

15,000 Watt Transient Voltage Suppressor (TVS)

15KPA17Ae3–15KPA280CAe3



Product Overview

The 15KPA series of axial lead 15,000 watt transient voltage suppressors provide a selection of standoff voltages (V_{WM}) from 17 to 280V. These are available in either unidirectional or bidirectional versions. RoHS compliant devices. They can protect against the secondary effects of lightning per IEC61000-4-5 and against voltage pulses from inductive switching environments and induced by RF radiation. Since their response time is virtually instantaneous, they can also be used in protection from transients caused by inductive load dumps, induced RFI, ESD and EFT per IEC61000-4-2 and IEC61000-4-4.

Features

- Available in both unidirectional and bidirectional configurations
- Suppress transients up to 15,000 watts at 10/1000 μ s (See [Figure 4-1](#))
- RoHS compliant (2002/95/EC)
- Enhanced reliability screening in reference to MIL-PRF-19500 are available. Refer to [High Reliability Non-Hermetic TVS Product Portfolio](#) for more details on the screening options.
- Moisture classification is Level 1 with no dry pack required per IPC/JEDEC J-STD-020F.

Applications/Benefits

- Available in working stand-off voltage 17V–280V, with V_{BR} tolerance of 5%
- Protection from transients caused by lightning strikes, switching transients, RFI and ESD
- Protection from ESD and EFT per IEC 61000-4-2 and IEC 61000-4-4
- Protection from the secondary effects of lightning per IEC61000-4-5

Figure 1. P600 Package



Also available in:

Case 5A (DO-204AR) package

(hirel plastic axial-leaded)

[M15KP22A –MXL15KP280CA\(e3\)](#)

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1. Maximum Ratings

Table 1-1. Maximum Ratings at 25°C Unless Otherwise Specified

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T_J and T_{STG}	–55 to +150	°C
Thermal Resistance, Junction to Lead ⁽¹⁾	$R_{\theta JL}$	8.0	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	77.5	°C/W
Average Power Dissipation ⁽¹⁾ at $T_L = 75^\circ\text{C}$	$P_{M(AV)}$	8.0	W
Peak Pulse Power Dissipation ⁽²⁾	P_{PP}	15,000	W
Solder Temperature at 10 Seconds	—	260	°C

Notes:

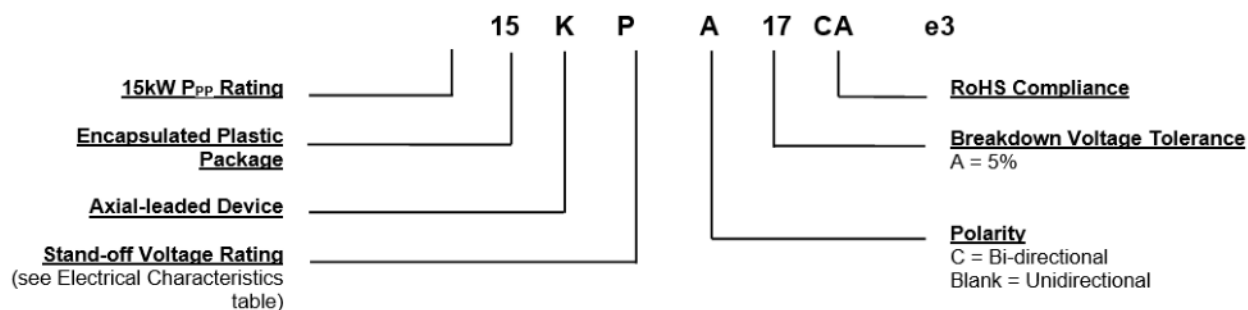
1. At 3/8 inch (9.5 mm) lead length from body. Mounted as shown in [Figure 4-5](#).
2. At 10/1000 μs with repetition rate of 0.01% or less (see [Figure 4-1](#)).

