

Standard Diodes, 600 A (SUPER MAGN-A-PAK Power Modules)



SUPER MAGN-A-PAK

FEATURES

- High current capability
- High surge capability
- High voltage ratings up to 2000 V
- 3000 V_{RMS} isolating voltage with non-toxic substrate
- Industrial standard package
- UL approved file E78996 
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

TYPICAL APPLICATIONS

- Rectifying bridge for large motor drives
- Rectifying bridge for large UPS

PRODUCT SUMMARY

$I_{F(AV)}$	600 A
Type	Modules - Diode, High Voltage
Package	SMAP
Circuit	Two SCRs doubler circuit

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$		600	A
	T_C	100	°C
$I_{F(RMS)}$		942	A
	T_C	100	°C
I_{FSM}	50 Hz	19 000	A
	60 Hz	20 100	
I^2t	50 Hz	1805	kA ² s
	60 Hz	1683	
$I^2\sqrt{t}$		18 050	kA ² /s
V_{RRM}	Range	800 to 2000	V
T_{Stg}, T_J	Range	-40 to +150	°C

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS

TYPE NUMBER	VOLTAGE CODE	V_{RRM} , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM} MAXIMUM AT T_J MAXIMUM mA
VS-VSKD600..	08	800	900	50
	12	1200	1300	
	16	1600	1700	
	20	2000	2100	



FORWARD CONDUCTION						
PARAMETER	SYMBOL	TEST CONDITIONS			VALUES	UNITS
Maximum average forward current at case temperature	I _{F(AV)}	180° conduction, half sine wave			600	A
					100	°C
Maximum RMS forward current	I _{F(RMS)}	180° conduction, half sine wave at T _C = 100 °C			942	A
Maximum peak, one-cycle forward, non-repetitive surge current	I _{FSM}	t = 10 ms	No voltage reappplied	Sinusoidal half wave, initial T _J = T _J maximum	19.0	kA
		t = 8.3 ms				
		t = 10 ms	100 % V _{RRM} reappplied		16.2	
		t = 8.3 ms			17.2	
Maximum I ² t for fusing	I ² t	t = 10 ms	No voltage reappplied		1805	kA ² s
		t = 8.3 ms				
		t = 10 ms	100 % V _{RRM} reappplied		1319	
		t = 8.3 ms			1230	
Maximum I ² √t for fusing	I ² √t	t = 0.1 ms to 10 ms, no voltage reappplied			18 050	kA ² √s
Low level value of threshold voltage	V _{F(TO)1}	(16.7 % × π × I _{F(AV)}) < I < (π × I _{F(AV)}), T _J = T _J maximum			0.70	V
High level value of threshold voltage	V _{F(TO)2}	(I > π × I _{F(AV)}), T _J = T _J maximum			0.77	
Low level value of forward slope resistance	r _{f1}	(16.7 % × π × I _{F(AV)}) < I < (π × I _{F(AV)}), T _J = T _J maximum			0.28	mΩ
High level value of forward slope resistance	r _{f2}	(I > π × I _{F(AV)}), T _J = T _J maximum			0.25	
Maximum forward voltage drop	V _{FM}	I _{pk} = 1800 A, T _J = 25 °C, t _p = 10 ms sine pulse			1.45	V

BLOCKING				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
RMS insulation voltage	V_{INS}	t = 1 s	3000	V
Maximum peak reverse and off-state leakage current	I_{RRM}	$T_J = T_J$ maximum, rated V_{RRM} applied	50	mA

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating and storage temperature range	T_J , T_{Stg}		-40 to 150	°C
Maximum thermal resistance, junction to case per junction	R_{thJC}	DC operation	0.065	K/W
Maximum thermal resistance, case to heatsink per module	R_{thC-hs}	Mounting surface smooth, flat and greased	0.02	
Mounting torque ± 10 %	SMAP to heatsink	A mounting compound is recommended and the torque should be rechecked after a period of 3 hours to allow for the spread of the compound.	6 to 8	Nm
	busbar to SMAP		12 to 15	
Approximate weight			1500	g
Case style		See dimensions - link at the end of datasheet	SUPER MAGN-A-PAK	

