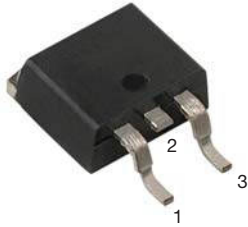
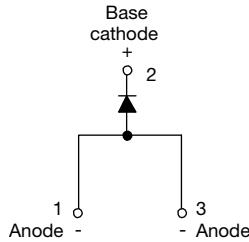


Surface Mount Fast Soft Recovery Rectifier Diode, 10 A


TO-263AB (D²PAK)

FEATURES

- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Designed and qualified for industrial level
- 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-10ETF..SPbF fast 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 (D²PAK)
$I_{F(AV)}$	10 A
V_R	200 V, 400 V, 600 V
V_F at I_F	1.2 V
I_{FSM}	140 A
t_{rr}	50 ns
T_J max.	150 °C
Diode variation	Single die
Snap factor	0.6

MAJOR RATINGS AND CHARACTERISTICS			
SYMBOL	CHARACTERISTICS	VALUES	UNITS
V_{RRM}		200 to 600	V
$I_{F(AV)}$	Sinusoidal waveform	10	A
I_{FSM}		140	
t_{rr}	1 A, 100 A/ μ s	50	ns
V_F	10 A, $T_J = 25$ °C	1.2	V
T_J	Range	-40 to 150	°C

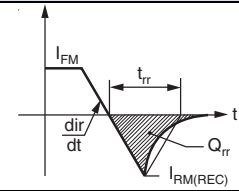
VOLTAGE RATINGS			
PART NUMBER	V_{RRM} , MAXIMUM PEAK REVERSE VOLTAGE V	V_{RSM} , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V	I_{RRM} AT 150 °C mA
VS-10ETF02SPbF	200	300	2.5
VS-10ETF04SPbF	400	500	
VS-10ETF06SPbF	600	700	

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current	$I_{F(AV)}$	$T_C = 128$ °C, 180° conduction half sine wave	10	A
Maximum peak one cycle non-repetitive surge current	I_{FSM}	10 ms sine pulse, rated V_{RRM} applied	115	
		10 ms sine pulse, no voltage reapplied	140	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied	66	A²s
		10 ms sine pulse, no voltage reapplied	94	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	$t = 0.1$ ms to 10 ms, no voltage reapplied	940	A²√s



ELECTRICAL SPECIFICATIONS					
PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum forward voltage drop	V_{FM}	10 A, $T_J = 25\text{ }^\circ\text{C}$		1.2	V
Forward slope resistance	r_t	$T_J = 150\text{ }^\circ\text{C}$		12.7	m Ω
Threshold voltage	$V_{F(TO)}$			1.25	V
Maximum reverse leakage current	I_{RM}	$T_J = 25\text{ }^\circ\text{C}$	$V_R = \text{Rated } V_{RRM}$	0.1	mA
		$T_J = 150\text{ }^\circ\text{C}$		2.5	

RECOVERY CHARACTERISTICS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Reverse recovery time	t_{rr}	I_F at 10 A _{pk} 25 A/ μ s 25 $^\circ\text{C}$	200	ns
Reverse recovery current	I_{rr}		2.75	A
Reverse recovery charge	Q_{rr}		0.32	μC
Snap factor	S		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	1.5	$^\circ\text{C/W}$
Maximum thermal resistance junction to ambient (PCB mount)	$R_{thJA}^{(1)}$		40	
Soldering temperature	T_S		260	$^\circ\text{C}$
Approximate weight			2	g
			0.07	oz.
Marking device		Case style D ² PAK (SMD-220)	10ETF02S	
			10ETF04S	
			10ETF06S	

