

## Standard Rectifier

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

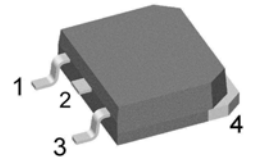
$$I_{FAV} = 25A$$

$$V_F = 1.16V$$

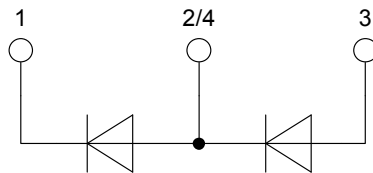
Phase leg

Part number

DSP25-16AT



Backside: anode/cathode



### 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

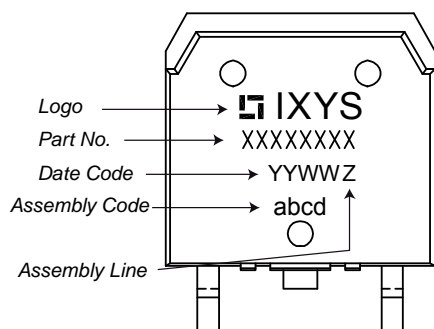
### Package: TO-268AA (D3Pak)

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

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, drain current	$V_R = 1600 V$			40	$\mu A$	
		$V_R = 1600 V$			1.5	mA	
$V_F$	forward voltage drop	$I_F = 25 A$			1.23	V	
		$I_F = 50 A$			1.47	V	
		$I_F = 25 A$	$T_{VJ} = 150^{\circ}C$			1.16	V
		$I_F = 50 A$	$T_{VJ} = 150^{\circ}C$			1.50	V
$I_{FAV}$	average forward current	$T_C = 135^{\circ}C$ 180° sine			25	A	
$V_{FO}$	threshold voltage	} for power loss calculation only			0.81	V	
$r_F$	slope resistance				13.8	m $\Omega$	
$R_{thJC}$	thermal resistance junction to case				0.9	K/W	
$R_{thCH}$	thermal resistance case to heatsink		0.15			K/W	
$P_{tot}$	total power dissipation	$T_C = 25^{\circ}C$			160	W	
$I_{FSM}$	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$		300	A	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		325	A	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}C$		255	A	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		275	A	
$I^2t$	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$		450	A <sup>2</sup> s	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		440	A <sup>2</sup> s	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}C$		325	A <sup>2</sup> s	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		315	A <sup>2</sup> s	
$C_J$	junction capacitance	$V_R = 400 V; f = 1 MHz$	$T_{VJ} = 25^{\circ}C$	10		pF	

Package TO-268AA (D3Pak)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			70	A
$T_{stg}$	storage temperature		-55		150	°C
$T_{vj}$	virtual junction temperature		-40		175	°C
<b>Weight</b>				5		g
$F_C$	mounting force with clip		20		120	N

### Product Marking



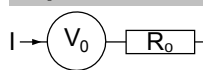
Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSP25-16AT	DSP25-16AT	Tube	30	475998

Similar Part	Package	Voltage class
DSP25-16A	TO-247AD (3)	1600
DSP25-16AR	ISOPLUS247 (3)	1600
DSP25-12AT	TO-268AA (D3Pak) (2)	1200
DSP25-12A	TO-247AD (3)	1200

