

endrich news

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WE WISH YOU A MERRY CHRISTMAS



AND A HAPPY NEW YEAR!

SPECIAL PURPOSE THICK FILM CHIP RESISTORS



Prosperity Dielectrics Co. Ltd (PDC) is a Taiwanese manufacturer of specialty thick film chip resistors since 1990. Specialty chip resistors are passive components that are designed for the use at special purposes. PDC is focussed only on these specialties and can offer excellent performance with competitive price and reasonable lead times. Highlights are the FPS (high-power & anti-surge type) and FVS (safety resistor with UL listing) series.

FEATURES

- Designed in these technologies: Metal Paste, Metal Strip, and Thick Film
- Optimized for these purposes: Current sensing, high voltage, Safety, Precision, high power, anti-surge, High resistance, trimmable, non-magnetic and anti-sulfurate

APPLICATIONS

- Power supplies: such as AC/DC, DC/DC, Inverter, SMPS, Charger, ...
- Communication: Modem / Router, Lan / Wlan, Tuner, Phones, ...
- Industrial electronics: such as electronic controller units, automation equipment, ...
- Special: such as automotive, medical, measurement, military, ...

TYPE	SERIES	RES. RANGE	TOLERANCE	TCR [PPM/K]	POWER RATING	SIZE
Anti-Surge	FNF	1 ~ 1 MΩ	±5 %, ±10 %, ±15 %, ±20 %	±100	1/10 ~ 1 W	0603 ~ 2512
Anti-Surge & high power	FPS double / triple power	0 Ω; 1 Ω ~ 1 MΩ	±1 %, ±5 %	±100 ~ ±200	1/8 ~ 2 W	0603 ~ 2512
Array	FCF-Array	0 Ω; 10 Ω ~ 1 MΩ	±1 % ~ 5 %	±200 ~ ±300	1/16 ~ 1/10 W	4P2R ~ 16P8R
Automotive	FWF	0 Ω; 1 ~ 10 MΩ	±1 %, ±5 %	±100 ~ ±200	1/16 ~ 1 W	0402 ~ 2512
Current sensing – thick film	FCF-L	510 mΩ < ~ 910 mΩ	±1 %, ±5 %	±200 ~ ±300	1/10 ~ 1 W	0603 ~ 2512
Current sensing – Metal Strip	FMF / FMF06	1 m ~ 100 mΩ	±1 %, ±2 %, ±5 %	±70 ~ ±100	1/2 ~ 5 W	1206 ~ 5931
Current sensing – Metal paste	FBF	10 mΩ ~ 910 mΩ	±1 %, ±5 %	±100 ~ ±400	1/8 ~ 2 W	0603 ~ 2512
High Power – Low Resistance	FPF-L / FPF25 Triple	50 m ~ 910 mΩ	±1 %, ±5 %	±100 ~ ±250	1/4 ~ 3 W	0603 ~ 2512
High Power – high resistance	FPF double / triple power	0 Ω; 1 Ω ~ 10 MΩ	±1 %, ±5 %	±100 ±150 ±200	1/8 ~ 3 W	0603 ~ 2512
High Ohmic	FHF	11 M ~ 100 MΩ	±1 %, ±5 %	±200	1/10 ~ 1/4 W	0603 ~ 1206
High Voltage	FVF	100 K ~ 100 MΩ	±1 %, ±5 %	±100 ~ ±200	1/10 ~ 1 W	0603 ~ 2512
High-Voltage with safety certificate (UL file)	FVS	100 KΩ ~ 100 MΩ	±1 %, ±5 %	±100 ~ ±200	1/10 ~ 1 W	0603 ~ 2512
Non-Magnetic	FGF	0 Ω; 1 ~ 10 MΩ	±1 %, ±5 %	±100 ~ ±200	1/10 ~ 1/4 W	0603 ~ 1206
Trimmable	FTF	10 ~ 1 MΩ	0 ~ -10 % (Z); 0 ~ -20 % (Y); 0 ~ -30 % (X)	±100	1/10 ~ 1 W	0603 ~ 2512

LOW POWER SINGLE CHANNEL OP-AMP

The **NJM8020/NJM8021** are single OP-Amps designed specifically to operate wide range of supply voltage and temperature.