1.1. Mechanical and Packaging

- Case: Epoxy body meets UL94V-0.
- Terminals: Matte-tin plating, fully RoHS compliant. Solderable per MIL-STD-750, method 2026.
- Marking: Manufacturer ID, date code and part number.
- Polarity: For unidirectional types, the color band denotes the cathode, which is positive with respect to the anode under normal TVS operation.
- Tape and Reel option: Standard per EIA-296 (add “TR” suffix to part number). Consult factory for quantities.
- Weight: Approximately 0.07 ounce (2.0 grams).
- See [Package Dimensions](#)

2. Part Nomenclature

Figure 2-1. Part Nomenclature



2.1. Symbols and Definitions

Table 2-1. Symbols and Definitions

Symbol	Definition
$\alpha_{V(BR)}$	Temperature Coefficient of Breakdown Voltage: The change in breakdown voltage divided by the change in temperature that caused it expressed in %/°C or mV/°C.
C_T	Total Capacitance: The total small signal capacitance between the diode terminals of a complete device.
$I_{(BR)}$	Breakdown Current: The current used for measuring Breakdown Voltage $V_{(BR)}$.
I_D	Standby Current: The current through the device at rated standoff voltage.
I_{FSM}	Surge Peak Forward Current: The forward current including all nonrepetitive transient currents but excluding all repetitive transients (ref JESD282-B).
I_{PP}	Peak Impulse Current: The peak current during an impulse.
P_{PP}	Peak Pulse Power: The peak power that can be applied for a specific pulse width and waveform. The product of I_{PP} and V_C .
$V_{(BR)}$	Breakdown Voltage: The voltage across the device at a specified current $I_{(BR)}$ in the breakdown region.
V_C	Clamping Voltage: The voltage across the device in a region of low differential resistance during the application of an impulse current (I_{PP}) for a specified waveform.
V_{WM}	Working Standoff Voltage: The maximum-rated value of dc or repetitive peak positive cathode-to-anode voltage that may be continuously applied over the standard operating temperature.

3. Electrical Characteristics

Table 3-1. Electrical Characteristics ($T_A = 25\text{ }^{\circ}\text{C}$ Unless Otherwise Stated)

Part Number ⁽¹⁾	Stand - Off Voltage V_{WM}	Breakdown Voltage ⁽²⁾ $V_{(BR)}$ at $I_{(BR)}$ (Volts)		Test Current I_{BR}	Maximum Standby Current ⁽³⁾ I_D at V_{WM}	Maximum Peak Pulse Current ⁽⁴⁾ I_{PP}	Maximum Clamping Voltage V_C at I_{PP}	Maximum Temperature Coefficient $\alpha_{V(BR)}$
	(Volts)	Min.	Max.	(mA)	(μA)	(A)	(Volts)	(%/°C)
15KPA17(C)Ae3	17	18.99	20.79	50	5000	515.4	29.3	0.1
15KPA18(C)Ae3	18	20.11	22.01	50	5000	488.7	30.9	0.1
15KPA20(C)Ae3	20	22.34	24.46	20	1500	440.2	34.3	0.1
15KPA22(C)Ae3	22	24.57	26.91	10	500	407.0	37.1	0.1
15KPA24(C)Ae3	24	26.81	29.35	5	150	371.0	40.7	0.1
15KPA26(C)Ae3	26	29.04	31.80	5	50	343.2	44.0	0.1
15KPA28(C)Ae3	28	31.28	34.24	5	25	317.9	47.5	0.1
15KPA30(C)Ae3	30	33.51	36.70	5	15	297.8	50.7	0.1
15KPA33(C)Ae3	33	36.90	40.40	5	2	276.1	54.7	0.1
15KPA36(C)Ae3	36	40.20	44.00	5	2	252.5	59.8	0.1
15KPA40(C)Ae3	40	44.70	48.90	5	2	229.5	65.8	0.1
15KPA43(C)Ae3	43	48.00	52.60	5	2	216.3	69.8	0.1
15KPA45(C)Ae3	45	50.30	55.00	5	2	207.4	72.8	0.1
15KPA48(C)Ae3	48	53.60	58.70	5	2	194.3	77.7	0.1
15KPA51(C)Ae3	51	57.00	62.40	5	2	182.1	82.9	0.1
15KPA54(C)Ae3	54	60.30	66.00	5	2	172.2	87.7	0.1
15KPA58(C)Ae3	58	64.80	70.90	5	2	161.0	93.8	0.1
15KPA60(C)Ae3	60	67.00	73.40	5	2	155.0	97.4	0.1
15KPA64(C)Ae3	64	71.50	78.30	5	2	144.9	104.2	0.1
15KPA70(C)Ae3	70	78.20	85.60	5	2	132.9	113.6	0.1
15KPA75(C)Ae3	75	83.80	91.70	5	2	123.8	122.0	0.1
15KPA78(C)Ae3	78	87.10	95.40	5	2	119.7	126.1	0.1
15KPA85(C)Ae3	85	94.90	104.00	5	2	109.7	137.6	0.1
15KPA90(C)Ae3	90	100.50	110.10	5	2	103.7	145.6	0.1
15KPA100(C)Ae3	100	111.70	122.30	5	2	93.6	161.3	0.1
15KPA110(C)Ae3	110	122.90	134.50	5	2	84.5	178.6	0.1
15KPA120(C)Ae3	120	134.00	146.80	5	2	78.5	192.3	0.1
15KPA130(C)Ae3	130	145.20	159.00	5	2	72.5	208.3	0.1
15KPA150(C)Ae3	150	167.60	183.50	5	2	62.4	241.9	0.1
15KPA160(C)Ae3	160	178.70	195.70	5	2	58.4	258.6	0.1
15KPA170(C)Ae3	170	189.90	207.90	5	2	55.4	272.7	0.1
15KPA180(C)Ae3	180	201.10	220.10	5	2	52.3	288.5	0.1
15KPA200(C)Ae3	200	223.40	244.60	5	2	47.3	319.1	0.1

