

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



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

TYPICAL APPLICATIONS

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

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	600 A
Type	Modules - diode, high voltage
Package	Super MAGN-A-PAK
Circuit configuration	Two diodes 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^2s
	60 Hz	1683	
$I^2\sqrt{t}$		18 050	$kA^2\sqrt{s}$
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 reapplied	Sinusoidal half wave, initial $T_J = T_J$ maximum	19.0	kA	
		$t = 8.3$ ms	20.1				
		$t = 10$ ms	100 % V_{RRM} reapplied		16.2		
		$t = 8.3$ ms	17.2				
Maximum I^2t for fusing	I^2t	$t = 10$ ms	No voltage reapplied	initial $T_J = T_J$ maximum	1805	kA ² s	
		$t = 8.3$ ms	1683				
		$t = 10$ ms	100 % V_{RRM} reapplied		1319		
		$t = 8.3$ ms	1230				
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ ms to 10 ms, no voltage reapplied			18 050	kA ² \sqrt{s}	
Low level value of threshold voltage	$V_{F(TO)1}$	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ maximum			0.70	V	
High level value of threshold voltage	$V_{F(TO)2}$	$(I > \pi \times I_{F(AV)})$, $T_J = T_J$ maximum			0.77		
Low level value of forward slope resistance	r_{f1}	$(16.7\% \times \pi \times I_{F(AV)} < I < \pi \times I_{F(AV)})$, $T_J = T_J$ maximum			0.28	mΩ	
High level value of forward slope resistance	r_{f2}	$(I > \pi \times I_{F(AV)})$, $T_J = T_J$ 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 $\pm 10\%$ busbar to Super MAGN-A-PAK	Super MAGN-A-PAK 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
Approximate weight					12 to 15	
Case style		See dimensions - link at the end of datasheet			1500	g
					Super MAGN-A-PAK	

ΔR_{thJC} CONDUCTION					
CONDUCTION ANGLE	SINUSOIDAL CONDUCTION	RECTANGULAR CONDUCTION	TEST CONDITIONS	VALUES	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

