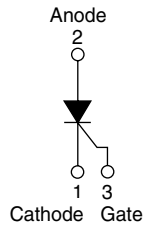


Surface Mountable Phase Control SCR, 16 A



D²PAK



DESCRIPTION/FEATURES

The 25TTS...SPbF 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.



Available
RoHS*
COMPLIANT

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 ("PbF" suffix).

PRODUCT SUMMARY	
V_T at 16 A	< 1.25 V
I_{TSM}	300 A
V_{RRM}	800 to 1600 V

OUTPUT CURRENT IN TYPICAL APPLICATIONS			
APPLICATIONS	SINGLE-PHASE BRIDGE	THREE-PHASE BRIDGE	UNITS
NEMA FR-4 or G10 glass fabric-based epoxy with 4 oz. (140 μm) copper	3.5	5.5	A
Aluminum IMS, $R_{thCA} = 15 \text{ °C/W}$	8.5	13.5	
Aluminum IMS with heatsink, $R_{thCA} = 5 \text{ °C/W}$	16.5	25.0	

Note

- $T_A = 55 \text{ °C}$, $T_J = 125 \text{ °C}$, footprint 300 mm²

MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	TEST CONDITIONS	VALUES	UNITS
$I_{T(AV)}$	Sinusoidal waveform	16	A
I_{RMS}		25	
V_{RRM}/V_{DRM}		800 to 1600	V
I_{TSM}		300	A
V_T	16 A, $T_J = 25 \text{ °C}$	1.25	V
dV/dt		500	V/μs
dI/dt		150	A/μs
T_J		- 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
25TTS08SPbF	800	800	10
25TTS12SPbF	1200	1200	
25TTS16SPbF	1600	1600	

* Pb containing terminations are not RoHS compliant, exemptions may apply

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ABSOLUTE MAXIMUM RATINGS						
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES		UNITS	
			TYP.	MAX.		
Maximum average on-state current	$I_{T(AV)}$	$T_C = 93\text{ }^\circ\text{C}$, 180° conduction half sine wave	16		A	
Maximum RMS on-state current	I_{RMS}		25			
Maximum peak, one-cycle, non-repetitive surge current	I_{TSM}	10 ms sine pulse, rated V_{RRM} applied	300			
		10 ms sine pulse, no voltage reapplied	350			
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	450		A^2s	
		10 ms sine pulse, no voltage reapplied	630			
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ to 10 ms, no voltage reapplied	6300		$A^2\sqrt{s}$	
Maximum on-state voltage drop	V_{TM}	16 A, $T_J = 25\text{ }^\circ\text{C}$	1.25		V	
On-state slope resistance	r_t	$T_J = 125\text{ }^\circ\text{C}$	12.0		$m\Omega$	
Threshold voltage	$V_{T(TO)}$		1.0		V	
Maximum reverse and direct leakage current	I_{RM}/I_{DM}	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_{RRM}/V_{DRM}$	0.5		mA
		$T_J = 125\text{ }^\circ\text{C}$		10		
Holding current	I_H	25TTS08, 25TTS12	Anode supply = 6 V, resistive load, initial $I_T = 1$ A	-	100	
		25TTS16		100	150	
Maximum latching current	I_L	Anode supply = 6 V, resistive load	200			
Maximum rate of rise of off-state voltage	dV/dt		500		$V/\mu s$	
Maximum rate of rise of turned-on current	dI/dt		150		$A/\mu s$	

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, $T_J = -10\text{ }^\circ\text{C}$	60		mA
		Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$	45		
		Anode supply = 6 V, resistive load, $T_J = 125\text{ }^\circ\text{C}$	20		
Maximum required DC gate voltage to trigger	V_{GT}	Anode supply = 6 V, resistive load, $T_J = -10\text{ }^\circ\text{C}$	2.5		V
		Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$	2.0		
		Anode supply = 6 V, resistive load, $T_J = 125\text{ }^\circ\text{C}$	1.0		
Maximum DC gate voltage not to trigger	V_{GD}	$T_J = 125\text{ }^\circ\text{C}$, $V_{DRM} = \text{Rated value}$	0.25		
Maximum DC gate current not to trigger	I_{GD}		2.0		mA

