Surface Mountable
Phase Control SCR, 10 A

D²PAK

DESCRIPTION/FEATURES

The 10TTS08SPbF High Voltage Series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications. The glass passivation technology used has reliable operation up to 125 °C junction temperature.

Typical applications are in input rectification (soft start) and these products are designed to be used with Vishay HPP input diodes, switches and output rectifiers which are available in identical package outlines.

This product has been designed and qualified for industrial level and lead (Pb)-free.

PRODUCT SUMMARY	
V_T at 6.5 A	< 1.15 V
I_{TSM}	140 A
V_{RRM}	800 V

OUTPUT CURRENT IN TYPICAL APPLICATIONS			
APPLICATIONS	SINGLE-PHASE BRIDGE	THREE-PHASE BRIDGE	UNITS
NEMA FR-4 or G-10 glass fabric-based epoxy with 4 oz. (140 µm) copper	2.5	3.5	A
Aluminum IMS, R_{thCA} = 15 °C/W	6.3	9.5	
Aluminum IMS with heatsink, R_{thCA} = 5 °C/W	14.0	18.5	

Note

- T_A = 55 °C, T_J = 125 °C, footprint 300 mm²

MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{T(AV)}$	Sinusoidal waveform	6.5	A
I_{RMS}		10	
V_{RRM}/V_{DRM}		800	V
I_{TSM}		140	A
V_T	6.5 A, T_J = 25 °C	1.15	V
dV/dt		150	V/µs
dI/dt		100	A/µs
T_J	Range	- 40 to 125	°C

VOLTAGE RATINGS			
PART NUMBER	V_{RRM}, MAXIMUM PEAK REVERSE VOLTAGE V	V_{DRM}, MAXIMUM PEAK DIRECT VOLTAGE V	I_{RRM}/I_{DRM} AT 125 °C mA
10TTS08SPbF	800	800	1.0

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average on-state current	$I_{T(AV)}$	T_C = 112 °C, 180° conduction half sine wave		6.5	A
Maximum RMS on-state current	$I_{T(RMS)}$			10	
Maximum peak, one-cycle, non-repetitive surge current	I_{TSM}	10 ms sine pulse, rated V_{RRM} applied, T_J = 125 °C		120	
		10 ms sine pulse, no voltage reapplied, T_J = 125 °C		140	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied, T_J = 125 °C		72	A^2s
		10 ms sine pulse, no voltage reapplied, T_J = 125 °C		100	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied, T_J = 125 °C		1000	$A^2\sqrt{s}$
Maximum on-state voltage drop	V_{TM}	6.5 A, T_J = 25 °C		1.15	V
On-state slope resistance	r_t	T_J = 125 °C		17.3	mΩ
Threshold voltage	$V_{T(TO)}$			0.85	V
Maximum reverse and direct leakage current	I_{RM}/I_{DM}	T_J = 25 °C	V_R = Rated V_{RRM}/V_{DRM}	0.05	mA
		T_J = 125 °C		1.0	
Typical holding current	I_H	Anode supply = 6 V, resistive load, initial I_T = 1 A		30	
Maximum latching current	I_L	Anode supply = 6 V, resistive load		50	
Maximum rate of rise of off-state voltage	dV/dt	T_J = 25 °C		150	V/µs
Maximum rate of rise of turned-on current	dI/dt			100	A/µs

TRIGGERING

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum peak gate power	P_{GM}		8.0	W
Maximum average gate power	$P_{G(AV)}$		2.0	
Maximum peak positive gate current	$+I_{GM}$		1.5	A
Maximum peak negative gate voltage	$-V_{GM}$		10	V
Maximum required DC gate current to trigger	I_{GT}	Anode supply = 6 V, resistive load, T_J = - 65 °C	20	mA
		Anode supply = 6 V, resistive load, T_J = 25 °C	15	
		Anode supply = 6 V, resistive load, T_J = 125 °C	10	
Maximum required DC gate voltage to trigger	V_{GT}	Anode supply = 6 V, resistive load, T_J = - 65 °C	1.2	V
		Anode supply = 6 V, resistive load, T_J = 25 °C	1	
		Anode supply = 6 V, resistive load, T_J = 125 °C	0.7	
Maximum DC gate voltage not to trigger	V_{GD}	T_J = 125 °C, V_{DRM} = Rated value	0.2	
Maximum DC gate current not to trigger	I_{GD}		0.1	mA

