

P4KE series



TRANSIENT VOLTAGE SUPPRESSOR DIODES

Voltage: 6.8~600 Volts

Current: 400 W

Package: DO-41

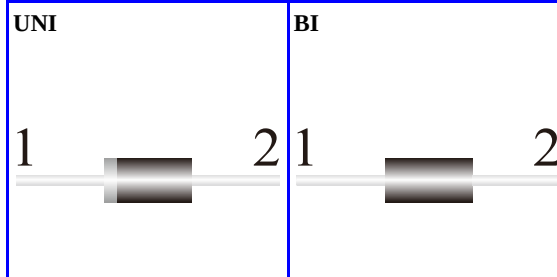
Features

- NH'S Glass Passivated Chip Technology
- Wave And Reflow Solderable
- Low Reverse Leakage
- Very Fast Response Time
- Excellent Clamping Capability
- 10/1000 μ s Waveform, Repetition Rate(Duty Cycle):0.01 %
- ESD Immunity Acc. IEC 61000-4-2

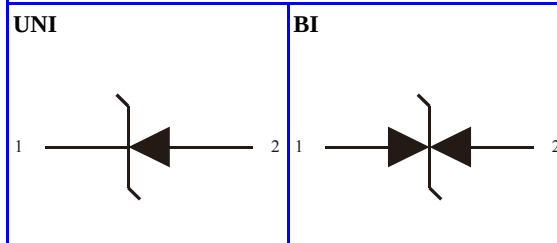
Typical Applications

- Power Port
- Communication And Data Port
- ESD Protection And Automotive Electronics
- Industrial Control and Automation

Diagram:



Polarity:



Single Phase, Half Wave, 60Hz, Resistive Or Inductive Load. For Capacitive Load, Derate Current By 20%

Maximum Ratings (Ta=25°C Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Value	Unit
Non-Repetitive Peak Pulse Power Dissipation	10/1000 μ s Waveform	P_{PP}	400	W
Peak Pulse Current	10/1000 μ s Waveform	I_{PP}	See Table-1	A
Peak Forward Surge Current	8.3ms Single Half Sine-Wave Superimposed On Rate Load	I_{FSM}	40	A
Power Dissipation On Infinite Heatsink	$T_L = 75.0\text{ }^{\circ}\text{C}$	P_D	1.0	W
Maximum Instantaneous Forward Voltage	$I_F = 100\text{ A}, V_{BR} < 200\text{ V}$	V_F	3.5	V
	$I_F = 100\text{ A}, V_{BR} > 201\text{ V}$		5.0	

Thermal Characteristics (Ta=25°C Unless Otherwise Specified)

Parameter	Test Conditions	Symbol	Value	Unit
Operating Junction Temperature Range		T_J	-55 ~ 150	$^{\circ}\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ 150	

C-V Curve Chart

Symbol Instruction

UNI	BI	Symbol	Instruction
		I_{PP}	Maximum Reverse Peak Pulse Current
		V_C	Clamping Voltage @ I_{PP}
		P_{PP}	Peak Power Dissipation
		V_{RWM}	Working Peak Reverse Voltage
		I_R	Maximum Reverse Leakage Current @ V_{RWM}
		V_{BR}	Breakdown Reverse Voltage
		I_T	Test Current @ V_{RWM}
		I_F	Maximum Average Forward Rectified Current
		V_F	Maximum Instantaneous Forward Voltage
		C_J	Junction Capacitance @ $V_R = 0$ and $f = 1.0\text{ MHz}$

