



Standard Rectifier

$$V_{RRM} = 2 \times 1600 \text{ V}$$

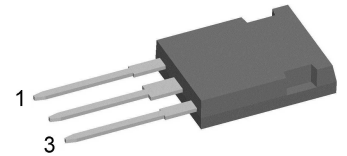
$$I_{FAV} = 45 \text{ A}$$

$$V_F = 1.23 \text{ V}$$

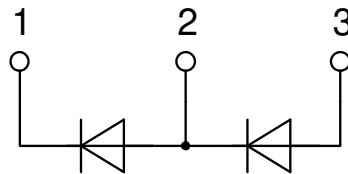
Phase leg

Part number

DSP45-16AR



Backside: isolated



Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour

Applications:

- Diode for main rectification
- For single and three phase bridge configurations

Package: ISOPLUS247

- Isolation Voltage: 3600 V~
- Industry standard 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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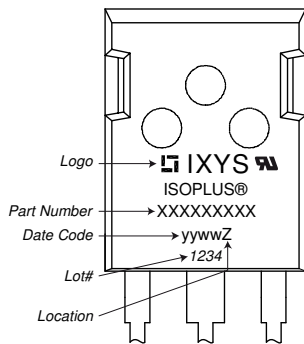


Rectifier				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1700	V	
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1600	V	
I_R	reverse current	$V_R = 1600\text{ V}$	$T_{VJ} = 25^{\circ}C$		40	μA	
		$V_R = 1600\text{ V}$	$T_{VJ} = 150^{\circ}C$		1.5	mA	
V_F	forward voltage drop	$I_F = 45\text{ A}$	$T_{VJ} = 25^{\circ}C$		1.26	V	
		$I_F = 90\text{ A}$			1.57	V	
		$I_F = 45\text{ A}$	$T_{VJ} = 150^{\circ}C$		1.23	V	
		$I_F = 90\text{ A}$			1.66	V	
I_{FAV}	average forward current	$T_C = 100^{\circ}C$ 180° sine	$T_{VJ} = 175^{\circ}C$		45	A	
V_{F0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}C$		0.81	V	
r_F	slope resistance				9.1	m Ω	
R_{thJC}	thermal resistance junction to case				0.9	K/W	
R_{thCH}	thermal resistance case to heatsink			0.3		K/W	
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		165	W	
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		480	A	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		520	A	
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}C$		410	A	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		440	A	
I^2t	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		1.15	kA ² s	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		1.13	kA ² s	
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}C$		840	A ² s	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		805	A ² s	
C_J	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}C$		18	pF	



Package ISOPLUS247		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			70	A
T_{VJ}	virtual junction temperature		-40		175	°C
T_{op}	operation temperature		-40		150	°C
T_{stg}	storage temperature		-40		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	2.7			mm
$d_{Spb/ Apb}$		terminal to backside	4.1			mm
V_{ISOL}	isolation voltage	t = 1 second t = 1 minute	3600 3000			V V
		50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA				

Product Marking



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSP45-16AR	DSP45-16AR	Tube	30	496561

Similar Part	Package	Voltage class
DSP45-16A	TO-247AD (3)	1600
DSP45-16AZ	TO-268AA (D3Pak) (2HV)	1600
DSP45-12A	TO-247AD (3)	1200
DSP45-12AZ	TO-268AA (D3Pak) (2HV)	1200

DSP45-18A	TO-247AD (3)	1800
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Equivalent Circuits for Simulation

