Traditional High Q (>10,000) Low ESR Multi-Layer Ceramic Capacitors

3838C/P (0.380” x 0.380”)

Product Features

- High Q
- High RF Current/Voltage
- Ultra Stable Performance
- Capacitance Range: 0.5pF to 5100pF
- Working Voltage: 3600V
- Extended Voltage: 7200V

Product Applications

Typical Functional Applications:
• Tuning • Bypass • Coupling
• D.C. Blocking • Impedance Matching

Typical Circuit Applications
• HF/ RF Power Amplifiers • Antenna Tuning • Plasma Chambers • Medical Equipment • Transmitters

Marking shown for illustration purposes only. Actual marking may differ.

Part Numbering

3838 C 100 J W 362 X

- 3838 — Case Size (0.380” x 0.380”)
- C — C=NP0 P=P90
- 100 — Capacitor Code 100=10x10⁰=10pF 1R0=1.0pF
- J — Capacitance Tolerance *See Table*
- W — Termination Type *See Table*
- 362 — Rated Voltage *See Table*
- X — Laser Marking

Capacitance Tolerance Codes

Code	A	B	C	D	F	G	J	K
Tol.	±0.05pF	±0.1pF	±0.25pF	±0.5pF	±1%	±2%	±5%	±10%

Voltage Codes

Voltage	Code
500V	501
1000V	102
2500V	252
3600V	362
7200V	722

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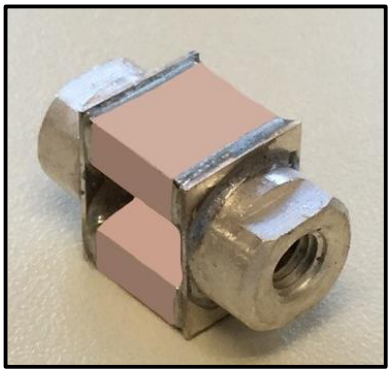
3838C/P Capacitance Values

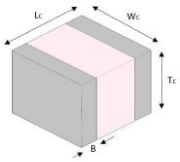
Special capacitances, tolerances and WVDC are available. Please contact PPI.



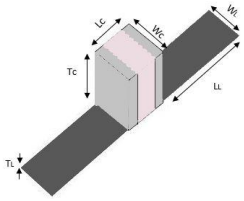
Cap. pF	Cap Code	Tol.	Rated WVDC Std.	Rated WVDC Ext.	Cap. pF	Cap Code	Tol.	Rated WVDC Std.	Rated WVDC Ext.	Cap. pF	Cap Code	Tol.	Rated WVDC Std.	Rated WVDC Ext.	Cap. pF	Cap Code	Tol.	Rated WVDC
0.5	0R5	B,C, D	3600V	7200V	**4.7**	4R7	B,C, D	3600V	7200V	**51**	510	F,G, J,K	3600V	7200V	**560**	561	F,G, J,K	2500V
0.6	0R6				**5.1**	5R1				**56**	560				**620**	621		
0.7	0R7				**5.6**	5R6				**62**	620				**680**	681		
0.8	0R8				**6.2**	6R2				**68**	680				**750**	751		
0.9	0R9				**6.8**	6R8				**75**	750				**820**	821	F,G, J,K	1000V
1.0	1R0				**7.5**	7R5				**82**	820				**910**	911		
1.1	1R1				**8.2**	8R2				**91**	910				**1000**	102		
1.2	1R2				**9.1**	9R1				**100**	101				**1100**	112		
1.3	1R3				**10**	100	F,G, J,K	3600V	7200V	**110**	111				**1200**	122		
1.4	1R4				**11**	110				**120**	121				**1500**	152		
1.5	1R5				**12**	120				**130**	131				**1800**	182		
1.6	1R6				**13**	130				**150**	151				**2200**	222		
1.7	1R7				**15**	150				**160**	161				**2400**	242		
1.8	1R8				**16**	160				**180**	181				**2700**	272	F,G, J,K	500V
1.9	1R9				**18**	180				**200**	201	F,G, J,K	3600V	N/A	**3000**	302		
2.0	2R0				**20**	200				**220**	221				**3300**	332		
2.1	2R1				**22**	220				**240**	241				**3600**	362		
2.2	2R2				**24**	240				**270**	271				**3900**	392		
2.4	2R4				**27**	270				**300**	301				**4300**	432		
2.7	2R7				**30**	300				**330**	331				**4700**	472		
3.0	3R0				**33**	330				**360**	361				**5100**	512		
3.3	3R3				**36**	360				**390**	391							
3.6	3R6				**39**	390				**430**	431	F,G, J,K	2500V	N/A				
3.9	3R9				**43**	430				**470**	471							
4.3	4R3				**47**	470				**510**	511							

