

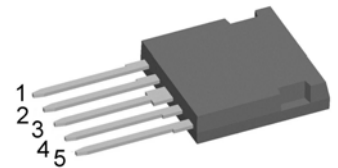
HiPerFRED

V_{RRM}	=	1200V
I_{DAV}	=	30A
t_{rr}	=	40ns

High Performance Fast Recovery Diode
Low Loss and Soft Recovery
3~ Rectifier Bridge

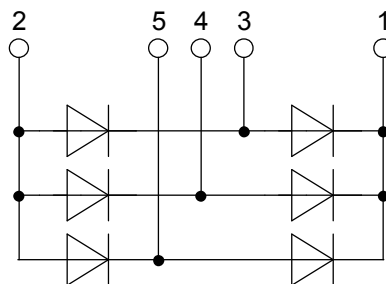
Part number

FUE30-12N1



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:

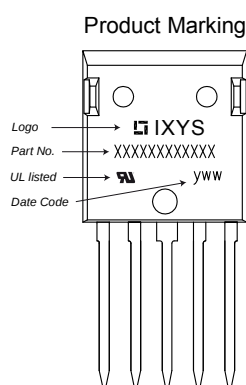
- Rectifiers in switch mode power supplies (SMPS)

Package: i4-Pac

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

Fast Diode				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V _{RSM}	max. non-repetitive reverse blocking voltage	T _{VJ} = 25°C				1200	V
V _{RRM}	max. repetitive reverse blocking voltage	T _{VJ} = 25°C				1200	V
I _R	reverse current, drain current	V _R = 1200 V	T _{VJ} = 25°C			100	μA
		V _R = 1200 V	T _{VJ} = 150°C			0.5	mA
V _F	forward voltage drop	I _F = 10 A	T _{VJ} = 25°C			2.37	V
		I _F = 30 A				3.17	V
		I _F = 10 A	T _{VJ} = 150°C			1.60	V
		I _F = 30 A				2.54	V
I _{DAV}	bridge output current	T _C = 120°C rectangular d = ⅓	T _{VJ} = 175°C			30	A
V _{F0}	threshold voltage	} for power loss calculation only				0.97	V
r _F	slope resistance					48	mΩ
R _{thJC}	thermal resistance junction to case					2.3	K/W
R _{thCH}	thermal resistance case to heatsink				0.20		K/W
P _{tot}	total power dissipation	T _C = 25°C				65	W
I _{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine; V _R = 0 V	T _{VJ} = 45°C			90	A
C _J	junction capacitance	V _R = 600 V f = 1 MHz	T _{VJ} = 25°C		5		pF
I _{RM}	max. reverse recovery current	} I _F = 15 A; V _R = 600 V -di _F /dt = 200 A/μs	T _{VJ} = 25°C		6		A
			T _{VJ} = 100°C		9		A
t _{rr}	reverse recovery time		T _{VJ} = 25°C		50		ns
			T _{VJ} = 100°C		140		ns

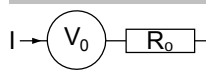
Package i4-Pac			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			50	A
T_{stg}	storage temperature		-55		150	°C
T_{VJ}	virtual junction temperature		-55		175	°C
Weight				9		g
F_C	mounting force with clip		20		120	N
$d_{Spp/App}$	creepage distance on surface striking distance through air	terminal to terminal	1.7			mm
$d_{Spb/Apb}$		terminal to backside	5.1			mm
V_{ISOL}	isolation voltage	t = 1 second	3000			V
		t = 1 minute	2500			V



Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	FUE30-12N1	FUE30-12N1	Tube	25	488690

