



Features

- Surface Mount package
- SC_CUT Crystal
- Low Profile Compact Package
- standard frequency: 5,10, 20 MHz (CMOS)
10 MHz (Sinewave)
- ultra low aging rate

Applications

- Base stations
- Test equipment
- Synthesizers
- Military communication equipment
- Digital Switching

Performance Specifications

CMOS Version

Frequency Stabilities ¹ (5,10 & 20 MHz)					
Parameter	Min	Typical	Max	Units	Condition
vs. operating temperature range (referenced to +25°C)			1	ppb [pk-pk]	--40 to +85°C
Initial tolerance	-0.2		+0.2	ppm	at time of shipment, nominal EFC $V_s \pm 5\%$ static Load $\pm 5\%$ static after 7 days of operation (CMOS) after 7 days of operation (CMOS)
vs. supply voltage change	-2		+2	ppb	
vs. load change	-2		+2	ppb	
vs. aging / day	-0.15		+0.15	ppb	
vs. aging / year	-30		+30	ppb	
Holdover/Drift	-1,5		+1,5	µsec	over 4 hours, temp change during the holdover time: 2.8°C; after 7 days constant operation
start up time		0.25	2	sec	
Warm-up time			5	minutes	to ± 20 ppb of final frequency (1 hour reading) @ +25°C

Supply Voltage (Vs)					
Parameter	Min	Typical	Max	Units	Condition
Supply voltage (standard)	3.135	3.3	3.465	VDC	
Power consumption			4.0	Watts	during warm-up
			1.35	Watts	steady state @ +25°C

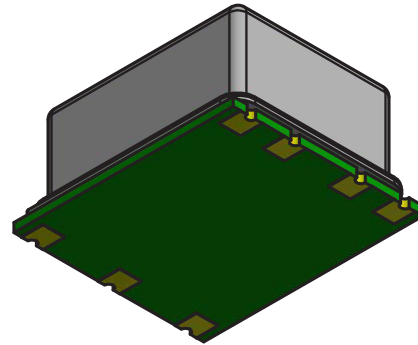
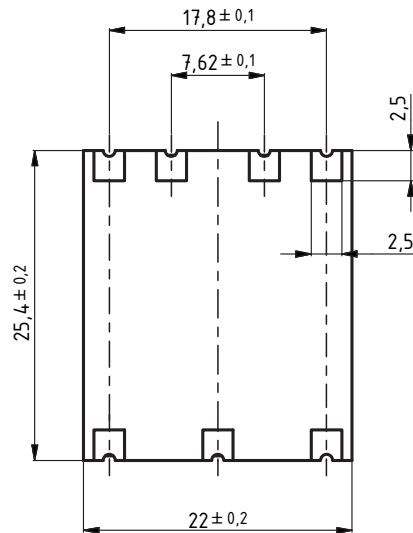
RF Output						
Signal [standard]	LVHCMOS					
Load		15		pF		
Signal Level (Vol)			0.4	VDC	with Vs=3.3V and 15pF Load	
Signal Level (Voh)	2.4			VDC	with Vs=3.3V and 15pF Load	
rise time			5	ns		
fall time			5	ns		
Duty Cycle	45		55	%	@ (Voh-Vol)/2	
Sub Harmonics			-40	dBc	frequencies >= 10 MHz	
Spurious			-90	dBc		
Frequency Tuning (EFC)						
Tuning Range	Fixed OCXO; No adjust					
Additional Parameters						
Phase Noise³		-131	-125	dBc/Hz	10 Hz	@ 10MHz
		-140	-135	dBc/Hz	100 Hz	
		-143	-140	dBc/Hz	1 kHz	
		-151	-150	dBc/Hz	10 kHz	
		-152	-150	dBc/Hz	100khz	
ADEV			5	E-11	10 s tau	@ 10MHz
			5	E-11	1000 s tau	
Weight			12	g		
Processing & Packing	Handling & Processing Note					
Absolute Maximum Ratings						
supply voltage (Vs)			5.5	V	with Vs=3.3 & 5.0 VDC	
Output Load			50	pF		
Operable Temperature Range	-40		+85	°C		
Storage Temperature Range	-40		+125	°C		