SWITCHING

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Typical turn-on time	t_{gt}	T_J = 25 °C	0.8	µs
Typical reverse recovery time	t_{rr}	T_J = 125 °C	3	
Typical turn-off time	t_q		100	

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**VALUES**	**UNITS**
Maximum junction and storage temperature range	T_J, T_{Stg}		- 40 to 125	°C
Soldering temperature	T_S	For 10 s (1.6 mm from case)	240	
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	1.5	°C/W
Typical thermal resistance, junction to ambient (PCB mount)	R_{thJA} (1)		40	
Approximate weight			2	g
			0.07	oz.
Marking device		Case style D^2PAK (SMD-220)	10TTS08S	

Note

(1) When mounted on 1" square (650 mm^2) PCB of FR-4 or G-10 material 4 oz. (140 µm) copper 40 °C/W
For recommended footprint and soldering techniques refer to application note #AN-994

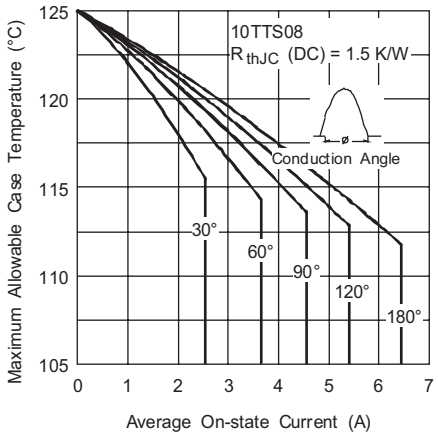

Fig. 1 - Current Rating Characteristics

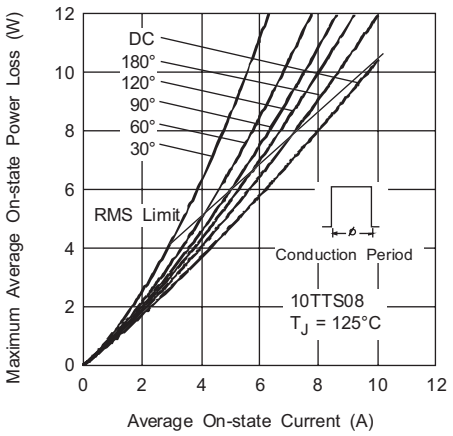

Fig. 4 - On-State Power Loss Characteristics

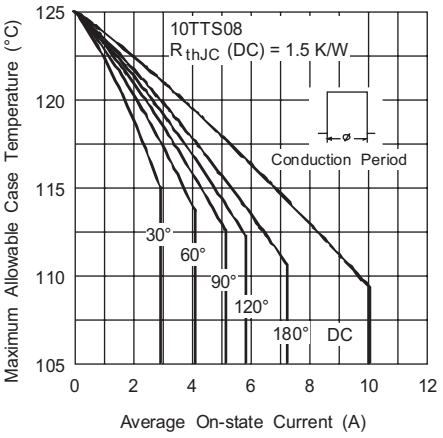