Equivalent Circuits for Simulation

* on die level

 $T_{VJ} = 175^{\circ}\text{C}$ 

Fast Diode

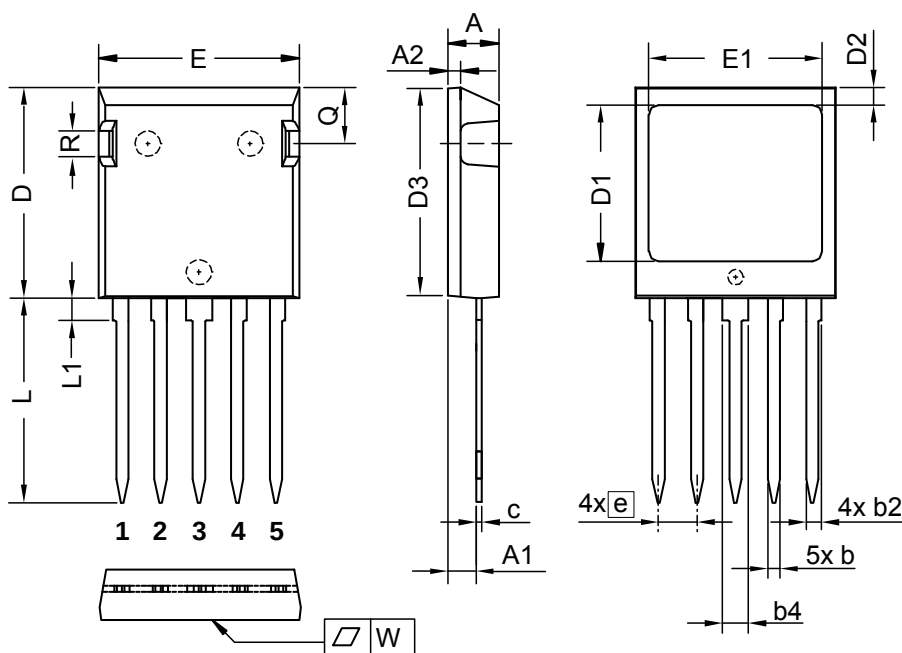
 $V_{0\max}$ threshold voltage 0.97

V

 $R_{0\max}$ slope resistance * 46

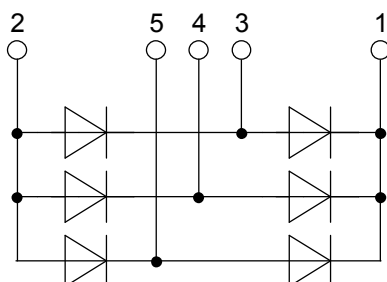
mΩ

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	3.81 BSC		0.150 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