Sinewave Version

Frequency Stabilities ¹ (10 MHz)					
Parameter	Min	Typical	Max	Units	Condition
vs. operating temperature range (referenced to +25°C)			1	ppb [pk-pk]	--40 to +85°C
Initial tolerance	-0.2		+0.2	ppm	at time of shipment, nominal EFC V _s ±5% static Load ±5% static after 7 days of operation (Sinewave) after 7 days of operation (Sinewave)
vs. supply voltage change	-2		+2	ppb	
vs. load change	-2		+2	ppb	
vs. aging / day	-0.2		+0.2	ppb	
vs. aging / year	-30		+30	ppb	
Holdover/Drift	-1,5		+1,5	µsec	over 4 hours, temp change during the holdover time: 2.8°C; after 7 days constant operation
start up time		0.25	2	sec	
Warm-up time			5	minutes	to ±20ppb of final frequency (1 hour reading) @ +25°C

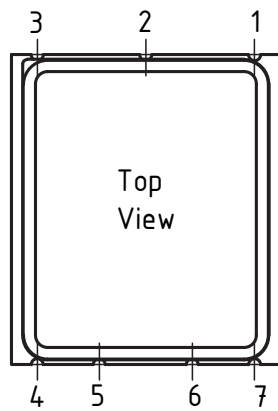
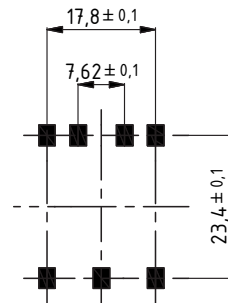
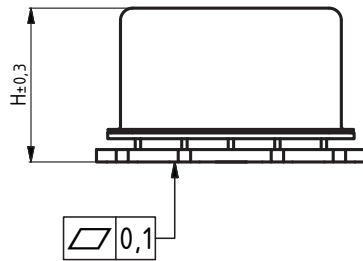
Supply Voltage (Vs)						
Parameter	Min	Typical	Max	Units	Condition	
Supply voltage (standard)	3.135	3.3	3.465	VDC		
Power consumption			4.0	Watts	during warm-up	
			1.35	Watts	steady state @ +25°C	
RF Output						
Signal	Sinewave					
Load	45	50	55	Ohm		
Output Power	0	3	6	dBm	with Vs=3.3V	
Harmonics			-30	dBc		
Spurious			-90	dBc		
Frequency Tuning (EFC)						
Tuning Range	Fixed OCXO; No adjust					
Additional Parameters						
Phase Noise ³		-100	-90	dBc/Hz	1Hz	@ 10MHz
		-130	-125	dBc/Hz	10 Hz	
		-145	-140	dBc/Hz	100 Hz	
		-152	-147	dBc/Hz	1 kHz	
		-155	-150	dBc/Hz	10 kHz	
		-155	-150	dBc/Hz	100khz	
		-160	-155	dBc/Hz	1 MHz	
ADEV			5	E-11	10 s tau	@ 10MHz
			5	E-11	1000 s tau	
Weight			12	g		
Processing & Packing	Handling & Processing Note					

Absolute Maximum Ratings					
supply voltage (Vs)			5.5	V	with Vs=3.3 & 5.0 VDC
Output Load			50	pF	
Operable Temperature Range	-40		+85	°C	
Storage Temperature Range	-40		+125	°C	