3838C/P (0.380” x 0.380”)

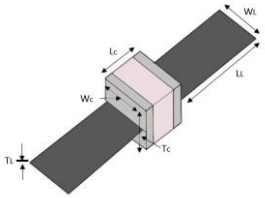
Termination Types and Codes



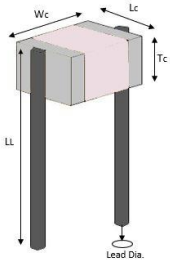
Chip Termination:
Codes: **W, L, P**



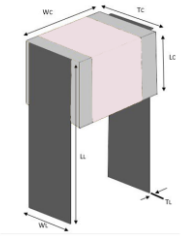
Microstrip Termination:
Codes: **MS, MN**



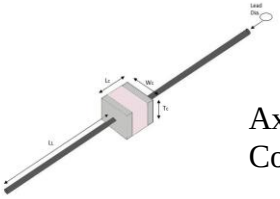
Axial Ribbon Termination:
Code: **AR, AN**



Radial Wire Termination:
Codes: **RW, RN**



Radial Ribbon Termination:
Code: **RR, FN**



Axial Wire Termination:
Codes: **AW, BN**

Termination Code	Magnetic Termination
W RoHS	100% Sn Solder over Nickel Plating
L	90% Sn10%Pb Tin/Lead Solder over Nickel Plating
MS RoHS	Silver-Plated Copper
AR RoHS	
RR RoHS	
RW RoHS	
AW RoHS	

Termination Code	Non-Magnetic Terminations
P RoHS	100%Sn Solder over Copper Plating
MN RoHS	Silver-Plated Copper
AN RoHS	
FN RoHS	
RN RoHS	
BN RoHS	

Note: “Non-Magnetic” means no magnetic materials.

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Termination Types For Termination Types images, see previous page

Unit: inch (millimeter)

Magnetic Terminations

		Capacitor Dimensions				Lead Dimensions		
Code	Term.	Length Lc	Width Wc	Thickness Tc	Overlap B	Length LL	Width WL	Thickness TL
W	Chip	0.380 -0.010+0.015 (9.65 - 0.25+0.38)	0.380 ±0.010 (9.65±0.25)	0.170 (4.32) max	0.024~0.059 (0.60~1.50)			
MS	Microstrip	0.380 -0.010.+0.015 (9.65 -0.25+0.38)	0.380 ±0.010 (9.65 ±0.25)	0.177 (4.50) max		0.728 (18.50) min	0.350 ± 0.020 (8.89±0.50) 0.315±0.010 (8.00±0.25)	0.008±0.001 (0.20± 0.025)
AR	Axial Ribbon							
RR	Radial Ribbon					0.354 (9.00) min	0.118 ± 0.010 (3.0 ± 0.25)	0.012 ± 0.001 (0.3 ± 0.025)
RW	Radial Wire					0.709 (18.00) min	Dia.: 0.031±0.004 (0.80 ± 0.10)	
AW	Axial Wire					0.906 (23.00) min		

Non-Magnetic Terminations

		Capacitor Dimensions				Lead Dimensions		
Code	Term.	Length Lc	Width Wc	Thickness Tc	Overlap B	Length LL	Width WL	Thickness TL
P	Chip	0.380 -0.010+0.015 (9.65 - 0.25+0.38)	0.380 ±0.010 (9.65±0.25)	0.170 (4.32) max	0.024~0.059 (0.60~1.50)			
MN	Microstrip	0.380 -0.010+0.015 (9.65 -0.25+0.38)	0.380 ±0.010 (9.65 ±0.25)	0.177 (4.50) max		0.728 (18.50) min	0.350 ± 0.020 (8.89±0.50) 0.315±0.010 (8.00±0.25)	0.008 ±0.001 (0.20 ± 0.025)
AN	Axial Ribbon							
FN	Radial Ribbon					0.354 (9.00) min	0.118 ± 0.010 (3.0 ± 0.25)	0.012 ± 0.001 (0.3 ± 0.025)
RN	Radial Wire					0.709 (18.00) min	Dia.: 0.031 ±0 .004 (0.80 ± 0.10)	
BN	Axial Wire					0.906 (23.00) min		

Note: Non-Magnetic means no magnetic materials. All leads are attached with high temperature solder and parts are RoHS Compliant.