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Table-1.ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Part Number And Code		Reverse Stand-off Voltage	Breakdown Voltage VBR @ I _T		Test Current	Max. Clamping Voltage @ I _{PP}	Max. Peak Pulse Current	Max. Reverse Leakage @ V _{RWM}
UNI-POLAR	BI-POLAR	V _{RWM} (V)	Min.(V)	Max.(V)	I _T (mA)	V _{C Max.} (V)	IPP(A)	I _R (uA)
P4KE6.8	P4KE6.8C	5.5	6.12	7.48	10	10.8	37.04	1000
P4KE6.8A	P4KE6.8CA	5.8	6.46	7.14	10	10.5	38.10	1000
P4KE7.5	P4KE7.5C	6.1	6.75	8.25	10	11.7	34.19	500
P4KE7.5A	P4KE7.5CA	6.4	7.13	7.88	10	11.3	35.40	500
P4KE8.2	P4KE8.2C	6.6	7.38	9.02	10	12.5	32.00	200
P4KE8.2A	P4KE8.2CA	7.0	7.79	8.61	10	12.1	33.06	200
P4KE9.1	P4KE9.1C	7.4	8.19	10.01	1	13.8	28.99	50
P4KE9.1A	P4KE9.1CA	7.8	8.65	9.56	1	13.4	29.85	50
P4KE10	P4KE10C	8.1	9.00	11.00	1	15.0	26.67	10
P4KE10A	P4KE10CA	8.6	9.50	10.50	1	14.5	27.59	10
P4KE11	P4KE11C	8.9	9.90	12.10	1	16.2	24.69	5
P4KE11A	P4KE11CA	9.4	10.45	11.55	1	15.6	25.64	5
P4KE12	P4KE12C	9.7	10.80	13.20	1	17.3	23.12	5
P4KE12A	P4KE12CA	10.2	11.40	12.60	1	16.7	23.95	5
P4KE13	P4KE13C	10.5	11.70	14.30	1	19.0	21.05	5
P4KE13A	P4KE13CA	11.1	12.35	13.65	1	18.2	21.98	5
P4KE15	P4KE15C	12.1	13.50	16.50	1	22.0	18.18	5
P4KE15A	P4KE15CA	12.8	14.25	15.75	1	21.2	18.87	5
P4KE16	P4KE16C	12.9	14.40	17.60	1	23.5	17.02	5
P4KE16A	P4KE16CA	13.6	15.20	16.80	1	22.5	17.78	5
P4KE18	P4KE18C	14.5	16.20	19.80	1	26.5	15.09	5
P4KE18A	P4KE18CA	15.3	17.10	18.90	1	25.2	15.87	5
P4KE20	P4KE20C	16.2	18.00	22.00	1	29.1	13.75	5
P4KE20A	P4KE20CA	17.1	19.00	21.00	1	27.7	14.44	5
P4KE22	P4KE22C	17.8	19.80	24.20	1	31.9	12.54	5
P4KE22A	P4KE22CA	18.8	20.90	23.10	1	30.6	13.07	5
P4KE24	P4KE24C	19.4	21.60	26.40	1	34.7	11.53	5
P4KE24A	P4KE24CA	20.5	22.80	25.20	1	33.2	12.05	5
P4KE27	P4KE27C	21.8	24.30	29.70	1	39.1	10.23	5
P4KE27A	P4KE27CA	23.1	25.65	28.35	1	37.5	10.67	5
P4KE30	P4KE30C	24.3	27.00	33.00	1	43.5	9.20	5
P4KE30A	P4KE30CA	25.6	28.50	31.50	1	41.4	9.66	5
P4KE33	P4KE33C	26.8	29.70	36.30	1	47.7	8.39	5
P4KE33A	P4KE33CA	28.2	31.35	34.65	1	45.7	8.75	5
P4KE36	P4KE36C	29.1	32.40	39.60	1	52.0	7.69	5
P4KE36A	P4KE36CA	30.8	34.20	37.80	1	49.9	8.02	5
P4KE39	P4KE39C	31.6	35.10	42.90	1	56.4	7.09	5
P4KE39A	P4KE39CA	33.3	37.05	40.95	1	53.9	7.42	5
P4KE43	P4KE43C	34.8	38.70	47.30	1	61.9	6.46	5
P4KE43A	P4KE43CA	36.8	40.85	45.15	1	59.3	6.75	5
P4KE47	P4KE47C	38.1	42.30	51.70	1	67.8	5.90	5

