



# Standard Rectifier

$$V_{RRM} = 2 \times 1200 \text{ V}$$

$$I_{FAV} = 25 \text{ A}$$

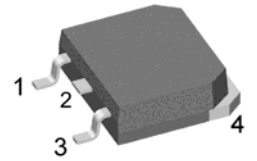
$$V_F = 1,16 \text{ V}$$

Phase leg

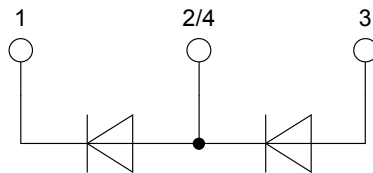
Part number

**DSP25-12AT**

Marking on Product: DSP25-12AT



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

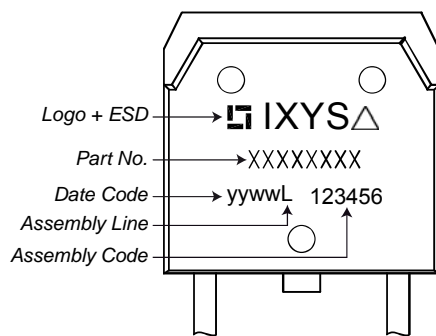
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Rectifier			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1300	V
$V_{RRM}$	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1200	V
$I_R$	reverse current	$V_R = 1200\text{ V}$	$T_{VJ} = 25^{\circ}C$		40	$\mu A$
		$V_R = 1200\text{ V}$	$T_{VJ} = 150^{\circ}C$		1,5	mA
$V_F$	forward voltage drop	$I_F = 25\text{ A}$	$T_{VJ} = 25^{\circ}C$		1,23	V
		$I_F = 50\text{ A}$			1,47	V
		$I_F = 25\text{ A}$	$T_{VJ} = 150^{\circ}C$		1,16	V
		$I_F = 50\text{ A}$			1,50	V
$I_{FAV}$	average forward current	$T_C = 135^{\circ}C$ 180° sine	$T_{VJ} = 175^{\circ}C$		25	A
$V_{F0}$	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}C$		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	$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}C$		300	A
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$		325	A
		$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}C$		255	A
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$		275	A
$I^2t$	value for fusing	$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}C$		450	A <sup>2</sup> s
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$		440	A <sup>2</sup> s
		$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}C$		325	A <sup>2</sup> s
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$		315	A <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400\text{ V; } f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}C$		10	pF

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

### Product Marking



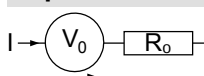
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSP25-12AT-TUB	DSP25-12AT	Tube	30	456055
Alternative	DSP25-12AT-TRL	DSP25-12AT	Tape & Reel	400	510578