* on die level

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

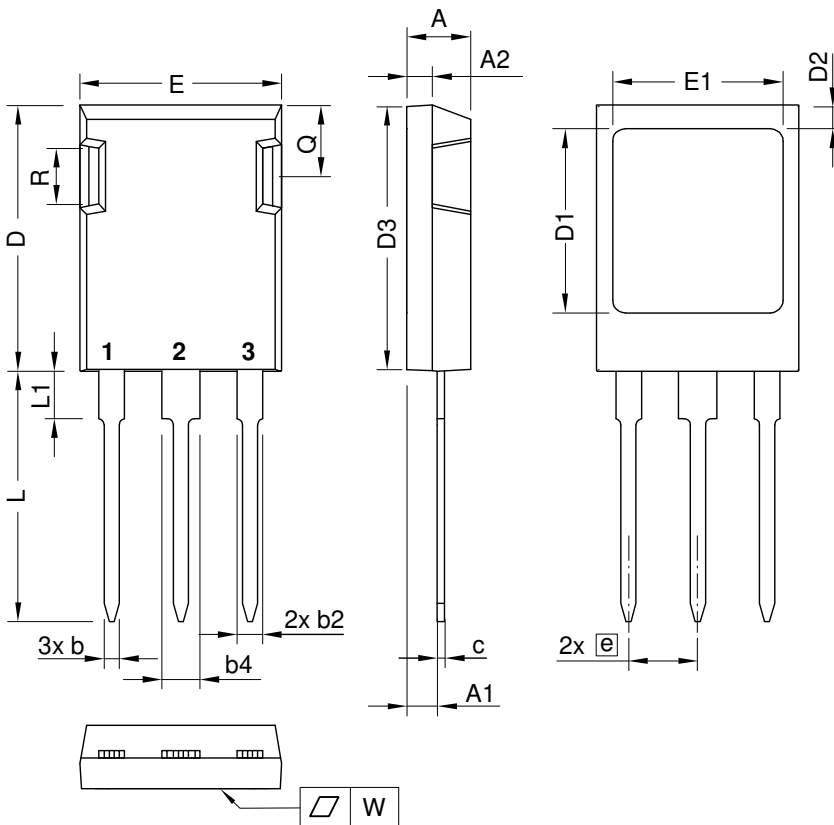


Rectifier

$V_{0\ max}$	threshold voltage	0.81	V
$R_{0\ max}$	slope resistance *	6.5	mΩ



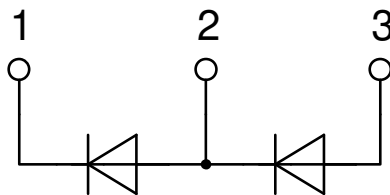
Outlines ISOPLUS247



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.83	5.21	0.190	0.205
A1	2.29	2.54	0.090	0.100
A2	1.91	2.16	0.075	0.085
b	1.14	1.40	0.045	0.055
b2	1.91	2.20	0.075	0.087
b4	2.92	3.24	0.115	0.128
c	0.61	0.83	0.024	0.033
D	20.80	21.34	0.819	0.840
D1	15.75	16.26	0.620	0.640
D2	1.65	2.15	0.065	0.085
D3	20.30	20.70	0.799	0.815
E	15.75	16.13	0.620	0.635
E1	13.21	13.72	0.520	0.540
e	5.45 BSC		0.215 BSC	
L	19.81	20.60	0.780	0.811
L1	3.81	4.38	0.150	0.172
Q	5.59	6.20	0.220	0.244
R	4.25	5.50	0.167	0.217
W	-	0.10	-	0.004

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststoffoberfläche der Bauteilunterseite
The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side

Die Gehäuseabmessungen entsprechen dem Typ TO-247 AD gemäß JEDEC außer Schraubloch und L_{max}.
This drawing will meet all dimensions requirement of JEDEC outline TO-247 AD except screw hole and except L_{max}.