Note

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

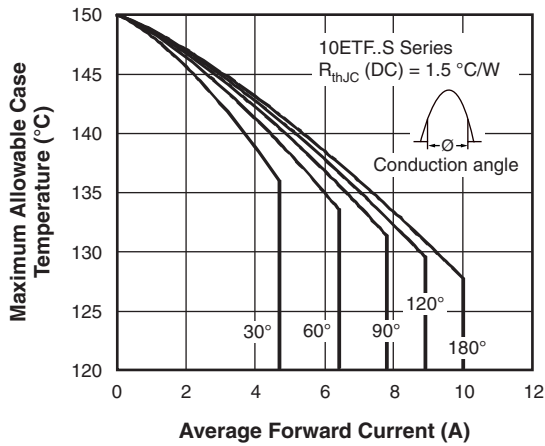


Fig. 1 - Current Rating Characteristics

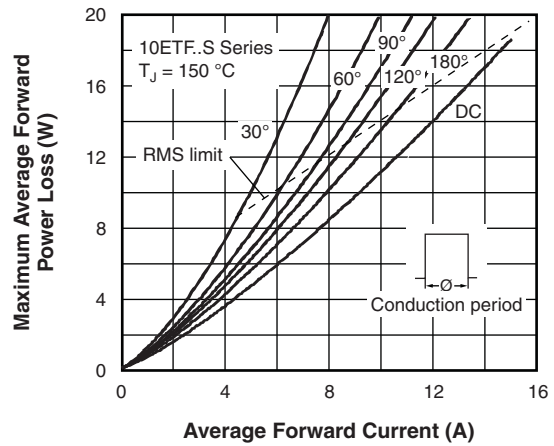


Fig. 4 - Forward Power Loss Characteristics

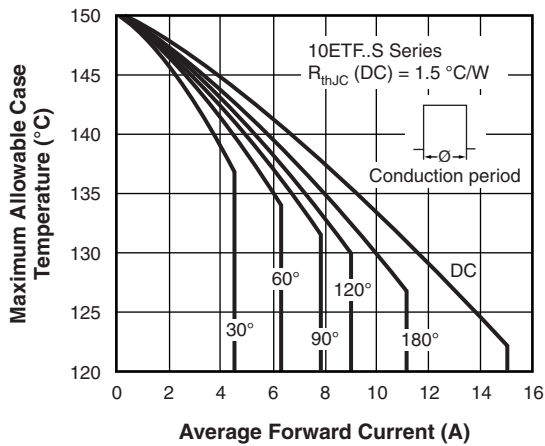


Fig. 2 - Current Rating Characteristics

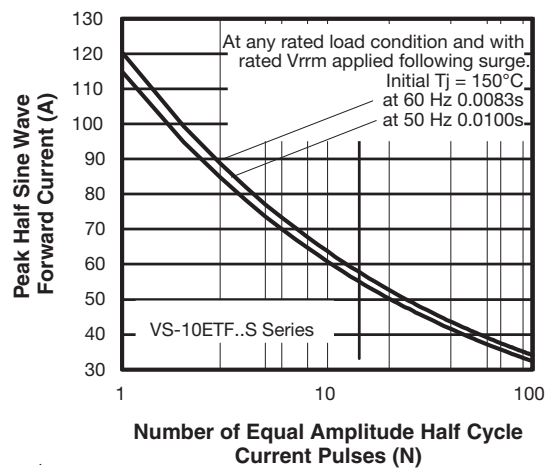


Fig. 5 - Maximum Non-Repetitive Surge Current

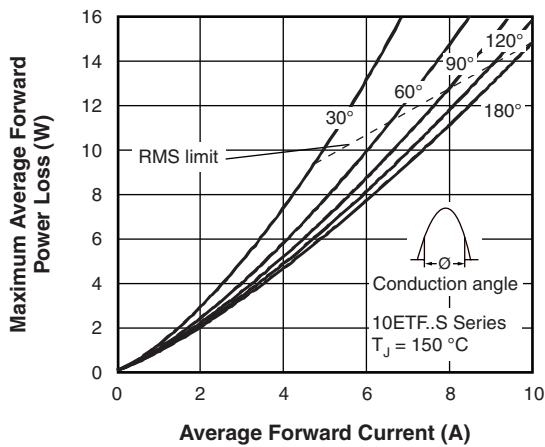


Fig. 3 - Forward Power Loss Characteristics

