Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

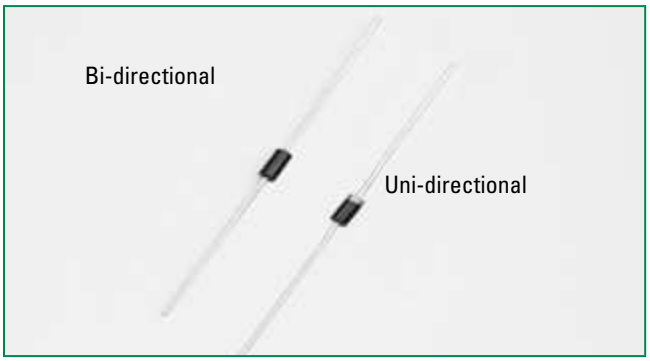
Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

Transient Voltage Suppression Diodes

Axial Leaded – 400W > P4KE series

Littelfuse
Expertise Applied | Answers Delivered

P4KE Series



Agency Approvals

AGENCY	AGENCY FILE NUMBER
	E230531

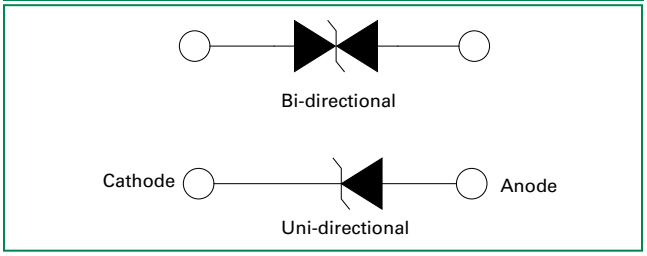
Maximum Ratings and Thermal Characteristics (T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation by 10/1000μs Test Waveform (Fig.2) (Note 1), (Note 4)	P_{PPM}	400	W
Steady State Power Dissipation on Infinite Heat Sink at T_L=75°C	P_D	1.5	W
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional Only (Note 2)	I_{FSM}	60	A
Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only (Note 3)	V_F	3.5/5.0	V
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 175	°C
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	60	°C/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	100	°C/W

Notes:

1. Non-repetitive current pulse , per Fig. 4 and derated above T_J (initial) =25°C per Fig. 3.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.
3. V_F < 3.5V for single die parts and V_F< 5.0V for stacked-die parts.
4. The P_{PPM} of stacked-die parts is 600W and please contact littelfuse for the detail stacked-die parts.

Functional Diagram



Description

The P4KE Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- 400W peak pulse capability at 10/1000μs waveform, repetition rate (duty cycles):0.01%
- Glass passivated chip junction in DO-41 Package
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Excellent clamping capability
- Typical failure mode is short from over-specified voltage or current
- Whisker test is conducted based on JEDEC JESD201A per its table 4a and 4c
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- ESD protection of data lines in accordance with IEC 61000-4-2
- EFT protection of data lines in accordance with IEC 61000-4-4
- Low incremental surge resistance
- Typical I_R less than 1μA when V_{BR} min>12V
- High temperature to reflow soldering guaranteed: 260°C/40sec / 0.375",(9.5mm) lead length, 5 lbs., (2.3kg) tension
- V_{BR} @ T_J= V_{BR}@25°C x (1+αT x (T_J - 25)) (αT:Temperature Coefficient, typical value is 0.1%)
- Plastic package is flammability rated V-0 per Underwriters Laboratories
- Matte tin lead–free plated
- Halogen free and RoHS compliant
- Pb-free E3 means 2nd level interconnect is Pb-free and the terminal finish material is tin(Sn) (IPC/JEDEC J-STD-609A.01)

Applications

TVS devices are ideal for the protection of I/O interfaces, V_{CC} bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

Additional Infomarion

Datasheet | Resources | Samples

Revised: 11/20/15

Transient Voltage Suppression Diodes

Axial Leaded – 400W > P4KE series

Electrical Characteristics (T_A=25°C unless otherwise noted)

