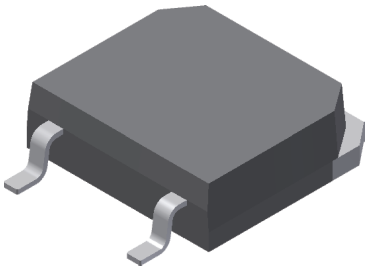
DSEP60-06AZ

600 V, 60 A High Performance Fast Recovery Diode

Low Loss and Soft Recovery Single Diode

RoHS



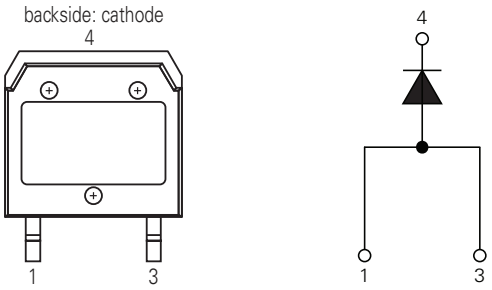
Features:

- Planar passivated chips
- Very low leakage current
- Short recovery time
- Soft recovery behavior
- Low I_{RM} values
- Avalance voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI

Benefits:

- Low I_{RM} reduces power dissipation within the diode and turn-on loss in the commutating switch
- Improved thermal behavior

Pinout Diagram TO-268AA (D³PAK-HV)



1: Anode; **3:** Anode; **4:** Cathode

Applications:

- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Freewheeling diode
- Rectifiers in Switch Mode Power Supplies (SMPS)
- Uninterruptible power supplies (UPS)

Package:

- RoHS compliant
- Epoxy meets UL 94V-0
- Industry standard outline

Product Summary

Characteristic	Value	Unit
V_{RRM}	600	V
I_{FAV}	60	A
t_{rr}	35	ns

Revised: TK.06/11/2024

Maximum Ratings

Symbol	Characteristics	Conditions	Value	Units
V_{RRM}	Repetitive Reverse Blocking Voltage	T_{vj} = 25 °C	600	V
I_{FAV}	Average Forward Current	T_C = 130 °C, T_{vj} = 175 °C; rectangular d = 0.5	60	A
I_{FSM}	Forward Surge Current	t = 10 ms; (50 Hz), sine; V_R = 0 V, T_{vj} = 45 °C	600	A
T_{stg}	Storage Temperature Range	–	–55 to +150	°C
T_{vj}	Virtual Junction Temperature Range	–	–55 to +175	°C
T_{OP}	Operating Temperature Range	–	–55 to +150	°C
P_{tot}	Total Power Dissipation	T_C = 25 °C	330	W

Thermal Specifications

Symbol	Characteristic	Value			Units
		Min.	Typ.	Max.	
R_{thJC}	Thermal Resistance, Junction to Case	–	–	0.45	K/W
R_{thCH}	Thermal Resistance, Case to Heatsink	–	0.15	–	K/W

Electrical Characteristics – Static

Symbol	Characteristics	Conditions		Value			Units
				Min.	Typ.	Max.	
I_R	Reverse Leakage Current	T_{vj} = 25 °C	V_R = 600 V	–	–	650	µA
		T_{vj} = 150 °C		–	–	2.5	mA
V_F	Forward Voltage	T_{vj} = 25 °C	I_F = 60 A	–	–	2.04	V
			I_F = 120 A	–	–	2.33	
		T_{vj} = 150 °C	I_F = 60 A	–	–	1.39	
			I_F = 120 A	–	–	1.70	
V_{FO}	Threshold Voltage	T_{vj} = 175 °C		–	–	0.95	V
r_F	Slope Resistance	T_{vj} = 175 °C		–	–	5	mΩ
C_J	Junction Capacitance	V_R = 400 V; f = 1 MHz		–	67	–	pF