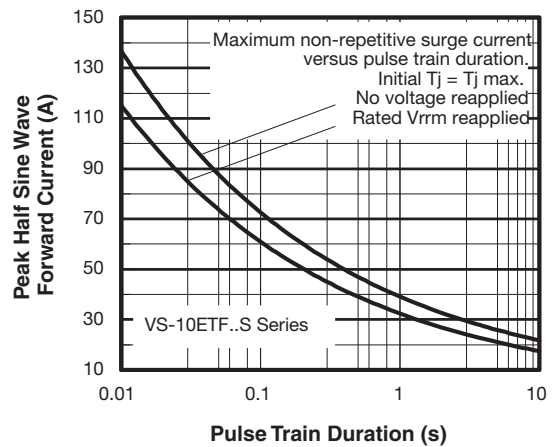


Fig. 6 - Maximum Non-Repetitive Surge Current

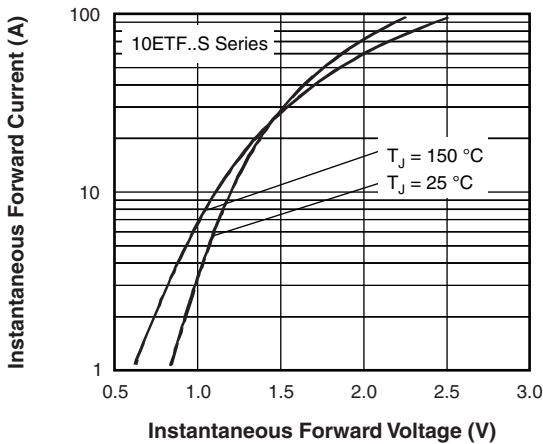


Fig. 7 - Forward Voltage Drop Characteristics

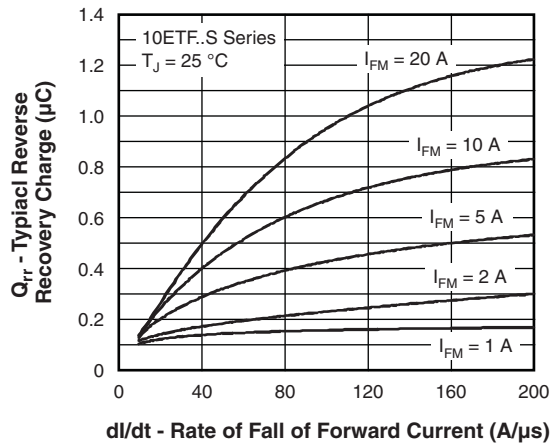


Fig. 10 - Recovery Charge Characteristics, $T_J = 25\text{ }^\circ\text{C}$

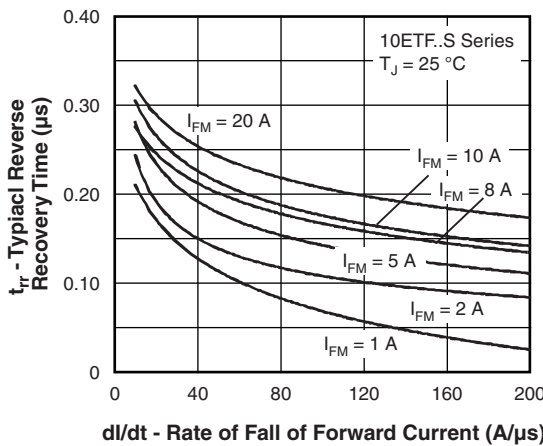


Fig. 8 - Recovery Time Characteristics, $T_J = 25\text{ }^\circ\text{C}$

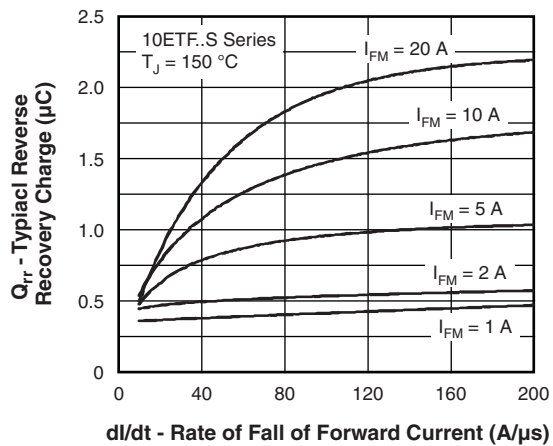


Fig. 11 - Recovery Charge Characteristics, $T_J = 150\text{ }^\circ\text{C}$