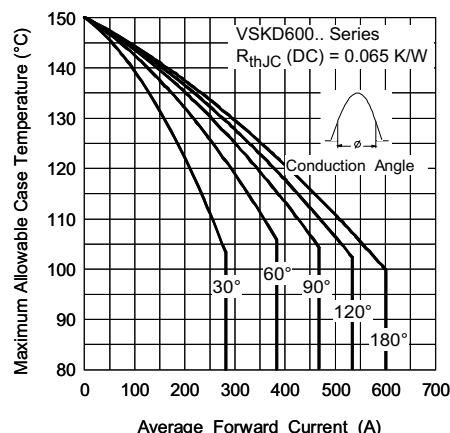


Fig. 1 - Current Ratings Characteristics

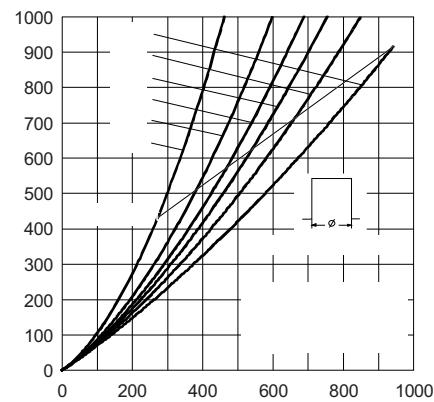


Fig. 4 - Forward Power Loss Characteristics

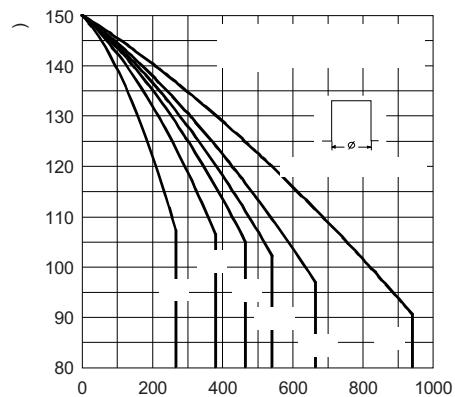


Fig. 2 - Current Ratings Characteristics

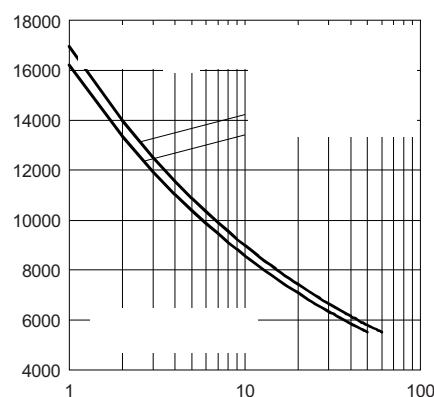


Fig. 5 - Maximum Non-Repetitive Surge Current

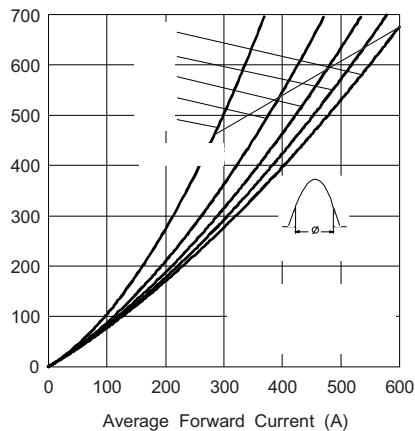


