

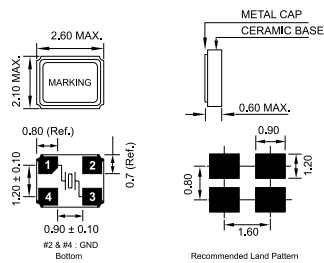
FREQUENCY CONTROL PRODUCTS FOR AUTOMOTIVE APPLICATIONS



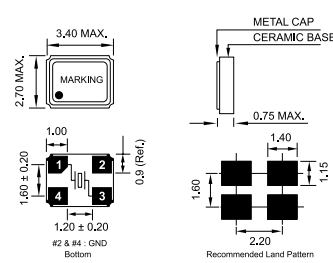
Certified to Automotive Quality Standard ISO/TS16949.
 Superior Shock and Vibration Performance.
 Specifically designed to meet the severe environments of automotive products.
 Environmentally Friendly Lead-Free/RoHS Compliant Products - ISO14000.

CRYSTALS

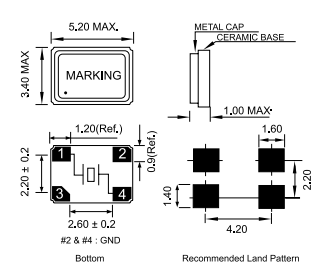
C2 Series 2.5 x 2



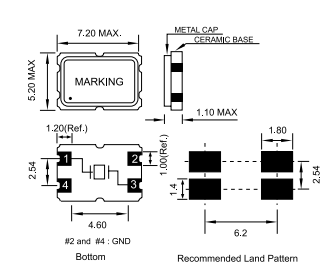
C3 Series 3.2 x 2.5



C5 Series 5 x 3.2

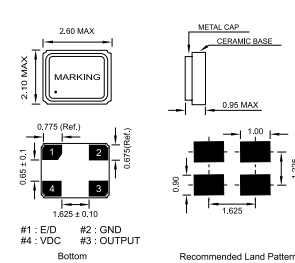


C7 Series 7x5

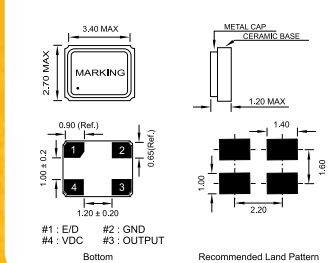


OSCILLATORS

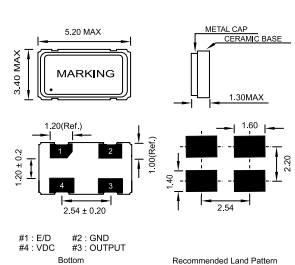
S2 Series 2.5 x 2



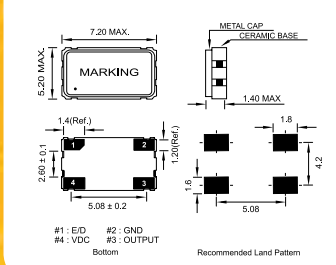
S3 Series 3.2 x 2.5



S5 Series 5 x 3.2



S7 Series 7x5



Frequency Range: 8 to 150 MHz
 Frequency Tolerance : ± 30 PPM at 25°C
 Frequency Stability: ± 50 to ± 100 PPM
 Operating Temp. Range -40°C to +125°C
 Superior Shock and Vibration Resistance
 Low Drive Levels from 15 uW to 500 uW
 Excellent Thermal Hysteresis
 Low Aging

Frequency Range: 1.0 to 156 MHz
 Frequency Stability: ±50 PPM to ±100 PPM
 Operating Temp. Range: -40 to +125°C
 Supply Voltage: +2.5 / +3.0 / +5.0 VDC
 Output: CMOS
 Tristate – Enable/Disable
 Low Power Consumption
 Tight Symmetry of 45/55%

Product	Series	Dimensions (mm)	TPMS	ECU	Sensor	GPS	Airbag	Multimedia	Satellite Radio	RKE
Crystals	C2E	2.5 x 2	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴
	C3E	3.2 x 2.5	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴
	C5S	5 x 3.2	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴
	C7S	7 x 5	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴
Oscillators	S2	2.5 x 2	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴
	S3	3.2 x 2.5	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴
	S5	5 x 3.2	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴
	S7	7 x 5	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴

Proud to be a small part of making a better world.



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OUR COMPONENTS ARE BUILT TOUGH ISO/TS-16949 CERTIFIED



RELIABILITY TEST

NO.	Test Item	Standard	Test Condition	Requirement
1	Drop Test	JIS-C6701	Fund 1-19.999MHz 100cm 20MHz above 75cm	$\Delta FR \leq \pm 10 \text{ppm}$ $\Delta RR \leq \pm 10 \text{Ohms}$
2	High Temp & Humidity	MIL-STD-883F : 1004.7	85°C±5°C&85%±5% R.H. ,168±6hrs	$\Delta FR \leq \pm 10 \text{ppm}$ $\Delta RR \leq \pm 10 \text{Ohms}$
3	Low Temp Exposure	JIS-C5202	(-40±3°C) 168hrs±6hrs	$\Delta FR \leq \pm 10 \text{ppm}$ $\Delta RR \leq \pm 10 \text{Ohms}$
4	Resistance To Soldering Heat	JESD22-B106-B	Reflow test 2 times	$\Delta FR \leq \pm 10 \text{ppm}$ $\Delta RR \leq \pm 10 \text{Ohms}$
5	Aging Test	JIS-C0021	125°C±3°C Aging test	$\Delta FR \leq \pm 10 \text{ppm}$ $\Delta RR \leq \pm 10 \text{Ohms}$
6	Temperature Cycling	MIL-STD-883F: 1010.8	-55±3°C/15±3min~+125± 3°C/15±3min , 100cycles	$\Delta FR \leq \pm 10 \text{ppm}$ $\Delta RR \leq \pm 10 \text{Ohms}$
7	Shock Test (Plus)	MIL-STD-883F : 2002.4	1500G, 0.5mS, 3 times for each direction(X, Y, Z), 3 cycles	$\Delta FR \leq \pm 10 \text{ppm}$ $\Delta RR \leq \pm 10 \text{Ohms}$
8	Vibration Test	MIL-STD-883F : 2007.3	Freq.range: 20~2000Hz Peak to peak amplitude :1.52mm Peak acceleration:20G (98m/s2)	$\Delta FR \leq \pm 10 \text{ppm}$ $\Delta RR \leq \pm 10 \text{Ohms}$
9	Thermal Shock	MIL-STD-883F : 1011.9	(-55°C~+125°C), Dwell time >15 mins , 15 cycles	$\Delta FR \leq \pm 10 \text{ppm}$ $\Delta RR \leq \pm 10 \text{Ohms}$

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