G343

OX-228	
Height "H"	cover material
12.1	metal

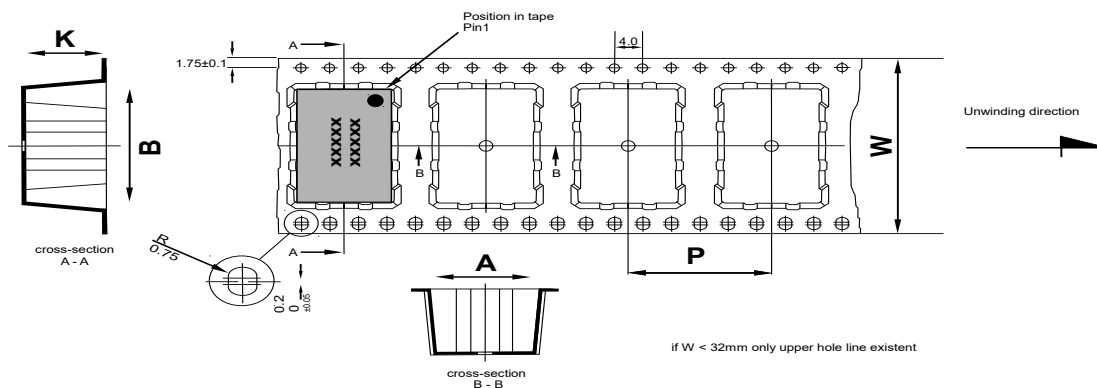


Dimensions in mm

Padvorschlag
land pattern
recommendation

Pin Connections	
1	I.C (Do not connect)
2	N.C
3	Supply Voltage Input (Vs)
4	RF Output
5	I.C (must remain un connected)
6	I.C (must remain un connected)
7	Ground (Case)

Standard Shipping Method (OX-228)



Dimension in mm:

A, B and K are dependent upon component dimensions
production tolerance complying DIN IEC 286-3

All dimensions in millimeters unless otherwise stated

Enclosure Type	Tape Width W (mm)	Quantity per meter	Quantity per reel	Dimension P
OX-228 (12.1mm)	44	37.5	100	28

Recommended Reflow Profile

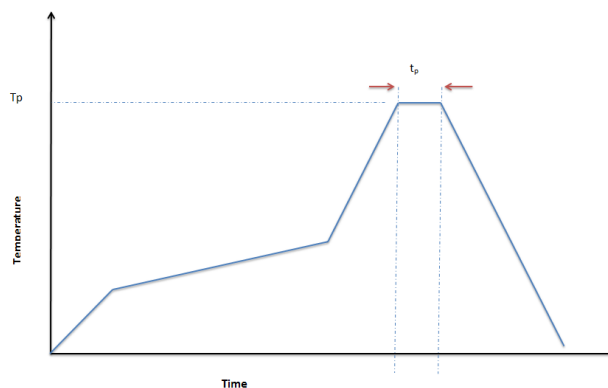
TP: max 260°C (@ solder joint,
customer board level)

T_p: max: 10...30 sec

Additional Information:

This SMD oscillator has been
designed for pick and place reflow
soldering

SMD oscillators must be on the top
side of the PCB during the reflow
process.

