



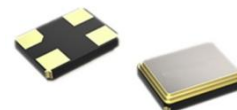
- *MHz SMD Crystals*
- *MHz Plastic SMD Crystals*
- *MHz SMD Crystals- Glass Seal*
- *MHz Thru Hole Crystals*
- *MHz Plastic SMD Crystals*
- *KHz SMD Crystals*
- *KHz Plastic SMD Crystals*
- *KHz Thru Hole Crystals*

MAIN FEATURE

- Ultra-small SMD Package, Seam Sealed Ceramic-Metal, 4pads
- High precision & High frequency stability

APPLICATION

- Small Bluetooth & wireless device • IoT, Health care equipment

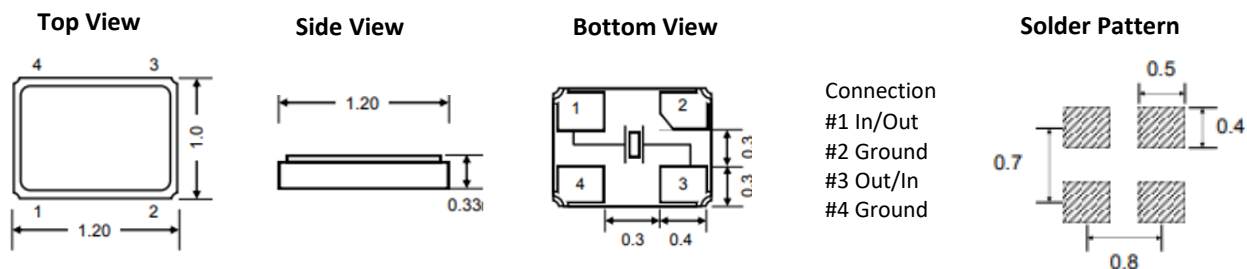


L1.2*W1.0*H0.33mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	26.00		96.00	MHz	
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±50		ppm@25 °C	See p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	See p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance(CL)	-	18	-	pF	See p/n guide for more option
Frequency Stability	-	±50	-	ppm	See p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@26.000 ~ 32.0MHz
			80		@32.001~40.00MHz
			60		@40.001~96.00MHz
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CM12 48M0A50-18-50-40-80 TLF

[Part Number and Part Code Structure](#)

TGS	CM12	48M0	A	50	-18	-50	-40	-80	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

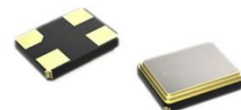
- 1) TGS: Company Code
- 2) CM12: MHz SMD Crystal, 4 pads, L1.2*W1.0*H0.33mm
- 3) 48M0: Frequency Range 48.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund.
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 80: Equivalent Series Resistance (ESR), 80: 80 ohm Max.
- 10) T: Package in Tape/Reel, 5000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

MAIN FEATURE

- Ultra-small SMD Package, Seam Sealed Ceramic-Metal, 4pads
- High precision & High frequency stability

APPLICATION

- Small Bluetooth & wireless device • IoT, Health care equipment

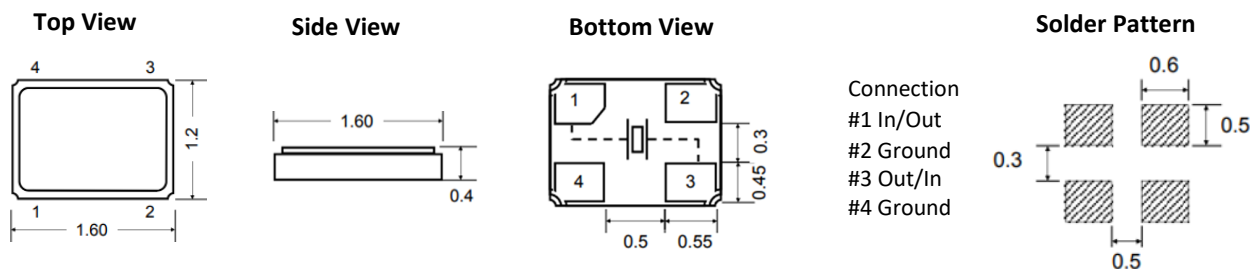


L1.6*W1.2*H0.40mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	24.00		96.00	MHz	
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±50		ppm@25 °C	See p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	See p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance(CL)	-	18	-	pF	See p/n guide for more option
Frequency Stability	-	±50	-	ppm	See p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@24.000 ~ 32.0MHz
			100		@32.001~38.00MHz
			80		@38.001~96.00MHz
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CM11 48M0A50-18-50-40-80 TLF

[Part Number and Part Code Structure](#)

TGS	CM11	48M0	A	50	-18	-50	-40	-80	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

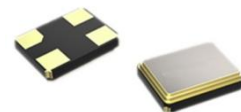
- 1) TGS: Company Code
- 2) CM11: SMD Crystal, 4 pads, L1.6*W1.0*H0.40mm
- 3) 48M0: Frequency Range 48.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund.
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 80: Equivalent Series Resistance (ESR), 80: 80 ohm Max.
- 10) T: Package in Tape/Reel, 3000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

MAIN FEATURE

- Ultra-small SMD Package, Seam Sealed Ceramic-Metal, 4pads
- Low Cost, High precision & High frequency stability

APPLICATION

- TV, STB LCDM and Cable Modem • Health care equipment



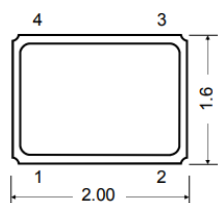
L2.0*W1.6*H0.46mm

STANDARD SPECIFICATION

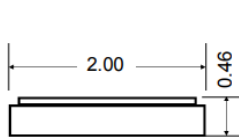
Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	16.000		54.000	MHz	
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance(CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@16.000 ~ 20.000MHz
			100		@20.001~30.000MHz
			80		@30.001~36.000MHz
			60		@36.001~54.000MHz
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (mm)

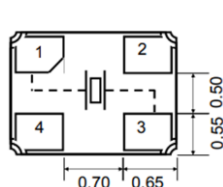
Top View



Side View

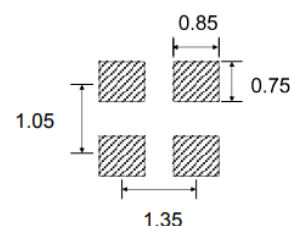


Bottom View



Connection
 #1 In/Out
 #2 Ground
 #3 Out/In
 #4 Ground

Solder Pattern



PART NUMBER GUIDE

Example: TGS CM21 26M0A50-18-50-40-100 TLF

Part Number and Part Code Structure

TGS	CM21	26M0	A	50	-18	-50	-40	-100	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CM21: SMD Crystal, 4 pads, L2.0*W1.6*H0.46mm
- 3) 26M0: Frequency Range 26.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund.
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 100: Equivalent Series Resistance (ESR), 100: 100 ohm Max.
- 10) T: Package in Tape/Reel, 3000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

MAIN FEATURE

- Small SMD Package, Seam Sealed Ceramic-Metal, 4pads
- Low Cost, High precision & High frequency stability

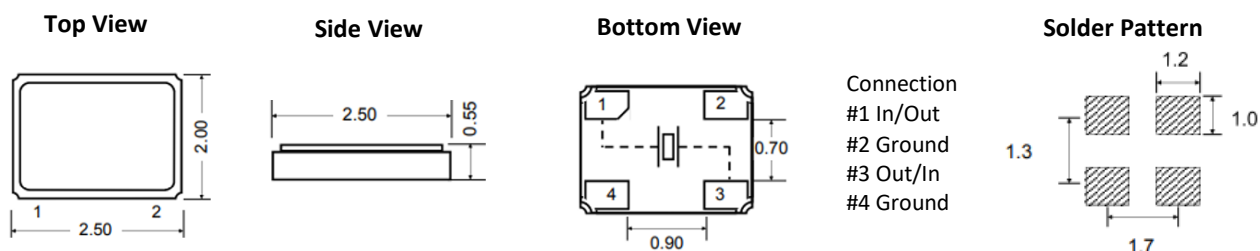
APPLICATION

- TV, STB LCDM and Cable Modem • Health care equipment

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	12.00		66.000	MHz	
Oscillation Mode	AT Fund.				3 rd Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			200	ohm	@12.000 ~ 13.000MHz
			150		@13.001~16.000MHz
			80		@16.001~20.000MHz
			60		@20.001~30.000MHz
			50		@30.001~35.000MHz
			40		@35.001~66.000MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

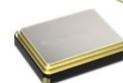
Example: TGS CM22 24M0A50-18-50-40-60 TLF

[Part Number and Part Code Structure](#)

TGS	CM22	24M0	A	50	-18	-50	-40	-60	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CM22: SMD Crystal, 4 pads, L2.5*W2.0*H0.55mm
- 3) 24M0: Frequency Range 24.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. ; 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 60: Equivalent Series Resistance (ESR), 60: 60 ohm Max.
- 10) T: Package in Tape/Reel, 3000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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L3.2*W2.5*H0.70mm



MAIN FEATURE

- Small SMD Package, Seam Sealed Ceramic-Metal, 4pads
- Low Cost, High precision & High frequency stability

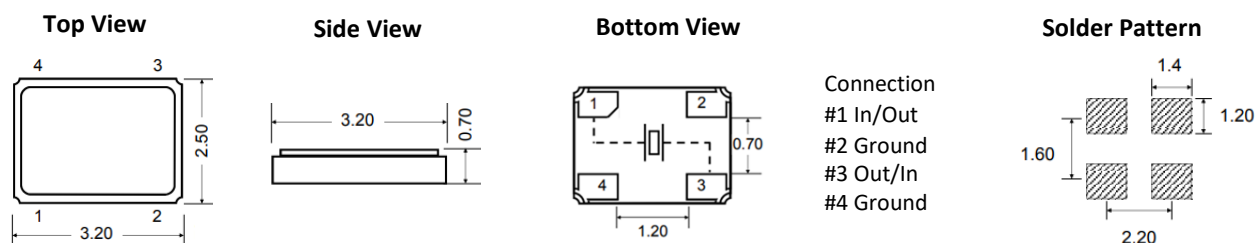
APPLICATION

- TV, STB LCDM and Cable Modem • Health care equipment

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	8.000		125.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			350	ohm	@8.000 ~ 10.000MHz
			100		@10.001~16.000MHz
			80		@16.001~19.000MHz
			60		@19.001~30.000MHz
			40		@30.001~54.000MHz
			100		@54.001~125.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CM32 24M0A50-18-50-40-60 TLF

[Part Number and Part Code Structure](#)

TGS	CM32	24M0	A	50	-18	-50	-40	-60	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CM32: SMD Crystal, 4 pads, L3.2*W2.5*H0.70mm
- 3) 24M0: Frequency Range 24.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 60: Equivalent Series Resistance (ESR), 60: 60 ohm Max.
- 10) T: Package in Tape/Reel, 3000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