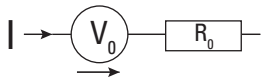
Electrical Characteristics – Dynamic

Symbol	Characteristics	Conditions		Value			Units
				Min.	Typ.	Max.	
I_{RM}	Reverse Recovery Current	T_{vj} = 25 °C	I_F = 60 A; V_R = 300 V; -di/dt = 200 A/µs	–	8	–	A
		T_{vj} = 100 °C		–	13	–	
t_{rr}	Reverse Recovery Time	T_{vj} = 25 °C		–	35	–	ns
		T_{vj} = 100 °C		–	110	–	

Package TO-268AA (D^3PAK-HV)

Symbol	Characteristics	Conditions	Value			Units
			Min.	Typ.	Max.	
I_{RMS}	RMS Current	per terminal	–	–	70	A
F_C	Mounting Force with Clip	–	20	–	120	N
G	Weight	–	–	4	–	g
$d_{Spp/App}$	Creepage Distance on Surface/ Striking Distance through Air	terminal to terminal	9.4	–	–	mm
$d_{Spb/Apb}$		terminal to backside	5.6	–	–	mm

Equivalent Circuits for Simulation (T_{vj} = 175 °C)



Fast Diode

Symbol	Characteristics	Value	Units
$V_{0\ max}$	Threshold Voltage	0.95	V
$R_{0\ max}$	Slope Resistance[1]	2.4	mΩ