ΔR_{thJC} CONDUCTION				
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	UNITS
180°	0.009	0.006	$T_J = T_J$ maximum	K/W
120°	0.011	0.011		
90°	0.014	0.015		
60°	0.021	0.022		
30°	0.037	0.038		

Note

- The table above shows the increment of thermal resistance R_{thJC} when devices operate at different conduction angles than DC

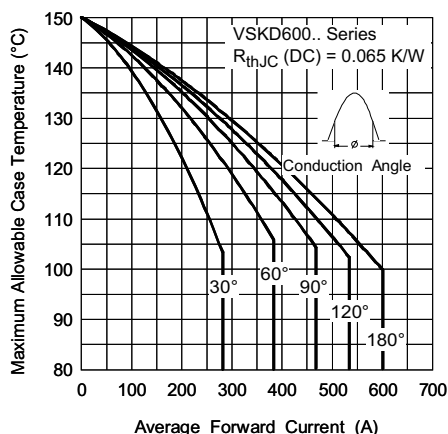


Fig. 1 - Current Ratings Characteristics

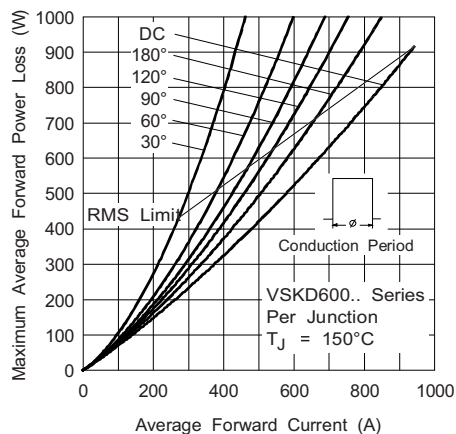


Fig. 4 - Forward Power Loss Characteristics

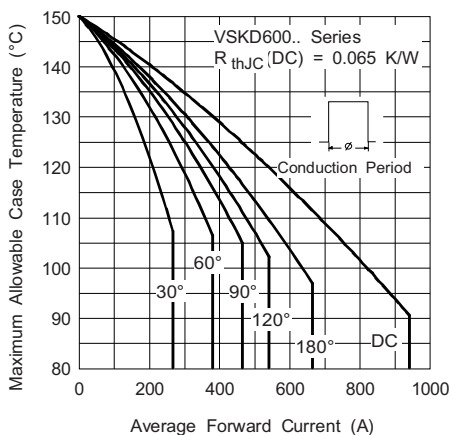