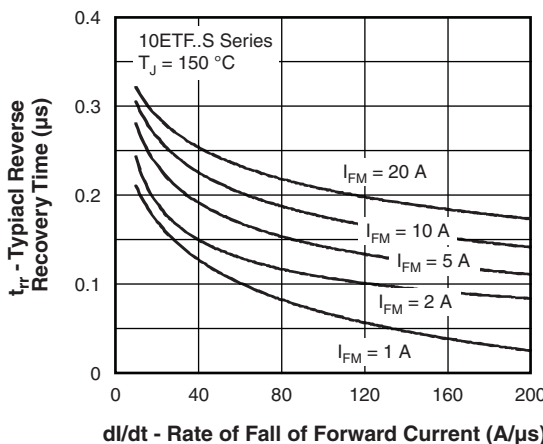


Fig. 9 - Recovery Time Characteristics, $T_J = 150\text{ }^\circ\text{C}$

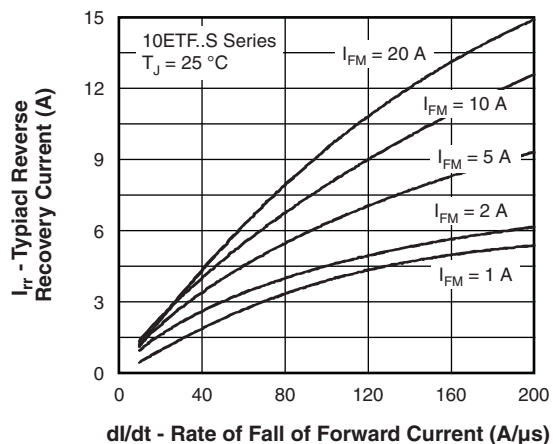


Fig. 12 - Recovery Current Characteristics, $T_J = 25\text{ }^\circ\text{C}$

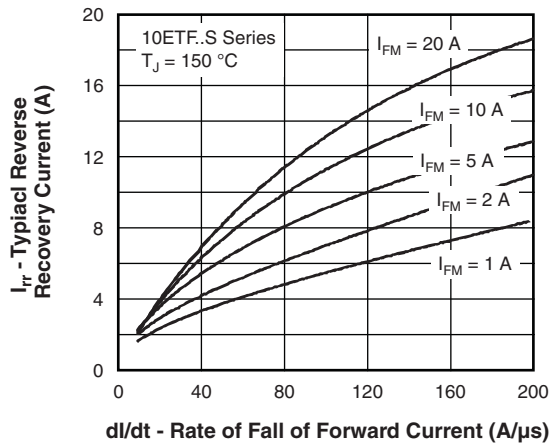


Fig. 13 - Recovery Current Characteristics, T_J = 150 °C

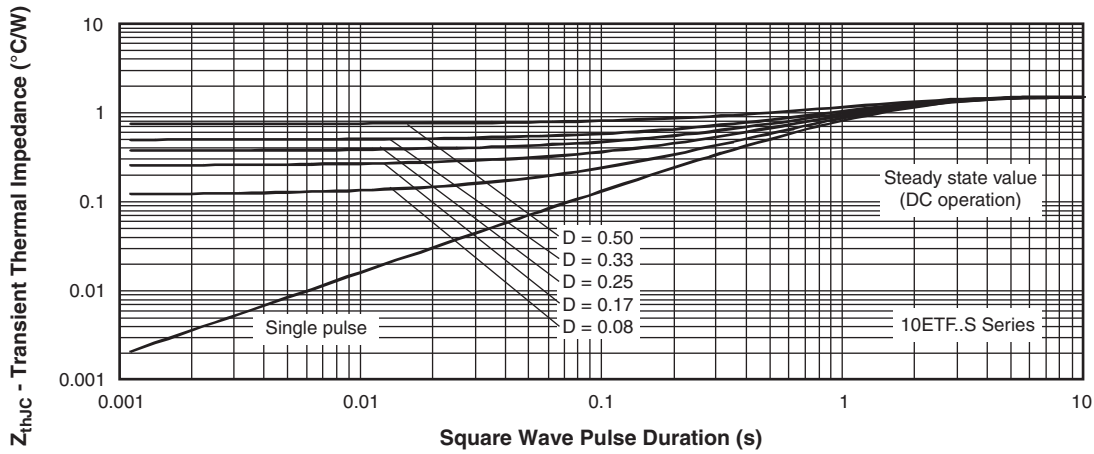
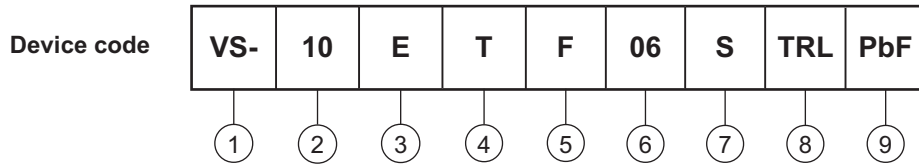


Fig. 14 - Thermal Impedance Z_{thJC} Characteristics



ORDERING INFORMATION TABLE



- 1** - Vishay Semiconductors product
- 2** - Current rating (10 = 10 A)
- 3** - Circuit configuration:
E = Single diode
- 4** - Package:
T = D²PAK (TO-220AC)
- 5** - Type of silicon:
F = Fast soft recovery rectifier
- 6** - Voltage code x 100 = V_{RRM}

02 = 200 V
04 = 400 V
06 = 600 V
- 7** - S = Surface mountable
- 8** -
 - None = Tube
 - TRR = Tape and reel (right oriented)
 - TRL = Tape and reel (left oriented)
- 9** - PbF = Lead (Pb)-free