These OP-Amps featured low input offset voltage of 2 mV max. low supply current of 0.7mA max. DC characteristics are also 100% tested and guaranteed from -40 to 125 °C. The NJM8020/NJM8021 are available in DFN6-G1 (1616) of small size package, significantly reducing the required portable application's board area.

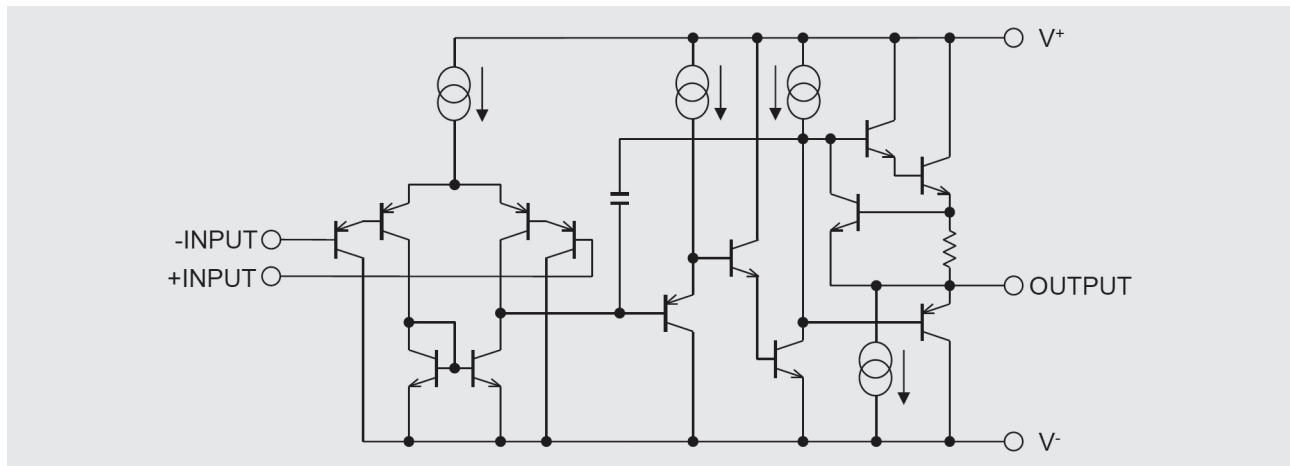
FEATURES ($V_+=5V$, $V_-=0V$, $T_A=25^\circ C$)

- Guaranteed Temperature -40°C to +125°C
- Input Offset Voltage 2 mV max.
- Input Offset Voltage Drift 17 $\mu V/^\circ C$ max.
- Supply Current 0.7 mA max.
- Operating Voltage +3 V to +36 V or ± 1.5 V to ± 18 V
- Integrated EMI filter EMIRR = 84 dB typ. @ f = 1.8 GHz
- GBW 1.1 MHz typ.
- GND sensing
- Internal ESD protection Human Body Model ± 2000 V typ.
- Package
 - NJM8020 SOT-23-5, SC-88A
 - NJM8021 SOT-23-5, SC-88A, DFN6-G1(ESON6-G1)