Fig. 2 - Current Ratings Characteristics

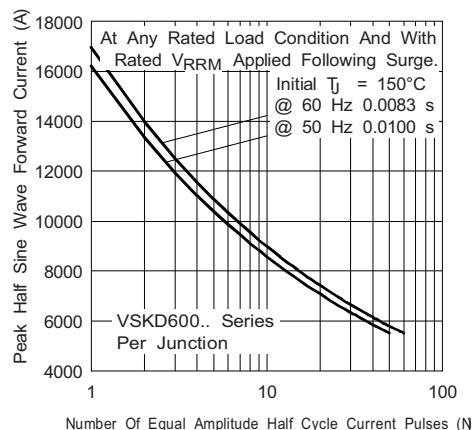


Fig. 5 - Maximum Non-Repetitive Surge Current

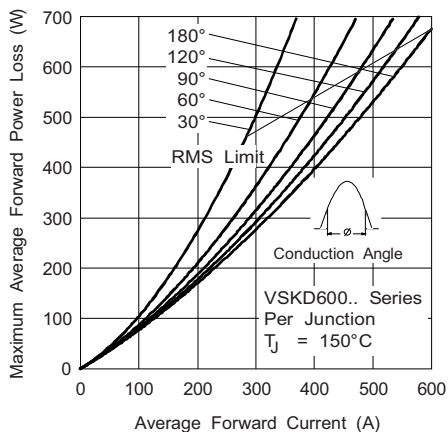


Fig. 3 - Forward Power Loss Characteristics

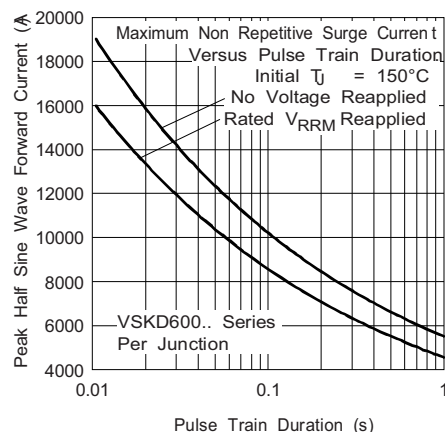


Fig. 6 - Maximum Non-Repetitive Surge Current

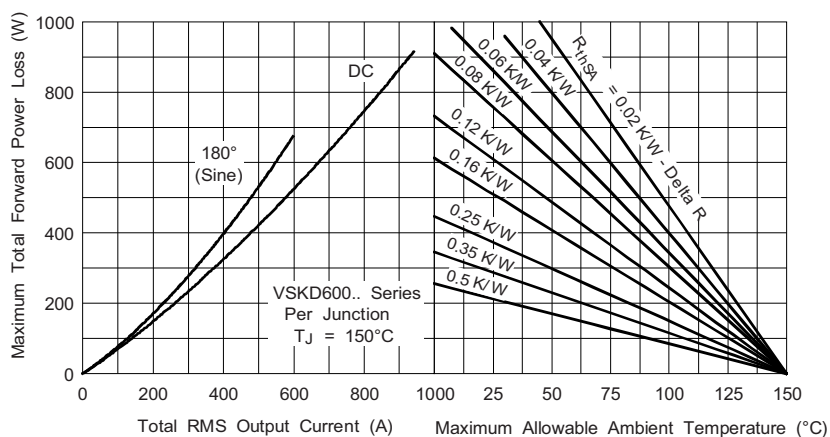


Fig. 7 - Forward Power Loss Characteristics

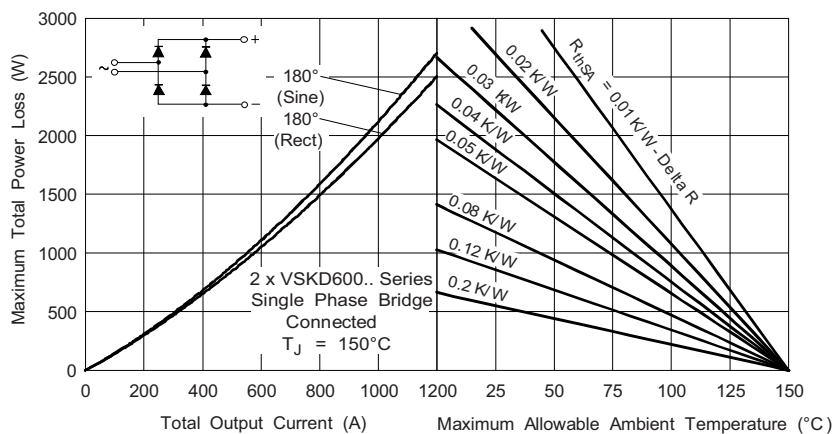


Fig. 8 - Forward Power Loss Characteristics

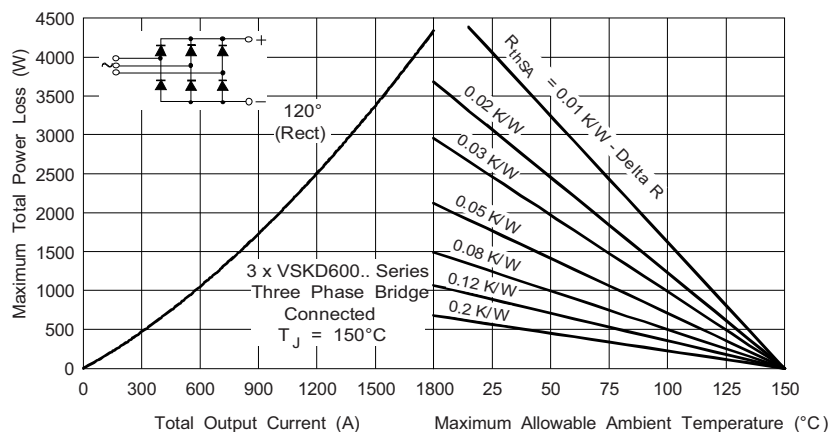
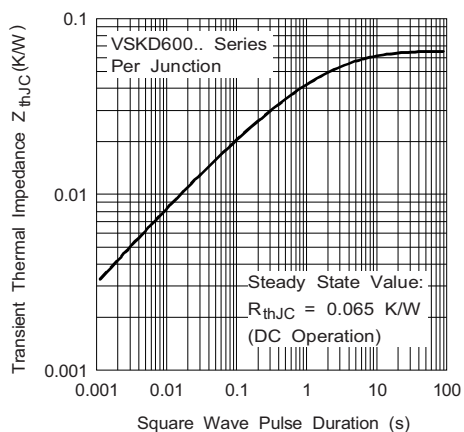