SWITCHING					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES		UNITS
Typical turn-on time	t_{gt}	$T_J = 25\text{ }^\circ\text{C}$	0.9		μs
Typical reverse recovery time	t_{rr}	$T_J = 125\text{ }^\circ\text{C}$	4		
Typical turn-off time	t_q		110		



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THERMAL AND 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	1.1	°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 ² PAK (SMD-220)	25TTS08S	
			25TTS12S	
			25TTS16S	

Note

⁽¹⁾ When mounted on 1" square (650 mm²) 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

25TTS...SPbF High Voltage Series



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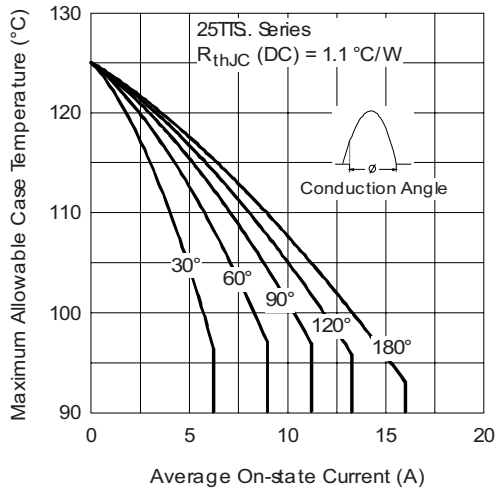


