

Standard Rectifier

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

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

$$V_F = 1.26 \text{ V}$$

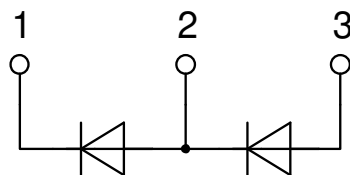
Phase leg

Part number

DMA50P1600HB



Backside: anode/cathode



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: 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				1700	V	
V_{RRM}	max. repetitive reverse blocking voltage				1600	V	
I_R	reverse current	$V_R = 1600$ V			40	μ A	
		$V_R = 1600$ V			1.5	mA	
V_F	forward voltage drop	$I_F = 50$ A			1.30	V	
		$I_F = 100$ A			1.61	V	
		$I_F = 50$ A	$T_{VJ} = 150^\circ\text{C}$			1.26	V
		$I_F = 100$ A				1.66	V
I_{FAV}	average forward current	$T_C = 130^\circ\text{C}$ 180° sine			50	A	
V_{FO}	threshold voltage	} for power loss calculation only			0.81	V	
r_F	slope resistance				8.6	m Ω	
R_{thJC}	thermal resistance junction to case				0.45	K/W	
R_{thCH}	thermal resistance case to heatsink			0.3		K/W	
P_{tot}	total power dissipation				330	W	
I_{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$		650	A	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V		700	A	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$		555	A	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V		595	A	
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$		2.12	kA ² s	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V		2.04	kA ² s	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$		1.54	kA ² s	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V		1.48	kA ² s	
C_J	junction capacitance	$V_R = 400$ V; f = 1 MHz	$T_{VJ} = 25^\circ\text{C}$		19	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		-55		175	°C
T_{op}	operation temperature		-55		150	°C
T_{stg}	storage temperature		-55		150	°C
Weight				6		g
M_D	mounting torque		0.8		1.2	Nm
F_C	mounting force with clip		20		120	N

Product Marking



Part description

- D = Diode
- M = Standard Rectifier
- A = (up to 1800V)
- 50 = Current Rating [A]
- P = Phase leg
- 1600 = Reverse Voltage [V]
- HB = TO-247AD (3)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DMA50P1600HB	DMA50P1600HB	Tube	30	522301

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	0.81	V
$R_{0 \max}$	slope resistance *	6	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	-	6.14
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

