SILICON GENERAL

LINEAR INTEGRATED CIRCUITS

MATCHED NPN TRANSISTOR ARRAYS

DESCRIPTION

These five matched transistors are general purpose NPN transistors configured with two internally connected to form a differential amplifier, each with its own associated source transistor. They are well suited to a wide variety of applications in low power systems in the DC through VHF range. In addition to being used as discrete transistors in conventional circuits, they also provide the very significant inherent integrated circuit advantages of close electrical and thermal matching. These transistor arrays offer V_{BE} typically matched to ±0.5mV, less than 10% variation in h_{FE}, operation from DC to 300MHz, high current gain from 10μA to 10mA, and high voltage capability.

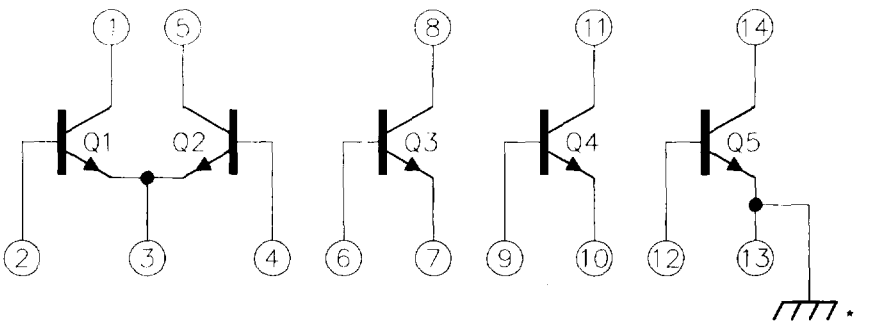
FEATURES

- **Two matched transistor pairs ±0.5mV**
- **Five general purpose matched transistors**
- **Operation from DC to 300MHz**
- **High current gain**
- **High voltage capabilities**

HIGH RELIABILITY FEATURES - SG3821

- **Available to MIL-STD-883**
- **SG level "S" processing available**

SCHEMATIC DIAGRAM



* Substrate pin must be connected to the most negative DC potential - which should also be a good AC ground - for proper isolation between transistors.

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April 1990

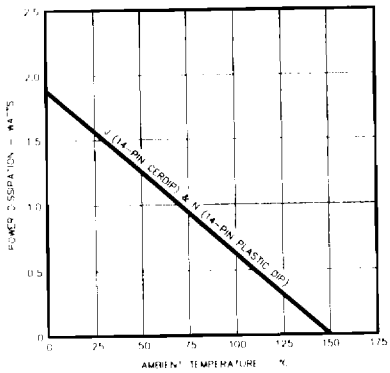
ABSOLUTE MAXIMUM RATINGS (Note 1)

Collector to SubstrateVoltage 40V
Collector to Base Voltage 40V
Collector to Emitter Voltage 25V
Storage Temperature Range ..... -65°C to 150°C

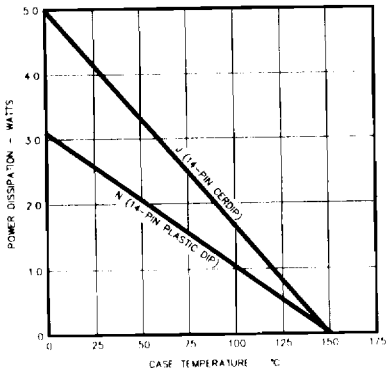
Operating Junction Temperature
Hermetic (J-Package) ..... 150°C
Plastic (N-Package) ..... 150°C
Storage Temperature Range ..... -65°C to 150°C
Lead Temperature (Soldering, 10 Seconds) ..... 300°C

Note 1. Exceeding these ratings could cause damage to the device.

THERMAL DERATING CURVES



MAXIMUM POWER DISSIPATION vs AMBIENT TEMPERATURE



MAXIMUM POWER DISSIPATION vs CASE TEMPERATURE

RECOMMENDED OPERATING CONDITIONS (Note 2)

Operating Ambient Temperature Range
SG3045, SG3821 ..... -55°C to 125°C
SG3046 ..... 0°C to 70°C

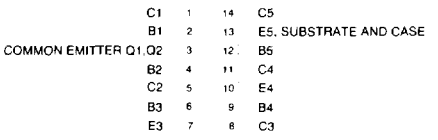
Note 2. Range over which the device is functional.

ELECTRICAL SPECIFICATIONS

(Unless otherwise specified, these specifications apply for the operating ambient temperature of T_A = 25°C. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

Parameter	Test Conditions	SG3821/3046			SG3045			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	
Breakdown Voltage:								
Collector-Substrate (BV_{CSO})	I_C = 10μA, I_B = 0	40			20			V
Collector-Base (BV_{CSO})	**I_C = 10μA, I_E = 0**	**40**			**20**			**V**
Collector-Emitter (BV_{CEO})	I_C = 100μA, I_B = 0	25			15			V
Emitter-Base (BV_{EBO})	**I_E = 10μA, I_C = 0**	**5**			**5**			**V**
Leakage Current								
Collector-Substrate (I_{CSO})	**V_{CS} = 20V, I_B = 0**			**80**			**80**	**nA**
Collector-Base (I_{CSO})	V_{CB} = 20V, I_E = 0			40			40	nA
Collector-Emitter (I_{CEO})	**V_{CE} = 20V, I_B = 0**			**500**			**500**	**nA**
Forward Current-Transfer Ratio (h_{FE})	V_{CE} = 5V, I_C = 10μA		80			80		
	V_{CE} = 5V, I_C = 1mA	50		400	50		400	
	V_{CE} = 5V, I_C = 10mA		80			80		
Base-to-Emitter Voltage (V_{BE})	**V_{CE}= 5V, I_E= 10mA**		**0.5**			**0.5**		**V**
Collector-Emitter Saturation ($V_{CE(SAT)}$)	I_C = 10mA, I_B= 1mA	0.5		0.9	0.5		0.9	V
Gain-Bandwidth Product	**V_{CE} = 5V, I_C= 3mA**		**500**			**500**		**MHz**
Collector-Substrate Capacitance	V_{CS} = 5V, I_C= 0		2.0			2.0		pF
Collector-Base Capacitance	**V_{CB} = 5V, I_C= 0**		**0.4**			**0.4**		**pF**
Noise Figure	f = 1KHz, V_{CE} = 5V, I_C = 100mA, R_S = 1kΩ		4			4		dB
Input Offset Voltage (V_{IO})	**V_{CE} = 5V, I_C=1mA**			**5**			**5**	**mV**
Input Offset Current (I_{IO})	V_{CE} = 5V, I_C=1mA			4			2	μA

CONNECTION DIAGRAMS & ORDERING INFORMATION (See Notes Below)

Package	Part No.	Ambient Temperature Range	Connection Diagram
14-PIN CERAMIC DIP J - PACKAGE	SG3821J/883B	-55°C to 125°C	
	SG3821J	-55°C to 125°C	
	SG3821N	0°C to 70°C	
	SG3045J/883B	-55°C to 125°C	
	SG3045J	-55°C to 125°C	
14-PIN PLASTIC DIP N - PACKAGE	SG3046N	0°C to 70°C	

Note 1. Contact factory for JAN and DESC product availablity.
2. All packages are viewed from the top.

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