

## Sonic Fast Recovery Diode

$$V_{RRM} = 2 \times 1800 \text{ V}$$

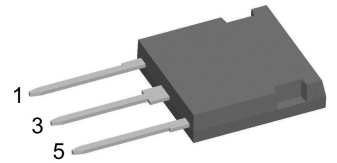
$$I_{FAV} = 60 \text{ A}$$

$$t_{rr} = 230 \text{ ns}$$


High Performance Fast Recovery Diode  
Low Loss and Soft Recovery  
Phase leg

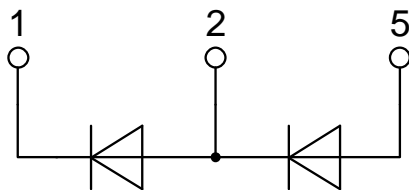
Part number

**DHH55-36N1F**



Backside: Isolated

 E72873



### Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low  $I_{rm}$ -values
- Very soft recovery behaviour
- 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

### Applications:

- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

### Package: i4-Pac

- Isolation Voltage: 3000 V~
- Industry convenient outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

### Terms Conditions of usage:

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.

Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

- to perform joint risk and quality assessments;

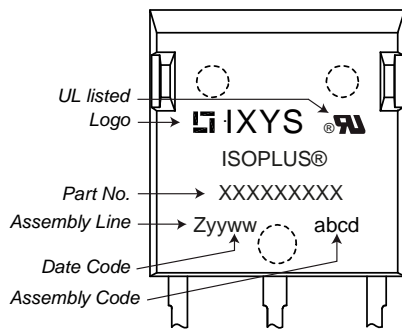
- the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					1800	V
$V_{RRM}$	max. repetitive reverse blocking voltage					1800	V
$I_R$	reverse current, drain current	$V_R = 1800\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		200	$\mu\text{A}$
		$V_R = 1800\text{ V}$		$T_{VJ} = 125^\circ\text{C}$		2	mA
$V_F$	forward voltage drop	$I_F = 60\text{ A}$		$T_{VJ} = 25^\circ\text{C}$		2.04	V
		$I_F = 120\text{ A}$				2.57	V
		$I_F = 60\text{ A}$		$T_{VJ} = 125^\circ\text{C}$		2.03	V
		$I_F = 120\text{ A}$				2.73	V
$I_{FAV}$	average forward current	$T_C = 50^\circ\text{C}$	rectangular	$T_{VJ} = 150^\circ\text{C}$		60	A
$V_{FO}$	threshold voltage	} for power loss calculation only		$T_{VJ} = 150^\circ\text{C}$		1.28	V
$r_F$	slope resistance					12	m $\Omega$
$R_{thJC}$	thermal resistance junction to case					0.6	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.20		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		210	W
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$		$T_{VJ} = 45^\circ\text{C}$		700	A
$C_J$	junction capacitance	$V_R = 1200\text{ V}$ $f = 1\text{ MHz}$		$T_{VJ} = 25^\circ\text{C}$		28	pF
$I_{RM}$	max. reverse recovery current	} $I_F = 60\text{ A}; V_R = 1200\text{ V}$		$T_{VJ} = 25^\circ\text{C}$		60	A
				$T_{VJ} = 100^\circ\text{C}$		70	A
$t_{rr}$	reverse recovery time	} $-di_F/dt = 800\text{ A}/\mu\text{s}$		$T_{VJ} = 25^\circ\text{C}$		230	ns
				$T_{VJ} = 100^\circ\text{C}$		350	ns

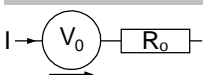
Package i4-Pac		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			70	A
$T_{VJ}$	virtual junction temperature		-55		150	°C
$T_{op}$	operation temperature		-55		125	°C
$T_{stg}$	storage temperature		-55		150	°C
<b>Weight</b>				9		g
$F_C$	mounting force with clip		20		120	N
$d_{Spp/App}$	creepage distance on surface   striking distance through air	terminal to terminal	5.5			mm
$d_{Spb/Appb}$		terminal to backside	5.1			mm
$V_{ISOL}$	isolation voltage	t = 1 second	3000			V
		t = 1 minute	2500			V

