Free wheeling diode in converters and motor control circuits
- Rectifiers in switch mode power supplies (SMPS)
- Inductive heating
- Uninterruptible power supplies (UPS)
- Ultrasonic cleaners and welders

Advantages

- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low I_{RM} reduces:
 - Power dissipation within the diode
 - Turn-on loss in the commutating switch

Symbol	Conditions	Characteristic Values	
		typ.	max.
I_R ①	$T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$ $T_{VJ} = 150^\circ\text{C}$ $V_R = V_{RRM}$	250 1	μA mA
V_F ②	$I_F = 30\text{ A}$; $T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$	1.11 1.46	V V
R_{thJC} R_{thCH}		0.25	K/W K/W
t_{rr}	$I_F = 1\text{ A}$; $-di/dt = 300\text{ A}/\mu\text{s}$; $V_R = 30\text{ V}$; $T_{VJ} = 25^\circ\text{C}$	30	ns
I_{RM}	$V_R = 100\text{ V}$; $I_F = 50\text{ A}$; $-di_F/dt = 100\text{ A}/\mu\text{s}$ $T_{VJ} = 100^\circ\text{C}$	5.5	6.8 A

Pulse test: ① Pulse Width = 5 ms, Duty Cycle < 2.0 %
 ② Pulse Width = 300 μs , Duty Cycle < 2.0 %

Data according to IEC 60747 and per diode unless otherwise specified

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

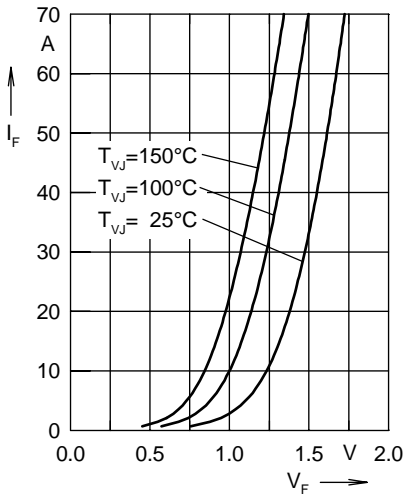


Fig. 1 Forward current I_F versus V_F

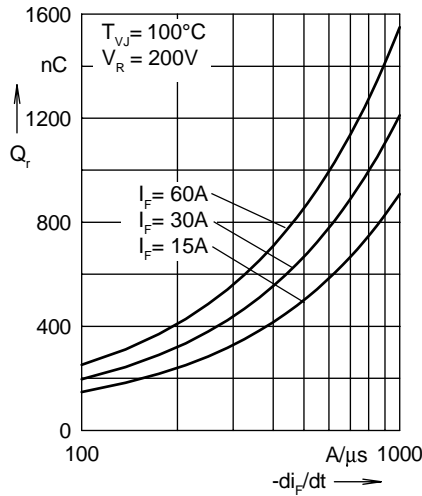


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

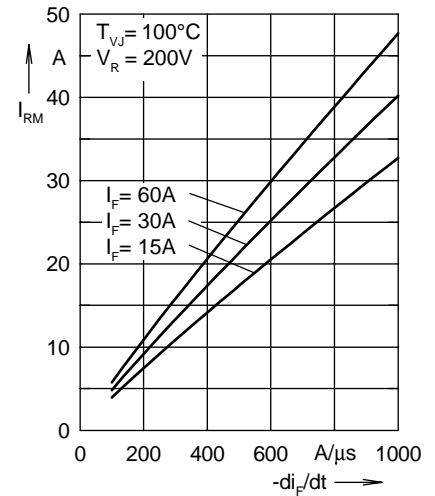


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

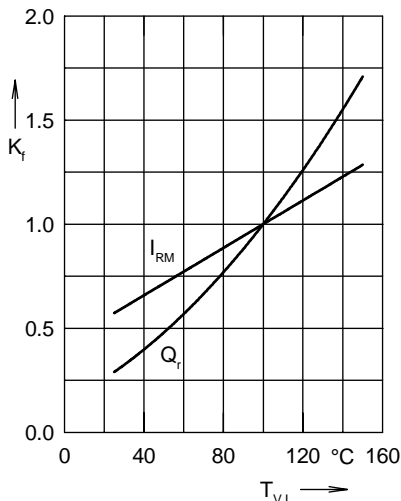


Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

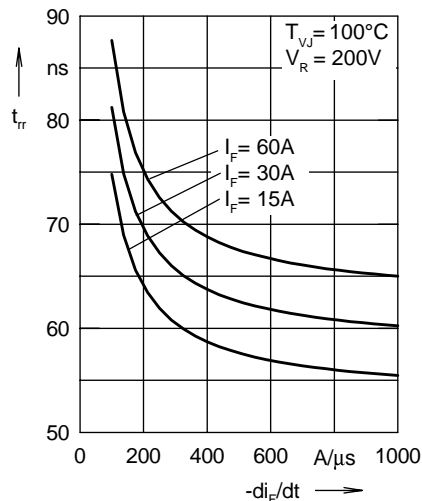


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

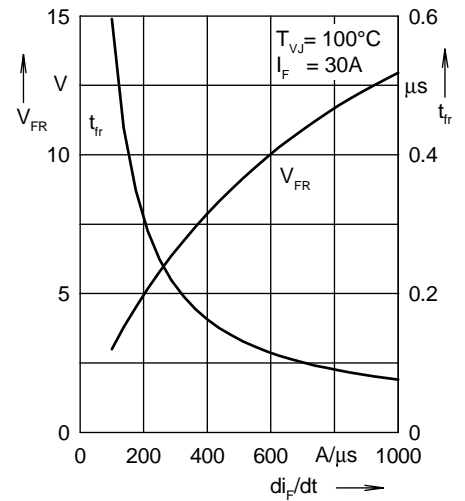


Fig. 6 Peak forward voltage V_{FR} and t_{rr} versus di_F/dt

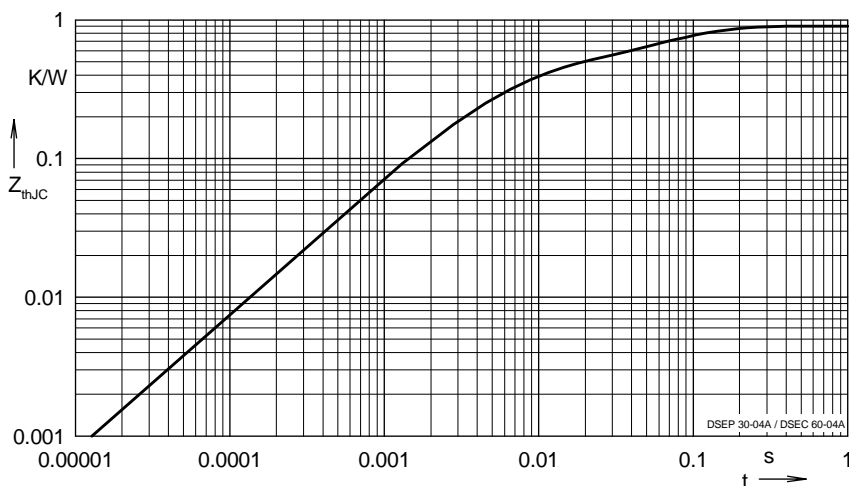


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.465	0.0052
2	0.179	0.0003
3	0.256	0.0396