

# Standard Rectifier

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

$$I_{FAV} = 50 \text{ A}$$

$$V_F = 1.28 \text{ V}$$

Phase leg

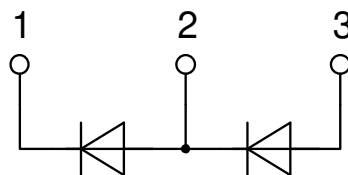
Part number

**DMA50P1200HR**



Backside: isolated

 E72873



### Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour
- High commutation robustness
- High surge capability

### Applications:

- Diode for main rectification
- For single and three phase bridge configurations

### Package: ISO247

- 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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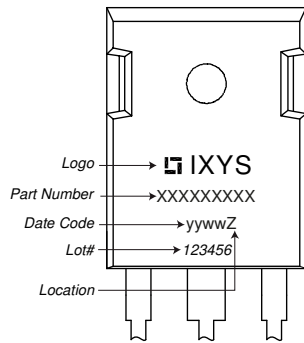


Rectifier				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM}$	max. non-repetitive reverse blocking voltage				1300	V	
$V_{RRM}$	max. repetitive reverse blocking voltage				1200	V	
$I_R$	reverse current	$V_R = 1200\text{ V}$			40	$\mu\text{A}$	
		$V_R = 1200\text{ V}$			1.5	mA	
$V_F$	forward voltage drop	$I_F = 50\text{ A}$			1.31	V	
		$I_F = 100\text{ A}$			1.64	V	
		$I_F = 50\text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1.28	V
		$I_F = 100\text{ A}$	$T_{VJ} = 150^\circ\text{C}$			1.70	V
$I_{FAV}$	average forward current	$T_C = 105^\circ\text{C}$ 180° sine			50	A	
$V_{FO}$	threshold voltage	} for power loss calculation only			0.82	V	
$r_F$	slope resistance				9	m $\Omega$	
$R_{thJC}$	thermal resistance junction to case				0.7	K/W	
$R_{thCH}$	thermal resistance case to heatsink			0.3		K/W	
$P_{tot}$	total power dissipation				210	W	
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^\circ\text{C}$		650	A	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		700	A	
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^\circ\text{C}$		555	A	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		595	A	
$I^2t$	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^\circ\text{C}$		2.12	kA <sup>2</sup> s	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		2.04	kA <sup>2</sup> s	
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^\circ\text{C}$		1.54	kA <sup>2</sup> s	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		1.48	kA <sup>2</sup> s	
$C_J$	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$	$T_{VJ} = 25^\circ\text{C}$		18	pF	



Package ISO247		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			70	A
$T_{VJ}$	virtual junction temperature		-55		175	°C
$T_{op}$	operation temperature		-55		150	°C
$T_{stg}$	storage temperature		-55		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
$d_{Spp/App}$	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	3600			V
		t = 1 minute	3000			V

**Product Marking**



**Part description**

- D = Diode
- M = Standard Rectifier
- A = (up to 1800V)
- 50 = Current Rating [A]
- P = Phase leg
- 1200 = Reverse Voltage [V]
- HR = ISO247 (3)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DMA50P1200HR	DMA50P1200HR	Tube	30	512335

