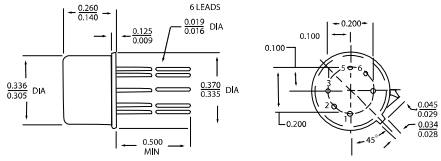
TYPES 2N2913 THRU 2N2920, 2N2915A, 2N2916A, 2N2929A, 2N2920A
TYPES 2N2972 THRU 2N2979
DUAL N-P-N SILICON TRANSISTORS

A BROAD FAMILY OF DUAL TRANSISTORS RECOMMENDED FOR

Differential Amplifiers
High-Gain, Low-Noise, Audio Amplifiers
Transducer Signal-Conditioner Amplifiers
Low-Level Flip-Flops

mechanical data

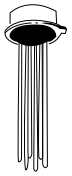
ALL LEADS INSULATED FROM CASE



Dimensions without tolerance designate true position, Leads having maximum diameter (0.019") measured in gaging plane 0.054" +0.001" -0.000" below the seating plane of the devicw shall be within 0.007" of their true position realative to a maximum width tab.

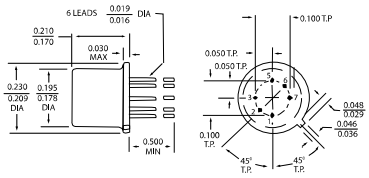
1. COLLECTOR 1
2. BASE 1
3. EMITTER 1
5. EMITTER 2
6. BASE 2
7. COLLECTOR 2

ALL DIMENSIONS ARE IN INCHES
UNLESS OTHERWISE SPECIFIED



OUTLINE A — TYPES 2N2913 THRU 2N2920, 2N2915A, 2N2916A, 2N2929A, 2N2920A

ALL LEADS INSULATED FROM CASE



FALLS WITHIN TO-71 DIMENSIONS

1. EMITTER 1
2. BASE 1
3. COLLECTOR 1
5. EMITTER 2
6. BASE 2
7. COLLECTOR 2

ALL DIMENSIONS ARE IN INCHES
UNLESS OTHERWISE SPECIFIED



OUTLINE 8 --- TYPES 2N2972 THRU 2N2979

quick-selection guide (for details see characteristics on the following pages)

TYPE		MIN $V_{(BR)CE0}$		MIN-MAX h_{FE} (I_C=10μA)		MIN $\frac{h_{FE1}}{h_{FE2}}$		$\lvert V_{BE1} - V_{BE2}\rvert$ (I_C = 100 μA)			$\lvert\Delta(V_{BE1} - V_{BE2})\Delta T_A\rvert$ ($T_{A(1)}$ = 25°C, $T_{A(2)}$ = 125°C)		
OUTLINE A	OUTLINE B	60 V	45 V	60-240	150-600	0.9	0.8	1.5 mV	3 mV	5 mV	0.5 mV	1 mV	2 mV
2N2913	2N2972		●	●									
2N2914	2N2973		●		●								
2N2915	2N2974		●	●		●			●			●	
2N2915A			●	●		●		●			●		
2N2916	2N2975		●		●	●			●			●	
2N2916A			●		●	●		●			●		
2N2917	2N2976		●	●			●			●			●
2N2918	2N2977		●		●		●			●			●
2N2919	2N2978	●		●		●			●			●	
2N2919A		●		●		●		●			●		
2N2920	2N2978	●			●	●			●			●	
2N2920A		●			●	●		●			●		

Tel. 1-973-377-9566, Fax. 1-973-377-3078
133 Kings Road,
Madison, New Jersey07940
United States of America

© 2014 American Microsemiconductor, Inc.
Specifications are subject to change without notice.