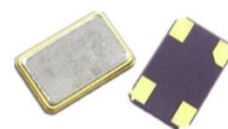
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MAIN FEATURE

- Small SMD Package, Seam Sealed Ceramic-Metal, 4pads
- Low Cost, High precision & High frequency stability

APPLICATION

- TV, STB LCDM and Cable Modem • Health care equipment

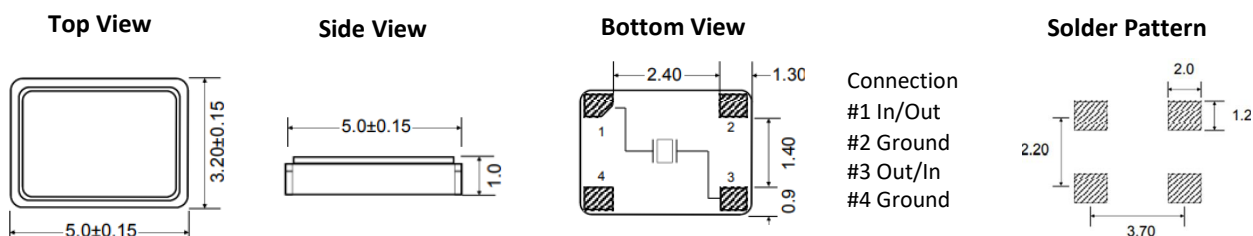


L5.0*W3.2*H1.0mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	8.000		150.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@8.000 ~ 10.000MHz
			100		@10.001~15.000MHz
			50		@15.001~40.000MHz
			40		@40.001~52.000MHz
			100		@40.001~80.000MHz, 3 rd OT
			80		@80.001~150.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CM53 24M0A50-18-50-40-50 TLF

[Part Number and Part Code Structure](#)

TGS	CM53	24M0	A	50	-18	-50	-40	-50	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CM53: SMD Crystal, 4 pads, L5.0*W3.2*H1.0mm
- 3) 24M0: Frequency Range 24.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 50: Equivalent Series Resistance (ESR), 50: 50 ohm Max.
- 10) T: Package in Tape/Reel, 1000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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MAIN FEATURE

- Small SMD Package, Seam Sealed Ceramic-Metal, 2 pads
- Low Cost, High precision & High frequency stability

APPLICATION

- TV, STB LCDM and Cable Modem • Health care equipment

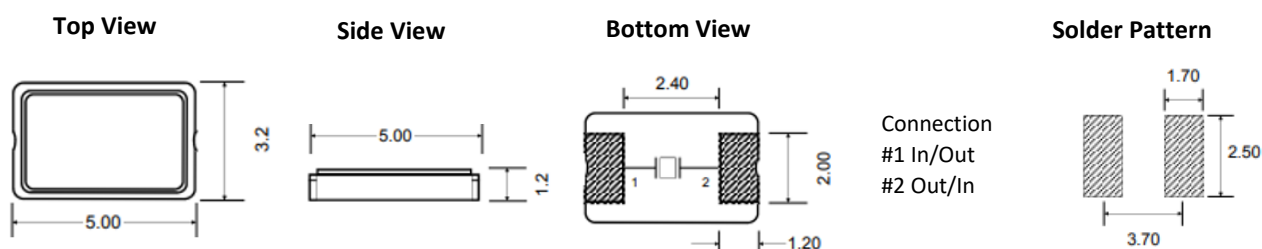


L5.0*W3.2*H1.2mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	8.000		150.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@8.000 ~ 10.000MHz
			100		@10.001~15.000MHz
			50		@15.001~40.000MHz
			40		@40.001~52.000MHz
			100		@40.001~80.000MHz, 3 rd OT
			80		@80.001~150.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CM532 24M0A50-18-50-40-50 TLF

[Part Number and Part Code Structure](#)

TGS	CM532	24M0	A	50	-18	-50	-40	-50	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CM532: SMD Crystal, 2 pads, L5.0*W3.2*H1.2mm
- 3) 24M0: Frequency Range 24.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 50: Equivalent Series Resistance (ESR), 50: 50 ohm Max.
- 10) T: Package in Tape/Reel, 1000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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MAIN FEATURE

- SMD Package, Seam Sealed Ceramic-Metal, 4 pads
- Low Cost, High precision & High frequency stability

APPLICATION

- TV, STB LCDM and Cable Modem • Health care equipment

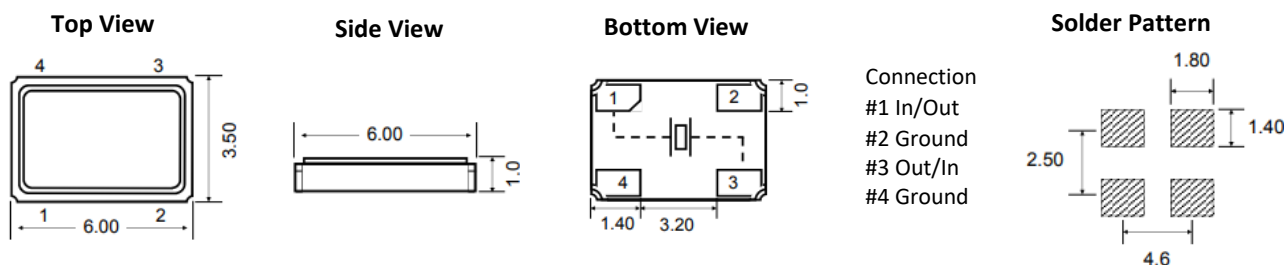


L6.0*W3.5*H1.0mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	7.000		50.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			100	ohm	@7.000 ~ 8.000MHz
			60		@8.001~10.000MHz
			50		@10.001~14.000MHz
			40		@14.001~20.000MHz
			30		@20.001~50.000MHz
			80		@40.001~50.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CM63 24M0A50-18-50-40-30 TLF

[Part Number and Part Code Structure](#)

TGS	CM63	24M0	A	50	-18	-50	-40	-30	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CM63: SMD Crystal, 4 pads, L6.0*W3.5*H1.0mm
- 3) 24M0: Frequency Range 24.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 30: Equivalent Series Resistance (ESR), 30: 30 ohm Max.
- 10) T: Package in Tape/Reel, 1000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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MAIN FEATURE

- SMD Package, Seam Sealed Ceramic-Metal, 2 pads
- Low Cost, High precision & High frequency stability

APPLICATION

- TV, STB LCDM and Cable Modem • Health care equipment

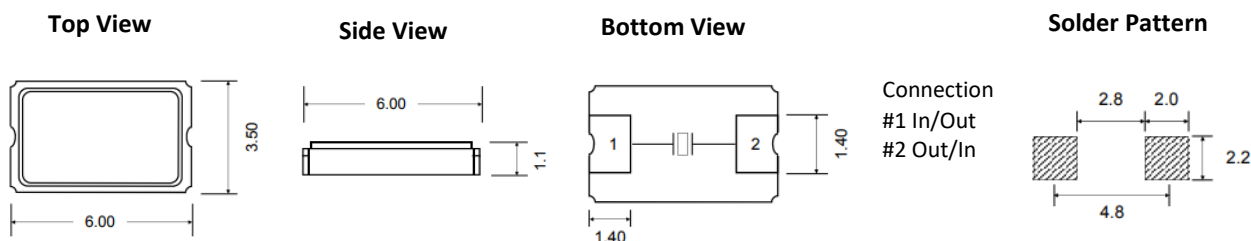


L6.0*W3.5*H1.1mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	7.000		50.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			100	ohm	@7.000 ~ 8.000MHz
			60		@8.001~10.000MHz
			50		@10.001~14.000MHz
			40		@14.001~20.000MHz
			30		@20.001~50.000MHz
			80		@40.001~50.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CM632 24M0A50-18-50-40-30 TLF

[Part Number and Part Code Structure](#)

TGS	CM632	24M0	A	50	-18	-50	-40	-30	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CM632: SMD Crystal, 2 pads, L6.0*W3.5*H1.1mm
- 3) 24M0: Frequency Range 24.000MHz or please specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 30: Equivalent Series Resistance (ESR), 30: 30 ohm Max.
- 10) T: Package in Tape/Reel, 1000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

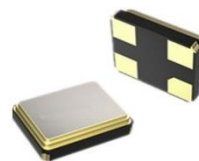
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MAIN FEATURE

- SMD Package, Seam Sealed Ceramic-Metal, 4 pads
- Low Cost, High precision & High frequency stability

APPLICATION

- TV, STB LCDM and Cable Modem • Health care equipment

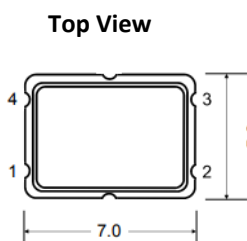


L7.0*W5.0*H1.1mm

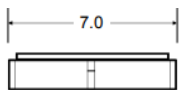
STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	6.000		150.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			100	ohm	@6.000 ~ 8.000MHz
			80		@8.001~12.000MHz
			60		@12.001~16.000MHz
			50		@16.001~20.000MHz
			40		@20.001~40.000MHz
			80		@40.001~150.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

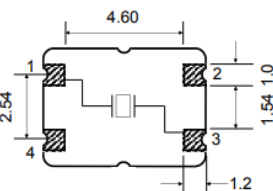
DIMENSION (mm)



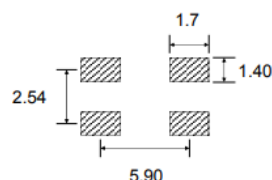
Side View



Bottom View



Solder Pattern



Connection
#1 In/Out
#2 Ground
#3 Out/In
#4 Ground

PART NUMBER GUIDE

Example: TGS CM75 24M0A50-18-50-40-40 TLF

[Part Number and Part Code Structure](#)

TGS	CM75	24M0	A	50	-18	-50	-40	-40	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

1) TGS: Company Code

2) CM75: SMD Crystal, 4 pads, L7.0*W5.0*H1.1mm

3) 24M0: Frequency Range 24.000MHz or specify detail frequency range

4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone

5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value

7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value

9) 40: Equivalent Series Resistance (ESR), 40: 40 ohm Max.