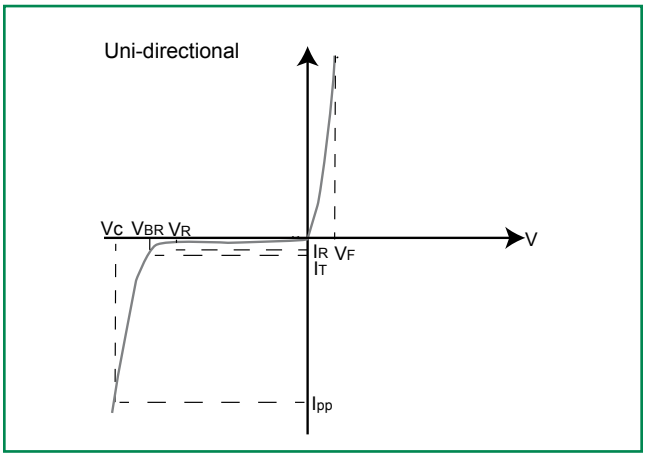
Part Number (Uni)	Part Number (Bi)	Reverse Stand off Voltage V_R (Volts)	Breakdown Voltage V_{BR} @ I_T (V)		Test Current I_T (mA)	Maximum Clamping Voltage V_C @ I_{pp} (V)	Maximum Peak Pulse Current I_{pp} (A)	Maximum Reverse Leakage I_R @ V_R (µA)	Agency Approval
			MIN	MAX					
P4KE6.8A	P4KE6.8CA	5.80	6.45	7.14	10	10.5	39.00	1000	X
P4KE7.5A	P4KE7.5CA	6.40	7.13	7.88	10	11.3	36.30	500	X
P4KE8.2A	P4KE8.2CA	7.02	7.79	8.61	10	12.1	33.90	200	X
P4KE9.1A	P4KE9.1CA	7.78	8.65	9.55	1	13.4	30.60	50	X
P4KE10A	P4KE10CA	8.55	9.50	10.50	1	14.5	28.30	10	X
P4KE11A	P4KE11CA	9.40	10.50	11.60	1	15.6	26.30	5	X
P4KE12A	P4KE12CA	10.20	11.40	12.60	1	16.7	24.60	5	X
P4KE13A	P4KE13CA	11.10	12.40	13.70	1	18.2	22.50	1	X
P4KE15A	P4KE15CA	12.80	14.30	15.80	1	21.2	19.30	1	X
P4KE16A	P4KE16CA	13.60	15.20	16.80	1	22.5	18.20	1	X
P4KE18A	P4KE18CA	15.30	17.10	18.90	1	25.5	16.10	1	X
P4KE20A	P4KE20CA	17.10	19.00	21.00	1	27.7	14.80	1	X
P4KE22A	P4KE22CA	18.80	20.90	23.10	1	30.6	13.40	1	X
P4KE24A	P4KE24CA	20.50	22.80	25.20	1	33.2	12.30	1	X
P4KE27A	P4KE27CA	23.10	25.70	28.40	1	37.5	10.90	1	X
P4KE30A	P4KE30CA	25.60	28.50	31.50	1	41.4	9.90	1	X
P4KE33A	P4KE33CA	28.20	31.40	34.70	1	45.7	9.00	1	X
P4KE36A	P4KE36CA	30.80	34.20	37.80	1	49.9	8.20	1	X
P4KE39A	P4KE39CA	33.30	37.10	41.00	1	53.9	7.60	1	X
P4KE43A	P4KE43CA	36.80	40.90	45.20	1	59.3	6.90	1	X
P4KE47A	P4KE47CA	40.20	44.70	49.40	1	64.8	6.30	1	X
P4KE51A	P4KE51CA	43.60	48.50	53.60	1	70.1	5.80	1	X
P4KE56A	P4KE56CA	47.80	53.20	58.80	1	77.0	5.30	1	X
P4KE62A	P4KE62CA	53.00	58.90	65.10	1	85.0	4.80	1	X
P4KE68A	P4KE68CA	58.10	64.60	71.40	1	92.0	4.50	1	X
P4KE75A	P4KE75CA	64.10	71.30	78.80	1	103.0	4.00	1	X
P4KE82A	P4KE82CA	70.10	77.90	86.10	1	113.0	3.60	1	X
P4KE91A	P4KE91CA	77.80	86.50	95.50	1	125.0	3.30	1	X
P4KE100A	P4KE100CA	85.50	95.00	105.00	1	137.0	3.00	1	X
P4KE110A	P4KE110CA	94.00	105.00	116.00	1	152.0	2.70	1	X
P4KE120A	P4KE120CA	102.00	114.00	126.00	1	165.0	2.50	1	X
P4KE130A	P4KE130CA	111.00	124.00	137.00	1	179.0	2.30	1	X
P4KE150A	P4KE150CA	128.00	143.00	158.00	1	207.0	2.00	1	X
P4KE160A	P4KE160CA	136.00	152.00	168.00	1	219.0	1.90	1	X
P4KE170A	P4KE170CA	145.00	162.00	179.00	1	234.0	1.80	1	X
P4KE180A	P4KE180CA	154.00	171.00	189.00	1	246.0	1.70	1	X
P4KE200A	P4KE200CA	171.00	190.00	210.00	1	274.0	1.50	1	X
P4KE220A	P4KE220CA	185.00	209.00	231.00	1	328.0	1.30	1	
P4KE250A	P4KE250CA	214.00	237.00	263.00	1	344.0	1.20	1	
P4KE300A	P4KE300CA	256.00	285.00	315.00	1	414.0	1.00	1	
P4KE350A	P4KE350CA	300.00	332.00	368.00	1	482.0	0.85	1	
P4KE400A	P4KE400CA	342.00	380.00	420.00	1	548.0	0.75	1	
P4KE440A	P4KE440CA	376.00	418.00	462.00	1	602.0	0.68	1	
P4KE480A	P4KE480CA	408.00	456.00	504.00	1	658.0	0.61	1	
P4KE510A	P4KE510CA	434.00	485.00	535.00	1	698.0	0.57	1	
P4KE530A	P4KE530CA	451.00	503.50	556.50	1	725.0	0.55	1	
P4KE540A	P4KE540CA	460.00	513.00	567.00	1	740.0	0.54	1	
P4KE550A	P4KE550CA	468.00	522.50	577.50	1	760.0	0.52	1	

