

HiPerFRED™ Epitaxial Diode

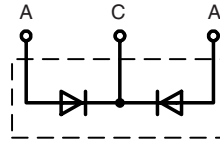
with common cathode and soft recovery

$$I_{FAV} = 2 \times 15 \text{ A}$$

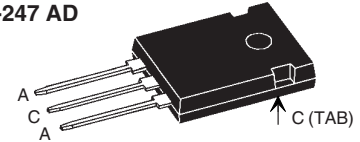
$$V_{RRM} = 600 \text{ V}$$

$$t_{rr} = 35 \text{ ns}$$

V_{RSM}	V_{RRM}	Type
V	V	
600	600	DSEC 30-06B



TO-247 AD



A = Anode, C = Cathode, TAB = Cathode

Symbol	Conditions	Maximum Ratings	
I_{FRMS}		50	A
I_{FAVM}	$T_C = 125^\circ\text{C}$; rectangular, $d = 0.5$	15	A
I_{FSM}	$T_{VJ} = 45^\circ\text{C}$; $t_p = 10 \text{ ms}$ (50 Hz), sine	110	A
E_{AS}	$T_{VJ} = 25^\circ\text{C}$; non-repetitive $I_{AS} = 1 \text{ A}$; $L = 100 \text{ mH}$	0.1	mJ
I_{AR}	$V_A = 1.5 \cdot V_R$ typ.; $f = 10 \text{ kHz}$; repetitive	0.1	A
T_{VJ}		-55...+175	$^\circ\text{C}$
T_{VJM}		175	$^\circ\text{C}$
T_{stg}		-55...+150	$^\circ\text{C}$
P_{tot}	$T_C = 25^\circ\text{C}$	95	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

Dimensions see Outlines.pdf

Symbol	Conditions	Characteristic Values	
		typ.	max.
I_R ①	$V_R = V_{RRM}$; $T_{VJ} = 25^\circ\text{C}$ $T_{VJ} = 150^\circ\text{C}$	100	μA
		0.5	mA
V_F ②	$I_F = 15 \text{ A}$; $T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$	1.59	V
		2.58	V
R_{thJC}		1.6	K/W
R_{thCH}		0.25	K/W
t_{rr}	$I_F = 1 \text{ A}$; $-di/dt = 100 \text{ A}/\mu\text{s}$ $V_R = 30 \text{ V}$; $T_{VJ} = 25^\circ\text{C}$	35	ns
I_{RM}	$V_R = 100 \text{ V}$; $I_F = 25 \text{ A}$; $T_{VJ} = 100^\circ\text{C}$ $-di_F/dt = 100 \text{ A}/\mu\text{s}$	2.6	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.

