

VS-VSKL300-08PBF Datasheet

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DiGi Electronics Part Number	VS-VSKL300-08PBF-DG
Manufacturer	Vishay General Semiconductor - Diodes Division
Manufacturer Product Number	VS-VSKL300-08PBF
Description	MODULE THYRISTOR 300A INT-A-PAK
Detailed Description	SCR Module 800 V 116 A Series Connection - SCR/Diode Chassis Mount INT-A-Pak

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Manufacturer Product Number:

VS-VSKL300-08PBF

Series:

-

Structure:

Series Connection - SCR/Diode

Voltage - Off State:

800 V

Current - On State (It (RMS)) (Max):

116 A

Current - Gate Trigger (Igt) (Max):

200 mA

Current - Hold (Ih) (Max):

600 mA

Mounting Type:

Chassis Mount

Base Product Number:

VSKL300

Manufacturer:

Vishay General Semiconductor - Diodes Division

Product Status:

Active

Number of SCRs, Diodes:

1 SCR, 1 Diode

Current - On State (It (AV)) (Max):

300 A

Voltage - Gate Trigger (Vgt) (Max):

3 V

Current - Non Rep. Surge 50, 60Hz (I_{tsm}):

6500A, 6900A

Operating Temperature:

-40°C ~ 140°C (Tj)

Package / Case:

INT-A-Pak

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.30.0080

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

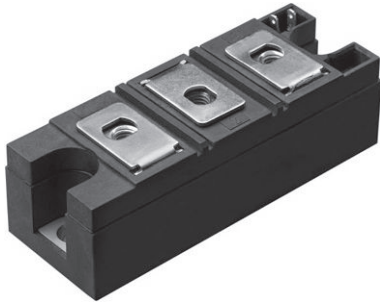


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VS-VSKL300/08PbF


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INT-A-PAK Power Module Thyristor/Diode, 300 A



INT-A-PAK

FEATURES

- Electrically isolated base plate
- 3000 V_{RMS} isolating voltage
- Industrial standard package
- Simplified mechanical designs, rapid assembly
- High surge capability
- Large creepage distances
- UL approved file E78996 
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

PRIMARY CHARACTERISTICS	
I _{T(AV)}	300 A
Type	Modules -thyristor, standard
Package	INT-A-PAK

APPLICATIONS

- Battery chargers
- Welders
- Power converters
- Alternators

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
V _{DRM} /V _{RRM}		800	V
I _{T(AV)}	53 °C	300	A
I _{T(RMS)}		116	A
I _{TSM}	50 Hz	6500	A
	60 Hz	6900	
I ² t	50 Hz	214	kA ² s
	60 Hz	195	
I ² √t		2140	kA ² √s
T _J	Range	-40 to +140	°C

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS			
TYPE NUMBER	V _{RRM} /V _{DRM} , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE V	V _{RSM} /V _{DSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I _{RRM} /I _{DRM} AT 125 °C mA
VS-VSKL300/08PbF	800	900	50



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ON-STATE CONDUCTION					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average on-state current at case temperature	$I_{T(AV)}$	180° conduction half sine wave		300	A
				53	°C
Maximum RMS on-state current	$I_{T(RMS)}$	As AC switch		116	A
Maximum peak, one-cycle on-state, non-repetitive surge current	I_{TSM}	t = 10 ms	No voltage reapplied	6600	
		t = 8.3 ms		6900	
		t = 10 ms	100 % V_{RRM} reapplied	5500	
		t = 8.3 ms		5800	
Maximum I^2t for fusing	I^2t	t = 10 ms	No voltage reapplied	214	kA ² s
		t = 8.3 ms		195	
		t = 10 ms	100 % V_{RRM} reapplied	151	
		t = 8.3 ms		138	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 ms to 10 ms, no voltage reapplied		2140	kA ² √s
Low level value of threshold voltage	$V_{T(TO)1}$	(16.7 % × π × $I_{T(AV)}$ < I < π × $I_{T(AV)}$), T_J maximum		0.796	V
High level value of threshold voltage	$V_{T(TO)2}$	(I > π × $I_{T(AV)}$), T_J maximum		0.868	
Low level value on-state slope resistance	r_{t1}	(16.7 % × π × $I_{T(AV)}$ < I < π × $I_{T(AV)}$), T_J maximum		0.972	mΩ
High level value on-state slope resistance	r_{t2}	(I > π × $I_{T(AV)}$), T_J maximum		0.88	
Maximum on-state voltage drop	V_{TM}	$T_J = 25\text{ °C}$, $I_{pk} = 500\text{ A}$	SCR	1.35	V
	V_{FM}		DIODE	1.20	