Note 1: On die level

Characteristic Curves

Figure 1. Forward Characteristics

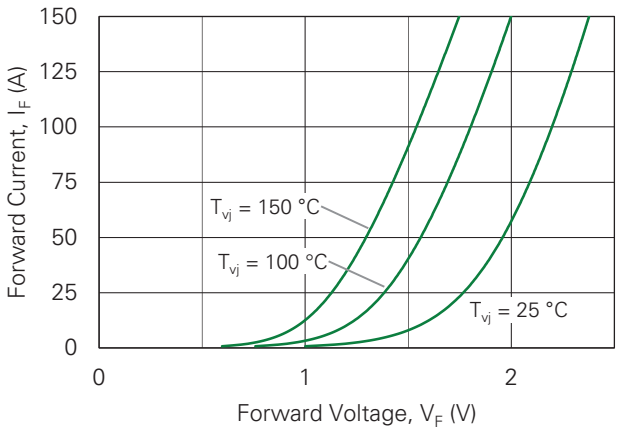


Figure 2. Typical Reverse Recovery Charge vs. -di_F/dt

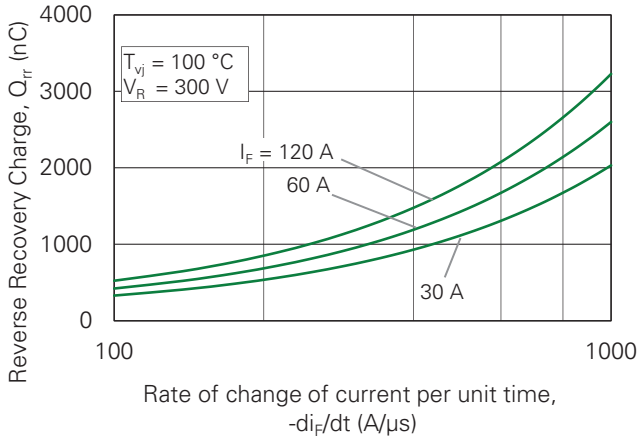


Figure 3. Typical Peak Reverse Current vs. -di_F/dt

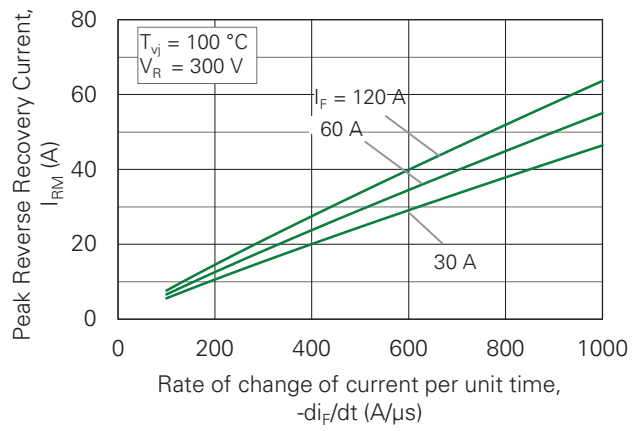


Figure 4. Dynamic Parameters Q_{rr}, I_{RM} vs. Virtual Junction Temperature

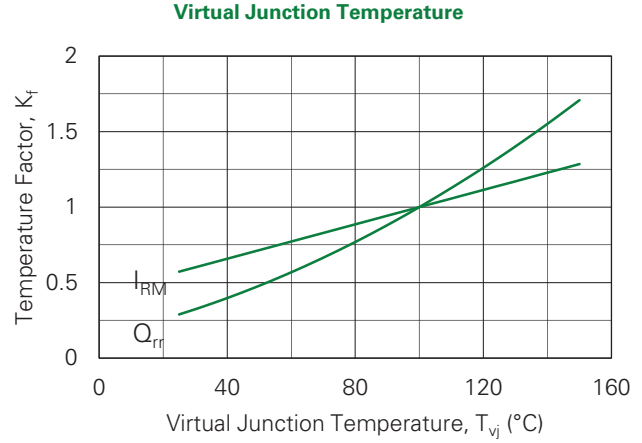


Figure 5. Typical Recovery Time vs. -di_F/dt

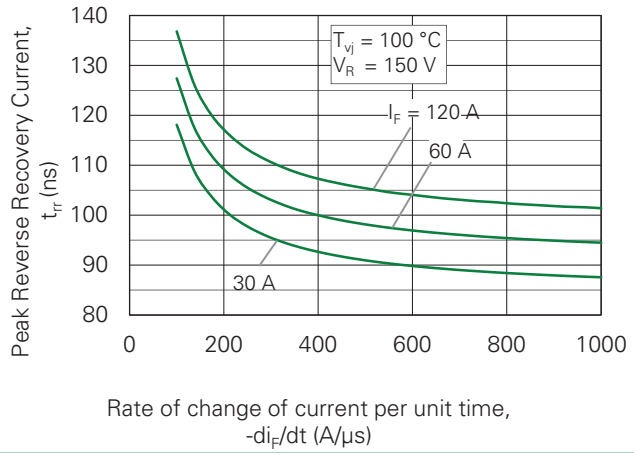


Figure 6. Typical Peak Forward Voltage V_{FR} and t_{fr} vs. -di_F/dt

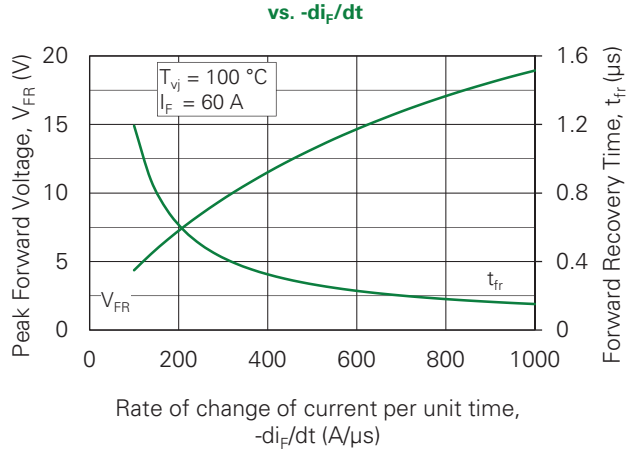
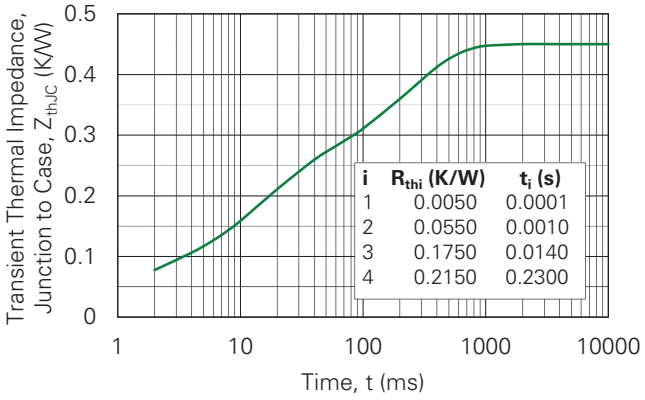
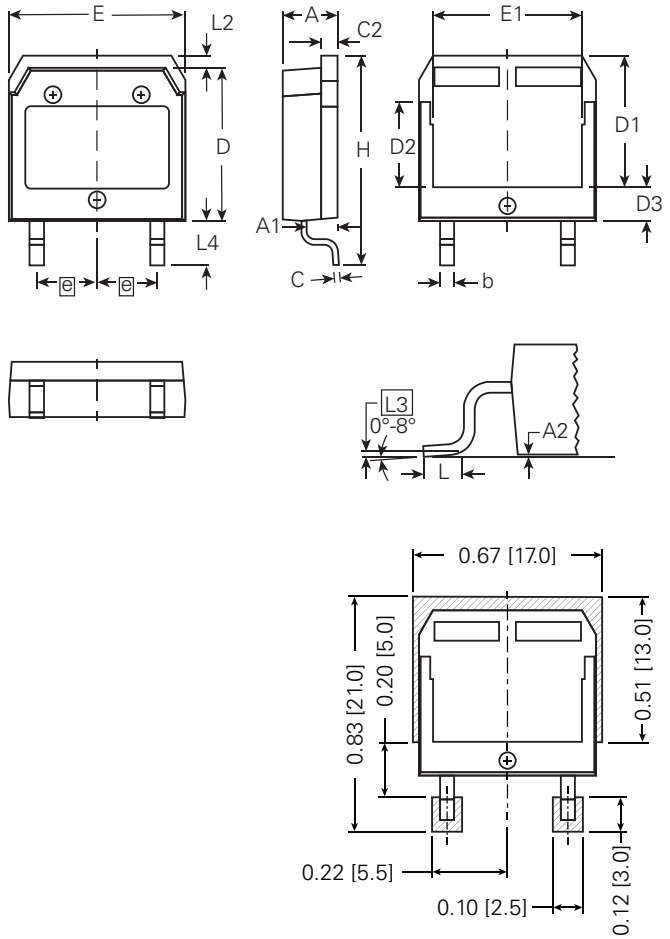


Figure 7. Transient Thermal Impedance, Junction to Case

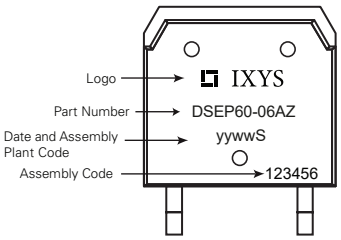