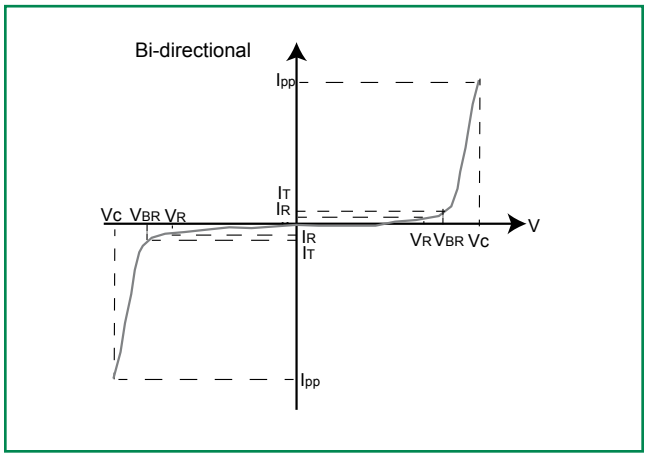
For bidirectional type having V_R of 10 volts and less, the I_R limit is double.

For parts without A , the V_{BR} is ± 10% and V_C is 5% higher than with A parts

Revised: 11/20/15

I-V Curve Characteristics





P_{PPM} Peak Pulse Power Dissipation – Max power dissipation
V_R Stand-off Voltage – Maximum voltage that can be applied to the TVS without operation
V_{BR} Breakdown Voltage – Maximum voltage that flows though the TVS at a specified test current (I_T)
V_C Clamping Voltage – Peak voltage measured across the TVS at a specified Ippm (peak impulse current)
I_R Reverse Leakage Current – Current measured at V_R
V_F Forward Voltage Drop for Uni-directional

Ratings and Characteristic Curves (T_A=25°C unless otherwise noted)

Figure 1 - TVS Transients Clamping Waveform

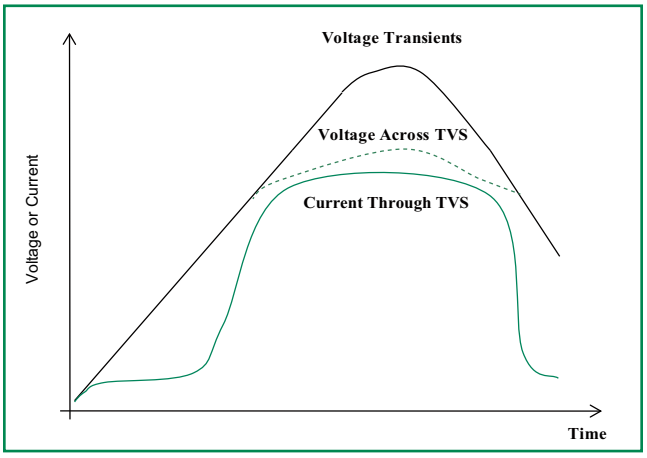
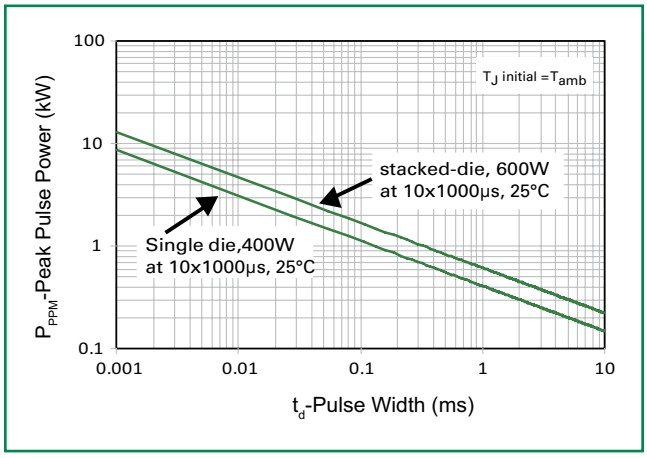