Aerospace Mgmt. Sys. Cert.
AS/EN/JISQ9100:2009 Rev. C
ISO9001:2008
Cert No. 45325

TYPES 2N2913 THRU 2N2920, 2N2915A, 2N2915A, 2N2916A, 2N2919A, 2N2920A, 2N2972 THRU 2N2979
DUAL N-P-N SILICON TRANSISTORS

*absolute maximum ratings at 25°C free-air temperature (unless otherwise noted)

	2N2913 thru 2N2918 2N2915A 2N2916A		2N2972 thru 2N2977		2N2919 2N2919A 2N2920 2N2920A		2N2978 2N2979		UNIT
	EACH TRIODE	TOTAL DEVICE	EACH TRIODE	TOTAL DEVICE	EACH TRIODE	TOTAL DEVICE	EACH TRIODE	TOTAL DEVICE	
Collector-Base Voltage	45		45		60		60		V
Collector-Emitter Voltage	45		45		60		60		V
Emitter-base Voltage	6		6		6		6		V
Collector-a _ Collector-w Voltage		(±200)				(±200)			V
Continuous Collector Current	30		30		30		30		mA
Continuous Device Dissipation at (qr below) 25°C Free-Air Temperature	0.3	0.5	0.25	0.3	0.3	0.5	0.25	0.3	w
Continuous Device Dissipation at (or below) 25°C Case Temperature	0.75	1.5	0.5	0.75	0.75	1.5	0.5	0.75	w
Storage Temperature Range	-65 to 200		-65 to 200		-65 to 200		-65 to 200		°C
Lead Temperature 1/16 Inch from Case for 60 Seconds	300		300		300		300		°C

*electrical characteristics at 250C free-air temperature (unless otherwise noted)

individual triode characteristics

PARAMETER	TEST CONDITIONS	2N2913 2N2915 2N2915A 2N2917 2N2972 2N2974 2N2976		2N2914 2N2916 2N2916A 2N2918 2N2973 2N2975 2N2977		2N2919 2N2919A 2N2978		2N2920 2N2920A 2N2979		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
$V_{(BR)CBO}$ Collector-Base Breakdown Voltage	I_C = 10 μA, I_E = 0	45		45		60		60		V
$V_{(BR)CEO}$ Collector-Emitter Breakdown Voltage	I_C = 10 mA, I_B = 0	45		45		60		60		V
$V_{(BR)EBO}$ Emitter-Base Breakdown Voltage	I_E = 10 μA, I_C = 0	6		6		6		6		V
I_{CBO} Collector Cutoff Current	V_{CB} = 45 v, I_E = 0		10		10		2		2	nA
	V_{CB} = 45 v, I_E = 0, T_A = -55°C		10		10		10		10	μA
I_{CEO} Collector Cutoff Current	V_{CE} = 5 v, I_B = 0		2		2		2		2	nA
I_{EBO} Emitter Cutoff Current	V_{EB} = 5 v, I_C = 0		2		2		2		2	nA
h_{FE} Static Forward Current Transfer Ratio	V_{CE} = 5 v, I_C = 10μA	60	240	150	600	60	240	150	600	
	V_{CE} = 5 v, I_C = 100μA	100		225		100		225		
	V_{CE} = 5 v, I_C = 1μA	150		300		150		300		
	V_{CE} = 5 v, I_C = 10μA, T_A = -55°C	15		30 (40)+		15		40		
V_{BE} Base-Emitter Voltage	V_{CE} = 5 v, I_C = 100μA		0.7		0.7		0.7		0.7	V
$V_{CE(sat)}$ Collector-Emitter Saturation Voltage	I_B = 100 μA, I_C = 1mA		0.35		0.35		0.35		0.35	V

Tel. 1-973-377-9566, Fax. 1-973-377-3078
133 Kings Road,
Madison, New Jersey07940
United States of America

© 2013 American Microsemiconductor, Inc.
Specifications are subject to change without notice.

