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[Vishay Semiconductor/Diodes Division](#)
[VS-20ETF10STRRPBF](#)

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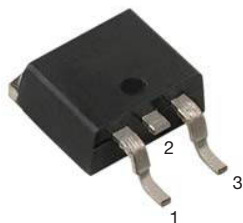


VS-20ETF08S-M3, VS-20ETF10S-M3, VS-20ETF12S-M3 Series

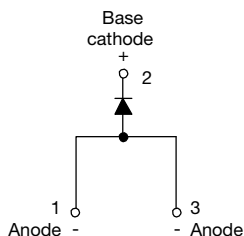
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Vishay Semiconductors

Surface Mount Fast Soft Recovery Rectifier Diode, 20 A



TO-263AB (D²PAK)



FEATURES

- Glass passivated pellet chip junction
- Designed and qualified according to JEDEC®-JESD 47
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Output rectification and freewheeling in inverters, choppers and converters
- Input rectifications where severe restrictions on conducted EMI should be met

DESCRIPTION

The VS-20ETF..S-M3 soft recovery rectifier series has been optimized for combined short reverse recovery time and low forward voltage drop.

The glass passivation ensures stable reliable operation in the most severe temperature and power cycling conditions.

PRODUCT SUMMARY	
Package	TO-263AB (D ² PAK)
I _{F(AV)}	20 A
V _R	800 V, 1000 V, 1200 V
V _F at I _F	1.31 V
I _{FSM}	355 A
t _{rr}	95 ns
T _J max.	150 °C
Diode variation	Single die
Snap factor	0.6

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
I _{F(AV)}	Sinusoidal waveform	20	A
V _{RRM}		800 to 1200	V
I _{FSM}		355	A
V _F	20 A, T _J = 25 °C	1.31	V
t _{rr}	1 A, 100 A/μs	95	ns
T _J	Range	-40 to +150	°C

VOLTAGE RATINGS			
PART NUMBER	V _{RRM} , MAXIMUM PEAK REVERSE VOLTAGE V	V _{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I _{RRM} AT 150 °C mA
20ETF08S-M3	800	900	6
20ETF10S-M3	1000	1100	
20ETF12S-M3	1200	1300	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	I _{F(AV)}	T _C = 97 °C, 180° conduction half sine wave	20	A
Maximum peak one cycle non-repetitive surge current	I _{FSM}	10 ms sine pulse, rated V _{RRM} applied	300	
		10 ms sine pulse, no voltage reapplied	355	
Maximum I ² t for fusing	I ² t	10 ms sine pulse, rated V _{RRM} applied	450	A ² s
		10 ms sine pulse, no voltage reapplied	635	
Maximum I ² √t for fusing	I ² √t	t = 0.1 ms to 10 ms, no voltage reapplied	6350	A ² √s

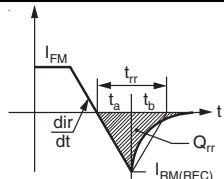


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ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	20 A, $T_J = 25\text{ }^\circ\text{C}$		1.31	V
Forward slope resistance	r_t	$T_J = 150\text{ }^\circ\text{C}$		11.88	$\text{m}\Omega$
Threshold voltage	$V_{F(TO)}$			0.93	V
Maximum reverse leakage current	I_{RM}	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_{RRM}$	0.1	mA
		$T_J = 150\text{ }^\circ\text{C}$		6	

RECOVERY CHARACTERISTICS					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Reverse recovery time	t_{rr}	I_F at 20 A _{pk} 25 A/ μs 25 $^\circ\text{C}$	400	ns	
Reverse recovery current	I_{rr}		6.1	A	
Reverse recovery charge	Q_{rr}		1.7	μC	
Snap factor	S	Typical	0.6		