Figure 2 - Peak Pulse Power Rating Curve



continues on next page.

Revised: 11/20/15

Ratings and Characteristic Curves (T_A=25°C unless otherwise noted) (Continued)

Figure 3 - Peak Pulse Power Derating Curve

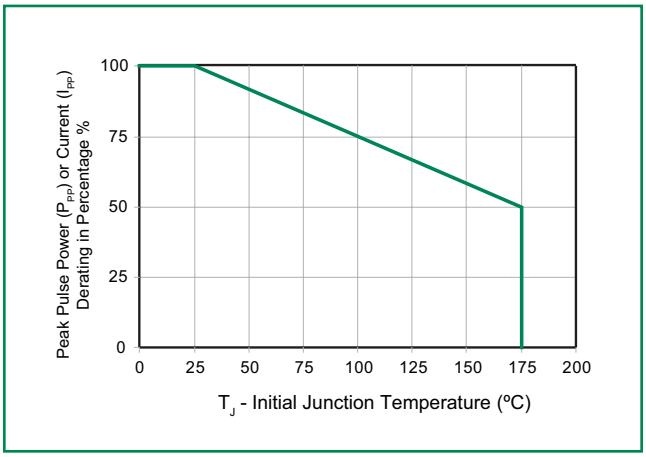


Figure 4 - Pulse Waveform

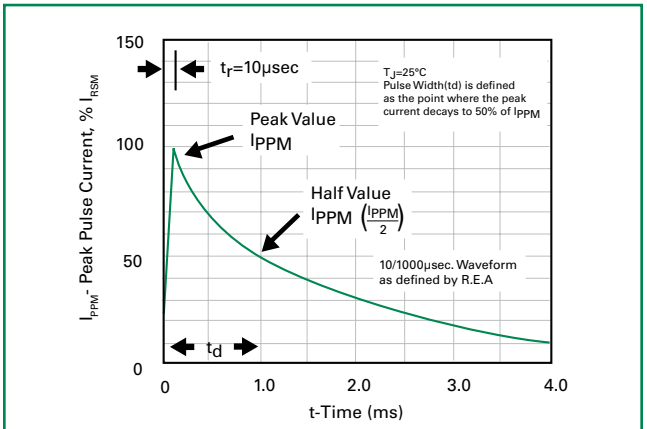


Figure 5 - Typical Junction Capacitance

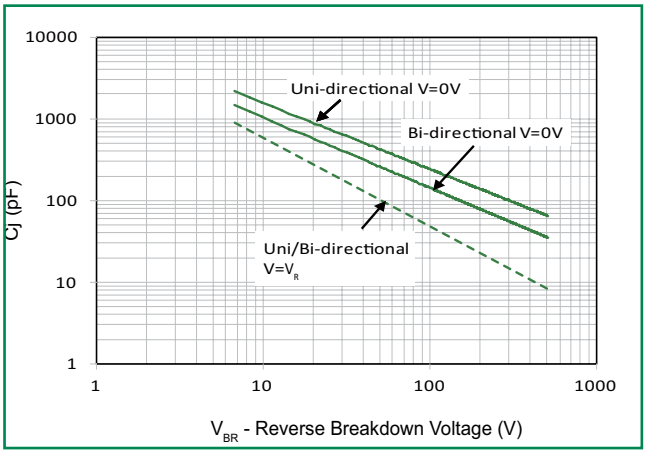


Figure 6 - Typical Transient Thermal Impedance

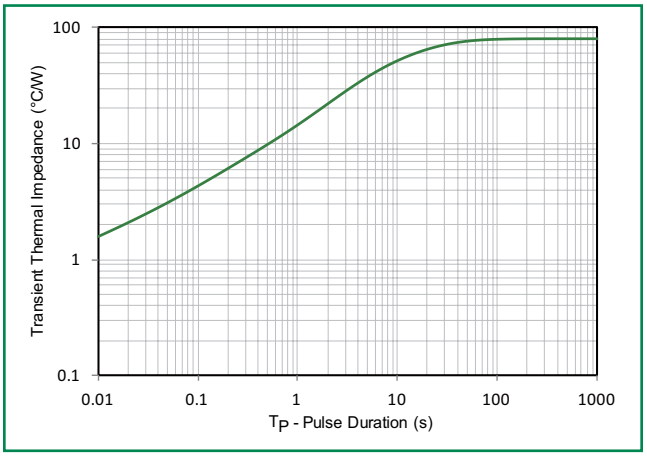


Figure 7 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only

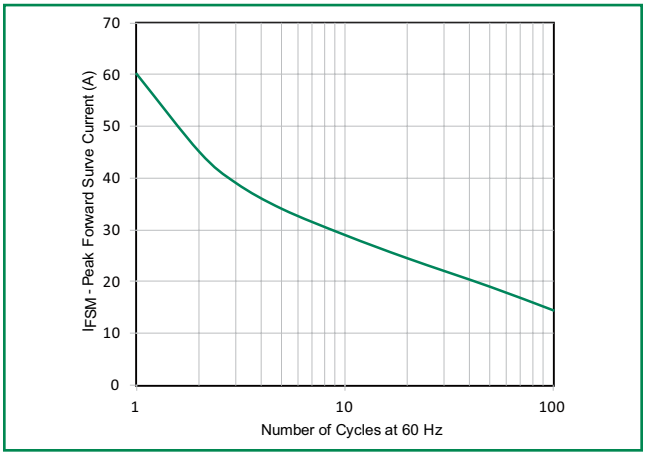
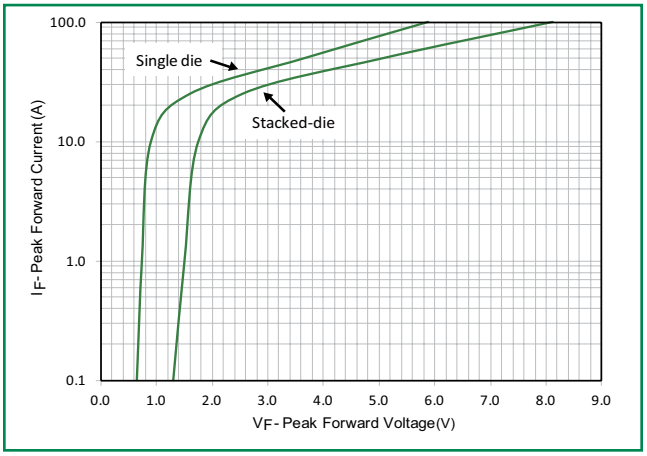
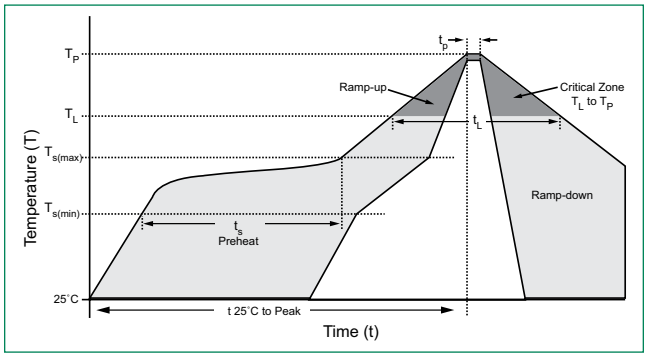


Figure 8 - Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)



Soldering Parameters

Reflow Condition		Lead–free assembly
Pre Heat	-Temperature Min ($T_{s(min)}$)	150°C
	-Temperature Max ($T_{s(max)}$)	200°C
	-Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_A) to peak		3°C/second max
$T_{S(max)}$ to T_A - Ramp-up Rate		3°C/second max
Reflow	-Temperature (T_A) (Liquidus)	217°C
	-Time (min to max) (t_s)	60 – 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		260°C



Flow/Wave Soldering (Solder Dipping)

Peak Temperature :	260°C
Dipping Time :	5 seconds
Soldering :	1 time

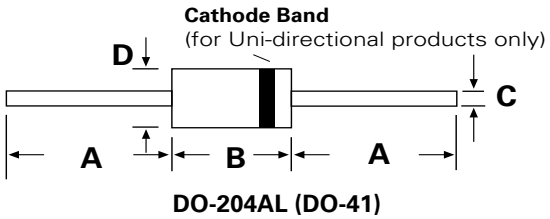
Physical Specifications

Weight	0.012oz., 0.3g
Case	JEDEC DO-204AL (DO-41) molded plastic body over passivated junction.
Polarity	Color band denotes the cathode except Bipolar.
Terminal	Matte Tin axial leads, solderable per JESD22-B102.

