

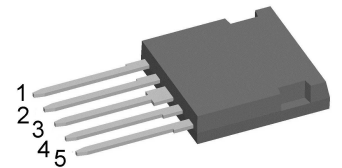
HiPerFRED

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

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

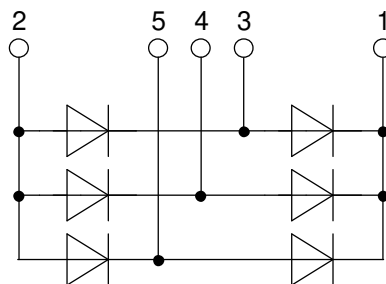
Part number

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: 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

Disclaimer Notice

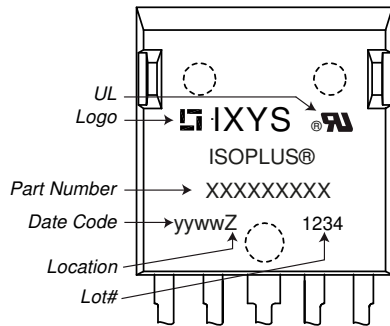
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Fast Diode				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$			1200	V	
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$			1200	V	
I_R	reverse current, drain current	$V_R = 1200\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		100	μA	
		$V_R = 1200\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$		0.5	mA	
V_F	forward voltage drop	$I_F = 10\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$		2.37	V	
		$I_F = 30\text{ A}$			3.17	V	
		$I_F = 10\text{ A}$	$T_{VJ} = 150^{\circ}\text{C}$		1.60	V	
		$I_F = 30\text{ A}$			2.54	V	
I_{DAV}	bridge output current	$T_C = 120^{\circ}\text{C}$ rectangular $d = \frac{1}{3}$	$T_{VJ} = 175^{\circ}\text{C}$		30	A	
V_{FO}	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}\text{C}$		0.97	V	
r_F	slope resistance				48	m Ω	
R_{thJC}	thermal resistance junction to case				2.3	K/W	
R_{thCH}	thermal resistance case to heatsink			0.2		K/W	
P_{tot}	total power dissipation		$T_C = 25^{\circ}\text{C}$		65	W	
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$	$T_{VJ} = 45^{\circ}\text{C}$		90	A	
C_J	junction capacitance	$V_R = 600\text{ V}$ $f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		5	pF	
I_{RM}	max. reverse recovery current	} $I_F = 15\text{ A}; V_R = 600\text{ V}$ $-di_F/dt = 200\text{ A}/\mu\text{s}$	$T_{VJ} = 25^{\circ}\text{C}$		6	A	
			$T_{VJ} = 100^{\circ}\text{C}$		9	A	
t_{rr}	reverse recovery time		$T_{VJ} = 25^{\circ}\text{C}$		50	ns	
			$T_{VJ} = 100^{\circ}\text{C}$		140	ns	



Package i4-Pac		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			50	A
T_{VJ}	virtual junction temperature		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				6		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