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction and storage temperature range	T_J, T_{Stg}		-40 to +150	$^\circ\text{C}$
Maximum thermal resistance, junction to case	R_{thJC}	DC operation	0.9	$^\circ\text{C}/\text{W}$
Maximum thermal resistance, junction to ambient (PCB mount)	$R_{thJA}^{(1)}$		62	
Soldering temperature	T_S		260	$^\circ\text{C}$
Approximate weight			2	g
			0.07	oz.
Marking device		Case style D ² PAK (SMD-220)	20ETF08S	
			20ETF10S	
			20ETF12S	

Note

⁽¹⁾ When mounted on 1" square (650 mm²) PCB of FR-4 or G-10 material 4 oz. (140 μm) copper 40 $^\circ\text{C}/\text{W}$
For recommended footprint and soldering techniques refer to application note #AN-994



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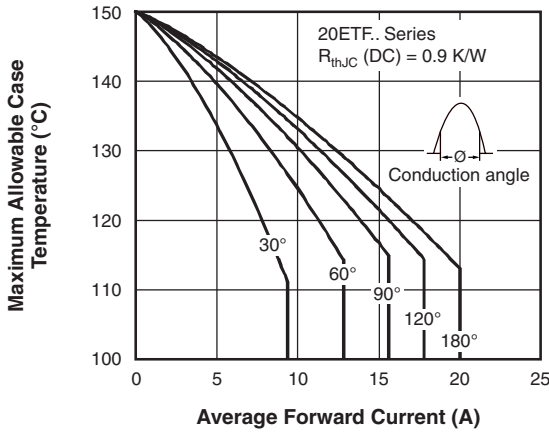


