New Jersey Semi-Conductor Products, Inc.

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2N3423 · 2N3424

DUAL NPN LOW NOISE SENSE AND HIGH FREQUENCY DIFFERENTIAL AMPLIFIERS DIFFUSED SILICON PLANAR EPITAXIAL TRANSISTORS

 <u>hFE1</u>1 hFE2 	0% @ 3.0 mA		Г	See TO5-9 Package Outline
	≘2 5.0 mV (MAX) @ 3.0 mA			
• 4(VBE1-V	/BE2) 20 μV/°C (MAX) @ 3.0 mA, –55°C to	+125°C		
• f _T 600	MHz (MIN) @ 4.0 mA			
• NF 3.5	dB (TPY) @ 60 Hz			
	IAXIMUM RATINGS (Note 1) Temperatures			
	Temperature		-65°C to +200°C	414411
-	ng Junction Temperature		200° C	JAALAT
Lead Temperature (60 seconds)			300° C	
Maximum F	Maximum Power Dissipation (Notes 2 & 3)		Both Sides	
Total Di	issipation at 25°C Case Temperature	0.6 W	1.2 W	
at 100°C Case Temperature		0.25 W	0.5 W	123456
	at 25°C Ambient Temperature	0.3 W	0.45 W	
Maximum \	/oitages and Current			
∨сво	Collector to Base Voltage		30 V	
VCEO	Collector to Emitter Voltage (Note 4)		15 V	
VEBO	Emitter to Base Voltage		3.0 V	
IC	Collector Current		50 m A	· · · · · · · · · · · · · · · · · · ·
VC1C2	Collector ₁ to Collector ₂ Voltage		±200 V	
	Voltage Rating Any Lead to Case		±200 V	

MATCHING CHARACTERISTICS (25°C Ambient Temperature unless otherwise noted)

CHARACTERISTIC	21 MIN,	N3423 MAX.	2 MIN.	N3424 MAX.	UNITS	TEST CONDITIONS
DC Current Gain Ratio (Note 5)	0.8	1.0	0.9	1.0		I _C = 3.0 mA, V _{CE} = 3.0 V
Base to Emitter Voltage Differential		10		5.0	mV	I _C = 3.0 mA, V _{CE} = 3.0 V
Base to Emitter Voltage Differential Change		3.2 (40 µV/°C)		1.6 (20 μV/°C)	mV	I _C = 3.0 mA, V _{CE} = 3.0 V, T _A = –55°C to +25°C
Base to Emitter Voltage Differential Change		4.0 (40 µV/°C)		2.0 (20 µV/°C)	m∨	I _C = 3.0 mA, V _{CE} = 3.0 V, T _A = +25°C to +125°C
	DC Current Gain Ratio (Note 5) Base to Emitter Voltage Differential Base to Emitter Voltage Differential Change Base to Emitter Voltage Differential	CHARACTERISTIC MIN. DC Current Gain Ratio 0.8 (Note 5) Base to Emitter Voltage Differential Base to Emitter Voltage Differential Change Base to Emitter Voltage Differential	MIN, MAX. DC Current Gain Ratio 0.8 (Note 5) 10 Base to Emitter Voltage Differential 10 Base to Emitter Voltage Differential 3.2 Change (40 µV/°C) Base to Emitter Voltage Differential 4.0	CHARACTERISTICMIN.MAX.MIN.DC Current Gain Ratio0.81.00.9(Note 5)108ase to Emitter Voltage Differential10Base to Emitter Voltage Differential3.23.2Change(40 μ V/°C)8ase to Emitter Voltage Differential4.0	CHARACTERISTICMIN.MAX.MIN.MAX.DC Current Gain Ratio0.81.00.91.0(Note 5)105.0Base to Emitter Voltage Differential3.21.6Change(40 μ V/°C)(20 μ V/°C)Base to Emitter Voltage Differential4.02.0	CHARACTERISTICMIN,MAX.MIN.MAX.UNITSDC Current Gain Ratio (Note 5)0.81.00.91.0Base to Emitter Voltage Differential Change105.0mVBase to Emitter Voltage Differential Change3.21.6mVBase to Emitter Voltage Differential4.02.0mV

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NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information furnished by NJ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However NJ Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verify that datasheets are current before placing orders.

ELECTRICAL CHARACTERISTICS (25°C Ambient Temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	MIN.	MAX.	UNITS	TEST CONDITIONS
hfe	DC Current Gain	20			IC = 3.0 mA, VCE = 1.0 V
		20	200		I _C = 3.0 mA, V _{CE} = 3.0 V
в∨сво	Collector to Base Breakdown Voltage	30		v	$I_{C} = 1.0 \ \mu A, I_{E} = 0$
BVEBO	Emitter to Base Breakdown Voltage	3.0		v	$I_{C} = 0, I_{E} = 10 \ \mu A$
VCEO(sus)	Collector to Emitter Sustaining Voltage (Notes 4 & 6)	15		V	IC = 3.0 mA, I _B = 0
				:	

Additional Electrical Characteristics on following page.

NOTES:

- These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
 These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
 These ratings give a maximum junction temperature of 200°C and junction to ambient thermal resistance of 584°C/W (derating factor of 1.72 mW/°C) for one side; 389°C/W (derating factor of 2.57 mW/°C) for both sides; junction to case thermal resistance 290°C/W (derating factor of 3.44 mW/°C) for one side; 145°C/W (derating factor of 6.85 mW/°C) for both sides.
 Bating refers to a bide current point where collectors to emister voltage is lowest
- 4. Rating refers to a high current point where collector to emitter voltage is lowest.
- 5. Lowest of two hFE readings is taken as hFE1 for purpose of this ratio. 6. Pulse conditions: length = $300 \ \mu$ s; duty cycle = 1%.
- 7. For product family characteristic curves, refer to Section 5

SYMBOL	CHARACTERISTIC	MIN.	MAX.	UNITS	TEST CONDITIONS
VCE(sat)	Collector Saturation Voltage		0.4	v	IC = 10 mA, IB = 1.0 mA
VBE(sat)	Base Saturation Voltage		1.0	v	$I_{C} = 10 \text{ mA}, I_{B} = 1.0 \text{ mA}$
ГСВО	Collector Cutoff Current		10	nA	IE = 0, VCB = 15 V
		ł	1.0	μА	IE = 0, VCB = 15 V, TA = 150°C
IEBO	Emitter Cutoff Current		10	μA	IC = 0, VEB = 3.0 V
h _{fe}	High Frequency Current Gain	6.0	12		IC = 4.0 mA, VCE = 10 V, f = 100 MHz
Cob	Common to Base Output Capacitance	1	1.7	рF	IE = 0, V _{CB} = 10 V, f = 140 kHz
			3.0	ρF	IE = 0, V _{CB} = 0, f = 140 kHz
Cib	Common to Base Input Capacitance		2.0	pF	IC = 0, VEB = 0.5 V, f ≈ 140 kHz
RE _(hie)	Real Part of Common Emitter Input Impedance		45	Ω	I _C = 3.0 mA, V _{CE} = 3.0 V, f = 350 MH
NF	Noise Figure	3.5 (T	YP)	dB	IC = 1.0 mA, VCE = 6.0 V, f = 60 MHz,
		I	1		R _G = 400 Ω

ELECTRICAL CHARACTERISTICS (25°C Ambient Temperature unless otherwise noted) (Cont'd)