Fig. 1 - Current Rating Characteristics

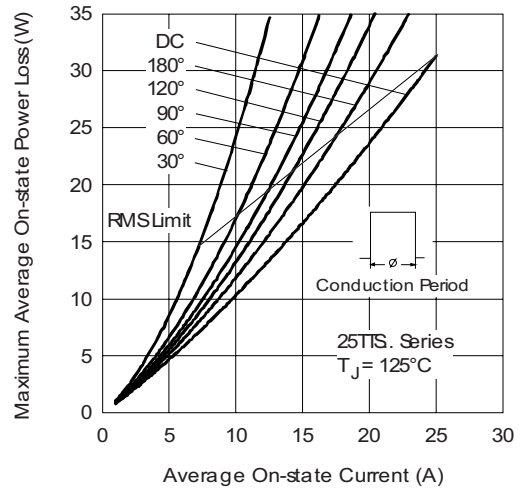


Fig. 4 - On-State Power Loss Characteristics

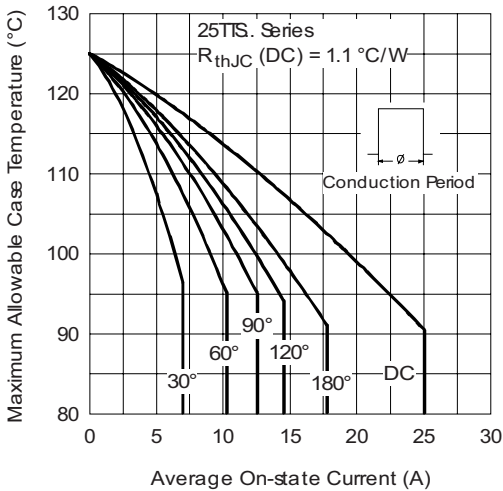


Fig. 2 - Current Rating Characteristics

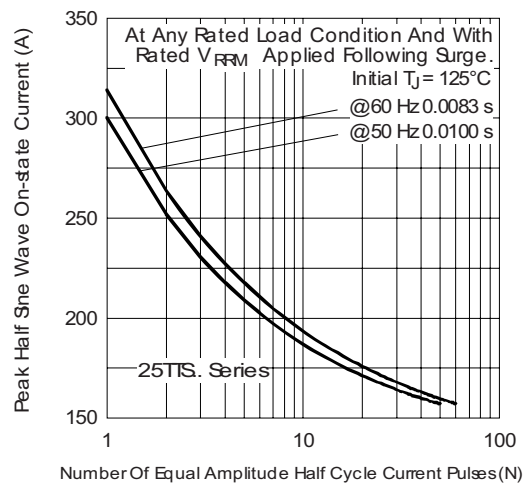


Fig. 5 - Maximum Non-Repetitive Surge Current

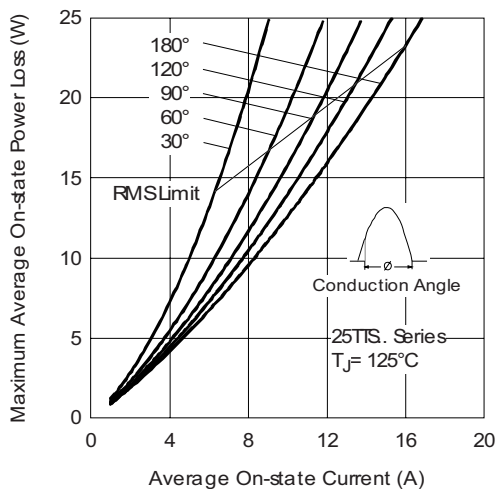


Fig. 3 - On-State Power Loss Characteristics

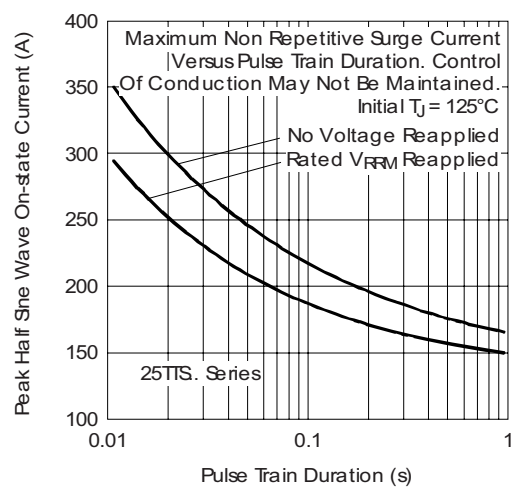


Fig. 6 - Maximum Non-Repetitive Surge Current



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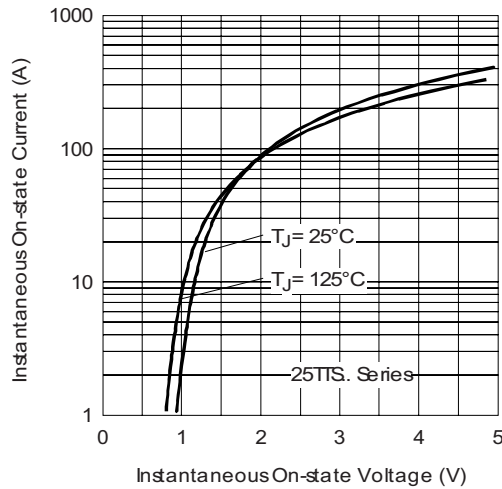