Similar Part	Package	Voltage class
DMA50P1200HB	TO-247AD (3)	1200

**Equivalent Circuits for Simulation**

\* on die level

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

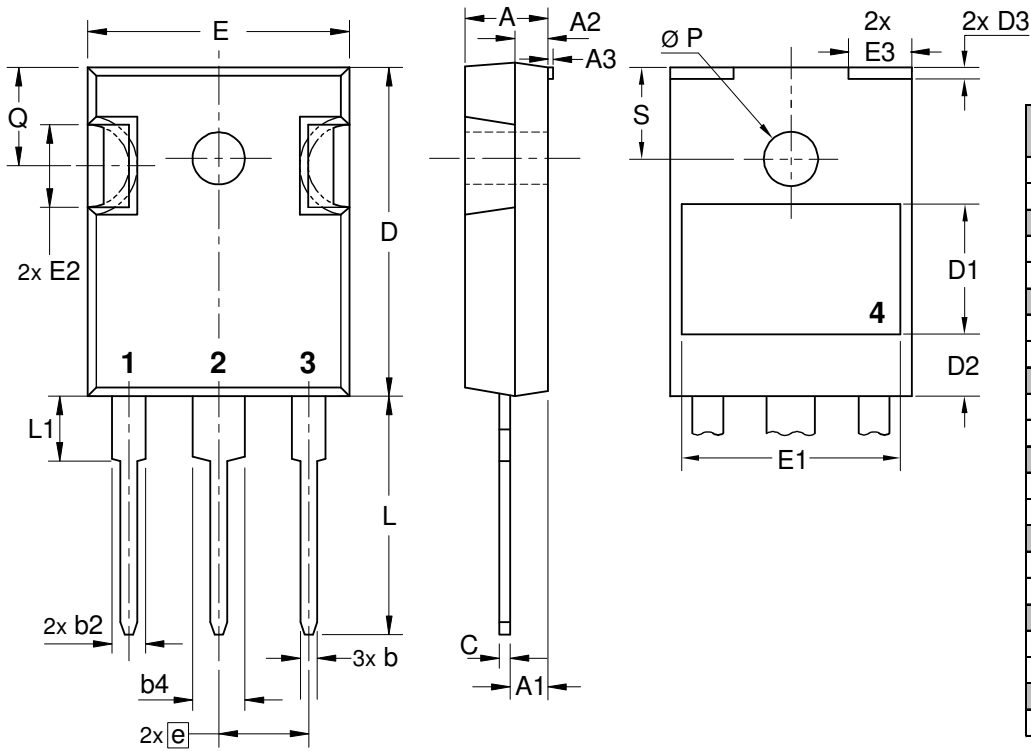


**Rectifier**

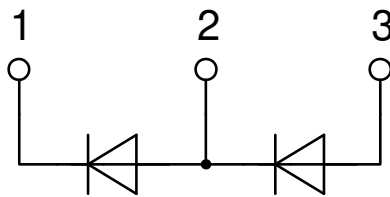
$V_{0\ max}$	threshold voltage	0.82	V
$R_{0\ max}$	slope resistance *	6.4	mΩ



Outlines ISO247



Dim.	Millimeter		Inches	
	min	max	min	max
A	4.70	5.30	0.185	0.209
A1	2.21	2.59	0.087	0.102
A2	1.50	2.49	0.059	0.098
A3	typ. 0.05		typ. 0.002	
b	0.99	1.40	0.039	0.055
b2	1.65	2.39	0.065	0.094
b4	2.59	3.43	0.102	0.135
c	0.38	0.89	0.015	0.035
D	20.79	21.45	0.819	0.844
D1	typ. 8.90		typ. 0.350	
D2	typ. 2.90		typ. 0.114	
D3	typ. 1.00		typ. 0.039	
E	15.49	16.24	0.610	0.639
E1	typ. 13.45		typ. 0.530	
E2	4.31	5.48	0.170	0.216
E3	typ. 4.00		typ. 0.157	
e	5.46 BSC		0.215 BSC	
L	19.80	20.30	0.780	0.799
L1	-	4.49	-	0.177
Ø P	3.55	3.65	0.140	0.144
Q	5.38	6.19	0.212	0.244
S	6.14 BSC		0.242 BSC	



