NPN Silicon Germanium RF Transistor
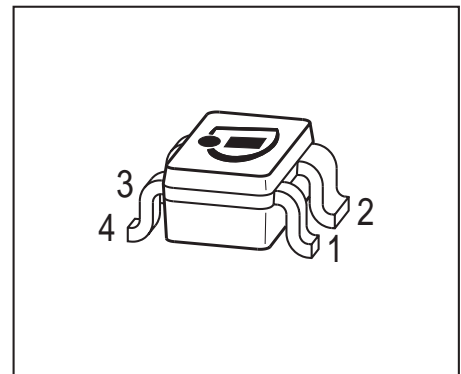
- For a wide range of applications including low noise amplifiers and oscillators
- Pb-free (RoHS compliant) package[1]
- Qualified according AEC Q101

AEC Qualified **RoHS** ✓

ESD (**E**lectro**s**tatic **d**ischarge) sensitive device, observe handling precaution!

Type	Marking	Pin Configuration						Package
BF776	R3s	1=B	2=E	3=C	4=E	-	-	SOT343

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}		V
$T_A > 0\ °C$		4	
$T_A \le 0\ °C$		3.7	
Collector-emitter voltage	V_{CES}	13	
Collector-base voltage	V_{CBO}	13	
Emitter-base voltage	V_{EBO}	1.2	
Collector current	I_C	50	mA
Base current	I_B	3	
Total power dissipation[2] $T_S \le 90°C$	P_{tot}	200	mW
Junction temperature	T_i	150	°C
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[3]	R_{thJS}	≤ 300	K/W

[1]Pb-containing package may be available upon special request
[2]T_S is measured on the collector lead at the soldering point to the pcb
[3]For calculation of R_{thJA} please refer to Application Note Thermal Resistance

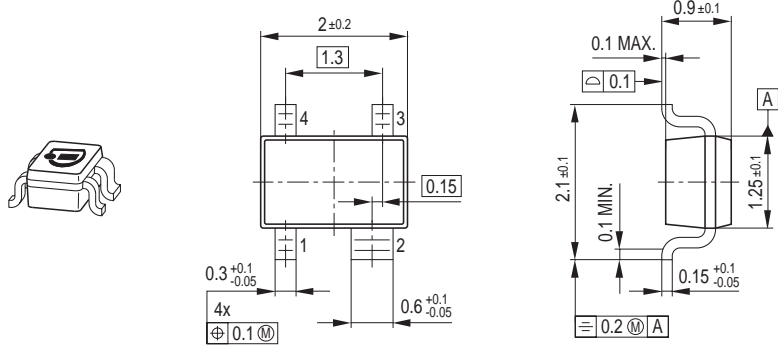**Electrical Characteristics** at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	4	4.5	-	V
Collector-emitter cutoff current V_{CE} = 13 V, V_{BE} = 0	I_{CES}	-	-	30	µA
Collector-base cutoff current V_{CB} = 5 V, I_E = 0	I_{CBO}	-	-	100	nA
Emitter-base cutoff current V_{EB} = 0.5 V, I_C = 0	I_{EBO}	-	-	3	µA
DC current gain I_C = 30 mA, V_{CE} = 3 V, pulse measured	h_{FE}	110	180	270	-

Electrical Characteristics at T_A = 25°C, unless otherwise specified

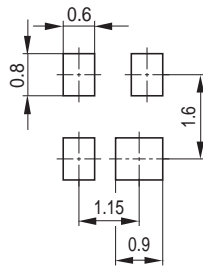| Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency I_C = 30 mA, V_{CE} = 3 V, f = 1 GHz	f_T	30	40	-	GHz
Collector-base capacitance V_{CB} = 3 V, f = 1 MHz, V_{BE} = 0 , emitter grounded	C_{cb}	-	0.09	0.2	pF
Collector emitter capacitance V_{CE} = 3 V, f = 1 MHz, V_{BE} = 0 , base grounded	C_{ce}	-	0.23	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	0.5	-	
Noise figure	F				dB
I_C = 5 mA, V_{CE} = 3 V, f = 1.8 GHz, $Z_S = Z_{Sopt}$		-	0.8	-	
I_C = 5 mA, V_{CE} = 3 V, f = 6 GHz, $Z_S = Z_{Sopt}$		-	1.3	-	
Power gain, maximum stable[1)] I_C = 30 mA, V_{CE} = 3 V, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, f = 1.8 GHz	G_{ms}	-	24	-	dB
Power gain, maximum available[1)] I_C = 30 mA, V_{CE} = 3 V, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, f = 6 GHz	G_{ma}	-	12.5	-	dB
Transducer gain I_C = 30 mA, V_{CE} = 3 V, $Z_S = Z_L$ = 50 Ω,	$|S_{21e}|^2$				dB
f = 1.8 GHz		-	21	-	
f = 6 GHz		-	10.5	-	
Third order intercept point at output[2)] V_{CE} = 3 V, I_C = 30 mA, $Z_S = Z_L$ = 50 Ω, f = 1.8 GHz	IP_3	-	26.5	-	dBm
1dB Compression point at output I_C = 30 mA, V_{CE} = 3 V, $Z_S = Z_L$ = 50 Ω, f = 1.8 GHz	P_{-1dB}	-	13	-	

[1]$G_{ma} = |S_{21e} / S_{12e}| \, (k-(k^2-1)^{1/2})$, $G_{ms} = |S_{21e} / S_{12e}|$

[2]IP3 value depends on termination of all intermodulation frequency components.
Termination used for this measurement is 50Ω from 0.1 MHz to 6 GHz

Package Outline

2 ±0.2
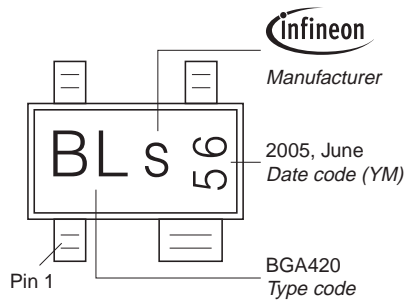
1.3

4   3

0.15

1   2

0.3 +0.1 -0.05

4x

⊕ 0.1 Ⓜ

0.6 +0.1 -0.05

0.9 ±0.1

0.1 MAX.

◻ 0.1

A

2.1 ±0.1

0.1 MIN.

1.25 ±0.1

0.15 +0.1 -0.05

▤ 0.2 Ⓜ A

Foot Print

0.6

0.8

1.6

1.15

0.9

Marking Layout (Example)

Infineon
Manufacturer

BL s 5 6

2005, June
Date code (YM)

Pin 1

BGA420
Type code

Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel
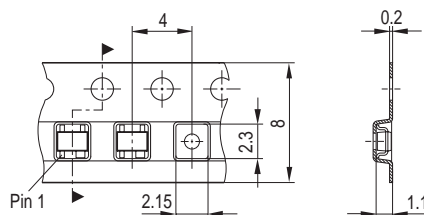
4

0.2

2.3

8

Pin 1   2.15   1.1

Attention please!

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