10) T: Package in Tape/Reel, 1000pcs/Reel

11) LF: RoHS Compliant

12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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MAIN FEATURE

- Low cost and short lead time
- Wide Frequency Range

APPLICATION

- PC, TV and all kind of consumer electronics products

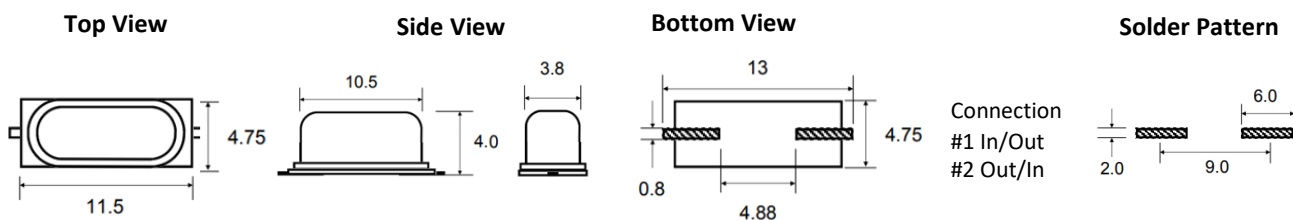


L11.5*W4.75*H4.0mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	3.000		150.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@3.000 ~ 4.000MHz
			120		@4.001 ~ 6.000MHz
			80		@6.001 ~ 10.000MHz
			60		@10.001 ~ 54.000MHz
			80		@30.001 ~ 40.000MHz, 3 rd OT
			70		@40.001 ~ 150.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

DIMENSION (+/-0.2mm)



PART NUMBER GUIDE

Example: TGS CSM2 4M0A50-18-50-40-150 TLF

[Part Number and Part Code Structure](#)

TGS	CSM2	4M0	A	50	-18	-50	-40	-150	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CSM2: SMD Crystal, 2 pads, L11.5*W4.75*H4.0mm
- 3) 4M0: Frequency Range 4.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 150: Equivalent Series Resistance (ESR), 150: 150 ohm Max.
- 10) T: Package in Tape/Reel, 1000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

MAIN FEATURE

- Low cost and short lead time
- Wide Frequency Range

APPLICATION

- PC, TV and all kind of consumer electronics products



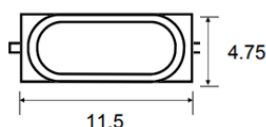
L11.5*W4.75*H2.5mm

STANDARD SPECIFICATION

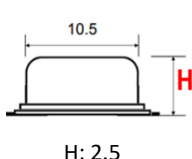
Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	3.000		150.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@3.000 ~ 4.000MHz
			120		@4.001 ~ 6.000MHz
			80		@6.001 ~ 10.000MHz
			60		@10.001 ~ 54.000MHz
			80		@30.001 ~ 40.000MHz, 3 rd OT
			70		@40.001 ~ 150.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

DIMENSION (+/-0.2mm)

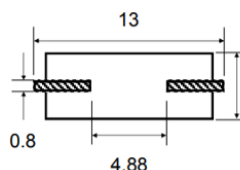
Top View



Side View

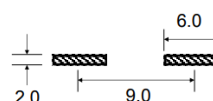


Bottom View



Solder Pattern

Connection
#1 In/Out
#2 Out/In



PART NUMBER GUIDE

Example: TGS CSSM2 4M0A50-18-50-40-150 TLF

[Part Number and Part Code Structure](#)

TGS	CSSM2	4M0	A	50	-18	-50	-40	-150	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

1) TGS: Company Code

2) CSSM2: SMD Crystal, 2 pads, L11.5*W4.75*H2.5mm

3) 4M0: Frequency Range 4.000MHz or specify detail frequency range

4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone

5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value

7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value

9) 150: Equivalent Series Resistance (ESR), 150: 150 ohm Max.

10) T: Package in Tape/Reel, 1000pcs/Reel

11) LF: RoHS Compliant

12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

MAIN FEATURE

- Low Cost and short lead time
- Wide Frequency Range

APPLICATION

- PC, TV and all kind of consumer electronics products

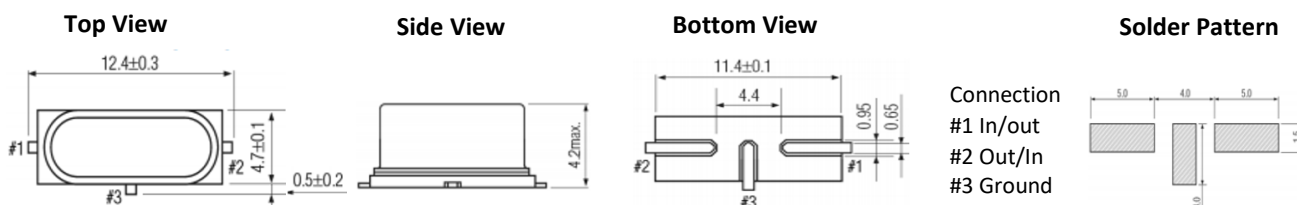


L12.4*W4.7*H4.2mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	3.000		150.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@3.000 ~ 4.000MHz
			120		@4.001 ~ 6.000MHz
			80		@6.001 ~ 10.000MHz
			60		@10.001 ~ 54.000MHz
			80		@30.001 ~ 40.000MHz, 3 rd OT
			70		@40.001 ~ 150.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CSM3 4M0A50-18-50-40-150 TLF

[Part Number and Part Code Structure](#)

TGS	CSM3	4M0	A	50	-18	-50	-40	-150	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CSM3: SMD Crystal, 3 pads, L12.4*W4.7*H4.2mm
- 3) 4M0: Frequency Range 4.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 150: Equivalent Series Resistance (ESR), 150: 150 ohm Max.
- 10) T: Package in Tape/Reel, 1000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

MAIN FEATURE

- Low Cost and short lead time
- Wide Frequency Range

APPLICATION

- PC, TV and all kind of consumer electronics products

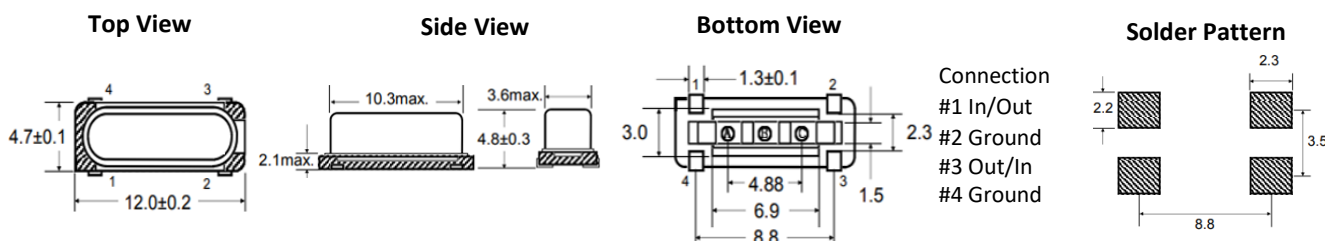


L12.0*W4.7*H4.8mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	3.500		100.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@3.000 ~ 4.000MHz
			120		@4.001 ~ 6.000MHz
			80		@6.001 ~ 10.000MHz
			60		@10.001 ~ 54.000MHz
			80		@30.001 ~ 40.000MHz, 3 rd OT
			70		@40.001 ~ 100.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CSM4 4M0A50-18-50-40-150 TLF

[Part Number and Part Code Structure](#)

TGS	CSM4	4M0	A	50	-18	-50	-40	-150	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CSM4: SMD Crystal, 4 pads, L12.0*W4.7*H4.8mm
- 3) 4M0: Frequency Range 4.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 150: Equivalent Series Resistance (ESR), 150: 150 ohm Max.
- 10) T: Package in Tape/Reel, 1000pcs/Reel
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A



L12.5*W4.6*H3.7mm



MAIN FEATURE

- Low Cost and short lead time
- Wide Frequency Range

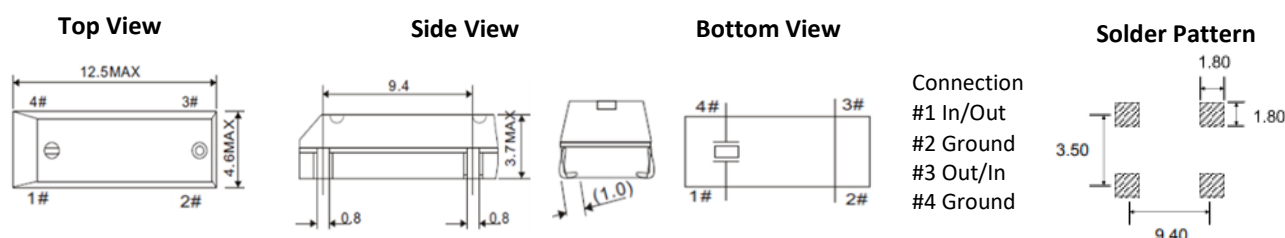
APPLICATION

- PC, TV and all kind of consumer electronics products

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	3.570		70.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@3.5700 ~ 5.000MHz
			120		@5.001 ~ 10.000MHz
			80		@6.001 ~ 16.000MHz
			40		@16.001 ~ 36.00MHz
			100		@30.001 ~ 36.00MHz, 3 rd OT
			80		@40.001 ~ 70.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±5		ppm	@25 °C

DIMENSION (mm)



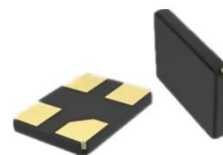
PART NUMBER GUIDE

Example: TGS CCME 4M0A50-18-50-40-150 TLH

[Part Number and Part Code Structure](#)

TGS	CCME	4M0	A	50	-18	-50	-40	-150	T	LH	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CCME: SMD Crystal, 4 pads, L12.5*W4.6*H3.7mm
- 3) 4M0: Frequency Range 4.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 150: Equivalent Series Resistance (ESR), 150: 150 ohm Max.
- 10) T: Package in Tape/Reel, 1000pcs/Reel
- 11) LH: RoHS/RoHS II Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A



L2.5*W2.0*H0.75mm



MAIN FEATURE

- High reliable • Low Cost and short lead time • 4 Pads

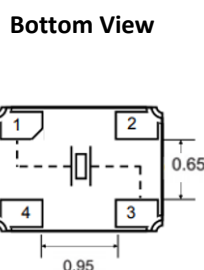
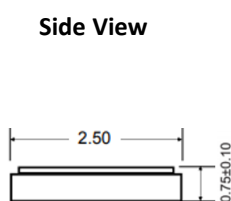
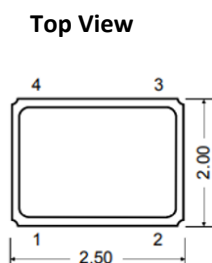
APPLICATION

- NB, DSC, USB and portable consumer electronics products

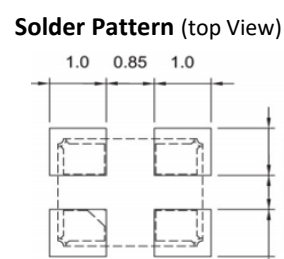
STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	12.0		64.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			200	ohm	@12.000 ~ 13.00MHz
			150		@13.001 ~ 15.00MHz
			120		@15.001 ~ 17.00MHz
			100		@17.001 ~ 20.00MHz
			80		@20.001 ~ 27.00MHz
			60		@27.001 ~ 64.00MHz
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (mm)