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Electrical Specifications

Quality Factor (Q)	Greater than 10,000 at 1 MHz
Insulation Resistance (IR)	Test Voltage: 500V 10^5 Megaohms min. @ +25°C rated WVDC 10^4 Megaohms min. @ +125°C rated WVDC
Rated Voltage	See Rated Voltage Table
Dielectric Withstanding Voltage (WVDC)	250% of Rated Voltage of 5 seconds, Rated Voltage ≤ 500VDC 150% of Voltage for 5 seconds, 500VDC <Rated Voltage ≤ 1250 VDC 120% of Voltage for 5 seconds, Rated Voltage > 1250 VDC
Operating Temperature Range	-55°C to 200°C
Temperature Coefficient (TC)	C: -55°C to 125°C 0±30ppm/°C; >125°C to 200°C 0±60ppm/°C P: -55°C to 200°C +90±20ppm/°C
Capacitance Drift	±0.02% or ±0.02pF, whichever is greater
Piezoelectric Effects	None
Termination Type	See Termination Type Table

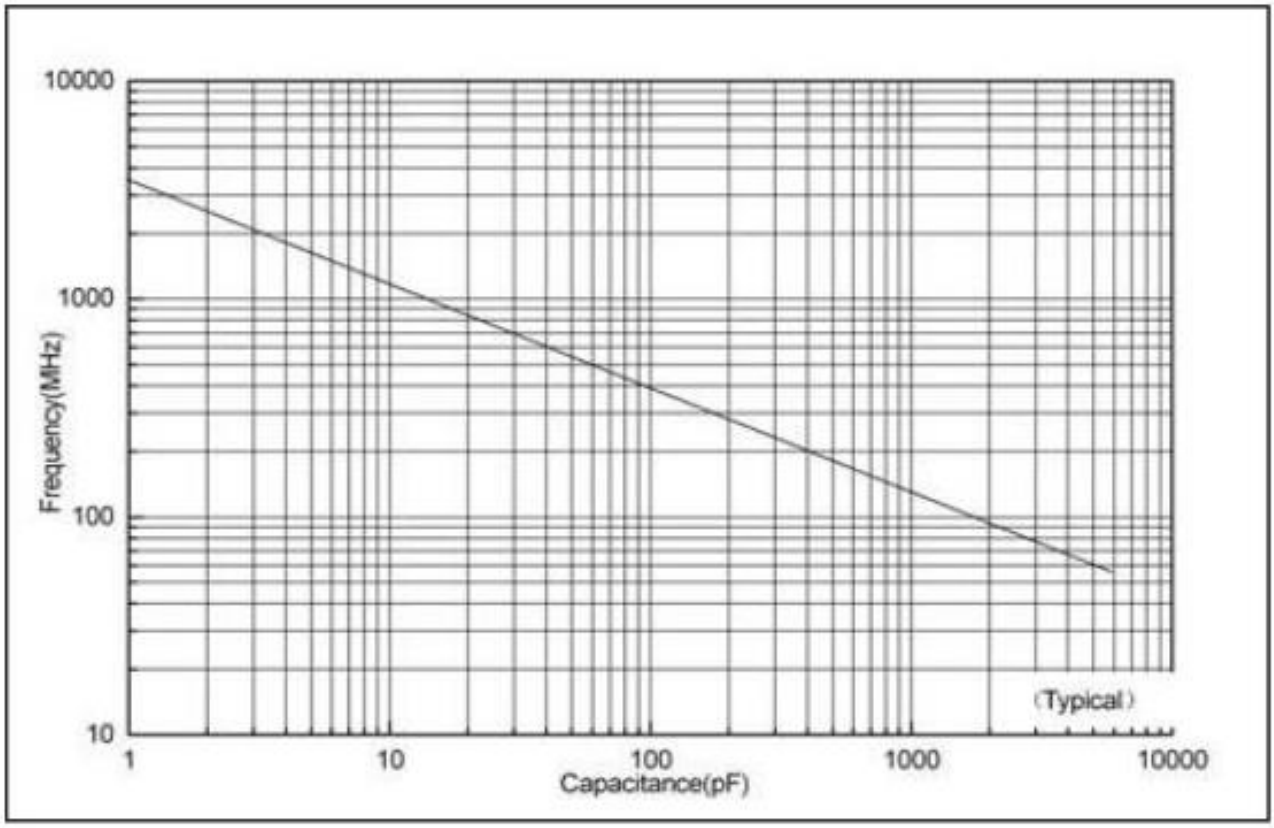
Environmental Specifications

	Specification	Test Parameters
Thermal Shock	**DWV:** The initial value **IR:** Shall not be less than 30% of the initial value. **Capacitance Change:** No more than 0.5% or 0.5pF, whichever is greater.	MIL-STD-202, Method 107, Condition A. At the maximum rated temperature (-55°C and 200°C) stay 30 minutes, the time of removing shall not be more than 3 minutes. Perform five cycles.
Moisture Resistance		MIL-STD-202, Method 106
Humidity (Steady State)	**DWV:** The initial value **IR:** The initial value **Capacitance Change:** No more than 0.3% or 0.3pF, whichever is greater.	MIL-STD-202, Method 103, Condition A With 1.5Volts DC applied while subjected to an environment of 85°C with 85% relative humidity for 240 hours minimum.
Life	**IR:** Shall not be less than 30% of the initial value. **Capacitance Change**: No more than 2.0% or 0.5pF, whichever is greater.	MIL-STD-202, Method 108. For 2000 hours, at 200°C. 200% of Voltage for Capacitors, Rated Voltage ≤ 500VDC; 120% of Voltage for Capacitors, 500VDC< Rated Voltage ≤1250VDC; 100% for Voltage for Capacitors, Rated Voltage >1250VDC
Terminal Strength	**Force:** 20lbs typical, 10lbs. min. **Duration Time:** 5 to 10 seconds	MIL-STD-202, Method 211A, Test Condition A. Applied a force and maintained for a period of 5 to 10 seconds. The force shall be in the direction of the axes of the terminations.

Capacitors are designed and manufactured to meet the requirements of MIL-PRF-55681 and MIL-PRF-123.