Fig. 1 - Current Rating Characteristics

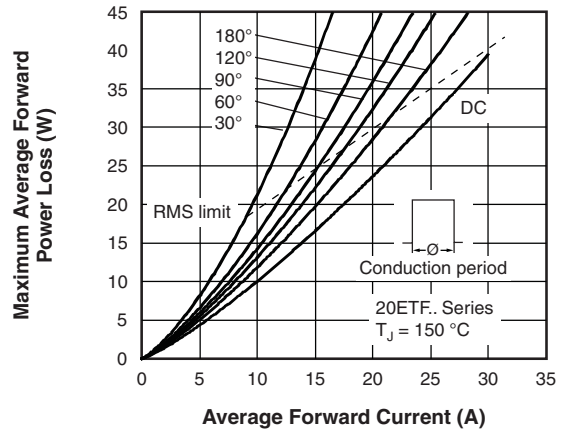


Fig. 4 - Forward Power Loss Characteristics

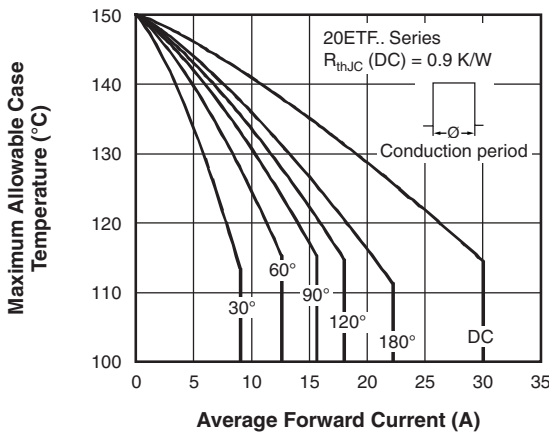


Fig. 2 - Current Rating Characteristics

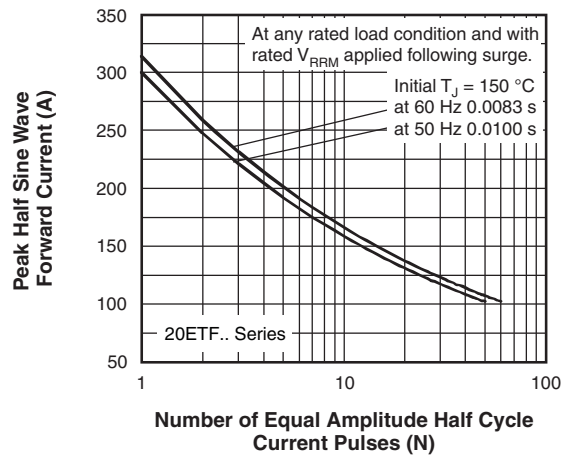


Fig. 5 - Maximum Non-Repetitive Surge Current

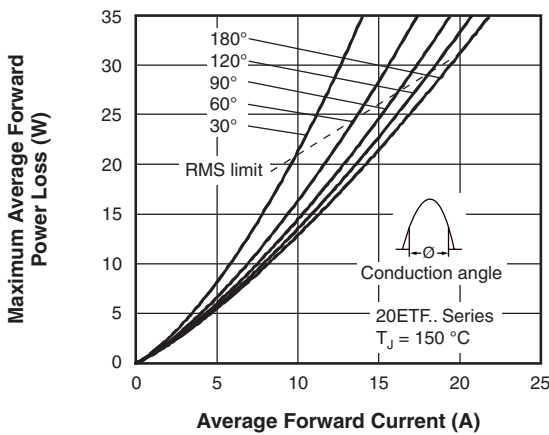


Fig. 3 - Forward Power Loss Characteristics

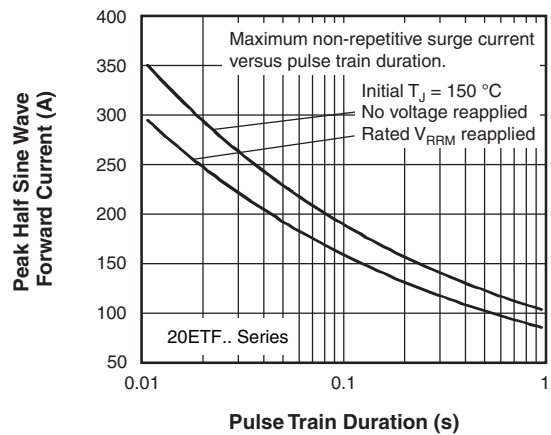


Fig. 6 - Maximum Non-Repetitive Surge Current



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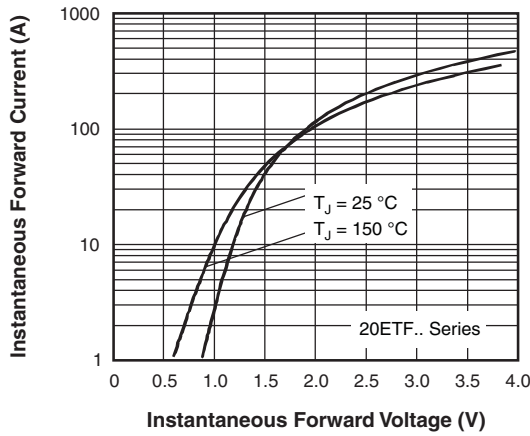