Connection
#1 In/Out
#2 Ground
#3 Out/In
#4 Ground



PART NUMBER GUIDE

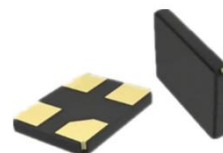
Example: TGS CMG22 16M0A50-18-50-40-120 TLH

Part Number and Part Code Structure

TGS	CMG22	16M0	A	50	-18	-50	-40	-120	T	LH	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CMG22: SMD Crystal Glass seal, 4 pads, L2.5*W2.0*H0.75mm
- 3) 16M0: Frequency Range 16.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 120: Equivalent Series Resistance (ESR), 120: 120 ohm Max.
- 10) T: Package in Tape/Reel, 1000pcs/Reel
- 11) LH: RoHS/RoHS II Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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L3.2*W2.5*H0.80mm

MAIN FEATURE

- High reliable • Low Cost and short lead time • 4 Pads

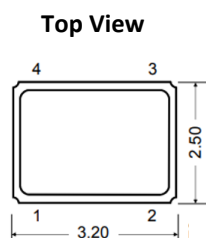
APPLICATION

- PC, TV, Hard Disk, Consumer electronics products and more

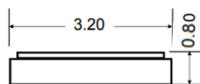
STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	10.0		54.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@10.000 ~ 12.00MHz
			120		@12.001 ~ 15.00MHz
			100		@15.001 ~ 16.000MHz
			80		@16.001 ~ 20.00MHz
			70		@20.001 ~ 27.00MHz
			60		@27.001 ~ 54.00MHz
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±3		ppm	@25 °C

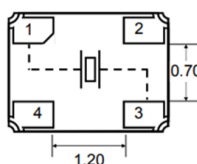
DIMENSION (mm)



Side View



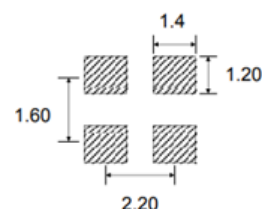
Bottom View



Connection

- #1 In/Out
- #2 Ground
- #3 Out/In
- #4 Ground

Solder Pattern



PART NUMBER GUIDE Example: TGS CMG32 16M0A50-18-50-40-100 TLH

Part Number and Part Code Structure

TGS	CMG32	16M0	A	50	-18	-50	-40	-100	T	LH	XX
1	2	3	4	5	6	7	8	9	10	11	12

1) TGS: Company Code

2) CMG32: SMD Crystal Glass seal, 4 pads, L3.2*W2.5*H0.80mm

3) 16M0: Frequency Range 16.000MHz or specify detail frequency range

4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone

5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value

7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value

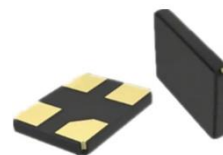
9) 100: Equivalent Series Resistance (ESR), 100: 100 ohm Max.

10) T: Package in Tape/Reel, 1000pcs/Reel

11) LH: RoHS/RoHS II Compliant

12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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L5.0*W3.2*H1.4mm



MAIN FEATURE

- High reliable • Low Cost and short lead time • 4 Pads

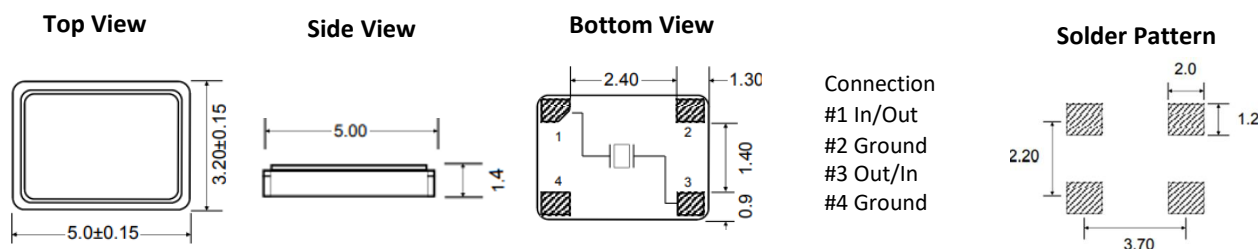
APPLICATION

- PC, TV, Hard Disk, Consumer electronics products and more

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	8.0		80.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			80	ohm	@8.000 ~ 12.00MHz
			70		@12.001 ~ 20.00MHz
			60		@20.001 ~ 40.00MHz
			50		@40.001 ~ 50.00MHz
			120		@40.000 ~ 60.00MHz, 3 rd OT
			100		@60.001 ~ 80.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CMG53 16M0A50-18-50-40-70 TLH

Part Number and Part Code Structure

TGS	CMG53	16M0	A	50	-18	-50	-40	-70	T	LH	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CMG53: SMD Crystal Glass seal, 4 pads, L5.0*W3.2*H1.40mm
- 3) 16M0: Frequency Range 16.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 70: Equivalent Series Resistance (ESR), 70: 70 ohm Max.
- 10) T: Package in Tape/Reel, 1000pcs/Reel
- 11) LH: RoHS/RoHS II Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

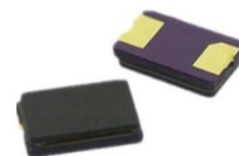
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MAIN FEATURE

- High reliable • Low Cost and short lead time • 2 Pads

APPLICATION

- PC, PDA, USB, DSC, Consumer electronics products and more

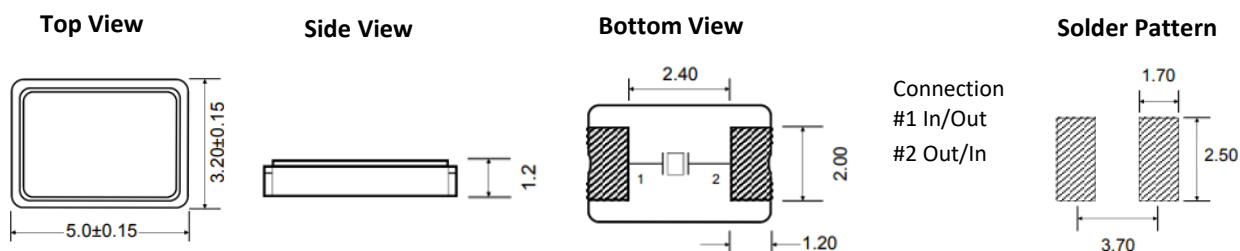


L5.0*W3.2*H1.2mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	8.0		80.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			80	ohm	@8.000 ~ 12.00MHz
			70		@12.001 ~ 20.00MHz
			60		@20.001 ~ 40.00MHz
			50		@40.001 ~ 50.00MHz
			120		@40.000 ~ 60.00MHz, 3 rd OT
			100		@60.001 ~ 80.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CMG532 16M0A50-18-50-40-70 TLH

[Part Number and Part Code Structure](#)

TGS	CMG532	16M0	A	50	-18	-50	-40	-70	T	LH	XX
1	2	3	4	5	6	7	8	9	10	11	12

1) TGS: Company Code

2) CMG532: SMD Crystal Glass seal, 2 pads, L5.0*W3.2*H1.2mm

3) 16M0: Frequency Range 16.000MHz or specify detail frequency range

4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone

5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value

7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value

9) 70: Equivalent Series Resistance (ESR), 70: 70 ohm Max.

10) T: Package in Tape/Reel, 1000pcs/Reel

11) LH: RoHS/RoHS II Compliant

12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

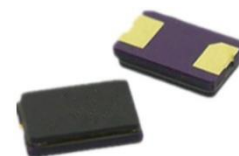
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MAIN FEATURE

- High reliable • Low Cost and short lead time • 2 Pads

APPLICATION

- PC, PDA, USB, DSC, Consumer electronics products and more



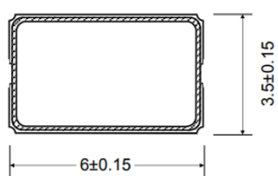
L6.0*W3.5*H1.5mm

STANDARD SPECIFICATION

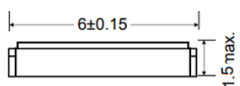
Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	8.0		80.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			80	ohm	@8.000 ~ 12.00MHz
			70		@12.001 ~ 20.00MHz
			60		@20.001 ~ 40.00MHz
			50		@40.001 ~ 50.00MHz
			120		@40.000 ~ 60.00MHz, 3 rd OT
			100		@60.001 ~ 80.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (mm)

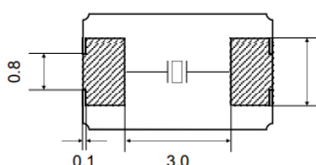
Top View



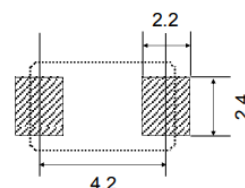
Side View



Bottom View



Solder Pattern



Connection
#1 In/Out
#2 Out/In

PART NUMBER GUIDE

Example: TGS CMG632 16M0A50-18-50-40-70 TLH

Part Number and Part Code Structure

TGS	CMG632	16M0	A	50	-18	-50	-40	-70	T	LH	XX
1	2	3	4	5	6	7	8	9	10	11	12

1) TGS: Company Code

2) CMG632: SMD Crystal Glass seal, 2 pads, L6.0*W3.5*H1.5mm

3) 16M0: Frequency Range 16.000MHz or specify detail frequency range

4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone

5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value

7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value

9) 70: Equivalent Series Resistance (ESR), 70: 70 ohm Max.

10) T: Package in Tape/Reel, 1000pcs/Reel

11) LH: RoHS/RoHS II Compliant

12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

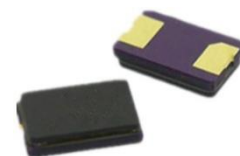
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MAIN FEATURE

- High reliable • Low Cost and short lead time • 2 Pads

APPLICATION

- TPMS, ECM, ABS and Sensor modules

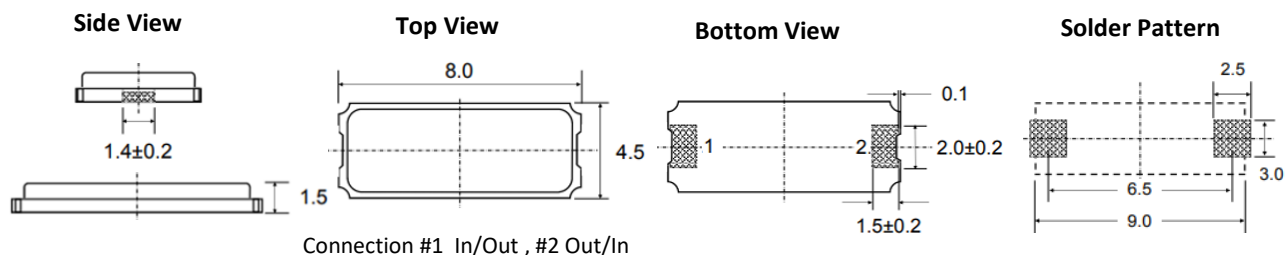


L8.0*W4.5*H1.5mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	8.0		80.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			80	ohm	@8.000 ~ 12.00MHz
			70		@12.001 ~ 20.00MHz
			60		@20.001 ~ 40.00MHz
			50		@40.001 ~ 50.00MHz
			120		@40.000 ~ 60.00MHz, 3 rd OT
			100		@60.001 ~ 80.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CMG842 16M0A50-18-50-40-70 TLH

[Part Number and Part Code Structure](#)

TGS	CMG842	16M0	A	50	-18	-50	-40	-70	T	LH	XX
1	2	3	4	5	6	7	8	9	10	11	12

1) TGS: Company Code

2) CMG842: SMD Crystal Glass seal, 2 pads, L8.0*W4.5*H1.5mm

3) 16M0: Frequency Range 16.000MHz or specify detail frequency range

4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone

5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value

7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value

8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value

9) 70: Equivalent Series Resistance (ESR), 70: 70 ohm Max.