Environmental Specifications

High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Temperature Cycling	JESD22-A104
H3TRB	JESD22-A101
RSH	JESD22-B106

Dimensions



DO-204AL (DO-41)

Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.160	0.205	4.10	5.20
C	0.028	0.034	0.71	0.86
D	0.080	0.107	2.00	2.70

Revised: 11/20/15

Transient Voltage Suppression Diodes

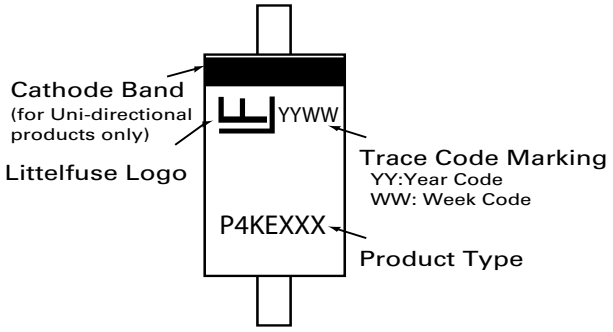
Axial Leaded – 400W > P4KE series

Part Numbering System

P4KE xxx XX X

- **OPTION CODE:**
  - **BLANK** Reel Tape
  - **-B** Bulk Packaging
- **TYPE CODE:**
  - **A** Uni-Directional (5% V_{BR} Voltage Tolerance)
  - **CA** Bi-Directional (5% V_{BR} Voltage Tolerance)
- **V_{BR} VOLTAGE CODE**
  (Refer to the Electrical Characteristics table)
- **SERIES CODE**

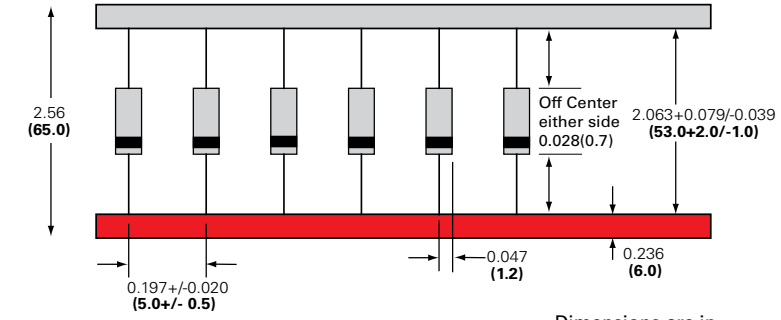
Part Marking System



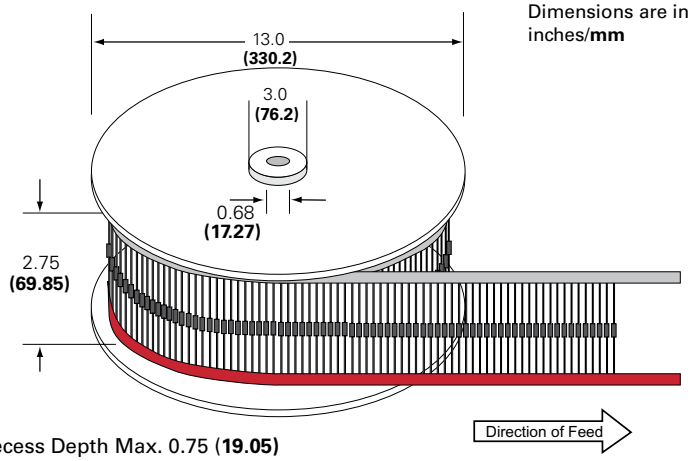
Packaging

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
P4KExxxXX	DO-204AL	5000	Tape & Reel	EIA STD RS-296
P4KExxxXX-B	DO-204AL	500	BOX	Littelfuse Spec.

Tape and Reel Specification



Dimensions are in inches/**mm**



Recess Depth Max. 0.75 (**19.05**)

Revised: 11/20/15