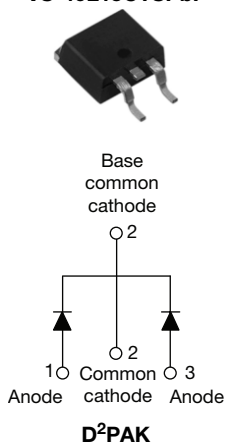
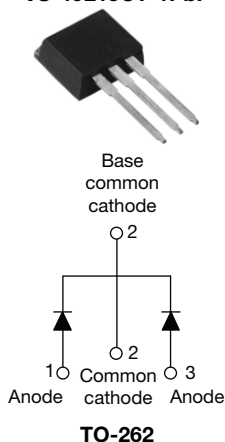


Schottky Rectifier, 2 x 20 A

VS-40L15CTSPbF



VS-40L15CT-1PbF



FEATURES

- 125 °C T_J operation ($V_R < 5$ V)
- Center tap module
- Optimized for OR-ing applications
- Ultralow forward voltage drop
- High frequency operation
- High purity, high temperature epoxy encapsulation for enhanced mechanical strength and moisture resistance
- Guard ring for enhanced ruggedness and long term reliability
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Halogen-free according to IEC 61249-2-21 definition
- Compliant to RoHS directive 2002/95/EC
- AEC-Q101 qualified



RoHS
COMPLIANT
HALOGEN
FREE

PRODUCT SUMMARY

$I_{F(AV)}$	2 x 20 A
V_R	15 V
I_{RM}	600 mA at 100 °C

DESCRIPTION

The center tap Schottky rectifier module has been optimized for ultralow forward voltage drop specifically for the OR-ing of parallel power supplies. The proprietary barrier technology allows for reliable operation up to 125 °C junction temperature. Typical applications are in parallel switching power supplies, converters, reverse battery protection, and redundant power subsystems.

MAJOR RATINGS AND CHARACTERISTICS

SYMBOL	CHARACTERISTICS	VALUES	UNITS
$I_{F(AV)}$	Rectangular waveform	40	A
V_{RRM}		15	V
I_{FSM}	$t_p = 5 \mu s$ sine	700	A
V_F	19 Apk, $T_J = 125$ °C (per leg, typical)	0.25	V
T_J		- 55 to 125	°C

VOLTAGE RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VS-40L15CTSPbF VS-40L15CT-1PbF	UNITS
Maximum DC reverse voltage	V_R	$T_J = 100$ °C	15	V
Maximum working peak reverse voltage	V_{RWM}			

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum average forward current per leg See fig. 5	$I_{F(AV)}$	50 % duty cycle at $T_C = 85$ °C, rectangular waveform	20	A
per device			40	
Maximum peak one cycle non-repetitive surge current per leg See fig. 7	I_{FSM}	5 μs sine or 3 μs rect. pulse	700	
		10 ms sine or 6 ms rect. pulse	330	
Non-repetitive avalanche energy per leg	E_{AS}	$T_J = 25$ °C, $I_{AS} = 2$ A, $L = 6$ mH	10	mJ
Repetitive avalanche current per leg	I_{AR}	Current decaying linearly to zero in 1 μs Frequency limited by T_J maximum $V_A = 1.5 \times V_R$ typical	2	A

VS-40L15CTSPbF, VS-40L15CT-1PbF

Vishay High Power Products Schottky Rectifier, 2 x 20 A



ELECTRICAL SPECIFICATIONS							
PARAMETER	SYMBOL	TEST CONDITIONS		TYP.	MAX.	UNITS	
Maximum forward voltage drop per leg See fig. 1	$V_{FM}^{(1)}$	19 A	$T_J = 25\text{ }^{\circ}\text{C}$	-	0.41	V	
		40 A		-	0.52		
		19 A	$T_J = 125\text{ }^{\circ}\text{C}$	0.25	0.33		
		40 A		0.37	0.50		
Reverse leakage current per leg See fig. 2	$I_{RM}^{(1)}$	$T_J = 25\text{ }^{\circ}\text{C}$	$V_R = \text{Rated } V_R$	-	10	mA	
		$T_J = 100\text{ }^{\circ}\text{C}$		-	600		
Threshold voltage	$V_{F(TO)}$	$T_J = T_J \text{ maximum}$		0.182		V	
Forward slope resistance	r_t			7.6		mΩ	
Maximum junction capacitance per leg	C_T	$V_R = 5\text{ }V_{DC}$ (test signal range 100 kHz to 1 MHz), $25\text{ }^{\circ}\text{C}$		-	2000	pF	
Typical series inductance per leg	L_S	Measured lead to lead 5 mm from package body		8	-	nH	
Maximum voltage rate of change	dV/dt	Rated V_R		10 000		V/μs	