### Equivalent Circuits for Simulation

\* on die level

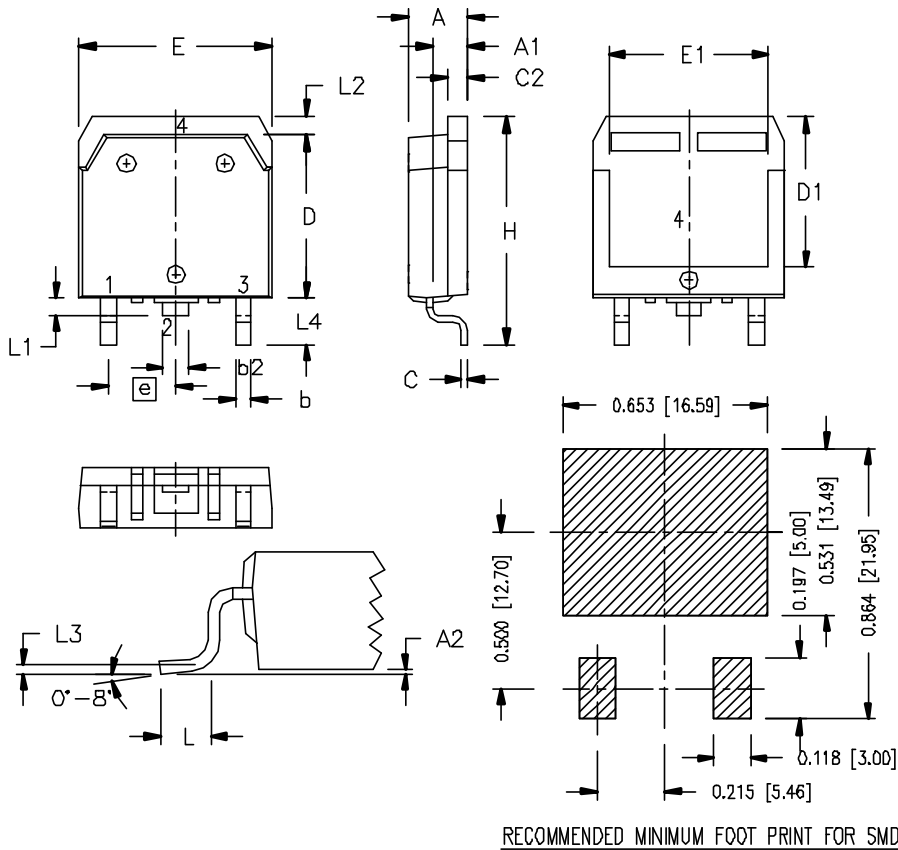
$T_{vj} = 175^{\circ}C$



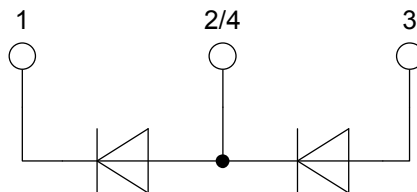
**Rectifier**

$V_{0\ max}$	threshold voltage	0.81	V
$R_{0\ max}$	slope resistance *	11.2	mΩ

## Outlines TO-268AA (D3Pak)



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.90	5.10	0.193	0.201
A1	2.70	2.90	0.106	0.114
A2	0.02	0.25	0.001	0.100
b	1.15	1.45	0.045	0.057
b2	1.90	2.10	0.075	0.083
C	0.40	0.65	0.016	0.026
C2	1.45	1.60	0.057	0.063
D	13.80	14.00	0.543	0.551
D1	12.40	12.70	0.488	0.500
E	15.85	16.05	0.624	0.632
E1	13.30	13.60	0.524	0.535
e	5.45 BSC		0.215 BSC	
H	18.70	19.10	0.736	0.752
L	2.40	2.70	0.094	0.106
L1	1.20	1.40	0.047	0.055
L2	1.00	1.15	0.039	0.045
L3	0.25 BSC		0.100 BSC	
L4	3.80	4.10	0.150	0.161