10) T: Package in Tape/Reel, 1000pcs/Reel

11) LH: RoHS/RoHS II Compliant

12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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MAIN FEATURE

- High reliable • Low Cost and short lead time • 2 Pins

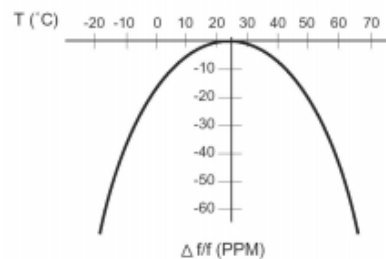
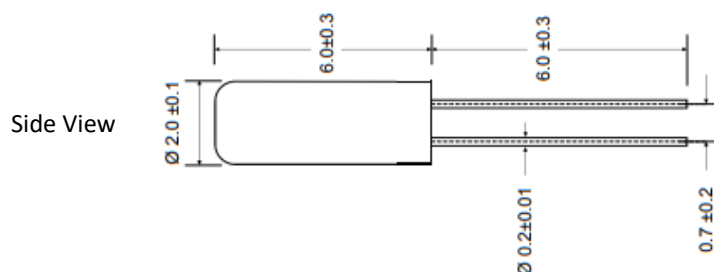
APPLICATION

- IoT, IT and consumer electronics and more

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	4.0		60.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@4.000 ~ 5.00MHz
			120		@5.001 ~ 7.00MHz
			80		@7.001 ~ 10.00MHz
			60		@10.001 ~ 12.00MHz
			40		@12.001 ~ 30.00MHz
			80		@30.000 ~ 60.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (mm)



Temperature Coefficient

PART NUMBER GUIDE

Example: TGS CCC 8M0A50-18-50-40-80 BLF

[Part Number and Part Code Structure](#)

TGS	CCC	8M0	A	50	-18	-50	-40	-80	B	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CCC: MHz Thru Hole Crystal, 2 pins, Ø2.0*L6.0mm
- 3) 8M0: Frequency Range 8.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~ +85°C; 10: -10°C ~ +60°C; 20: -20°C ~ +70°C; or Specify detail value
- 9) 80: Equivalent Series Resistance (ESR), 80: 80 ohm Max.
- 10) B: Package in Bulk.
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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MAIN FEATURE

- High reliable • Low Cost and short lead time • 2 Pins

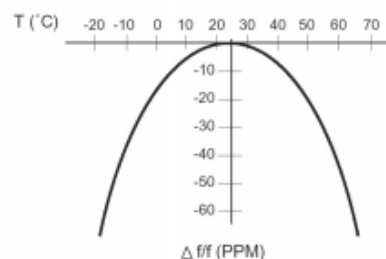
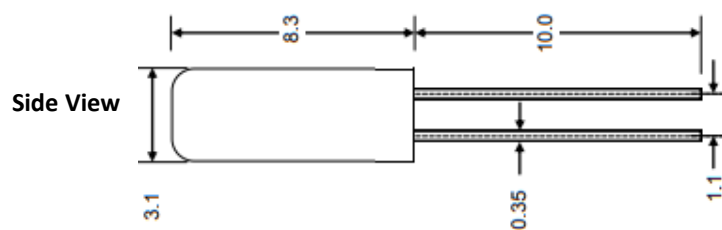
APPLICATION

- IoT, IT and consumer electronics and more

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	4.0		60.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			150	ohm	@4.000 ~ 5.00MHz
			120		@5.001 ~ 7.00MHz
			80		@7.001 ~ 10.00MHz
			60		@10.001 ~ 12.00MHz
			40		@12.001 ~ 30.00MHz
			80		@30.00 ~ 60.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (mm)



Temperature Coefficient

PART NUMBER GUIDE

Example: TGS CCD 8M0A50-18-50-40-80 BLF

[Part Number and Part Code Structure](#)

TGS	CCD	8M0	A	50	-18	-50	-40	-80	B	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CCD: MHz Thru Hole Crystal, 2 pins, Ø3.1*H8.3mm
- 3) 8M0: Frequency Range 8.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 80: Equivalent Series Resistance (ESR), 80: 80 ohm Max.
- 10) B: Package in Bulk.
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

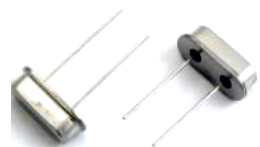
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MAIN FEATURE

- Wide Frequency Range • Low Cost and short lead time • 2 Pins

APPLICATION

- IoT, HDTV, IT and consumer electronics and more

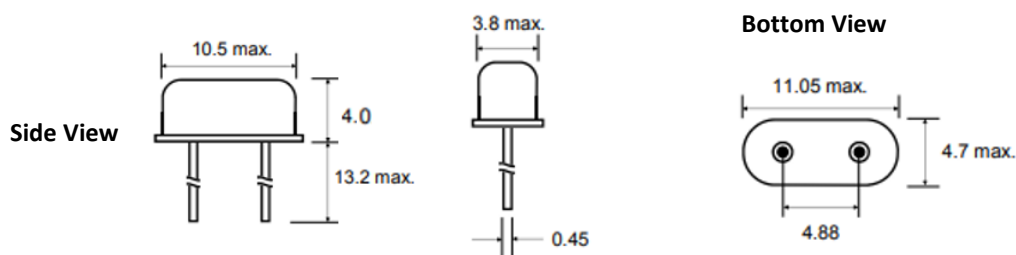


L11.05*W4.7*4.0mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	3.0		100.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			200	ohm	@3.000 ~ 5.0000MHz
			80		@5.001 ~ 10.000MHz
			60		@10.001 ~ 20.000MHz
			40		@20.001 ~ 36.00MHz
			100		@27.001 ~ 50.00MHz, 3 rd OT
			80		@50.01 ~ 100.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (+/-0.2 mm)



PART NUMBER GUIDE

Example: TGS CS 8M0A50-18-50-40-80 BLF

[Part Number and Part Code Structure](#)

TGS	CS	8M0	A	50	-18	-50	-40	-80	B	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CS: MHz Thru Hole Crystal, 2 pins, L11.05*W4.7*4.0mm
- 3) 8M0: Frequency Range 8.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 80: Equivalent Series Resistance (ESR), 80: 80 ohm Max.
- 10) B: Package Code, B: in Bulk T: in Tape and Box.
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

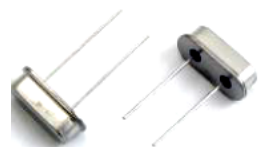
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MAIN FEATURE

- Wide Frequency Range • Low Cost and short lead time • 2 Pins

APPLICATION

- IoT, HDTV, IT and consumer electronics and more

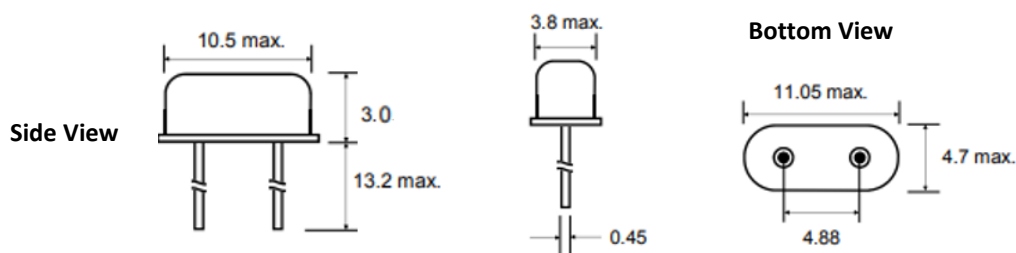


L11.05*W4.7*3.0mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	3.0		100.00	MHz	
Oscillation Mode	AT Fund.				3 RD Overtone Option
Frequency Tolerance	-	±50		ppm@25 °C	see p/n guide for more option
Operating Temp. Range	-40	-	+85	°C	see p/n guide for more option
Storage Temp. Range	-55	-	+125	°C	
Load Capacitance (CL)	-	18	-	pF	see p/n guide for more option
Frequency Stability	-	±50	-	ppm	see p/n guide for more option
Equivalent Series Resistance (ESR)			200	ohm	@3.000 ~ 5.0000MHz
			80		@5.001 ~ 10.000MHz
			60		@10.001 ~ 20.000MHz
			40		@20.001 ~ 36.00MHz
			100		@27.001 ~ 50.00MHz, 3 rd OT
			80		@50.01 ~ 100.00MHz, 3 rd OT
Drive Level	-	-	100	μW	
Shunt Capacitance	-	-	7.0	pF	
Insulation Resistance	500	-		mW	DC/100V +-10%
Aging per year	-	±3		ppm	@25 °C

DIMENSION (+/-0.2 mm)



PART NUMBER GUIDE

Example: TGS CSS 8M0A50-18-50-40-80 BLF

[Part Number and Part Code Structure](#)

TGS	CSS	8M0	A	50	-18	-50	-40	-80	B	LF	XX
1	2	3	4	5	6	7	8	9	10	11	12

- 1) TGS: Company Code
- 2) CSS: MHz Thru Hole Crystal, 2 pins, L11.05*W4.7*3.0mm
- 3) 8M0: Frequency Range 8.000MHz or specify detail frequency range
- 4) A: Oscillation Mode, A: AT Fund. 3: 3rd Overtone
- 5) 50: Freq. tolerance, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 6) 18: Load Capacitance(CL), 15: 15pF; 18: 18pF; 20: 20pF; 30: 30pF or Specify detail CL value
- 7) 50: Frequency Stability, 50: +/-50ppm; 10: +/-10ppm; 20: +/-20ppm; 30: +/-30ppm or Specify detail value
- 8) 40: Operating Temp. Range, 40: -40°C ~+85°C; 10: -10°C ~+60°C; 20: -20°C ~+70°C; or Specify detail value
- 9) 80: Equivalent Series Resistance (ESR), 80: 80 ohm Max.
- 10) B: Package Code, B: in Bulk T: in Tape and Box.
- 11) LF: RoHS Compliant
- 12) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