Note

(1) Pulse width < 300 μ s, duty cycle < 2 %

THERMAL - MECHANICAL SPECIFICATIONS				
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum junction temperature range	T _J		- 55 to 125	°C
Maximum storage temperature range	T _{Stg}		- 55 to 150	
Maximum thermal resistance, junction to case per leg	R _{thJC}	DC operation See fig. 4	1.5	°C/W
Typical thermal resistance, case to heatsink	R _{thCS}	Mounting surface, smooth and greased	0.50	
Maximum thermal resistance, junction to ambient	R _{thJA}	DC operation	40	
Approximate weight			2	g
			0.07	oz.
Mounting torque	minimum	Non-lubricated threads	6 (5)	kgf · cm (lbf · in)
	maximum		12 (10)	
Marking device		Case style D ² PAK	40L15CTS	
		Case style TO-262	40L15CT-1	

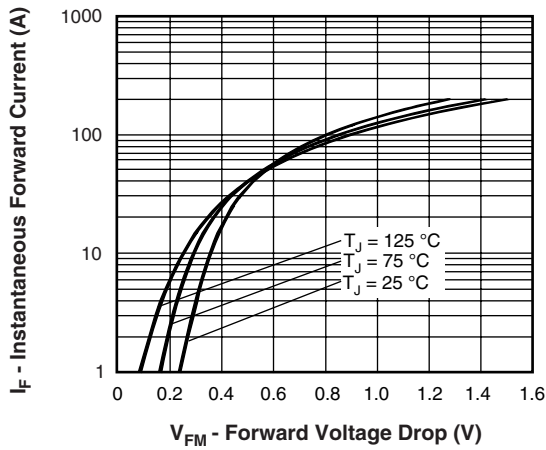


Fig. 1 - Maximum Forward Voltage Drop Characteristics

