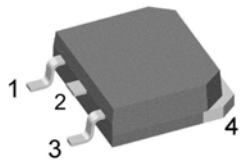
Standard Rectifier

V_{RRM} = 2x 1600 V
I_{FAV} = 25 A
V_F = 1.16 V

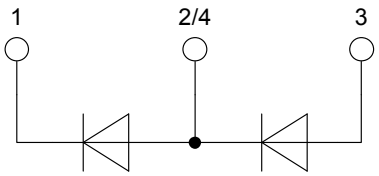
Phase leg

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

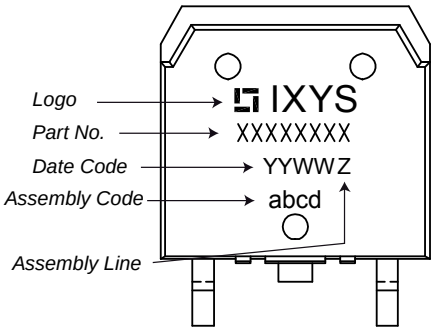
Package: TO-268AA (D3Pak)

- 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°C			1700	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			1600	V
I_R	*reverse current, drain current*	V_R = 1600 V	T_{VJ} = 25°C			40	µA
		V_R = 1600 V	T_{VJ} = 150°C			1.5	mA
V_F	*forward voltage drop*	I_F = 25 A	T_{VJ} = 25°C			1.23	V
		I_F = 50 A				1.47	V
		I_F = 25 A	T_{VJ} = 150 °C			1.16	V
		I_F = 50 A				1.50	V
I_{FAV}	*average forward current*	T_C = 135°C	T_{VJ} = 175°C			25	A
		180° sine					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 175°C			0.81	V
r_F	*slope resistance* }					13.8	mΩ
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°C			160	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°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°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°C			450	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			440	A²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			325	A²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			315	A²s
C_J	*junction capacitance*	V_R = 400 V; f = 1 MHz	T_{VJ} = 25°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
Weight				5		g
F_C	*mounting force with clip*		20		120	N

Product Marking

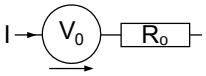


Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSP25-16AT	DSP25-16AT	Tube	30	475998

