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Precision P-Channel MOSFET Arrays Offer Nano-Power Operation

<u>Advanced Linear Devices'</u> ALD310702A/ALD310702 nano-power precision p-channel EPAD MOSFET arrays are matched-pair circuits designed for the next generation of products requiring extremely low-power applications and mostly-on operation. The MOSFET arrays are designed for switching and amplifying applications in -0.40-V to -8.0-V (\pm 0.20-V to \pm 4.0-V) systems where low input bias current, low input capacitance and fast switching speeds are required.

The p-channel MOSFET arrays feature precision-matched gate threshold voltages of $-0.20 \text{ V} \pm 0.02 \text{ V}$. This enhances I/O signal operating ranges, particularly in extremely low operating voltage environments.

Precise offset voltages (V_{OS}) are within 1 mV typical for the ALD310702A or within 2 mV typical for the ALD310702. Minimum operating voltage is less than 0.2 V, and minimum operating current is less than 1 nA. the devices also feature matched transconductance and output conductance.

The ALD technology enables portable devices that run on trickle charge and energy harvesting power sources, as well as dc-dc converters in electronics equipment, ranging from microprocessors to communications and from computer power supplies to power plants. Typical application examples are differential amplifier input stages, backup power circuits, power failure detectors, sensors in security equipment and portable devices, high-side and sample-and-hold switches, discrete analog switches/multiplexers and many other applications across multiple industry sectors that require an always available backup battery (see the table).

Matched and tracked temperature characteristics of the MOSFET pair also distinguish ALD's EPAD MOSFET from others available in the market today, according to the vendor. The unique temperature tracking means that paired n- and p-channel devices automatically adjust to changing temperatures to ensure stable, uninterrupted operation.

"The temperature tracked and matched MOSFET is important for precision operations, but designers also need to know that the precision is going to be held stable with time and temperature," observed Robert Chao, president and founder of ALD.

The ALD310702A/ALD310702 joins ALD's EPAD Matched Pair MOSFET family and is available in quad arrays as two separate matched pairs. This p-channel version complements the popular ALD110802 n-channel high-precision devices already available from ALD.

The ALD310702A/ALD310702 are now available at either Digi-Key or Mouser, starting at \$3.70 each in hundred-piece quantities. For more information, see the ALD310702A/ALD310702 <u>datasheet</u>.

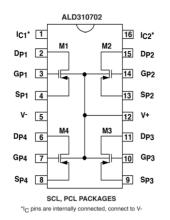


Figure. The ALD310702A/ALD310702 monolithic, quad p-channel MOSFET arrays offer the industry's most precise temperature tracking characteristics while simplifying bias circuitry. These high precision monolithic quad p-channel MOSFET arrays are matched at the factory using ALD's proven EPAD CMOS technology. This device is available in a quad version and is a member of the EPAD Matched Pair MOSFET Family. The ALD310702A/ALD310702 are p-channel versions of the popular ALD110802A/ALD110802 n-channel precision threshold devices. Together, these two MOSFET series enable complementary precision n-channel and p-channel MOSFET array-based circuits.



Table. Circuit applications for the ALD310702A/ALD310702 p-channel MOSFET arrays.

0.5% precision current mirrors and current sourcesLow tempco (≤50 ppm/°C) current mirrors/sourcesEnergy harvesting circuitsVery low voltage analog and digital circuitsBackup battery circuits and power failure detectorsPrecision low-level voltage-clampsLow-level zero-crossing detector
Energy harvesting circuits Very low voltage analog and digital circuits Backup battery circuits and power failure detectors Precision low-level voltage-clamps
Very low voltage analog and digital circuits Backup battery circuits and power failure detectors Precision low-level voltage-clamps
Backup battery circuits and power failure detectors Precision low-level voltage-clamps
Precision low-level voltage-clamps
Low-level zero-crossing detector
Source followers and buffers
Precision capacitive probes and sensor interfaces
Precision charge detectors and charge integrators
Discrete differential amplifier input stage
Peak-detectors and level-shifters
High-side switches and Sample-and-Hold switches
Precision current multipliers
Discrete analog switches/multiplexers
Discrete voltage comparators