Fig. 7 - On-State Voltage Drop Characteristics

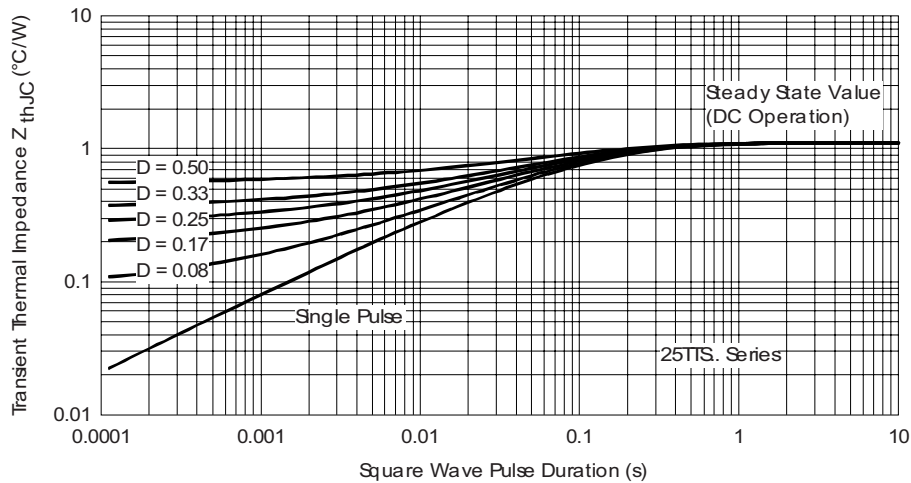


Fig. 8 - Gate Characteristics

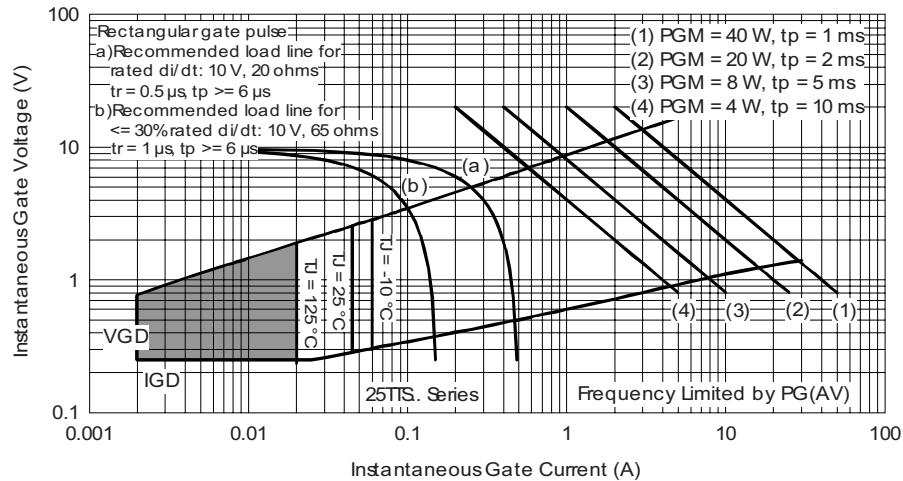


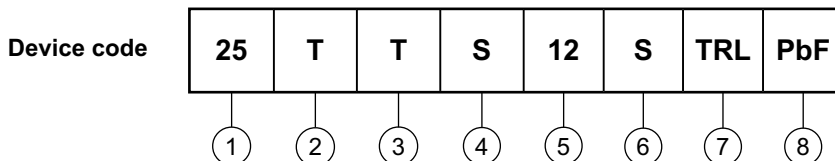
Fig. 9 - Thermal Impedance Z_{thJC} Characteristics

25TTS...SPbF High Voltage Series



Vishay High Power Products Surface Mountable Phase Control SCR, 16 A

ORDERING INFORMATION TABLE



- 1** - Current rating (25 = 25 A)
- 2** - Circuit configuration:
T = Single thyristor
- 3** - Package:
T = TO-220AC
- 4** - Type of silicon:
Standard recovery rectifier
- 5** - Voltage rating = Voltage code x 100 = V_{RRM}
- 6** - S = TO-220 D²PAK (SMD-220) version
- 7** -
 - None = Tube
 - TRL = Tape and reel (left oriented)
 - TRR = Tape and reel (right oriented)
- 8** -
 - None = Standard production
 - PbF = Lead (Pb)-free