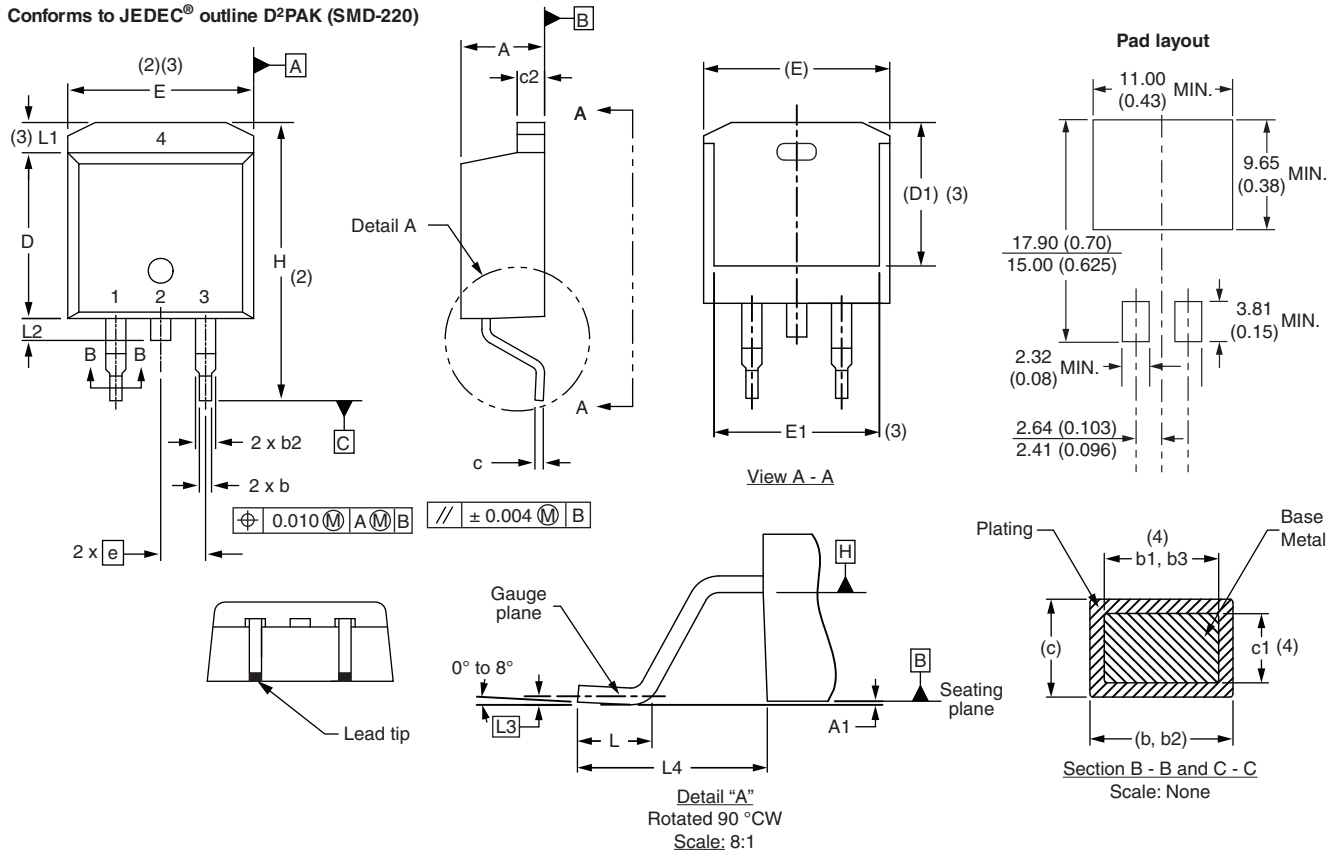
ORDERING INFORMATION (Example)			
PREFERRED P/N	QUANTITY PER T/R	MINIMUM ORDER QUANTITY	PACKAGING DESCRIPTION
VS-10ETF02SPbF	50	1000	Antistatic plastic tubes
VS-10ETF02STRRPbF	800	800	13" diameter reel
VS-10ETF02STRLPbF	800	800	13" diameter reel
VS-10ETF04SPbF	50	1000	Antistatic plastic tubes
VS-10ETF04STRRPbF	800	800	13" diameter reel
VS-10ETF04STRLPbF	800	800	13" diameter reel
VS-10ETF06SPbF	50	1000	Antistatic plastic tubes
VS-10ETF06STRRPbF	800	800	13" diameter reel
VS-10ETF06STRLPbF	800	800	13" diameter reel

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

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

- Dimensioning and tolerancing per ASME Y14.5 M-1994
- 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
- Thermal pad contour optional within dimension E, L1, D1 and E1
- Dimension b1 and c1 apply to base metal only
- Datum A and B to be determined at datum plane H
- Controlling dimension: inch
- Outline conforms to JEDEC® outline TO-263AB



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.



Стандарт Электрон Связь

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331