

# Standard Rectifier

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

$$I_{FAV} = 10 \text{ A}$$

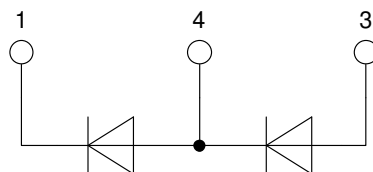
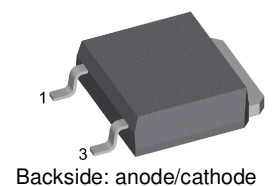
$$V_F = 1.27 \text{ V}$$

Phase leg

Part number

**DMA10P1600UZ**

Marking on Product: MAUMZP



### 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-252 (DPak)

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- High creepage distance between terminals

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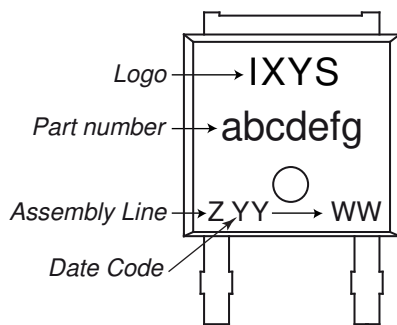


Rectifier				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM}$	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1700	V	
$V_{RRM}$	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1600	V	
$I_R$	reverse current	$V_R = 1600\text{ V}$	$T_{VJ} = 25^{\circ}C$		5	$\mu A$	
		$V_R = 1600\text{ V}$	$T_{VJ} = 150^{\circ}C$		0.05	mA	
$V_F$	forward voltage drop	$I_F = 5\text{ A}$	$T_{VJ} = 25^{\circ}C$		1.29	V	
		$I_F = 10\text{ A}$			1.55	V	
		$I_F = 5\text{ A}$	$T_{VJ} = 150^{\circ}C$			1.27	V
		$I_F = 10\text{ A}$				1.63	V
$I_{FAV}$	average forward current	$T_C = 140^{\circ}C$ 180° sine	$T_{VJ} = 175^{\circ}C$		10	A	
$V_{FO}$	threshold voltage	} for power loss calculation only	$T_{VJ} = 175^{\circ}C$		0.90	V	
$r_F$	slope resistance				37	m $\Omega$	
$R_{thJC}$	thermal resistance junction to case				2	K/W	
$R_{thCH}$	thermal resistance case to heatsink			0.5		K/W	
$P_{tot}$	total power dissipation		$T_C = 25^{\circ}C$		75	W	
$I_{FSM}$	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$		100	A	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$		110	A	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}C$			85	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$			92	A
$I^2t$	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$		50	A <sup>2</sup> s	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$		50	A <sup>2</sup> s	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^{\circ}C$			36	A <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$			35	A <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}C$		1	pF	



Package TO-252 (DPak)			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			20	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>				0.3		g
$F_C$	mounting force with clip		20		60	N
$d_{Spp/App}$	creepage distance on surface / striking distance through air	terminal to terminal	3.6			mm
$d_{Spb/Apb}$		terminal to backside	3.0			mm

**Product Marking**



**Part description**

- D = Diode
- M = Standard Rectifier
- A = (up to 1800V)
- 10 = Current Rating [A]
- P = Phase leg
- 1600 = Reverse Voltage [V]
- UZ = TO-252AA (DPak) (2HV)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DMA10P1600UZ-TRL	MAUMZP	Tape & Reel	2500	524589
Alternative	DMA10P1600UZ-TUB	MAUMZP	Tube	70	524582