Fig. 2 - Current Rating Characteristics

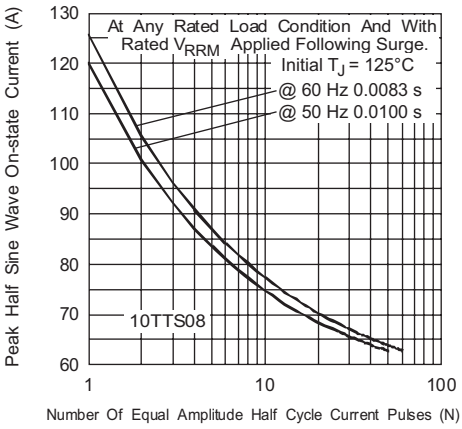

Fig. 5 - Maximum Non-Repetitive Surge Current

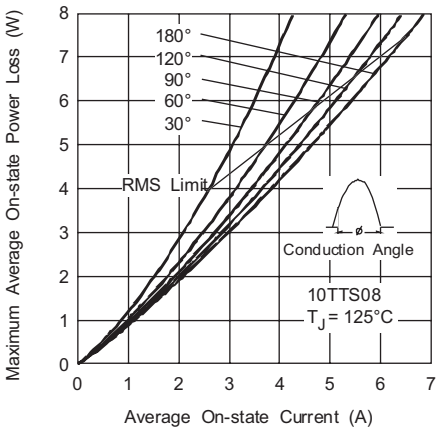

Fig. 3 - On-State Power Loss Characteristics

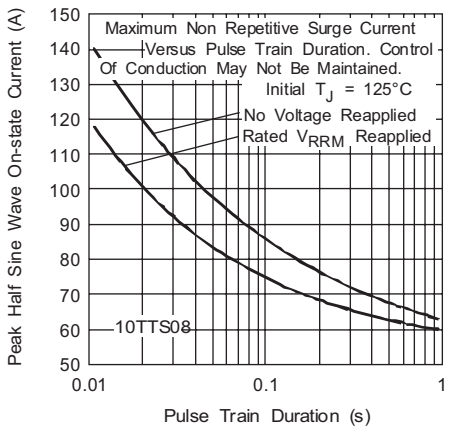

Fig. 6 - Maximum Non-Repetitive Surge Current

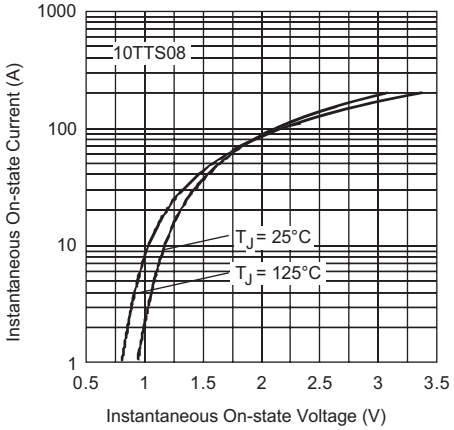

Fig. 7 - On-State Voltage Drop Characteristics

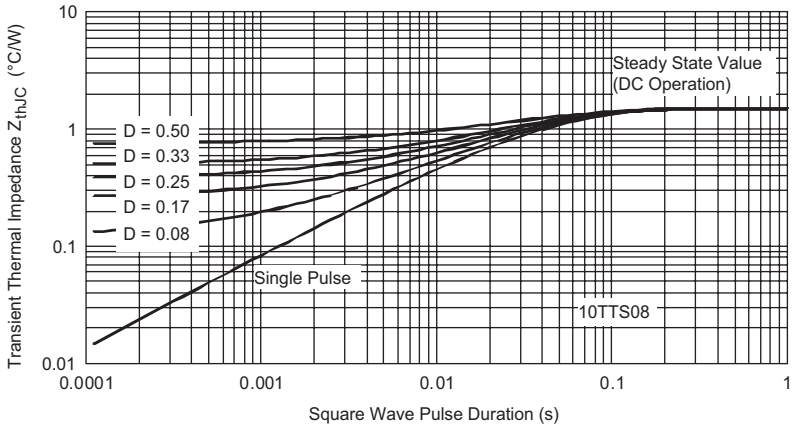

Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

ORDERING INFORMATION TABLE

Device code

10	T	T	S	08	S	TRL	PbF
1	2	3	4	5	6	7	8

1 - Current rating, RMS value

2 - Circuit configuration:
T = Single thyristor

3 - Package:
T = TO-220AC

4 - Type of silicon:
S = Converter grade

5 - Voltage code x 100 = V_{RRM}

6 - S = TO-220 D^2PAK (SMD-220) version

7 - Tape and reel option:
- TRL = Left reel
- TRR = Right orientation reel

8 -
- None = Standard production
- PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95046
Part marking information	http://www.vishay.com/doc?95054
Packaging information	http://www.vishay.com/doc?95032

