VS-P100 Series



Power Modules, Passivated Assembled Circuit Elements, 25 A



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PACE-PAK (D-19)

PRIMARY CHARACTERISTICS				
Ι _Ο	25 A			
Туре	Modules - thyristor, standard			
Package	PACE-PAK (D-19)			

FEATURES

- · Glass passivated junctions for greater reliability
- Electrically isolated base plate
- Available up to 1200 V_{RRM}/V_{DRM}
- High dynamic characteristics
- Wide choice of circuit configurations
- Simplified mechanical design and assembly
- UL E78996 approved
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

DESCRIPTION

The VS-P100 series of integrated power circuits consists of power thyristors and power diodes configured in a single package. With its isolating base plate, mechanical designs are greatly simplified giving advantages of cost reduction and reduced size.

Applications include power supplies, control circuits and battery chargers.

MAJOR RATINGS AND CHARACTERISTICS					
SYMBOL	CHARACTERISTICS	VALUES	UNITS		
I _O	85 °C	25	A		
1	50 Hz	357	А		
ITSM	60 Hz	375	~		
l ² t	50 Hz	637	A ² s		
	60 Hz	580	A-5		
l²√t		6365	A²√s		
V _{DRM} , V _{RRM}		400 to 1200	V		
V _{ISOL}		2500	V		
TJ	Range	-40 to +125	°C		
T _{Stg}		-40 to +125	°C		

ELECTRICAL SPECIFICATIONS

VOLTAGE RATINGS					
TYPE NUMBER	V _{RRM} /V _{DRM} , MAXIMUM REPETITIVE PEAK REVERSE AND PEAK OFF-STATE VOLTAGE V	V _{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I _{RRM} MAXIMUM AT T _J MAXIMUM mA		
VS-P101, VS-P121, VS-P131	400	500			
VS-P102, VS-P122, VS-P132	600	700			
VS-P103, VS-P123, VS-P133	800	900	10		
VS-P103, VS-P124, VS-P134	1000	1100			
VS-P105, VS-P125, VS-P135	1200	1300			

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RoHS

COMPLIANT



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PARAMETER	SYMBOL		TEST CON	DITIONS	VALUES	UNITS
Maximum DC output current at case		Full bridge	E 11. 11		25	А
temperature	Ι _Ο	Fuil bridge			85	°C
		t = 10 ms	No voltage		357	
Maximum peak, one-cycle non-repetitive	I _{TSM} ,	t = 8.3 ms	reapplied		375	^
on-state or forward current	I _{FSM}	t = 10 ms	100 % V _{RBM}		300	A
		t = 8.3 ms	reapplied	Sinusoidal half wave,	315	
		t = 10 ms	No voltage	applied 10 % V _{RRM}	637	A ² s
Movimum 12t for fusing	l ² t	t = 8.3 ms	reapplied		580	
Maximum I ² t for fusing		t = 10 ms	100 % V _{BBM}		450	
		t = 8.3 ms	reapplied		410	
Maximum I ² \sqrt{t} for fusing	l²√t	t = 0.1 ms to 10 ms, no voltage reapplied I^2t for time tx = $I^2\sqrt{t}\cdot\sqrt{tx}$		6365	A²√s	
Maximum value of threshold voltage	V _{T(TO)}	T _J = 125 °C		0.82	V	
Maximum level value of on-state slope resistance	r _{t1}	$T_{J} = 125 \text{ °C}, \text{ average power} = V_{T(TO)} \times I_{T(AV)} + r_{t} + (I_{T(RMS)})^{2}$		12	mΩ	
Maximum on-state voltage drop	V _{TM}	$I_{TM} = \pi \times I_{T(A)}$	AV)	T _J = 25 °C	1.35	V
Maximum forward voltage drop	V _{FM}	$I_{FM} = \pi \times I_{F(A)}$	AV)	T _J = 25 °C	1.35	V
Maximum non-repetitive rate of rise of turned-on current	dl/dt	T_J = 125 °C from 0.67 V _{DRM} I _{TM} = π x I _{T(AV)} , I _g = 500 mA, t _r < 0.5 μs, t _p > 6 μs		200	A/µs	
Maximum holding current	I _H	T _J = 25 °C a	anode supply $= 6$	V, resistive load, gate open	130	mA
Maximum latching current	١L	$T_{,1} = 25 \text{ °C}$ anode supply = 6 V, resistive load		250	ШA	