PIN CONFIGURATION

Parts Number	NJM8020F	NJM8020F3	NJM8021F	NJM8021F3	NJM8021KG1
Package Outline	SOT-23-5	SC-88A	SOT-23-5	SC-88A	DFN6-G1(*)
Pin Function	<p>(Top View) Pin 1: OUTPUT Pin 2: V- Pin 3: +INPUT Pin 4: -INPUT Pin 5: V+</p>	<p>(Top View) Pin 1: +INPUT Pin 2: V- Pin 3: -INPUT Pin 4: OUTPUT Pin 5: V+</p>	<p>(Top View) Pin 1: +INPUT Pin 2: V- Pin 3: -INPUT Pin 4: OUTPUT Pin 5: V+</p>	<p>(Top View) Pin 1: V+ Pin 2: N.C. Pin 3: OUTPUT Pin 4: -INPUT Pin 5: +INPUT Pin 6: V- Note: Exposed Pad on Underside</p>	<p>(Top View) Pin 1: V+ Pin 2: N.C. Pin 3: OUTPUT Pin 4: -INPUT Pin 5: +INPUT Pin 6: V- Note: Exposed Pad on Underside</p>

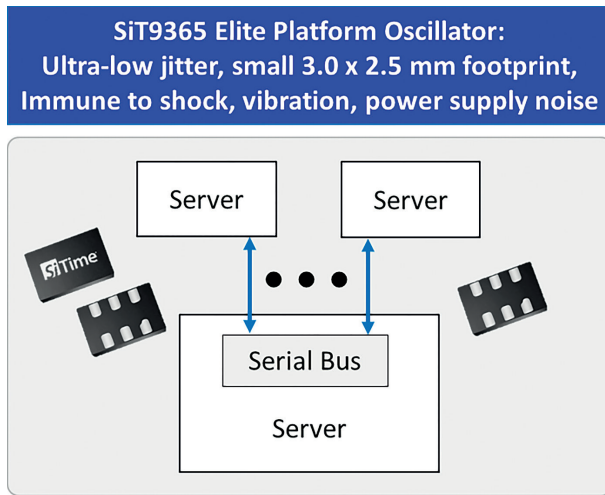
EQUIVALENT CIRCUIT



FUTURE-FOCUSED ETHERNET SOLUTIONS

Driven by the rapid escalation of broadband Internet users and the growing use of bandwidth-hungry applications, data centers are expanding with plans to implement new Ethernet standards that support much higher speeds (remember when 10 Mbps Ethernet was unbelievably fast in the early 1980s?). With growing bandwidth needs and data transmission speeds, come increased performance requirements. If your networking or server platform will use 10 GbE, 40 GbE, or 100 GbE, you will need a timing solution that delivers reliable performance. That's where the ultra-low jitter SiT9365 oscillator comes in.

This device is part of the Elite Platform™ of MEMS-based differential oscillators from SiTime. The Elite Platform products provide superior robustness against external stressors, like vibration, shock, and board noise. Based on a novel DualMEMS™ architecture that ensures the best performance under airflow, rapid temperature changes and other dynamic conditions commonly experienced by communications equipment, these oscillators offer better stability over the entire temperature range, as well as stability over fast temperature transients. This provides a more reliable system. In addition, the Elite Platform architecture includes an integrated LDO that provides power supply noise filtering and results in 0.2 ps/mV PSNR best-in-class performance, even with noisy power supplies. The on-chip LDO, with multi-level internal voltage regulation, simplifies designs. It allows designers to power the oscillator with any on-board switching power supply and eliminates the need for an external dedicated LDO regulator. In contrast, other oscillators



such as quartz-based devices are susceptible to power supply noise and require a dedicated LDO.

The SiT9365 is available in 32 standard frequencies (including 156.250000 MHz required for most Ethernet applications), three standard output signaling levels, stability as low as ±10 ppm, and RMS phase jitter (random) <300 fs, the typical jitter budget allotted to the clock oscillator in Ethernet applications. The Elite differential family, shown below, includes VCXO options and devices that can be programmed to any frequency up to 725 MHz.

