



High Frequency NPN Transistor Array

General Description

The **αRD3127** consists of five general purpose silicon NPN transistors on a common monolithic substrate. Each of the completely isolated transistors exhibits low 1/f noise and a value of f_T in excess of 1GHz, making the **αRD3127** useful from DC to 500MHz. Access is provided to each of the terminals for the individual transistors and a separate substrate connection has been provided for maximum application flexibility. The monolithic construction of the **αRD3127** provides close electrical and thermal matching of the five transistors.

Features

- Gain Bandwidth Product (f_T) >1GHz
- Power Gain 30dB (Typ) at 100MHz
- Noise Figure. 3.5dB (Typ) at 100MHz
- Five Independent Transistors on a Common Substrate
- Pb-Free Plus Anneal Available (RoHS Compliant)

Applications

- VHF Amplifiers
- Multifunction Combinations - RF/Mixer/Oscillator
- Sense Amplifiers
- Synchronous Detectors
- VHF Mixers
- IF Converter
- IF Amplifiers
- Synthesizers
- Cascade Amplifiers

Ordering information

Table 1

Part	Temp. range, °C	Package	Package drawing	Burn-In case temp, °C	Burn-In time, hrs
αRD3127	-55 to +125	16-pin plastic DIP	Figure1	+125	240

αRD3127

Absolute maximum ratings

The following ratings apply for each transistor in the device

Collector-to-Emitter Voltage, V_{CE0}	15V
Collector-to-Base Voltage, V_{CBO}	20V
Collector-to-Substrate Voltage, V_{C10} (Note 1)	20V
Collector Current, I_C	20mA

Thermal Information

Thermal Resistance (Typical, Note 2)	θ_{JA} (°C/W)
PDIP Package	120
Maximum Power Dissipation (Any One Transistor) ..	85mW
Maximum Junction Temperature (Die)	175°C
Maximum Junction Temperature (Package).....	150°C
Maximum Storage Temperature Range	-65°C to 150°C
Maximum Lead Temperature (Soldering 10s)	260°C

Operating Conditions

Temperature Range	-55°C to 125°C
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CAUTION: Stresses above those listed in “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTES:

1. The collector of each transistor of the αRD3127 is isolated from the substrate by an integral diode. The substrate (Terminal 5) must be connected to the most negative point in the external circuit to maintain isolation between transistors and to provide for normal transistor action.
2. θ_{JA} is measured with the component mounted on an evaluation PC board in free air.

Electrical Specifications $T_A = 25^\circ\text{C}$

Table 2

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS	
DC CHARACTERISTICS (For Each Transistor)						
Collector-to-Base Breakdown Voltage	$I_C = 10\mu\text{A}, I_E = 0$	20	32	-	V	
Collector-to-Emitter Breakdown Voltage	$I_C = 1\text{mA}, I_B = 0$	15	24	-	V	
Collector-to-Substrate Breakdown-Voltage	$I_{C1} = 10\mu\text{A}, I_B = 0, I_E = 0$	20	60	-	V	
Emitter-to-Base Breakdown Voltage (Note 3)	$I_E = 10\mu\text{A}, I_C = 0$	4	5.7	-	V	
Collector-Cutoff-Current	$V_{CE} = 10\text{V}, I_B = 0$	-	-	0.5	μA	
Collector-Cutoff-Current	$V_{CB} = 10\text{V}, I_E = 0$	-	-	40	nA	
DC Forward-Current Transfer Ratio	$V_{CE} = 6\text{V}$	$I_C = 5\text{mA}$	35	88	-	
		$I_C = 1\text{mA}$	40	90	-	
		$I_C = 0.1\text{mA}$	35	85	-	
Base-to-Emitter Voltage	$V_{CE} = 6\text{V}$	$I_C = 5\text{mA}$	0.71	0.81	0.91	V
		$I_C = 1\text{mA}$	0.66	0.76	0.86	V
		$I_C = 0.1\text{mA}$	0.60	0.70	0.80	V
Collector-to-Emitter Saturation Voltage	$I_C = 10\text{mA}, I_B = 1\text{mA}$	-	0.26	0.50	V	
Magnitude of Difference in V_{BE}	Q_1 and Q_2 Matched	-	0.5	5	mV	
Magnitude of Difference in I_B	$V_{CE} = 6\text{V}, I_C = 1\text{mA}$	-	0.2	3	μA	
DYNAMIC CHARACTERISTICS						
Noise Figure	$f = 100\text{kHz}, R_S = 500\Omega, I_C = 1\text{mA}$	-	2.2	-	dB	
Gain-Bandwidth Product	$V_{CE} = 6\text{V}, I_C = 5\text{mA}$	-	1.15	-	GHz	
Voltage Gain	$V_{CE} = 6\text{V}, f = 10\text{MHz}, R_L = 1\text{k}\Omega, I_C = 1\text{mA}$	-	28	-	dB	
Power Gain	Cascode Configuration	27	30	-	dB	
Noise Figure	$f = 100\text{MHz}, V_+ = 12\text{V}, I_C = 1\text{mA}$	-	3.5	-	dB	