08 = 800 V
12 = 1200 V
16 = 1600 V

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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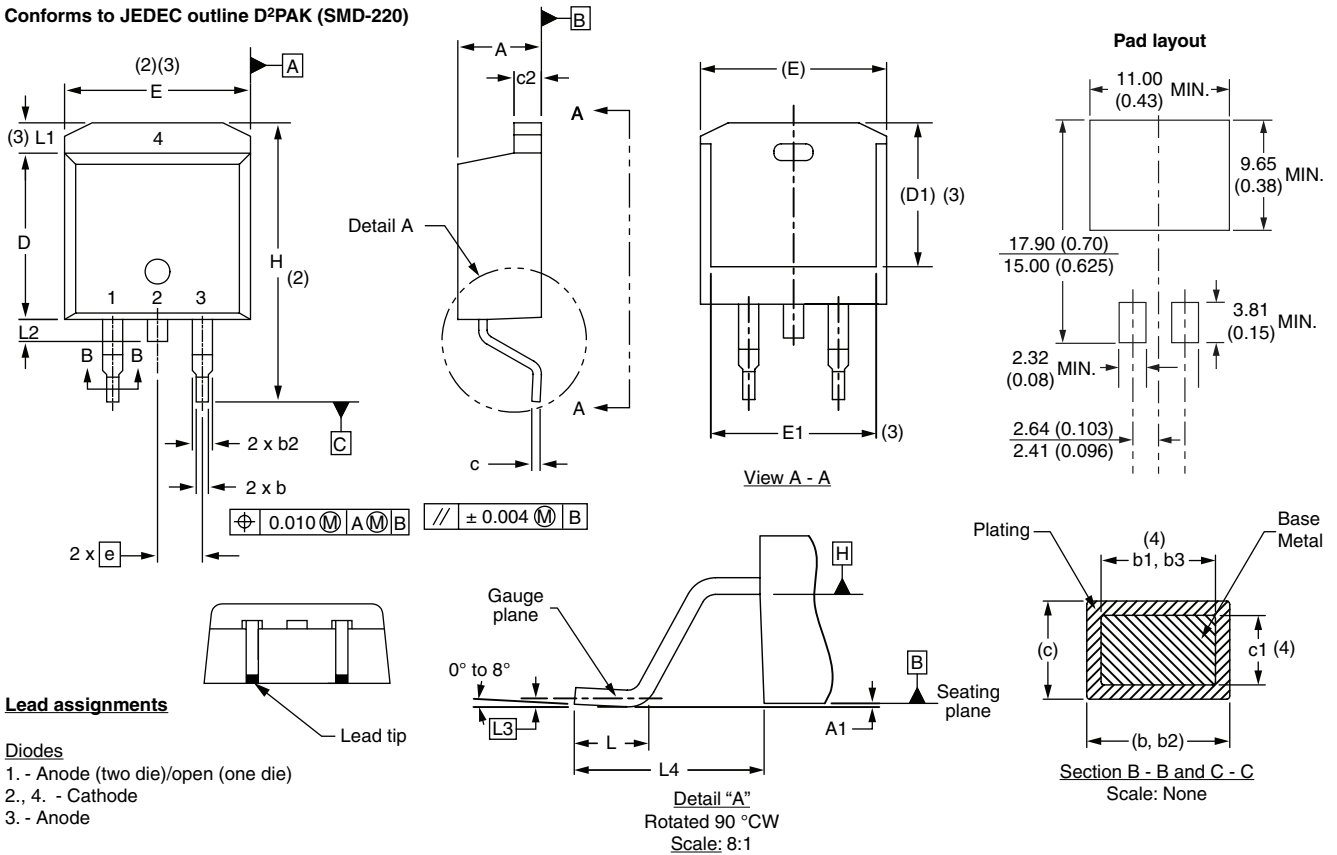
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D²PAK

DIMENSIONS in millimeters and inches

Conforms to JEDEC outline D²PAK (SMD-220)



SYMBOL	MILLIMETERS		INCHES		NOTES	SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.			MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190		D1	6.86	-	0.270	-	3
A1	0.00	0.254	0.000	0.010		E	9.65	10.67	0.380	0.420	2, 3
b	0.51	0.99	0.020	0.039		E1	6.22	-	0.245	-	3
b1	0.51	0.89	0.020	0.035	4	e	2.54 BSC		0.100 BSC		
b2	1.14	1.78	0.045	0.070		H	14.61	15.88	0.575	0.625	
b3	1.14	1.73	0.045	0.068	4	L	1.78	2.79	0.070	0.110	
c	0.38	0.74	0.015	0.029		L1	-	1.65	-	0.066	3
c1	0.38	0.58	0.015	0.023	4	L2	1.27	1.78	0.050	0.070	
c2	1.14	1.65	0.045	0.065		L3	0.25 BSC		0.010 BSC		
D	8.51	9.65	0.335	0.380	2	L4	4.78	5.28	0.188	0.208	

Notes

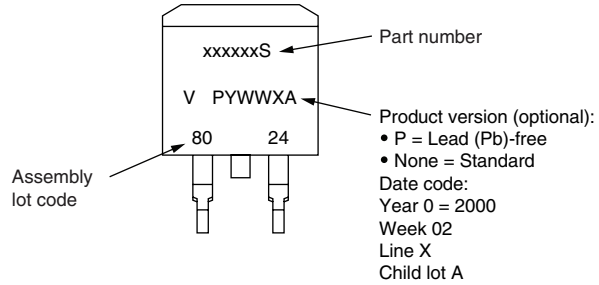
- (1) Dimensioning and tolerancing per ASME Y14.5 M-1994
- (2) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body
- (3) Thermal pad contour optional within dimension E, L1, D1 and 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