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Part Number And Code		Reverse Stand-off Voltage	Breakdown Voltage VBR @ I _T		Test Current	Max. Clamping Voltage @ I _{PP}	Max. Peak Pulse Current	Max. Reverse Leakage @ V _{RWM}
UNI-POLAR	BI-POLAR	V _{RWM} (V)	Min.(V)	Max.(V)	I _T (mA)	V _{C Max.} (V)	IPP(A)	I _R (uA)
P4KE47A	P4KE47CA	40.2	44.65	49.35	1	64.8	6.17	5
P4KE51	P4KE51C	41.3	45.90	56.10	1	73.5	5.44	5
P4KE51A	P4KE51CA	43.6	48.45	53.55	1	70.1	5.71	5
P4KE56	P4KE56C	45.4	50.40	61.60	1	80.5	4.97	5
P4KE56A	P4KE56CA	47.8	53.20	58.80	1	77.0	5.19	5
P4KE62	P4KE62C	50.2	55.80	68.20	1	89.0	4.49	5
P4KE62A	P4KE62CA	53.0	58.90	65.10	1	85.0	4.71	5
P4KE68	P4KE68C	55.1	61.20	74.80	1	98.0	4.08	5
P4KE68A	P4KE68CA	58.1	64.60	71.40	1	92.0	4.35	5
P4KE75	P4KE75C	60.7	67.50	82.50	1	108.0	3.70	5
P4KE75A	P4KE75CA	64.1	71.25	78.75	1	103.0	3.88	5
P4KE82	P4KE82C	66.4	73.80	90.20	1	118.0	3.39	5
P4KE82A	P4KE82CA	70.1	77.90	86.10	1	113.0	3.54	5
P4KE91	P4KE91C	73.7	81.90	100.10	1	131.0	3.05	5
P4KE91A	P4KE91CA	77.8	86.45	95.55	1	125.0	3.20	5
P4KE100	P4KE100C	81.0	90.00	110.00	1	144.0	2.78	5
P4KE100A	P4KE100CA	85.5	95.00	105.00	1	137.0	2.92	5
P4KE110	P4KE110C	89.2	99.00	121.00	1	158.0	2.53	5
P4KE110A	P4KE110CA	94.0	104.50	115.50	1	152.0	2.63	5
P4KE120	P4KE120C	97.2	108.00	132.00	1	173.0	2.31	5
P4KE120A	P4KE120CA	102.0	114.00	126.00	1	165.0	2.42	5
P4KE130	P4KE130C	105.0	117.00	143.00	1	187.0	2.14	5
P4KE130A	P4KE130CA	111.0	123.50	136.50	1	179.0	2.23	5
P4KE150	P4KE150C	121.0	135.00	165.00	1	215.0	1.86	5
P4KE150A	P4KE150CA	128.0	142.50	157.50	1	207.0	1.93	5
P4KE160	P4KE160C	130.0	144.00	176.00	1	230.0	1.74	5
P4KE160A	P4KE160CA	136.0	152.00	168.00	1	219.0	1.83	5
P4KE170	P4KE170C	138.0	153.00	187.00	1	244.0	1.64	5
P4KE170A	P4KE170CA	145.0	161.50	178.50	1	234.0	1.71	5
P4KE180	P4KE180C	146.0	162.00	198.00	1	258.0	1.55	5
P4KE180A	P4KE180CA	154.0	171.00	189.00	1	246.0	1.63	5
P4KE200	P4KE200C	162.0	180.00	220.00	1	287.0	1.39	5
P4KE200A	P4KE200CA	171.0	190.00	210.00	1	274.0	1.46	5
P4KE220	P4KE220C	175.0	198.00	242.00	1	344.0	1.16	5
P4KE220A	P4KE220CA	185.0	209.00	231.00	1	328.0	1.22	5
P4KE250	P4KE250C	202.0	225.00	275.00	1	360.0	1.11	5
P4KE250A	P4KE250CA	214.0	237.50	262.50	1	344.0	1.16	5
P4KE300	P4KE300C	243.0	270.00	330.00	1	430.0	0.93	5
P4KE300A	P4KE300CA	256.0	285.00	315.00	1	414.0	0.97	5
P4KE350	P4KE350C	284.2	315.00	385.00	1	504.0	0.79	5
P4KE350A	P4KE350CA	299.3	332.50	367.50	1	482.0	0.83	5