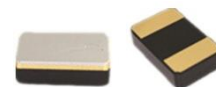
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MAIN FEATURE

- 32.768KHz • Ultra-Small Package • 2 Pads

APPLICATION

- Smart phone and mobile communication and more

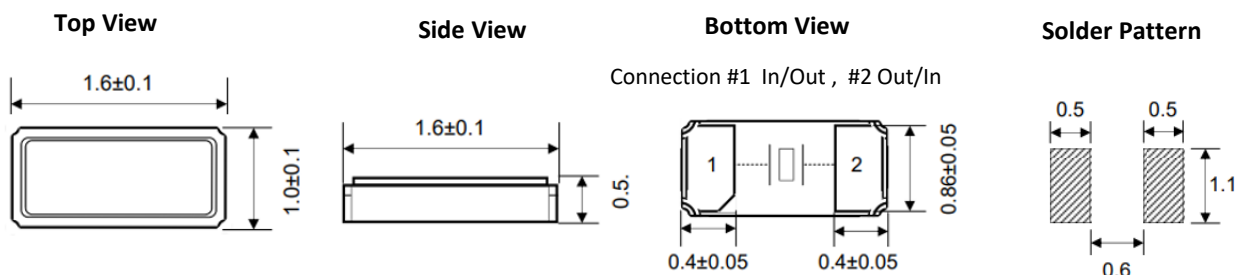


L1.6*W1.0*H0.5mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	-	32.768	-	KHz	
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±20		ppm	@25 °C or Specify
Operating Temperture Range	-40	-	+85	°C	CL: 9.0pF or Specify
Storage Temperature Range	-55	-	+125	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.028	0.034	0.04	ppm/C ²	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	90	Kohm	
Drive Level	-	-	0.5	μW	
Shunt Capacitance	0.9	1.5	2.0	pF	
Dynamic Capacitance	-	2.3	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±3		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (mm)



PART NUMBER GUIDE

Example: TGS CCMV 32K768A20-12.5-40-90 TLF

[Part Number and Part Code Structure](#)

TGS	CCMV	32K768	A	20	-12.5	-40	-90	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11

1) TGS: Company Code

2) CCMV: KHz SMD Crystals, L1.6*W1.0*H0.5mm

3) 32K768: Frequency Range 32.768000KHz

4) A: Oscillation Mode, AT Fund.

5) 20: Frequency tolerance: +/-20ppm or specify

6) 12.5: Load Capacitance, 12.5pF; 9: 9.0pF or Specify

7) 40: Operating Temp. Range -40°C ~+85°C,

8) 90: Equivalent Series Resistance, 90 Kohm Max.

9) T: Package in Tape/Reel, 3000pcs/Reel

10) LF: RoHS compliant

11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

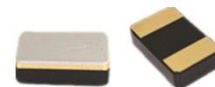
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MAIN FEATURE

- 32.768KHz • Ultra-Small Package • 2 Pads

APPLICATION

- Smart phone and mobile communication and more



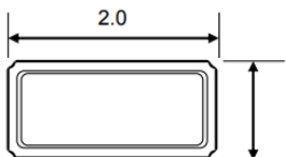
L2.0*W1.2*H0.6mm

STANDARD SPECIFICATION

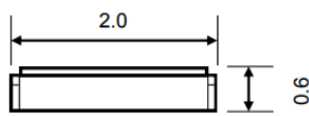
Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	-	32.768	-	KHz	
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±20		ppm	@25 °C or Specify
Operating Temperture Range	-40	-	+85	°C	CL: 7.0pF, 9.0pF or Specify
Storage Temperature Range	-55	-	+125	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.028	0.034	0.04	ppm/C ²	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	90	Kohm	
Drive Level	-	-	0.5	μW	
Shunt Capacitance	0.9	1.3	2.0	pF	
Dynamic Capacitance	-	5.0	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±3		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (+/-0.1mm)

Top View

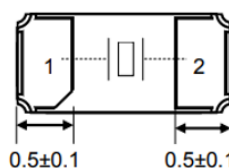


Side View

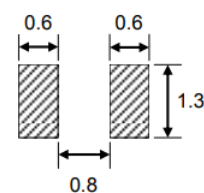


Bottom View

Connection #1 In/Out , #2 Out/In



Solder Pattern



PART NUMBER GUIDE

Example: TGS CCMS 32K768A20-12.5-40-90 TLF

[Part Number and Part Code Structure](#)

TGS	CCMS	32K768	A	20	-12.5	-40	-90	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11

1) TGS: Company Code

2) CCMS: KHz SMD Crystals, 2 pads, L2.0*W1.2*H0.6mm

3) 32K768: Frequency Range 32.768000KHz

4) A: Oscillation Mode, AT Fund.

5) 20: Frequency tolerance: +/-20ppm or specify

6) 12.5: Load Capacitance, 12.5pF; 9: 9.0pF or Specify

7) 40: Operating Temp. Range -40°C ~+85°C,

8) 90: Equivalent Series Resistance, 90 Kohm Max.

9) T: Package in Tape/Reel, 3000pcs/Reel

10) LF: RoHS compliant

11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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MAIN FEATURE

- 32.768KHz • SMD Package 2 Pads with Metal Lid

APPLICATION

- Mobile Communications, Consumer Devices and more

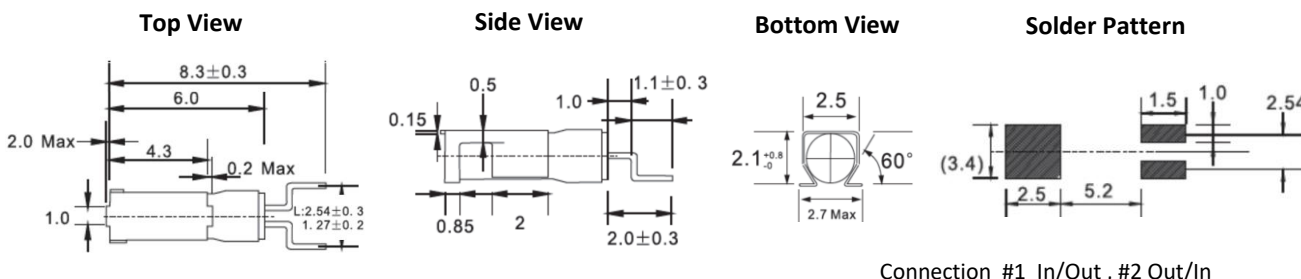


Ø2.0*L6.0mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	30.00	32.768	200.00	KHz	@25 °C or Specify CL: 7.0pF, 9.0pF or Specify
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±20		ppm	
Operating Temperture Range	-40	-	+85	°C	
Storage Temperature Range	-55	-	+125	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.028	0.034	0.04	ppm/C ²	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	50	Kohm	
Drive Level	-	-	1.0	μW	
Shunt Capacitance	0.9	1.1	2.0	pF	
Dynamic Capacitance	-	5.0	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±3		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (mm)



Connection #1 In/Out , #2 Out/In

PART NUMBER GUIDE

Example: TGS CCMA 32K768A20-12.5-40-50 TLF

[Part Number and Part Code Structure](#)

TGS	CCMA	32K768	A	20	-12.5	-40	-50	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11

1) TGS: Company Code

2) CCMA: KHz SMD Crystals, Ø2.0*L6.0mm with Metal Lid

3) 32K768: Frequency Range 32.7680KHz or Specify

4) A: Oscillation Mode, AT Fund.

5) 20: Frequency tolerance: +/-20ppm or specify

6) 12.5: Load Capacitance, 12.5pF; 9: 9.0pF or Specify

7) 40: Operating Temp. Range -40°C ~+85°C,

8) 50: Equivalent Series Resistance, 50 Kohm Max.

9) T: Package in Tape/Reel, 3000pcs/Reel

10) LF: RoHS compliant

11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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MAIN FEATURE

- 32.768KHz • SMD Package 2 Pads with Lead Formed

APPLICATION

- Mobile Communications, Consumer Devices and more



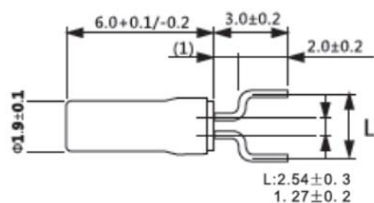
Ø2.0*L6.0mm

STANDARD SPECIFICATION

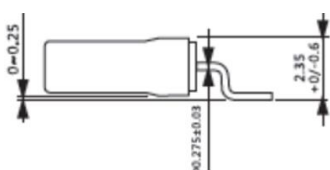
Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	30.00	32.768	200.00	KHz	CL: 7.0pF, 9.0pF or Specify
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±20		ppm	
Operating Temperture Range	-40	-	+85	°C	
Storage Temperature Range	-55	-	+125	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.028	0.034	0.04	ppm/C ²	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	50	Kohm	
Drive Level	-	-	1.0	μW	
Shunt Capacitance	0.9	1.1	2.0	pF	
Dynamic Capacitance	-	5.0	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±3		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (mm)

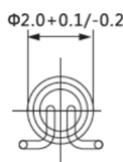
Top View



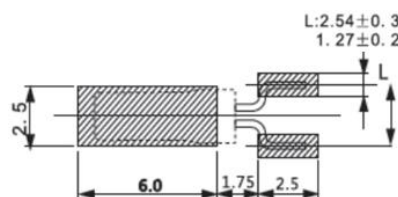
Side View



Bottom View



Solder Pattern(Top View)



Connection #1 In/Out , #2 Out/In

PART NUMBER GUIDE

Example: TGS CCMB 32K768A20-12.5-40-50 TLF

[Part Number and Part Code Structure](#)

TGS	CCMB	32K768	A	20	-12.5	-40	-50	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11

1) TGS: Company Code

2) CCMB: KHz SMD Crystals, Ø2.0*L6.0mm with Lead Formed

3) 32K768: Frequency Range 32.7680KHz or Specify

4) A: Oscillation Mode, AT Fund.

5) 20: Frequency tolerance: +/-20ppm or specify

6) 12.5: Load Capacitance, 12.5pF; 9: 9.0pF or Specify

7) 40: Operating Temp. Range -40°C ~+85°C,

8) 50: Equivalent Series Resistance, 50 Kohm Max.