Table 3-1. Electrical Characteristics ($T_A = 25\text{ }^{\circ}\text{C}$ Unless Otherwise Stated) (continued)

Part Number ⁽¹⁾	Stand - Off Voltage V_{WM}	Breakdown Voltage ⁽²⁾ $V_{(BR)}$ at $I_{(BR)}$ (Volts)		Test Current I_{BR}	Maximum Standby Current ⁽³⁾ I_D at V_{WM}	Maximum Peak Pulse Current ⁽⁴⁾ I_{PP}	Maximum Clamping Voltage V_C at I_{PP}	Maximum Temperature Coefficient $\alpha_{V(BR)}$
	(Volts)	Min.	Max.	(mA)	(μA)	(A)	(Volts)	(%/°C)
15KPA220(C)Ae3	220	245.70	269.10	5	2	35.2	356.0	0.1
15KPA240(C)Ae3	240	268.10	293.50	5	2	39.3	384.6	0.1
15KPA260(C)Ae3	260	290.40	318.00	5	2	36.2	416.7	0.1
15KPA280(C)Ae3	280	312.80	342.40	5	2	33.2	454.5	0.1

Notes:

1. Include C for bidirectional devices. A suffix indicated V_{BR} tolerance of 5% as shown.
2. V_{BR} measured after I_{BR} applied for 300 μs , I_{BR} is square wave pulse or equivalent.
3. Surge current waveform per [Figure 4-3](#) and derated per [Figure 4-2](#).
4. For bidirectional types with V_{WM} of 30 volts or less, the I_D limit is doubled.
5. (Non-Repetitive) Peak Forward Surge Current $I_{FSM} = 400\text{A}$. For Unidirectional devices only. Measured on 8.3 ms single half sine-wave or equivalent square wave, duty cycle = 4 pulses per minute maximum. Also see [Figure 4-6](#).