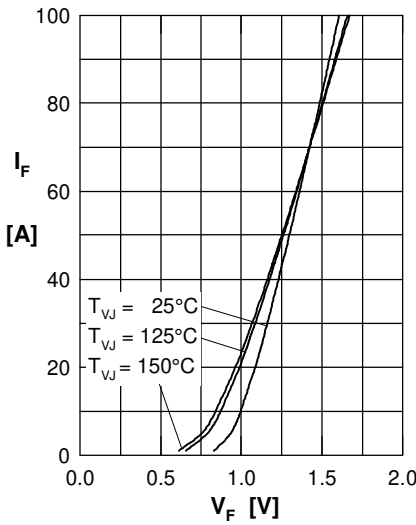


Fig. 1 Forward current versus voltage drop per diode

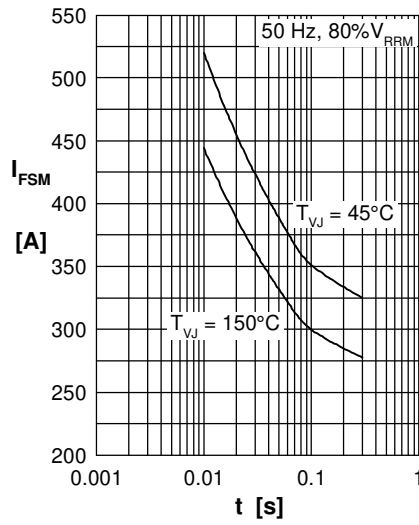


Fig. 2 Surge overload current versus time per diode

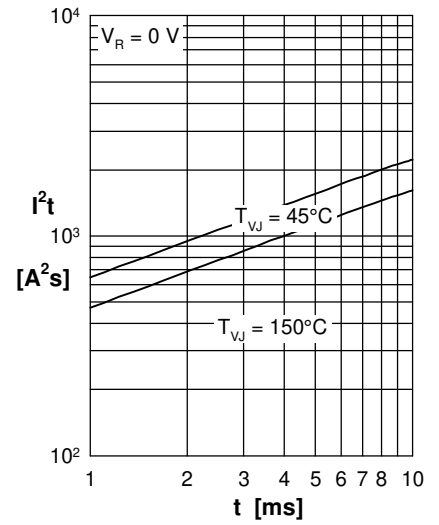


Fig. 3 I^2t versus time per diode

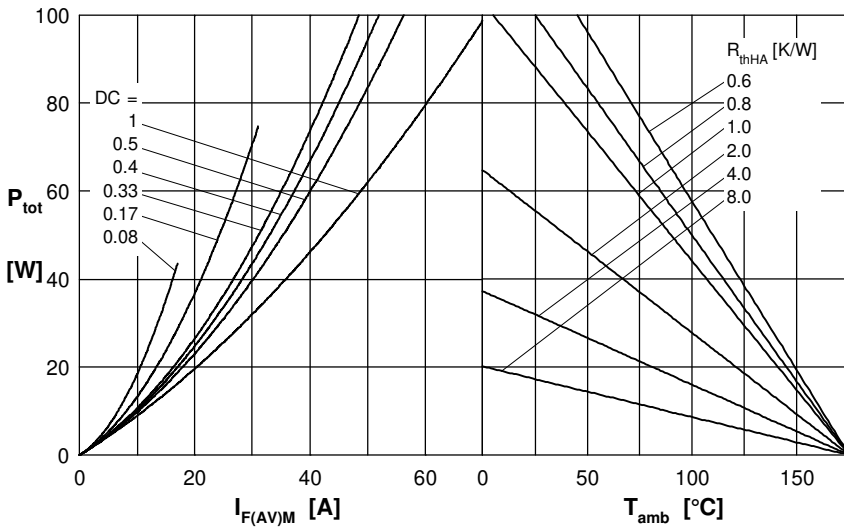


Fig. 4 Power dissipation versus direct output current and ambient temperature per diode

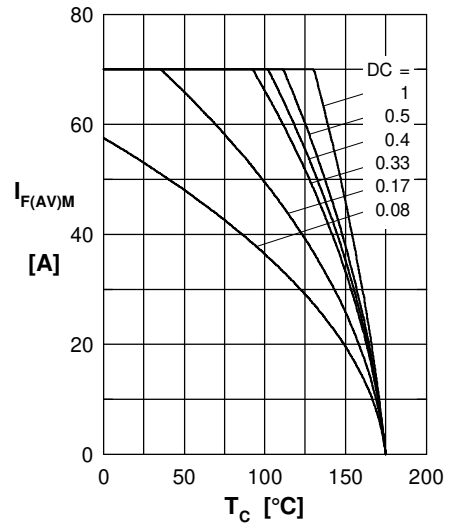


Fig. 5 Max. forward current versus case temperature per diode

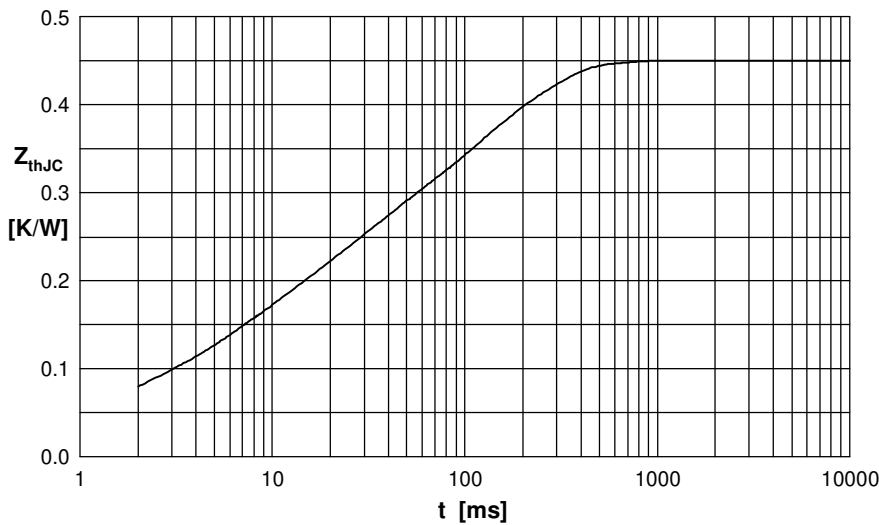


Fig. 6 Transient thermal impedance junction to case versus time per diode

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.033	0.0006
2	0.075	0.0038
3	0.124	0.0170
4	0.218	0.1400

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