### Product Marking



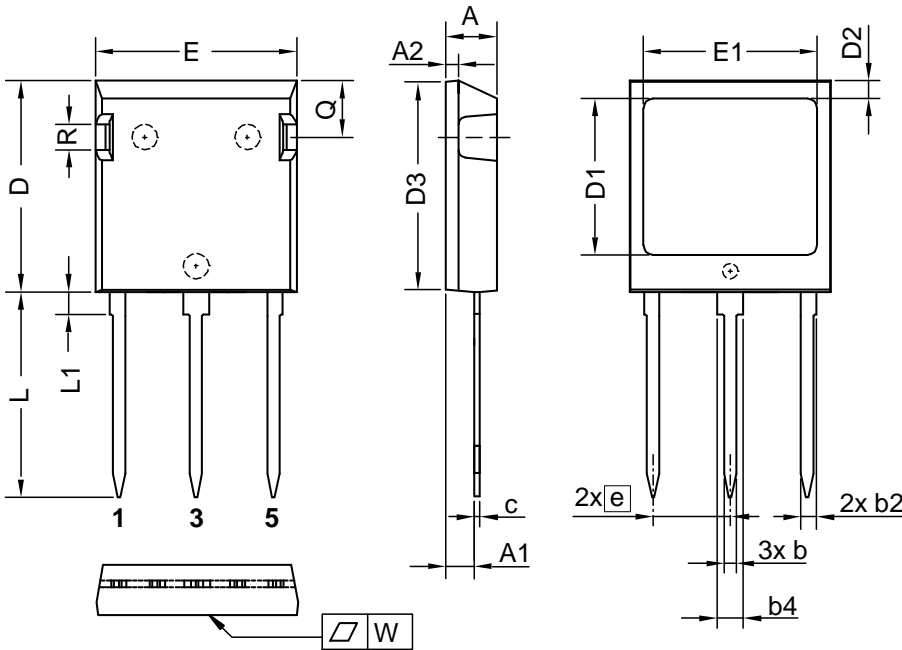
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DHH55-36N1F	DHH55-36N1F	Tube	25	500173

### Equivalent Circuits for Simulation

*\* on die level*
 $T_{VJ} = 150\text{ }^{\circ}\text{C}$ 

**Fast Diode**

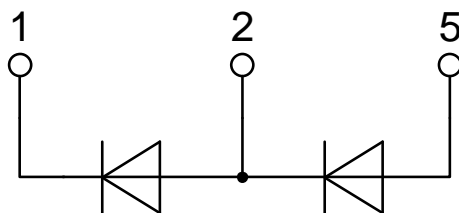
$V_{0\text{ max}}$	threshold voltage	1.28	V
$R_{0\text{ max}}$	slope resistance *	9.5	mΩ

## Outlines i4-Pac



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.83	5.21	0.190	0.205
A1	2.59	3.00	0.102	0.118
A2	1.17	2.16	0.046	0.085
b	1.14	1.40	0.045	0.055
b2	1.47	1.73	0.058	0.068
b4	2.54	2.79	0.100	0.110
c	0.51	0.74	0.020	0.029
D	20.80	21.34	0.819	0.840
D1	14.99	15.75	0.590	0.620
D2	1.65	2.03	0.065	0.080
D3	20.30	20.70	0.799	0.815
E	19.56	20.29	0.770	0.799
E1	16.76	17.53	0.660	0.690
e	7.62 BSC		0.300 BSC	
L	19.81	21.34	0.780	0.840
L1	2.11	2.59	0.083	0.102
Q	5.33	6.20	0.210	0.244
R	2.54	4.57	0.100	0.180
W	-	0.10	-	0.004

Die konvexe Form des Substrates ist typ. < 0.05 mm über der Kunststoffoberfläche der Bauteilunterseite  
 The convex bow of substrate is typ. < 0.05 mm over plastic surface level of device bottom side