Fig. 7 - Forward Voltage Drop Characteristics

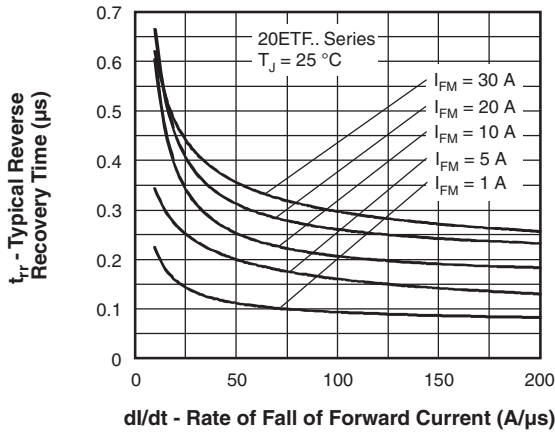


Fig. 8 - Recovery Time Characteristics, $T_J = 25\text{ }^\circ\text{C}$

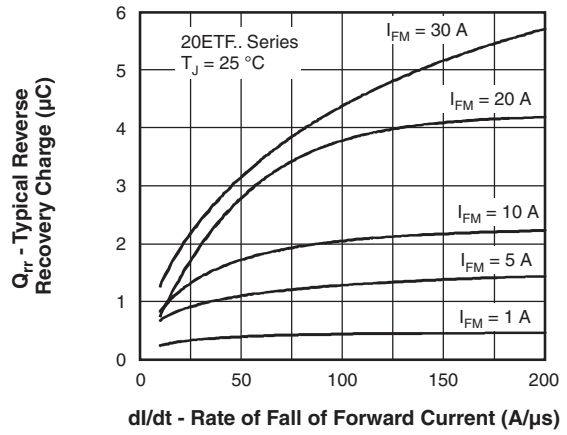


Fig. 10 - Recovery Charge Characteristics, $T_J = 25\text{ }^\circ\text{C}$

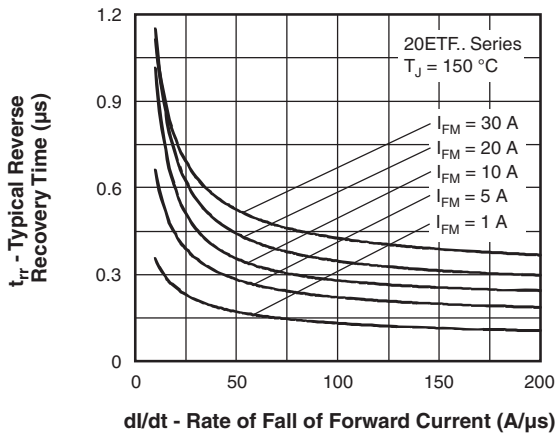


Fig. 9 - Recovery Time Characteristics, $T_J = 150\text{ }^\circ\text{C}$

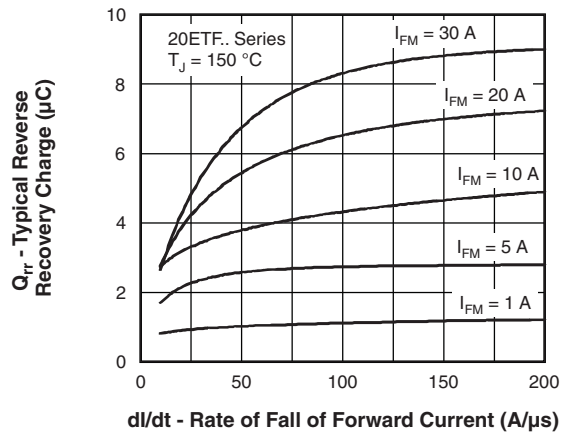


Fig. 11 - Recovery Charge Characteristics, $T_J = 150\text{ }^\circ\text{C}$



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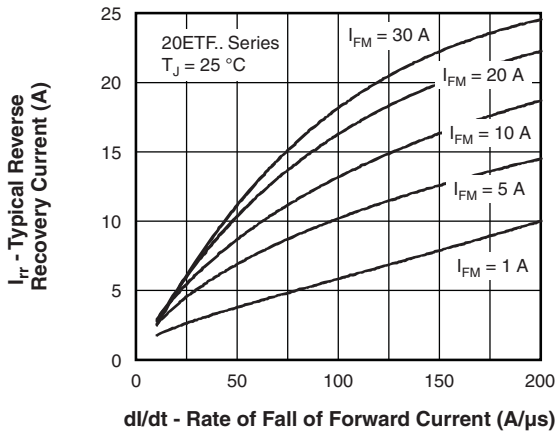