## Rectifier

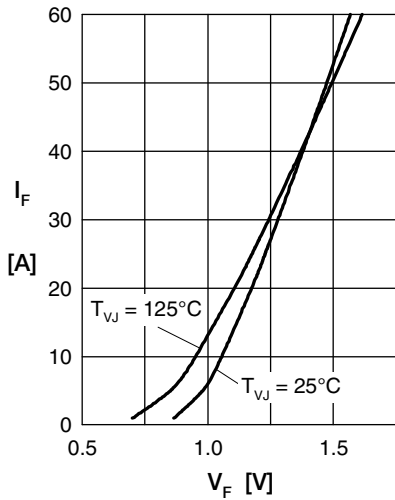


Fig. 1 Forward current versus voltage drop per diode

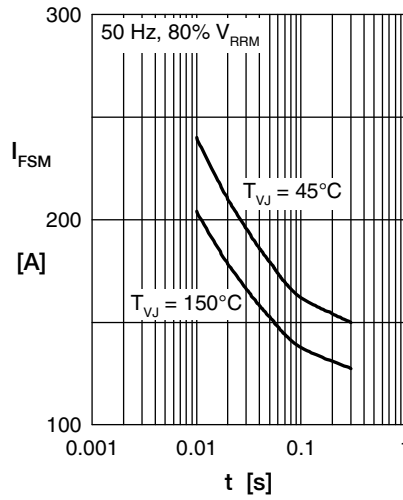


Fig. 2 Surge overload current

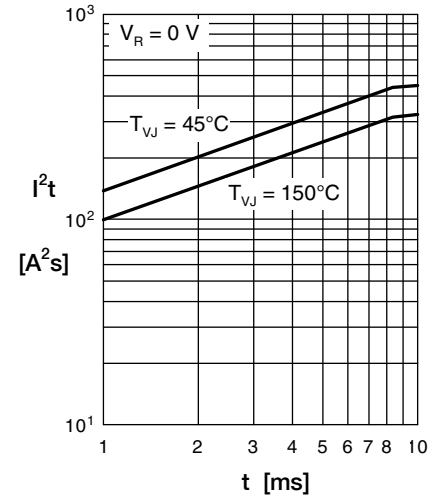


Fig. 3  $I^2t$  versus time per diode

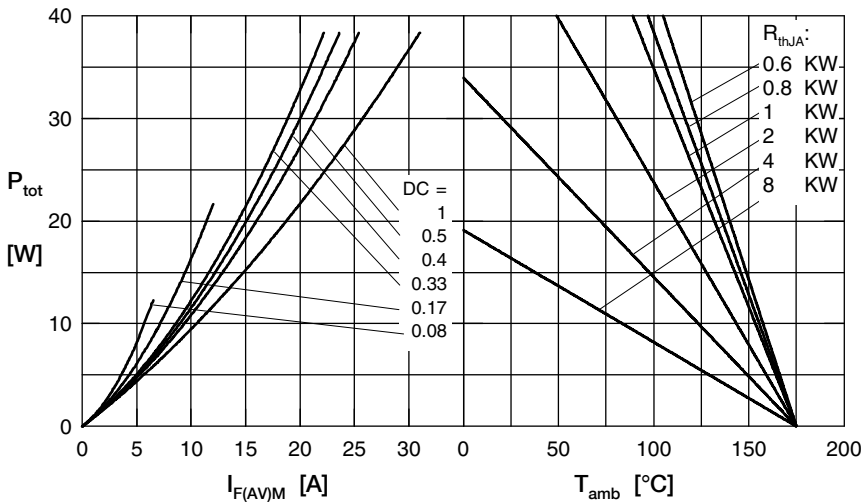


Fig. 4 Power dissipation vs. direct output current and ambient temperature

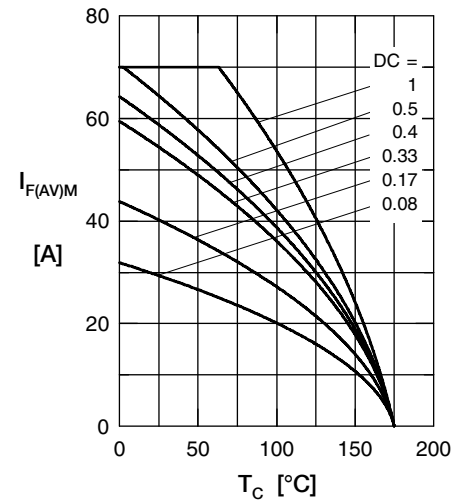


Fig. 5 Max. forward current vs. case temperature

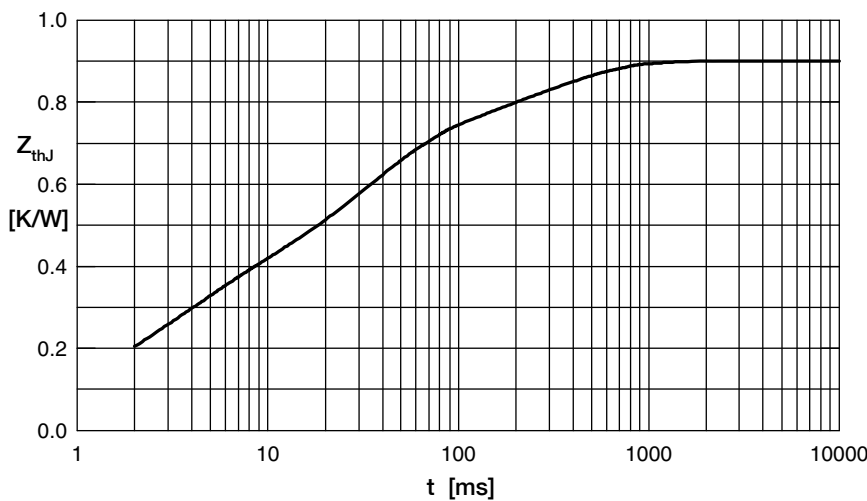


Fig. 6 Transient thermal impedance junction to case

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.03	0.0004
2	0.08	0.002
3	0.2	0.003
4	0.39	0.03
5	0.2	0.29