DEVICE	FREQUENCY	TYPE / FEATURES	PACKAGES [mm x mm]	OUTPUT
ELECTRICAL SPECIFICATION				
SiT9365	32 std. frequencies (25 to 322 MHz)	Low-Jitter Differential XO: 0.23 ps (typ.) integrated RMS phase jitter (12 kHz to 20 MHz); 0.1 ps (typ.) integrated RMS phase jitter under Ethernet mask for 10G/40G/100G	3.2 x 2.5, 7.0 x 5.0	LVPECL, LVDS, HCSSL
SiT9366	Any frequency 1 to 220 MHz			
SiT9367	Any frequency 220 to 725 MHz	Differential VCXO: ±25 to ±3600 ppm pull range; 0.1% frequency tuning linearity		
SiT3372	Any frequency 10 to 220 MHz			
SiT3373	Any frequency 220 to 725 MHz			

Delivering reliable high-speed data is no longer an option. Networking and communications equipment needs to keep pace with increasing bandwidth requirements. New technologies such as DualMEMS, used in Elite Platform timing solutions, will provide the dynamic performance, system reliability, and timing and jitter margins demanded by forward-looking Ethernet standards at the core of next generation equipment.

MELF RESISTORS, WITH UPGRADED RATED POWER



Metal film performance, economical price! RCD Series MGP melf* resistors utilize precision film technology which is inherently low inductance, low noise, and high stability even after extended periods. Heavy solder plating assures excellent solderability and long shelf life. Series MHM offers hermetically sealed environmental protection and utmost reliability. MGP series parts are color banded, MHM are alphanumerically marked with resistance and tolerance. *Melf = metal electrode face-bonded (cylindrical component).

FEATURES

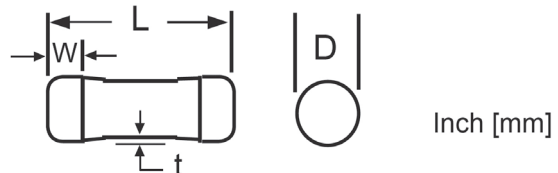
- Industry's widest selection of metal film MELF resistors-
- 0.1 W to 0.5 W, 0.1 Ω to 22 M Ω , 0.1 % to 5 %, 10 ppm to 100 ppm/ $^{\circ}$ C
- Low cost, quick delivery (available on SWIFT™ program)
- Precision performance, excellent environmental stability
- Series MHM hermetic sealed is an industry first!

APPLICATIONS

- Power supplies: such as AC/DC, DC/DC, Inverter, SMPS, Charger, ...
- Communication: Modem / Router, Lan / Wlan, Tuner, Phones, ...
- Industrial electronics: such as electronic controller units, automation equipment, ...
- Special: such as medical, measurement, military, ...

SWIFT™

- Unique delivery program of RCD for faster production
- Extra manufacturing line reserved for urgent demands
- Short lead time is dependant on type, tolerance, quantity & price adder



Contact us for details!

	RCD TYPE	WATTAGE [STD]	WATTAGE [OPT. 'S']	VOLTAGE RATING	RESISTANCE RANGE	DIELECTRIC STRENGTH	$L \pm 0.012 / 0.3$ [Inch / mm]	$D \pm 0.008 / 0.2$ [Inch / mm]	W MIN. [Inch / mm]	T MAX. [Inch / mm]
MGP45		0.1 W	0.20 W	100 V	1 W to 1 M	200 V	0.079 [2.0]	0.044 [1.12]	0.012 [0.3]	0.003 [0.076]
MGP50		0.125 W	0.25 W	200 V	0.18 W to 10 M	250 V	0.135 [3.4]	0.057 [1.45]	0.02 [0.5]	0.004 [0.1]
MGP55		0.25 W	0.50 W	250 V	0.1 W to 22 M	350 V	0.232 [5.9]	0.085 [2.15]	0.024 [0.6]	0.006 [0.15]
MGP55³		0.125 W	0.25 W	250 V	10 W to 200 K	350 V	0.275 [7.0]	0.120 [3.05]	0.050 [1.27]	0.006 [0.15]

SiTime OSCILLATORS REPLACE DISCONTINUED MURATA RESONATORS, WHILE UPGRADING SYSTEM

In March of 2018, Murata will discontinue three ceramic resonator series: CSBLA_J, CSBFB_J, and CSBLB_J. These resonators join the CSK and CSBLA_E series on Murata's list of discontinued kHz devices. According to the company's website, Murata has no replacement parts for these resonators, causing supply chain disruption for many customers.