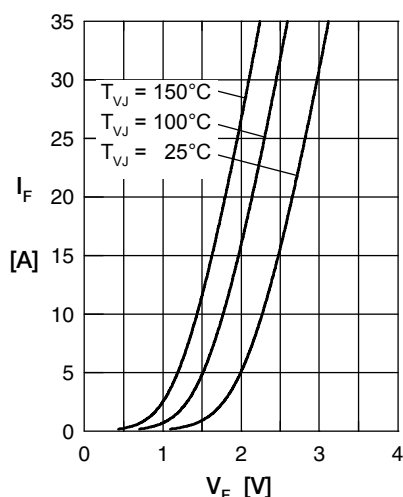


Fig. 1 Forward current I_F versus V_F

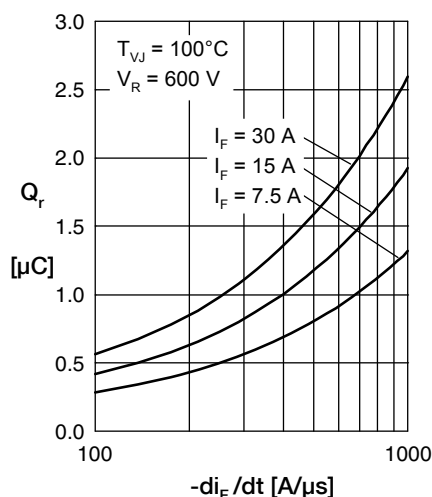


Fig. 2 Reverse recovery charge Q_r versus $-di_F/dt$

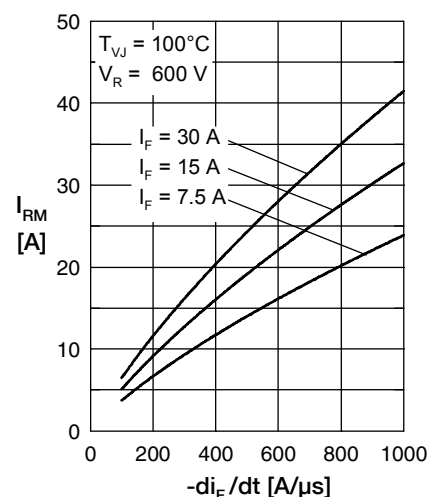


Fig. 3 Peak reverse current I_{RM} versus $-di_F/dt$

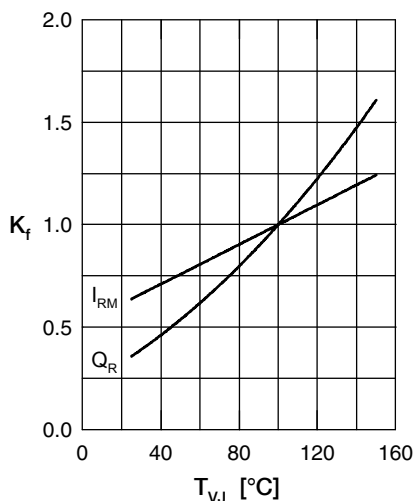


Fig. 4 Dynamic parameters Q_r , I_{RM} versus T_{VJ}

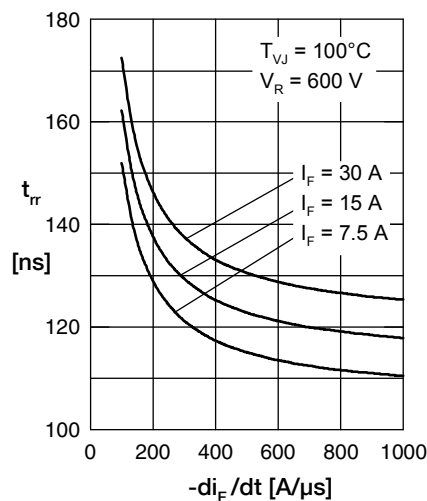


Fig. 5 Recovery time t_{rr} versus $-di_F/dt$

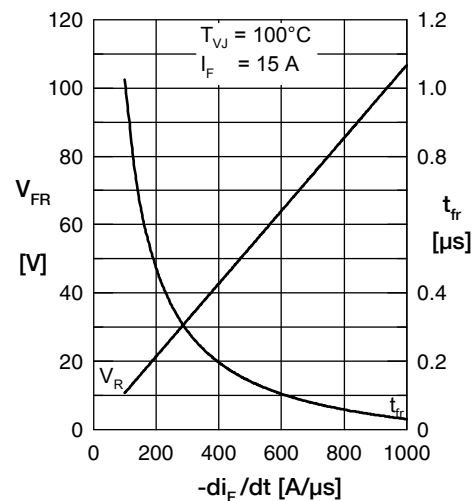


Fig. 6 Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

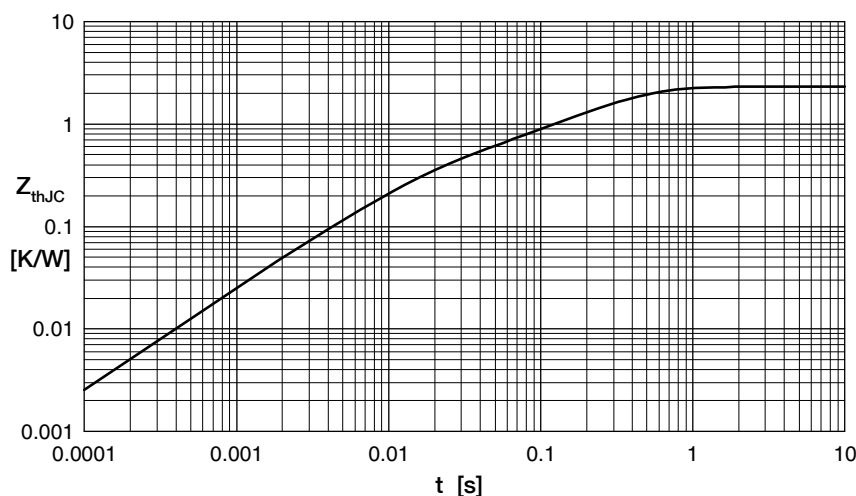


Fig. 7 Transient thermal resistance junction to case

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.78545	0.0052
2	0.30245	0.0003
3	0.0621	0.0004
4	1.15	0.0092