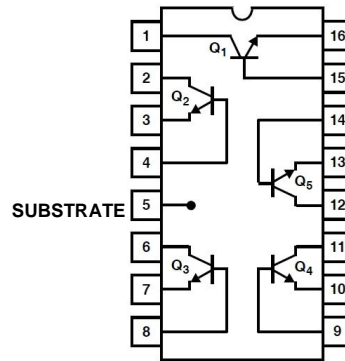
NOTE:

3. When used as a zener for reference voltage, the device must not be subjected to more than 0.1mJ of energy from any possible capacitance or electrostatic discharge in order to prevent degradation of the junction. Maximum operating zener current should be less than 10mA.

αRD3127

Pinout

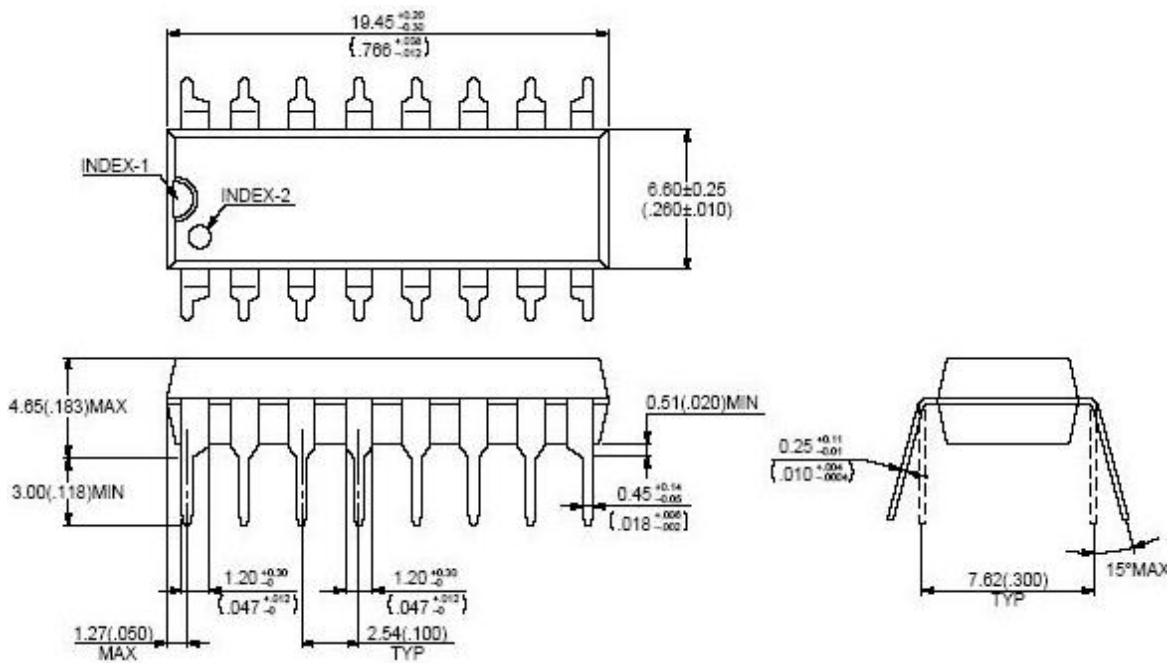
αRD3127
(PDIP)
TOP VIEW



Physical Dimensions

Figure 1

16-PIN PLASTIC DIP



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