Product Marking



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

Equivalent Circuits for Simulation

* on die level

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

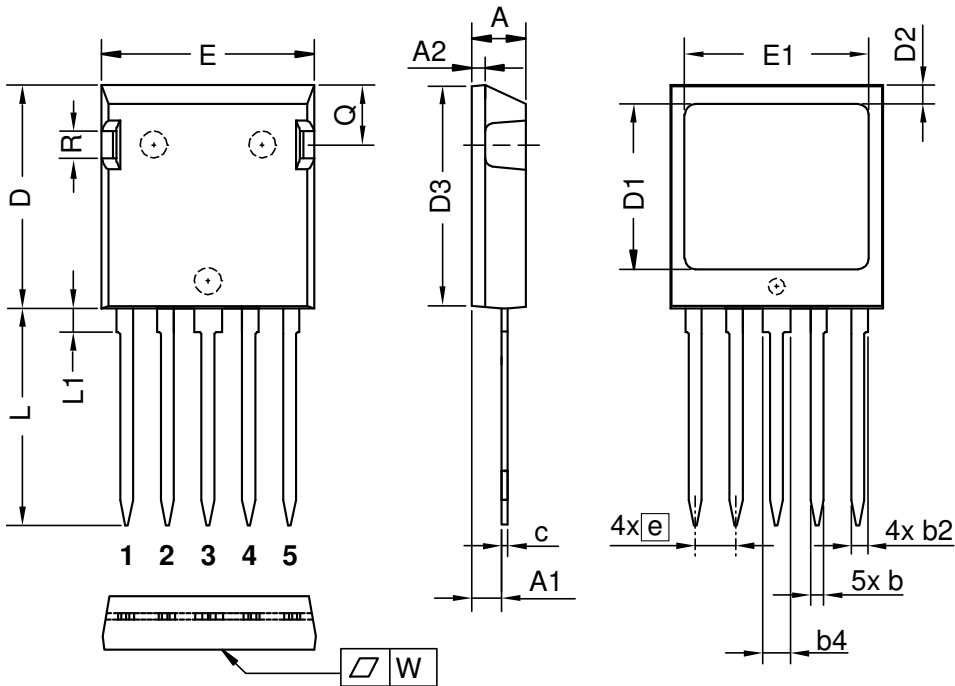


Fast Diode

$V_{0\ max}$	threshold voltage	0.97	V
$R_{0\ max}$	slope resistance *	46	mΩ

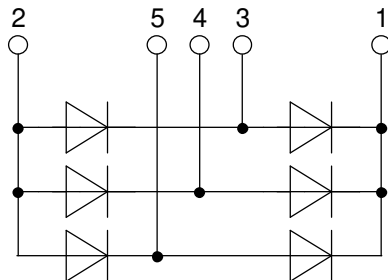


Outlines i4-Pac



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 convexbow of substrate is typ. < 0.05 mm over plastic surface level of device bottom side