9) T: Package in Tape/Reel, 3000pcs/Reel

10) LF: RoHS compliant

11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

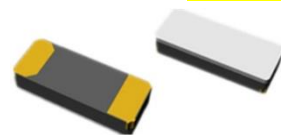
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MAIN FEATURE

- 32.768KHz • Ultra-Small Package, 2 Pads • High Precision & Reliability

APPLICATION

- Smart Meter, PDA, Wave Clock
- Mobile Communication Devices and more



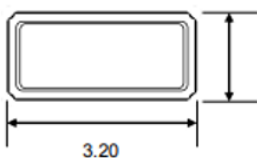
L3.2*W1.5*H0.80mm

STANDARD SPECIFICATION

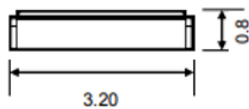
Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	-	32.768	-	KHz	@25 °C or Specify CL: 7.0pF, 9.0pF or Specify ESR: 50 Kohm Max. available
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±20		ppm	
Operating Temperature Range	-40	-	+85	°C	
Storage Temperature Range	-55	-	+125	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.028	0.034	0.04	ppm/°C²	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	70	Kohm	
Drive Level	-	-	0.5	μW	
Shunt Capacitance	0.9	0.95	2.0	pF	
Dynamic Capacitance	-	3.4	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±3		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (+/-0.1mm)

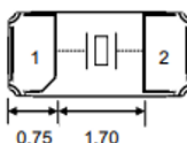
Top View



Side View

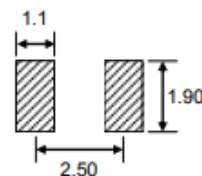


Bottom View



Connection
#1 In/Out
#2 Out/In

Solder Pattern



PART NUMBER GUIDE

Example: TGS CCMM 32K768A20-12.5-40-70 TLF

[Part Number and Part Code Structure](#)

TGS	CCMM	32K768	A	20	-12.5	-40	-70	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11

1) TGS: Company Code

2) CCMM: KHz SMD Crystals, 2 pads L3.2*W1.5*H0.80mm

3) 32K768: Frequency Range 32.768000KHz

4) A: Oscillation Mode, AT Fund.

5) 20: Frequency tolerance: +/-20ppm or specify

6) 12.5: Load Capacitance, 12.5pF; 9: 9.0pF or Specify

7) 40: Operating Temp. Range -40°C ~ +85°C,

8) 70: Equivalent Series Resistance, 70 Kohm Max.; 50 Kohm Max. available

9) T: Package in Tape/Reel, 3000pcs/Reel

10) LF: RoHS compliant

11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

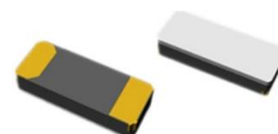
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MAIN FEATURE

- 32.768KHz • Ultra-Small Package, 2 Pads • High Precision & Reliability

APPLICATION

- Smart Meter, PDA, Wave Clock
- Mobile Communication Devices and more

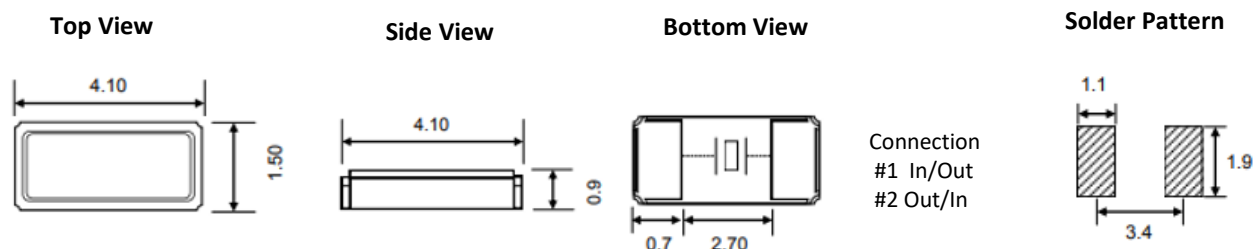


L4.1*W1.5*H0.90mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	-	32.768	-	KHz	
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±20		ppm	@25 °C or Specify
Operating Temperature Range	-40	-	+85	°C	CL: 7.0pF, 9.0pF or Specify
Storage Temperature Range	-55	-	+125	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.028	0.034	0.04	ppm/°C	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	80	Kohm	
Drive Level	-	-	0.5	µW	
Shunt Capacitance	0.9	1.3	2.0	pF	
Dynamic Capacitance	-	2.1	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±3		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (+/-0.1mm)



PART NUMBER GUIDE

Example: TGS CCMJ 32K768A20-12.5-40-80 TLF

[Part Number and Part Code Structure](#)

TGS	CCMJ	32K768	A	20	-12.5	-40	-80	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11

1) TGS: Company Code

2) CCMJ: KHz SMD Crystals, 2 pads L4.1*W1.5*H0.90mm

3) 32K768: Frequency Range 32.768000KHz

4) A: Oscillation Mode, AT Fund.

5) 20: Frequency tolerance: +/-20ppm or specify

6) 12.5: Load Capacitance, 12.5pF; 9: 9.0pF or Specify

7) 40: Operating Temp. Range -40°C ~+85°C,

8) 80: Equivalent Series Resistance, 80 Kohm Max.

9) T: Package in Tape/Reel, 3000pcs/Reel

10) LF: RoHS compliant

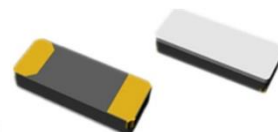
11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

MAIN FEATURE

- 32.768KHz • Ultra-Small Package, 2 Pads • High Precision & Reliability

APPLICATION

- Smart Meter, PDA, Wave Clock
- Mobile Communication Devices and more

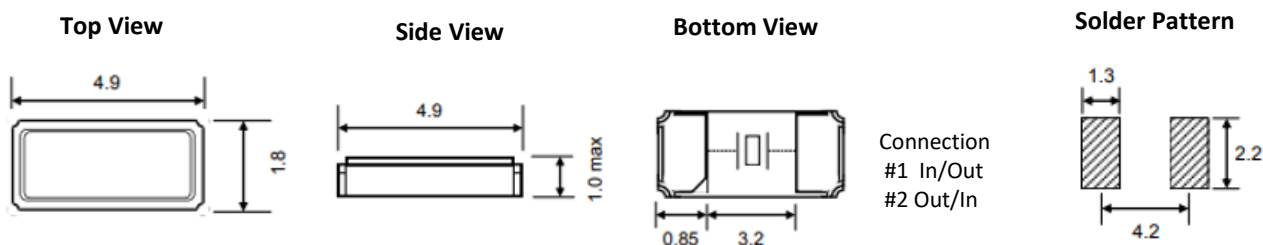


L4.9*W1.8*H1.0mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	-	32.768	-	KHz	
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±20		ppm	@25 °C or Specify
Operating Temperature Range	-40	-	+85	°C	CL: 7.0pF, 9.0pF or Specify
Storage Temperature Range	-55	-	+125	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.028	0.034	0.04	ppm/°C²	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	70	Kohm	
Drive Level	-	-	0.5	µW	
Shunt Capacitance	0.9	1.15	2.0	pF	
Dynamic Capacitance	-	2.1	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±3		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (+/-0.1mm)



PART NUMBER GUIDE

Example: TGS CCMX 32K768A20-12.5-40-70 TLF

[Part Number and Part Code Structure](#)

TGS	CCMX	32K768	A	20	-12.5	-40	-70	T	LF	XX
1	2	3	4	5	6	7	8	9	10	11

1) TGS: Company Code

2) CCMX: KHz SMD Crystals, 2 pads L4.9*W1.8*H1.0mm

3) 32K768: Frequency Range 32.768000KHz

4) A: Oscillation Mode, AT Fund.

5) 20: Frequency tolerance: +/-20ppm or specify

6) 12.5: Load Capacitance, 12.5pF; 9: 9.0pF or Specify

7) 40: Operating Temp. Range -40°C ~+85°C,

8) 70: Equivalent Series Resistance, 70 Kohm Max.

9) T: Package in Tape/Reel, 3000pcs/Reel

10) LF: RoHS compliant

11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A



L7.0*W1.5*H1.4mm



MAIN FEATURE

- 32.768KHz • Plastic Package • High Precision & Reliability

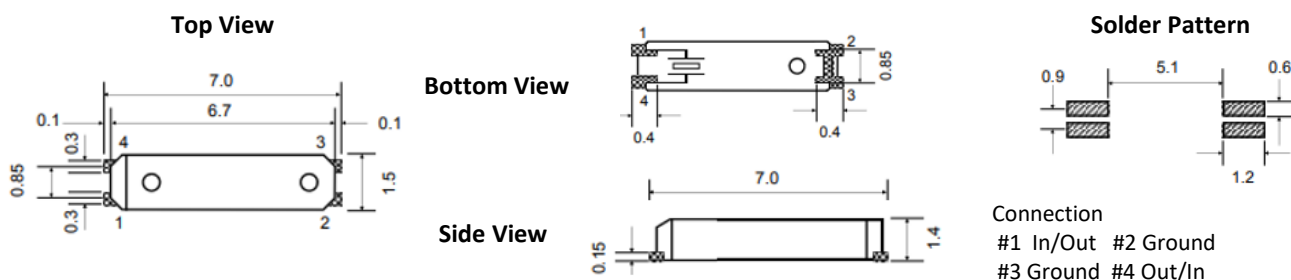
APPLICATION

- Notebook computer, TV, STB, LCDM and more

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	-	32.768	-	KHz	
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±20		ppm	@25 °C or Specify
Operating Temperature Range	-40	-	+85	°C	CL: 7.0pF, 9.0pF or Specify
Storage Temperature Range	-55	-	+125	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.028	0.034	0.04	ppm/C ²	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	65	Kohm	
Drive Level	-	-	1.0	µW	
Shunt Capacitance	0.9	1.8	2.0	pF	
Dynamic Capacitance	-	1.9	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±3		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (+/-0.1mm)



PART NUMBER GUIDE

Example: TGS CCMN 32K768A20-12.5-40-65 TLH

Part Number and Part Code Structure

TGS	CCMN	32K768	A	20	-12.5	-40	-65	T	LH	XX
1	2	3	4	5	6	7	8	9	10	11

- 1) TGS: Company Code
- 2) CCMN: KHz Plastic SMD Crystals, 2 pads L7.0*W1.5*H1.4mm
- 3) 32K768: Frequency Range 32.768000KHz
- 4) A: Oscillation Mode, AT Fund.
- 5) 20: Frequency tolerance: +/-20ppm or specify
- 6) 12.5: Load Capacitance, 12.5pF; 9: 9.0pF or Specify
- 7) 40: Operating Temp. Range -40°C ~+85°C,
- 8) 65: Equivalent Series Resistance, 65 Kohm Max.
- 9) T: Package in Tape/Reel, 9000pcs/Reel
- 10) LH: RoHS//RoHS II compliant

11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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L8.0*W3.8*H2.4mm



MAIN FEATURE

- 32.768KHz • Plastic Package • High Precision & Reliability

APPLICATION

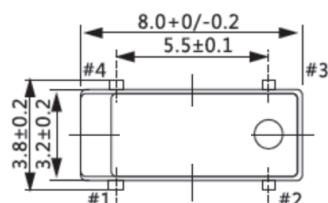
- Notebook computer, TV, STB, LCDM and more

STANDARD SPECIFICATION

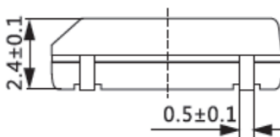
Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	30.00	32.768	200.00	KHz	
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±20		ppm	@25 °C or Specify
Operating Temperture Range	-40	-	+85	°C	CL: 7.0pF, 9.0pF or Specify See Part number Guide for option
Storage Temperature Range	-55	-	+125	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.028	0.034	0.04	ppm/C ²	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	50	Kohm	
Drive Level	-	-	1.0	μW	
Shunt Capacitance	0.9	1.35	2.0	pF	
Dynamic Capacitance	-	1.8	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±3		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (+/-0.1mm)

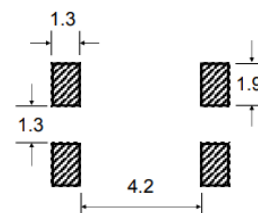
Top View



Side View



Solder Pattern



Connection
#1 In/Out
#2 Ground
#3 Ground
#4 Out/In

PART NUMBER GUIDE

Example: TGS CCMC 32K768A20-12.5-40-50 TLH

Part Number and Part Code Structure

TGS	CCMC	32K768	A	20	-12.5	-40	-50	T	LH	XX
1	2	3	4	5	6	7	8	9	10	11

1) TGS: Company Code

2) CCMC: KHz Plastic SMD Crystals, 2 pads L8.0*W3.8*H2.4mm

3) 32K768: Frequency Range 32.768000KHz or specify from 30.00~200.00KHz

4) A: Oscillation Mode, AT Fund.

