



# Standard Rectifier

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

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

$$V_F = 1.16 \text{ V}$$

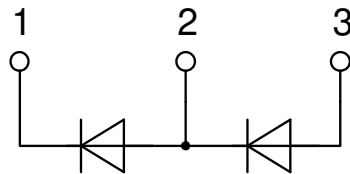
Phase leg

Part number

**DSP25-12A**



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-247**

- 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				1300	V	
$V_{RRM}$	max. repetitive reverse blocking voltage				1200	V	
$I_R$	reverse current	$V_R = 1200\text{ V}$			40	$\mu\text{A}$	
		$V_R = 1200\text{ V}$			1.5	mA	
$V_F$	forward voltage drop	$I_F = 25\text{ A}$			1.23	V	
		$I_F = 50\text{ A}$			1.47	V	
		$I_F = 25\text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1.16	V
		$I_F = 50\text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1.50	V
$I_{FAV}$	average forward current	$T_C = 135^\circ\text{C}$ 180° sine			25	A	
$V_{F0}$	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			0.3		K/W	
$P_{tot}$	total power dissipation				160	W	
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^\circ\text{C}$			300	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			325	A
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^\circ\text{C}$			255	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			275	A
$I^2t$	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^\circ\text{C}$			450	A <sup>2</sup> s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			440	A <sup>2</sup> s
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^\circ\text{C}$			325	A <sup>2</sup> s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			315	A <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$	$T_{VJ} = 25^\circ\text{C}$		10	pF	



Package TO-247			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
$M_D$	mounting torque		0.8		1.2	Nm
$F_C$	mounting force with clip		20		120	N

**Product Marking**



Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DSP25-12A	DSP25-12A	Tube	30	463604

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

**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-247**



Sym.	Inches		Millimeter	
	min.	max.	min.	max.
A	0.185	0.209	4.70	5.30
A1	0.087	0.102	2.21	2.59
A2	0.059	0.098	1.50	2.49
D	0.819	0.845	20.79	21.45
E	0.610	0.640	15.48	16.24
E2	0.170	0.216	4.31	5.48
e	0.215	BSC	5.46	BSC
L	0.780	0.800	19.80	20.30
L1	-	0.177	-	4.49
Ø P	0.140	0.144	3.55	3.65
Q	0.212	0.244	5.38	6.19
S	-	0.242 BSC	-	6.14 BSC
b	0.039	0.055	0.99	1.40
b2	0.065	0.094	1.65	2.39
b4	0.102	0.135	2.59	3.43
c	0.015	0.035	0.38	0.89
D1	0.515	-	13.07	-
D2	0.020	0.053	0.51	1.35
E1	0.530	-	13.45	-
Ø P1	-	0.29	-	7.39