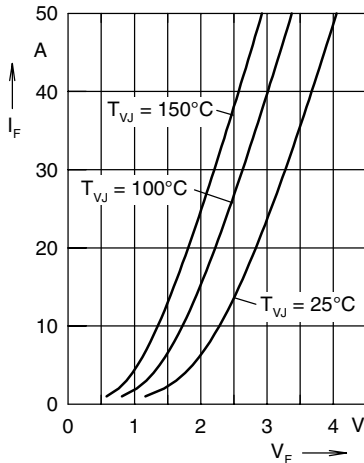


Fig. 1 Forward current I_F vs. V_F

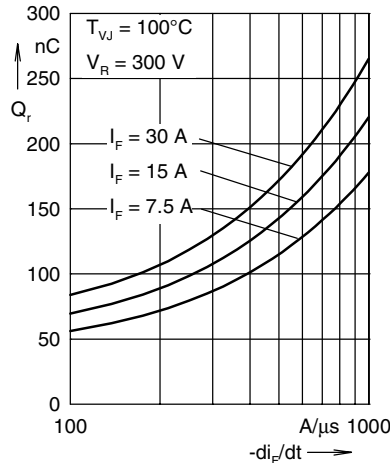


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

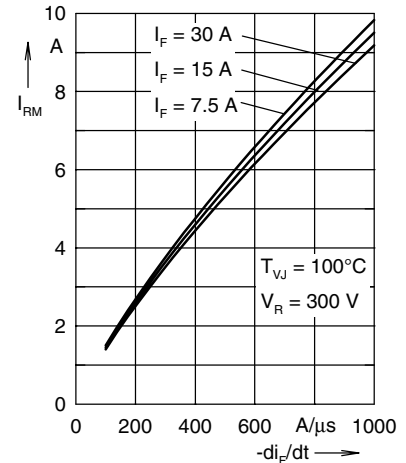


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

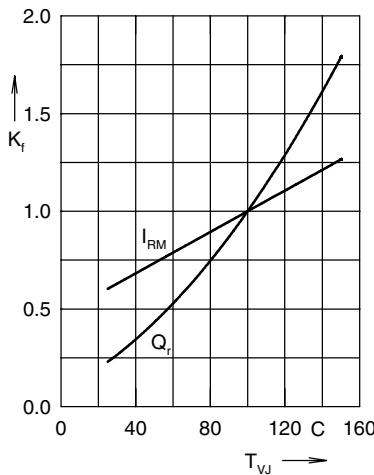


Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

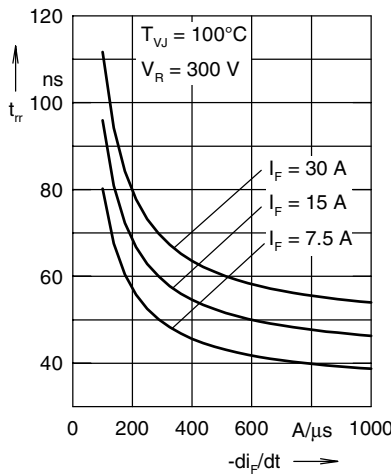


Fig. 5 Recovery time t_{tr} versus $-di_F/dt$

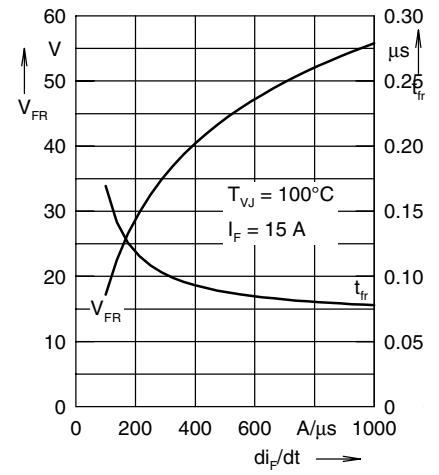


Fig. 6 Peak forward voltage V_{FR}/t_{tr} versus di_F/dt

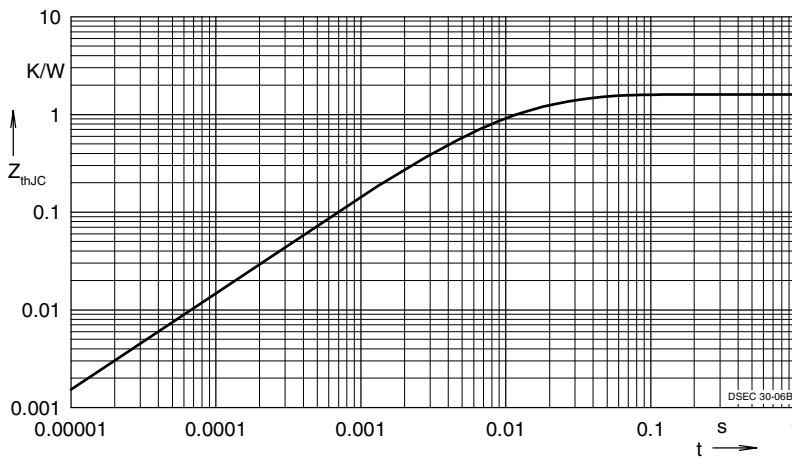


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.908	0.0052
2	0.35	0.0003
3	0.342	0.017

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