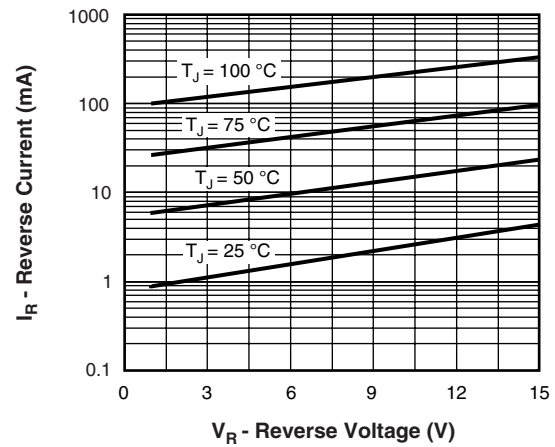


Fig. 2 - Typical Values of Reverse Current vs. Reverse Voltage

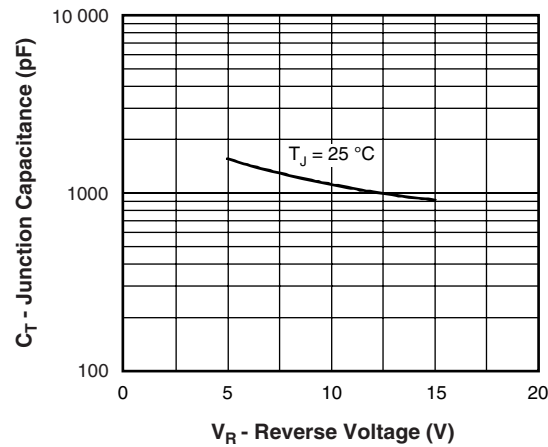


Fig. 3 - Typical Junction Capacitance vs. Reverse Voltage

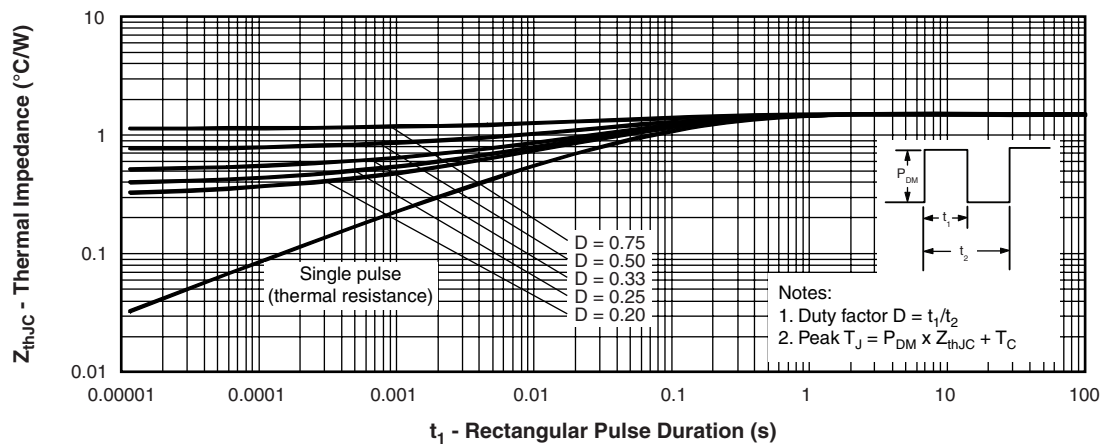


Fig. 4 - Maximum Thermal Impedance Z_{thJC} Characteristics

VS-40L15CTSPbF, VS-40L15CT-1PbF

Vishay High Power Products Schottky Rectifier, 2 x 20 A

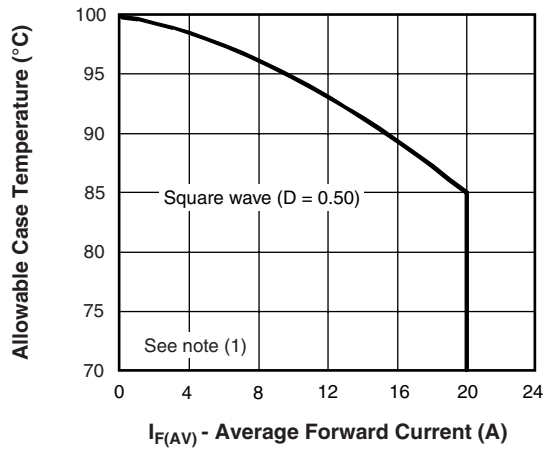


Fig. 5 - Maximum Allowable Case Temperature vs. Average Forward Current

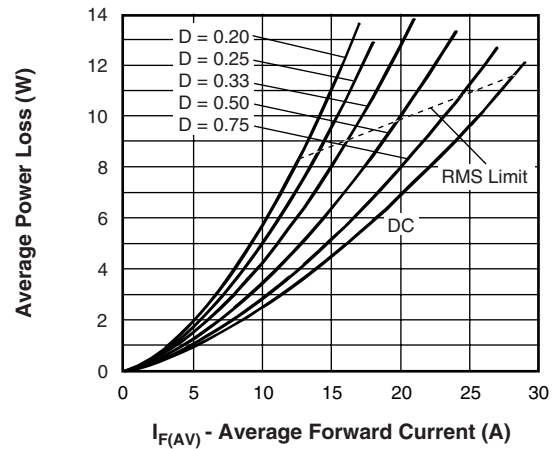


Fig. 6 - Forward Power Loss Characteristics

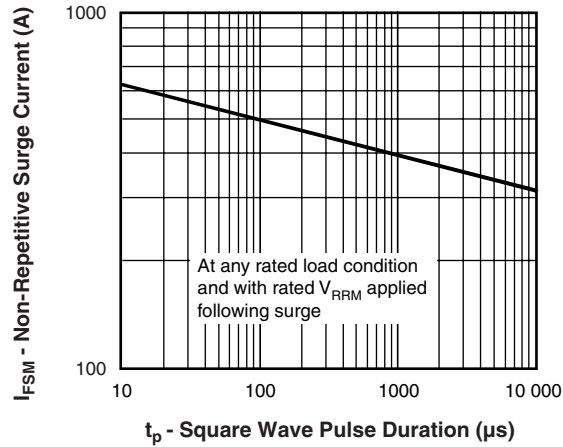


Fig. 7 - Maximum Non-Repetitive Surge Current

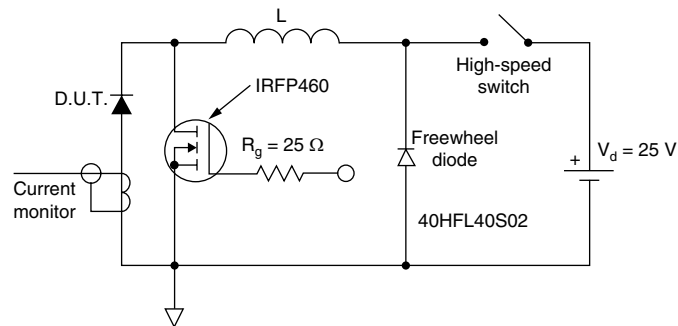


Fig. 8 - Unclamped Inductive Test Circuit

Note

- (1) Formula used: $T_C = T_J - (P_d + P_{d_{REV}}) \times R_{thJC}$;