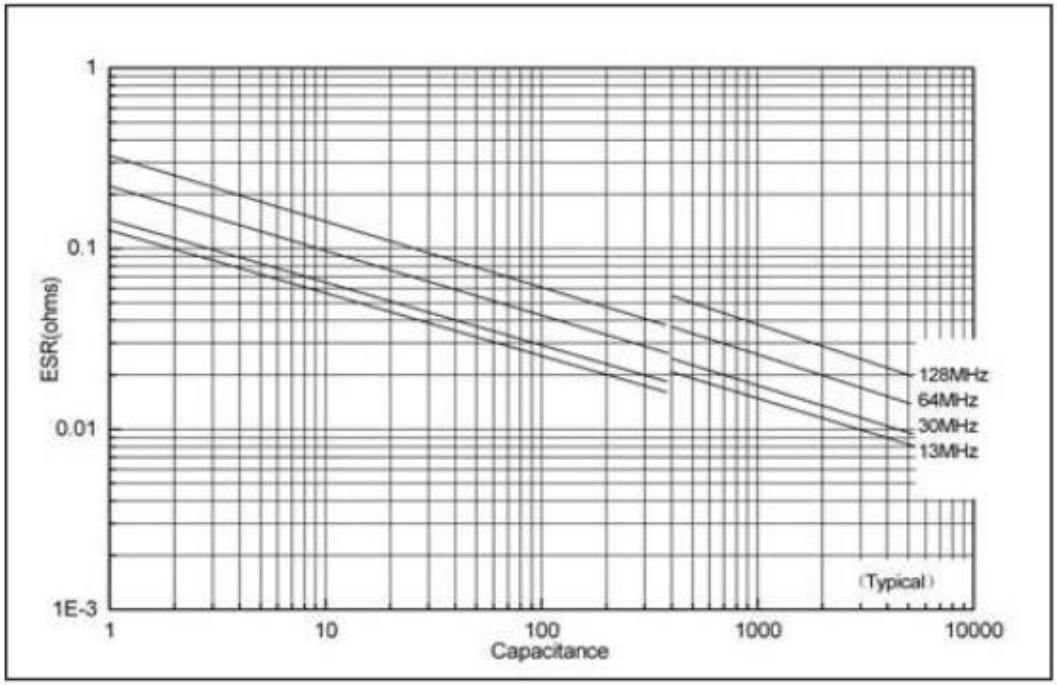
Series Resonance vs. Capacitance

Series Resonance vs. Capacitance



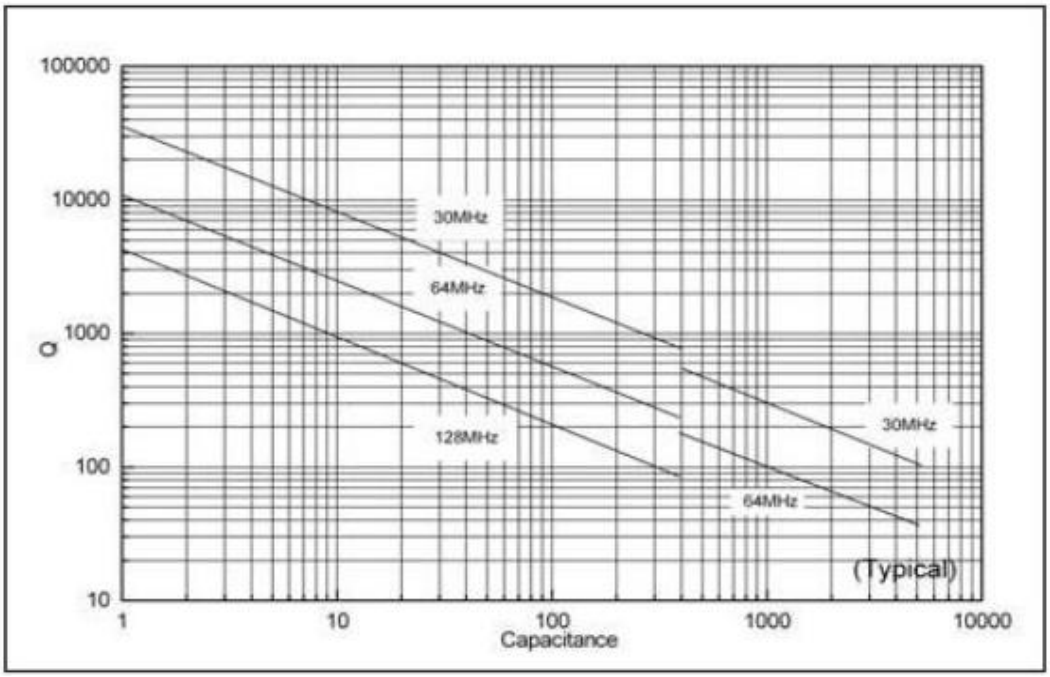
ESR vs. Frequency

ESR vs Frequency



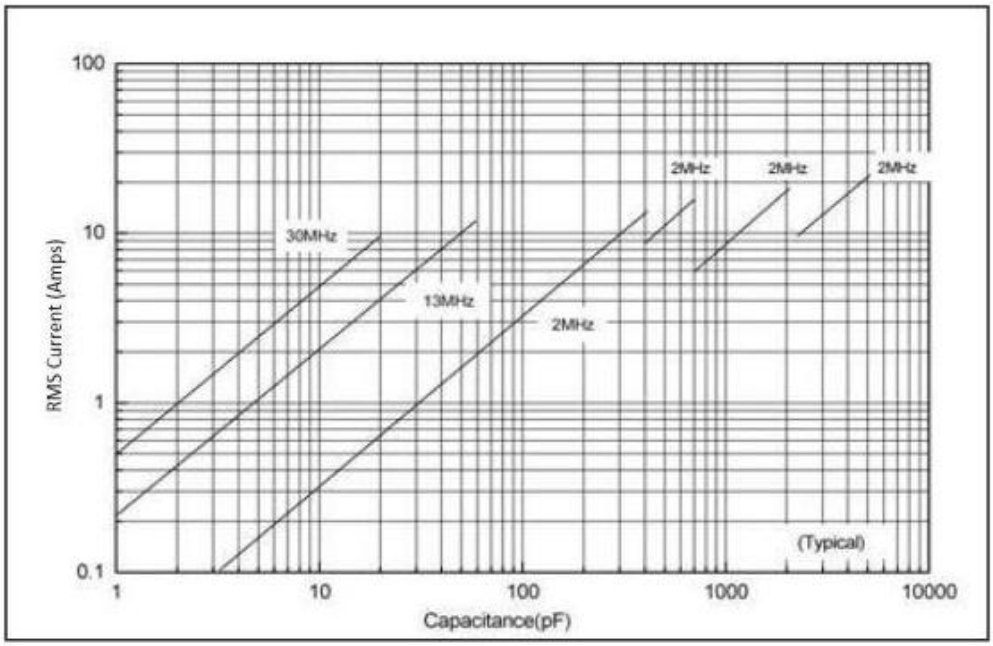
Q vs. Capacitance

Q vs Capacitance



Current Rating vs. Capacitance

3838C/P Current Rating vs Capacitance

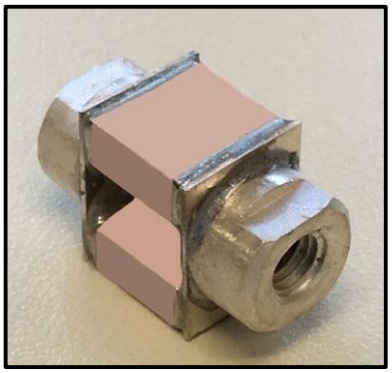


The current depends on voltage limited: $I = \frac{\sqrt{2}}{2} I_{peak} = \frac{\sqrt{2}}{2} \times \frac{V_{rated}}{X_C} = \sqrt{2}\pi fCV_{rated}$

The current depends on power dissipation limited: $I = \sqrt{\frac{P_{dissipation}}{ESR}}$

Note: If the thermal resistance of mounting surface is 12°C/W, then a power dissipation of 5W will result in the current limited. We can calculate the current limited.

Custom Assemblies