Part Marking Information

Vishay High Power Products

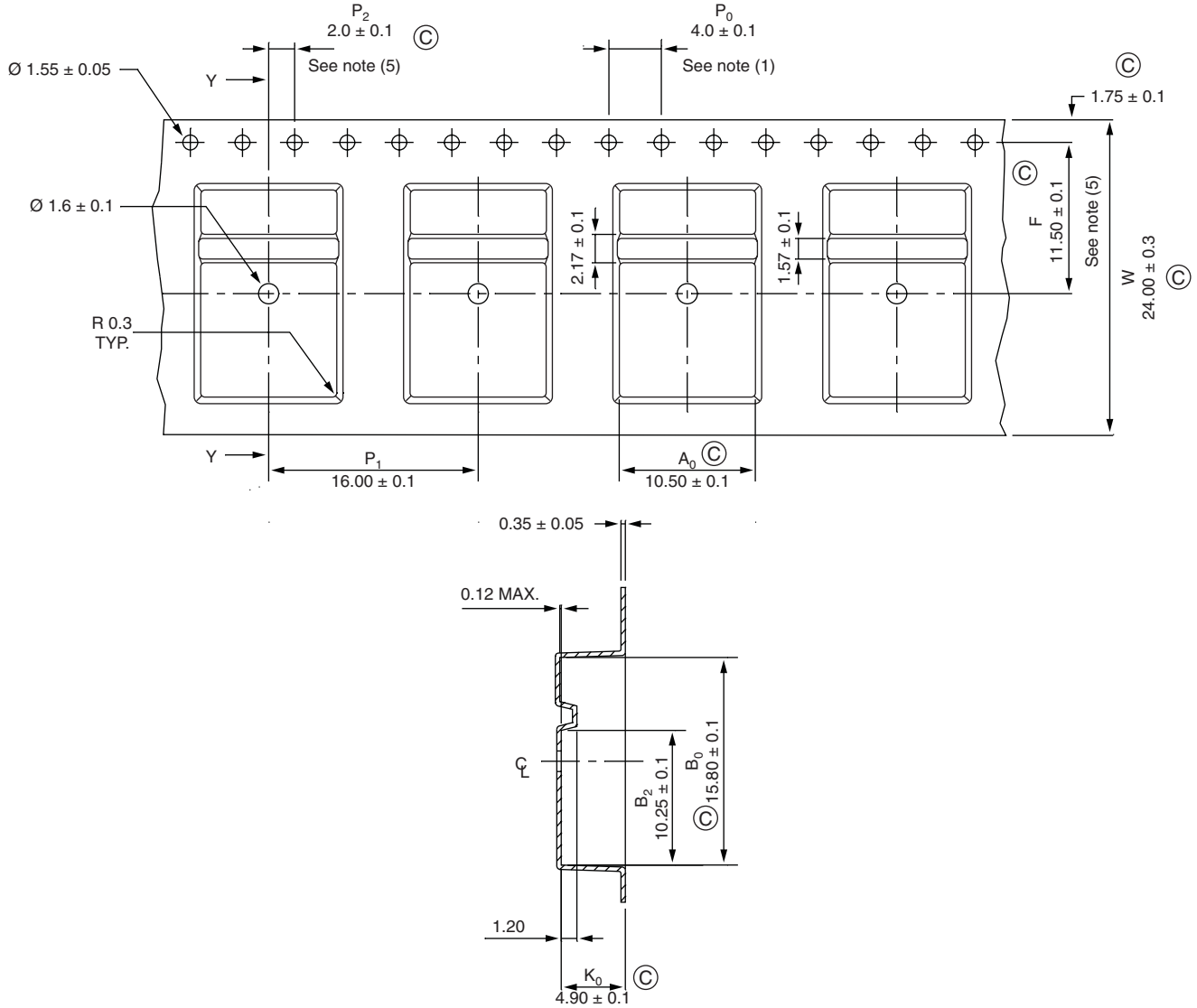
D²PAK



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 $10^6 \Omega$ 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