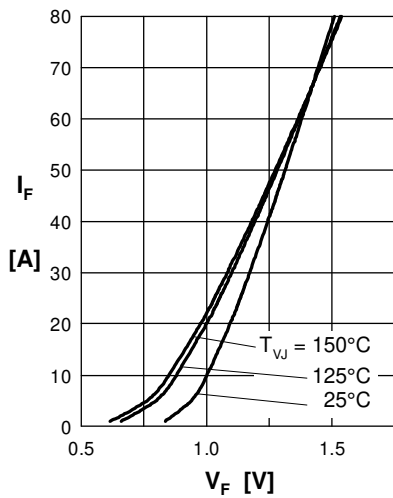
Rectifier


Fig. 1 Forward current versus voltage drop per diode

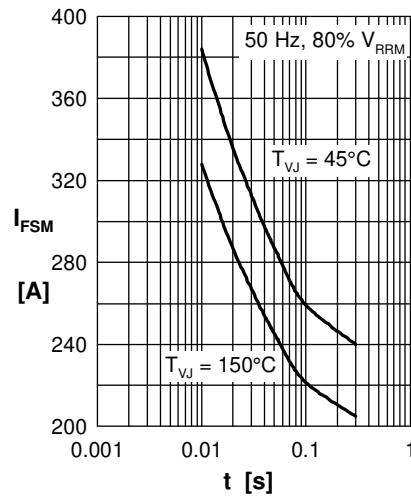


Fig. 2 Surge overload current

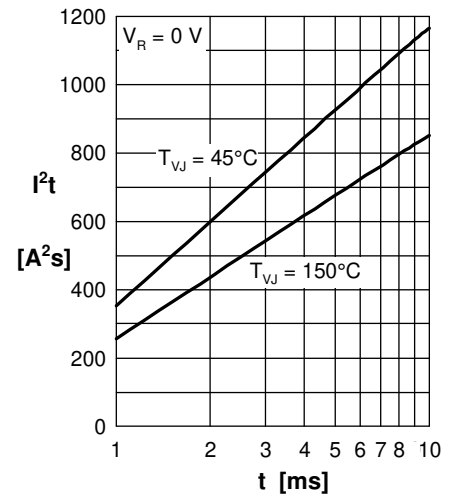
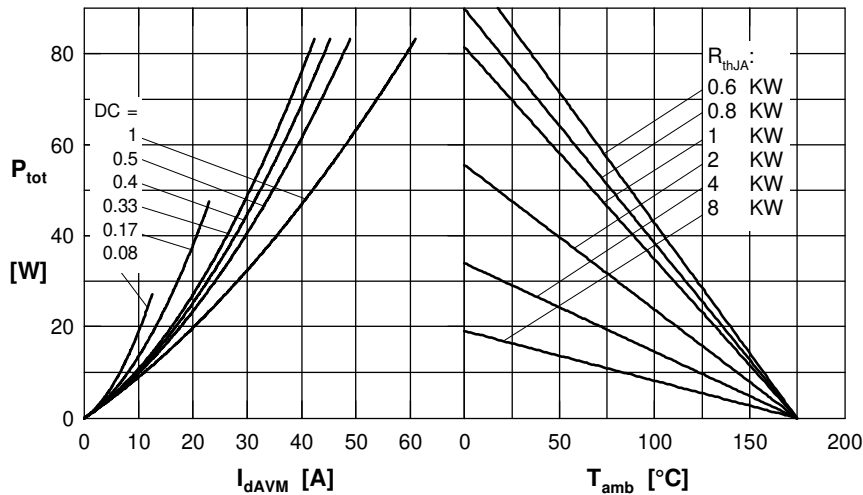

 Fig. 3 I^2t versus time per diode


Fig. 4 Power dissipation vs. direct output current & ambient temperature

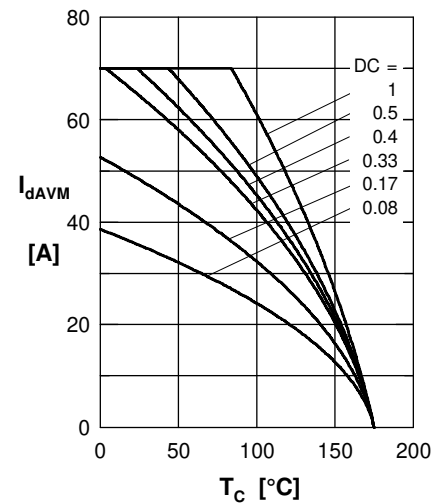


Fig. 5 Max. forward current vs. case temperature

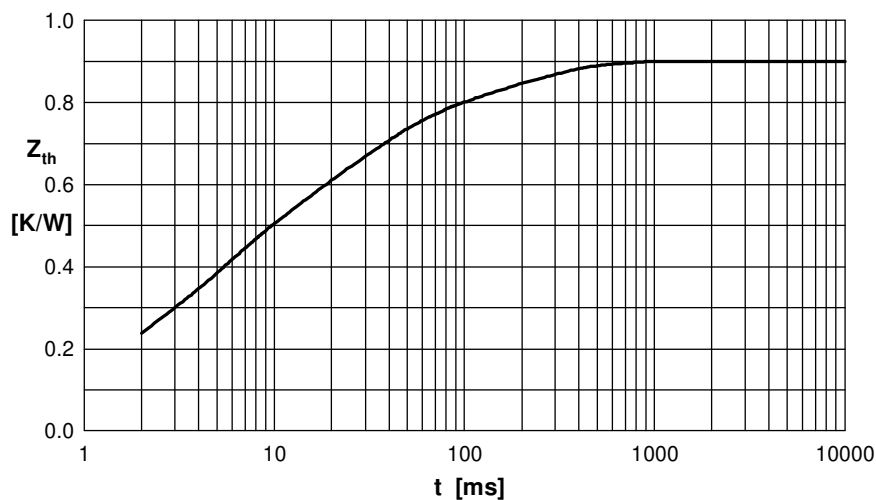


Fig. 6 Transient thermal impedance junction to case

i	R _i	t _i
1	0.0607	0.0004
2	0.123	0.00256
3	0.2305	0.045
4	0.323	0.0242
5	0.1628	0.18