5) 20: Frequency tolerance: +/-20ppm or specify

6) 12.5: Load Capacitance, 12.5pF; 9: 9.0pF or Specify

7) 40: Operating Temp. Range -40°C ~+85°C, 10: -10°C ~+60°C, 20: -20°C ~+70°C or specify

8) 50: Equivalent Series Resistance, 50 Kohm Max.

9) T: Package in Tape/Reel, 1000pcs/Reel

10) LH: RoHS//RoHS II compliant

11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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MAIN FEATURE

- 32.768KHz High Precision & Reliability • Low Cost

APPLICATION

- Clock/Watch and more

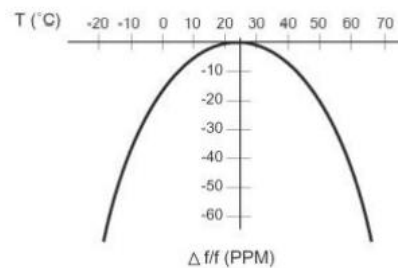
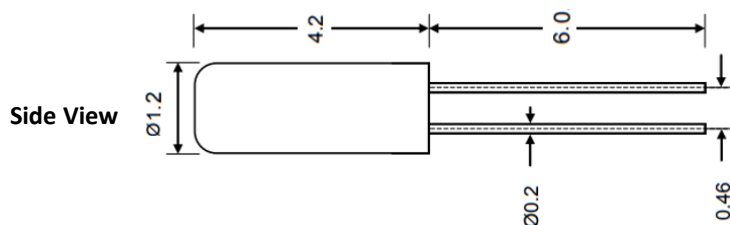


Ø1.2*H4.2mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range		32.768		KHz	
Oscillation Mode		AT Fund.			
Frequency Tolerance	-	±20		ppm	@25 °C or Specify
Operating Temperature Range	-20	-	+70	°C	CL: 7.0pF, 9.0pF or Specify Wide Operating Temp. range See Part number Guide for option
Storage Temperature Range	-40	-	+85	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.031	0.036	0.041	ppm/C ²	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	60	Kohm	
Drive Level	-	-	1.0	µW	
Shunt Capacitance			2.0	pF	
Dynamic Capacitance	-	0.0030	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±5		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (+/-0.1mm)



Temperature Coefficient

PART NUMBER GUIDE

Example: TGS CCE 32K768A20-12.5-20-60 BLF

Part Number and Part Code Structure

TGS	CCE	32K768	A	20	-12.5	-20	-60	B	LF	XX
1	2	3	4	5	6	7	8	9	10	11

1) TGS: Company Code

2) CCE: KHz Thru Hole Crystals, Ø1.2*H4.2mm

3) 32K768: Frequency Range 32.768000KHz

4) A: Oscillation Mode, AT Fund.

5) 20: Frequency tolerance: +/-20ppm or specify

6) 12.5: Load Capacitance, 12.5pF; 9: 9.0pF or Specify

7) 20: Operating Temp. Range -20°C ~+70°C; 40: -40°C ~+85°C or Specify

8) 60: Equivalent Series Resistance, 60 Kohm Max.

9) B: Package in Bulk

10) LF: RoHS Compliant

11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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MAIN FEATURE

- 32.768KHz Std and wide Frequency range
- Low Cost, Short lead time and massive quantity supply

APPLICATION

- Clock/Watch and more

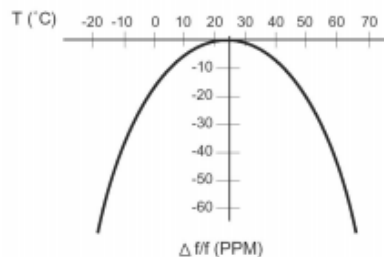
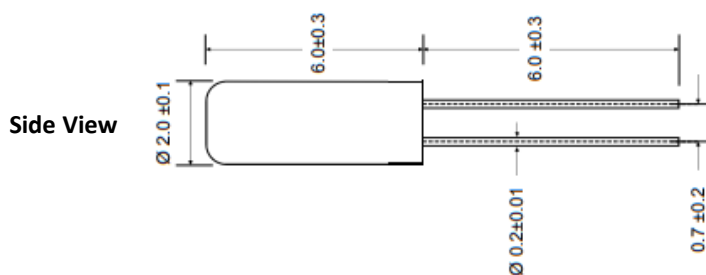


Ø2.0*H6.0mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	30.00	32.768	200.00	KHz	@25 °C or Specify CL: 7.0pF, 9.0pF or Specify Wide Operating Temp. range See Part number Guide for option
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±20		ppm	
Operating Temperature Range	-10	-	+60	°C	
Storage Temperature Range	-40	-	+85	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.028	0.034	0.040	ppm/°C	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	35	Kohm	
Drive Level	-	-	1.0	µW	
Shunt Capacitance	0.9	1.8	2.0	pF	
Dynamic Capacitance	-	0.003	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±5		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (mm)



Temperature Coefficient

PART NUMBER GUIDE

Example: TGS CCA 32K768A20-12.5-10-35 BLF

Part Number and Part Code Structure

TGS	CCA	32K768	A	20	-12.5	-10	-35	B	LF	XX
1	2	3	4	5	6	7	8	9	10	11

- 1) TGS: Company Code
- 2) CCA: KHz Thru Hole Crystals, Ø2.0*H6.0mm
- 3) 32K768: Frequency Range 32.768KHz standard or specify from 30.00KHz to 200.00KHz
- 4) A: Oscillation Mode, AT Fund.
- 5) 20: Frequency tolerance: +/-20ppm or specify
- 6) 12.5: Load Capacitance, 12.5pF; 7: 7.0pF; 9: 9.0pF or Specify
- 7) 10: Operating Temp. Range -10°C ~+60°C; 20: -20°C ~+70°C; 40: -40°C ~+85°C or specify
- 8) 35: Equivalent Series Resistance, 35 Kohm Max.
- 9) B: Package in Bulk
- 10) LF: RoHS Compliant
- 11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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MAIN FEATURE

- 32.768KHz Std and wide Frequency range
- Low Cost, Short lead time and massive quantity supply

APPLICATION

- Clock/Watch and more

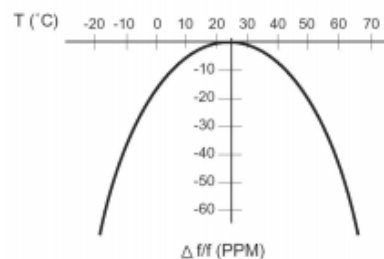
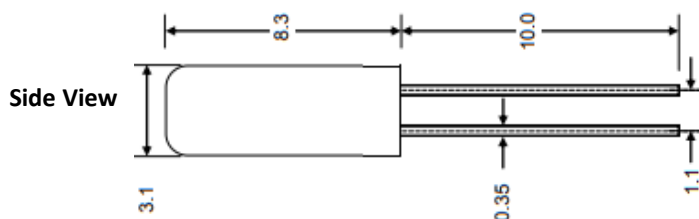


Ø3.1*H8.3mm

STANDARD SPECIFICATION

Parameter	Value			Unit	Condition
	Min.	Type	Max.		
Frequency Range	30.00	32.768	200.00	KHz	
Oscillation Mode	AT Fund.				
Frequency Tolerance	-	±20		ppm	@25 °C or Specify
Operating Temperature Range	-10	-	+60	°C	CL: 7.0pF, 9.0pF or Specify Wide Operating Temp. range See Part number Guide for option
Storage Temperature Range	-40	-	+85	°C	
Load Capacitance (CL)	-	12.5	-	pF	
Frequency/Temp Coefficient	0.028	0.034	0.040	ppm/C ²	
Turnover Temp	+20	+25	+30	°C	
Equivalent Series Resistance		-	30	Kohm	
Drive Level	-	-	1.0	µW	
Shunt Capacitance	0.9	1.8	2.0	pF	
Dynamic Capacitance	-	2.1	-	Ff	
Quality Factor		60000			
Capacitance Ratio	-	450	-		
Aging per year	-	±5		ppm/year	
Insulation Resistance	500	-	-	Mohm	@ 100Vdc ± 15V

DIMENSION (+/-0.1mm)



Temperature Coefficient

PART NUMBER GUIDE

Example: TGS CCA 32K768A20-12.5-10-30 BLF

Part Number and Part Code Structure

TGS	CCA	32K768	A	20	-12.5	-10	-30	B	LF	XX
1	2	3	4	5	6	7	8	9	10	11

- 1) TGS: Company Code
- 2) CCA: KHz Thru Hole Crystals, Ø3.1*H8.3mm
- 3) 32K768: Frequency Range 32.768KHz standard or specify from 30.00KHz to 200.00KHz
- 4) A: Oscillation Mode, AT Fund.
- 5) 20: Frequency tolerance: +/-20ppm or specify
- 6) 12.5: Load Capacitance, 12.5pF; 7: 7.0pF; 9: 9.0pF or Specify
- 7) 10: Operating Temp. Range -10°C ~+60°C; 20: -20°C ~+70°C; 40: -40°C ~+85°C or specify
- 8) 60: Equivalent Series Resistance, 30 Kohm Max.
- 9) B: Package in Bulk
- 10) LF: RoHS Compliant

11) XX: Internal Control Code- 2 letter or digits ; Blank: N/A

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