Fig. 9 - Forward Power Loss Characteristics


Fig. 10 - Thermal Impedance Z_{thJC} Characteristic

ORDERING INFORMATION TABLE

Device code

VS-	VSK	D	600	-	20
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1

2

3

4

5

1

- Vishay Semiconductors product

2

- Module type

3

- Circuit configuration D = 2 diodes in series
(see Circuit Configuration table)

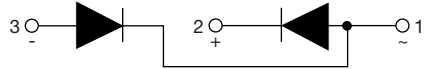
4

- Current rating

5

- Voltage code x 100 = V_{RRM} (see Voltage Ratings table)

CIRCUIT CONFIGURATION

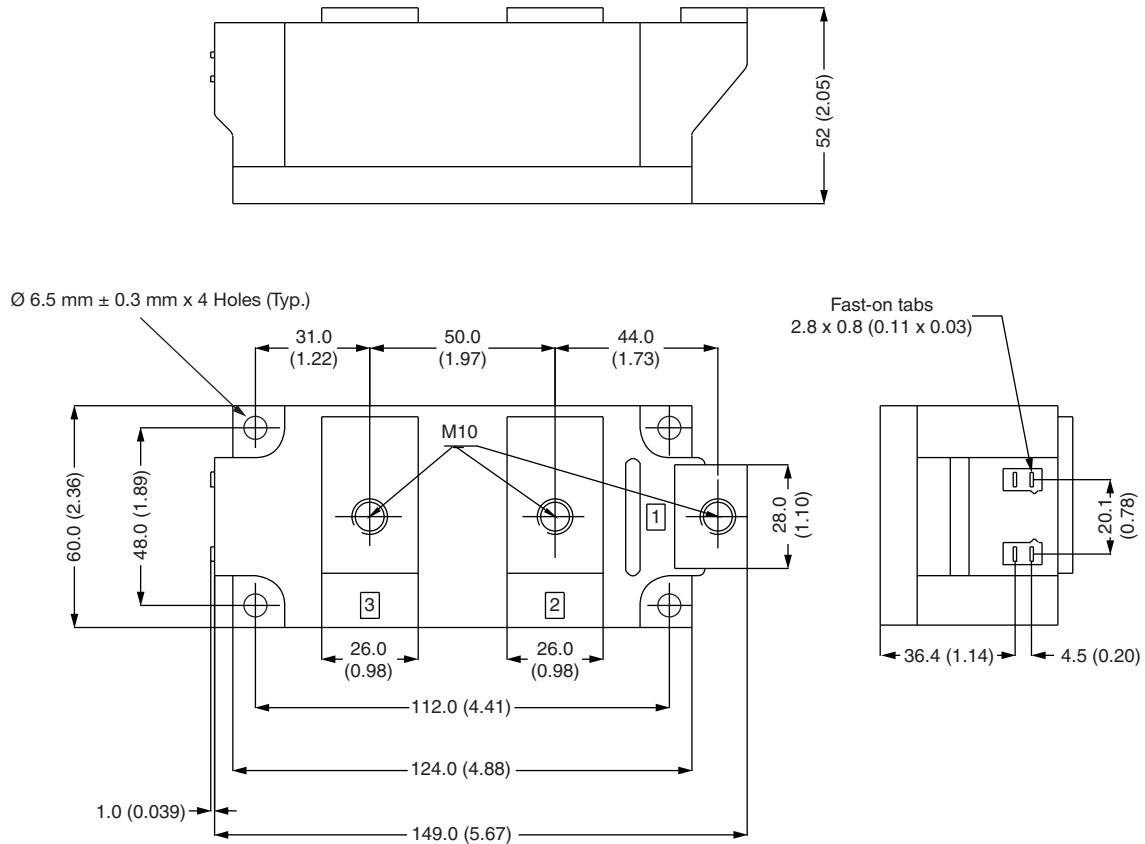
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two diodes doubler circuit	D	