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

### Equivalent Circuits for Simulation

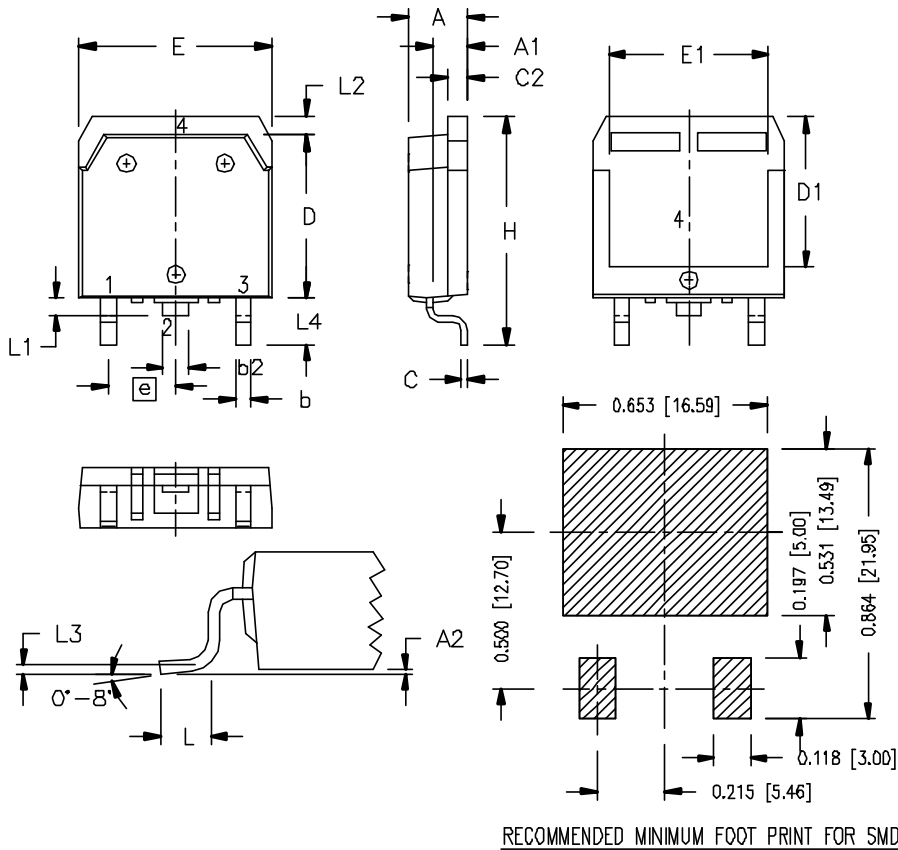
\* on die level

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

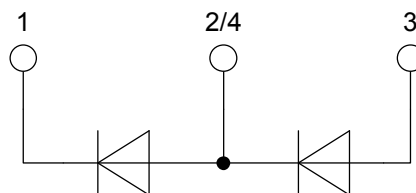


Rectifier

$V_{0\max}$	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**

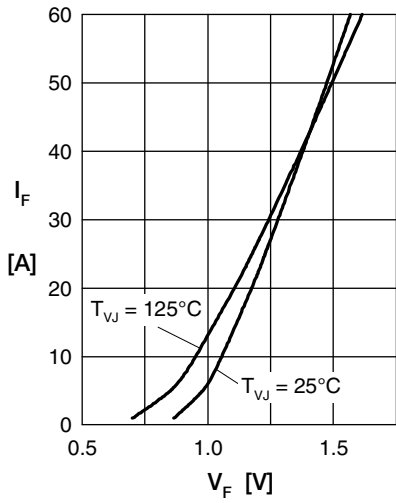


Fig. 1 Forward current versus voltage drop per diode

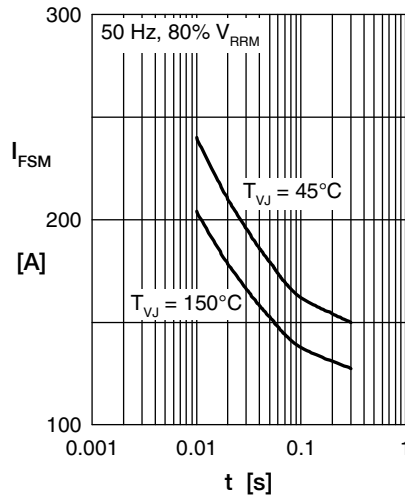