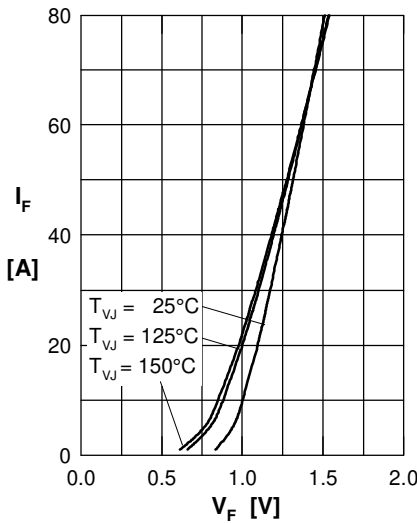
**Rectifier**


Fig. 1 Forward current versus voltage drop per diode

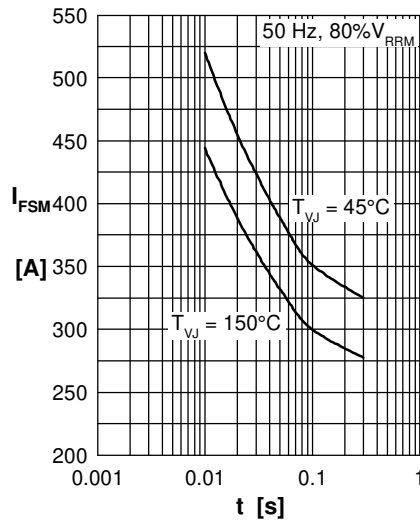


Fig. 2 Surge overload current versus time per diode

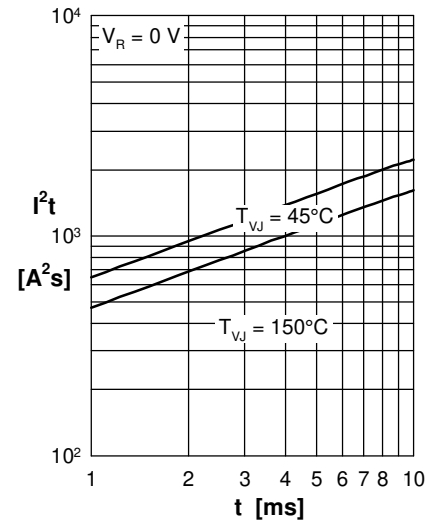
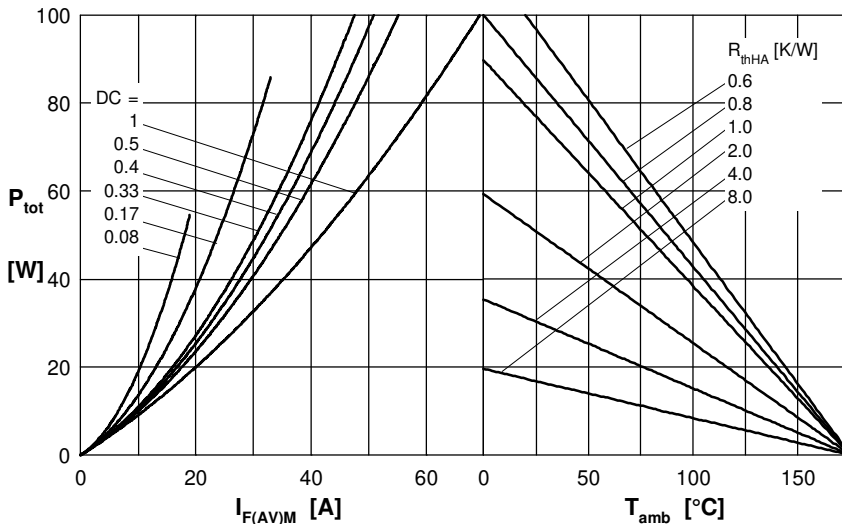

 Fig. 3  $I^2t$  versus time per diode


Fig. 4 Power dissipation versus direct output current and ambient temperature per diode

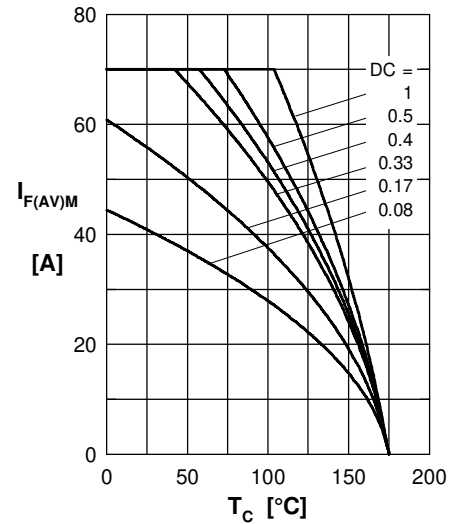


Fig. 5 Max. forward current vs. case temperature per diode

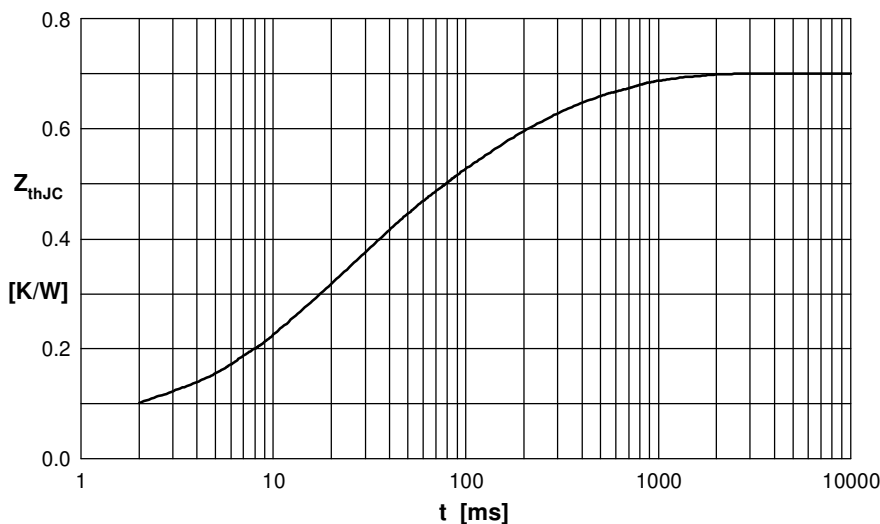


Fig. 6 Transient thermal impedance junction to case versus time per diode

 Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.06	0.0004
2	0.12	0.0100
3	0.20	0.0240
4	0.20	0.1000
5	0.12	0.4500