Fig. 12 - Recovery Current Characteristics, $T_J = 25\text{ }^\circ\text{C}$

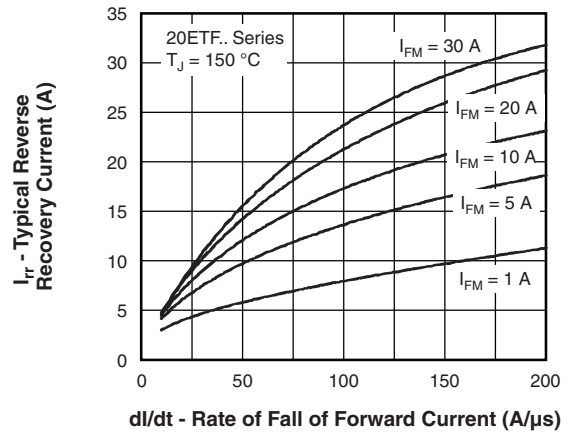


Fig. 13 - Recovery Current Characteristics, $T_J = 150\text{ }^\circ\text{C}$

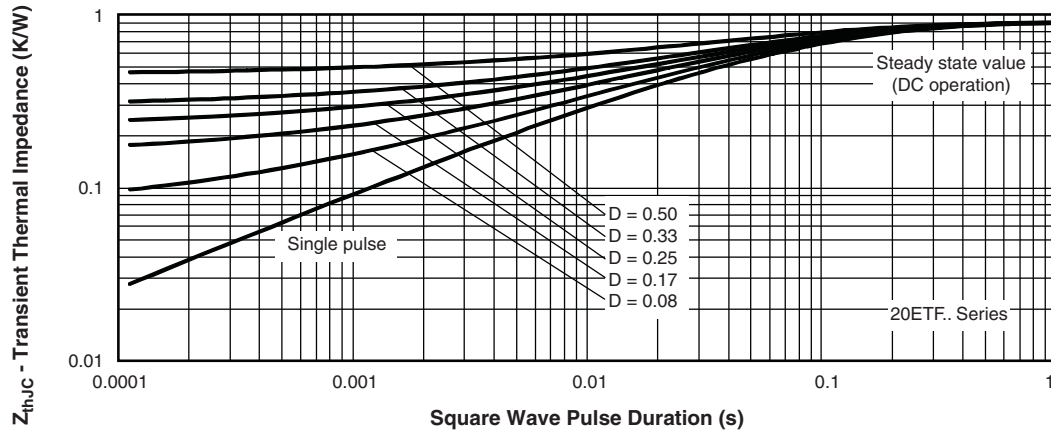


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics

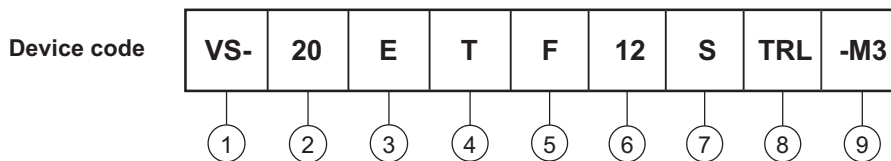


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ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (20 = 20 A)
- 3** - Circuit configuration:
E = single diode
- 4** - Package:
T = D²PAK
- 5** - Type of silicon:
F = fast soft recovery rectifier
- 6** - Voltage code x 100 = V_{RRM}

08 = 800 V
10 = 1000 V
12 = 1200 V
- 7** - S = surface mountable
- 8** -
 - None = tape
 - TRR = tape and reel (right oriented)
 - TRL = tape and reel (left oriented)
- 9** - -M3 = halogen-free, RoHS-compliant, and terminations lead (Pb)-free

ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-20ETF08S-M3	50	1000	Antistatic plastic tubes
VS-20ETF08STRR-M3	800	800	13" diameter reel
VS-20ETF08STRL-M3	800	800	13" diameter reel
VS-20ETF10S-M3	50	1000	Antistatic plastic tubes
VS-20ETF10STRR-M3	800	800	13" diameter reel
VS-20ETF10STRL-M3	800	800	13" diameter reel
VS-20ETF12S-M3	50	1000	Antistatic plastic tubes
VS-20ETF12STRR-M3	800	800	13" diameter reel
VS-20ETF12STRL-M3	800	800	13" diameter reel