There's good news. Low frequency SiT1576, SiT1579, and SiT1569 oscillators from SiTime provide a functional alternative to the Murata ceramic resonators. Only SiTime offers this range of kHz solutions, saving OEMs and ODMs from facing difficult design decisions.

Ceramic Resonator Series	Frequency (kHz)	Freq. Stability (PPM)	Temp. Range (°C)	SiTime Oscillator	Frequency	Freq. Stability (PPM)	Temp. Range (°C)
CSK	375 to 600	±3000	-20 to 80	SiT1576 Low Jitter TCXO	1 Hz to 2 MHz	±5	-40 to 85
CSBFB_J	430 to 519 700 to 1,250			SiT1569 Low Power XO	1 Hz to 462 kHz	±50	
CSBLA_E	370 to 699			SiT1579 XO	1 Hz to 2 MHz	±50	
CSBLA_J	700 to 1,250						
CSBLB_J	455, 600, 640						

REPLACE AND UPGRADE – IN ONE MOVE

End-of-life products with no replacement are a sign of aging or obsolete technology. SiTime solutions, based on revolutionary MEMS and analog technology, provide both a replacement and an improvement. SiTime kHz solutions offer far better stability (±5 ppm compared to ±3000 ppm), in addition to the following benefits:

Device	Frequency	Temp. Range (°C)	Stability (PPM)	Package Size (mm)	Voltage (V)
SiT1576 Super-TCXO	Programmable 1 Hz to 2 MHz	-20 to 70 -40 to 85	±5 All-Inclusive	1.5 x 0.8 CSP	1.62 to 3.63
SiT1579 Oscillator	Programmable 1 Hz to 2 MHz	-20 to 70 -40 to 85	±50 All-Inclusive	1.5 x 0.8 CSP	1.62 to 3.63
SiT1569 Oscillator	Programmable 1 Hz to 462.5 kHz	-20 to 70 -40 to 85	±50 All-Inclusive	1.5 x 0.8 CSP	1.62 to 3.63

FEATURES & BENEFITS

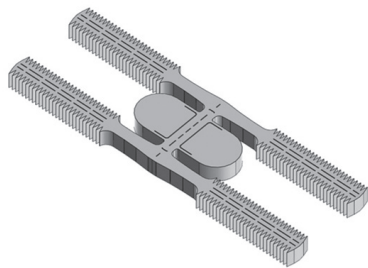
- Better quality and reliability
- Immune to shock and vibration
- Lowest sensitivity to EMI
- 1.2 mm² package, reducing PCB area
- Drives multiple loads to replace multiple resonators, reducing BOM and PCB area

SiTime OSCILLATORS REPLACE DISCONTINUED MURATA RESONATORS, WHILE UPGRADING SYSTEM

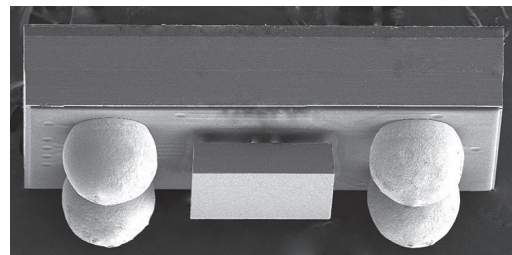
SiTime SiT1576, SiT1579, and SiT1569 oscillators are easy to design-in and don't require external components such as load or bypass capacitors. Because they are a completely integrated timing solution, these "plug-and-play" devices eliminate the hassles of matching a resonator to the oscillator circuit. Parameters such as crystal motional impedance, resonant mode, drive level, oscillator negative resistance, and load capacitance are no longer a consideration. Since matching errors are eradicated, start-up is guaranteed.

