



# Standard Rectifier

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

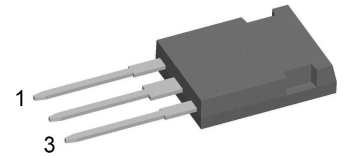
$I_{FAV} = 45 \text{ A}$

$V_F = 1.23 \text{ V}$

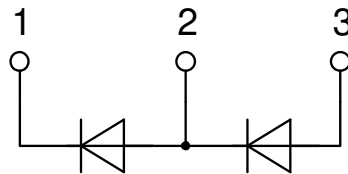
Phase leg

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

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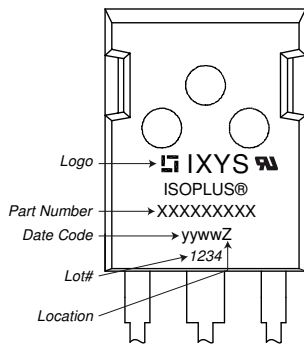


Rectifier				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM}$	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1700	V	
$V_{RRM}$	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1600	V	
$I_R$	reverse current	$V_R = 1600 V$	$T_{VJ} = 25^{\circ}C$		40	$\mu A$	
		$V_R = 1600 V$	$T_{VJ} = 150^{\circ}C$		1.5	mA	
$V_F$	forward voltage drop	$I_F = 45 A$	$T_{VJ} = 25^{\circ}C$		1.26	V	
		$I_F = 90 A$			1.57	V	
		$I_F = 45 A$	$T_{VJ} = 150^{\circ}C$		1.23	V	
		$I_F = 90 A$			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 $\Omega$	
$R_{thJC}$	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 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$		480	A	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		520	A	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}C$		410	A	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		440	A	
$I^2t$	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$		1.15	kA <sup>2</sup> s	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		1.13	kA <sup>2</sup> s	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}C$		840	A <sup>2</sup> s	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		805	A <sup>2</sup> s	
$C_J$	junction capacitance	$V_R = 400 V; f = 1 MHz$	$T_{VJ} = 25^{\circ}C$		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
<b>Weight</b>				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

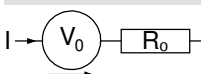
Similar Part	Package	Voltage class
DSP45-16A	TO-247AD (3)	1600
DSP45-16AZ	TO-268AA (D3Pak) (2HV)	1600
DSP45-12A	TO-247AD (3)	1200
DSP45-12AZ	TO-268AA (D3Pak) (2HV)	1200