Aerospace Mgmt. Sys. Cert.
AS/EN/JISQ9100:2009 Rev. C
ISO9001:2008
Cert No. 45325

TYPES 2N2913 THRU 2N2920, 2N2915A, 2N2916A, 2N2919A, 2N2920A, 2N2972 THRU 2N2979
DUAL N-P-N SILICON TRANSISTORS

* electrical charactersitics at 250C free-air temperature (continued)

individual triode characteristics

PARAMETER		TEST CONDITIONS	2N2913 thru 2n2920 - 2n2972 thru 2n2979		2N2915A 2N2916A 2N2919A 2N2920A		UNIT
			MIN	MAX	MIN	MAX	
h_{ib}	Small-Signal Common-Base Input Impedance	V_{CB} = 5 V, I_C = 1 mA, f = 1 kHz	25	32	25	32	Ω
h_{ob}	Small-Signal Common-Base Output Admittance	V_{CB} = 5 V, I_C = 1 mA, f = 1 kHz		1		1	μmho
$\|h_{fe}\|$	Small-Signal Common-Emitter Forward Current Transfer Ratio	V_{CE} = 5 V, I_C = 0.5 mA, f = 20 kHz	3		3	8	
C_{obo}	Common-Base Open-Circuit Output Capacitance	V_{CB} = 5 V, I_E = 0 mA, f = 140 kHz to 1 MHz		6		6	pF
C_{ibo}	Common-Base Open-Circuit Input Capacitance	V_{EB} = 0.5 V, I_C = 0, f = 140 kHz to 1 MHz				10	pF

triode matching characteristics

PARAMETER		TEST CONDITIONS	2N2915 2N2916 2N2919 2N2920 2N2974 2N2975 2N2978 2N2979		2N2915A 2N2916A 2N2919A 2N2920A		2N2917 2N2918 2N2976 2N2977		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
h_{FE1} / h_{FE2}	static Forward-Current-Gain Balance Ratio	V_{CE} = 5V, I_C = 100 μA, See Note 6	0.9	1	0.9	1	0.8	1	
		V_{CE} = 5V, I_C = 100 μA to 1 mA, T_A = -55°C to 125°C, See Note 6			0.85	1			
$\|V_{BE1} - V_{BE2}\|$	Base-Emitter-Voltage Differential	V_{CE} = 5V, I_C = 100 μA		3		1.5		5	mV
		V_{CE} = 5V, I_C = 10 μA to a mA		5		2		10	
$\|\Delta(V_{BE1} - V_{BE2})\Delta T_A\|$	Base-Emitter-Voltage Differential Change With Temperature	V_{CE} = 5V, I_C = 100 μA, $T_{A(1)}$ = 25°C, $T_{A(2)}$ = -55°C		0.8		0.4		1.6	mV
		V_{CE} = 5V, I_C = 100 μA, $T_{A(1)}$ = 25°C, $T_{A(2)}$ = 125°C		1		0.5		2	

*operating characteristics at 25°C free-air temperature

individual triode characteristics (see note 4)

PARAMETER		TEST CONDITIONS	2N2913 2N2915 2N2915A 2N2917 2N2919	2N2919A 2N2972 2N2974 2N2976 2N2978	2N2914 2N2916 2N2916A 2N2918 2N2920	2N2920A 2N2973 2N2975 2N2977 2N2979	UNIT
			MAX		MAX		
F	Average Noise Figure	V_{CE} = 5V, I_C = 10 μA, R_G = 10kΩ, f = 1 kHz, Noise bandwidth= 200 Hz	4		3		dB
		V_{CE} = 5V, I_C = 10 μA, R_G = 10kΩ, Noise bandwidth= 15.7 kHz, See Note 7	4		3		

NOTES: 4. The terminals of the triode not under test are open-cicuited for the meausrement of these characteristics.
6. The lower of the two h_{FE} readings is taken as h_{FE1}.
7. This parameter is measured in an amplifier with response down 3 dB at 10Hz and 10 kHz and a high-frequency rolloff of 6 dB/octave.

Tel. 1-973-377-9566, Fax. 1-973-377-3078
133 Kings Road,
Madison, New Jersey07940
United States of America

© 2014 American Microsemiconductor, Inc.
Specifications are subject to change without notice.