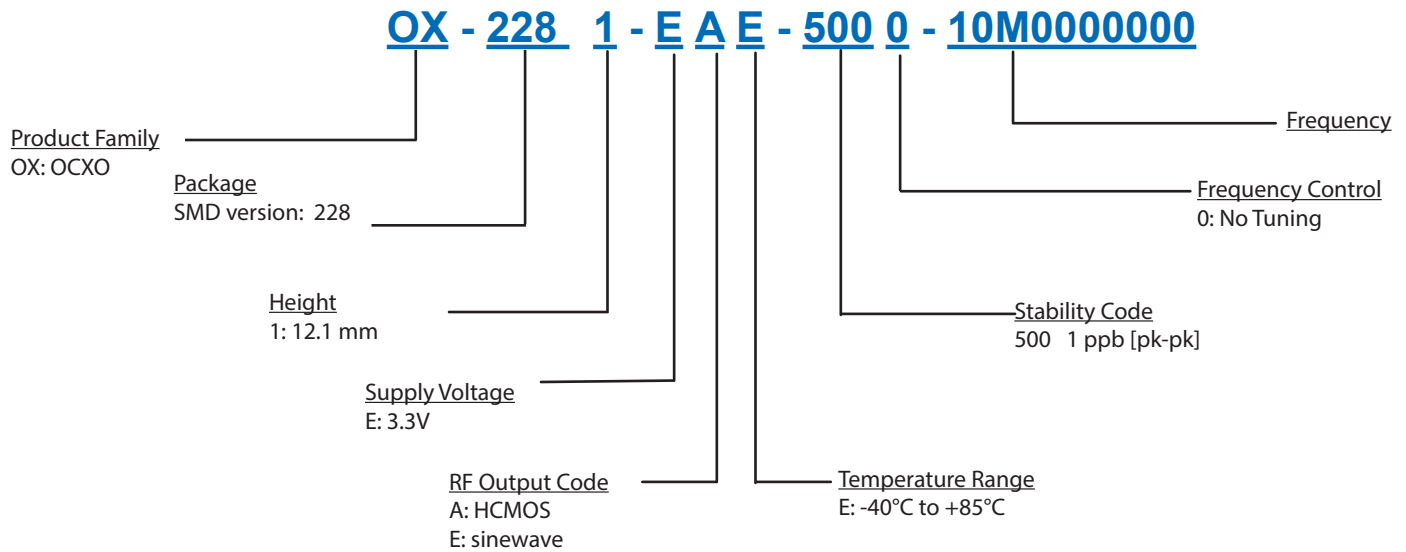


Additional Environmental Conditions

Parameter	Description
Rapid temperature changes	MIL-883-1010 Cond B 1000 cycles -55/125C
Vibration	MIL-STD-883 Meth 2007 Cond A 20G 20-2000Hz 4x in each 3axis 4 min
Shock	Mech.Shock MIL-STD-202 Meth 213 Cond.C 100G 6ms 6 shocks in each direction
Solderability	J_STD_002C Cond A, Through hole device/ Cond. B, SMD 255C (dipping time 50,5sec.) Dip+Look with 8h damp pre-treatment: solder wetting >95%
Solvent resistance	MIL-STD-883 Meth 2015 Solv. 1,3,4
ESD	HBM JESD22-A114-F Class 1C 10* 1000V
Moisture Sensit.	Level 1 JESD22-A113-B
RoHS compliance	100% RoHS 6 compliant
Washable	washable device

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

Ordering Information



Notes:

1. Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
2. Unless other stated all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, temperature (25°C).
3. Phase noise degrades with increasing output frequency.
4. Subject to technical modification.
5. Contact factory for availability.

Contact Information

USA:

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Mt Holly Springs, PA 17065
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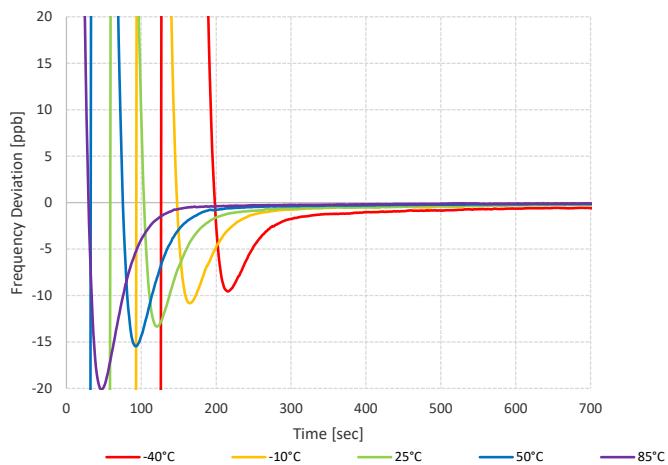
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typical performance data