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UNI-POLAR	BI-POLAR	V _{RWM} (V)	Min.(V)	Max.(V)	I _T (mA)	V _{C Max.} (V)	IPP(A)	I _R (uA)
P4KE380	P4KE380C	308.6	342.00	418.00	1	547.2	0.73	5
P4KE380A	P4KE380CA	324.9	361.00	399.00	1	524.4	0.76	5
P4KE400	P4KE400C	324.8	360.00	440.00	1	576.0	0.69	5
P4KE400A	P4KE400CA	342.0	380.00	420.00	1	552.0	0.72	5
P4KE440	P4KE440C	357.3	396.00	484.00	1	633.6	0.63	5
P4KE440A	P4KE440CA	376.2	418.00	462.00	1	607.2	0.66	5
P4KE500	P4KE500C	406.0	450.00	550.00	1	720.0	0.56	5
P4KE500A	P4KE500CA	427.5	475.00	525.00	1	690.0	0.58	5
P4KE520	P4KE520C	422.2	468.00	572.00	1	748.8	0.53	5
P4KE520A	P4KE520CA	444.6	494.00	546.00	1	717.6	0.56	5
P4KE550	P4KE550C	446.6	495.00	605.00	1	792.0	0.51	5
P4KE550A	P4KE550CA	470.3	522.50	577.50	1	759.0	0.53	5
P4KE600	P4KE600C	487.2	540.00	660.00	1	864.0	0.46	5
P4KE600A	P4KE600CA	513.0	570.00	630.00	1	828.0	0.48	5

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TRANSIENT VOLTAGE SUPPRESSOR DIODES