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

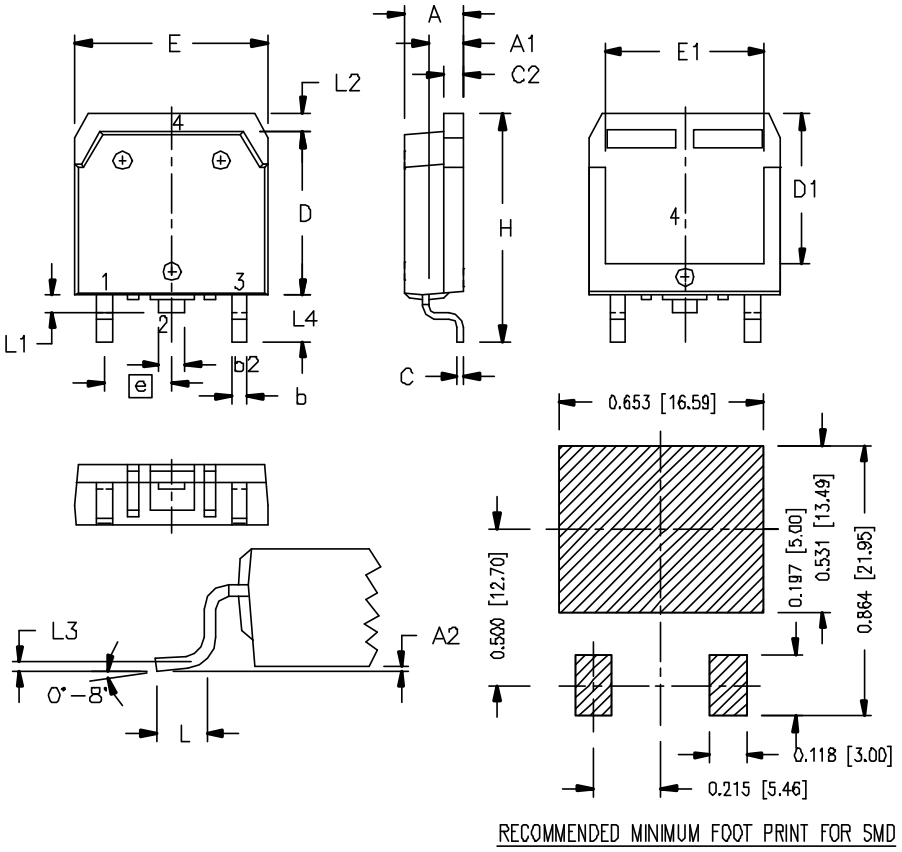
** on die level* T_{VJ} = 175°C



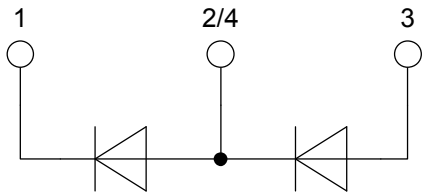
Rectifier

$V_{0\,max}$	*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

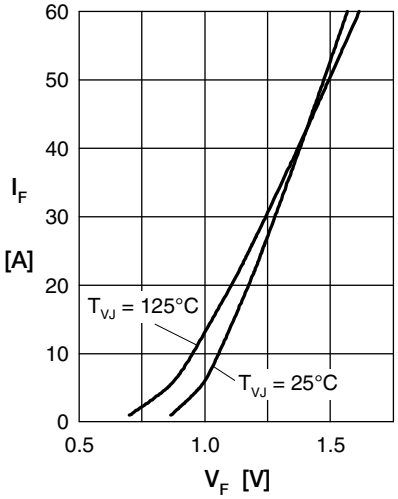


Fig. 1 Forward current versus voltage drop per diode

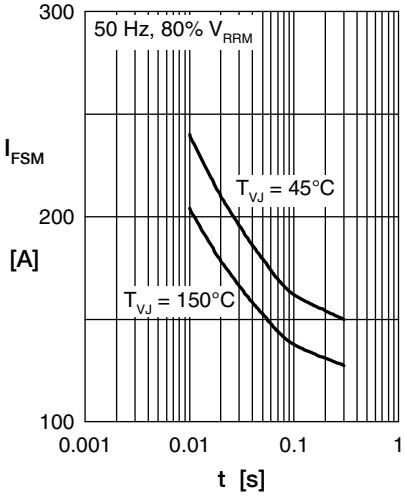


Fig. 2 Surge overload current

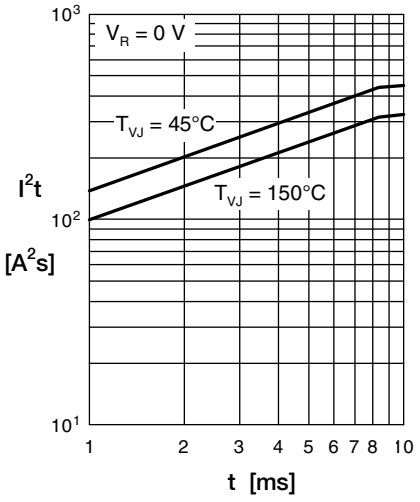


Fig. 3 I^2t versus time per diode

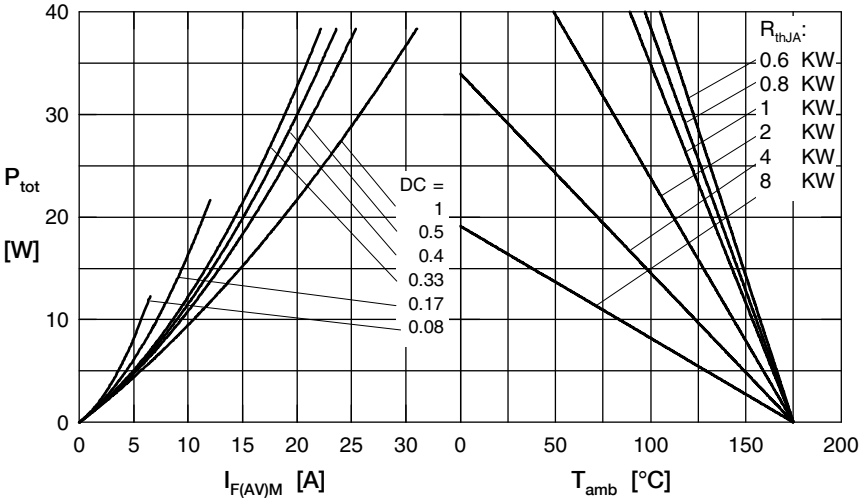


Fig. 4 Power dissipation vs. direct output current and ambient temperature

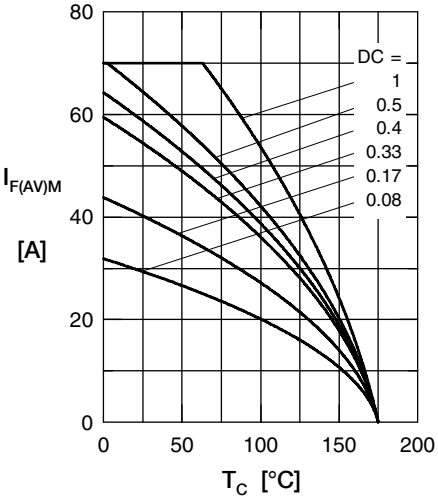


Fig. 5 Max. forward current vs. case temperature

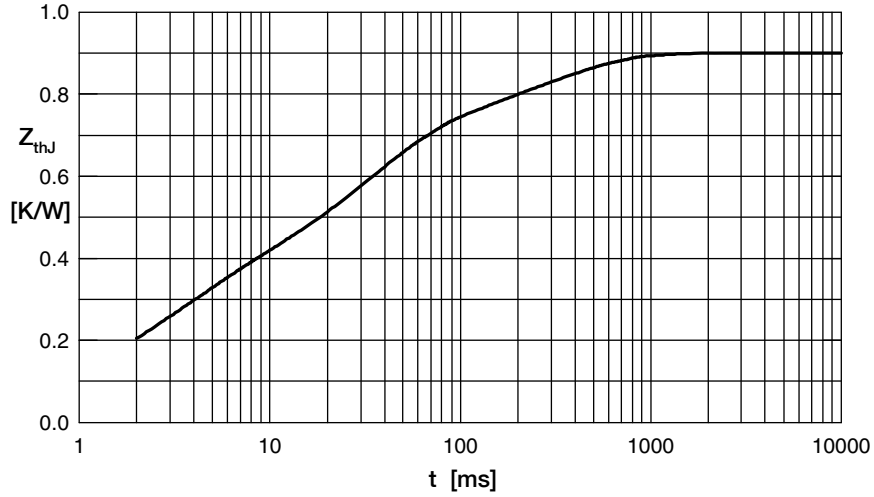


Fig. 6 Transient thermal impedance junction to case

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