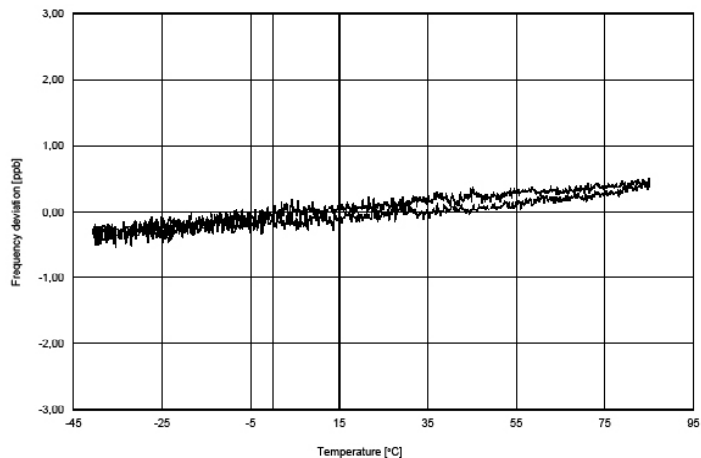
typical warm up

@ OX-2281-EAE-5000-10M0000000



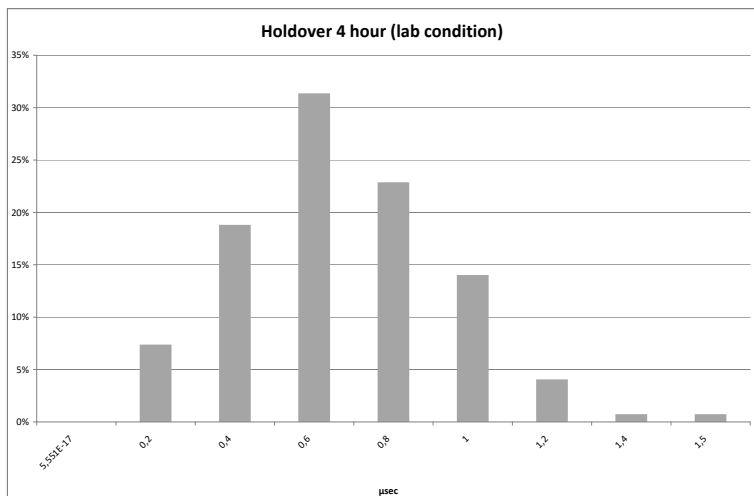
typical temp stability

@ OX-2281-EAE-5000-10M0000000



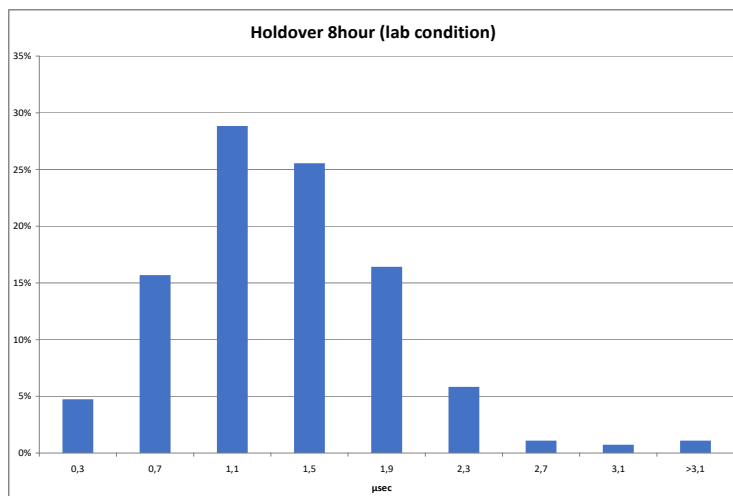
typical holdover over 4 hour lab condition

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typical holdover over 8 hour lab condition

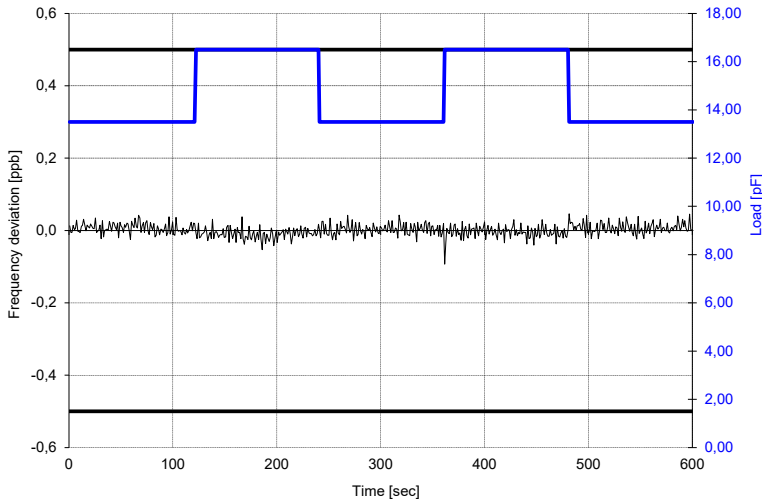
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typical performance data