Typical Characteristics Curves

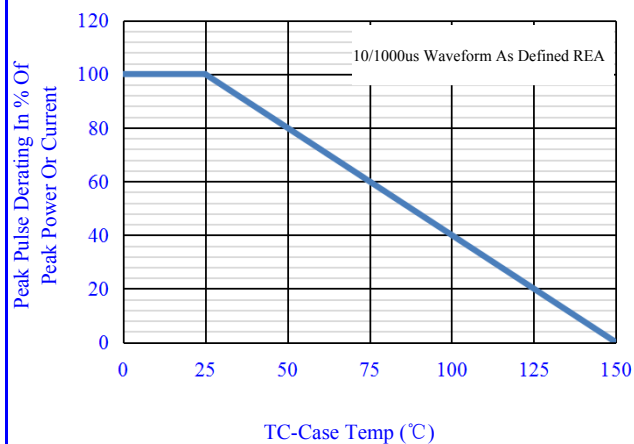


Fig.1-Peak Power Or Current Vs.Tc

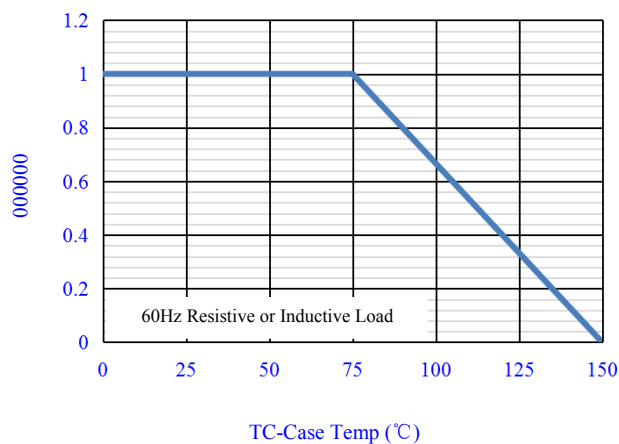


Fig.2-Steady State Power Derating Curve

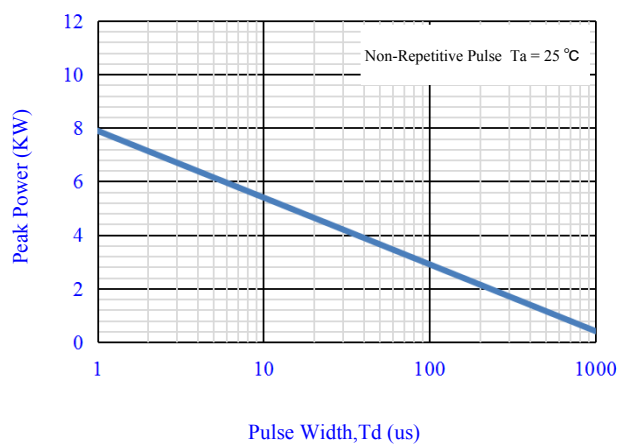


Fig.3-Peak Pulse Power Rating Curve

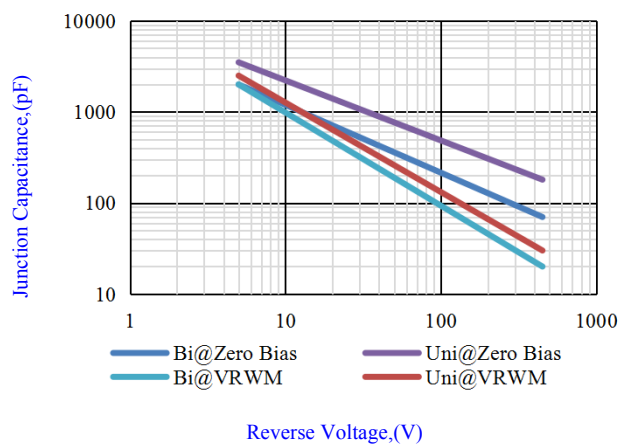


Fig.4-Typical Junction Capacitance

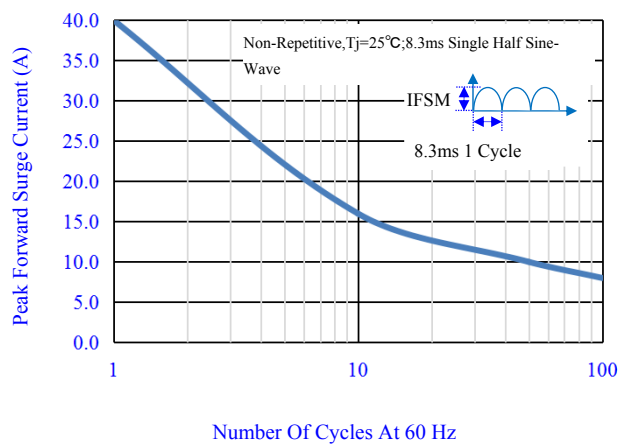


Fig.5-Max. Non-Repetitive Surge Current

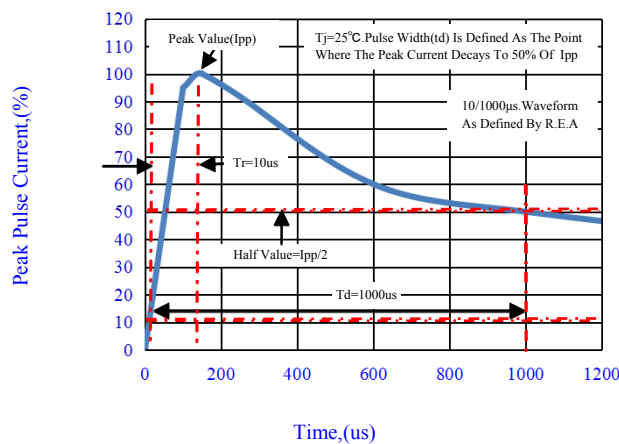


Fig.6-Pulse Waveform

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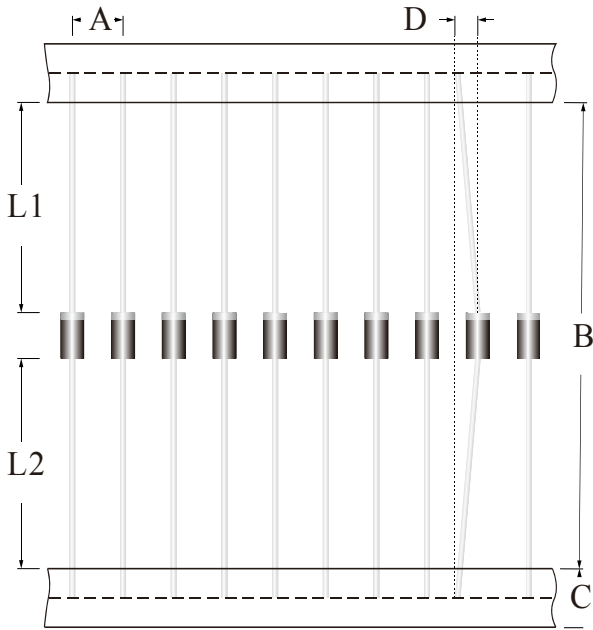
OUTLINE DRAWINGS