SWITCHING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Typical delay time	t_d	Gate current 1 A, $dI_g/dt = 1\text{ A}/\mu\text{s}$ $V_d = 0.67\% V_{DRM}$, $T_J = 25\text{ °C}$		1.0	μs
Typical turn-off time	t_q	$I_{TM} = 300\text{ A}$, $T_J = T_J$ maximum, $dI/dt = 20\text{ A}/\mu\text{s}$, $V_R = 50\text{ V}$ $dV/dt = 20\text{ V}/\mu\text{s}$, Gate 0 V 100 Ω, $t_p = 500\text{ μs}$		100	

BLOCKING					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum critical rate of rise of off-state voltage	dV/dt	$T_J = T_J$ maximum linear to 67 % rated V_{DRM}		500	V/μs
Maximum peak reverse and off-state leakage current	I_{DRM} , I_{RRM}	$T_J = T_J$ maximum, rated V_{DRM}/V_{RRM} applied		50	mA
RMS insulation voltage	V_{INS}	50 Hz, circuit to base, all terminal shorted, t = 1 s		3000	V



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TRIGGERING				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum peak gate power	P_{GM}	$T_J = T_J$ maximum, $t_p \leq 5$ ms	10.0	W
Maximum average gate power	$P_{G(AV)}$	$T_J = T_J$ maximum, $f = 50$ Hz, $d\% = 50$	2.0	
Maximum peak positive gate current	I_{GM}	$T_J = T_J$ maximum, $t_p \leq 5$ ms	3.0	A
Maximum required DC gate voltage to trigger	V_{GT}	$T_J = 25$ °C Anode supply: 12 V resistive load	3	V
Maximum required DC gate current to trigger	I_{GT}		200	mA
Maximum holding current	I_H		600	
Maximum peak positive gate voltage	$+V_{GM}$	$T_J = T_J$ maximum, $t_p \leq 5$ ms	20	V
Maximum peak negative gate voltage	$-V_{GM}$		5.0	
DC gate voltage not to trigger	V_{GD}	$T_J = T_J$ maximum Maximum gate current/voltage not to trigger is the maximum value which will not trigger any unit with rated V_{DRM} anode to cathode applied	0.30	V
DC gate current not to trigger	I_{GD}		10	mA
Maximum non-repetitive rate of rise of turned-on current	di/dt	Gate drive 20 V, 20 Ω , $t_r \leq 1$ μ s $T_J = T_J$ maximum, anode voltage $\leq 80\%$ V_{DRM}	1000	A/ μ s

THERMAL AND MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction operating temperature range	T_J		-40 to +140	°C
Maximum storage temperature range	T_{Stg}		-40 to +150	
Maximum thermal resistance, junction to case per junction	R_{thJC}	DC operation	0.19	K/W
Maximum thermal resistance, case to heatsink per module	R_{thCS}	Mounting surface smooth, flat and greased	0.035	
Mounting torque $\pm 10\%$	IAP to heatsink busbar to IAP	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. Lubricated threads.	4 to 6	Nm
Approximate weight			500	g
			17.8	oz.
Case style			INT-A-PAK	

ΔR CONDUCTION PER JUNCTION											
DEVICES	SINUSOIDAL CONDUCTION AT T_J MAXIMUM					RECTANGULAR CONDUCTION AT T_J MAXIMUM					UNITS
	180°	120°	90°	60°	30°	180°	120°	90°	60°	30°	
VSKL300	0.019	0.022	0.028	0.041	0.068	0.013	0.023	0.031	0.043	0.069	K/W

Note

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



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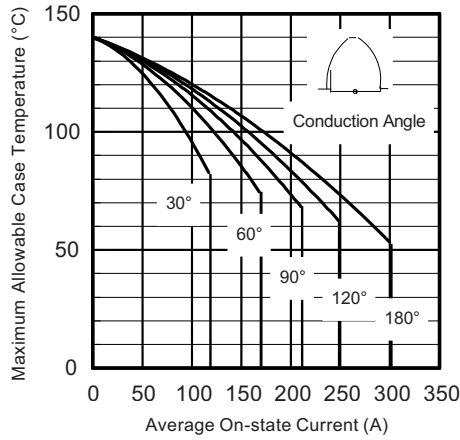