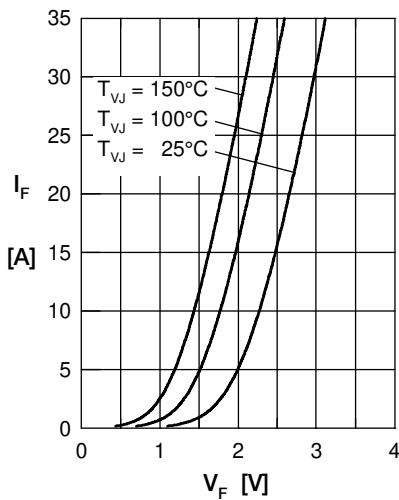
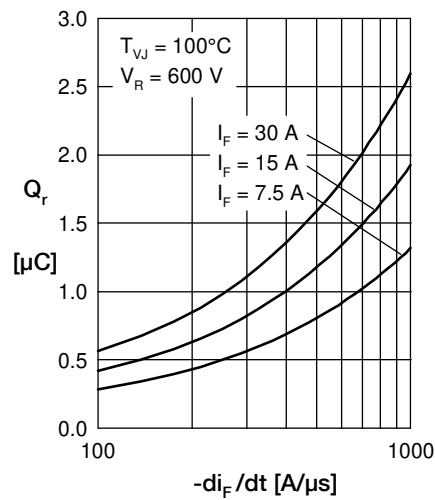
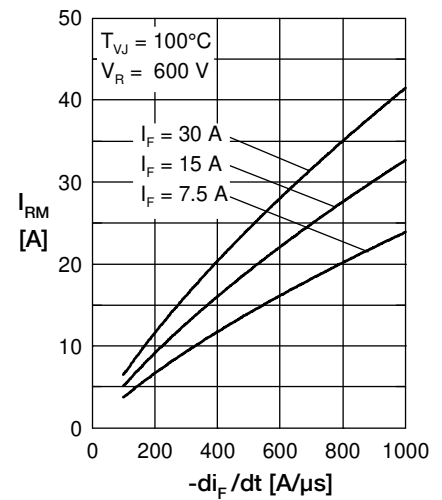
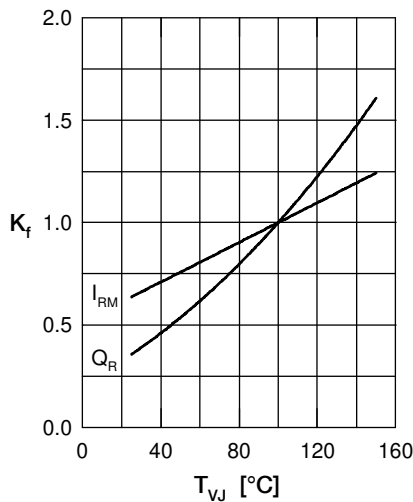
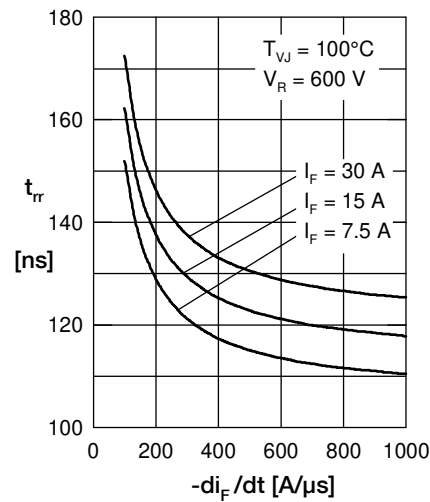
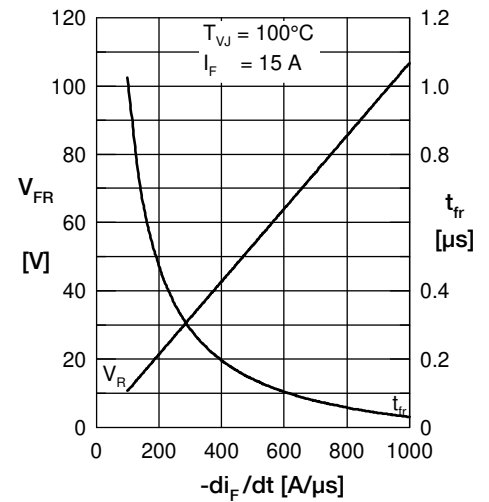
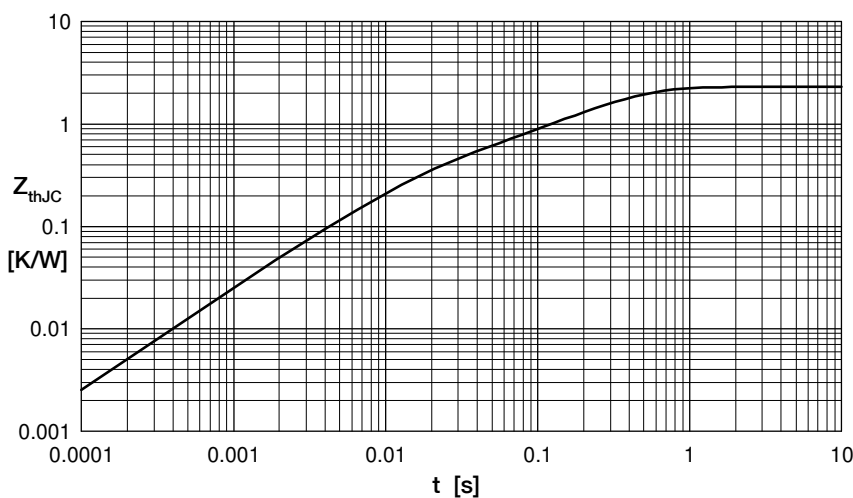
Fast Diode

 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