DO-41

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20	-	3.00	0.0866	-	0.1181
B	4.25	-	5.75	0.1673	-	0.2264
C	0.45	-	0.75	0.0177	-	0.0295
D	24.00	-	28.00	0.9449	-	1.1024

COMPONENT PITCH DIMENSION DIAGRAM



DO-41

OUTLINE DIMENSIONS						
Dim.	Milimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.50	-	5.50	0.1772	-	0.2165
B	51.00	-	53.00	2.0079	-	2.0866
C	5.50	-	6.50	0.2165	-	0.2559
D	-	-	1.20	-	-	0.0472
L2-L1	-	-	1.00	-	-	0.0394

P4KE series



TRANSIENT VOLTAGE SUPPRESSOR DIODES

MARKING



MARKING INSTRUCTION

NH=Niuhan Trademark
FF=Product Line Code,According To Actual Changes
P4KExxxx=Make,XX=See Table-1
White band denotes cathode

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NH=Niuhan Trademark
FF=Product Line Code,According To Actual Changes
P4KExxxx=Make,XX=See Table-1
White band denotes cathode

PACKING INFORMATION

Package Type	Package Code	Product Weight Approx(g/Pcs)	Package Method	Quantity (Pcs/Min. Pack.)	Quantity (Pcs/Inner Box)	Quantity (Pcs/Carton)
DO-41	P1	0.208	Tape	5000	5000	50000

P4KE series

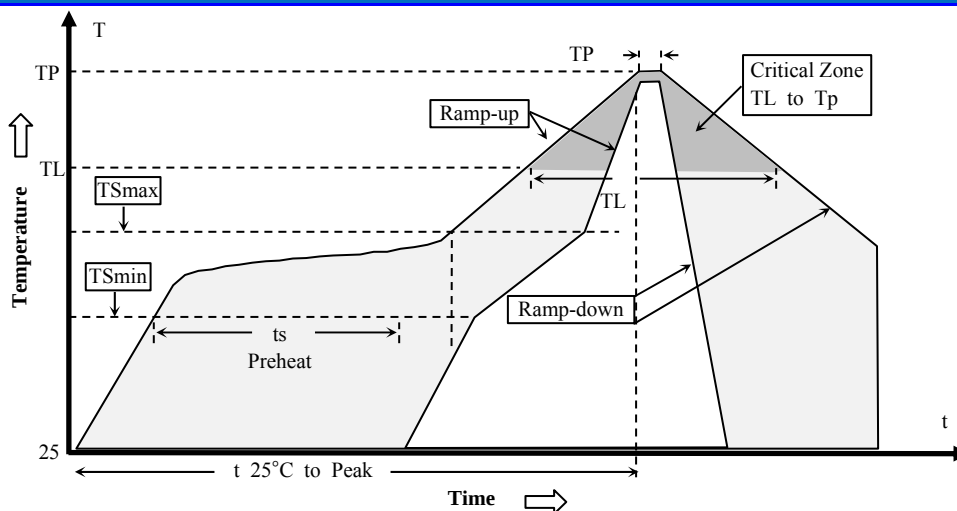


TRANSIENT VOLTAGE SUPPRESSOR DIODES

Recommended wave soldering condition

Product	Peak Temperature	Soldering Time
Pb-free devices	260 +0/-5 °C	5 +1/-1 seconds

Recommended temperature profile for IR reflow



Profile feature	Sn-Pb eutectic Assembly	Pb-free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat -Temperature Min(T _S min) -Temperature Max(T _S max) -Time(t _s min to t _s max)	100°C 150°C 60-120 seconds	150°C 200°C 60-180 seconds
Time maintained above: -Temperature (T _L) - Time (t _L)	183°C 60-150 seconds	217°C 60-150 seconds
Peak Temperature(T _P)	240 +0/-5 °C	260 +0/-5 °C
Time within 5°C of actual peak temperature(tp)	10-30 seconds	20-40 seconds
Ramp down rate	6°C/second max.	6°C/second max.
Time 25 °C to peak temperature	6 minutes max.	8 minutes max.

Note : All temperatures refer to topside of the package, measured on the package body surface.

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