Fig. 3 - Forward Power Loss Characteristics

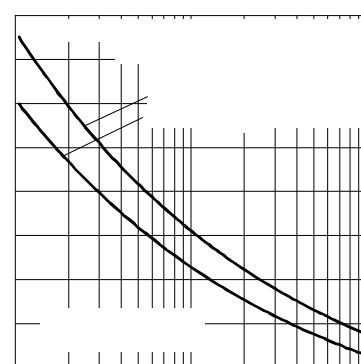


Fig. 6 - Maximum Non-Repetitive Surge Current

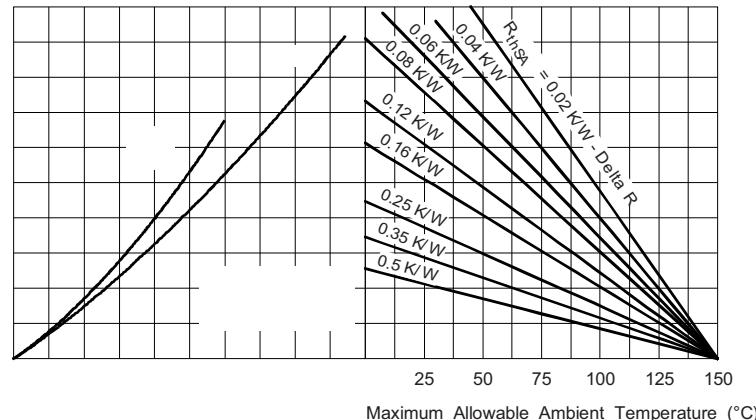


Fig. 7 - Forward Power Loss Characteristics

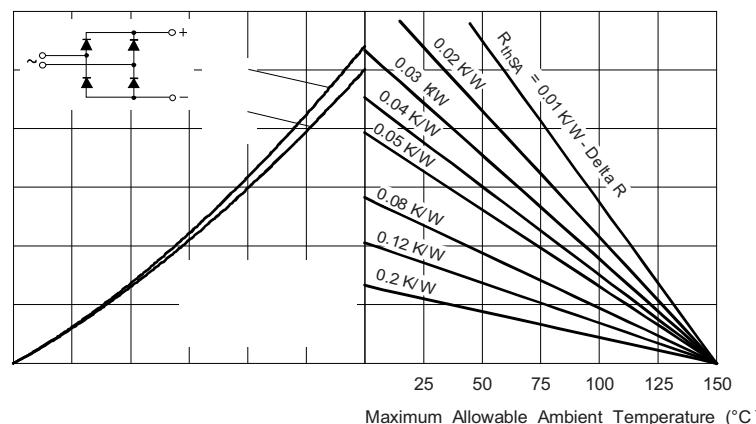


Fig. 8 - Forward Power Loss Characteristics

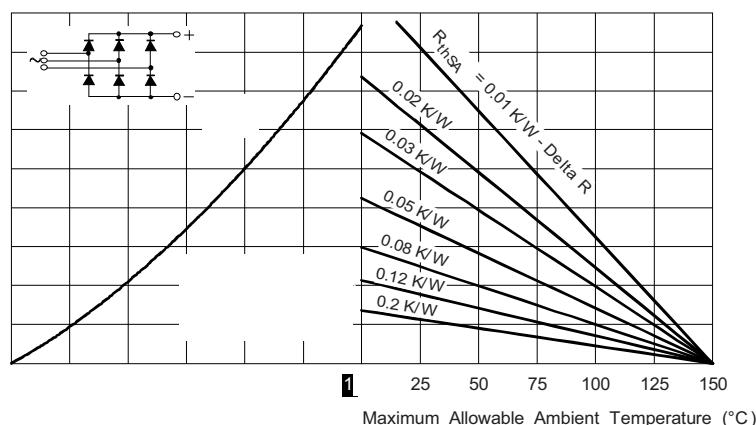
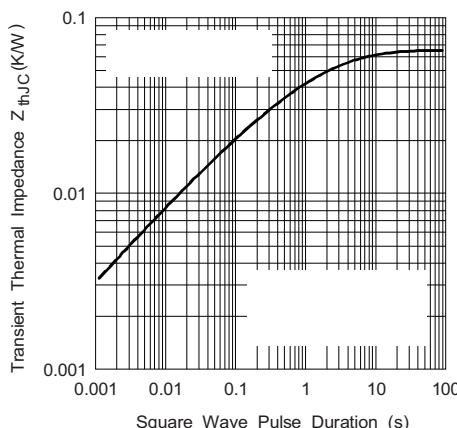