 P_d = Forward power loss = $I_{F(AV)} \times V_{FM}$ at $(I_{F(AV)}/D)$ (see fig. 6);
 $P_{d_{REV}}$ = Inverse power loss = $V_{R1} \times I_R (1 - D)$; I_R at $V_{R1} = 80\%$ rated V_R



VS-40L15CTSPbF, VS-40L15CT-1PbF

Schottky Rectifier, 2 x 20 A Vishay High Power Products

ORDERING INFORMATION TABLE

Device code	VS-	40	L	15	C	T	S	TRL	PbF
	1	2	3	4	5	6	7	8	9

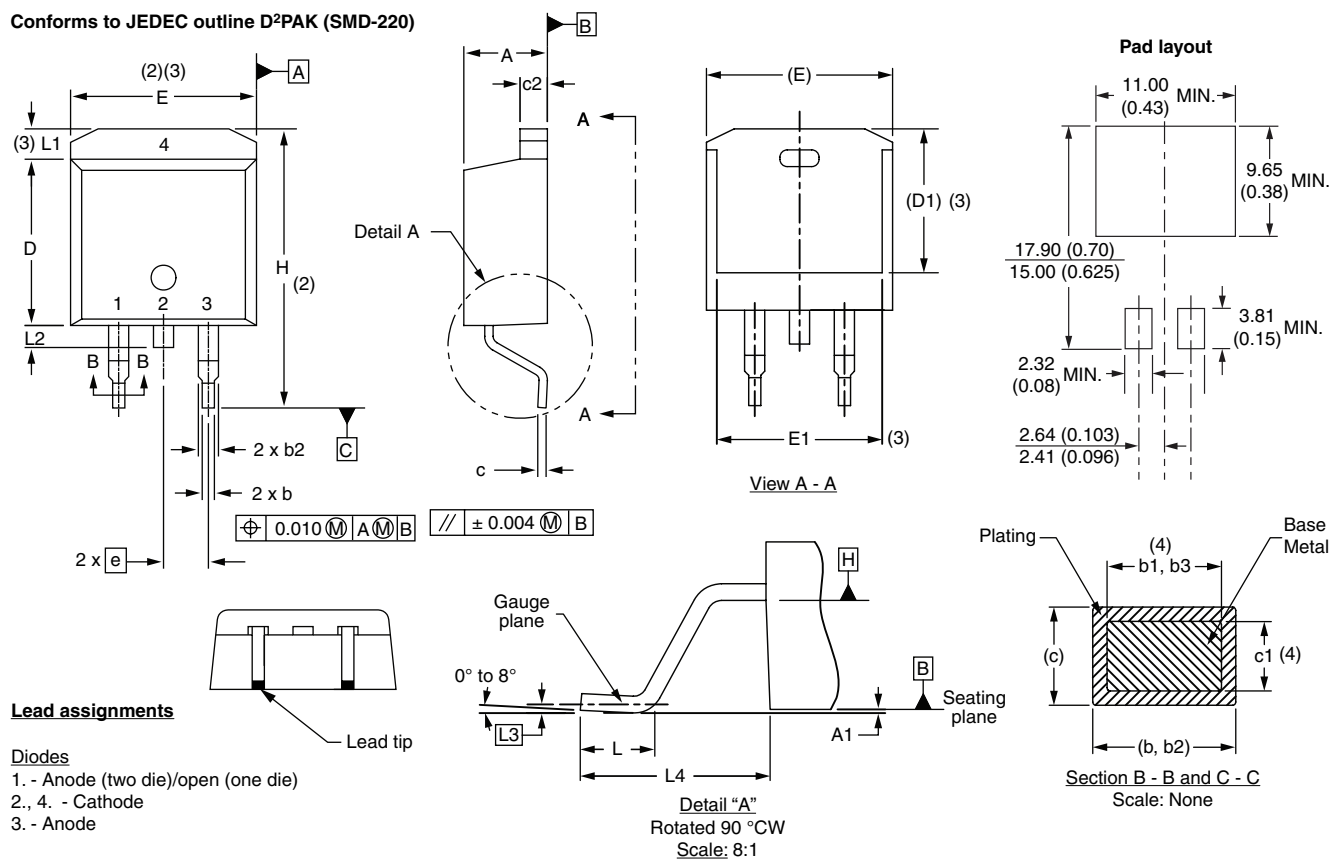
- | | | |
|----------|---|--|
| 1 | - | HPP product suffix |
| 2 | - | Current rating (40 A) |
| 3 | - | L = Schottky "L" series |
| 4 | - | Voltage rating (15 V) |
| 5 | - | C = Common cathode |
| 6 | - | T = TO-220 |
| 7 | - | • S = D ² PAK
• -1 = TO-262 |
| 8 | - | • None = Tube (50 pieces)
• TRL = Tape and reel (left oriented - for D ² PAK only)
• TRR = Tape and reel (right oriented - for D ² PAK only) |
| 9 | - | PbF = Lead (Pb)-free |