BLOCKING					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Maximum critical rate of rise of off-state voltage	dV/dt	T_J = 125 °C, exponential to 0.67 V _{DRM} gate open	200	V/µs	
Maximum peak reverse and off-state leakage current at V _{RRM} , V _{DRM}	I _{RRM} , I _{DRM}	T _J = 125 °C, gate open circuit	10	mA	
Maximum peak reverse leakage current	I _{RRM}	T _J = 25 °C	100	μA	
RMS isolation voltage	V _{ISOL}	50 Hz, circuit to base, all terminals shorted, T_J = 25 °C, t = 1 s	2500	V	

TRIGGERING					
PARAMETER	SYMBOL	TEST CO	NDITIONS	VALUES	UNITS
Maximum peak gate power	P _{GM}			8	W
Maximum average gate power	P _{G(AV)}			2	vv
Maximum peak gate current	I _{GM}			2	А
Maximum peak negative gate voltage	-V _{GM}			10	V
	V _{GT}	$T_J = -40 \ ^{\circ}C$	Anode supply =	3	v
Maximum gate voltage required to trigger		T _J = 25 °C		2	
		T _J = 125 °C		1	
		$T_J = -40 \ ^{\circ}C$	6 V resistive load	90	
Maximum gate current required to trigger	I _{GT}	T _J = 25 °C		60	mA
		T _J = 125 °C		35	
Maximum gate voltage that will not trigger	V _{GD}	$T_{\rm J}$ = 125 °C, rated V _{DRM} applied 0.2		0.2	V
Maximum gate current that will not trigger	I _{GD}			mA	

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THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Maximum junction operating and storage temperature range	T _J , T _{Stg}		-40 to +125	°C	
Maximum thermal resistance, junction to case per junction	R _{thJC}	DC operation	2.24	K/W	
Maximum thermal resistance, case to heatsink	R _{thCS}	Mounting surface, smooth and greased	0.10	r./ vv	
Mounting torque, base to heatsink ⁽¹⁾			4	Nm	
Approximate weight			58	g	
Approximate weight			2.0	oz.	
Case style			PACE-PA	AK (D-19)	

Note

⁽¹⁾ A mounting compound is recommended and the torque should be checked after a period of 3 hours to allow for the spread of the compound



Fig. 1 - Current Ratings Nomogram (1 Module Per Heatsink)



Fig. 2 - On-State Power Loss Characteristics



Fig. 3 - On-State Power Loss Characteristics

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Fig. 4 - Current Ratings Characteristics



Fig. 5 - On-State Voltage Drop Characteristics





Fig. 6 - Maximum Non-Repetitive Surge Current



Fig. 7 - Maximum Non-Repetitive Surge Current



Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

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CIRCUIT CONFIGURATION				
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	SCHEMATIC DIAGRAM	TERMINAL POSITIONS	
Single phase, hybrid bridge common cathode	0	(-) $(-)$ $(+)$ $(+)$ $(+)$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	
Single phase, hybrid bridge doubler connection	2	$G1 \circ G2$ $AC2 \circ AC1 \circ O$ $(-) \circ O(+)$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	
Single phase, all SCR bridge	3	G^{3} G^{3} G^{1} AC_{2} G^{4} G^{2} $(+)$	$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	

CODING ⁽¹⁾						
CIRCUIT DESCRIPTION	CIRCUIT CONFIGURATION CODE	BASIC SERIES	WITH VOLTAGE SUPPRESSION	WITH FREEWHEELING DIODE	WITH BOTH VOLTAGE SUPPRESSION AND FREEWHEELING DIODE	
Single phase, hybrid bridge common cathode	0	P10.	P10.K	P10.W	P10.KW	
Single phase, hybrid bridge doubler connection	2	P12.	P12.K	-	-	
Single phase, all SCR bridge	3	P13.	P13.K	-	-	

Note

⁽¹⁾ To complete code refer to Voltage Ratings table, i.e.: for 600 V P10.W complete code is P102W

LINKS TO RELATED DOCUMENTS		
Dimensions	www.vishay.com/doc?95335	

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D-19 PACE-PAK

DIMENSIONS in millimeters (inches)

SHAY







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