Fig. 2 Surge overload current

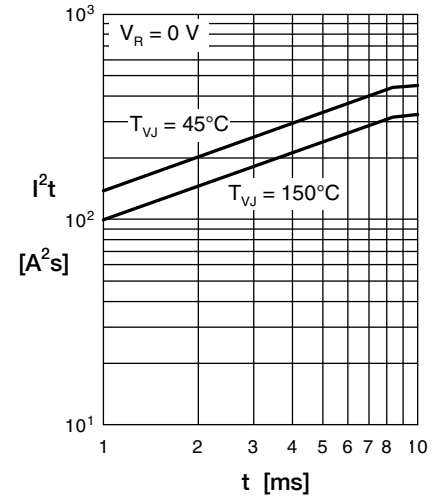


Fig. 3  $I^2t$  versus time per diode

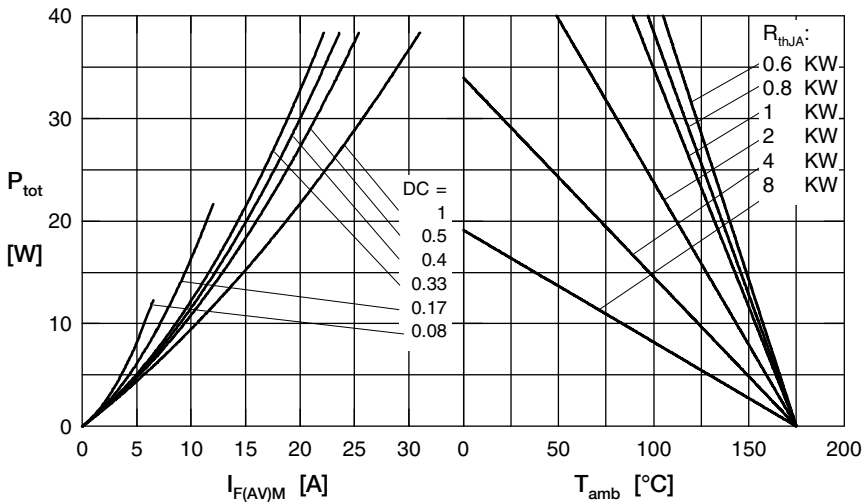


Fig. 4 Power dissipation vs. direct output current and ambient temperature

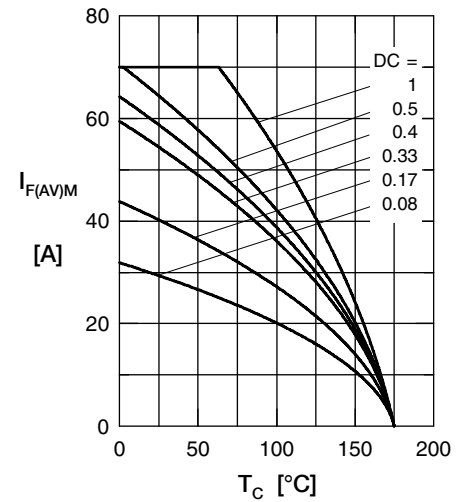


Fig. 5 Max. forward current vs. case temperature

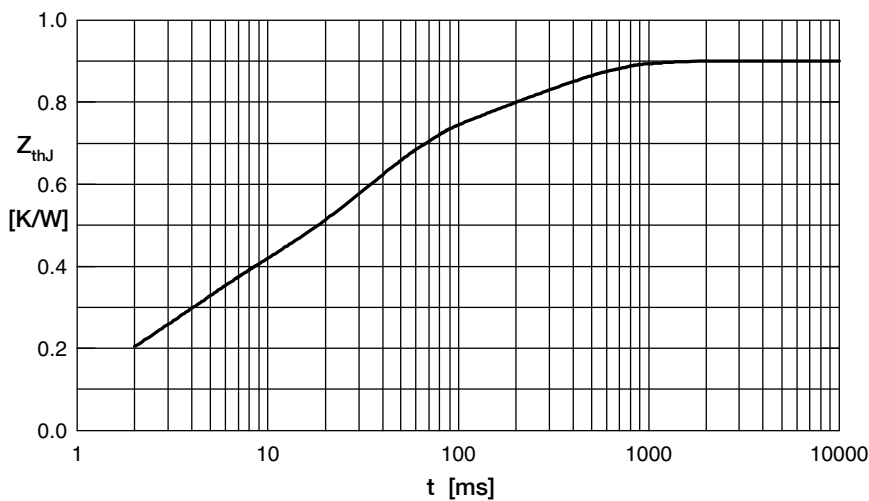


Fig. 6 Transient thermal impedance junction to case

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