Aerospace Mgmt. Sys. Cert.
AS/EN/JISQ9100:2009 Rev. C
ISO9001:2008
Cert No. 45325

TYPES 2N2913 THRU 2N2920, 2N2915A, 2N2916A, 2N2919A, 2N2920A, 2N2972 THRU 2N2979
DUAL N-P-N SILICON TRANSISTORS

TYPICAL MATCHING CHARACTERISTICS

FOR TYPES 2N2915, 2N2915A, 2N2916, 2N2916A, 2N2919, 2N2919A, 2N2920, 2N2920A, 2N2974, 2N2975, 2N2978, 2N2979

STATIC FORWARD-CURRENT-GAIN BALANCE RATIO
vs
COLLECTOR CURRENT

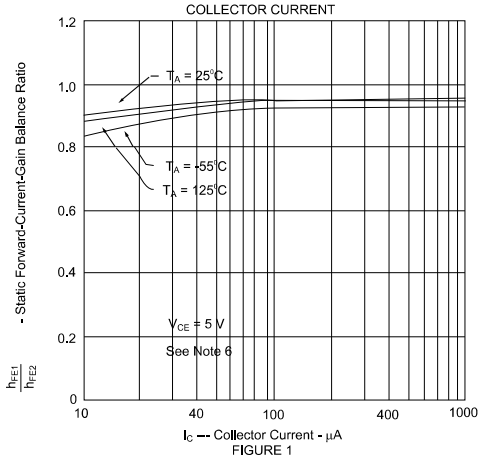


FIGURE 1

BASE-EMITTER-VOLTAGE DIFFERENTIAL
vs
COLLECTOR CURRENT

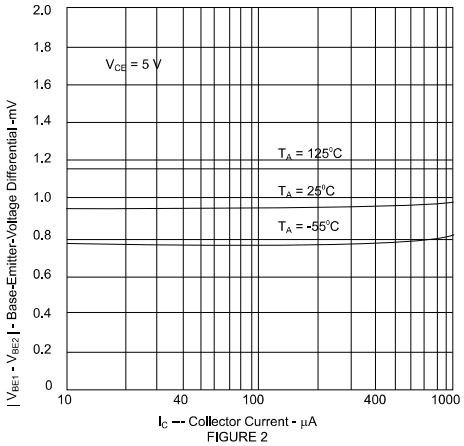


FIGURE 2

BASE-EMITTER-VOLTAGE DIFFERENTIAL
vs
FREE-AIR TEMPERATURE

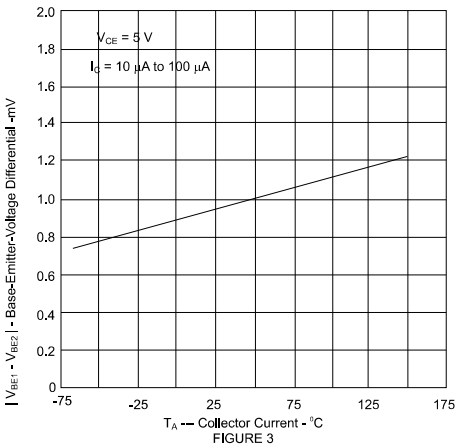


FIGURE 3

NOTE 6: The lower of the two h_{FE} reading is taken as h_{FE1}.
These curves represent the average behavior of groups of dual transistors. Unlike normal single-triode characteristics, matching characteristics of dual transistors may differ considerably in behavior from the typical, For example, a minority o devices have been observed with smaller V_{BE} mismatch at 150°C than at -65°C, as opposed to the average behavior as shown in figures 2 and 3.

Tel. 1-973-377-9566, Fax. 1-973-377-3078
133 Kings Road,
Madison, New Jersey07940
United States of America

© 2013 American Microsemiconductor, Inc.
Specifications are subject to change without notice.

www.americanmicrosemi.com

Aerospace Mgmt. Sys. Cert.
AS/EN/JISQ9100:2009 Rev. C
ISO9001:2008
Cert No. 45325