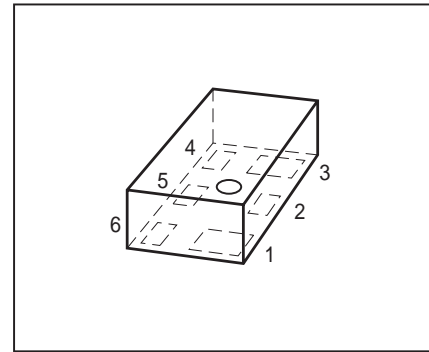
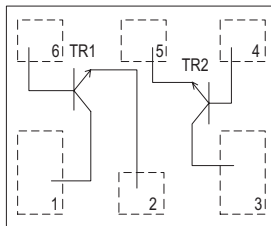


**NPN Silicon RF TWIN Transistor\***

- Low voltage/ low current applications
- Ideal for VCO modules and low noise amplifiers
- World's smallest SMD 6-pin leadless package
- Built in 2 transistors (TR1: die as BFR460L3,  
TR2: die as BFR360L3)
- Low noise figure: TR1: 1.1dB at 1.8 GHz  
TR2: 1.0 dB at 1.8 GHz
- TR1 with excellent ESD performance  
typical value > 1500 V (HBM)
- Pb-free (RoHS compliant) package <sup>1)</sup>
- Qualified according AEC Q101



\* Short term description



**ESD (Electrostatic discharge) sensitive device, observe handling precaution!**

Type	Marking	Pin Configuration						Package
BFS466L6	AC	1=C1	2=E1	3=C2	4=B2	5=E2	6=B1	TSLP-6-1

<sup>1)</sup>Pb-containing package may be available upon special request

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Collector-emitter voltage TR1, $T_A > 0\text{ °C}$ TR1, $T_A \leq 0\text{ °C}$ TR2, $T_A > 0\text{ °C}$ TR2, $T_A \leq 0\text{ °C}$	$V_{CEO}$	4.5 4.2 6 6	V
Collector-emitter voltage TR1 TR2	$V_{CES}$	15 15	
Collector-base voltage TR1 TR2	$V_{CBO}$	15 15	
Emitter-base voltage TR1 TR2	$V_{EBO}$	1.5 2	
Collector current TR1 TR2	$I_C$	50 35	mA

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Base current	$I_B$		mA
TR1		5	
TR2		4	
Total power dissipation <sup>1)</sup>	$P_{tot}$		mW
TR1, $T_S \leq 104^\circ\text{C}$		200	
TR2, $T_S \leq 102^\circ\text{C}$		210	
Junction temperature	$T_j$		$^\circ\text{C}$
TR1		150	
TR2		150	
Ambient temperature	$T_A$		
TR1		-65 ... 150	
TR2		-65 ... 150	
Storage temperature	$T_{stg}$		
TR1		-65 ... 150	
TR2		-65 ... 150	

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>2)</sup>	$R_{thJS}$		K/W
TR1		$\leq 230$	
TR2		$\leq 230$	

<sup>1)</sup> $T_S$  is measured on the collector lead at the soldering point to the pcb

<sup>2)</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage TR1, $I_C = 1\text{ mA}$ , $I_B = 0$ TR2, $I_C = 1\text{ mA}$ , $I_B = 0$	$V_{(BR)CEO}$	4.5 6	5 9	- -	V
Collector-emitter cutoff current TR1, $V_{CE} = 15\text{ V}$ , $V_{BE} = 0$ TR2, $V_{CE} = 15\text{ V}$ , $V_{BE} = 0$	$I_{CES}$	- -	- -	10 10	$\mu\text{A}$
Collector-base cutoff current TR1, $V_{CB} = 5\text{ V}$ , $I_E = 0$ TR2, $V_{CB} = 5\text{ V}$ , $I_E = 0$	$I_{CBO}$	- -	- -	100 100	nA
Emitter-base cutoff current TR1, $V_{EB} = 0,5\text{ V}$ , $I_C = 0$ TR2, $V_{EB} = 1\text{ V}$ , $I_C = 0$	$I_{EBO}$	- -	- -	1 1	$\mu\text{A}$
DC current gain TR1, $I_C = 20\text{ mA}$ , $V_{CE} = 3\text{ V}$ , Pulse measured TR2, $I_C = 15\text{ mA}$ , $V_{CE} = 3\text{ V}$ , Pulse measured	$h_{FE}$	90 90	120 120	160 160	-

**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics</b> (verified by random sampling)					
Transition frequency	$f_T$				GHz
TR1, $I_C = 30\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 1\text{ GHz}$		16	22	-	
TR2, $I_C = 15\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 1\text{ GHz}$		11	14	-	
Collector-base capacitance	$C_{cb}$				pF
TR1, $V_{CB} = 3\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , emitter grounded		-	0.29	0.45	
TR2, $V_{CB} = 5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , emitter grounded		-	0.26	0.4	
Collector emitter capacitance	$C_{ce}$				
TR1, $V_{CE} = 3\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , base grounded		-	0.14	-	
TR2, $V_{CE} = 5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , base grounded		-	0.14	-	
Emitter-base capacitance	$C_{eb}$				
TR1, $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{CB} = 0$ , collector grounded		-	0.54	-	
TR2, $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{CB} = 0$ , collector grounded		-	0.43	-	