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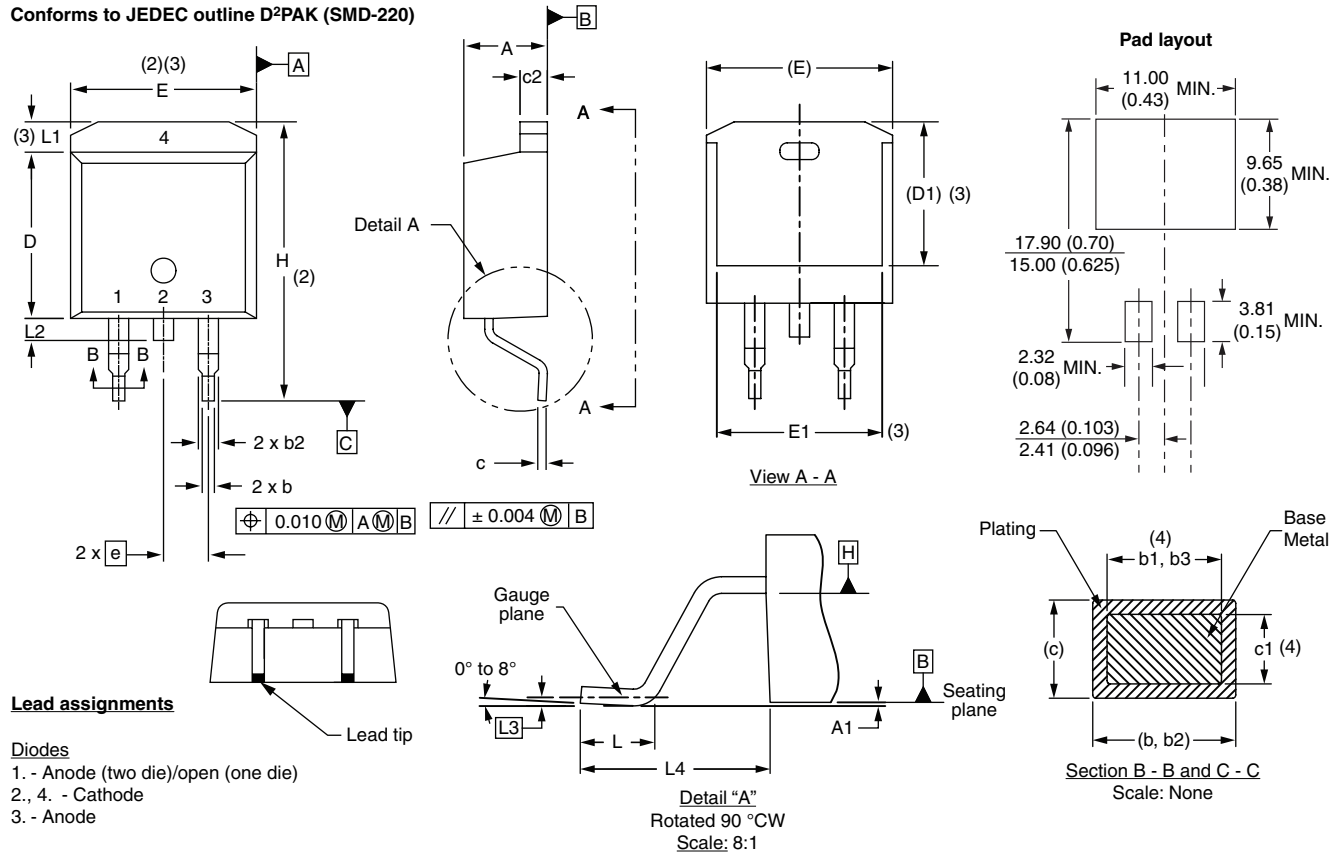
D^2PAK

DIMENSIONS in millimeters and inches



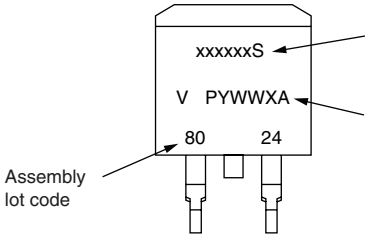
SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	0.00	0.254	0.000	0.010	
b	0.51	0.99	0.020	0.039	
b1	0.51	0.89	0.020	0.035	4
b2	1.14	1.78	0.045	0.070	
b3	1.14	1.73	0.045	0.068	4
c	0.38	0.74	0.015	0.029	
c1	0.38	0.58	0.015	0.023	4
c2	1.14	1.65	0.045	0.065	
D	8.51	9.65	0.335	0.380	2

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D1	6.86	-	0.270	-	3
E	9.65	10.67	0.380	0.420	2, 3
E1	6.22	-	0.245	-	3
e	2.54 BSC		0.100 BSC		
H	14.61	15.88	0.575	0.625	
L	1.78	2.79	0.070	0.110	
L1	-	1.65	-	0.066	3
L2	1.27	1.78	0.050	0.070	
L3	0.25 BSC		0.010 BSC		
L4	4.78	5.28	0.188	0.208	

Notes

(1) Dimensioning and tolerancing per ASME Y14.5 M-1994
(2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
(3) Thermal pad contour optional within dimension E, L1, D1 and E1
(4) Dimension b1 and c1 apply to base metal only
(5) Datum A and B to be determined at datum plane H
(6) Controlling dimension: inch
(7) Outline conforms to JEDEC outline TO-263AB