LINKS TO RELATED DOCUMENTS	
Dimensions	www.vishay.com/doc?95014
Part marking information	www.vishay.com/doc?95008
Packaging information	www.vishay.com/doc?95032

D²PAK, TO-262

DIMENSIONS FOR D²PAK in millimeters and inches

Conforms to JEDEC outline D²PAK (SMD-220)



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

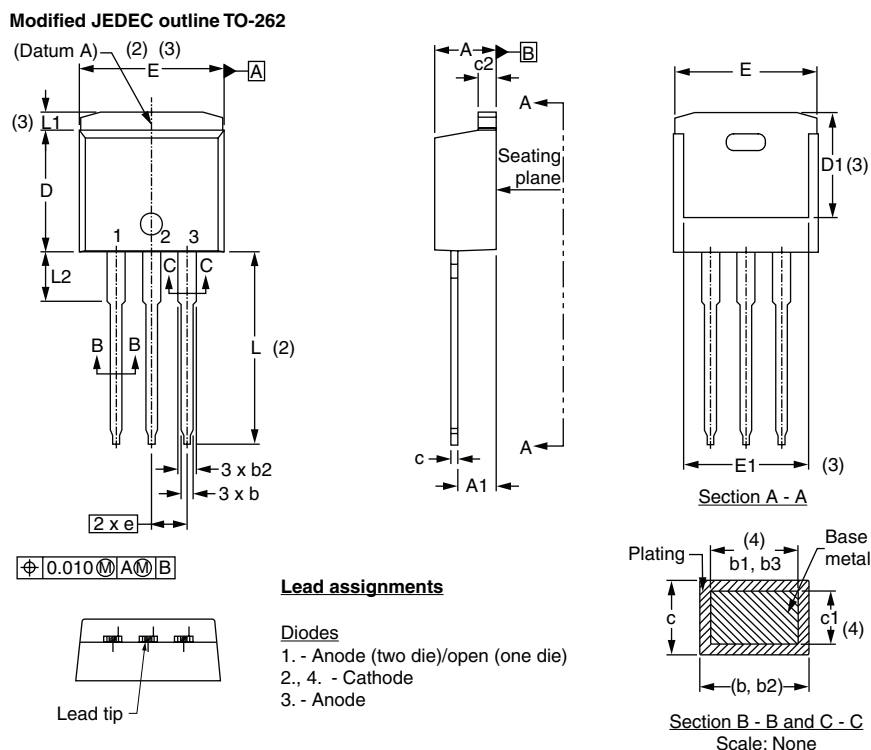
SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
H	14.61	15.88	0.575	0.625	
L	1.78	2.79	0.070	0.110	
L1	-	1.65	-	0.066	3
L2	1.27	1.78	0.050	0.070	
L3	0.25 BSC		0.010 BSC		
L4	4.78	5.28	0.188	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

DIMENSIONS FOR TO-262 in millimeters and inches



SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.06	4.83	0.160	0.190	
A1	2.03	3.02	0.080	0.119	
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
D1	6.86	8.00	0.270	0.315	3
E	9.65	10.67	0.380	0.420	2, 3
E1	7.90	8.80	0.311	0.346	3
e	2.54 BSC		0.100 BSC		
L	13.46	14.10	0.530	0.555	
L1	-	1.65	-	0.065	3
L2	3.56	3.71	0.140	0.146	

Notes

- (1) Dimensioning and tolerancing as per ASME Y14.5M-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) Controlling dimension: inches

- (6) Outline conform to JEDEC TO-262 except A1 (maximum), b (minimum) and D1 (minimum) where dimensions derived the actual package outline



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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.