Passive Plus offers Capacitor Assemblies for high power requirements. Typical assemblies are configured in series and/or parallel combinations, producing higher voltage/current handling capabilities, extended capacitance range and tighter tolerances.

To get started, simply send us either a mechanical drawing or circuit conditions and we can recommend a solution. All components are 100% up-screened for Partial Discharge and Sonoscanned. All assemblies include a 100hr Military burn in.

Recommended Land Pattern Dimensions

When mounting the capacitor to substrate, it's important to carefully consider that the amount of solder (size of fillet) used has a direct effect upon the capacitor once it's mounted.

1) The greater the amount of solder, the greater the stress to the elements. This may cause the substrate to break or crack.

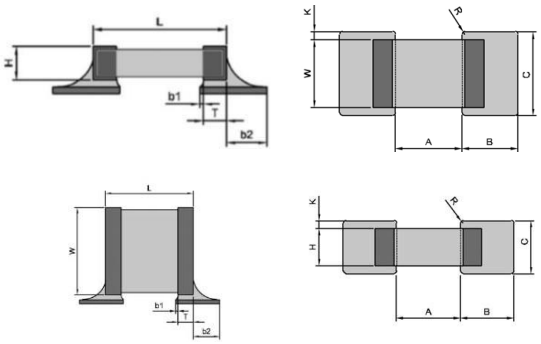
2) In the situation where two or more devices are mounted onto a common land, be sure to separate the device into exclusive pads by using soldering resist.

Horizontal Mounting (mm)

A	B	C
7.1	3.0	10.2

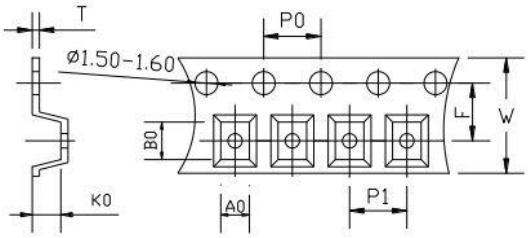
Vertical Mounting* (mm)

A	B	C
7.1	3.0	5.0



Tape & Reel Specifications (mm)

Horizontal Orientation



Orientation	W	P0	P1	T	F	Qty Min	Qty/ reel	Tape Material
Horizontal	16.00	4.00	12.00	0.30	7.50	50	200	Plastic

A_0 B_0 K_0

- Determined by component size. Typical clearance between the cavity and the component is:
  .05 (.002) min to .50 (.020) max for 8mm tape and .50 (.002) min to .65 (.026) max for 12mm tape.
- The component cannot rotate more than 20° within the determined cavity.