**Rectifier**

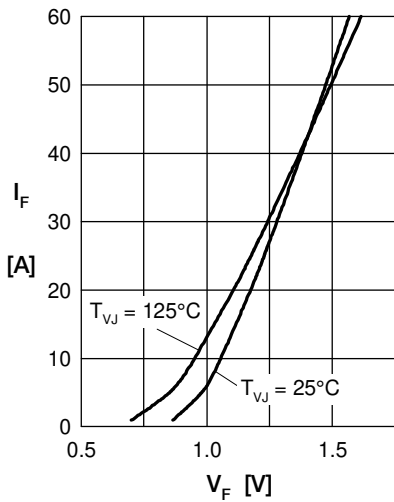


Fig. 1 Forward current versus voltage drop per diode

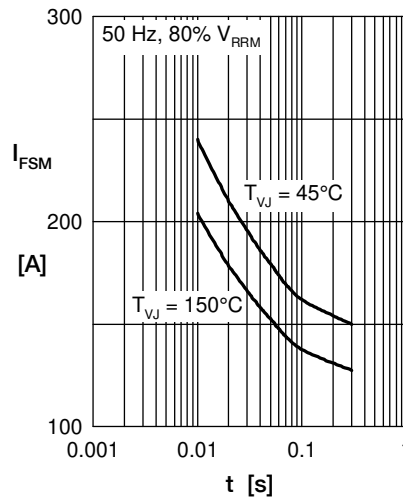


Fig. 2 Surge overload current

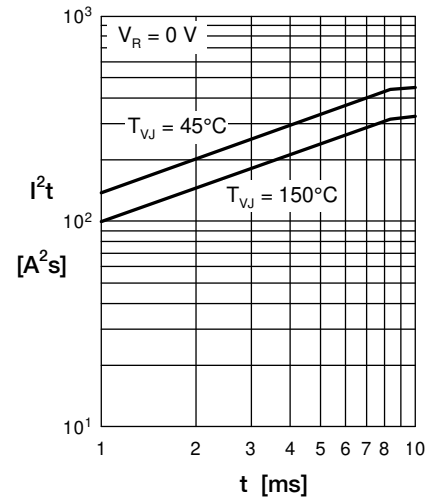


Fig. 3  $I^2t$  versus time per diode

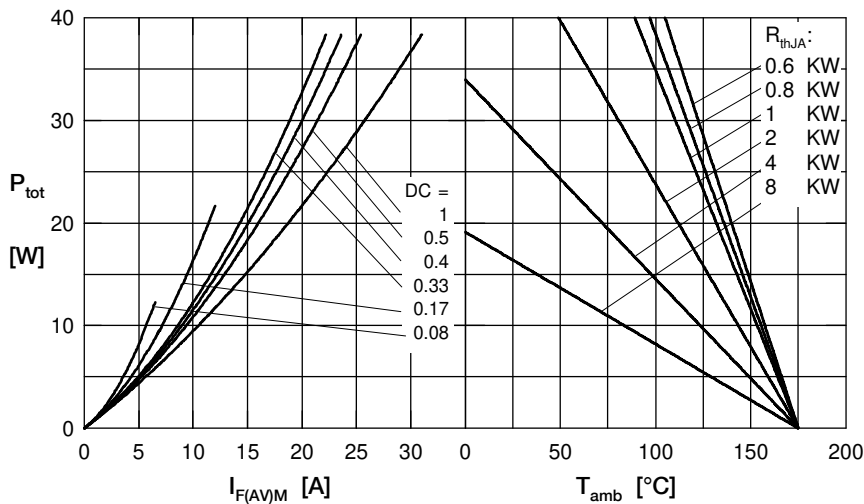


Fig. 4 Power dissipation vs. direct output current and ambient temperature

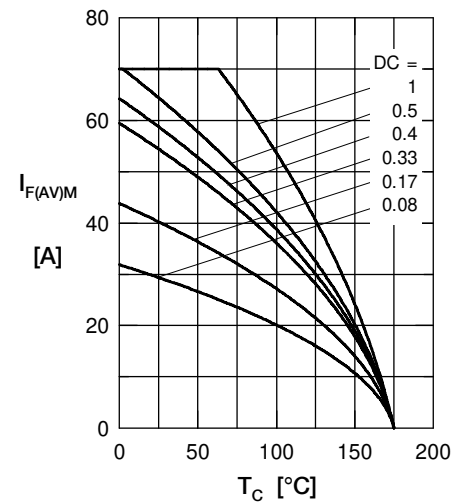


Fig. 5 Max. forward current vs. case temperature

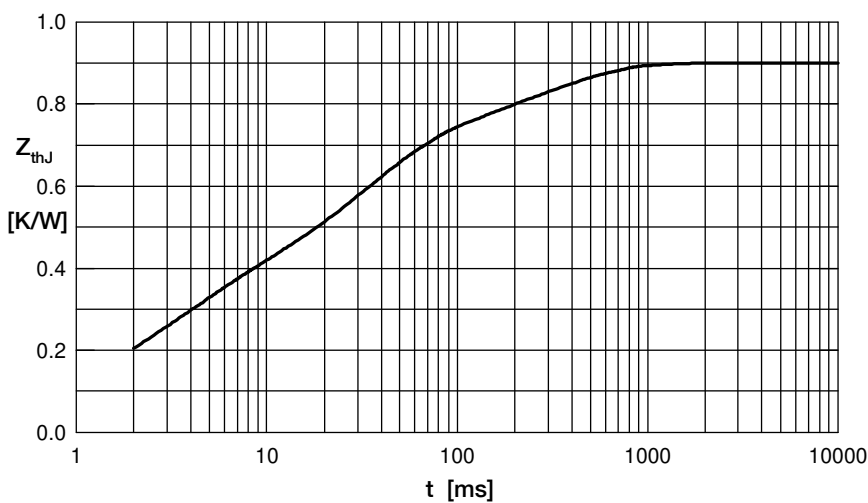


Fig. 6 Transient thermal impedance junction to case

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