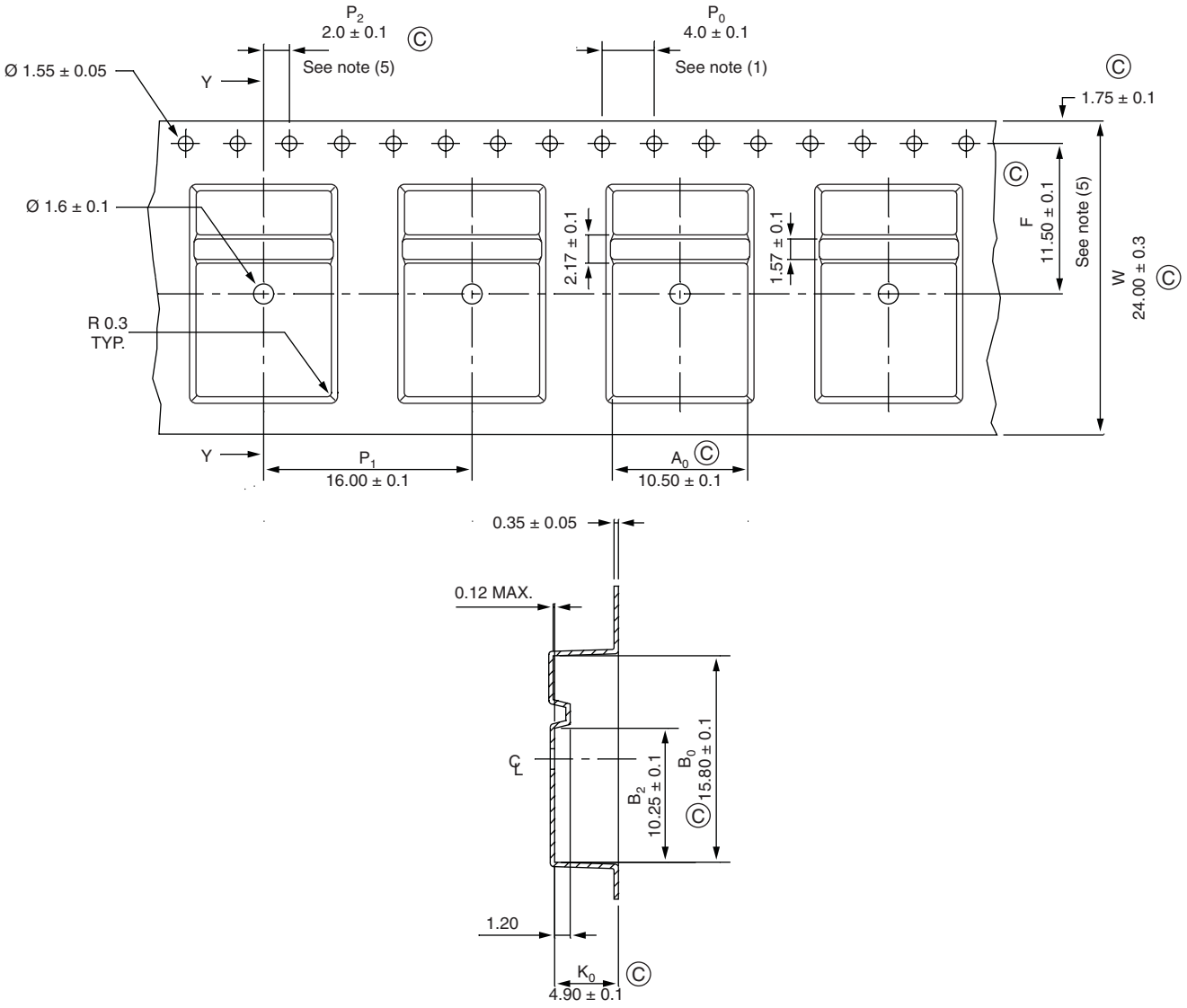
D²PAK



Example: This is a xxxxxxS with assembly lot code 8024, assembled on WW 02, 2000

D²PAK

TAPE AND REEL INFORMATION in millimeters (inches)



Section Y - Y

Notes

(1) 10 sprocket hole pitch cumulative tolerance ± 0.02
(2) Camber not to exceed 1 mm in 100 mm
(3) Material: conductive black styrenic alloy
(4) K_0 measured from a plane on the inside bottom of the pocket to the top surface of the carrier
(5) Measured from centerline of sprocket hole to centerline of pocket
(6) Vendor: (optional)
(7) Must also meet requirements of EIA standard # EIA-481A taping of surface mount components for automatic placement
(8) Surface resistivity of molded material must measure less or equal to 10^6 Ω per square. Measured in accordance to procedure given in ASTM D-257 and ASTM D-991
(9) Total length per reel must be 45 m
(10) Ⓒ critical