Fig. 1 - Current Ratings Characteristics

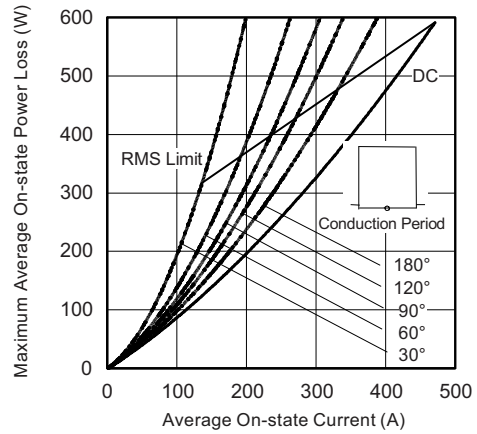


Fig. 4 - On-State Power Loss Characteristics

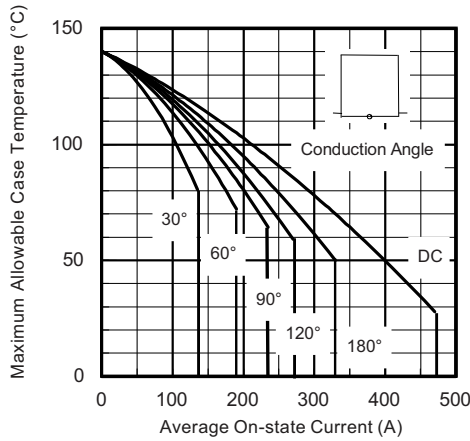


Fig. 2 - Current Ratings Characteristics

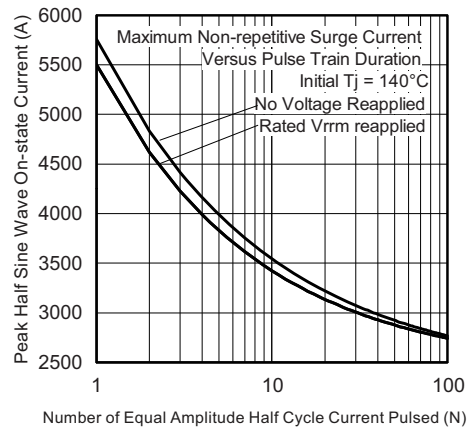


Fig. 5 - Maximum Non-Repetitive Surge Current

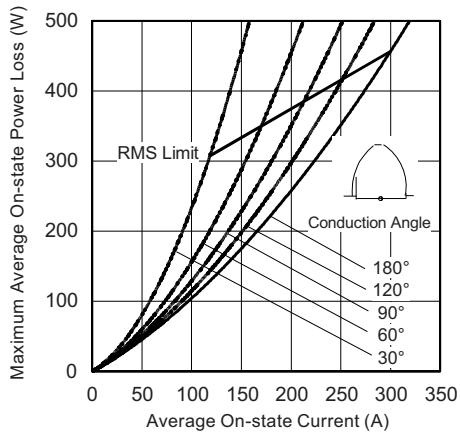


Fig. 3 - On-State Power Loss Characteristics

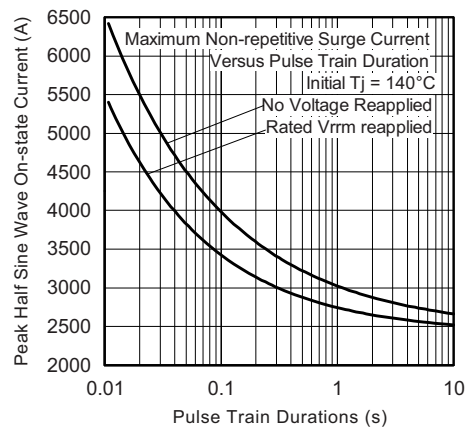


Fig. 6 - Maximum Non-Repetitive Surge Current



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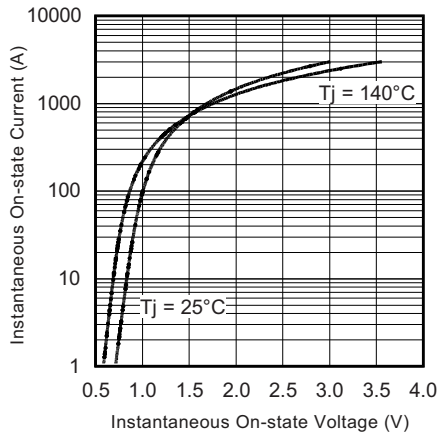