GUARANTEED SUPPLY, ULTRA-SHORT LEAD TIMES

While no one likes to deal with obsolete parts, there can be a significant upside to using new technology. MEMS technology is inherently suited for smaller size, better performance, and higher robustness. In addition, SiTime MEMS solutions provide substantial supply chain benefits and flexibility, with a wide range of frequencies as low as 1 Hz. This flexibility, coupled with very fast lead times, is enabled by MEMS technology and the programmable architecture employed in SiTime products.



MEMS Resonator
Resonator design common to all
SiTime low-frequency resonators



All-silicon Low-frequency MEMS Oscillator
Ultra-small CSP with MEMS die mounted to
underside of programmable CMOS oscillator IC

All of SiTime kHz oscillators are based on the same silicon MEMS resonator design (shown above), making mass production extremely scalable. The MEMS resonator die is mounted to a programmable oscillator IC. Output frequency is configured with a phase-locked loop (PLL) and stored in one-time programmable (OTP) memory – both located in the oscillator IC. This arrangement allows for a large variety of configuration parameters and features. These all-silicon ingredients enable a highly efficient and sustainable manufacturing model.

In contrast, the frequency of quartz resonators is attained through the physical size and shape of the quartz crystal. Because various crystal cuts are required to produce different frequencies, manufacturing and support for a wide range of frequencies are difficult for quartz companies to manage, especially in lower frequencies.

Supply chain benefits are built into SiTime's future-focused timing technology. MEMS oscillators have been rapidly replacing quartz technology since they entered mass production 10 years ago. To learn more about the advantages of MEMS oscillators, read our white paper on The Top Eight Reasons to Use an Oscillator instead of a Crystal Resonator.

ULTRA LOW CAPACITANCE STEERING DIODE/TVS ARRAY



The **DSL03-24** provides ESD, EFT and surge protection for high-speed data interfaces. The transient voltage array, steering diode combination device meets IEC 61000-4-2 (ESD), IEC 61000-4-4 (EFT) and IEC 61000-4-5 (Surge) requirements.

Available in the space-saving SOT-23-6 package configuration, this device is offered in 24 Volts with a Peak Pulse Power rating of 500 Watts for and 8/20µs waveshape.

FEATURES & BENEFITS

- Compatible with IEC 61000-4-2 (ESD):
Air 15 kV, Contact 8 kV
- Compatible with IEC 61000-4-4 (EFT):
40 A, 5/50 ns
- Compatible with IEC 61000-4-5 (Surge):
24 A, 8/20 µs – Level 2 (Line-Gnd) & Level 3 (Line-Line0)
- 500 Watts Peak Pulse Power per Line (tp = 8/20 µs)
- ESD Protection > 25 kilovolts
- Protection for 2 Lines
- Low Capacitance: < 5 pF
- RoHS Compliant
- REACH Compliant

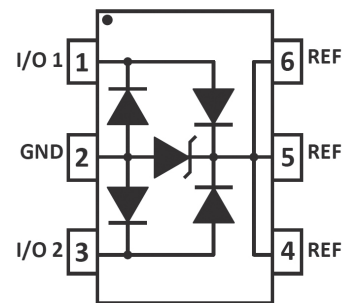
APPLICATIONS

- xDSL
- Portable Electronics
- SMART Phones

MECHANICAL CHARACTERISTICS

- Molded JEDEC SOT-23-6 Package
- Approximate Weight: 16 milligrams
- Lead-Free Nickel Palladium Gold Plating
- Solder Reflow Temperature - 260 - 270°C
- Flammability Rating UL 94V-0
- 8 mm Tape and Reel per EIA Standard 481

PIN CONFIGURATION



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