## Fast Diode

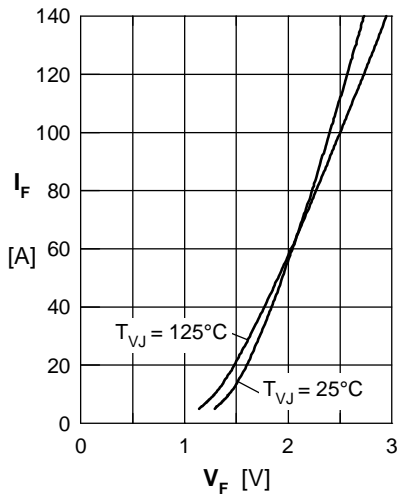


Fig. 1 Typ. rward current  $I_F$  versus  $V_F$

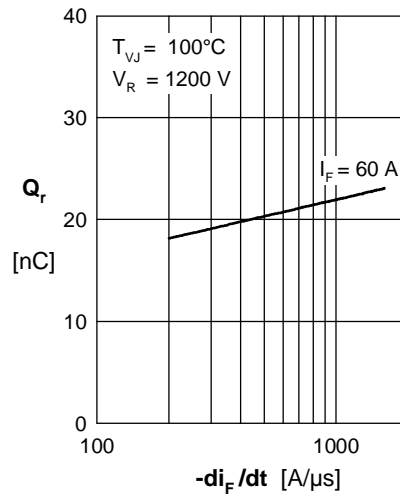


Fig. 2 Typ. reverse recovery charge  $Q_r$  versus  $-di_F/dt$

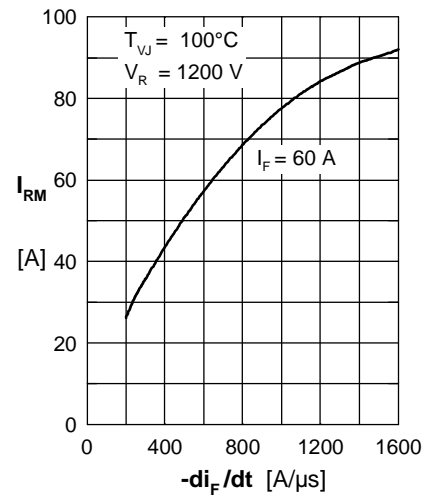


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

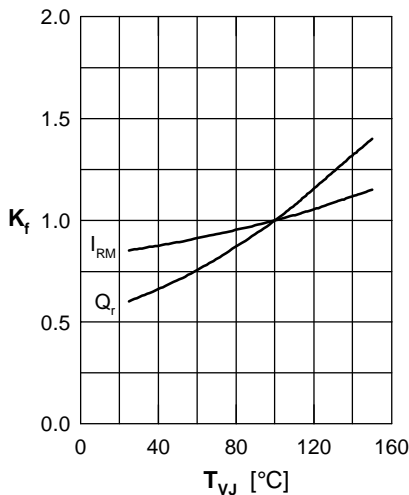


Fig. 4 Dynamic parameters  $Q_r, I_{RM}$  versus  $T_{VJ}$

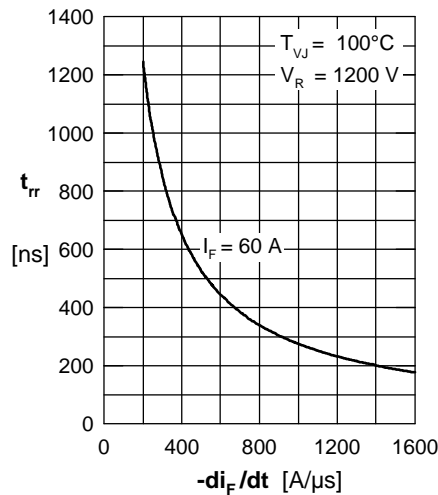


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $-di_F/dt$

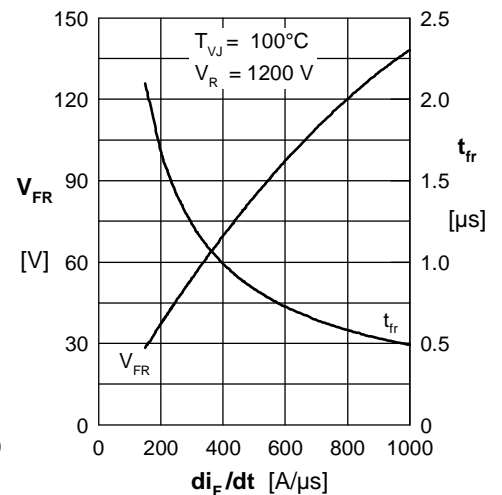


Fig. 6 Typ. peak forward voltage  $V_{FR}$  & typ. forward recovery time  $t_{fr}$  versus  $di_F/dt$

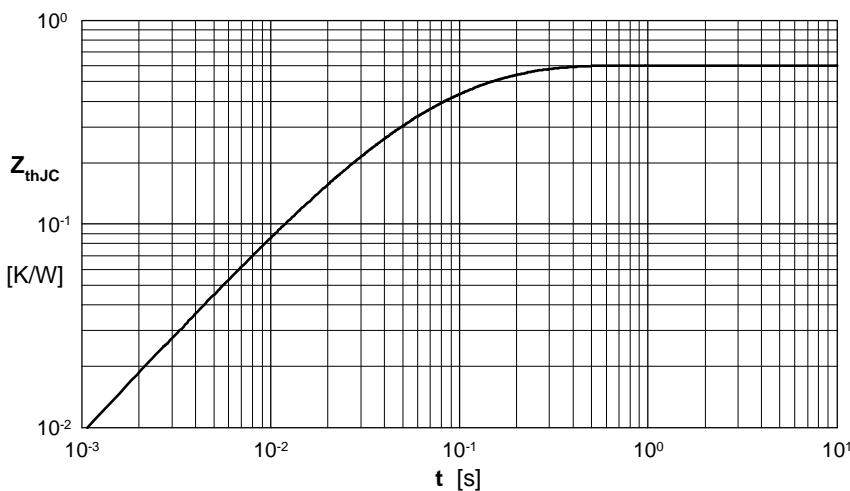


Fig. 7 Transient thermal resistance junction to case

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.212	0.0055
2	0.248	0.0092
3	0.063	0.0007
4	0.077	0.0391