4. Graphs

Figure 4-1. Peak Pulse Power Rating Curve

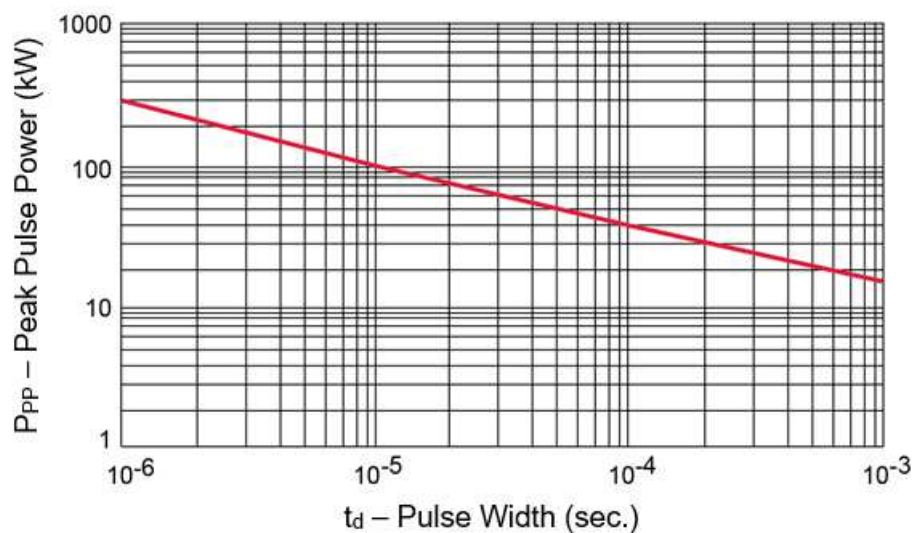


Figure 4-2. Pulse Derating Curve

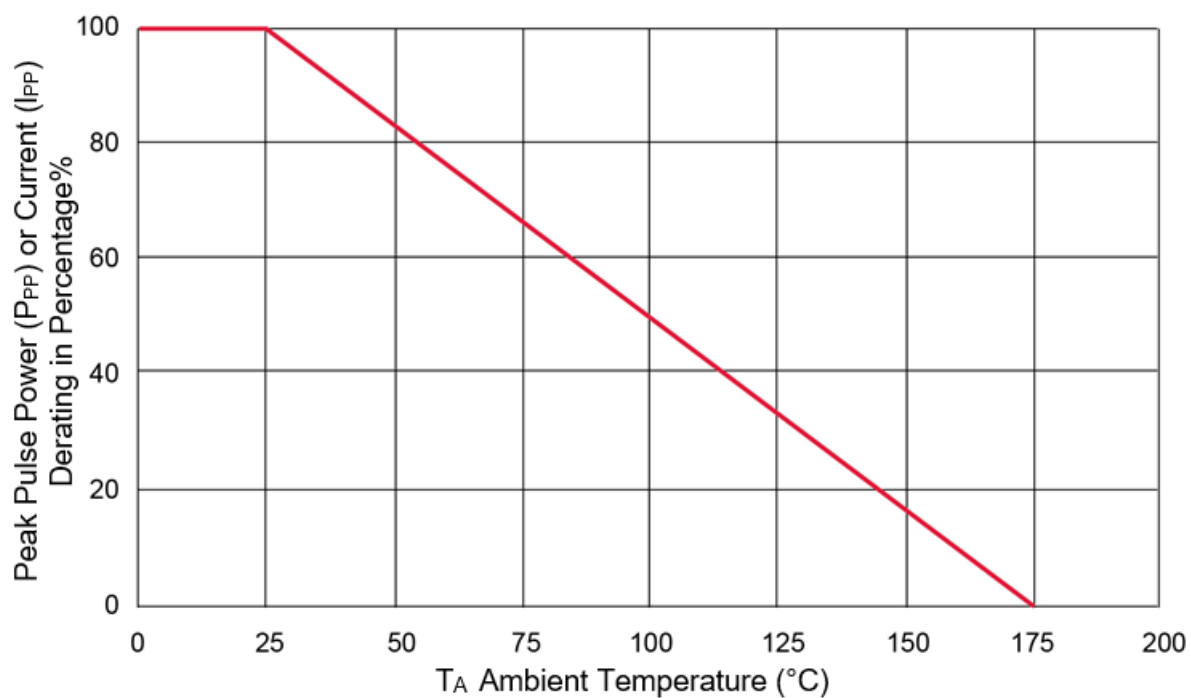


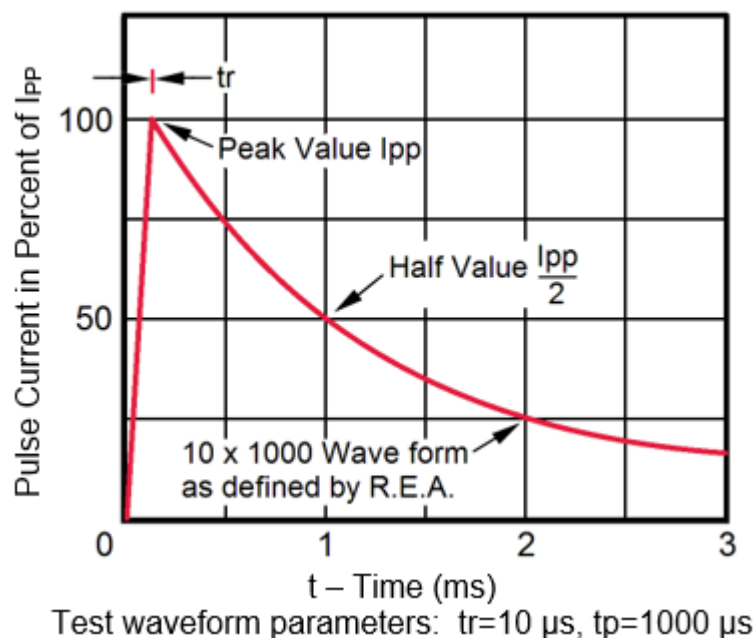
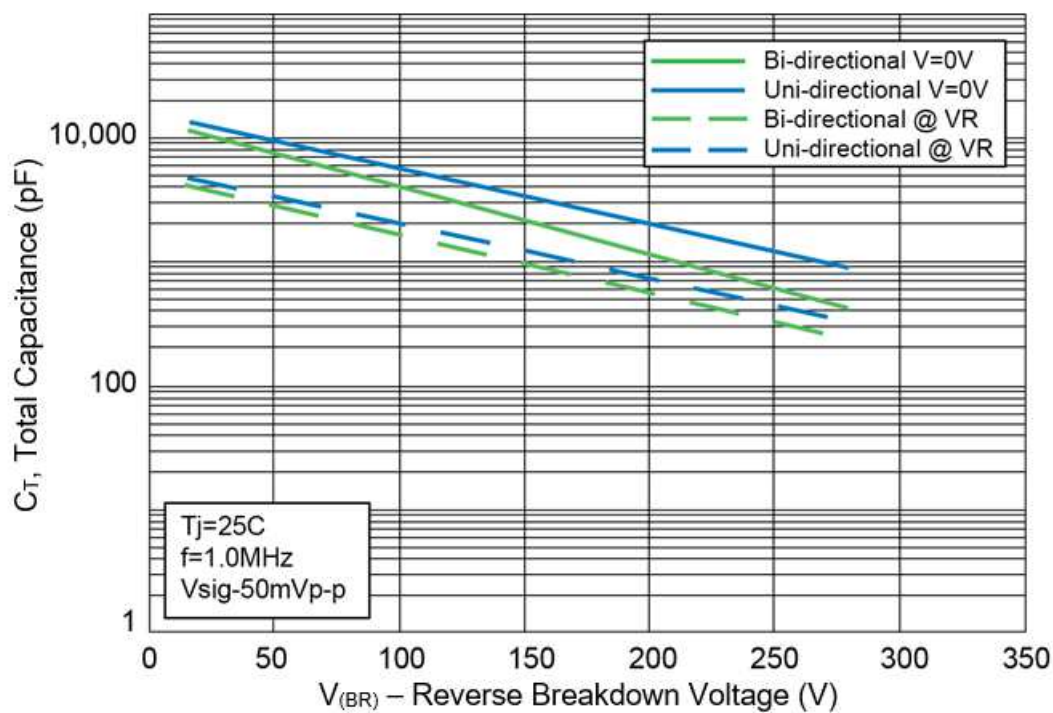
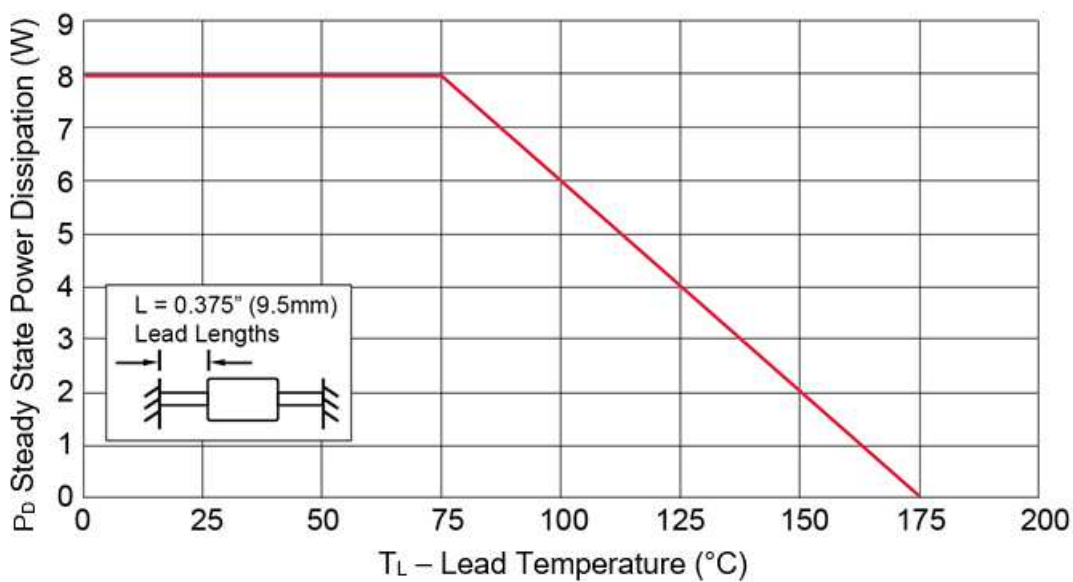
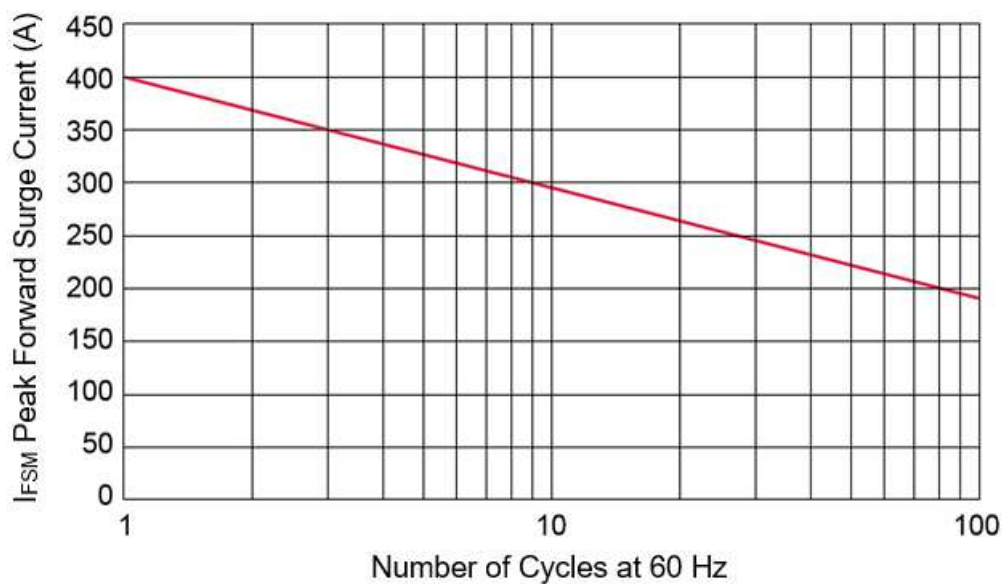
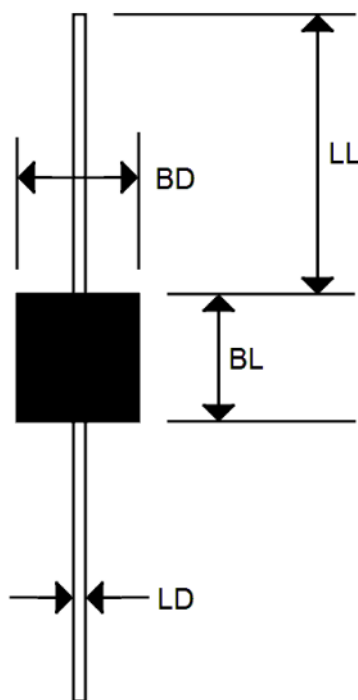
Figure 4-3. Pulse Waveform for 10/1000 μ s Exponential Surge**Figure 4-4.** Typical Junction Capacitance

Figure 4-5. Steady State Power Derating Curve**Figure 4-6.** Maximum Non-Repetitive Forward Surge Current (Unidirectional Devices Only)

5. Package Dimensions

Figure 5-1. Package Dimensions



Dim.	Dimensions			
	Inch		Millimeters	
	Min.	Max.	Min.	Max.
LL	0.750	—	19.05	—
BL	0.340	0.360	8.645	9.135
BD	0.340	0.360	8.645	9.135
LD	0.047	0.053	1.194	1.346

6. Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

Revision	Date	Description
A	08/2025	Document was converted to Microchip template and assigned literature number DS00006119.
Rev. B	01/2025	Document was created and assigned literature number RF01131.

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