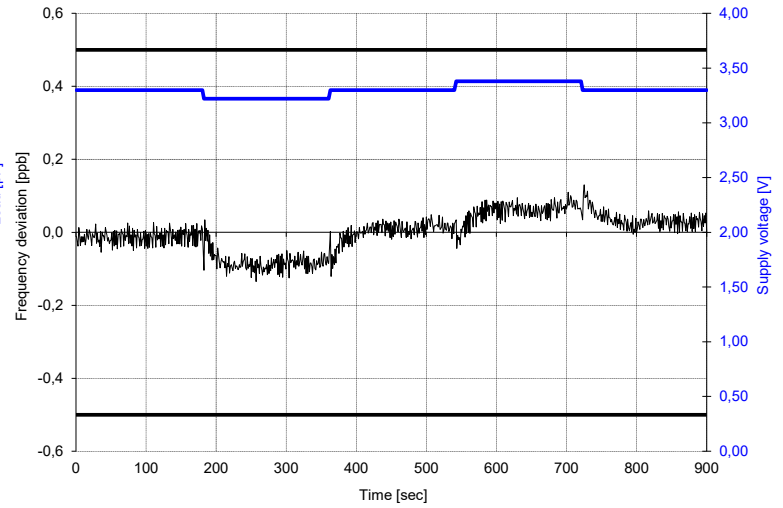
typical frequency vs. load change

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typical frequency vs. supply voltage

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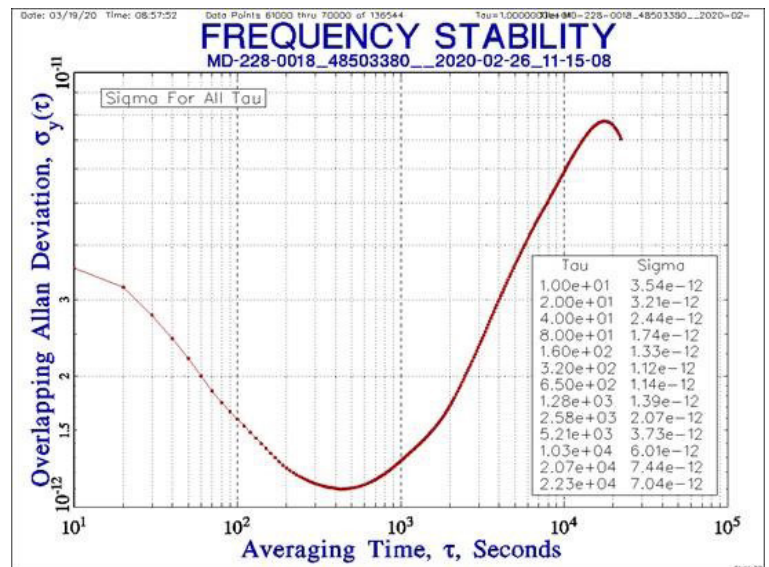
typical Phase Noise

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typical ADEV

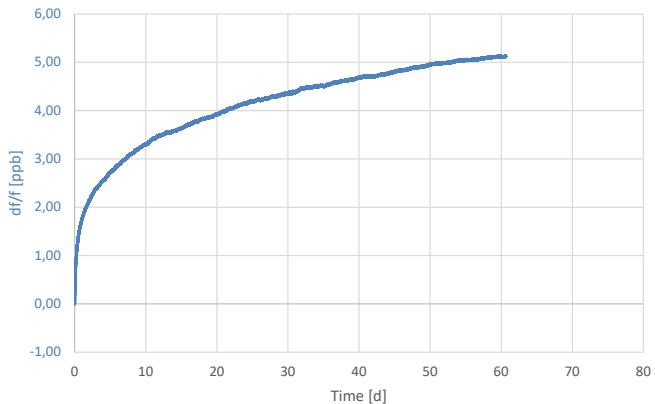
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typical performance data

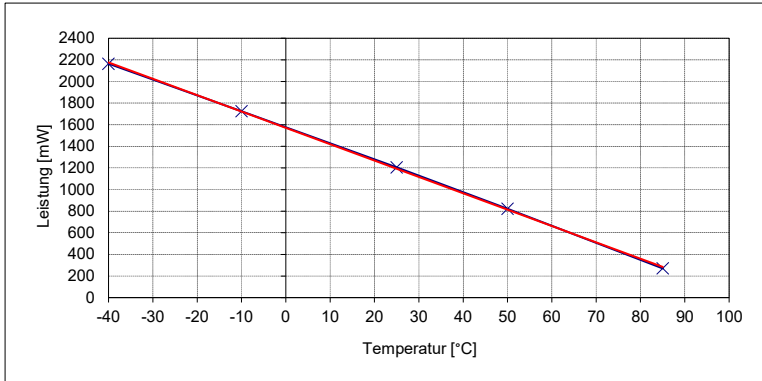
typical aging data

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typical power consumption vs. operating temperature

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recommended power on time after x days of power off

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