Fig. 9 - Forward Power Loss Characteristics


Fig. 10 - Thermal Impedance Z_{thJC} Characteristic

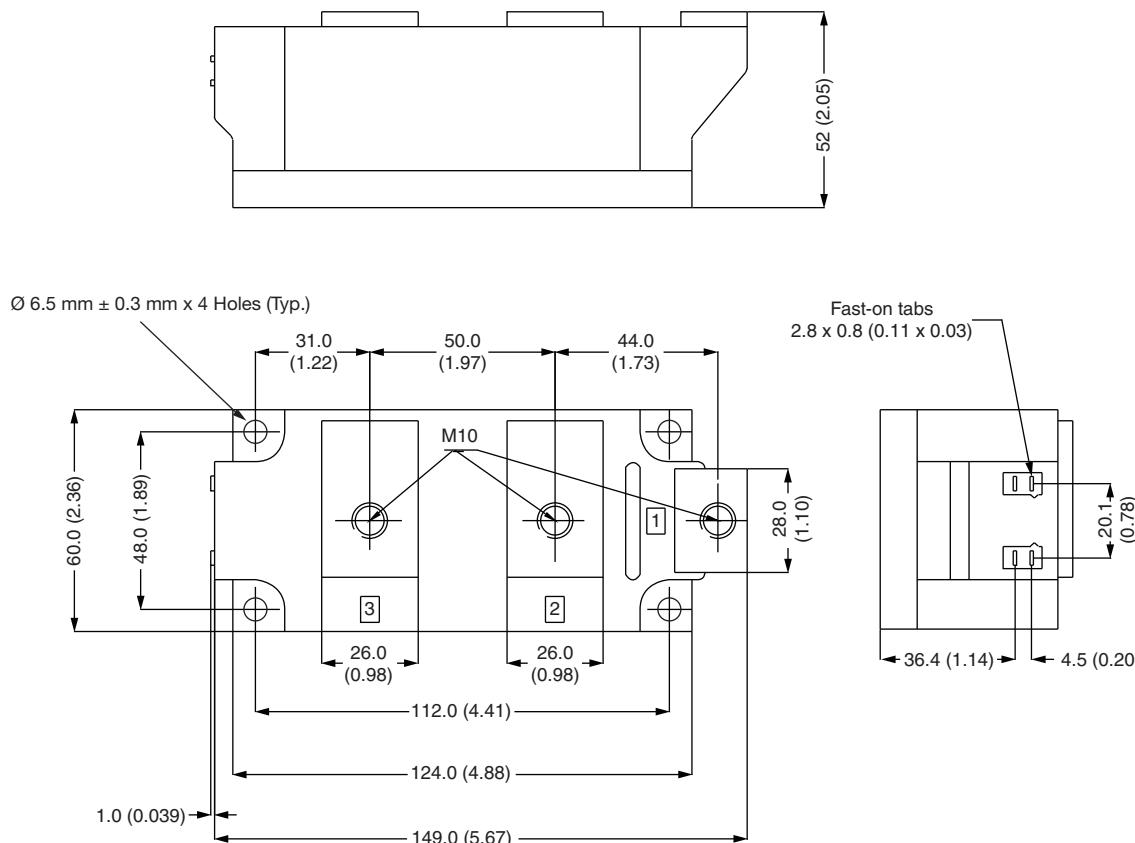
ORDERING INFORMATION TABLE

Device code	VS-VS	KD	600	-	20
	(1)	(2)	(3)	(4)	
[1] - Vishay Semiconductors product					
[2] - Circuit configuration D = two diodes in series (see circuit configuration table)					
[3] - Current rating					
[4] - Voltage code x 100 = V_{RRM} (see voltage ratings table)					

CIRCUIT CONFIGURATION		
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
Two diodes doubler circuit	KD	
LINKS TO RELATED DOCUMENTS		
Dimensions	www.vishay.com/doc?95088	

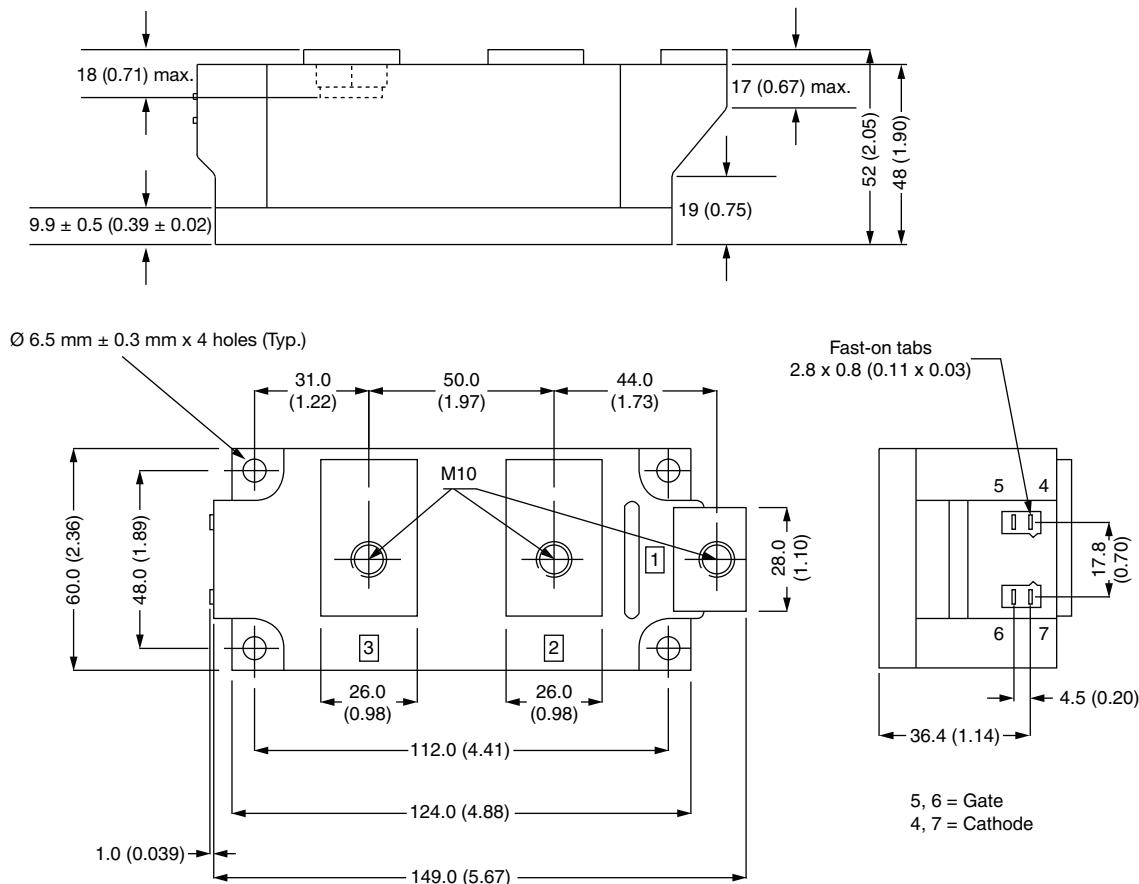
Super MAGN-A-PAK Diode

DIMENSIONS in millimeters (inches)



Super MAGN-A-PAK Thyristor/Diode

DIMENSIONS in millimeters (inches)



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