Part Outline Drawing TO-268AA (D^3PAK-HV)



Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max
A	4.90	5.10	0.193	0.201
A1	2.70	2.90	0.106	0.114
A2	0.02	0.25	0.001	0.010
b	1.15	1.45	0.045	0.057
C	0.40	0.65	0.016	0.026
C2	1.45	1.60	0.057	0.063
D	13.80	14.00	0.543	0.551
D1	11.80	12.10	0.465	0.476
D2	7.50	7.80	0.295	0.307
D3	2.90	3.20	0.114	0.126
E	15.85	16.05	0.624	0.632
E1	13.30	13.60	0.524	0.535
e	5.450 BSC		0.215 BSC	
H	18.70	19.10	0.736	0.752
L	1.70	2.00	0.067	0.079
L2	1.00	1.15	0.039	0.045
L3	0.250 BSC		0.010 BSC	
L4	3.80	4.10	0.150	0.161

Part Numbering and Marking



DS	=	Diode
E	=	Fast Recovery Diode
P	=	HiPerFRED
60	=	Current Rating (A)
06	=	Reverse Voltage (600 V)
AZ	=	Package (TO-268 HV)

Packing Options

Part Number	Marking	Packing Mode	Quantity
DSEP60-06AZ-TUB	DSEP60-06AZ	Tube	30 pcs
DSEP60-06AZ-TRL	DSEP60-06AZ	Tape & Reel	400 pcs