Similar Part	Package	Voltage class
DMA10P1200UZ	TO-252AA (DPak) (2HV)	1200

**Equivalent Circuits for Simulation**

\* on die level

$T_{VJ} = 175\text{°C}$

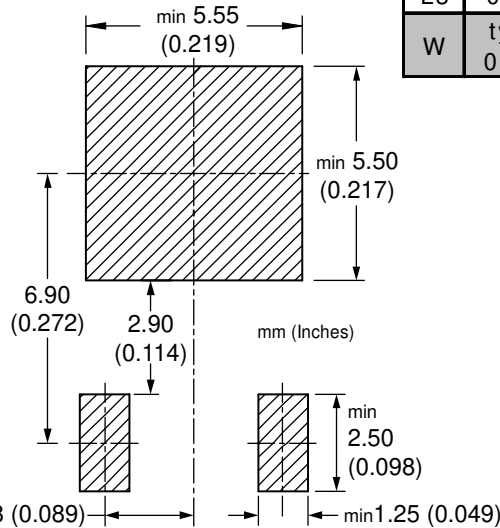
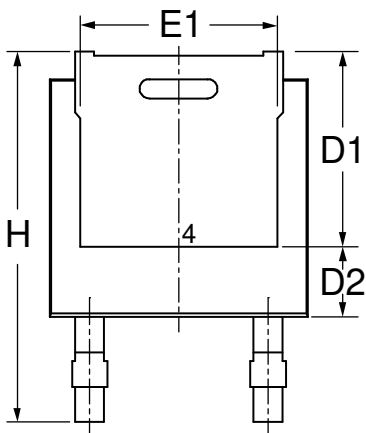
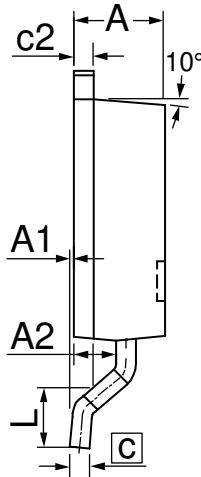
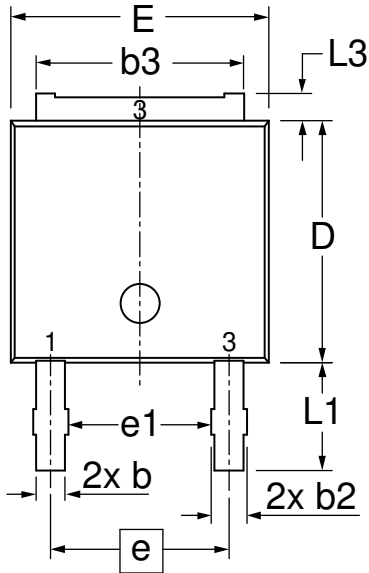
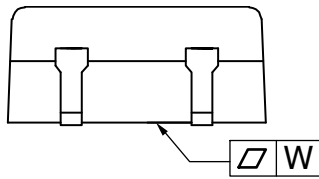


**Rectifier**

$V_{0\ max}$	threshold voltage	0.9	V
$R_{0\ max}$	slope resistance *	34	mΩ

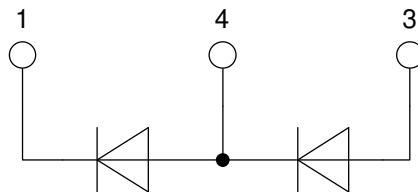


**Outlines TO-252 (DPak)**



Recommended min. foot print

Dim	Millimeters		Inches	
	min	max	min	max
A	2.18	2.39	0.086	0.094
A1	0.00	0.13	0.000	0.005
A2	0.97	1.17	0.038	0.046
b	0.64	0.89	0.025	0.035
b2	0.76	1.14	0.030	0.045
b3	5.08	5.59	0.200	0.220
c	0.46	0.61	0.018	0.024
c2	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
D1	4.57	5.21	0.180	0.205
D2	2.03		0.080	
E	6.35	6.73	0.250	0.265
E1	4.32	5.21	0.170	0.205
e	4.57		0.180	
e1	3.62		0.143	
H	9.15	10.34	0.360	0.407
L	1.40	1.78	0.055	0.070
L1	2.54	2.92	0.100	0.115
L3	0.64	1.02	0.025	0.040
W	typ. 0.02	0.040	typ. 0.0008	0.000