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95046
Part marking information	www.vishay.com/doc?95444
Packaging information	www.vishay.com/doc?95032



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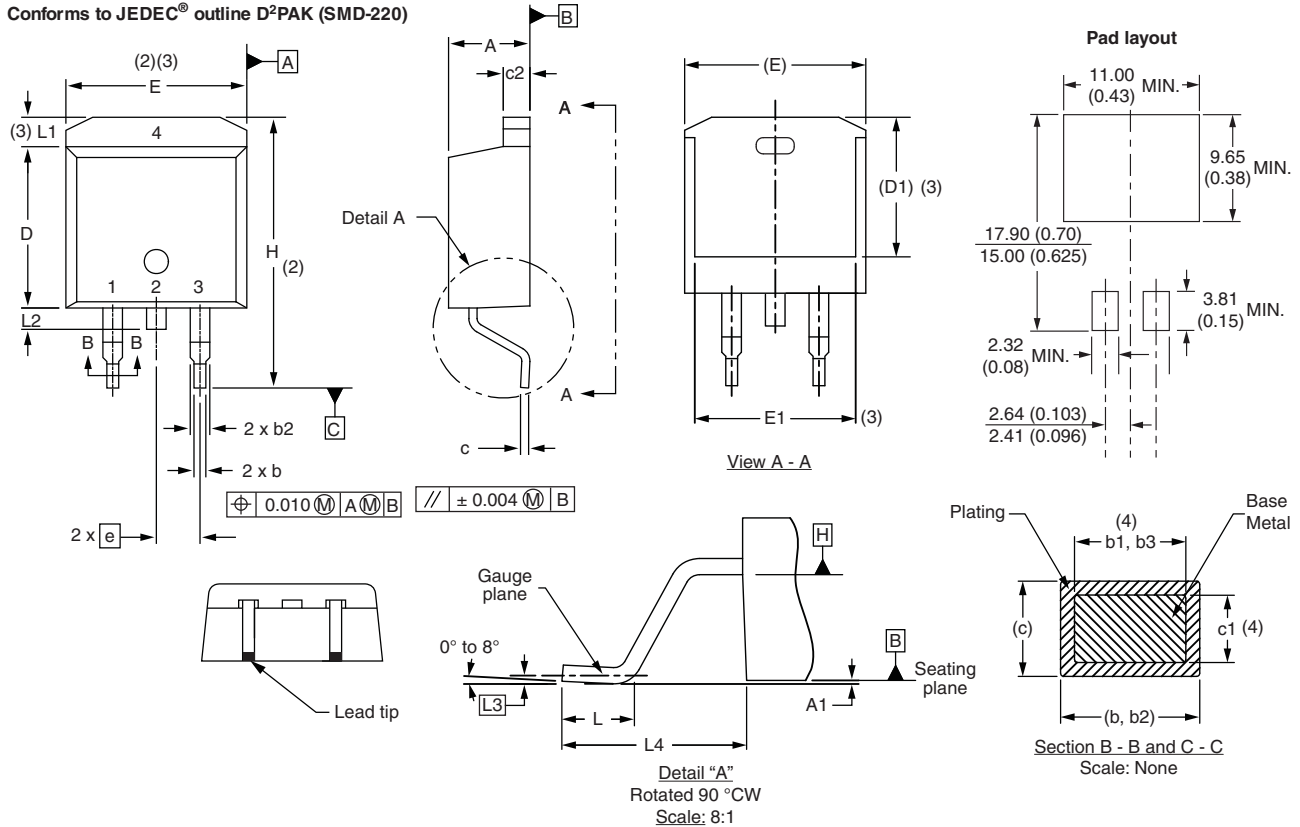
Outline Dimensions

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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	8.00	0.270	0.315	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	7.90	8.80	0.311	0.346	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



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