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

\* on die level

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

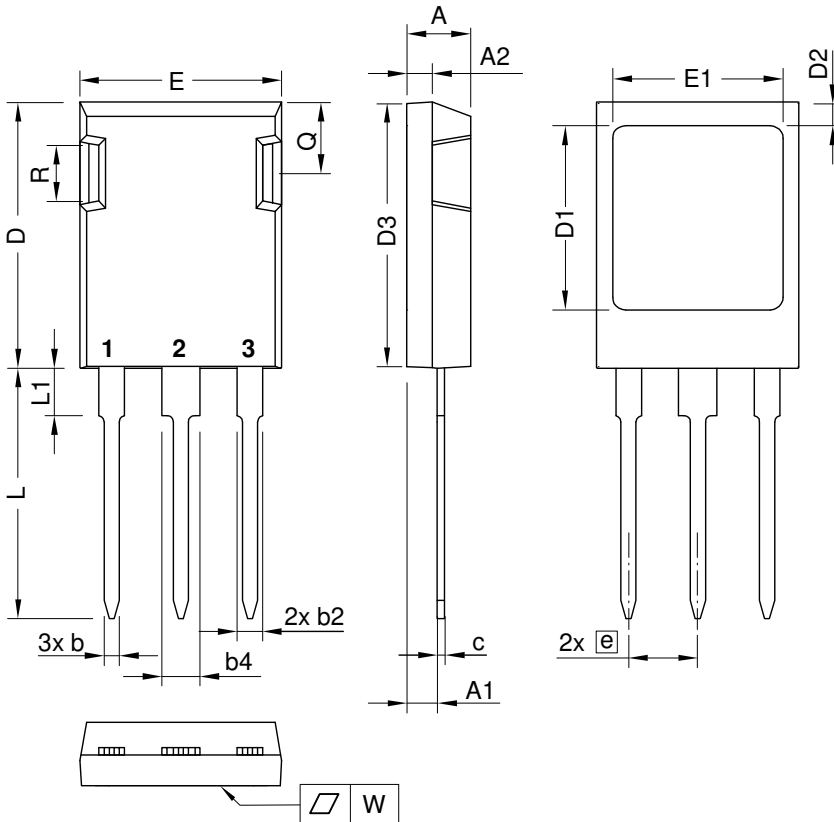


**Rectifier**

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



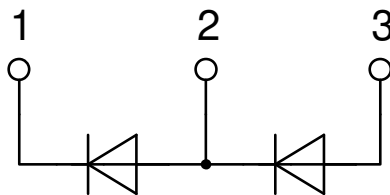
Outlines ISOPLUS247



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**

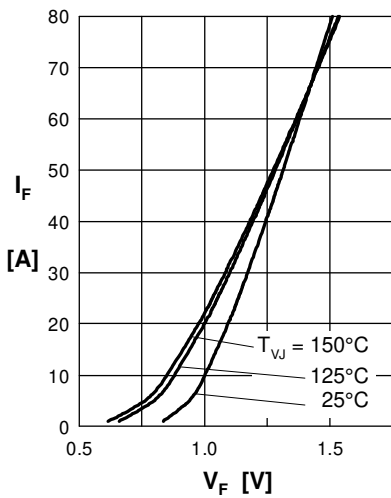


Fig. 1 Forward current versus voltage drop per diode

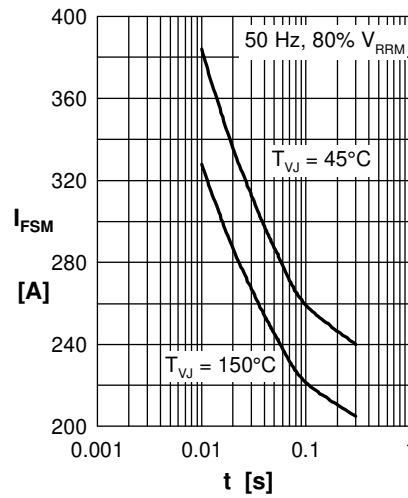


Fig. 2 Surge overload current

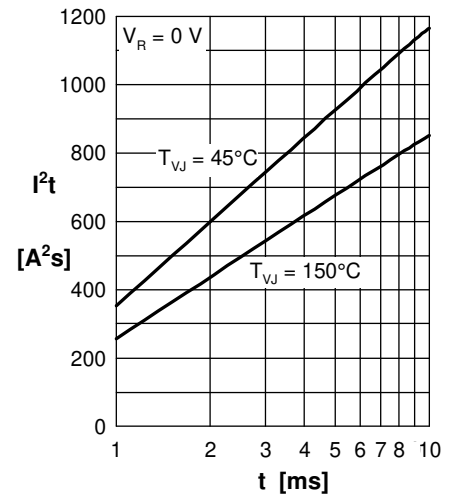


Fig. 3  $I^2t$  versus time per diode

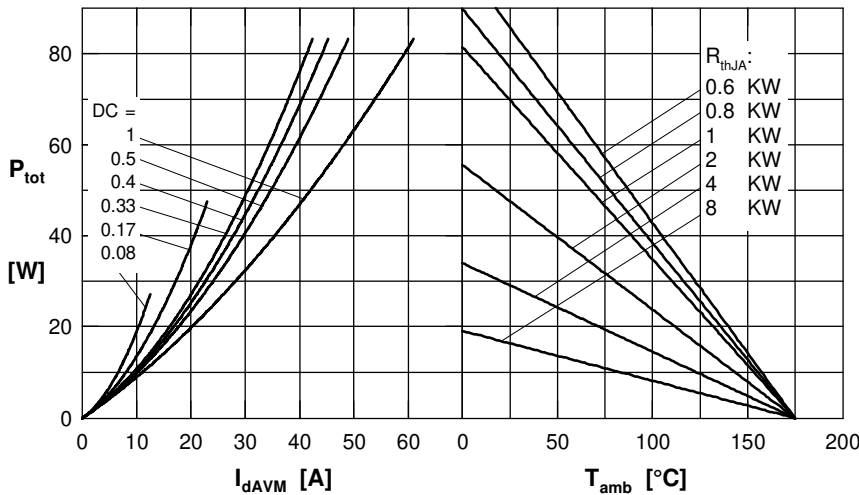


Fig. 4 Power dissipation vs. direct output current & ambient temperature

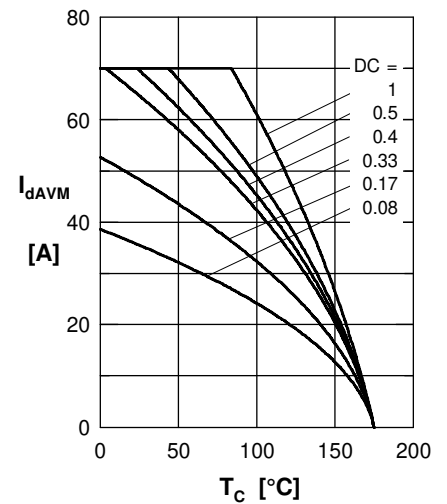


Fig. 5 Max. forward current vs. case temperature

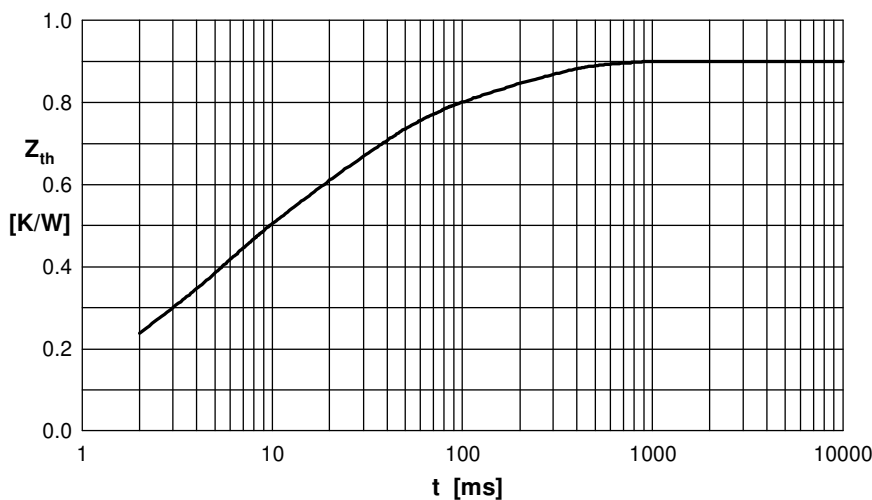


Fig. 6 Transient thermal impedance junction to case

i	R <sub>i</sub>	t <sub>i</sub>
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