**Rectifier**

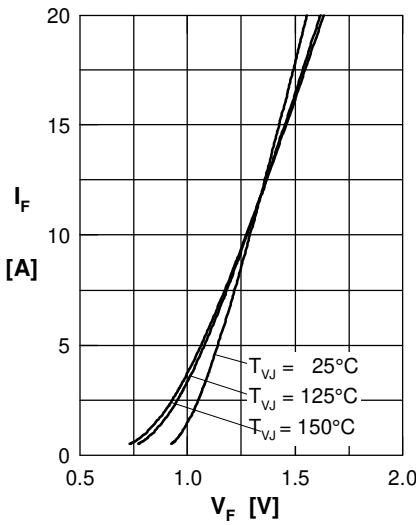


Fig. 1 Forward current versus voltage drop per diode

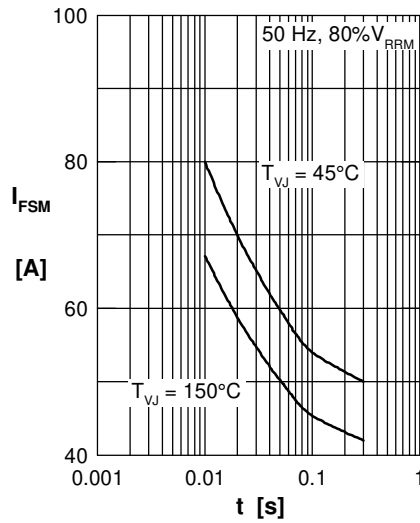


Fig. 2 Surge overload current

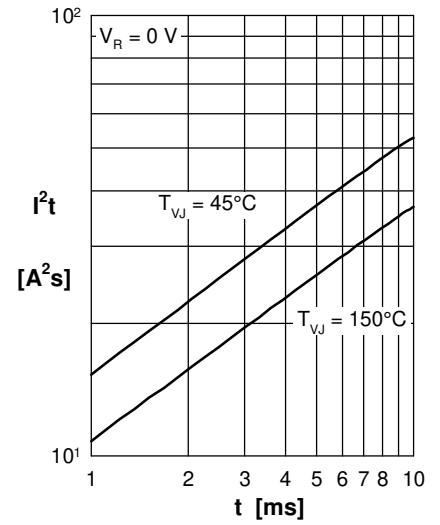


Fig. 3  $I^2t$  versus time per diode

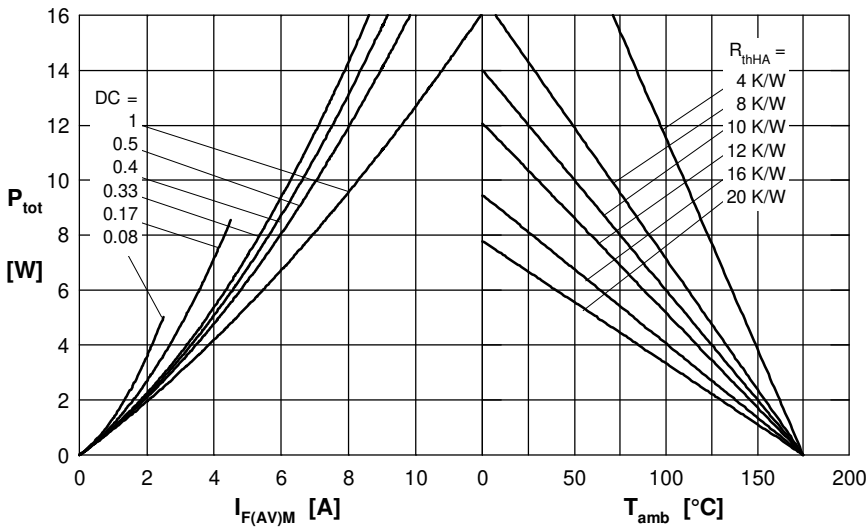


Fig. 4 Power dissipation vs. direct output current and ambient temperature

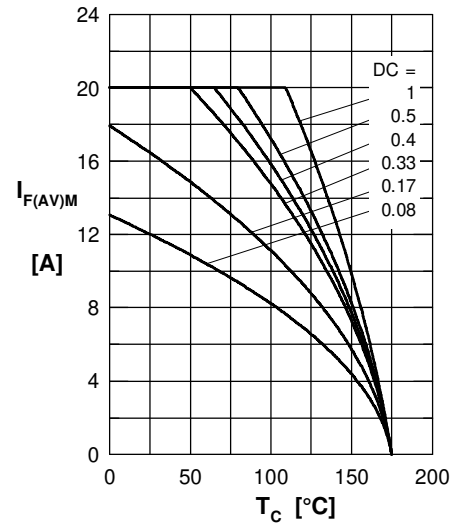


Fig. 5 Max. forward current vs. case temperature

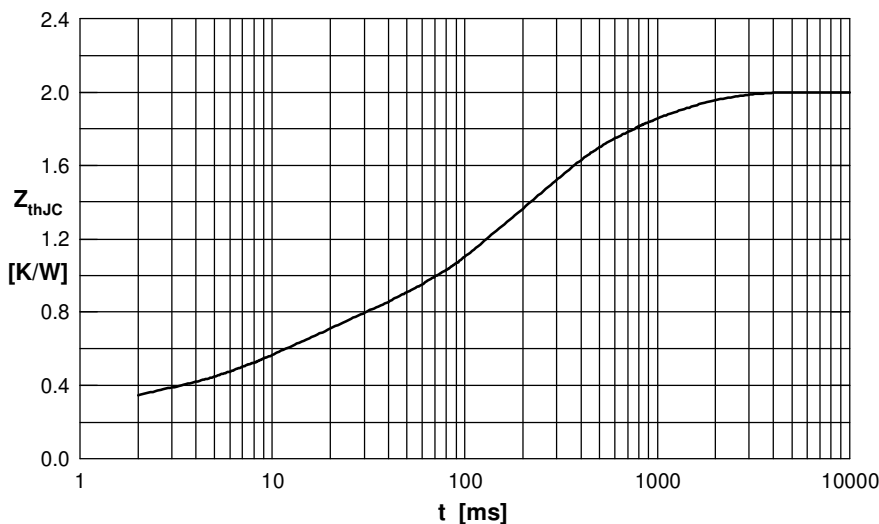


Fig. 6 Transient thermal impedance junction to case

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.275	0.0005
2	0.385	0.0105
3	0.880	0.1700
4	0.460	0.8500