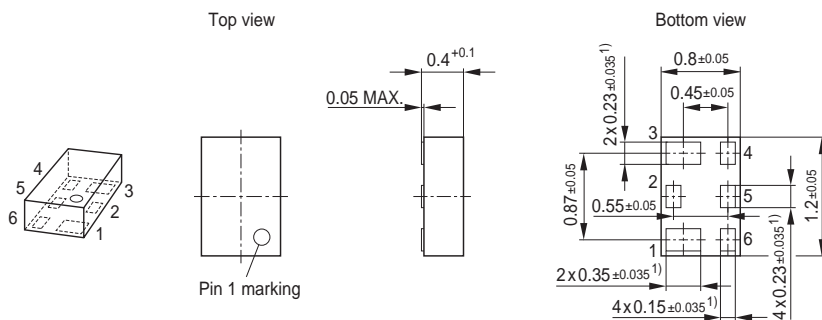
**Electrical Characteristics at TA = 25°C, unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics (verified by random sampling)</b>					
Noise figure	$F$				dB
TR1, $I_C=5\text{mA}$ , $V_{CE} = 3\text{ V}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_{\text{Sopt}}$		-	1.1	-	
TR1, $I_C=5\text{mA}$ , $V_{CE} = 3\text{ V}$ , $f = 3\text{ GHz}$ , $Z_S = Z_{\text{Sopt}}$		-	1.4	-	
TR2, $I_C=3\text{mA}$ , $V_{CE} = 3\text{ V}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_{\text{Sopt}}$		-	1	-	
TR2, $I_C=3\text{mA}$ , $V_{CE} = 3\text{ V}$ , $f = 3\text{ GHz}$ , $Z_S = Z_{\text{Sopt}}$		-	1.4	-	
Power gain, maximum available <sup>1)</sup>	$G_{\text{ma}}$				
TR1, $I_C = 20\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S=Z_{\text{Sopt}}$ , $Z_L=Z_{\text{Lopt}}$ , $f = 1.8\text{ GHz}$		-	17	-	
TR1, $I_C = 20\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S=Z_{\text{Sopt}}$ , $Z_L=Z_{\text{Lopt}}$ , $f = 3\text{ GHz}$		-	12	-	
TR2, $I_C = 15\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S=Z_{\text{Sopt}}$ , $Z_L=Z_{\text{Lopt}}$ , $f = 1.8\text{ GHz}$		-	16.5	-	
TR2, $I_C = 15\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S=Z_{\text{Sopt}}$ , $Z_L=Z_{\text{Lopt}}$ , $f = 3\text{ GHz}$		-	11.5	-	
Transducer gain	$ S_{21e} ^2$				
TR1, $I_C = 20\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_L = 50\Omega$ , $f = 1.8\text{GHz}$		-	14.5	-	
TR1, $I_C = 20\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_L = 50\Omega$ , $f = 3\text{GHz}$		-	10	-	
TR2, $I_C = 15\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_L = 50\Omega$ , $f = 1.8\text{GHz}$		-	13.5	-	
TR2, $I_C = 15\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $Z_S = Z_L = 50\Omega$ , $f = 3\text{GHz}$		-	9.5	-	
Third order intercept point at output <sup>2)</sup>	$IP_3$				dBm
TR1, $V_{CE}=3\text{V}$ , $I_C=20\text{mA}$ , $Z_S=Z_L=50\Omega$ , $f=1.8\text{GHz}$		-	28	-	
TR2, $V_{CE}=3\text{V}$ , $I_C=15\text{mA}$ , $Z_S=Z_L=50\Omega$ , $f=1.8\text{GHz}$		-	24.5	-	
1dB Compression point, at output	$P_{-1\text{dB}}$				
TR1, $I_C=20\text{mA}$ , $V_{CE}=3\text{V}$ , $Z_S=Z_L=50\Omega$ , $f=1.8\text{GHz}$		-	12	-	
TR1, $I_C=15\text{mA}$ , $V_{CE}=3\text{V}$ , $Z_S=Z_L=50\Omega$ , $f=1.8\text{GHz}$		-	9	-	

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

<sup>2</sup> $IP_3$  value depends on termination of all intermodulation frequency components.  
Termination used for this measurement is 50Ω from 0.1 MHz to 6 GHz

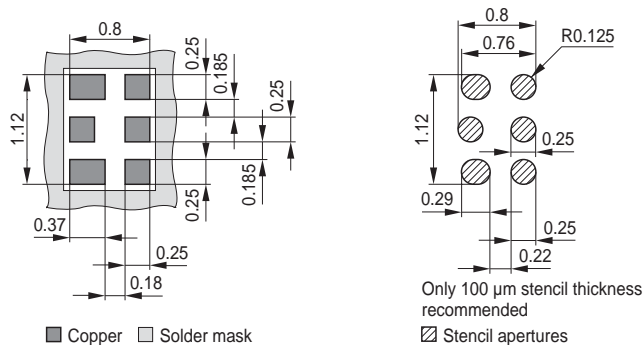
### Package Outline



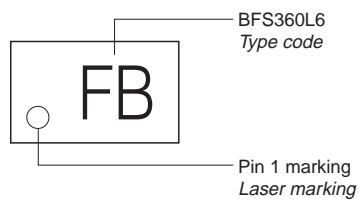
1) Dimension applies to plated terminal

### Foot Print

For board assembly information please refer to Infineon website "Packages"

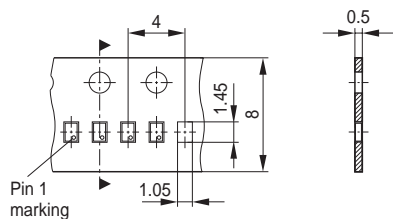


### Marking Layout (Example)



### Standard Packing

Reel  $\varnothing$ 180 mm = 15.000 Pieces/Reel



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