LINKS TO RELATED DOCUMENTS

Dimensions	www.vishay.com/doc?95088
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Super MAGN-A-PAK Diode

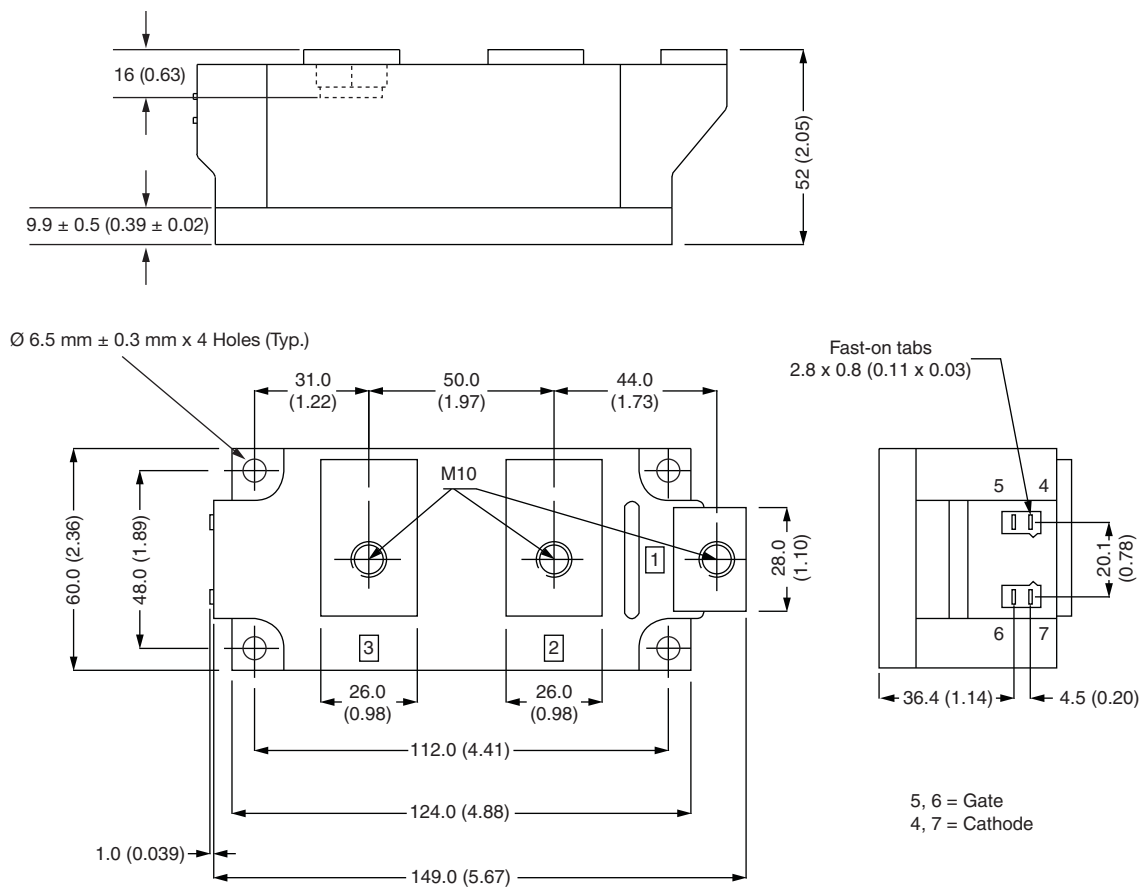
DIMENSIONS in millimeters (inches)





Super MAGN-A-PAK Thyristor/Diode

DIMENSIONS in millimeters (inches)





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