Fig. 7 - On-State Voltage Drop Characteristics (SCR)

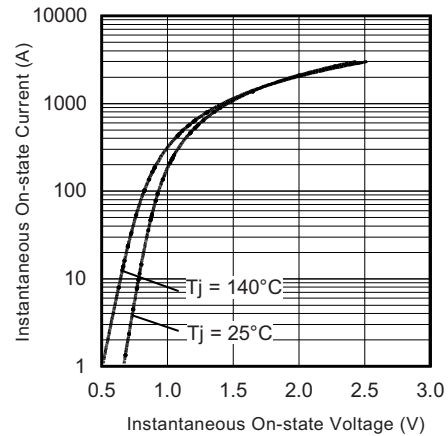


Fig. 8 - On-State Voltage Drop Characteristics (Diode)

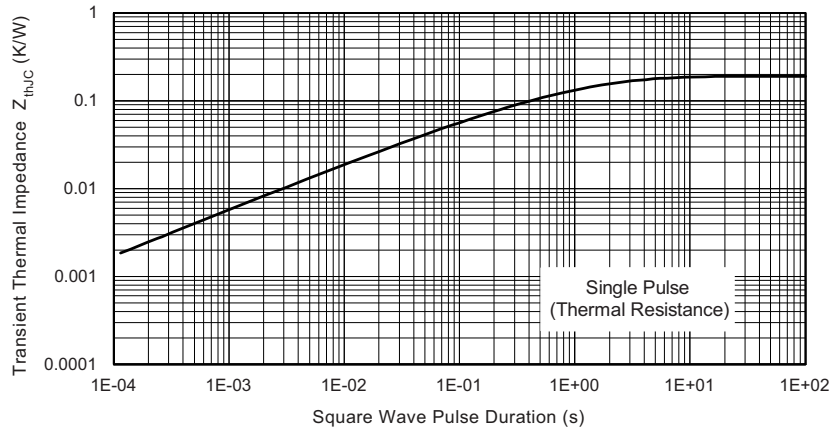


Fig. 9 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code	VS-VS	KL	300	08	PbF
	①	②	③	④	⑤

- 1** - Vishay Semiconductors product
- 2** - Circuit configuration
- 3** - Current rating (300 = 300 A)
- 4** - Voltage rating (08 = 800 V)
- 5** - PbF = Lead (Pb)-free



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CIRCUIT CONFIGURATION		
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	CIRCUIT DRAWING
SCR/diode doubler circuit, negative control	L	

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95010

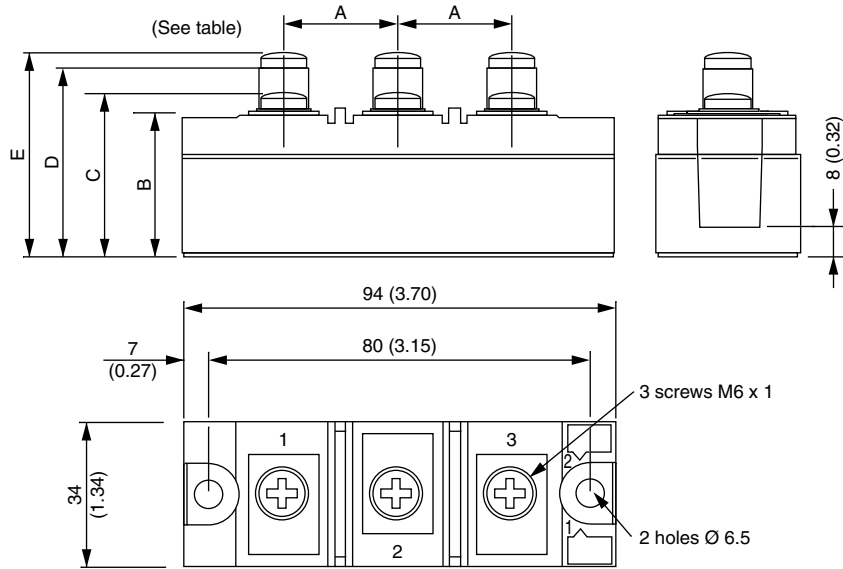


Outline Dimensions

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INT-A-PAK Diode

DIMENSIONS in millimeters (inches)



A	B	C	D	E
23 (0.91)	30 (1.18)	36 (1.42)	-	-



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